# CUBISM AND FUTURISM

## SPIRITUAL MACHINES AND THE CINEMATIC EFFECT

R. BRUCE ELDER



# CUBISM AND FUTURISM



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*In Memoriam*

**David Campbell Elder**
**1942–2017**

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# CONTENTS

*Acknowledgements* ▪ xi
*Introduction* ▪ 1

1 **MODERNISM AND THE VISUAL ARTS ▪ 35**
Modernism and Abstraction ▪ 38
The Attributes of Aesthetic Experience ▪ 44
Optical Experience and the Higher Noesis ▪ 47
Producing Facts ▪ 51
Primordial Experience: A Non-reflexive, Pre-objective Awareness ▪ 65
The Influence of Emmanuel Kant ▪ 70
Basic Themes in Cubism and Futurism ▪ 85
The Senses' Disconnection from Reality ▪ 85
Time, Reality, and Meaning ▪ 89
Absolute Space, Relative Space ▪ 103
Nerves ▪ 114
Notes ▪ 119

**2 DUDLEY MURPHY, FERNAND LÉGER, AND *BALLET MÉCANIQUE*: VORTICISM, CUBISM, COLLAGE, AND LÉGER'S NEW REALISM • 139**

The New Vision • 139
Prosthetics for the Senses: Reconciling Two Descriptions of the World • 151
Cubism and the Crisis of Vision • 155
Cubism and *Passage* • 162
Understanding Simultaneity, Understanding Instantaneity • 167
Cubist Painting Between Structure and Representation • 170
The Transitional Phase: Towards Synthetic Cubism • 172
Cubist Collage and *Papier collé* • 176
Synthetic Cubism • 183
Bergson's Importance for Cubism • 190
Léger and Synthetic Cubism • 199
Proceeding from Synthetic Cubism: Fernand Léger and the New Realism • 200
Léger: Cubism, Quasi-Cubism, and Non-Cubism • 202
Léger, the Object, and the Human Body • 206
Léger and the "All-Over" Form • 208
Léger's New Realism • 211
Léger and the Theory of Contrasts • 213
The Idea of the New Human and Its Contribution to Léger's Evolution • 219
Equivalent to Life: Plastically Organized Intensity • 221
Léger and Purism • 228
Towards the Cinema: A Montage of Pre-existing Elements • 235
*Ballet mécanique* and the Mechanical Ballet: Rhythm in *Ballet mécanique* • 236
Diversity in *Ballet mécanique* • 268
Another Appeal of the Cinema • 270
Cubism, African American Art, and Infinite Plasticity • 273
Cendrars and Léger on Language and Cinema • 275
Léger's Collaborators • 281
Another Key Collaborator: George Antheil • 291
Pound's Antheil: Parallels Between the Film *Ballet mécanique* and Antheil's Theory of Composition • 296
Pound, Antheil, Vorticism, and Harmony • 302
A Mechanical Ballet: Music, Film, and Film Music • 310
Shot Analysis of *Ballet mécanique* • 318
Conclusion • 318
Notes • 321

**3 FUTURISM 375**
Futurism and New Italian Culture ▪ 379
Futurism: The Violence of the New Replacing the Old ▪ 381
Painting Becomes a Futurist Synthetic Art ▪ 385
Speed + Electricity + Collective Consciousness = Futurism ▪ 400
Futurism, Symbolism, Unanimism, and Bergson ▪ 404
Universal Dynamism and Perception ▪ 408
The Influence of Bergson ▪ 414
The Cinematic Condition of Futurism ▪ 419
Futurism's Occult New Man ▪ 423
Futurism, Electromagnetism, and the Issue of Homologies ▪ 458
The Futurist Theory of Perception ▪ 468
The Futurists, Universal Relations, and Space ▪ 476
Bergson, Symbolism, Unanimism, and Primordial Experience ▪ 479
The *Serata futurista* and the Variety Theatre ▪ 504
The Futurists' Dynamic View of Reality and Futurist Dynamism ▪ 513
The *Serata futurista* and the Cinema ▪ 518
Futurist Painting and Sonic Art ▪ 528
Futurism and the Cinema ▪ 538
Arnaldo Ginna, Bruno Corra, and Synaesthetic Cinema ▪ 552
Futurism and the Anti-anthropocentric Aspiration ▪ 568
In Lieu of a Conclusion ▪ 575
Notes ▪ 582

*Index* ▪ 643
*Appendix*: A Shot analysis of *Ballet mécanique* ▪ Online at https://www.wlupress.wlu.ca/Books/C/Cubism-and-Futurism
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As this book was entering the later stages of production, my wife Kathryn and I went on a short but very stimulating, trip to Italy and Spain: I had been invited to present, in five cities, mini-retrospectives of my film/video work and to participate in public interviews. This proved to be the adventure of a lifetime—the screenings and talks were warmly received, and Kathy and I had enchanting meals and conversations with many wonderful people who are deeply committed to the cause of poetic film. We arrived home aglow. The morning after we got back to Toronto, however, Kathy suffered a stroke. My wife has always been the staunchest and most able supporter of my work: her careful scholarship and her facility with bibliographic resources had guided me through all the stages of every other book I have written—and she had been of great help right into the later stages of this one. But the effects of the stroke made it impossible for her to continue working on it. That said, observing her resolve to heal herself and her dedication, perseverance, and strength of spirit in maintaining the therapeutic and rehabilitative regimens prescribed has been among the most moving experiences of my life and a real inspiration. (I am pleased to say that as this book nears publication, her recovery has been impressive, and I look forward to her resuming her own scholarly activities.)

But the manuscript was in a state that led me to feel desperate—indeed, I despaired that the work I had done to that point might be swept away in a maelstrom. A number of good souls undertook to rescue it. First and foremost, Dr. Erika Loic, one of the keenest readers and most lucid writers I know, shepherded me through the last stages in the production. Her help and guidance were of inestimable value. I could not have finished the project without her. Daniel Browne and Irina Lyubchenko combed over the manuscript, both for conceptual and historical errors and for literary solecisms. Their painstaking efforts helped immeasurably. I have not words to express my gratitude to them. Dr. Stephen Broomer provided encouragement—and, more to the point, he served as an example of the sort of artistic commitment, scholarly dedication, and belief in the healing value of art that the best

young Ph.D.s provide academics who have been at it for so long that they have come to question the point of all. It was a source of great solace for me, in the midst of these travails, that all four of these angels were individuals I had supervised, or am currently supervising, as graduate students. It was wonderful to see, as they helped me though these horrors, what fine scholars they had become. They made me very proud. Carlo Muia did a meticulous job of checking my Italian translations for errors in understanding and the entire text for typographical offences committed against that language. Irina Lyubchenko was a terrific asset in helping eliminate errors from the Russian and in supplying translations of Russian texts not available in English. Dr. Loic did trojan service with French, German, Spanish, and Latin materials. Manuela Büchting corrected a particularly difficult passage whose translation from the German I bungled badly. I take responsibility for the errors that remain.

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Of necessity, I had to deal with materials in several languages. My older brother, David C. Elder, helped buoy me when the challenges arising from that fact seemed insurmountable. My siblings all learned languages with great facility. I did not. As the black sheep in the family, I applied myself to mathematics and science, and I studied languages very reluctantly—essentially only to the extent forced on me by a language-teacher father who maintained the archaic belief that being able to read literature in several languages, and being capable of speaking to people from many different countries in their native tongue, makes life richer and more satisfying. My obstinacy in my early years has certainly deprived me of much pleasure. Still, the principal topic I have been pursuing over these last few years has been the homologies I detect between changes in science and technology and changes in art and culture, and I have tried to console myself with the notion (which I hope is not wholly illusory) that my formal training in mathematics, computer programming, and engineering science has helped me develop a relatively rigorous understanding of scientific and technological developments in the nineteenth and twentieth centuries. Even so, I wondered at how completely my brother had absorbed my father's archaic values and the evident delight he continued to take throughout his career in working in (and, quite simply, in speaking) several languages. When the maelstrom was threatening to

sweep away all the work I had done on the manuscript, he encouraged me to keep faith and to believe that I could meet the challenges involved, including dealing with the language issues. David was passionate about literature, painting, dance, museums, and museology (several museum officials have told me how greatly his advice had helped them). Over the last two and a half decades, David, his wife Pat Solomon, and Kathy and I visited many galleries and museums in Canada, the United States, and Europe together. And nearly every year for at least a decade, we took in the New York City Ballet's summer season in Saratoga Springs, watching many of George Balanchine's modernist masterpieces. He was rarely far from my mind as I wrote this book; and sometimes while I was composing a passage, I would engage in reverie about how he would respond to the ideas I was putting together (he read all my books and many of my essays and engaged me in conversations about them). He cheered me on as the manuscript was nearing completion (and checked in regularly to be apprised of progress in Kathy's condition) until, complaining of fatigue, he was taken to the hospital, and died within a few days. This book is dedicated to him.

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# INTRODUCTION

Cubism by now has entered the annals of art history—the movement has been chronicled, its motives scrutinized (sometimes with more than a small measure of suspicion regarding its alleged elitism), and its works have been parsed and analyzed. Its value now is beyond contest, though it needs to be said that its acknowledged worthiness sometimes eclipses the movement's radical cast. Futurism is regarded as something different: it has not become normative in the same way that Cubism has. It is still felt as transgressive, radical, tendentious, excessive, and contestational. Its politics remain troubling, and for good reason. Nevertheless, interest in the movement has intensified in the past decade, as new media artists look back to its interests in movement and change and in matter ephemeralizing into energy.

Yet Cubism and Futurism were closely related movements that vied with each other in the economy of renown. Issues concerning perception, dynamism, and the dynamism of perception passed back and forth between the two movements—this mutual exchange is hardly surprising, given the impact that Henri Bergson's (1859–1941) philosophy had on both. In this volume, I hope to establish that the two movements had much in common. Specifically, I hope to show that the two movements developed out of a similar climate of

ideas as that which gave rise to the cinema, and that the aspiration to create an art of energy, light, and movement influenced the ideals of both Cubism and Futurism. Despite their frequent denials, both owed much to Symbolism and to the cinema. Accordingly, I make many excursi into Symbolist thought and the Symbolists' use of ideas they drew from Henri Bergson. I hope that by bringing my reflections on these two movements within the compass of a single volume I can present a portrait of the two movements as artistic ventures that possessed deep similarities: both movements explored the spiritual (hermetic) meaning of the new technologies of this period. Investigation of that topic languished for decades after these movements waned, as the idea that technology is inhumane took a firm hold on so many thinkers' beliefs. This has changed recently as the gnostic views of many new media theorists have given renewed vitality to the pursuit of pneumatic technologies.

However, I also intend to draw distinctions *between* the movements. Specifically, I will argue for a view that challenges received notions about the comparative worth of the two art movements. I intend to show that of the two movements, Futurism was the more radical aesthetically and philosophically, though certainly not politically—at least as far as its explicit political statements are concerned. In making that comment, I do not want to suggest that aesthetic (or philosophical) issues can be neatly and tidily disintricated from political considerations. That would be preposterous. But, on the subject of the Futurist ideology, I would argue that it is important to distinguish between the explicit politics of the Futurists' manifestos and their political alliances on the one hand and the politics implicit in Futurist aesthetics on the other. Clearly, the Futurists' explicit politics were nothing less than reprehensible: Futurism was racist, misogynist, triumphalist, pro-war, pro-violence, and aligned, through its Lamarckian underpinnings, with reprehensibly Spencerian "survival of the fittest" social views. That said, the political position implicit in Futurist art and art theory is more ambiguous. There is no doubt that aspects of the Futurists' art and elements of their art theory resulted from, and advocated for, the abhorrent politics that they made explicit in their manifestos (and sometimes in their political alliances). However, I believe, that is only part of the story—and I hope to be able to show that in this book.

Perhaps I can anticipate the point I wish to make by saying this about the historically progressive aspects of Futurism. Great as my admiration for Pablo Picasso's (1881–1973) art is, I know that the enthusiasm I feel for it is for work that belongs to the history of art.[1] I do not mean by that assertion that Picasso's work fails to affect me emotionally. Rather, I mean that I respond to his work with a certain distance: what I admire about Picasso is his unrelenting imagination, his ability to pull discordant elements together in ways that no one before him did. Nonetheless, I recognize that I respond to his

work as part of art history's legacy to us. When I am up close to a painting or sculpture by Umberto Boccioni (1882–1916), when I study Filippo Tommaso Marinetti's (1876–1944) visual poems or the Russian Futurist books they influenced—or even when I examine carefully some paintings by Giacomo Balla (1871–1958)—for example, *Volo di rondini* (Flight of the Swallows, 1913) or *Il pianeta Mercurio passa davanti al sole nel telescopio* (The Planet Mercury Passing in Front of the Sun, Seen by Telescope, 1914)—I feel that I am dealing with something different, something somehow more current. (Specifiying what that "something" and "somehow" are is a principal goal of this book.) Yes, some of Boccioni's or Marinetti's or Balla's technical or formal strategies have been consigned to the storehouse of history. Nevertheless, I feel that the imaginative space of their work belongs almost to the present. To speak more personally, as an artist, I feel that I can draw on the ideas that animate their work when I make my own films or videos (and when I engage in hopefully practical conversations with aspiring artists about the media they make). I can relate to the Futurists almost as contemporaries. The proliferation in recent years of articles on Futurism in journals (such as *Leonardo*) devoted to work being made in the interstices of technology, science, and art attests that many other new media artists feel the same way.

What does it mean to say that the Futurists were, as concerns the march of history, more progressive than the Cubists? One thing must be made clear at the outset: it does not mean simply that, in comparison with that of the Cubists, the Futurists' enthusiasm for technology anticipates more exactly the interests of the contributors to *Leonardo* (for example). The Futurists' world-historical role has deeper roots than that. Nor does it suggest simply and straightforwardly that to align oneself with historical currents is to adopt the project of liberation. But, on that score, we must recognize that resisting change can, willy-nilly, align one's efforts with reactionary and oppressive forces. Cubism and Futurism were born on the cusp of a change of world view as profound as that which began in the early fifteenth century (and which many of us now commonly attribute to Gutenberg's invention of movable type, in 1450). We are still living through that technological shift (which is why Futurism still seems contemporary).

Momentous cultural developments are reflected at both the material level of culture (in the actual physical instruments that are used to manipulate the material world in which we live) and at its symbolic level (at the cultural, which has a "mental" aspect—the ideal term for the point I want to make would be an exact equivalent to the German *geistig*, meaning, at once, mental, intellectual, or spiritual, but regrettably English has no equivalent).[2] Sometimes the changes in these two levels occur almost simultaneously, with the changes at the material and symbolic levels occurring almost at the same time.

But sometimes the changes in the material/technical stratum occur before the related symbolic changes, and sometimes they happen later (demonstrating the unviability of technological determinist theories, such as the orthodox economico-political theories of Friedrich Engels, which maintain that every change in the means of production is reflected immediately or nearly immediately in changes to the ideological superstructure). But the two levels do undergo corresponding changes, with homologous developments appearing at both the material and symbolic strata, though the changes at the symbolic level appear at variously spaced intervals from the changes that occur at the material level (and sometimes the symbolic change occurs considerably later or some time earlier).

Several of the artistic developments that occurred when the Cubist and Futurist movements were in their heyday relate to a fundamental change in world view, as an electromagnetic conception of reality replaced the Newtonian conception. This paradigm shift was connected to developments in electromagnetic technologies that had started one hundred years earlier and to the formulation of the scientific theory of electromagnetism eighty years earlier. The Italian curator, art historian, literary critic, and cultural theorist Renato Barilli (b. 1935), in *Arte contemporanea: Da Cézanne alle ultime tendenze* (Contemporary Art: From Cézanne to Recent Trends, 1988) and *Scienza della fenomenologia e degli stili* (The Science of Culture and the Phenomenology of Styles, 1991), argues that the time when the science of electromagnetism supplanted Newtonian physics (around 1860) marked a basic and thoroughgoing cultural transformation and the beginning of the contemporary or postmodern world view. I think Barilli is right in claiming that the development of ideas about electromagnetism led to a paradigm shift in the way Western people understand the world. As a consequence, that historical moment witnessed the prodigious development of new art forms and the wholesale introduction of new metaphors and new syntactic structures, along with a stunningly rapid development of new technologies. The interplay of technology, mentality, and art forms is a principal theme of this book. The nature of this change from a mechanical to an electromagnetic conception of reality is a topic I pursue throughout the book. To anticipate a few of the topics of that discussion, it involved a shift from the concept of absolute space (which can be measured according to unchanging coordinates) and absolute time (which can be measured by timepieces counting intervals of identical duration) to a notion of relative space and time (which changes according to a viewer's vantage point and velocity); from a conception of reality as composed of unchanging (or nearly unchanging) objects to one that views reality as being composed of interacting fields of energy; and from a hylomorphic to a process metaphysic. I consider how ideas about electromagnetism were connected to the cinema and

gave rise (often through several layers of mediation) to new forms in literature and visual art. Understanding that change is the essential core of the book.

The basis for my conviction that Futurism was the more radical movement was that its features went further in registering that historic transition. The changes involved in that transition were so thoroughgoing that they exerted an influence on philosophical anthropology, altering fundamentally what a human being is understood to be (and what he or she might justly desire). Hence, the moral and political questions that Futurists asked were more pressing even than those raised by the Cubists. Futurism did more to alert people to the blows that were about to rain down on twentieth- and twenty-first-century cultures. The Futurists anticipated that theme we identify as Marshall McLuhan's (1911–1980)—that the artist serves as warning device, instructing people to how to adapt their nervous system to prepare it for the blows that are about to come.[3] Marinetti advocated for the artist's leadership role. The intellectual historian Emilio Gentile notes that Marinetti had proclaimed that only the artist, through his incendiary genius, can prepare the nation for the coming Futurist age—that is, the electrotechnical age.[4]

Both Cubism and Futurism responded to deep-seated needs. From the seventeenth century onwards, a new image of reality—of matter and of consciousness's/the spirit's relation to it—consolidated itself, becoming at once ever more restrictive and ever more normative. This new *Weltbild* no longer depicted matter as a realm whose origin was divine and whose order was providential and purposive. Rather, nature came to be seen as a realm whose constitution need not be accounted for on any basis that lies outside of nature itself, and especially not through the purposes its entities and their activities served. On this view, the task of understanding nature became that of noting regularities in occurrences, of identifying laws summarizing patterns in the succession of events. The belief that all that cognition can afford is knowledge of the regularities in the succession of events was a factor that restricted moderns' conception of time to that of a linear process. Since, on this view, consciousness's function was solely cognition, and since cognition was understood to be simply the computation and classification of observed regularities in the succession of appearances and the formation of theories about interrelations among these regularities, knowledge was reduced to being the product of calculative reason. Some of the most profound realms of human consciousness were reconceived as they came to be understood as lying beyond the bounds of the legitimate activities of humans' cognitive machinery. The new picture of reality depicted consciousness as confronting a world the reasons for whose order we cannot know—a world indifferent to individual lives, that came into being by accident and will disappear at a time mandated by the initial accidental conditions that gave rise to it.

Even more than in Kant's philosophy, the scope of human understanding came to seem horribly restricted. Kant at least had the exigent necessity of the categories, based on (what he believed to be) the intractable demand that thought conform to logic, to guarantee that the structure of the *phenomenal* world could be known *a priori*. Postmoderns repudiated that faith, limited though it was. Alfred North Whitehead (1861–1947), to take one example, extended the recognition that percepts are constructs to mount a thoroughgoing critique of the Newtonian conception of reality. He argued that earlier notions of the nature of reality had been undermined by pernicious assumptions that confused psychic phenomena with objective givens. History had exposed the limitations of these assumptions, and it was now time for a new paradigm to emerge.

That conviction has endured for more than a century now. In *Cubism and Futurism: Spiritual Machines and the Cinematic Effect*, I argue that Cubism and Futurism developed in an era when many thinkers had concluded that the senses (at least as they are constituted at present and are now used) did not supply us with an adequate image of reality. But this crisis of cognition was not restricted to the senses alone. Reason, most historical epistemologies averred, possesses a veridicality superior to that of the senses: they assigned reason the crucial role in revealing reality's true character. But that role had been diminished as reason was converted into calculative reason, computing the likelihood of observing regular patterns in experience. The model used to coordinate these regularities involved theoretical inference, not immediate cognition. Consequently, reason couldn't furnish what the understanding longed for, the direct disclosure of a vibrant reality. The lack of accord between the austere reality presented in Newtonian science and the familiar world of perception troubled thinkers and, especially, artists (for one of its consequences was the downgrading of sensation, the domain that aesthetics deals with). Reason, according to most historical epistemologies, is a mode of understanding (often called intuition or insight) that can correct the senses. However, the march of history revealed that it does not have such powers of insight. Reason, as moderns had understood it, joined the senses as a subject of skepticism.

For many later moderns, the conception of consciousness and experience the seventeenth century had bequeathed seemed frightfully inadequate. These people felt the noetic strength of forms of non-rational or super-rational experience that modernity had disenfranchised—they felt the need for non-calculative, non-instrumental modes of cognition. Like Walter Benjamin (1892–1940) in "The Project for a Coming Philosophy," they claimed cognition encompasses a broad range of experiences. Traditional societies believed that prayer, meditation, trance, dream, and contemplative pursuits provide genuine understanding, but modern societies have excluded these on the basis of

the naturalist assertion that science furnishes no warrant for the world view that emerges from them. Modern societies for the most part have repudiated what older societies deemed sources of profound understanding—they have disavowed the knowledge claims of the religious seeker, the mystic, and the artist. Nonetheless, many members of modern society criticize this disavowal, claiming that intuitive, bodily knowledge—which remains largely pre-conscious and unconceptualized—informs us of the continuity of our be-ing with that of other beings (I use this hyphenated term "be-ing" to refer to the power—the **νέργεια** [energeia]—that maintains beings in existence). They asserted that only a mode of experience that appreciates the performative dimension of awareness—one that does not reduce veridical experience to the activities of instrumental reason (which cultural theorists from Maurice Merleau-Ponty to Paul Virilio have shown to be akin to *θεωρία* [theoria], the view of a detached spectator)—can reconnect us to reality. (The Futurists' formula of *arte-azione* [art-action] affirms the idea of the identity of meaning and performance in their work—this is an idea that McLuhan would make central to his media poetics.)[5] Such thinkers conceive of the performative as the domain of religion and of art: they understand art and religion as comprising the rituals we engage in to endow life with an aesthetic intensity. The artists associated with many of the avant-garde movements of the twentieth century felt the importance of trance, transport, prayer, dream, and other modes of experiences whose noetic worth modern societies have disavowed (both Cubists and Futurists conceived these elemental experiences as having been strong among people belonging to much earlier societies). They strove to develop artistic forms that might revitalize these cognitive modalities, so that eventually they might assume an expanded role when a new paradigm of knowledge and a new understanding of reality emerged. Indeed, many early-twentieth-century artists believed the role of avant-garde movements to be that of hastening the arrival of this new understanding.

The effort to revitalize forms of knowledge that traditional societies embraced but that modern societies have repudiated is only one factor that accounts for the importance of the avant-garde. Another concerns humans' relation to nature in the scientific era. History brought forth a conception of nature that made it seem inadequate as a home for the human soul and the fulfilment of all human longing. Moreover, developments in science showed that nature is not at all what we imagine, or even what we perceive it as being. We see it as coloured, warm or cold, hard or soft; but, science seemed to suggest, it can best be described as being constituted by particles that in themselves lack secondary properties: they simply move shorter or greater distances at slower or faster speeds. In this book I suggest that many artists and thinkers offered a radical response to this *Weltbild*—this picture of a featureless and

inhospitable reality—that downgraded sensation. If science's new image of nature no longer presented matter as a realm whose origin was divine and whose order was providential and purposive, thinkers proposed, by way of a response, to radicalize the Romantic view of nature. The Romantics conceived of nature not as *natura naturata*, as nature fashioned by a transcendent Creator, but as *natura naturans*, nature invested with a creative element that impels beings into existence, a sort of immanentized divine brought down from the superlunary realm and installed as a sublunar genetrix. Cubism and Futurism, each in its own way (or, rather, ways), recast this conception of nature as invested with creative power. While examining the foundations of Cubism and Futurism we will have to consider the various forms this notion of a creative impulse that animates reality assumed in the last decade of the nineteenth and the first decades of the twentieth century.

Suffice it to say for now that they were all vitalisms of one sort or another. A new conception of the universe had arisen in response to the introduction of a novel conception of time associated with G.W.F. Hegel's (1770–1831) philosophy and Charles Darwin's (1809–1882) science. Earlier world views had tended to see time and the time-bound realm as illusions, as insubstantial phantasms of insignificant ontological value, by way of comparison with the truly real, or as the illusory projections of a higher realm, beyond time. With Hegel and Darwin, time, movement, and change came to seem the very fabric of reality. Darwin's work inspired thinkers to conceive of the universe on a biological model—indeed, many concluded that reality is ultimately a biocosmic process whose dynamizing force is akin to a vital energy. This development raised the question of what drives time, movement, and change, and so notions of a Schopenhauerian *Wille,* a Nietzschean *Wille zur Mach*, or a Bergsonian *élan vital* came to the fore. Reality came to be understood as vital, throbbing energy, and the idea arose that humans should join themselves to its throbbing biological rhythm.

Like Futurism, Cubism was a movement on the cusp of the transition from the Cartesian world of objects in space, of standardized Cartesian coordinates and interchangeable machine parts, to a Teslian world of continuities and flows, in which electromagnetic energy is conceived through astonishingly biological analogies (which developed partly because Luigi Galvani [1737–1798] showed the nerves to be carriers of electricity). Some aspects of Cubism reflected the emerging ideas of the electromagnetic age. But unlike the Futurists, the Cubists often attempted to defend the reality of the object against the emerging ideas, which must have struck the Cubists (as it did many thinkers of the time) as perniciously skeptical and deleteriously anti-foundationalist. The segmenting and faceting of the object into several parts—which was the fundamental method of the Analytical Cubists—epitomized the mechanical

world's drive to resolve forms into simple, similar parts—in fact, it relied on the way of thinking that produced movable type. Does anyone fail to notice the mechanical precision of the interlocking parts in the works that Pablo Picasso and Georges Braque produced in their Analytical Cubist period? Yet at the same time, the multiple, fluid points of view implied in this work also suggested the continuities and flows that were basic attributes of postmodern visual culture (that is, the visual culture of the electromagnetic age).

In contrast to Cubism's paradoxical character, Futurism, which substantially emerged two or three years later, embraced completely the emerging electromagnetic view of reality: the *topoi* and tropes of Futurist visual and literary culture were those mandated by the new discursive regime. Whitehead challenged the tenets of what would soon be seen as a sort of folk ontology, whose fundamental tenet was that reality is composed of material objects. Bergson's writing heralded the transformation of standard or "school" metaphysics into one that rejected that view, for time and universal change were central to his view of reality. He alleged that thought alone is responsible for the Eleatic mistake of thinking that immutable objects constitute reality:

> Whereas through all our natural abilities of perceiving and conceiving, which are constructed with the necessity of action in sight, we believe that immobility is as real as movement (we even believe that the former is fundamental and prior to the latter, and that movement is "added" to it), we may find a solution to philosophical problems only if we succeed, by a reversal of these mental habits, to see in mobility the only reality that is given. Immobility is but a picture (in the photographic sense of the word) taken of reality by our mind . . . The moments of duration are only snapshots which our understanding has taken of the continuity of duration.[6]

The conceptualizing faculty gives rise to the idea of physical time, an abstraction formed by analogizing time and space (and based on the intellectual trope of a timeline). Psychological duration is entirely different: it arises from inner experience, where we encounter time as fluent, as "succession without distinction . . . an interconnection and organization of elements, each one of which represents the whole, and cannot be distinguished or isolated from it except by [the distorting effects of] abstract thought."[7] Bergson saw *durée*, which we could well translate as process, as the tendency to bring forth novelty. Whitehead, too, stressed that process results in the continuing coming-on of novelty; for him, reality is pervaded by a sort of *nisus* that strives to realize new features. Reality, for him, is process, a "perpetual perishing" of what is and the perpetual emergence, through what he called "concrescence," of a new moment of reality. The fundamental unit of reality, he declared, is not the concrete, bounded object, nor is it even the particle of matter at an

absolute point in space and time, but "the ultimate creature derivative from the creative process," or what he called an actual event.[8]

The conviction that process has priority over things and substances (that process in fact *engenders* what we understand as things and substances and endows them with their characteristics)—a conviction that Whitehead and Bergson shared—is one that conforms to the electromagnetic metaphysics that rose to prominence in the late nineteenth and early twentieth centuries. Whitehead was unusually well qualified to understand the changes the new sciences demanded of our cosmological beliefs. He was a geometer who wrote his doctoral dissertation on Maxwell's theory of electromagnetism. He had attended presentations by the electrical engineer and visionary cosmologist Nikola Tesla (1846–1953) in London (1891), on the topic of "Experiments with Alternate Currents of Very High Frequency and Their Application to Methods of Artificial Illumination"—lectures in which Tesla laid the groundwork of his ideas on radio technology. As far as I know, the text of the London lectures does not exist, but that of a lecture he gave on the same topic to the American Institute of Electrical Engineers at Columbia College in New York, on 20 May 1891, does, and it seems quite likely that the lectures were substantially similar. The address at Columbia began with Tesla saying that nature is a most captivating and worthy object of study and that "nature has stored up in the universe infinite energy. The eternal recipient and transmitter of this energy is the ether . . . Of all forms of nature's energy, which are ever and ever changing and moving, like a soul animates the inert universe, electricity and magnetism are perhaps the most fascinating." He went on to ask, "What is electricity, and what is magnetism?"[9]

It is difficult to recognize how momentous a shift this represents. To begin to suggest the magnitude of this change, I point out that in the early nineteenth century, scientists didn't talk of energy. They talked, rather, of force, and in fact of forces of different types. Force simply describes the effect of one object on the observable behaviour of another (the notion of the gravitational force of the Sun on the Earth lays out what we can expect of observations of the Earth's orbit). Force isn't an ontological reality (that is, part of the meaning of Newton's "*hypotheses non fingo*"); rather, the concept of force is simply notional, used to summarize certain regularities of experience. This is hard to imagine now, for in the years since the Faraday–Maxwell paradigm, based on electromagnetic theory, displaced the Newtonian paradigm as the central scientific doctrine, force has come to be equated with energy. But considering force in that way is a sort of revisionist understanding: in Newtonian physics, force is simply a way of stating expectations regarding patterns in observations.

In the era dominated by electromagnetic theory, by contrast, energy is understood to be an ontological reality—in fact, it is understood either to be

the fundamental ontological reality or akin to ultimate reality. Moreover, in the electromagnetic era, thinkers came to recognize the essential identity of various forms of energy.[10] We who live at the beginning of the twenty-first century hardly give a thought to electronic devices' ability to produce from invisible waves in the atmosphere the sounds and sights of a palpable reality—television and the computer have made that phenomena too commonplace to be given any consideration. Even before the personal computer, even before television, schoolchildren were already making themselves familiar with the laws of electricity that make that phenomenon possible by assembling diverse electronic devices (a crystal radio set was a popular first choice) from transistors and resistors and capacitors and CMOS circuits. The common use of electromagnetic devices for more than a century now, and the widespread understanding of the rudimentary principles that account for the operation fostered by exercises that most schoolchildren engage in, of fabricating electronic devices, have obscured the startling novelty of the new reality that Whitehead and other thinkers of the early electromagnetic era first glimpsed. Nearly a century ago, Whitehead (to use him once again as an example) already understood that these electromagnetic signals would form the basis of an emerging conception of the constitution of reality: "Thus our cosmic epoch is to be conceived primarily as a society of electromagnetic occasions."[11]

In his 1891 lectures, Tesla remarked on light and its relation to electricity. Experimenting with heating a dielectric exposed to strong fields of high-frequency currents, he observed the phenomenon we today know as luminescence. He explained that the emission of light was "due to the air molecules coming bodily in contact with the point; they are attracted and repelled, charged and discharged, and, their atomic charges being thus disturbed, vibrate and emit light waves."[12] His conception of light, then, resembles the postmodern idea that light results from photons being emitted from atoms that have been stimulated (either directly or indirectly) by the electric potential of an external source. From this experiment, Tesla concluded that it would be possible to use high-frequency currents to produce light and heat, as an ordinary flame does, but without consumption of material. Light would manifest energy being transformed from one state to another, without any matter being annihilated. Clearly, then, Tesla believed that electromagnetic energy (including light) has special occult powers. Other scientists came to similar conclusions.

Along with Giovanni Battista Piranesi (1720–1778), William Blake (1757–1827) was the first artist of the electromagnetic era. Remarkably, Blake was utterly aware of being an opponent of Newton and the Newtonian conception of reality—this is made quite clear by the image from *Europe, a Prophecy* (1794), of "Urizen as the Creator of the Material World" (a.k.a. "The Ancient of Days"),

the embodiment of a bad demiurgic force, reaching down to measure off space with giant calipers: "Times on times he divided & measur'd / Space by space in his ninefold darkness, / Unseen, unknown," Blake writes.[13] For Blake, Urizen was one of the four Zoas, who should be understood as regions/agencies of the self/experience (Tharmas represents the body; Luvah represents passion; Urthona represents the imagination; and, finally, Urizen represents reason). If any one of these agencies takes over, the self/the world as experienced falls out of balance. In the age dominated by Newtonian science, Urizen had taken over: Urizen is self-limiting, territorial, and, finally, prone to paranoia, so those are the characteristics of "The Age of Reason." The body (the senses) have become restricted, the passions inhibited, and the imagination impoverished.

Like the demiurge of certain gnostic sects, Blake's Urizen is a fallen god (the book Blake devoted to Urizen, *The [First] Book of Urizen* [1794], is an anti-Genesis): he lives alone, isolated in his will to dominate, and his effect is that of "Petrifying all the Human Imagination into rock & sand."[14] Under Urizen's rule—so Blake suggests—life rots as we fall under the sway of the empirical lie.[15] Blake understood Newton's universe (the universe that Urizen frames) to be a sundered world (so the name Urizen comes from the Greek *ηοριζειν* [horizein] meaning to limit, bound, restrict)—it is a universe of force, of matter in motion, of law (it is, to use a term Blake uses so often in *The First Book of Urizen*, "petrific"). It does not accommodate human reality, and human beings cannot identify with it. Thus it is experienced as alien and empty—as a wondrous, shuddering, abominable void. Blake's universe, to the contrary, teems with mythic presences, beings that (in conformity with electromagnetic fluxes) merge, multiply, and transform themselves one into another.

Blake might have been aware that a new era was emerging that would challenge the Newtonian conception of the universe. *He* might have been aware of the world-historical role of his prophetic books. But he was hardly a typical artist. Artists are not generally inclined to abstract speculation on the relation of the formal devices they favour to sweeping changes in *mentalité*. Generally, the works of progressive artists reflect the changes that are taking place—but they do so not by thematizing them in abstract theoretical models of the historical process, but by fastening onto some concrete changes that are occurring and by inquiring into them. For many innovators, radio waves were symbolic of the new age—just as they were for scientists such as Sir Oliver Lodge (1851–1940) and Sir William Crookes (1832–1919)—for whom radio waves modelled the link between electromagnetic phenomena and intelligence. Crookes believed that thought was the result of brain waves, that those brain waves resembled radio transmissions, and that radio waves

established that by manipulating the aether (using electromagnetic devices) one could reproduce and transmit thought. Other thinkers were ready to extend Lodge's and Crookes's approach, applying a similar way of thinking to the cinema. The cinema, they maintained, was a machine for modulating light, a part of the electromagnetic spectrum that traditionally had been used as a figure for consciousness. Some thinkers, especially those who embraced pneumatic ideas, concluded that the cinema's fluid, fluctuating light forms offer an analogy both for the movement of thought and for the underlying dynamics of the universe. The universe is not mostly empty space in which there occasionally appears inert, insensate matter that can be pushed around by mindless forces—which is how the Newtonians conceived it. Rather, it is filled with pervasive vital energy. This energy is ubiquitous vibratory reality, whose modulations were intelligent through and through (indeed, human thought itself results from the modulation of electromagnetic energy). So the fluxing and transforming energies and vibrations that make up reality can also be conscious. Gone is the picture of the universe as bifurcated, composed of dead matter on the one hand and spiritual beings on the other.

The cinema—because it is an electric medium, and because its forms are made from light (and light was understood to be the aetheric vibratory phenomenon most closely akin to thought and intelligence)—was understood to be an electromagnetic art. Many artists and thinkers lauded its luminous nature as the model for all the electromagnetic arts (which is a claim I intend to establish in this book). Hence, the cinema was thought to be the art best fitted to the new electric age, a medium whose features could serve as a model for the other arts. A principal goal of this work is to establish that the cinema became a pivotal force around which developed many new artistic forms. The programs of the Cubist and Futurist movements were tantamount to agendas for recasting various artistic media so that they could take on some of the electrological attributes of the cinema.

Notions drawn from electromagnetism were used to explain the operation of the nervous system. So electromagnetism became a model for understanding consciousness. The relations among electromagnetism, neurology, and phenomenology will be among the foci of this study. Furthermore, as the work of the tough-minded scientist Sir William Crookes evidences, the discursive regime of the time connected electromagnetism with occult ideas about the aether, vibratory energy, and the nature of thought. The cinema assumed the burden of some of these heterodox ideas: by virtue of the cinema's being the electromagnetic art *par excellence*, cinematic forms could demonstrate the wonder of this newly understood occult reality and make occult operations manifest. Of all media, film—fluxing light—most thoroughly and most

potently reveals the intelligent forms that arise out of the fluid transformations of energy. The cinema could serve thinkers as the radio served Lodge and Crookes: if there is an analogy between thought's dynamic character and the fluid forms of electromagnetic media (of which the cinema is the exemplar), then the manipulation of light (an electromagnetic phenomenon) could reveal the various modes that thought processes can assume. So great was the enthusiasm for this new dynamic art that this model acquired a power of its own to influence the way people understood reality. The cinema itself began to shape ideas about art and even reality. The cinema itself became a change agent.

Many early-twentieth-century thinkers concluded that the cinema had a privileged relation to ultimate reality. Cinematic experiments with the transformation of light (that is, of the highest form of electromagnetic energies) can instruct us about ultimate reality as being, essentially, thought process. The cinema itself was understood as a machine that could produce aetheric waves capable of cognition and communication. This belief motivated artists and thinkers to study the cinema and ponder the forms it should assume. Deliberation on the nature of the cinema extended into other arts, with advanced artists of the time proposing to transform other media into art forms that reflect the intelligent dynamics of electromagnetic realities. The cinema became a model for the renewal of all the arts. So a key *topos* in the manifestos of the avant-garde art movements that emerged in the first half of the twentieth century was the identification of those features of the cinema that they might adapt to their art media so that their artworks might become works suited to the electromagnetic age.

This view connected with a debate that took place in the early part of the twentieth century about the status of the new art form, cinema. In the previous volumes in this series, *Harmony and Dissent: Film and Avant-Garde Art Movements in the Early Twentieth Century*, and *DADA, Surrealism, and the Cinematic Effect*, I questioned the common view that the birth of cinema provoked an embarrassed response from artists, who felt that its lowly provenance and its ability to provide, at minimal effort, a likeness of reality condemned it to remain a medium offering merely populist, artistically unworthy mimetic forms (this at the time that had given birth to abstract art and when a great number of thinkers had begun to question the aesthetic value of representation). In those works, I pointed out that while that was one strain of thought that developed in response to the birth of the cinema, other writers and artists immediately embraced the cinema, proclaiming it to be the art best suited to the postmodern era. In short order, the privileged status accorded to the cinema—by reason of its connection with the electromagnetic fields that generate both thought and the *appearances* of objects of the every-

day world—linked itself with the conclusion some participants drew from the paragonal debate that erupted at the beginning of the twentieth century. (In the previous sentence, I stressed the *appearances* of objects, rather than simply objects, because the furniture of the world was commonly understood to be—as Einstein's famous equation concerning the relation between mass, energy, and the speed of light seemed to suggest—simply congealed electromagnetic fields.) Accordingly, many of the artists who felt the lure of the cinema (the Futurists foremost among them) posed questions to themselves concerning the means to be employed to incorporate electrotechnical forms into the media with which they worked, which affordance would allow them to transmit electromagnetic energies (or, at least, energies similar in character and intensity to electromagnetism). Thus, like the Internet today, at the beginning of the twentieth century this dynamic medium, which was so bracingly new, became a model for thinking about broader scientific or cultural change. And, as I just noted, in the process that model accumulated a significance—a historical *power* and *agency*—of its own. I call this power "the cinematic effect."

I also attempt to connect what have often been called the "primitivist" interests of the Cubists and the Futurists—I prefer to refer to these as non-European interests—to a broader impact that that African American art (especially, but not exclusively, jazz music) had on European culture. I do this by deploying Stanley Crouch's idea of "infinite plasticity." This is important for a number of reasons. First, that connection highlights how non-European cultural forms came to be construed as being closely related to what people of the time commonly thought of as "the modern" (and I would call "the postmodern"). Second, it shows that plasticity itself came to be regarded as a sign of the new. But another importance is that the idea of "infinite plasticity" can be connected with electromagnetism, through the image of fields of force interacting with one another and pulling one another into new shapes. Thus it serves to link notions of non-European art, culture and thought to the postmodern, Americanness, electromagnetism, and the cinema.

I note here a terminological difficulty that plagues any discussion of the topic of the transition to the age of electromagnetism. Following the periodization usually used in philosophy, I prefer to refer to the era that was ushered in by Gutenberg and that first found exemplary expression in the writings of Descartes and Newton "the modern era"; the new epoch, ushered in by Galvani and first expressed in an exemplary manner in the work of Michael Faraday, Henri Bergson, and Alfred North Whitehead, I prefer to call "the postmodern" era.[16] However, thinkers of the period this book discusses generally referred to the electromagnetic era as the modern

era—at the time, many saw (and some continue to see) the electromagnetic age as simply a continuation and intensification of the technological modern. The metropolitan centres of the early twentieth century were celebrated as "modern" cities—and were so described even when writers were commenting on the transformation of the city by electromagnetism. Not many writers really saw that the birth of the electromagnetic age represented a thoroughgoing paradigm change.

The difficulties this poses must not be underestimated. The argument I offer in *Cubism and Futurism: Spiritual Machines and the Cinematic Effect* depends on making a clear distinction between "the modern era" and "the postmodern era." That is an important difference between this volume and its predecessors: previously I could simply skirt the distinction between the more general technological modern and the electromagnetic postmodern. But in this volume, I cannot. The Cubist and Futurist programs make that impossible. Whenever possible, I have referred to "the postmodern" when discussing cultural developments associated with developments in electromagnetic theory, and "the modern" to refer to the culture associated with Gutenberg, Descartes, and Newton. But I cannot rewrite the words of thinkers from the period this book discusses when they comment on "the modern" as marked by the development of ideas about electromagnetism and the proliferation of electromagnetic devices. It would be completely inappropriate to reconstruct their writing so that it consistently refers to postmodern culture. Nor would it serve the interests of clarity for me to cite, for example, Léger's and Marinetti's remarks on "the modern" and then to simply go and use the term "postmodern" when discussing that passage. That would generate confusion and misunderstanding. The terminological slippage would be inelegant, imprecise, and bewildering. In such instances, I have sometimes inserted the phrase "what Marinetti"—or whomever I have just cited—"referred to as 'the modern' and I call 'the postmodern.'" But even that is too downright awkward to encourage me to insert it all that often. In addition, sometimes, when highlighting the intent of authors of the time, I have characterized their thinking as concerning "the technological modern," to indicate that they are thinking of cultures of technology generically, without distinguishing its modern and postmodern phases. But that expression is unfortunately too inexact to be generally useful.

In the end, I have had to accept the appalling ambiguity of the term "modern," and use it sometimes to describe postmodern culture. I hope that readers will be able to discern whether I am writing of "the modern" as the age understood it or of postmodern art and culture. I have been continually mindful of the need to make that possible.

On this matter of the terminological difficulties around the ideas of the modern and the postmodern era, I also point out that I have rigorously restricted my use of the terms "modernism" and "modernist" to refer, first of all, to an art theory and, secondarily, to artistic practices strongly associated with that theory. This art theory maintains that the purpose of art is to elicit a special sort of experience, generally called aesthetic experience, that is afforded only by art (or, according to some, by art and natural beauty), and that this sort of experience is elicited by formal properties of that which provokes the experience. This art theory generally accords high value to innovation and experimentation with form (the shapes, colours, and lines that make up the work); and it puts emphasis on materials, techniques, and processes. Consequently, some modernists rejected what they saw as the conservative values of the realistic depiction of subjects. An artistic form, modernists proclaimed, must be built only on features essential to the medium in which it is constructed.

Many modernists also propounded the art historical thesis that art advances by identifying more and more of the essential attributes of the various media and by progressively eliminating formal constructions that built on accidental (rather than essential) features of a medium. Some even proposed that art would come to an end when the natures of the various art media were exhaustively understood.

To return to the topic of the epochal transition that was occurring at the beginning of the twentieth century, from the modern to the postmodern era also required rethinking humans' place in the cosmos. Humans had believed—or at least hoped—the universe might provide a home for the soul and at least comfort for, if not satisfaction of, human longings. The new view of the universe saw it as a biocosmic form—essentially as a nervous system that carries electric currents that can formulate the idea of—and, therefore, produce—the furniture of the reality we mistakenly take as objective existents. In this view of the universe as a gigantic biocosmic organism, human beings figure as organisms within the grand organism that is the cosmos—as tiny organisms within a grand organism. They have little significance within the grand dynamic that is the universal process. This development led to paradoxical psychological consequences: people felt deflated on learning that the universe had not evolved to provide for human needs, but they experienced at the same time exhilaration at the possibility of joining their minds with the universal mind—for the idea that human beings are organisms within a magnificent organism was thought to imply the psychocosmic proposition that an identical dynamic drives human vitality and human thinking and nature's (or the universe's) vitality and thinking.[17]

The notion of reality as process had potentially distressing, even traumatic, implications. Artists strove to contain the impact of this potential trauma. If the universe seemed unresponsive to humans' longing for a home for the soul, perhaps the problem was that humans were asking for what could never be granted to them. The universe might not respond to humans' demands, but perhaps that is because, from a higher standpoint, there was no reason to assume it should. (Human being, considered on the cosmic scale, is relatively insignificant compared to the wonder and grandeur of the cosmos.) Moreover, its grandeur is of a different sort entirely than that which would have been predicted by those who had viewed the universe as a clockwork mechanism—as a perfect machine with its harmonically oscillating gears governed by the exquisite laws of physics and mathematics. That notion of the universe, which developed in the modern period (its origins lie sometime in the early seventeenth century), had long been under question, as the relative insignificance of human beings became an ever more common experience. But an increasing number of thinkers came to suggest that even if humans are not all that significant within the larger dynamic (and even if, as seemed certain, they should not assume that the universe was designed to provide them solace), they could nonetheless experience life's surge and know its wonder. But that is the most that humans might hope for.

This paradigm change altered what a work of art was conceived to be. The earliest fully worked-out statement of the new conception of an artwork appears in Arthur Schopenhauer's (1788–1860) writing from early in the age of electromagnetics. The great philosopher of will proposed that artistic creativity mimics the dynamics of nature—a notion that directly influenced both the Cubists and the Futurists. Picasso's famous comment, "Painting isn't a question of sensibility; it's a matter of seizing the power, taking over from nature," reflects that view, as does his equally celebrated remark: "Whether he wants it or not, man is the instrument of nature; she imposes on him character and appearance… You cannot go against nature. She is stronger than the strongest of men. We can permit ourselves some liberties, but in details only."[18]

This change brought many thinkers and artists to proclaim that the most urgent task for their contemporaries was to overcome the limitations of anthropocentric forms and anthropocentric thinking and to achieve a transcendent (biocosmic) view.[19] They encouraged humans to abandon their outmoded way of thinking—to recognize that although humans have a relatively insignificant role in an ongoing organic process that is the universe as a whole, nevertheless they can adopt a higher viewpoint and experience the unfolding process from the vantage point of the whole.

Futurist artists wholeheartedly adopted the notion that the atmosphere (or aether) is filled with energy and vibrations and that the evolution of those energy-

forms (described in the kinetic theory of gases) was giving shape to reality's history.[20] Their contemporary, Nikola Tesla, had argued for that very conception:

> Every living being is an engine geared to the wheelwork of the universe. Though seemingly affected only by its immediate surrounding, the sphere of external influence extends to infinite distance. There is no constellation or nebula, no sun or planet, in all the depths of limitless space, no passing wanderer of the starry heaven, that does not exercise some control over its destiny—not in the vague and delusive sense of astrology, but in the rigid and positive meaning of physical science.
>
> More than this can be said. There is no thing endowed with life—from man, who is enslaving the elements, to the humblest creature—in all this world that does not sway it in turn. Whenever action is born from force, though it be infinitesimal, the cosmic balance is upset and universal motion result…
>
> Everything that exists, organic or inorganic, animated or inert, is susceptible to stimulus from the outside. There is no gap between, no break of continuity, no special and distinguishing vital agent. The same law governs all matter, all the universe is alive. [21]

Tesla goes on to reveal the non-anthropocentric implications of this electromagnetic cosmology:

> The human being is a self-propelled automaton entirely under the control of external influences. Willful and predetermined though they appear, his actions are governed not from within, but from without. He is like a float tossed about by the waves of a turbulent sea…
>
> The whole earth is alive with electrical vibrations in which he takes part. The atmosphere crushes him with a pressure of from sixteen to twenty tons, according, to barometric condition[s]. He receives the energy of the sun's rays in varying intervals at a mean rate of about forty foot pounds per second, and is subjected to periodic bombardment of the sun's particles, which pass through his body as if it were tissue paper. The air is rent with sounds which beat on his eardrums, and he is shaken by the unceasing tremors of the earth's crust. He is exposed to great temperature changes, to rain and wind.
>
> What wonder then that in such a terrible turmoil, in which cast iron existence would seem impossible, this delicate human engine should act in an exceptional manner?[22]

This is the view that progressive artists of the early electromagnetic age were striving to convey. Many enthusiasts proclaimed that one can join oneself to the life of the whole and feel its throbbing, surging energy. A life lived at the maximum of vitality is what we should aspire to. This view is certainly exhilarating. But it is not without danger—indeed, it was a key source for Fascist views on life and art. This ambiguity is a principle theme of the third chapter of the present volume.

In the writings on cinema during this period, a recurrent theme was that filmmaking is an art in which the role of humans is reduced relative to other forms of artmaking. As Bazin pointed out, cinema images are products of a biocosmic life-force (related to *natura naturans*). This idea was joined with the proposition that, by virtue of its ability to present movement, the cinema can offer rich dynamic forms and elicit powerful kinaesthetic effects. It can bypass the intellect and affect the body directly. Indeed, the cinema is splendidly suited for imparting a sense of life's throbbing vitality. If the purpose of art is to impart the pulse of life, then the cinema has special importance, for speed, dynamism, and a kinetic throb are among its attributes. Furthermore, it imparts the sense that this dynamic effect is owed largely to non-human factors.

It might seem odd to expound on the role the cinema played in reshaping artistic practices in the era of electromagnetic thought. Against the argument I offer in this volume, one might contend that the cinema is the paradigmatic mechanical (Newtonian) art, not an electric art. Renato Barilli suggests as much. However, there is ample evidence that in the period this book covers, the cinema was understood to be an art of electric light, a medium whose electromagnetic nature linked it with Röntgen-rays (which in the very late nineteenth century were perhaps the principal model of electromagnetic reality). To suggest the linkages made possible by the discursive regime founded on ideas about electromagnetism, I note the following curiosity: in August 1896, a double-presentation featuring "Edison's Wonderful Vitascope" and "Prof. Roentgen's Great X-Rays" opened in Toronto, at Robinson's Musee. The museum, located at 81 Yonge Street (Toronto's main street), had a zoo on its rooftop, a curio shop on the second floor, the Bijou Theatre on the ground floor, and a "Wonderland," a sort of *Wunderkammer*, offering freaks and waxworks, in the basement. The price of admission to the Vitascope screening was 10 cents, while to see the professor's "X-Rays" cost 25 cents. The date is worth noting: X-rays were a novelty. The date of the discovery of X-rays is usually given as 8 November 1895 (just about one month and a half before the first presentation of the films, at the Salon Indien du Grand Café in Paris, on 28 December, a few months after the dynamics of mental energies were revealed to Sigmund Freud, on 24 July). In fact, Arthur W. Goodspead, in 1890, at the University of Pennsylvania, had observed shadow pictures (of the same sort Wilhelm Röntgen would observe five years later) produced by emissions from a "Crookes tube." And Nikola Tesla conducted experiments with shadow pictures (and shadowgraphs) in 1894.

A leaflet for a similar exhibition in Covent Garden, London, in the same year suggests much about the way X-rays were understood:

BEFORE LEAVING THE EXHIBITION
**"SEE"**
THE WONDROUS
X RAYS
The
Greatest Scientific Discovery
of the Age

---

by the aid of the New Light you are
enabled to see
"**THROUGH A SHEET OF METAL**"

---

"**THROUGH A BLOCK OF WOOD**"

---

And also
"**Count the Coins within your Purse**."
**ADMISSION - 3d**
Open all day
**XRAY PHOTOGRAPHS TAKEN**

The phrase "by the aid of the New Light you are enabled to see" is most telling: the "new light" created the possibility that one might see through opaque objects and see the interiors of bodies. The electromagnetic/electrotechnical regime had now taken the occult art of light into its purview. In 1896 the *Electrical Review* published X-rays of a man, made by Nikola Tesla with X-ray tubes of his own devising.[23] Tesla had become interested in X-rays when, endeavouring to make an image of Mark Twain, he produced instead an image of a screw used to adjust the camera's focus. That was in 1894, before Wilhelm Röntgen announced the discovery of X-rays. In 1895 and 1896 he (Tesla) produced what he called shadowgraphs of the human body, using what later came to be called "Röntgen-rays" or X-rays, and sent some to the German scientist. Röntgen responded with an enthusiastic letter of congratulation (1 July 1901), noting, "You have surprised me tremendously with the beautiful photographs of the wonderful emissions, and I say thank you very much for them. If only I knew how you make such things!"[24]

The simultaneous exhibition, in August 1896, on Toronto's Yonge Street, of Edison's Vitascope and "Prof. Roentgen's Great X-Rays," says much about the emerging discursive paradigm. As I explain in this volume, in this period, the cinema was thought to be the supreme electromagnetic art. As a result, artists and art theorists who ruminated on the epochal changes that were taking place in the arts turned to the cinema to give substance and form to

their deliberations. To say that reality is made up not of fixed objects assembled like the parts of a machine, but of flows of electromagnetic energy or dynamic fields resembling waves, any one of which can interact with all other fields (even those separated from it by some distance), threatens to dispense altogether with the art object. To be sure, the notion that the art object of the future would be non-objective and dematerialized had defenders in this era—and those who defended the idea (for example Hilla Rebay [1890–1967]) often were affiliated with schools of thought (notably, Theosophy) that claimed that reality more closely resembles energy than what we commonly understand by material substance. For most people today, to think of dematerialized objects is still a formidable challenge. For thinkers of the early twentieth century (a time when the idea that an artwork is, before it is anything else, a constructed object, forged from material, still found supporters), the idea that artworks lack any material correlate was almost impossibly difficult to grasp. The cinema provided a concrete example of the dialectical interaction between the ephemeral electrotechnical realm of energy flows and the materially embodied artwork—a synthesis (*Aufhebung*) of an artwork fashioned from fields of energy and an artwork wrought from material. The cinema was thought of as an electric medium, one that affects us by shaping light (which is a form of electromagnetic energy); yet it uses material (celluloid, film stock) to shape light. When one makes a film, one carves light much as one carves stone (or whatever medium one uses to make a sculpture)—and that shaped light can be understood to be the paradigmatic example of an artwork composed of electromagnetic energies that have been shaped, fused together, and arranged according to artistic principles. The contemporary artist James Turrell speaks of the "thingness of light." The cinema, by virtue of the intimate connections between celluloid, light, and projection space, served in the early twentieth century as proof of the thingness of light: the cinematic apparatus immerses the spectator in pulsating, changing light. It also served as a model for reflecting on the relations between objects, formed light, energy, and cosmic reality.

For early-twentieth-century thinkers, to shape light was to shape electricity. Studying light would afford insight into electricity. As early as 1893, Nikola Tesla stated in a magazine devoted to photography that

> the various forms of manifestation of energy which were generally designated as "electric," or more precisely "electro-magnetic," are energy manifestations of the same nature as those of radiant heat and light. Therefore the phenomena of light and heat, and others besides these, may be called electrical phenomena. Thus electrical science has become the mother of science of all, and its study has become all-important. The day when we shall know exactly what "electricity" is, will chronicle an event probably greater and more important than any other recorded in the history of the human race.[25]

Some early-twentieth-century thinkers believed that light transformed the cinema auditorium into an electromagnetic space. Deliberation on the cinema also served to make thoughts about a higher reality concrete and specific—airy speculation could take a concrete form. Hence, thinking about the cinema did not lead one away from the emerging electrotechnical paradigm. Rather, it deepened such reflections. And that, of course, is a principal reason the cinema seemed so significant during this period.

This book is one of a series of volumes about the early intellectual reception of the cinema and, most important, its reception by those associated with advanced artistic practices. The series examines how art theorists, philosophers, cultural theorists, and, especially, artists of the first decades of the twentieth century responded to the advent of the cinema. The first volume in the series, *Harmony and Dissent: Film and Avant-garde Art Movements in the Early Twentieth Century*, dealt with the efforts of artists in the 1910s and 1920s to bring forth a pure abstract art and the significant role the cinema played in these movements. The second volume, *DADA, Surrealism, and the Cinematic Effect*, concerned the film's reception by those who were associated with the Dada and Surrealist movements. This volume deals with its reception by the artists and thinkers associated with Cubism and Futurism. As I remarked above, the common view of the cinema's early intellectual reception—a view that has attained near-hegemonic status—is that art lovers wrote about the cinema in an embarrassed and apologetic tone. In the previous two volumes, and again in this one, I have striven to bring the scope of that claim into question. Admittedly, some early writers on the cinema were troubled by its origins in "the vaudeville peep show and the circus sideshow," fearing that its vulgarity made it an unsuitable companion for the great high arts and that its readily achieved mimetic effects could not be avoided or overcome. However, I have argued (and I argue again in this volume) there was another strain in the intellectual reception of early cinema that has gone largely unrecognized. The second response was far from anxious about film's lowly provenance in popular entertainment or its apparent proclivity for representation. On the contrary, it embraced the new medium as the first art that could truly reflect modern urban life. In *Harmony and Dissent*, I made the point this way: with the appearance of the cinema, a new *paragone* erupted, with many thinkers declaring that the cinema is the *ottima arte* (that is, the top art) or that it was destined to become so when the "true" cinema emerged. There I argued (as I argue here) that many early-twentieth-century artists and thinkers saw in the cinema a rival for the more established arts, one that, because it responded to the gnosiological imperatives of the time, might well be taken as the top art for moderns.

At this point, having offered a bird's-eye view of the emerging world view, I can be somewhat more definite regarding what I mean when I claim that

some artists and thinkers embraced the cinema as the *ottima arte*. When we read artists' writings from this period, including texts by Cubists and Futurists, we discover that many poets, painters, playwrights, and sculptors excitedly declared that the arrival of this new art, which was so paradigmatically fitted for the modern urban world, had imposed on them the demand that the media in which they worked (or the forms they created using the materials of their various media) be reconstituted so that they might take on at least *some* of the attributes that made the cinema the *ottima arte*. Notions about how to recast the art media (or the forms forged in those media), and about the urgency of doing so, became, I have argued, a principal part—indeed, *the* principal part—of the conceptual core of the artistic programs advanced by the vanguard art movements of the first half of the twentieth century. In *Cubism and Futurism: Spiritual Machines and the Cinematic Effect*, I show that this insight can be extended to the artistic programs of the Cubist and Futurist movements.

Although the feeling that the cinema was especially well fitted for the postmodern world was widespread (particularly among those committed to advanced artistic practices), beliefs about what made it so well-fitted for the postmodern world differed. In both *Harmony and Dissent* and *DADA, Surrealism, and the Cinematic Effect*, I explored how changes in the discursive regime regulating Western thought in the late nineteenth and early twentieth centuries led some people to argue that the purpose of art is to generate pneumatic effects, and that the cinema is the most effective pneumatic instrument, so the cinema is the top art. In *Cubism and Futurism: Spiritual Machines and the Cinematic Effect*, I argue that other thinkers and artists maintained that the urgent task for their contemporaries was to overcome the limitations of anthropocentric thinking and to achieve a transcendental (biocosmic) viewpoint—the outlines of this belief, I show, coincided exactly with the contours of the electromagnetic paradigm that was gaining an ever-increasing hold on postmoderns' minds (and perhaps is best understood as representing the emergence of the postmodern). Like the aesthetic and speculative beliefs of the Dadaists and Surrealists, this view was shaped by occult and esoteric beliefs. Accordingly, a principal goal in our examination of Cubism and Futurism will be to identify the esoteric ideas that provided the intellectual groundwork for the Cubists' and Futurists' convictions about the importance of humans' achieving a non-anthropocentric viewpoint. It will turn out that this effort is crucial not only to understanding early-twentieth-century ideas about process, but essential as well to understanding what Cubists and Futurists understood the cinema to be.

The late modern and early postmodern eras saw the rise of Romantic science. Romanticism itself gave expression to the feeling that humans had become estranged from nature. Romantic artists aspired to heal that breach—

to create an art that would allow one to experience the essential identity of human be-ing, Be-ing, and nature (here it would be defensible to put capital-N Nature). Romantic science held out the hope that the understanding of nature, of human be-ing, and of the relation between nature and human be-ing could be transformed so that the fundamental identity of humankind with the circumambient world, and finally the cosmos, would be revealed.[26] Ideas drawn from natural history—a discipline that rose to supreme importance in the period—led many artists and thinkers to conclude that evolution would carry humankind to a stage that would reintegrate humans with the natural world/cosmos. These ideas also allowed thinkers to usher out of the forum of received beliefs the notion that nature had been fixed, for once and for all, at the moment of Creation. The postmodern understanding is that nature also undergoes change and development.[27] Notions of transformation drawn from various bodies of esoteric thought helped thinkers elaborate their views on these evolutionary processes and on the identity between human beings and nature that evolution would bring into effect or, alternatively, disclose. These evolutionary views generated a new philosophical anthropology, as the Newtonian conception of human be-ing was replaced by an electrological notion of the electric person. Popular versions of the Romantic science of the day imagined these evolutionary processes to be guided by a fundamental reality, into which humanity would in the end be incorporated. This fundamental reality is a field—and the best model available for understanding that integral (and integrating) field is that of electromagnetic energy.

The field effects of this meeting of scientific ideas about electromagnetism with occult ideas about energy and aetheric influence are extraordinarily complex: Marshall McLuhan grasped, as swiftly and surely as anyone, their often paradoxical nature. One paradox this meeting of ideas produced was a renewed emphasis on individuality (admittedly the individuality it stressed was of a different character than that which Enlightenment thinkers such as Immanuel Kant extolled), which was joined to claims celebrating the evolutionary process that would lead to the annihilation of the individual and his/her subsumption in the Great Whole (a.k.a. "the field"). In 1977, Marshall McLuhan stated in an interview with *Maclean's*,

> The effect of information is not to pull people together. It makes people feel independent when information is available everywhere. Everybody feels that they are able to make it alone. This may be an illusion but it happens at the speed of light, which is electric speed. Every place in the world is pulling away from every other place.[28]

Elsewhere, McLuhan stresses the unifying effects of electric media (usually under the rubric of retribalization). He states in his famous *Playboy* interview,

> The electronically induced technological extensions of our central nervous systems, which I spoke of earlier, are immersing us in a world-pool of information movement and are thus enabling man to incorporate within himself the whole of mankind. The aloof and dissociated role of the literate man of the Western world is succumbing to the new, intense depth participation engendered by the electronic media and bringing us back in touch with ourselves as well as with one another. But the instant nature of electric-information movement is decentralizing—rather than enlarging—the family of man into a new state of multitudinous tribal existences. Particularly in countries where literate values are deeply institutionalized, this is a highly traumatic process, since the clash of the old segmented visual culture and the new integral electronic culture creates a crisis of identity, a vacuum of the self, which generates tremendous violence—violence that is simply an identity quest, private or corporate, social or commercial.[29]

A similar paradox, arising from embracing simultaneously individualism and an ecstatic belief that through the evolutionary process the individual will be subsumed in an all-comprehending whole, can be found in the writings of the Cubists and Futurists. Furthermore, as most readers surely know, a key theme in McLuhan's writings is that of sensory ratios. According to McLuhan, the prehistoric, or tribal, person's sensorium involved a harmonious balance among the senses, in which hearing, smell, touch, sight, and taste were accorded equal importance. At that time, humans' experience of the world involved each of the senses in equal measure.[30] However, successive technological innovations affected this sensory balance and the alteration that ensued transformed the society that created that technology. We will see that the Cubists and even more so the Futurists maintained a version of these beliefs about the senses—and that their non-European interests reflected an awareness that a process of retribalization was occurring.

It has taken several volumes for me to lay out my argument regarding the cinema's impact on avant-garde movements and to provide evidence to support it. Dividing my argument among those volumes has not been an easy or straightforward task. I include in this volume comments on Dadaist and Surrealist views that go well beyond brief mention. The reason is simple: as just noted, in *Cubism and Futurism: Spiritual Machines and the Cinematic Effect*, I am focusing on the belief that the urgent task for artists and thinkers in the early twentieth century was to overcome the limitations of anthropocentric forms of thought and to achieve a transcendental (biocosmic) view in keeping with electromagnetic field theories. Those ideas are associated with radical forms of *Lebensphilosophie*, and the Surrealist and the Dada movements (the latter especially) were both influenced by vitalist philosophies of various sorts, including radical varieties of *Lebensphilosophie*. I acknowledged that impact

in *DADA, Surrealism, and the Cinematic Effect*. But I put off dealing with that subject at any length until this book, since I knew that vitalistic philosophies would be its central theme. For much the same reason, some part of my commentary on Cubist collage appears in the previous volume. My reason for anticipating there a subject that is also dealt with in this volume is that a key topic in the earlier volume was the dialectic as a noetic (and pneumatic) form. So it made sense to deal with the dialectical relation between part and whole in collage there. The only way to avoid repeating long passages of philosophical analysis in both volumes was to deal *in extenso* with Cubist collage there and to make brief mention of the topic here.

I have done my best to avoid needless repetition between volumes. Nonetheless, these are connected volumes and they all deal with some common themes. Despite their interrelation, I am doing my best to make each volume autonomous so that a reader can follow the argument presented here without having the other volumes at hand. To accomplish this goal, some repetition was necessary. This occurs primarily in the section in Chapter 1 headed "Basic Themes of Cubism and Futurism." There I repeat some ideas presented in the two earlier volumes to give a context to ideas I set out in this volume.

My next comment repeats (*mutatis mutandis*) a point I made in the preface to *DADA, Surrealism, and the Cinematic Effect*: most scholarship about the relation between Cubism and Futurism and film has analyzed the influence those two artistic movements had on the cinema. This book takes the opposite approach: it analyzes the impact the cinema had on the ideals of those two movements. It proposes that many painters and writers in the early twentieth century were struck by the cinema's extravagantly modern character and felt it necessary to reconstitute literature and visual art so that they might take on some of the characteristics that made the cinema the most significant modern art form. This claim is entirely novel—I attempt to establish it primarily (but not exclusively) by showing that the manifestos of those two movements can be understood as proposals, formulated in the wake of the recognition that the cinema was the most important art form for moderns. This book is a peculiar sort of contribution that crosses media theory with art history in an unusual amalgam. Though I do not consider it primarily a film studies book, I do hope my media theoretical approach to topics this book deals with will open up some unique insights into those branches of film studies concerned with the cinematic apparatus and with experimental film. The work contains much material on the cinema (specifically, on the intellectual reception of the early cinema) because we must understand the ideas about the cinema harboured by the artists who affiliated themselves with Cubism and Futurism if we are to analyze how the cinema influenced their proposals for reconstituting poetry, painting, theatre, music, and dance.

One way to understand the Cubists' and Futurists' views on the cinema is to read what they wrote about the cinema and the other arts (often their writings on painting and music reveal more of what they thought about cinema than their writings devoted specifically to the cinema). But for Cubism at least, we have another important source of information: we can study the film work of the artist Fernand Léger (1881–1955), who, although never strictly a Cubist, was keenly aware of developments in Cubist painting, and whose work has some affinity with that of painters more closely aligned with the movement. By analyzing *Ballet mécanique*, we can glean valuable insights into the aesthetic principles of the era, as they were understood by an artist intimate with the work of Cubist painters. To accompany this book, I have prepared a detailed analysis (with analytical commentary) for this film, which is posted online on WLU Press's website. Because this adjunct to the printed volume is a painstaking analysis that provides details of the mathematical structure of the work (the metrical matrix that gives form to the work) and the film's extensive use of literal repetition and, accordingly, consists (along with extensive commentary) of pages and pages of numbers, it seemed to me better to put this text online. The analysis confirms points in my theoretical and historical exposition, so I hope that readers will read it. The film can be found readily in electronic form, so readers can compare my description and commentary against the work itself. A detailed bibliography that offers information about the publishing history of some of the items it contains can also be found on WLU Press's website.

One unusual feature of the book caused me a lot of trouble. I have incorporated into many quoted passages glosses on those passages. This book offers ideas about the development of Cubism and Futurism that challenge prevailing views, and I use quotations to show that I have a solid textual basis for claiming that Cubist and Futurist artists harboured ideas that have hitherto gone unrecognized—and, more important than that, that these notions are not aberrations or deviations from the central corpus of their artistic beliefs, but absolutely central. The purpose of incorporating glosses into these artists' texts is to highlight the connection that statement has to the leading themes of this book, connections that, it seems, have gone largely unnoticed. The ideas I offer in *Cubism and Futurism: Spiritual Machines and the Cinematic Effect* have been hiding in plain sight in these artists' texts, stated but unnoticed, despite their being read (in many cases) for over one hundred years now. Initially I hoped that I could encourage readers to reread these passages and to note the electrological assumptions in these texts simply through contextualization—that proceeding sometimes by constructing a Benjaminian constellation of citations would suffice to bring out meanings in each that had receded into latency with the more general recession of electrotechnical

motifs into what McLuhan characterizes as the environment (background assumptions of which we are not conscious). The results of a trial with an early version of the manuscript based on that expectation disappointed me considerably: standard art historical beliefs seemed too well established to be overturned by such a moderate form of intervention. So I decided to interpolate commentary into the passages quoted. The comments I add to the quotations have the purpose of ensuring that these electrological assumptions are recognized. The downside of my decision to add these remarks, a decision that gave me much trouble, is that texts I quote often have a poetic character, and, accordingly, have a multiplicity of meanings. Teasing out one of these meanings and highlighting it has the effect of flattening these marvellous, poetic compositions. I note as well that, on the advice of a copy-editor and in the interests of saving space, I have generally abbreviated long titles after their initial mention; contracting the titles of Futurist manifestos especially often eliminates their wonderful poetry. I have also generally restricted myself to using surnames after the first mention of an artist's or author's name, again in order to shorten the text.

I note here that I am keenly aware there are many topics of direct and pressing relevance to the argument of this book that have gone unaddressed. I have had to prune material that I would have relished including. I do not want my fundamental purpose—of explaining the cinema's role in recasting advanced artistic practices in the first decades of the twentieth century—to be lost as the project became one of Brobdingnagian proportions: I feared that allowing the book to become bloated might discourage readers from considering the details that I offer concerning artists' and thinkers' notions about the cinema and the imperative they felt to recast traditional media when the cinema arrived on the scene. I have striven to find a sweet spot—to amass just enough evidence to prove the novel conjecture that the cinema was a primary, perhaps *the* primary, force shaping the agendas of Cubist and Futurist movements and to provide just enough background information to allow readers to get a firm grasp on my argument concerning the intellectual and social setting from which Cubism and Futurism emerged; the influence that context had on determining artists' and thinkers' understanding of the cinema as a rival to long-standing artistic media; what they deemed the cinema's strengths to be; and how traditional media should be reformed. I hope that the examples I have dealt with will enable readers to work out for themselves how my umbrella argument could be applied to countless topics I would love to have taken up, but could not while keeping this book (and the series) to a reasonable length.

Finally, a note on the book's title: I intimated above that I ardently wish that English had a word equivalent to the German *Geist*, which can mean

spirit, mind, or even ghost, and, the adjective *geistig*, which can mean mental or spiritual or intellectual—it can even be used to characterize anything having to do with soul or the mind. Hegel uses the word *Geist* in the title of his famous early work, *Phänomenologie des Geistes*, which has been translated as *The Phenomenology of Mind* and as *The Phenomenology of Spirit*. English has no equivalent to *geistig*. But it is that sense—of an entity or events having a mental/spiritual nature—that I intend by using the word spiritual in the title: by spiritual machine I mean, more or less, an apparatus having a mental, or spiritual, or pneumatic nature, in addition to being a material entity. More exactly, the term "spiritual machine" should be understood as a vital entity-process that from one point of view can be considered material, from another as having the attributes of intelligent and intuitive life. That syncategorial be-ing defies traditional ontology, showing just how radical are the implications of the new paradigm that consolidated itself in the period this book discusses. Spinoza's idea of a monistic substance (*Deus sive natura*) that can be understood either as mind/spirit or matter/nature (and potentially in an infinite number of other ways), has provided me with the model of thinking about this reality.

## Notes

1 I deem it imperative to acknowledge that the misogyny expressed in some of Picasso's art is greater than that expressed in any visual artwork by any Futurist. That said, one must allow that Cubist art theory offers next to nothing that approaches the abhorrent political views of the Futurists.

2 Here I am drawing on the work of Renato Barilli, and in particular on his *Scienza della cultura e fenomenologia degli stili* (Bologna: Il Mulino editore, 1991). In English: *The Science of Culture and the Phenomenology of Style*, trans. Corrado Federici (Montreal and Kingston: McGill–Queen's University Press, 2012). Of course, the distinction between the two levels is somewhat arbitrary: printing technology, for example, is the result of *τέχνη* (*techne,* know-how), and *τέχνη* involves mental as well as manual skills. What is more, the distinction between the two levels of culture is collapsing: the computer programs we write are symbolic forms that arose out of historically specific conceptions of what thought is (symbol manipulation constrained by logical principles), yet they have become the means with which we interact with the material world; we use them to send and receive money, purchase books and have them sent to us, make reservations at hotels and restaurants, book airline tickets, and reserve seats at the theatre, the symphony, or the ballet.

3 "What would happen if art were suddenly seen for what it is, namely, exact information of how to rearrange one's psyche in order to anticipate the next blow from our own extended faculties?" Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), 71.

4 Emilio Gentile, "La politica di Marinetti," *Storia contemporanea 7,* no. 3 (September 1974): 426. The remark appears in a document from 1918, in which the Futurists outlined their political agenda and drew a distinction between Futurism as an artistic and

as a political program. That document argues that this advanced artistic sensibility of the Futurists, though it had gone beyond anything the general public could embrace, was nonetheless required for the political regeneration of Italy. Marinetti's tract is reprinted in de Felice, *Mussolini il revoluzionario*, 741.

5 Marinetti, "Il tattilismo: Manifesto futurista" (1921), in Maria Drudi Gambillo and Teresa Fiori, eds., *Archivi del Futurismo*, vol. 1 (Rome: De Luca, 1958), 56–61, esp. 56.

6 Henri Bergson, *La pensée et le mouvant* (1934) (Paris: Presses Universitaires de France, 1985). Also in *Œuvres,* annotated by André Robinet, vol. 3 (Paris: Presses Universitaires de France, 1970; cited in English in Leszek Kolakowski, *Bergson* (Oxford: Oxford University Press, 1985), 12.

7 Henri Bergson, *Essai sur les données immédiates de la conscience* (Paris: F. Alcan, 1889). In English: *Time and Free Will*, trans. F.L. Pogson (London: Macmillan, 1913), 101.

8 Alfred North Whitehead, *Science and the Modern World* (Cambridge: Cambridge University Press, 1926), 106.

9 Nikola Tesla, "Experiments with Alternate Currents of Very High Frequency and Their Application to Methods of Artificial Illumination." Lecture delivered before AIEE at Columbia College, 20 May 1891. In *Transactions of the American Institute of Electrical Engineers*, vol. 8, 267–319 (New York: AIEE, 1891). This essay has been reprinted many times.

10 If Isaac Newton's *Philosophiæ Naturalis Principia Mathematica* (1687) served as the defining document for the era of mechanics, then James Clerk Maxwell's *A Dynamical Theory of the Electromagnetic Field* (1865) created the groundwork that allowed a new paradigm to develop, for in it Maxwell synthesized many intellectual and conceptual themes that had emerged over the previous century with his own discoveries. And like Newton's work, Maxwell's provided the first expansive theoretical formulation of that paradigm, still *in statu nascendi*. Maxwell showed that electric and magnetic fields travel through space as waves moving at the speed of light, and argued that light is a phenomenon caused by undulations in the very same medium that is the cause of electric and magnetic phenomena. In arguing this, he developed a unified theory that treated light and electrical phenomena as essentially similar. This unified theory enabled scientists to predict the existence of radio waves: soon after, the radio itself was developed, establishing beyond any doubt that Maxwell's equations were the basis of a new model of reality. The capacity of electronic devices to produce from invisible waves in the atmosphere palpable sounds and sights made evident to all that electromagnetic signals can produce the impression of a material reality. Electromagnetic events came to be seen as fundamental entities whose immediate relevance to our be-ing is continuously transmitted to us.

11 Alfred North Whitehead, *Process and Reality: An Essay in Cosmology* (1929), corrected edition, ed. David Ray Griffin and Donald W. Sherburne (New York: Free Press, 1978), 92. Whitehead was remarkably uninterested in copyediting or proofreading, and the original edition (1928) of *Process and Reality* contained many errors. Griffin and Sherburne's corrected edition, prepared more than half a century after the Grifford lectures on which the book was based, corrected many but not all of the errors in the first edition.

12 Tesla, "Experiments with Alternate Currents," in *Transactions*, at 286.

13 Blake's image "The Ancient of Days" appears on the title page of his *Europe, A Prophecy*, which he printed at Lambeth in 1794. For a convenient reprinting of it, see Kathleen Raine, *William Blake* (London: Thames and Hudson, 1970), plate 54, page 77. For the

quotation, from Chapter 1 of *The First Book of Urizen*, lines 8–9, see Blake, *The Complete Writings of William Blake with Variant Readings*, ed. Geoffrey Keynes (London: Oxford University Press, 1966), 222–37 at 222.

14 Blake, "Night the Second," in *Vala, The Four Zoas* (1795–1804), in *The Complete Writings*, 280–91 at 281.

15 On Blake's anti-empiricism, see Frye, *Fearful Symmetry: A Study of William Blake* (Princeton: Princeton University Press, 1947), esp. Chapter 1, "The Case Against Locke," 3–29.

16 Barilli is acute on this issue of the periodization of art. See his *Scienza della cultura e fenomenologia degli stili*; and his *L'alba del contemporaneo. L'arte europea da Fussli a Delacroix* (Bologna: Feltrinelli editore, 1996).

17 The most startling and profound version of the psychocosmic proposition is Nikolai Fyodorov's (1829–1903) cosmism.

18 The first remark is attributed to Picasso by his wife Françoise Gilot, in Gilot and Carleton Lake, *Life with Picasso* (New York: McGraw-Hill, 1964), 59. The second appears in Richard Friedenthal, ed., *Letters of the Great Artists—From Blake to Pollock*, trans. Daphne Woodward (London: Thames and Hudson, 1963), 256–57.

19 There are clear parallels here to the advocacy in recent years of object-oriented ontologies. Those parallels would be an interesting topic to explore, especially since this volume considers similarities between recent new media theories and the artistic theories that developed in response to the advent of the electromagnetic age. But I felt that it might take me too far away from my key task, that of recovering the beliefs the Cubists and Futurists actually held, so as to understand the role of the cinematic effect in their thinking.

20 Commentary on the topic "art and entropy" proliferates in the period's books on art theory.

21 This citation is from Tesla, "How Cosmic Forces Shape Our Destinies," *New York American*, 7 February 1915, 3.

22 This citation and the previous, ibid.

23 Tesla was very much taken with X-rays at this time. In 1896 and 1897, he published the following articles and gave the cited talks on the phenomenon: "Tesla's Startling Results in Radiography at Great Distances through Considerable Thickness of Substance," *Electrical Review* (New York) 28, no. 11 (11 March 1896): 31, 134; "Tesla's Latest Results—He Now Produces Radiographs at a Distance of More Than Forty Feet," *Electrical Review* 28, no. 12 (18 March 1896): 147; "Tesla on Reflected Roentgen Rays," *Electrical Review* 28, no. 14 (1 April 1896): 171, 174; "Tesla on Roentgen Radiations," *Electrical Review* 28, no. 15 (8 April 1896): 183, 186; "Tesla's latest Roentgen Ray Investigations," *Electrical Review* 28, no. 17 (22 April 1896): 206–7, 211; "Electrical Progress On Apparatus for Cathography," *Mining and Scientific Press*, 9 May 1896, 378; "Tesla Describes an Interesting Feature of the X-Ray Radiations," *Electrical Review* 29, no. 2 (8 July 1896): 13–14; "Roentgen Rays or Streams," *Electrical Review* 29, no. 7 (12 August 1896): 79, 83; "Tesla on the Roentgen Streams," *Electrical Review* 29, no. 23 (2 December 1896): 277; "Tesla on Electricity," *Electrical Review* 30, no. 4 (27 January 1897): 46ff. This last article is a transcript of a talk Tesla gave in Buffalo at the Ellicot Club on 12 January 1897 commemorating the introduction of Niagara Falls power to Buffalo, New York. In it, he comments on his work with X-rays and expresses his hope that, like Buffalo, Hamilton and Toronto will avail themselves of the possibilities created by hydroelectric power, which will become the generator of the new age. Near the beginning this article states, "I am deeply earnest in my wish that I were capable of having the fire of eloquence kindled in me, that I might dwell in adequate terms on

this fascinating science of electricity, on the marvelous development which electrical annals have recorded and which, as one of the speakers justly remarked, stamp this age as the Electrical Age." Still more articles by Tesla: "The Age of Electricity," *Cassier's Magazine*, March 1897, 378–86; "The Streams of Lenard and Roentgen and Novel Apparatus for Their Production," lecture before the New York Academy of Sciences (6 April 1897); "Mr. Tesla on Roentgen Rays," *Electrical Engineer*, 14 April 1897; "An Interesting Electrical Exhibition—Address by Nikola Tesla, Announcing Recent Achievements," *Electrical Review*, 14 April 1897, 175; "On Hurtful Actions of Lenard and Roentgen Tubes," *Electrical Review* 30, no. 18 (5 May 1897): 207, 211; "On the Source of Roentgen Rays and the Practical Construction and Safe Operation of Lenard Tubes," *Electrical Review* 31, no. 4 (11 August 1897): 67, 71.

24 Röntgen's letter is in the Tesla Museum, Belgrade, Serbia, document no. MNT, CXLIV, 152. Tesla's images appeared at the very time Röntgen announced his discovery of X-rays. His contributions to the discovery of X-rays are not as widely known as Röntgen's, and that is because much of his work was lost when his laboratory in New York burned down on 13 March 1895. If I have emphasized Tesla's discoveries, it is because he had demonstrated X-rays' power of imaging, which the mind of the era would connect with the imaging powers of that other electromagnetic medium, the cinema.

25 Nicola Tesla, "The Action of the Eye," in *My Inventions and Other Writings* (London: Penguin Books, 2011), 99–100 at 100. First published in *American Journal of Photography*, 1 September 1893. The published paper is a revised version of the opening part ("Introductory—Some Thoughts on the Eye") of a talk, "On Light and Other High Frequency Phenomena," delivered at the Franklin Institute in Philadelphia in February 1893 and at the National Electric Light Association in St. Louis in March 1893. The entire speech can be found in Tesla, *The Nikola Tesla Treasury* (Radford: Wilder Publications, 2007), 204–63. Other remarks by Tesla in "The Action of the Eye" confirm my claims about the relations among light, electromagnetic energy, and thought. For example, he asks:

> Will it ever be within human power to analyze the condition of the retina when disturbed by thought or reflex action, by the help of some optical or other means of such sensitiveness that a clear idea of its state might be gained at any time? If this were possible, then the problem of reading one's thoughts with precision, like the characters of an open book, might be much easier to solve than many problems belonging to the domain of positive physical science, in the solution of which many, if not the majority, of scientific men implicitly believe. (99)

26 Years later, this idea brought Tesla to the belief that it would be possible to photograph thoughts. David H. Childress reports,

> Tesla once said in 1933, when 78 years old, "I expect to photograph thoughts…In 1893, while engaged in certain investigations, I became convinced that a definite image formed in thought, must by reflex action, produce a corresponding image on the retina, which might be read by a certain apparatus. This brought me to my system of television which I announced at that time…My idea was to employ an artificial retina receiving the object of the image seen, an optic nerve and another retina at the place of reproduction…both being fashioned somewhat like a checkerboard, with the optic nerve being a part of each."

Childress, *The Fantastic Inventions of Nikola Tesla* (Stelle: Adventures Unlimited Press, 1993), 276–78.

Childress at 277 offers a picture of the thought television. The quotation within this quotation is given as coming from a newspaper interview that was released to wire services 10 September 1933. Tesla reasoned that since a thought (an electrical phenomenon) produced a corresponding image in the retina, it should be possible to read and to store in a machine the electrical data involved in this neural transmission. The recorded information could then be processed by an artificial optic nerve and (just as the charge transmitted by human optical nerve produces an image on the mind) could produce an image at "the place of reproduction."

27 Evolutionary theory was also taken to confirm the idea that sensation does not present the world as it is. Our sensory faculties evolved to ensure survival of the species, not to offer accurate renditions of what affects them.

28 Marshall McLuhan, "Interview," *Maclean's* 9, no. 5 (1977), 4–9 at 4.

29 Interview with Marshall McLuhan conducted by Eric Norden, in *Playboy Magazine*, March 1969, 26–27, 45, 55–56, 61, 63; reprinted in *Essential McLuhan*, ed. Eric McLuhan and Frank Zingrone (Toronto: Anansi, 1995), 233–69 at 249.

30 That theme of McLuhan's writings draws heavily on the ideas of Giambattista Vico.

# MODERNISM AND THE VISUAL ARTS

# 1

This chapter highlights some key aspects of the framework within which art and experience were understood in the early twentieth century. I believe it essential to have the ideas I present here in our intellectual kitbag if we are to understand the program of the Cubist and Futurist artists. Some parts of this investigation will be a bit difficult, because some topics that must be addressed are now unfamiliar—they have long been relegated to the storehouse of history. But we cannot gauge the radicality of these two movements without them.

Film had its origins partly in scientific experiment, partly in popular forms of entertainment, and partly in the idealistic dream of creating the "total work of art"—that is, a representation that depicts with complete fidelity every feature of its model. Among the popular forms with which the cinema was associated were vaudeville, the sentimental novel, and the peep show—and of these, the last was the most important. Among the earliest films was Edison's *The Kiss*, and this was soon followed by *Annabelle Butterfly Dance* (Edison: William K.L. Dickson, 1894) and *Annabelle Serpentine Dance* (1895); and several boxing films were evidently intended to provide the pleasure of watching stripped-down males pummelling each other with their fists.[1]

Its association with popular forms of entertainment brought the cinema into disrepute among most people who had an interest in the arts—in music, dance, literature, theatre, painting, and sculpture.[2] Within a few years of its invention, however, a few thinkers were beginning to see a great potential in film. By 1907, some were declaring that films were being made that realized the artistic promise of the medium.[3] By the late 1910s and early 1920s, at least a few artists and intellectuals—people like the pioneering applied psychologist Hugo Münsterberg (1863–1916) and the French art historian Élie Faure (1873–1937) and, somewhat later, the poet and aesthete Béla Balázs (1884–1949), and the filmmakers and film theorists Sergei Eisenstein (Сергей Эйзенштейн, Sergej Jejzenshtejn, 1898–1948) and Dziga Vertov (Дзига Вертов, pseud. for Давид Абелевич Кауфман, David Abelevich Kaufman, 1896–1954)—were issuing tracts that argued for the aesthetic potential of the new medium.[4]

These tracts had a polemic purpose: to prove that film could be (or had already become) an art like the other great, high arts. According to modernists, the defining feature of a work of art was its ability to bring about a particular type of experience, which they termed an *aesthetic* experience. As Clive Bell put it in the "The Aesthetic Hypothesis," which became modernism's most famous creedal declaration,

> The starting-point for all systems of aesthetics must be the personal experience of a peculiar emotion. The objects that provoke this emotion we call works of art. All sensitive people agree that there is a peculiar emotion provoked by works of art. I do not mean, of course, that all works provoke the same emotion. On the contrary, every work produces a different emotion. But all these emotions are recognisably the same in kind; so far, at any rate, the best opinion is on my side. That there is a particular kind of emotion provoked by works of visual art [the subject of Bell's book], and that this emotion is provoked by every kind of visual art, by pictures, sculptures, buildings, pots, carvings, textiles, etc., etc., is not disputed, I think, by anyone capable of feeling it. This emotion is called the aesthetic emotion; and if we can discover some quality common and peculiar to all the objects that provoke it, we shall have solved what I take to be the central problem of aesthetics. We shall have discovered the essential quality in a work of art, the quality that distinguishes works of art from all other classes of objects.[5]

Whenever the modernists explained the nature of aesthetic experience, they pointed out that it arises when people set aside their quotidian way of relating to objects.[6] Ordinarily we treat the objects lying about us as though they were simply things to use. We respond to them less than intensely because we respond to them in routinized ways that are based on the use we make of them. We need to know no more about them than is required by the ways we employ them, so our perceptions of them are less than vivid.

But sometimes an object—even a familiar object—arrests us and seizes our attentions. Our perception becomes vivified as we notice that parts seem suitably adapted to one another. I might notice, for example, that the texture of the cup from which I drink my morning coffee is singularly well adapted to its colour, that its colour fits its overall shape, that the slight flare of the opening accords with the proportions of its base. I have become aware that the parts of the object are suited to one another and to the whole that they constitute.

I have become aware of its form. The transformation of my experience of the cup from its usual character correlates with a change in the experienced object: I no longer view the cup as I routinely do but instead respond to its form. This change in what I experience (the difference in the noematic object, to express the idea in the lexicon of the phenomenologists) has effected a change in how I experience, for my interest in the cup is no longer determined by its use; rather, I am giving my full attention to the experience of the relations among its features.

This is a simple, workaday example, but this experience, and experiences like it, are part of a continuum of experiences towards one end of which are increasingly complex and increasingly compelling forms. All of these experiences share recognizable qualities with experiences prompted when one turns one's attention over to a work of art and opens oneself to it. Aesthetic experience depends on apprehending form and requires a sense of the mutual adaption of the features of the experienced object to one another and to the whole that they constitute. The experience is compelling, and it demands that we set aside our utilitarian concerns and our quotidian manner of relating to objects. Clive Bell writes that

> art transports us from the world of man's activity to a world of aesthetic exaltation. For a moment we are shut off from human interests; our anticipations and memories are arrested; we are lifted above the stream of life. The pure mathematician rapt in his studies knows a state of mind which I take to be similar, if not identical. He feels an emotion for his speculations which arises from no perceived relation between them and the lives of men, but springs, in-human or super-human, from the heart of an abstract science. I wonder, sometimes, whether the appreciators of art and of mathematical solutions are not even more closely allied. Before we feel an aesthetic emotion for a combination of forms, do we not perceive intellectually the rightness and necessity of the combination? If we do, it would explain the fact that passing rapidly through a room we recognise a picture to be good, although we cannot say that it has provoked much emotion. We seem to have recognized intellectually the rightness of its forms without staying to fix our attention, and collect, as it were, their emotional significance.[7]

The consequence of this, Bell (like most of the modernists) concluded, is that art has nothing to do with life—not even with the emotions of life: "to appreciate a work of art we need bring with us nothing from life, no knowledge of its ideas and affairs, no familiarity with its emotions."[8]

But if a work of art succeeds or fails because of a particular emotion that contemplation of its form engenders, then the relation between the work of art and reality counts for little, if anything. It is the relations intrinsic to the artwork (the relation of one element or one feature of the artwork to other elements and features and, ultimately, to the whole) that are significant; whatever extrinsic relations (relations between the forms internal to the work and the world) the art object may possess are irrelevant. Extrinsic relations, which modernists asserted to be aesthetically immaterial, generally have to do with representation. Of course, there are many works that offer accurate representations and, nonetheless, are formally compelling. So modernists could not assert that concern with the representational dimension of an artwork so interferes with our contemplation of that work's form as to make aesthetic emotion impossible. But modernists like Bell claimed that "the representational element in a work of art may or may not be harmful; always it is irrelevant."[9]

## MODERNISM AND ABSTRACTION

Though no rigorous argument for the complete repudiation of representational practices issued from any strong modernist theorist, there was nonetheless an anti-representational tendency implicit in the modernist's basic position. This is evident in remarks that Clive Bell offers about representation in "The Aesthetic Hypothesis":

> Before a work of art people who feel little or no emotion for pure form find themselves at a loss. They are deaf men at a concert. They know that they are in the presence of something great, but they lack the power of apprehending it. They know that they ought to feel for it a tremendous emotion, but it happens that the particular kind of emotion it can raise is one that they can feel hardly or not at all. And so they read into the forms of the work those facts and ideas for which they are capable of feeling emotion, and feel for them the emotions that they can feel—the ordinary emotions of life. When confronted by a picture, instinctively they refer back its forms to the world from which they came. They treat created form as though it were imitated form, a picture as though it were a photograph. Instead of going out on the stream of art into a new world of aesthetic experience, they turn a sharp corner and come straight home to the world of human interests. For them the significance of a work of art depends on what they bring to it; no new thing is added to their lives, only the old material is stirred.[10]

The psychologist-aesthetician Edward Bullough's ideas on "under-distancing" buttressed these claims (Bullough always hyphenated underdistancing, though I shall not). In a series of lectures he delivered at Cambridge University in 1907 (and subsequently distilled into one of the most important essays on aesthetics ever published), Bullough laid the foundations of the modernist theory of aesthetic experience. Bullough considered that a particularly important quality of such an experience was a feature he called "Distance" (Bullough consistently used an upper-case first letter, though, again, I shall not). He pointed out its nature by contrasting two experiences of fog that we can have, one non-aesthetic and the other aesthetic in nature:

> Nevertheless, a fog at sea can be a source of intense relish and enjoyment. Abstract from the experience of the sea fog, for the moment, its danger and practical unpleasantness . . . direct the attention to the features "objectively" constituting the phenomenon—the veil surrounding you with an opaqueness as of transparent milk, blurring the outline of things . . . observe the carrying power of the air . . . note the curious creamy smoothness of the water . . . and the experience may acquire, in its uncanny mingling of repose and terror, a flavour of such concentrated poignancy and delight as to contrast sharply with the blind and distempered anxiety of its other aspects. This contrast, often emerging with startling suddenness, is like a momentary switching on of some new current, or the passing ray of a brighter light, illuminating the outlook upon perhaps the most ordinary and familiar objects—an impression which we experience sometimes in instants of direst extremity, when our practical interest snaps like a wire from sheer over-tension, and we watch the consummation of some impending catastrophe with the marvelling unconcern of a mere spectator.[11]

The difference between our experience of fog as something terrifying and our experience of it as something beautiful is that the latter is characterized by what Bullough calls distance—a separation between oneself and the sources of one's affects, and between the experience of fog we have at the particular moment and the experience we would have if we responded in our usual ways. When our experience of the fog is distanced, we respond reflectively, recognizing that fog has the power to impel fear (we may even feel terror), but at the same time we uncouple from our usual experience of fog—to rise above it and thematize.

Bullough implied that adopting a distanced response is, at least in some measure, subject to volition. One can sit down in a movie theatre to watch Alain Renais's *Hiroshima, mon amour* and tell oneself that one should not simply succumb to the emotions provoked by the film's images and plot—to the pity and terror the film's Japanese footage induces, to the erotic feelings aroused by the film's images of bodies, or to sentimental feelings the love story elicits—and should instead thematize any such feelings. We can, at least to

some extent, instruct ourselves to distance ourselves from those affects, and experience the work chiefly through the beauty of its language, the intricacy of its cutting, and so on.

But perhaps there are factors that impede my ability to get a distance on the work. These factors can be internal: perhaps I am preoccupied by a nasty workplace episode of a sort that arises periodically, seemingly as a dismaying aspect of a human's lot in life, and am unable to put aside those cares; or I am so fatigued at the end of the workday because of the tension-filled environment that I am unable to concentrate (and the capacity to concentrate seems requisite to achieving "distance"). Or these factors can be external, having to do with my circumstances: suppose I am reading a novel that concerns the loss of a family member, and I have just experienced such a loss—in this case, I may not be able to get any significant distance on the feelings of bereavement the novel elicits, and so may not be able to experience the novel as an aesthetic construction.

Or, to use Bullough's example, a man who is deeply jealous in his relationship with his wife may experience what Bullough called a too profound "concordance" between a performance of *Othello* and one's life—that is, too much similarly between what one sees on stage and what one imagines happening in one's own life. Bullough remarked about this person, "He will probably do anything but appreciate the play . . . The concordance will merely render him acutely conscious of his own jealousy; by a sudden reversal of perspective he will no longer see Othello apparently betrayed by Desdemona, but himself in an analogous situation with his own wife."[12]

Artists cannot do much about factors having to do with one's internal condition: no matter how great a work, there will be times when the demands involved in giving over all our attention to a work are simply too great, times when our fatigue is simply too deep, or our workaday conditions too troubling, or a problem too nagging, for us to frame the necessary distance. However, modernists argued, there are features of the work of art that may encourage (or, conversely, discourage) our efforts to develop the needed distance. Qualities of a work that discourage such efforts Bullough described as promoting "under-distancing." In the example given above, of a novel about the loss of a family member, the reader failed to develop the necessary distance *partly* because of the concordance between the events the novel depicts and events that had just occurred in his own life. Psychic underdistancing occurred *partly* because the novel's representations too closely resembled the events of his life.

Nevertheless, the bald assertion that too great a closeness between the depictions a work of art offers and the world of our ordinary acquaintance can encourage underdistancing is not one that all modernists underwrote. In fact, Bullough, for example, believed that an artwork's concordance with

reality could *intensify* aesthetic experience, by evoking sympathies that allow us to apprehend it more fully. Accordingly, he argued that concordance should be as complete as it can be without eliminating distance—that there should be "*the utmost decrease of distance without its disappearance*."[13] Bullough's views notwithstanding, some modernists *did* conclude that too great representational fidelity ran the risk of promoting underdistancing. And since, like Clive Bell, modernists argued that the representational dimension of a work of art is always irrelevant, they saw no reason why artists should assume the risk of creating accurate depictions—or, for that matter, depictions of any sort whatsoever. Since the representational element threatens to encourage underdistancing, and since it is aesthetically irrelevant, it might just as well be abandoned.

There were other arguments against allowing concerns with representational fidelity to take precedence over considerations of formal and conceptual unity (though they did not always call on artists to eschew representation altogether). Roger Fry, an influential British defender of Impressionism, pointed out regarding Raphael's (1483–1520) *La trasfigurazione* (Transfiguration, 1516–20) that a Christian spectator with a reasonable understanding of human nature might well find the story of the transfiguration to be improbably presented: the people whom Raphael depicts as surrounding Christ are out of accord with the Biblical report (instead of the poor and humble whom the Bible reports were Christ's followers, the painting presents grandees in implausibly decorated gowns, posed in impressive, but unnatural, theatrical poses). But this need not trouble a spectator who is "highly endowed with the special sensibility to form, who feels the intervals and relations of forms as a musical person feels the intervals and relations of tones . . . Such a spectator will be likely to be immensely excited by the extraordinary power of co-ordination of many complex masses in a single inevitable whole, by the delicate equilibrium of many directions of line."[14] Fry continues by listing the variety of responses such a spectator (whom he refers to as "our pagan spectator" because of his lack of concern about fidelity to the biblical account) may have, and enucleating the aesthetic kernel of the complex of sensations he would likely feel:[15]

> We may imagine, for instance, that our pagan spectator, though entirely unaffected by the story, is yet conscious that the figures represent men, and that their gestures are indicative of certain states of mind and, in consequence, we may suppose that according to an internal bias his emotion is either heightened or hindered by the recognition of their rhetorical insincerity. Or we may suppose him to be so absorbed in purely formal relations as to be indifferent even to this aspect of the design as representation. We may suppose him to be moved by the pure contemplation of the spatial relations of plastic volumes. It

> is when we have got to this point that we seem to have isolated this extremely elusive aesthetic quality which is the one constant quality of all works of art, and which seems to be independent of all the prepossessions and associations which the spectator brings with him from his past life.
>
> A person so entirely pre-occupied with the purely formal meaning of a work of art, so entirely blind to all the overtones and associations of a picture like the Transfiguration is extremely rare. Nearly everyone, even if highly sensitive to purely plastic and spatial appearances, will inevitably entertain some of those thoughts and feelings which are conveyed by implication and by reference back to life…
>
> It is evident also that owing to our difficulty in recognising the nature of our own feelings we are liable to have our aesthetic reaction interfered with by our reaction to the dramatic overtones and implications.[16]

Fry wrote these passages later in his career, as he looked over his critical commentary to select those parts he wanted to pull together into a book. This selection draws him nearer to the position that representational considerations may interfere with that pure, intense absorption in form that is the heart of aesthetic experience. He confesses slightly later, in "Retrospect," that he has doubts that the fusion of the emotions elicited by a representation and by form is really possible (as his earlier writings had supposed).[17]

Harold Osborne developed Fry's later position in *Abstraction and Artifice in Twentieth-Century Art*, but he considered the question less as Fry did—that is, from the vantage point of the spectator—and more from the vantage point of the creator. Osborne argues against the claim (which he wrongly identifies as Bell's) that the representational structures of a work can be successfully detached from its formal construction and exemplificatory properties:

> The fact that any form in a picture is seen as representational alters its prominence, insistence, impact in the structure of the picture, and the nature of the semantic reference also has a bearing. This is a psychological fact of which artists must perforce take account. They therefore modify and abstract from the semantic content in order to bring it into line with the compositional structure which is the central idea of the work. The deliberate suppression of natural features in the interests of aesthetic structure has been a particular feature of twentieth-century art.[18]

The attempt to introduce representational considerations into the effort to construct an intricately developed pleasing whole may distort the form. Osborne makes a strong point here. The artist Pissarro is said to have remarked that "the big problem to resolve is how to pull back everything, even the smallest details of a picture, into the harmony of the ensemble, into full agreement."[19] The primary demand on making any work, including an abstract work, is to create a unity among all the elements within it. Suppose the artist creates a form in which hues across the surface articulate a rhythm: this rhythm might

demand that a certain area be coloured orange. However, the representational demands may determine that the colour in this area should be something other than orange—the blue of a lake, perhaps. Then the artist is faced with irreconcilable demands. The formal system requires one hue, the representational imperatives suggest another. Which colour should the artist use? It is not clear how these conflicting demands might be reconciled.

Critics of this position might point out that artists have always had to balance representational and formal systems and use this fact as the basis for asserting that the ability to balance these competing demands makes for artistic greatness. And one must admit that certain painters' stature (Paul Cézanne [1839–1906] would be an obvious example) depends on their power to reconcile these competing impulses—on their being able to find forms in which the representational requirements are brought into accord exactly with the demands imposed by the formal system (or, more likely, the hierarchy of formal systems), with the representational system tolerating the distortions the formal system imposes while the hierarchy of formal systems preserves its integrity despite accommodating the demands of the representational system.

Though reason may require us to admit this much, we might nonetheless claim that what we admire in representational works, finally, is their formal integration. That was exactly the claim that Clive Bell (and other modernists) staked: that the representational dimension is significant only for the manner in which it is adapted to the formal system. But introducing representational concerns runs the risk of distorting the work's form, of pulling it away from the form determined by the hierarchy of formal systems—and this risk is assumed despite there being no aesthetic advantage whatsoever in incorporating a representational dimension.

There is a final line of reasoning that explains modernism's favouring abstraction. Modernism turned art towards self-reflexivity. It was noted that art is a strictly tautological enterprise: if a work of art is about anything at all, it is about the relations that constitute it. What is more, these relations determine it to be a unique object, whose form of unity is incommensurate with that of any other work of art. When we contemplate a work of art, we consider it simply for its intrinsic properties, and not in relation to any other object. Its stylistic likeness with other works or its place within the artist's *oeuvre*, or its similarity with any other object, are strictly irrelevant. All that matters is the work in itself. The object of aesthetic experience is the form of the artwork in its absolute uniqueness. Artists should do what they can to focus experience on the unique form of the work. One way to do that is to create completely abstract works—then there will be no confusion about what the work concerns: it will be evident that it is about the relations that constitute it, and not about the world it depicts.

As we will see, this tension between an impulse towards representation—to understand and to be engaged with a world that by the early twentieth century seemed to be moving away beyond one's grasp—and an aesthetic impulse towards transcendence and the wholeness suggested in the integration of pure forms, is a topic to which we will return repeatedly. Cubism and Futurism earned the right to be taken seriously as movements committed to a Constructivist conception of the work of art. This commitment led to Cubists' and Futurists' separating the appearance of the work of art from the surfaces of reality. This distancing encouraged the viewer/reader/spectator to experience the force of the object's material. In what follows, I endeavour to honour the Cubists' and Futurists' commitment to a work's construction as well as the era's interest in truth to the material—to recognize that artists (in this period, to an unusual extent) were interested in creating constructions that built upon the material nature of the medium in which they were realized. But, to acknowledge the great paradox that lies at the heart of these art movements, I also attempt to honour their efforts to elevate aesthetic experience a higher, non-material realm.

## THE ATTRIBUTES OF AESTHETIC EXPERIENCE

The key characteristics of the aesthetic experience outlined by the modernists are the following. First, the aesthetic object absorbs our attention: we withdraw our attention from the environment around the aesthetic object and concentrate exclusively on the object's form. The aesthetic object is said to be "framed apart" from the environment. Second, our experience of the object is not of any cognitive variety; accordingly, our relation to the work is not discursive. As Kant pointed out, out experience of the object does not involve subsuming it under categories. The art historian's concern with the circumstances of the work's production or its relation to stylistic movements is strictly ancillary: it may have value in directing our attention towards features of the work that may then seize hold of our attention and engender an aesthetic experience, but such concerns are not in and of themselves aesthetically relevant. Not even theoretically informed efforts to parse the work into syntagmatically related components have aesthetic relevance (though, of course, they may serve as a propaedeutic to the immediate and non-conceptual experience of the work as a complex of interrelations). Third, aesthetic experience is both immediate and engrossing: we ordinarily live life anticipating the outcomes of what we do, and expecting (or at least hoping for) some profit from our efforts. We experience almost every moment of ordinary life in the mode of anticipation, and we try to arrange for it to have a desirable outcome or, at least, to prepare ourselves for whatever outcome arrives. The matter is quite different when

we engage aesthetically with a work of art: the immediate moment absorbs us totally. Our past knowledge of how things should be becomes irrelevant. The unexpected does not disturb us, for when we surrender ourselves to the aesthetic mode of experience, we do not import expectations of the way things should evolve, or anticipate what result events should have.[20]

Finally, the aesthetic experience is completely engrossing and all-consuming. We live much of our lives split between percipience and reverie. We pay enough attention to our environment, our duties, and our associates to enable us to negotiate the demands that routinely are placed on us. But we give over a part of our awareness to imagining a world other than the one we are occupying at the moment—to imagining what we might do when we return home, or what we might say when we meet a friend, or to conjecturing about what has led to some calamity (or good fortune) that befell us. Our engagement with a work of art is of a more consuming, more involving sort. When I go to a concert to listen to, say, J.S. Bach's *Messe in H-moll* (BWV 232, 1749), I cannot allow myself to be distracted by such flights of reverie. I must be completely absorbed in my percipient acts. I cannot even allow myself to be distracted by feelings arising from a bitter misunderstanding with a colleague or by my exhilaration over some success. I turn myself over to the work of art as though through an act of self-transcendence.

In presenting the modernists' ideas on the experience, I am emphasizing one side of their beliefs. I am aware there are other sides—in fact, highlighting the importance of frequently unacknowledged aspects of the modernist beliefs propounded by Cubist and Futurist artists figures among my purposes for writing this volume. But I also set out to show how uneasily Cubism—to say nothing of Futurism—fits within the modernist rubric. That said, I realize that advancing on too many fronts at once is likely to produce confusion, and it is a more prudent approach to start by laying out more well-established views and to delay expounding my own convictions (which are likely to be controversial) until after I have provided the groundwork for them. For the time being, I simply point out that the idea of apprehending pure form through a contemplative, non-discursive experience has similarities to the idea that one grasps a reality higher than that of the everyday world through a noetic experience that is likewise contemplative and non-discursive. In an earlier book, *Harmony and Dissent: Film and Avant-garde Art Movements in the Early Twentieth Century* (2008), I undertook a wide-ranging discussion that opened up some broad topics concerning modernity's cognitive (and perceptual) regime, with a view to showing that a crisis within that regime engendered several strange (and highly questionable) epistemological beliefs and enthusiasms. There, I proposed that a crisis of cognition precipitated by modernity produced, by reaction, a peculiar pneumatic epistemology. I showed that this pneumatic

epistemology influenced people's conception of the cinema. I also showed that this pneumatic conception of cinema explains the medium's pivotal role in shaping two key moments in early-twentieth-century art: the quest to bring forth a pure, "objectless" (non-representational) art, and Russian Suprematism, Constructivism, and Productivism. In the succeeding volume, *DADA, Surrealism, and the Cinematic Effect* (2012), I proposed that developments in philosophy, science, and mathematics in the late nineteenth and early twentieth centuries produced what literary historians have sometimes characterized as a *fin-de-siècle* mood (needless to say, I think the issues involved go much deeper than is suggested by that term), which held that reason no longer could furnish insight into reality's fundamental nature. These developments produced an epistemological crisis, as reason seemed to have become untethered from the world. The idea the mind has no access to truth is one many find unendurable. People longed to believe that humans have at their disposal another means—an irrational or super-rational means—for apprehending a higher reality, a *surréalité*. The noesis (higher intuition) celebrated in many spiritual, esoteric, and occult traditions fit the bill—the occult traditions seemed to many to offer an alternative means of apprehending higher truths. The widespread (and often forgotten) interest in esoteric and occult topics influenced DADA and Surrealism in important ways.

The idea that the age demanded an alternative noesis that would overcome the deficits of the rational-scientific understanding of the world became so widespread as to constitute the basis for a discursive regime (authorizing, *inter alia*, how one is to conceive of and speak of the mind, knowledge, art, and the cinema). It even sanctioned an extravagant syllogism that many thinkers in the early twentieth century embraced: the value of art forms depends on their ability to produce powerful pneumatic effects, and the cinema is the most effective pneumatic device, so the cinema is the top art, at least for modern times. This book has a related bone structure, though one that cannot be so neatly summarized in syllogistic form. The basic argument of this volume and its analysis of films, paintings, and poems is undergirded by a gnosiological proposition.[21] Reality is process; however, the human mind does not ordinarily understand reality as process and instead sees it as composed of static objects. It follows that the mind has lost its grip on reality. (This proposition can be subdivided as follows: the mind can know reality in two ways, direct acquaintance or inference; however, the senses have turned out to be deceivers, and calculative reason assumes that reality is populated by static objects, so neither can *it* grasp reality). History and scientific developments (for what they are worth) have shown us that a higher vantage point would be required to attain knowledge of reality—and perhaps that higher vantage point does not exist.

## OPTICAL EXPERIENCE AND THE HIGHER NOESIS

Discussions around the arts, and visual art in particular, accorded importance to the idea that when we engage aesthetically with a work of art, the immediate moment absorbs us totally. The primary reason this idea assumed special importance in the visual arts is that around the mid-nineteenth century, a strain of thinkers appeared who maintained that visual experience, especially when it detaches itself from language, offers a loftier, more noble, more pure mode of cognition than that afforded by other sensory modalities: it is loftier, purer, more noble because its transactions are less with the material world and more with light. Out of this emerged such claims as Clement Greenberg's: "To render substance entirely optical . . . and form as an integral part of ambient space—this brings anti-illusionism full circle. Instead of the illusion of things, we are now offered the illusion of modalities: namely, that matter is incorporeal, weightless and exists only optically like a mirage."[22] Though the conviction was not universally accepted by modernists and is not one of the core tenets of modernism in the visual arts, many visual art theorists who embraced modernist ideas maintained that there is an optical form of awareness that opens us towards higher truths than those which verbal thinking can impart. Optical awareness differs from verbal thinking partly in its instantaneity: whereas verbal thinking proceeds developmentally, moving from one thought to the next, and seeks to consolidate its certainty in each step along the way, optical awareness presents itself with dazzling celerity, as though vouchsafing its revelations in a thrice.

Since optical awareness comes as though in a flash, and since it opens us towards higher truths, these truths must belong to the realm of pure simultaneity. The idea that the domain of truth is a timeless realm of simple simultaneity is a venerable metaphysical proposition. Plato (ca. 427–ca. 347 BCE) and Baruch Spinoza (1632–1677), among others, expounded it, and generally it was associated with the idea that the highest ways of knowing resemble seeing—that the higher noesis is a relative of vision. These ideas were accepted by a surprising number of modernists (whose ideas, after all, reiterated the metaphysical basis of Christian philosophy). Consequently, many art theorists, including many modernists—in fact, most of them—made the issue of a fundamental, indivisible moment of seeing, a punctate moment completely lacking in extension, fundamental to their doctrines of aesthetic experience. Many Romantics had expounded similar ideas, but the modernists radicalized the conception of the timeless "now" of aesthetic experience to insist that our apprehension of a work of art occurs within a moment of uncontaminated brevity—within the compass of a moment of complete simultaneity and absolute instantaneity. Modernist art celebrated perceptual

intensity—the immediate sensation of pure colour, of the tug of colours pushing towards and pulling away from the picture plane, engendering the sense of the whole as composed of an immediately apprehensible, all-over pattern; or the immediate sensation of sound organized not consecutively (meaning was no longer thought to emerge as we assemble and relate forms through time), but in the immediacy of its sensuousness (for example, in the tone colours, *chromoharmonies*, and non-retrogradable rhythms of Olivier Messiaen's [1908–1992] compositions). In Messiaen's works—or for that matter in Gertrude Stein's (1874–1946) poetry and prose—patterns emerge through time, and their force, accumulating over time, carries us to the point where time passes away and we arrive at the experience of pure simultaneity. Modernists employed these forms to consolidate the apprehension of the work of art into the utterly punctate immediacy of the moment of total presence.

This is one basis for modernists' doubts about the aesthetic viability of narrative. Narrative infuses the lived moment with retentions and protensions, and dilates into William James's specious present:

> The relation of experience to time has not been profoundly studied. Its objects are given as being of the present, but the part of time referred to by the datum is a very different thing from the conterminous of the past and future which philosophy denotes by the name Present. The present to which the datum refers is really a part of the past—a recent past—delusively given as being a time that intervenes between the past and the future. Let it be named the specious present, and let the past, that is given as being the past, be known as the obvious past. All the notes of a bar of a song seem to the listener to be contained in the present. All the changes of place of a meteor seem to the beholder to be contained in the present. At the instant of the termination of such series, no part of the time measured by them seems to be a past. Time, then, considered relatively to human apprehension, consists of four parts, viz., the obvious past, the specious present, the real present, and the future. Omitting the specious present, it consists of three . . . nonentities—the past, which does not exist, the future, which does not exist, and their conterminous, the present; the faculty from which it proceeds lies to us in the fiction of the specious present.[23]

That specious present in turn grounds the ordinary, workaday experience of time as continuity (James himself stated that the specious present is "the prototype of all conceived times . . . the short duration of which we are immediately and incessantly sensible").[24] Since the experience of time as a continuous, unfolding experience is narrative's inevitable effect, narrative (or at the very least narratives of the conventional form) had to be jettisoned. Likewise, representations, which carry the "now" of immediate experience into the otherness of represented time, were deemed equally suspect.

The belief that truth reveals itself as an immediate presence is one that modernists shared with Edmund Husserl (1859–1938), the founder of phenomenology. This coincidence of ideas helps explain why many modernists found phenomenological ideas congenial and why so much modernist art criticism has a phenomenological tone. Husserl described the immediate present, revealed through lived intuition, as an indivisible moment. One need not offer a narrative account of consciousness: consciousness involves self-presence since its data are self-revealing. Consciousness need not be a consciousness of consciousness, nor need it be an analysis of consciousness, nor an account of consciousness, nor a history of consciousness (as implied by the Safer® Soap-using critics' demand to explain consciousness/the growth of the self through narrative). We do not need such narratives of consciousness, Husserl implied, because mental acts are self-revealing, so they are always already meaningful. The punctate phase of the immediate "now-apprehension" is the nuclear core of all mental acts (even if most mental acts drag a comet's tail of retentions along with them); and even the retentional train that immediate apprehensions drag along with themselves are really a kind of primary memory inherent in the primordial immediacy of this "now-apprehension."[25]

In the years when Cubism and Futurism flourished, this notion of the now-experience became connected to ideas about higher dimensions of space. Thinkers extravagantly proposed that the fourth and higher dimensions could be experienced. The apprehension of higher dimensions was often construed as an experience that lifted one out of the domain of illusion and into the elevated realm of truth. Albert Gleizes claimed that "Cubism goes beyond externals in order to get a better hold on them. It no longer suffices to look at the model, the painter must re-conceive it. He will transport it into a Space which is at once spiritual and plastic in Nature—a Space in regard to which we may perhaps allow ourselves to speak of the Fourth Dimension."[26] Apollinaire, in a late addition to the manuscript of *Les peintres cubistes*, notes that "the imaginative use of the term fourth dimension was just a way of expressing the aspirations and concerns of many young artists who were looking at sculptures from Egypt, Africa and the Pacific Islands, thinking about scientific works and seeking a sublime form of art."[27] And the art critic and propagandist for Cubism Maurice Raynal (1884–1954) similarly pointed out this regarding the Cubists' interest in the sculpture of Egypt, Africa, and Oceania:

> The Primitives . . . obeyed a very exalted need, that of the mysticism which illuminated their thinking . . . Instead of painting the objects as they saw them, they painted them as they thought them, and it is precisely this law that the cubists have readopted, amplified and codified under the name of "The Fourth Dimension." The cubists, not having the mysticism of the Primitives as a motive

> for painting, took from their own age a kind of mysticism of logic, of science and reason, and this they have obeyed like the restless spirits and seekers after truth that they are.[28]

Ideas about a transcendent fourth dimension circulated widely at the end of the nineteenth century and the beginning of the twentieth, even among scientists. The Theosophist C.W. Leadbeater identified intuition of the fourth dimension with astral vision. In *The Astral Plane* (1895), which was translated into French as *Le plan astral* (1899), Leadbeater asserts that astral vision "is a faculty very different from and much more extended than physical vision. An object is seen, as it were, from all sides at once, the inside of a solid being as plainly open to the view as the outside."[29] Seen from the astral plane, "even purely physical objects present a very different appearance," to the extent that "even the most familiar objects may at first seem unrecognizable."[30] Nonetheless,

> a moment's consideration will show that such vision approximates much more closely to true perception than does physical sight. Looked at on the astral plane, for example, the sides of a glass cube would all appear equal, as they really are, while on the physical plane we see the further side in perspective—that is, it appears smaller than the nearer side, which is, of course, a mere illusion. It is this characteristic of astral vision which has led to its sometimes being spoken of as sight in the fourth dimension.[31]

The experience of one who possesses astral sight or four-dimensional vision is not bound by the illusions of time: from the transcendental viewpoint, one experiences an eternal and absolute reality beyond time—one experiences reality *sub specie aeternitatis*. Everyday phenomena are seen as they truly are—eternal and changeless.

Leadbeater offered similar views in the later *Clairvoyance* (1899), which was published in French as *De la clairvoyance* in 1910: "the tesseract or fourth-dimensional cube which [C. Howard Hinton] describes is a reality, for it is quite a familiar figure on the astral plane." (Hinton was a popularizer of the idea of a transcendental fourth dimension, who offered readers exercises that might help them develop the power of seeing this higher realm.) Leadbeater also noted that if you looked at a wooden cube with astral sight, "you would see all the sides at once, and all the right way up, as though the whole cube had been flattened out before you, and you would see every particle of the inside as well—not through the others, but all flattened out." Leaderbeater also cites an article from the Theosophical periodical *The Vahan* that argues that "astral sight . . . seems to correspond to the fourth dimension."[32]

## PRODUCING FACTS

In 1905, Albert Einstein (1879–1955) offered arguments about fundamental laws of physics that rocked the world. The laws of Sir Isaac Newton's (1642–1726) clockwork universe were suddenly brought into question and extravagant alternatives proposed: time and space are one; light waves curve; what two observers see cannot be identical. This new view offered so fundamental a challenge to the prevailing conception of reality that the faculty of understanding itself fell under scrutiny.

Challenges to the Newtonian conception of reality had been lodged even before Einstein—and the ideas involved in these attracted much attention. In 1902, Henri Poincaré (1854–1912) published *La science et l'hypothèse* (Science and Hypothesis), a book that became known outside the small group of professional mathematicians. In that book, Poincaré reviewed developments in geometry, including the work of Bernhard Riemann (1826–1866) and Nikolai Lobachevski (1792–1856)—findings that challenged (or at least seemed to challenge) Euclidean geometry, which since the time of Plato had been accepted as describing space in a way that conforms to our intuitions of its nature. The Euclidean description of space was grounded in what had seemed unquestionable principles, and its propositions (theorems) were derived from strict rules of inference; this made it seem plausible that intuitions conformed to the way reality must be. Riemann and Lobachevski, each in his own way, challenged the claim that the axioms and postulates (founding principles) of Euclidean geometry were beyond doubt, given that they are intuitively obvious and, moreover, produce a description of space that shows it must necessarily be as we experience it as being. Thinkers realized that these developments put at stake our confidence that our intuitions (the basis of our understanding) of space are necessarily true. Poincaré considered these developments from a philosophical perspective. In *La science et l'hypothèse* he argued for what has become known as a conventionalist position: the axioms, postulates, and theorems of Euclidean geometry are not universally or absolutely true—Euclidean geometry, which had set the standard for mathematical rigour since ancient times, was only one of many possible systems of geometry. No geometric system actually concerns reality itself—the points, lines, and planes that geometers talk about are not objects in the world, but mathematical objects whose definition and existence are internal to the system itself. Poincaré also noted that there was no mathematical reason for limiting geometric systems to three dimensions—a consistent four-dimensional geometric system, and systems of higher dimensions, could be developed.

Poincaré's ideas were taken up by the mathematician Maurice Princet (1875–1973). Princet was interested in nightlife and *la vie bohème*—André

Salmon referred to him as "le mathématicien du cubisme."[33] In *Einstein, Picasso: Space, Time, and the Beauty That Causes Havoc*, George I. Miller shows that Princet consorted with Pablo Picasso, Guillaume Apollinaire (1880–1918), Max Jacob (1876–1944), Jean Metzinger (1886–1956), and Marcel Duchamp (1887–1968) in Montmartre cafés and introduced ideas on four-dimensional geometry to the Bateau-Lavoir painters.[34] Princet showed Picasso a book by the French artillery officer, insurance actuary, and amateur mathematician Esprit Jouffret (1837–1904), *Traité élémentaire de géométrie à quatre dimensions et introduction à la géométrie à n dimensions* (Elementary Treatise on the Geometry of Four Dimensions and an Introduction to N-Dimensional Geometry, 1903), and he helped him interpret its meanings. Jouffret's treatise is partly a popularization of Poincaré's *La science et l'hypothèse*, partly a compendium of marvellous facts about spaces of higher than three dimensions, and partly an exfoliation of some of its graphic implications (in it, Jouffret described hypercubes and other four-dimensional polyhedra and showed how the principles of projective geometry could be applied to create "shadows" of these figures on a two-dimensional surface).[35] Picasso's sketchbooks for *Les demoiselles d'Avignon* give evidence of the great influence Jouffret's graphic presentation of the projective geometry of complex polygons had on that work.[36]

Leo Stein sets out Picasso's response to Princet's idea:

> There was a friend of the Montmartre crowd, interested in mathematics, who talked about infinities and the fourth dimension. Picasso began to have opinions on what was and what was not real, though as he understood nothing of these matters the opinions were childishly silly. He would stand before a Cézanne or a Renoir picture and say contemptuously, "Is that a nose? No, this is a nose," and he would draw a pyramidal diagram with two circles connected by crossed lines… He was bent now on doing something important—reality was important whatever else it might be, and so Picasso was off.[37]

The impact that non-Euclidean and higher-dimensional geometries had on late-nineteenth- and early-twentieth-century thinkers needs to be understood in context. The seventeenth century saw a profound transformation in humans' understanding of the cosmos. Among these changes, greater importance was attached to the material world.[38] There are many reasons for this change, but one of the most important arose from the discoveries of Isaac Newton. In the earlier models of the universe, a sharp distinction was made between the sublunary and superlunary realms—between the spiritual order of the heavens and the derived order of the here below. Newton's physics challenged this conviction, which had founded the Classical and Christian-Medieval world views. Newton showed that the same laws of motion that

govern the movement of bodies on earth also apply in the celestial realm. Thereafter, the sharp distinction between the terrestrial and celestial realms seemed untenable. Order could be discovered by paying heed to the material realm just as effectively as—indeed, much more easily than—it could be by deliberating on the patterns in the heavens that are beyond our grasp. Even before Newton, the independence of spirit fostered by the rise of the artisanal classes and the humanistic views that flowed from that development led to a questioning of all principles whose warrant lay in authority.[39] In the period from Bacon to Newton the idea that humans should search out the facts, unbridled by church teachings or the views of its philosophical Scholastic masters, was endorsed by wider and wider groups of people. The writings of Francis Bacon (1561–1626)—*The Advancement and Proficience of Learning Divine and Human* (1605), *Instauratio Magna* (Great Instauration, 1620), and *Novum Organum Scientiarum* (New Method, 1620) in particular—gave staggeringly elegant and forceful expression to those views (1561–1627), and Newton's great discoveries confirmed the value of Bacon's counsel.

Another aspect of Francis Bacon's work that is less commonly noted must also be addressed, to emend an important omission in discussions of Renaissance science. Alexandre Koyré's (1892–1964) historical analysis of the scientific study of the cosmos from the time of Nicolaus Cusanas (also Nicholas of Kues and Nicolas of Cusa, 1401–1464) and Giordano Bruno (1548–1600) led him to conclude that, despite the number of significant developments that took place in this interval, there was a continuous evolutionary thread. That thread was essentially Platonic (which is one reason for his having chosen to start with the Neo-Platonist Cusanas).[40] Koyré challenged scientists' claims that they uncovered facts by operating on nature, using experimental methods. Science is not really a means of discovering objective facts and observing regularities in occurrences (which are laid out in scientific laws). Science at heart is theory. It relies on assumptions (some of which derive from religious assumptions about the origin and nature of the cosmos) concerning the fundamental processes underlying phenomena, and it seeks confirmation of those assumptions. His favourite example to use in making this point was Galileo Galilei. Galileo claimed to have discovered the principles of motion and gravity through experimentation. Koyré claimed he did not: he asserted that Galileo's descriptions of weights moving down an inclined plane were in fact thought experiments. Galileo, Koyré asserted, worked out his ideas mathematically (using the method of indivisibles to develop techniques of calculation that were forerunners of infinitesimal calculus), and not through observation. That side of his work is what Galileo highlighted with his famous statement from *Il Saggiatore* about the book of nature being written in mathematical language. Stilman Drake, to the contrary, after carefully

working through Galileo's notes, was able to show that Galileo was a diligent experimentalist who assiduously recorded and painstakingly processed his observations. And this underestimation of the role of experiments in Galileo's formulation of his scientific experiment is far from the only example of Koyré's Platonist interpretation of sciences' history.

The persuasive force of Koyré's prose made this sort of interpretation of the Renaissance and the Scientific Revolution the standard view. But it is certainly not the view that Francis Bacon held. Bacon wrote that a human "can only act and understand [nature] insofar as by working upon her he has come to perceive her order. Beyond this he has neither knowledge nor power. For there is no strength that can break the causal chain. Accordingly, these twin goals, human science and human power, come in the end to one. To be ignorant of causes is to be frustrated in action."[41] In fact, Bacon's statement gives expression to an interpenetration of making and knowing that developed during the Renaissance and would find its most complete expression in the philosophy of Giambattista Vico. The real (and hardly noticed) turning that occurred in the Renaissance was a new conception of an inextricable interrelation of making and knowing.[42] This notion found an exemplary advocate in the person of Leonardo da Vinci. The polymathic painter, inventor, sculptor, engineer was sometimes troubled by being looked down on with scorn by "certain presumptuous persons" (academics), who scorned him as a mere inventor. He wrote an angry retort to the puffed-up university scholars, "You have set painting among the mechanical arts! . . . If you call it mechanical because it is by manual work that the hands represent what the imagination creates, your writers are setting down with the pen by manual work what originates in the mind."[43]

The Renaissance, it has long been understood, produced a new conception of space as volume that could be sectioned again and again into smaller volumes on the model of three orthogonal real number lines. This belief was the founding notion of Marshall McLuhan's conception of Newtonian science (whose replacement by a scientific system grounded in the ideas of Michael Faraday (1791–1867) and John Clerk Maxwell (1831–1879) is a central topic of concern for the Toronto theorist of literature and communication). As have the vast majority of thinkers since Koyré's time, McLuhan understood that the mathematization of nature (based as it was in mensuration and number) was the product of "pure unadulterated thought."[44] What he and many historians of science have overlooked is the role of practical activities in generating this conception of space. The case of Galileo, who is generally considered to have been a pre-eminent force in the production of this abstract, mathematical conception of nature, is instructive. Edgar Zilsel's (1891–1941) was a lonely voice challenging this Platonic account of the mathematization of nature.

Zilsel's pioneering efforts in the sociology of science (which blended Marxism with the positivism of the *Wiener Kreis*) led him to the assertion that the rise of capitalism resulted in the interaction of craftspeople with scholars and that the resulting exchanges laid the foundations of early modern science.[45] Earlier, before the rise of capitalism, craftspeople were usually looked down on by scholars, while scholars were gloriously ignorant of practical craft activity. The coming of capitalism gave impetus to the development of technical and computational processes, which were applied in navigation, cartography, and surveying and to the development of devices like the astrolabe. As a result of their involvement in these advanced technical fields, craftspeople started to develop theories about the crafts and their potential usefulness, and this theoretical engagement led them to apply craft knowledge in investigating nature. This application of craft and mercantile knowledge (which encouraged exactitude in mensuration) led to the development of experimental science and gave it its character as computation.

Zilsel points out the following concerning the sources of Galileo's mathematical learning:

> During his student days, there was no mathematical instruction at Pisa. He learned mathematics privately, his tutor, Ostilio Ricci, being an architect and teacher at the Accademia del designo which had been founded in 1562 by the painter Vasari as something between a modern academy of arts and a technical college. Thus Galileo's first mathematical education was directed by persons who were artist-engineers.[46]

Galileo certainly wasn't alone in turning to practitioners for instruction in computational skills that would allow him to measure the effects of action on nature. The mechanicals of this era did not turn to members of the university for instruction; instead, they looked for a reckoning master—a *maestro d'abbaco* (abacus master) in Italian, a *maître d'algorisme* in French, a *Rechenmeister* in German. J.V. Field points out in "Mathematics and the Craft of Painting" that

> it is to the elementary textbooks of the abacus schools that one must trace the rise of algebra to become a part of learned mathematics in the sixteenth century. Moreover, the use of mathematics in the crafts seems to have encouraged thinking in three dimensions, as was requred for many practical problems, rather than the two-dimensional terms that characterize almost all the theorems of Euclid. Such habits eventually led to important changes with the learned system of geometry.[47]

Galileo's formal studies were in *disegno* (design/production), and his first position, obtained in 1588, was that of an instructor in the Accademia delle Arti del Disegno in Florence, teaching perspective and *chiaroscuro*. Galileo

was deeply immersed in the artistic activities of that city, and while at the Accademia, he formed a friendship with the Florentine painter Lodovico Cardi (1559–1613, more commonly called Cigoli) that was to last for Cigoli's lifetime. In 1589 he took up the chair of mathematics in Pisa.

The interpenetration of knowing and making resulted in a belief that the arts offered a means for understanding the cosmos. In reflecting on their activities, artists generated theoretical knowledge. The mysteries of nature gave way as nature was acted upon: speculation was idle and useless, whereas acting on nature forced it to reveal its secrets (and, I am afraid, the idea of forcing was of great importance). Similar ideas would last right into the twentieth century and would play a key role in the activities of the Cubists and Futurists.

The successes of the new science, a consequence of focusing its efforts on the material realm, produced a revised understanding of the scientific method. As I noted in the introduction, the task of understanding nature became that of noting regularities in events, of identifying laws that describe patterns in the succession of observed occurrences. Earlier views of nature had invoked a superlunary (divine) force that gave order to nature and all that it contained. This superlunary force, generally personified as a god or a *δημιουργός* (dēmiourgos, demiurge), could be understood only through pure reason—so these views maintained—but once the nature and workings of that force were understood, reason alone, unaided by observation, could know, with greater certainty than the senses were able to furnish, the actual constitution of reality. "How can one describe the motion of the planets?" Plato asked in the *Timaeus*. He answered that one apprehends nature's order not by observation, but through reason (a higher form of intuition). The *Δημιουργός* operates by reason; so it would not tolerate having the planets move in any orbit but the best. Circular motion is the perfect form of movement; therefore, the planets must move in circular motion. No observation is needed to confirm this.

Bacon rejected this approach to studying nature. According to him, knowledge must be founded on empirical study, directed towards apprehending the regularities of nature. Purpose, he asserted, lies outside the purview of the empirical method (recall the lengths Kant went to in his defence of teleology). In this way, teleology was rejected and with it all warrant for claims that the order of nature is any other than the product of chance. Humans were constrained to accept the view that theirs was an accidental universe. The work of consciousness came to be understood solely as cognition, and cognition as nothing other than observing regularities in the succession of appearances, subsuming those regularities under general laws, and (as an ultimate ideal) organizing those laws into a coherent account of reality. Knowledge was thus reduced to information about patterns in chains of events. Some of the most

profound domains of human awareness were reconceived as lying beyond the bounds of the legitimate activities of the cognitive enterprise. According to this image of reality, consciousness confronts a world, the reasons for the order of which we cannot know—a world that is indifferent to individual lives, that had come into being by accident, and that will disappear at a time mandated by the initial accidental conditions that gave rise to it. The vagaries of these indifferent, accidental congeries of matter are all we can hope to know.

For many later moderns, this image of consciousness and reality seemed inadequate. They felt the noetic strength and richness of forms of experience that modernity had disenfranchised. As Walter Benjamin did in "The Project for a Coming Philosophy," they claimed that cognition encompasses a wider range of experience, including experiential modalities richer and more fulfilling than reason. Prayer, meditation, trance, dream, and contemplative pursuits provide genuine understanding of reality, including the divine. These domains of experience are the provinces of the religious seeker, the mystic, and the artist. Intuitive bodily knowledge, which remain largely pre-conscious and unconceptualized, informs us of the continuity of our be-ing with that of other beings.[48] Religious figures, mystics, and artists insist that only a participatory mode of experience—a mode of experience that acknowledges that when we know, we engage with and act on the reality we apprehend—is capable of overcoming the deleterious effects of instrumental reason. Instrumental reason, seekers point out, pretends to be *θεωρία* (theoria, theory), that is, the observation of nature as though from the position of an outside spectator—it conceives of knowledge as arising at the position of the outside spectator even while it maintains that the *τέλος* (telos) of knowledge, far from distanced and objective as *θεωρία* would suggest, is actually the control and regulation of nature (which thereby eliminates chance). The artists associated with some vanguard movements in twentieth-century art felt the importance of disenfranchised modes of experience such as trance, prayer, dream, and meditation and strove to develop artistic forms that might revitalize them, preparing the way for them to assume a greater role in the knowledge enterprise once a new understanding of reality emerged. Indeed, many of these artists believed that one purpose of vanguard art is to hasten its appearance. The disenfranchisement of non-rational ways of knowing came at a great cost, they maintained. For one thing, our ability to have these experiences had withered, like organs (such as the human appendix) that, having lost their purpose, are reduced to vestigial forms—which accounts for the odd forms these experiences have adopted under the regime of modernity, including its trivialized "New Age" manifestations. Recognizing that the performative dimension is the domain of religion and art, they sought participatory modes of experience, hoping that experience of this sort would revitalize these experiences and return them to health.

Compared to previous *epistémès*, these developments accorded greater importance to empirical discovery and so to the senses. The discipline of science studies has revealed that questions about the importance of experiment and empirical observation provoked much debate in the seventeenth century. Steven Shapin and Simon Schaffer's renowned *Leviathan and the Air-Pump* focuses on the debate between Robert Boyle (1627–1691) and Thomas Hobbes (1588–1679). Boyle maintained that knowledge in natural philosophy should be sought through experiment and the discovery of matters of fact. Hobbes argued against that assertion, challenging even the belief that there are simple matters of fact (*données*). In the end, Boyle's notions prevailed. Or rather, they prevailed for a time. I suspect that what many readers of *Leviathan and the Air-Pump* found so staggering—even some who were not favourably disposed to Hobbes's rationalism—was how deeply in accord they discovered themselves to be, first, with Hobbes's ideas on perception, and, second, with the role of agreement in producing knowledge. Boyle maintained that experimental procedures can produce agreement, or knowledge, "and, in particular the variety of knowledge called 'matters of fact.'"[49] Shapin and Schaffer note that on this philosophy of science, facts are *données*—pure givens, which come forth without humans playing any role. Humans might formulate theories and interpretations—and what is made can be unmade. But facts are givens, and they are the unchanging and unchangeable bedrock on which theories are formed:

> Matters of fact are regarded as the very "mirror of nature." Like Stendhal's ideal novel, matters of fact are held to be the passive result of holding a mirror up to reality. What men make, men may unmake: but what nature makes no man may dispute. To identify the real of human agency in the making of an item of knowledge is to identify the possibility of its being otherwise. To shift the agency onto natural reality is to stipulate the grounds for universal and irrevocable assent.[50]

Shapin and Schaffer continue by pointing out that philosophy had traditionally made the distinction between apodictic propositions—propositions that, because they are analytic, are necessarily true—and contingent propositions, the truth of which (if they are true) is not apodictic (this distinction maps the difference between "knowledge" and "science" on the one hand and "opinion" on the other). Scientists modelled their enterprise on the demonstrative "sciences," such as geometry (the sections on physics in Hobbes's writings, and Spinoza's *Ethica ordine geometrico demonstrata* [1677], are prime examples of the ideal). Before the mid-seventeenth century, these designations "knowledge" (or "science") and "opinion" were kept rigidly separate. After that time, Shapin and Schaffer note, in England thinkers began to suggest that all that

could be expected of physical knowledge ("science") was probability. If all knowledge is merely probable, the distinction between knowledge and opinion shrinks. If a scientific explanation—that is, a scientific hypothesis—is merely probable and subject to revision, then it does not command assent in the same way as the apodictic propositions advanced in mathematical demonstrations do. English philosophers saw accepting this new status of scientific knowledge as an advance—as a prudent and judicious rejection of overreaching claims to certainty:

> By the adoption of a probabilistic view of knowledge one could attain to an *appropriate* certainty and aim to secure *legitimate* assent to knowledge claims. The quest for necessary and universal assent to physical propositions was seen as inappropriate and illegitimate. It belonged to a "dogmatic" enterprise, and dogmatism was seen not only as a failure but as dangerous to genuine knowledge.
>
> If universal and necessary assent was not to be expected of explanatory constructs in science, how then was science proper to be *founded*? Boyle and the experimentalists offered the matter of fact as the foundation of proper knowledge.[51]

These views laid the foundations for a program for the advancement of learning, which the Royal Society was founded to carry out.

Hobbes disagreed with the program at nearly every point. For him, the proper way of producing knowledge was to start by laying out definitions for the key terms in the inquiry (so that absurdities would be avoided) and then to follow the correct method (viz., deduction, according to well-defined rules of inference) from these definitions to their consequences. For Hobbes, there was no room for disorder: confusion led to moral and social (political) mischief.[52] "*More geometrico*" is the proper way to establish certain knowledge, Hobbes maintained: "in geometry, which is the only science that it hath pleased God hitherto to bestow upon mankind, men begin at settling the significations of their words; which settling of significations, they call *definitions*, and place them in the beginning of their reckoning."[53] Geometric methods start with terms with precise meaning, and when the methods of inference are followed correctly, geometry yields apodictic knowledge.

Shapin and Schaffer highlight a key feature of Hobbes's epistemology: that he downgraded the standing of so-called factual knowledge, disconnecting it from science and philosophy. For Hobbes, empirical knowledge is merely a collection of sensory impressions. Hobbes was a material monist—for him, all that exists consists of matter in motion. Sense impressions are the physical results of particles impacting our sensory organs. The notion that the impressions we have correspond to the material properties of external objects and their configurations was, for him, sheer fantasy: dreaming, hallucinating,

and rubbing one's eyes can also produce similar impressions. Shapin and Schaffer point out that Hobbes extended special epistemological privilege to knowledge based on sensory impressions. However, he also acknowledged that social consensus does not remove the limitations from so-called factual knowledge. Sensory impressions played an important role in constituting knowledge, but nothing—not even general agreement—can make propositions founded on sensory impressions command universal assent. Indeed, Hobbes even wanted to call statements based on such sensory impressions by a name that might distinguish them from philosophy or from true science:

> The "register of the *knowledge of fact" Hobbes* called "history," "natural history" being the catalogue of "such facts, or effects of nature, as have no dependence of man's *will*." Thus the fundamental distinction Hobbes made between factual knowledge (or history) and philosophy involved the exercise of man's agency… Philosophy and science were constituted by the knowledge of consequences and causes, and, again, the model was provided by geometry: "As when we know, that, if the figure shown be a circle, then any straight line through the centre shall divide it into two equal parts." "And this," Hobbes said, "is the knowledge required in a philosopher."[54]

Boyle, on the other hand, had a less imperative conception of knowledge and knowledge production. His theory of knowledge production is based on methods for creating "matters of fact." That facts are not *données*, but are produced, is a truth that lay hidden in plain sight until it began to be thematized in the twentieth century, by thinkers such as Martin Heidegger (1889–1976), Hannah Arendt (1906–1975), and Hans Jonas (1903–1993).[55] Shapin and Schaffer's *Leviathan and the Air-Pump* problematizes the issues around empirical knowledge production with an unprecedented historical rigour and a close-reading of texts relevant to the interrelation of theories of science and theories of state in the seventeenth century. They point out that Boyle's procedures for knowledge production depended on what the Wittgensteinians among us would call a language game, one with rules that practitioners had to follow if their experiments were to be accepted as scientific knowledge.[56] This language game used three technologies: material (in Boyle's case, the air pump); literary (the textual conventions used to disseminate the results to those who could not be direct witnesses); and social (the conventions for dealing with one another and for considering truth-claims). Several witnesses must observe the phenomenon produced by the machine acting on nature, and they must share a set of beliefs that enable them to confirm the fact in an identical manner.[57] Boyle's procedures for knowledge production relied on a consensus of freely and independently developed beliefs.

Furthermore, in Boyle's new program, questions that could not be settled experimentally were not legitimate questions.[58] Against Hobbes, who required

absolute certainty based on logic and deduction to establish a phenomenon as a fact, the English experimentalists maintained that all that we can expect of physical knowledge are propositions that are probably true: only the consensus of observers warrants taking what is observed as fact, and this does not make them apodictic.

Consider (as Shapin and Schaffer do not, except perhaps by implication) where historical developments carried the debate between Hobbes and Boyle and the members of the Royal Society. How would that debate have appeared to sociologists and social theorists at the beginning of the twentieth century? Observation had become increasingly suspect—the reliability of sensation had come into doubt, and even more the traditional belief that perception holds up a mirror to nature. Furthermore, by the end of the nineteenth century, science had become *big* science, and more and more of what was observed was the result of putting nature under stress: science, it was widely understood, produces its results by forcing nature to disclose its secrets (as Boyle's air pump operated on nature to force a vacuum to appear). The devices used to stress nature were already becoming more complex, while increasingly what experimentalists observed were fluctuations on dials (such graphic display devices have now migrated to computer screens).

Shapin and Schaffer point out that Boyle tried to counter Hobbes by highlighting the amount of labour needed to make a fact under Boyle's regime: observations had to be independently verified, and a consensus had to be reached. This required replicating equipment, observations, and witnesses.[59] Establishing matters of fact demanded immense amounts of labour. But there is an even more complex problem concerning the production of facts that Shapin and Schaffer were the first to point out—this is part of what I meant when I said that a key to the critique of empiricism lay hidden in plain sight until the authors discovered it. That issue concerns the *social* status of facts and knowledge: "A fact is a constitutively social category," Shapin and Schaffer point out. "It is an item of public knowledge."[60] The replicability just mentioned related to this status: Boyle's way of knowledge relied on replication because "replication is the set of technologies which transforms what counts as belief into what counts as knowledge."[61] But if this knowledge relies on a consensus—if, in that sense, it is a social phenomenon—we are entitled to ask which public's (which social group's) consensus is important. For Hobbes it was all of humanity, for he maintained that all humans are endowed with the light of natural reason. Boyle's public consisted of qualified witnesses, professionals, and he maintained that meaning is formed through the consensus of experts.[62] The bouncing needles on the complex gauges on the unbelievably complex devices built to stress nature and demand that it provide its reasons (its *λόγος*) have agreed-upon meanings, and the seemingly isolated meaning

of any particular phenomenon has its significance within an overarching physical theory, which is, to all intents and purposes, technology's ontology. The movement of needles on the dials of the Large Hadron Collider that indicated the momentary presence of a Higgs boson have their significance within a framework of agreed-upon principles that constitute the standard theory of atomic physics—this agreed-upon set of principles, and this fact added to it, constitute knowledge as Boyle understood it.[63] No ontological foundation undergirds it, for, moderns have agreed, reality cannot be grasped and understood in absolute and certain terms.

It took many decades for that recognition to be worked out. In order for it to develop, the knowledge culture that had coalesced around Boyle's experimentalism first had to fragment, bringing that consensus into question. By the early twentieth century, it no longer seemed preposterous to suggest that physical science and medicine furnished no absolute truths. After all, many pointed out, for a long while it seemed that consensus around Newtonian physics furnished the absolute truth about motion, gravity, space, time, and simultaneity. But a new physics had arisen that challenged aspects of that account. Newtonian physics had declared that an object's size is not affected by its motion, that the speed of clocks remains the same regardless whether the clock is moving or at rest, and that the mass of objects does not vary with changes in speed. Einstein's physics contested each of these claims: it maintained that at high velocities, physical objects contract, that clocks change their speed, and that the mass of a moving object increases. That one consensus (Einsteinian physics) could replace another (Newtonian phyics) showed that what science deems to be knowledge is not absolute or certain.

It would be nice to be able to conclude, as Shapin and Schaffer do, that "Hobbes was right" (that is the last sentence of their splendid book). Unfortunately, there are still more devils to confront: Hobbes's model for certainty in knowledge was geometry, and the rise of non-Euclidean geometries destroyed the belief in the certainty and universal applicability of Euclidean geometry. In *DADA, Surrealism, and the Cinematic Effect*, I go into some detail explaining that the impossibility of determining whether space is described by Euclidean, Riemannian, or Lobatchevskian geometry was one factor (among several) that drove mathematicians to conclude that mathematics is a purely formal system that deduces theorems (strings of symbols) from axioms (a basic set of symbol strings) according to rules of inference (allowable ways of rewriting strings), and that its applicability to world was of absolutely no relevance. Still more troubling is that from the time of the Greeks, at least, reason and imagination were thought to interoperate harmoniously. The rise of non-Euclidean geometries challenged this belief, for it exposed that although reason could find no formal incoherence in some non-Euclidean or

*n*-dimensional geometries, humans could not imagine (intuit) the spaces that non-Euclidean geometries study (nor all of the forms that can fill it).[64] Thus, they brought into question the faith that reason and imagination (intuition) operate harmoniously, and that this harmony gives them a purchase on reality: reason could not expose any contradiction in the idea of non-Euclidean space, even though the properties of some non-Euclidean (and most of all *n*-dimensional) figures seemed so extravagant that it was difficult to concede that such figures could possibly be real. Our imagination (intuition) may be unable to picture clearly the nature of an *n*-dimensional space; nonetheless, reason cannot expose any incoherence in the *idea* of such a space. Reason itself seemed to have become disconnected from reality. Neither Hobbes's way nor Boyle's, it seemed, lead to knowledge.

It seemed for a while in the early nineteenth century that the *agon* between a realism of the senses and a realism of the intellect had been settled for once and all: the senses had triumphed. That view still had its adherents in the early twentieth century. Shapin and Schaffer's book could be taken as announcing that the period of the valorization of the senses was ending and that reason's claims were making themselves heard once again. If this is so, it was not a timely announcement, for the artists had gotten there first: "I paint objects as I think them, not as I see them," Picasso remarked.[65] Or, again, "to find, is the thing…when I paint[,] my object is to show what I have found, not what I am looking at."[66] The parallel with *Leviathan and the Air-Pump* is almost exact. Science was at first a rationalist discipline: Plato posted over the entrance to the academy the declaration, "Let no one ignorant of Geometry enter here," because he believed that by studying mathematics one learns to separate reason from the senses. Until one had achieved that separation, one should not attempt to study philosophy and acquire a higher knowledge. As the famous analogy of the line in the sixth book of the *Republic* (509d–513e) highlights, there are four models of reality: two lesser models based on the visible world, and two higher models, discursive reason (*διάνοια,* dianoia) and a philosophical-mystical understanding (*νόησις*, noesis), the latter of which furnishes knowledge of the *νοετα* (noeta, intelligible objects). The plight of the soul when chained to the senses is described by Plotinus in the fourth *Ennead*:

> With this comes what is known as the casting of wings, the enchaining in body: the Soul has lost that innocency of conducting the higher which it knew when it stood with the All-soul, that earlier state to which all its interests would bid it hasten back.
>
> It has fallen: it is at the chain: debarred from expressing itself now through its intellectual phase, it operates through sense; it is a captive; this is the burial, the encavernment, of the Soul.

> But in spite of all it has, for ever, something transcendent: by a conversion towards the intellective act, it is loosed from the shackles and soars—when only it makes its memories the starting point of a new vision of essential being.[67]

During the time when this transcendent apriorist tradition held sway, the role of art was essentially that of giving an image (a sensuous-rational form) of the higher realm of harmony. (That is the reason why Hegel's *Vorlesung zur Ästhetik* argued that the ideal of art is the perfect integration of Concept or Idea and content).[68] During the time from the Classical Greek era until, at the earliest, the remarkable development of the *Donaustil*, or more forcefully, until Dutch Golden Age painting (especially genre painting) of the seventeenth century, painters attempted to give visible/imaginative form to the ideal realm of harmonious forms.[69] It is sometimes suggested that the development of linear perspective in the late Medieval/early Renaissance period, based as it was on principles of geometric optics, represented a turning away from the rational realm of ideal proportions and a giant step forward in the development of realist art based on careful observation. The claim is spurious: Florentine art of the fifteenth and sixteenth centuries might very well represent the apogee of the harmoniously laid-out image of the ideal. The optical science that Florence adopted at this time came from Iran and from the writings of the Arab mathematician Alhazan (960–1040)—hardly a source of pictorial realism.[70] For the next century and a half, geometric optics continued to develop within the framework of the transcendent apriorist tradition. This is clear in the rediscovery of the *camera obscura* by Johannes Kepler (1571–1630), a scientist whose work proceeded entirely within the Platonic tradition: Kepler's fundamental conviction, that God produced a world according to the principles of mathematical harmony, is right out of Plato's *Timaeus*. He took it as axiomatic that the cosmos must be structured by the five Platonic solids—indeed, these solids must be related to the six planets (or, rather, the six planets known in Kepler's time: Mercury, Venus, Mars, Earth, Jupiter, Saturn). When Kepler's mathematical predications regarding the heliocentric universe were not borne out in tables of observations, he simply ignored the deviation between the mathematical ideal and the observed data, asserting "that the geometrical things have provided the Creator with the model for decorating the whole world."[71] Any reader of *Harmonices mundi* (The Harmony of the World, 1619) will attest that the work begins with one of the most mystical, transcendent tracts that a mathematician/physicist has ever recorded. It really wasn't until the Golden Age of Dutch painting that the transcendent apriorist tradition seemed to have been decisively defeated and some version of empiricism to have prevailed. From then until the late nineteenth century, visual art strove to copy the world disclosed by the senses—and its products increasingly approached that ideal.

But the late nineteenth century experienced a crisis of confidence regarding the senses. If the world of Robert Boyle and Rembrandt van Rijn (1606–1669) suggested an optimistic confidence in the capacity of the senses to deliver accurate information about the world, by the middle of the nineteenth century, that confidence had been shaken. It has been pointed out before that empiricism (an openness to nature and the material world) thrives in times of confidence, and that rationalism (or tradition of an *a priori* transcendent) resurges whenever there is widespread doubt and uncertainty (Thomas Hobbes, to use that example, was hardly a beacon of confidence and rosy optimism). To put the artistic implication of this hyperbolically—of course, the claim would need to undergo radical adjustments to be precise and truly accurate—the tradition of the *a priori* transcendent comes to the fore in times of doubt and despair. The early twentieth century was clearly one such time. A transcendent art was necessary.[72]

## PRIMORDIAL EXPERIENCE: A NON-REFLEXIVE, PRE-OBJECTIVE AWARENESS

The phenomenologist Michel Henry offers a commentary on a related idea, that of a primordial, non-reflexive experience that is prior to objective awareness. Henry's argument begins with the observation that the objects that populate the world of perception and the "idealities" (abstractions) of the scientific world are constituted through the same process—the same power brings forth both:

> It is the power of showing, of making visible, of putting something into the condition of presence. This making visible is itself a putting-in-front (*faire-venir-devant*) in the condition of the object, such that the visibility in which each thing becomes visible is nothing other than objectivity as such. Objectivity is the foreground of light in which everything that shows itself to us is shown—whether it is a sensible reality or a scientific ideality. Consciousness is traditionally understood as the "subject," but the subject is the condition of the object, which means that things become objects for us and thereby show themselves to us so that we can know them.[73]

Scientific knowledge expands this core conception of objectivity, enlarging it into a "supra-objective and supra-individual" universality. What science deems to be objectively true is that which every mind (or, at least, every mind with the requisite competence) recognizes. The object must be summoned before consciousness to give an account of itself; by appearing before us, it demonstrates its truth. In this, Henry follows the Edmund Husserl of *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie* (The Crisis of European Science and Transcendental Phenomenology, 1936),

who also envisioned a "Europe" whose essential character had come to be defined by the ideal of rationality and the universality of knowledge, which had guided European science from the time of Classical Greece. As Husserl did in *Die Krisis der europäischen Wissenschaften*, Henry maintains that the pursuit of rationality and universality reached an apogee with the development of Galilean science. Henry notes that culture (by which he means "*an action that life exerts on itself and through which it transforms itself insofar as life is both transforming and transformed*") depends on a sort of knowledge other than that of science and consciousness (as intentional).[74] He illustrates this point with the example of reading a book: a student reading a book in the library scans strings of symbols (letters and punctuation marks), and interprets them, assimilating biological knowledge (for example) from them. What kind of knowledge is required for this sort of assimilation? In the first place it requires an understanding of language at some high level—an understanding of language that enables the intellectual grasp of ideal meanings. But beneath that, there is the knowledge of how to move one's eyes across the page and how to use one's hands to turn the pages.

To answer the question, "Which of the sorts of knowledge is most fundamental?," Henry proposes we must reject some of the essential prejudices of our time, viz.,

> the beliefs that scientific knowledge is not only the most important but in reality the only true knowledge; that knowledge means science, that is, the type of mathematical knowledge of nature introduced at the time of Galileo; that everything prior to this arrival of rigorous science in the West was only a mass of disordered knowledge and confused feelings, if not prejudices and illusions.[75]

It is not, Henry points out, scientific knowledge alone that allows the student to acquire the biological knowledge presented in the book, for it is not scientific knowledge that allows the student to move her eyes and her hands over the pages or to focus her thoughts. What is fundamental in enabling her to acquire knowledge?

In responding to this question regarding the most fundamental sort of knowledge, Henry again follows the Husserl of *Die Krisis der europäischen Wissenschaften*, who, in that work, turned to the concept of the *Lebenswelt*, the life-world, that is, that relation to be-ing that is "pre-given" and "pre-theoretical," a background, unthematized and unarticulated, against which all our experience and knowledge appears: it is our embeddedness in life (here understood as a fundamental vitality) that allows us to have the kind of knowledge necessary to understand science.

> Scientific knowledge is objective, in this sense that it is the knowledge of an objectivity. An object can only be perceived, if it is in this condition of being-

> there in front and thus shows itself in this way and thus can be reached by a regard and thus can be known. *But knowing how to move the hands, knowing how to turn the eyes—this knowledge of life is not objective in any way or in any sense; it does not have an object because it does not contain in itself the relation to the object and because this relation is not its essence.*[76]

What Henry draws from this simple example is remarkable: for him, this experience highlights that there are modalities of knowledge that do not conform to Galilean science's model of objectivity or to the conditions for any abstract, universal form of knowledge whatsoever. These forms of experience are not based on a making-visible (that is, a "putting-in-front-of" act that allows the object to come forth), nor do they propose the subject as the condition of the object, nor objects as being objects-for-us (objects do not show themselves to us so that we can know them). In sum, there are modalities of knowledge that are not intentional ("intentional" here being used as technical term from philosophy, one that highlights that when we are aware, we are aware *of* something), and are "ek-static" (Henry uses the term "ek-static," or ecstatic, to refer to something that is a condition of experience and so "stands apart from" phenomena or is "other than" experience):

> If the knowledge contained in the movement of rubbing the hands and making it possible had an object, such as these hands and their potential movement, this movement would not happen at all. Knowledge would stand in front of it like it stands in front of something objective. It would be forever separated from it by the distance of objectivity, and it would be unable to ever rejoin it. To the extent that the movement of the hands is considered as something objective, and as long as it is considered this way, the possibility of acting on it and initiating it will seem enigmatic and magical for the one who considers it as an object. This enigma can vanish only by entering into life and by finding it in the essence that excludes every exteriority from it, because it excludes every relation to the object, every intentionality, and every ek-stasis from itself. Life alone has the ability to unite with the power of the hands and to identify with them, to be what it is and to do what it does. It alone possesses *a knowledge that merges with this power because it is nothing other than its continual experience of itself—its radical subjectivity*. It is only in and through the immanence of its radical subjectivity that the power of the hands, or of any power whatsoever, is possible. That is to say that it is in possession of itself and thus *can* be deployed at any moment. The knowledge of life is this knowledge that excludes the ek-stasis of objectivity from itself; it is a knowledge that sees nothing and for which there is nothing to see. Instead, it consists of the immanent subjectivity of its pure experience of itself and the pathos of this experience.[77]

Scientific developments in the late nineteenth century revealed that perceptual "reports" do not deliver to us an object that stands outside us, nor do

they mirror such an object. Perception is a process—it requires activity on our parts: it synthesizes memory, data from the immediate manifold of *sensa* produced by the external object (that is an unknowable entity or, perhaps, an unknowable process belonging to the noumenal realm), and expectations (caused by reactivation of bodily/sensory memories of other similar objects) about other possible sensations that would result if other perspectives on the object were assumed. That understanding of the perceptual processes brought home forcefully a realization that commonsense understanding precludes: that the objects we are aware of are phenomenal, not physical. This development had almost paradoxical effects on the arts. Artists, along with other thinkers, embraced a philosophy of life, and came, through a thought process similar to the one Henry laid out for us, to the idea that while certain sorts of seeing and thinking lead to abstractions, the process of constructing the life-world is rooted in life itself. Accordingly, the dynamics of perception assumed special importance as evidence of the operations of a universal life-force.

But this response, facets of which we will explore on several occasions in this book, is paired with another: in response to the feeling that the real world of physical objects eluded apprehension either by the senses or by the intellect, many groups of artists insisted on building a substitute object in the realm of the arts. Art theorists of the time wrote about the importance of raising the ontological status of the artwork from the lower-grade reality of representations to that of objects in the world. The objecthood of the art object must be affirmed, some artists maintained—and different artistic groups proposed various ways of doing so. For the Constructivists, this end was to be achieved by creating objects that are like others in the world, in that they would be fabricated from industrial materials using industrial methods of production; for the artists committed to the cause of *gegenstandlose Kunst*, the work would not be a likeness of objects of the world, but a formed thing (the term *Bildung* was central in their rhetoric); and for the Cubists, the objecthood of a painting would be affirmed by the work's pronounced insistence on the architectonics of painting (and later by collage, which incorporated objects from the real world in the built form).

In large measure, this turn towards affirming the objecthood of the constructed object was an attempt to ground knowledge in Giambattista Vico's (1668–1744) anti-Cartesian *factum-verum* principle—that one can know the truth in what one makes—taken to its utmost extreme. It reflects the hope that by turning a work of art into a pure built form, a constructed form that alludes to nothing beyond what it actually contains, one creates something whose truth can be understood through the evidence it gives of the way it is made (and, so far as the spectator is concerned, need not be privy to secrets of the sort that, traditionally, artists have been loath to reveal). Against the sense

that the world of objects is ephemeralizing into mere appearance, stressing its construction would endow the object with the certainty of a built thing, which could be known completely because the principles of its construction are understood. (The Cubists adopted that strategy—which I believe was backwards-looking—while the Futurists, despite their proclaimed enthusiasm for industry and industrial methods of fabrications, accepted that all that we can know is phenomenal, or, more truly, *geistig*.)

To return to the idea that the process of forming a percept is rooted in life itself, we note that the idea that perception is dynamic (it must be, because it is our response to being immersed in the flow of life) bolstered the emphasis on the experience of the immediate now, that moment continually emerging out of the flow of reality. Social and technological developments reinforced the importance of "now-experience" and the sense that memory is epistemologically pernicious. Urbanization and the new technologies impressed on the modern consciousness the reality of incessant change—it made evident that nothing perdures, that all things undergo change (some changing more rapidly, some more slowly). In the ninth section of *Ulysses* (the "Scylla and Charybdis" section), Stephen Dedalus thinks of the Platonizing tendencies of the faculties and deliberates on the permanence of change. He first vows to focus on the immediate now, so as to apprehend it, and then ponders the role of memory in creating a sense of perdurance. The sense of the otherness of the self Joyce articulates in that famous passage—that the self is formed outside the immediacy of being immersed in the flow of life—the feeling that "Je est un autre," as Rimbaud proclaimed in a letter to Paul Demeny (15 May 1871)—is a common modern epiphany. The conviction that memory should be eliminated so that we might live wholly in "the now, the here," and thereby overcome the epistemic mischief of believing there are stable entities when, in fact, there are none, was central to the Futurist program. Contrast this aspect of modern experience with the traditional belief there is a persisting ongoing self underlying the ever-changing contents of consciousness, a transcendental self to which all experience is referred (a conviction central to Kant's epistemological theories and to his aesthetics). That idea of the stable (if inapprehensible) self was jettisoned in favour of the view that the self, immersed in the flow of life, undergoes perpetual change.

Ezra Pound (1885–1972) offered a telling remark that connects this now-experience of urban life to the repudiation of narrative form, which, only a short time earlier, still seemed capable of truly reflecting experience. Pound notes, "The life of the village is narrative . . . In a city, the visual impressions succeed each other, overlap, overcross, they are cinematographic. They are often a flood of nouns without verbal relations."[78] The first part of that remark is often cited by scholars working on the visual culture of the city—few cite

the rest.[79] Yet that latter part of the comment is very important, not least for identifying one motivation for the cinematic mode of construction that dominates literary form during the period this book discusses—that of parataxis. The connection between cinematic form and modern experience is profound.

Consider in this connection the extraordinary mimesis of urban life that James Joyce (1882–1941) presents in *Ulysses* by using cinematic forms of construction—film gives paradigmatic expression to (what people of the time understood as) the modern technological imperative's formal cause (to take up the scholastic framework that work adopts), which, as the "Aeolus" section of that work shows, also gave rise to the tram, the telephone, the telegraph, and the lithograph printing press used by newspapers. By ensuring that the montage is not subservient to the plot, the cinema can offer a startlingly precise phenomenology of modern urban experience, as the succession of images it presents is incomparably more rapid and less continuous than what is offered by sculpture or narrative fiction. In 1903, near the very beginning of the age of the cinema, Simmel commented on the non-narrative, cinematic quality of urban experience (though without naming either narrative or the cinema)—he noted that the modern individual often feels himself or herself overwhelmed by "the rapid crowding of changing images, the sharp discontinuity in the grasp of a single glance, and the unexpectedness of onrushing impressions."[80]

### The Influence of Immanuel Kant

Modernist art theory adopted its principal tenets from Kant's aesthetic theory, as he presented them in *Kritik der Urteilskraft* (Critique of Power of Judgment, 1790). In the "third critique" (as that work is generally known), Kant considers the character of judgments of taste, that is, judgments that objects are either aesthetically appealing or beautiful (the latter type of judgment he thinks chiefly concerns natural objects). Kant claims that a pure judgment of taste expresses a disinterested pleasure one takes in the perceptual form of an object, considered apart from any concept, and that it has a form that might allow it to find universal assent. Kant's claim that aesthetic judgments could garner universal agreement is particularly remarkable, as Kant allowed that aesthetic judgments are really singular judgments that a person makes based on an immediate, subjective response to a particular object. Despite that character, Kant denied that the aesthetic claim asserted when one says "this object is beautiful" is an expression of subjective feeling that could be more properly stated, "This object is beautiful to me but others may experience it differently, and for them it would not be beautiful." Rather, it is an actual judgment: its true form is actually that of any judgment (this object is beautiful). The statement is not a short form for a statement about one's individual feeling, but a judgment that says what it means, and all people should assent

to it. A person "judges not merely for himself, but for everyone, and speaks of beauty as if it were a property of things."[81]

The observations Kant offered to establish the disinterestedness of the aesthetic attitude have a place among the influential in all aesthetics—they are so well known that the proposition that the aesthetic attitude is disinterested is often said to have originated with Kant, even though Anthony Ashley Cooper, 3rd Earl of Shaftesbury (1671–1713), stated it decades before the great German philosopher (Shaftesbury contrasted the "disinterested attention" necessary to appreciate the aesthetic values with the desire to possess and to use the object of attention). What made Kant's discussion of the disinterestedness of the aesthetic attitude so influential is that he developed his analysis of the aesthetic attitude in the form of logical demonstration. Whereas Shaftesbury and the empiricists wanted to fathom the psychological differences between the aesthetic attitude and the practical stances we assume in ordinary life, Kant concerned himself with identifying the differences in logical character between aesthetic judgments and other sorts of judgments. Kant analyzed aesthetic judgments (which he called judgments of taste) by using the table of categories that the logic of his day employed. This table of categories required one to classify the logical form of propositions according their *quality*, *quantity*, *relation*, and *modality*. Kant's analysis of aesthetic judgments purports to reveal that they have the following form: as for their quality, they have two key features—first, their "determining ground can be *no other than subjective*" (that is, unlike logical judgments, they do not refer our sensation to a quality in the object, but are purely subjective); and, second, unlike judgments that are simply reports on pleasure or satisfaction, they are disinterested.[82] As for quantity, a judgment of taste is universal, since they have a special sort of interpersonal validity, for which Kant coined the term *Gemeingültigkeit* (common validity). As for the relational aspect of judgments of taste, a judgment of taste (unlike most other judgments) does not bring the object of judgment under a concept or rule: in contrast to judgments concerning the morality of some action, the judgment that this painting is beautiful cannot be arrived at through any general description of its features (it is balanced, it is harmonious, it possesses intensity, etc.). And where concepts have no role, there can be no rules.

One implication of Kant's remarks about the relational aspect of judgments of taste is that we cannot draft a procedure for deciding on disputes about beauty; one can attempt to settle aesthetic disputes only by encouraging the parties to the disagreement to pay closer heed to the object being judged, and that encouragement will not necessarily result in agreement. Finally, as for the modality of judgments of taste, Kant states that aesthetic judgments are necessary: the "*beautiful* we think as having a *necessary* reference to satisfaction,"

Kant states.[83] Kant offers a precision concerning the type of necessity that judgments of taste exhibit. A judgment of taste cannot be apodictic, Kant says, because then we could guarantee that all people would, if they thought rightly, consent to the judgment. But a judgment of taste is exemplary, Kant says, meaning that it invites universal assent. A judgment of taste "claims that everyone *ought* to give his approval to the object in question and also describe it as beautiful."[84] It implicitly proposes that everyone who correctly relates the aesthetic object to his or her faculties will consent to the judgment.

Kant did allow some experiences of beauty to involve bringing the object we experience as beautiful under a concept of perfection, which for Kant involves a reference to use, for the object is deemed to be good of its kind. Beauty experienced in this way Kant refers to as "*pulchritudo adhaerens*" (that is, "dependent" or "adherent beauty"). Beauty that is experienced without bringing the object under a concept Kant refers to as "pulchritudo vago" ("free" or "pure" or "independent beauty").[85] Free or independent beauty belongs only to those objects that we judge to be beautiful without invoking any concept relating to the object's possible utility or to the kind of object it is. Kant proposed that such beauty belongs to natural objects, non-representational art (such as patterned designs), and instrumental (non-vocal) music, and to such creatures as parrots, hummingbirds, birds of paradise, and several forms of crustaceans that please us, even though we lack any sense of the type of perfection to which they conform. The beauty of a building or a horse or a person is more often of a dependent type, because our experience of buildings and horses and humans presupposes a concept of the type of thing that it is and the end it should serve.

Kant distinguished aesthetic experience from all sorts of conceptual thinking. Aesthetic judgments involve no concepts. No rules can be formulated for making aesthetic judgments. No abstract description of a work of art can imply anything about a judgment of taste regarding that object; only the immediate, direct experience of the object provides any ground for aesthetic descriptions. Kant showed—more rigorously than anyone before him had, certainly, and probably more rigorously than anyone has since—that we cannot prove a judgment of taste (that is, we cannot prove that an object is beautiful) because it possesses certain features, or because its object belongs to a class, membership in which can be decided on empirical or cognitive grounds:

> To apprehend a regular, purposive building by means of one's cognitive faculty (whether in a clear or a confused way of representation) is something quite different from being conscious of this representation as connected with the sensation of satisfaction. Here the representation is altogether referred to the subject and to its feeling of life, under the name of the feeling of pleasure or pain. This establishes a quite separate faculty of distinction and of judgment,

> adding nothing to cognition, but only comparing the given representation in the subject with the whole faculty of representations, of which the mind is conscious in the feeling of its state.[86]

Kant denied that apprehending beauty is a cognitive act. He pointed out that judgments about beauty do not differ from cognitive judgments by being more confused or less clear, as Alexander Gottlieb Baumgarten (1714–1762), one of the founders of the discipline of aesthetics, claimed. A judgment that a certain object is beautiful does not differ from the judgment that, for example, it has the shape of a frustum by being less clear. Rather, the former judgment belongs to a different class—the two judgments have different logical forms. The whole point of Kant's analysis of judgments of taste was to show they have a different logical form than judgments of any other sort. When Kant states that the relational aspect of judgments of taste is peculiar because, unlike judgments of other sorts, judgments of taste do not bring the object of judgment under a concept or rule, he is implying that judgments of taste do not refer to our cognition of the object but only to our feelings of satisfaction or dissatisfaction in our perception of the object.

Many people resist Kant's insight on the matter because it implies that much of the commerce we commonly have with artworks has a mistaken basis. Kant's thesis implies that we cannot frame theoretical rules for constructing beautiful objects. It also implies that it is impossible to formulate aesthetic principles of the following sort: It is aesthetically advantageous for an art object to possess this or that characteristic (e.g., it is aesthetically advantageous for an art object to be deeply personal, or to display simple proportions, or to depict life as it is lived by the common person, or that it is structured by a severe architecture). The modernists did not resist Kant's insights on this matter—they accepted that feelings of satisfaction, not propositional, theoretical, or cognitive concerns, are the basis of our appreciation of beauty. Indeed, this was among the stronger aspects of their critical and theoretical approach.

There is another aesthetic theory, besides that of the modernists, that affirms that intellectual concepts play no role in the aesthetic experience. This is the theory that aesthetic judgments are merely expressions of one's liking for this or disliking for that object. That thesis is often referred to as the "boo-hurray" theory of aesthetic judgments, for it maintains that all aesthetic judgments are just disguised, and usually rather elaborate, ways of saying "boo" or "hurray" about an object. To say that the forms in this painting exhibit an intriguing spatial ambiguity, for they can be seen either as being pressed flat against the picture plane or as ever so subtly pulling away from the picture plane, is just a fancy way of stating that I find a particular work intriguing ("Hurray!"). The reasons

I offer to support aesthetic judgments are, strictly speaking, just expressions of my feelings of delight and approval, for they offer no objective support for the judgment—another person may perceive exactly the characteristics I have referred to, yet not find the work intriguing (and so might be inclined to issue a "boo" statement). And I might find another work that displays the same characteristics, yet find the work unappealing (and so might want to issue a "boo" expression, using a pseudo-assertion of the following form: "I dislike this work because some of its colours are murky; the murkiness of those colours prevents them from balancing the luminescent areas, and this has the result of throwing the overall effect out of balance." Exponents of the "boo-hurray" theory maintain that such statements have no apodictic relation to feelings of liking or disliking a work).

Although Kant argued that intellectual concepts play no role in the aesthetic experience and that all aesthetic judgments have only a subjective ground, he did not agree that this entails aesthetic judgments are simply relative to the individual's taste. The obligatory character of an aesthetic judgment is due to its assuming the existence of "common sense [*sensus communis*]" or a public sense (as Kant also called it).[87] By this, Kant meant mental features common to all people. He believed that the communicability of even our ordinary knowledge of the world requires the universality he identifies as common sense, for common sense is presupposed in every principle of knowledge that is not one of skepticism. It comes as no surprise, then, that Kant believed that the universal communicability of an aesthetic feeling needs common sense: the *sensus communis*, the capacity for disinterested feeling, does not vary from person to person, as anything having to do with interests or sensuous pleasure does. It is a form of immediate intuition, the exercise of a faculty common to all, just as much as reason and sensation.

Kant associated interest with a concern for the real existence of the object: "The satisfaction which we combine with the representation of the existence of an object is called 'interest.' Such satisfaction always has reference to the faculty of desire, either as its determining ground or as necessarily connected with its determining ground."[88] Conversely, he connected the disinterestedness of the aesthetic attitude to a lack of concern for the real existence of the object: "We must not be in the least prejudiced in favor of the existence of the things, but be quite indifferent in this respect, in order to play the judge in things of taste."[89] Because judgments about utility concern the existence of the object, such judgments have no part in determining an object's aesthetic worth—for interest cannot mingle in such judgments. To say that something is good for some purpose is to commend that object as something the existence of which is to be willed. When we experience an object as beautiful, we contemplate it with a quiet satisfaction, so that though it pleases us, we do not

desire to put it to use or even to possess it (and in adding this, Kant extends the doctrines of the English philosopher and aesthetician Lord Shaftesbury). In sum, we are not even concerned with the object's existence, Kant asserts.[90]

The delight we take in a work of art concerns only its appearance; its existence or non-existence is strictly irrelevant. The disinterestedness of aesthetic judgments is one of Kant's grounds for maintaining that an aesthetic judgment can be universally valid. For if one recognizes that the pleasure one takes in a thing does not depend on any characteristics of oneself that might be peculiar to oneself (as desires, interests, and appetites are), then one has grounds for believing that this pleasure has a basis in something that one shares with all other beings who share one's perceptual and cognitive faculties: "For the fact of which everyone is conscious, that the satisfaction is for him quite disinterested, implies in his judgment a ground of satisfaction for all men."[91]

Kant believes that the satisfaction which aesthetic contemplation provides arises from the free play of the imagination and the understanding. We relate this freedom to the object of contemplation's being adapted to our powers of perceptual awareness. Kant introduces teleological notions in this context—his purpose for proposing such ideas is to align the argument of the third critique with those offered in the two previous critiques (an unfortunate consequence of this is that the argument is not laid out in as straightforward a manner as one might hope). In the first critique (the *Kritik der reinen Vernunft*; Critique of Pure Reason [1781; rev. ed., 1787]), Kant showed, through transcendental principles (that is, according to the Kantian lexicon, principles about what conditions make the phenomenon in question possible), that the world as we know it is fitted for human understanding because the understanding actually furnishes the order we experience. The understanding serves as a lawgiver to nature. The order and regularity in the world we know, the mind put there. The second critique concerns human understanding: there Kant shows that reason furnishes us with the moral law and morally justified beliefs about human freedom, the immortality of human beings, and the existence of God; these are expressed in the postulates of practical reason. In the introduction to the third critique, the *Kritik der Urteilskraft*, Kant tells us that his goal is to bridge the chasm between his theoretical philosophy expounded in the *Kritik der reinen Vernunft* and his practical philosophy, laid out in the *Kritik der praktischen Vernunft* and *Grundlegung zur Metaphysik der Sitten* (Laying the Ground for the Metaphysics of Morals, 1785). *Kritik der Urteilskraft* deals with a third *a priori* faculty, the power of judgment, which furnishes a teleological perspective. Its principle is to regard nature as purposive, but to do so only as a regulative judgment. Aesthetic judgments about the beautiful and the sublime involve a sense of purposiveness (of a qualified sort).

The possibility of aesthetic awareness, Kant seems to say, depends on considering the object as adapted to our powers of understanding—specifically, to the faculty of sensory apprehension. The adaptation of objects to our powers of cognition Kant calls subjective purposiveness, to distinguish it from objective purposiveness or actual teleological organization; the latter form of purposiveness we judge through understanding and reason, while the former we judge by taste.[92] Objects are represented as having subjective purposiveness because their form, as apprehended, is in harmony with the cognitive faculties. Objects that we experience as possessing subjective purpose serve "through their manifoldness and unity . . . at once to strengthen and to sustain the mental powers (that come into play)."[93]

By asserting that perceptual awareness alone, unaided by analysis or reasoning, informs us of subjective purposiveness, Kant demarcates the form of purposiveness characteristic of the aesthetic object from both "internal purposiveness" (which depends upon an object's exemplifying its type, which property, of course, is internal to the object's nature) and "external purposiveness" (which depends on its utility or its fitness for some purpose, which property, of course, does not belong, or is external, to its nature).[94] Contrasting the purposiveness that aesthetic judgment concerns with the latter type of purposiveness, Kant describes subjective purposiveness as "purposiveness without purpose" (*Zweckmäßigkeit ohne Zweck*).[95] He relates the idea of "purposiveness without purpose" to the object's adaptedness to our cognitive faculties. He states, for example, that a beautiful object brings the cognitive powers (which he calls "understanding") and "imagination" into harmony (*Übereinstimmung*).[96] An aesthetic experience creates "a mutual subjective harmony of the cognitive powers."[97] When the faculties of understanding and imagination are so "animated by mutual agreement" as to be free and unimpeded play, they are stimulated to a greater vitality.[98]

Kant's basic ideas about the interplay of the imagination and understanding are set out in the *Kritik der reinen Vernunft*: there he proposes that intuition (*Anschauung*) furnishes sensations (*Empfindungen*), which are the basis for knowledge of the world of object-appearances (*Erscheinung*). However, these sensations are brought into a harmony (*Übereinstimmung*), which is a condition for our cognizing them, through the activities of the imagination and the understanding: "now a representation by which an object is given that is to become a cognition in general requires *imagination* for the gathering together the manifold of intuition, and *understanding* for the unity of the concept uniting the representations."[99] The unification of the synthesized manifold occurs through the recognition that there are similar marks (*Merkmale*) shared by the manifold and the concept.

Fundamental to this thesis is Kant's conception of the character of the concepts. The *Kritik der reinen Vernunft* suggests that concepts are rules for the synthesis of the contents of the perceptual manifold into object representations.[100] When Kant argues that the unification of the manifold takes place through the recognition that the manifold and the concept share similar marks, what he means is that the concept and the manifold contain characteristics indicating that a concept (or rule) is applicable to the manifold (and how it is applicable). And when he claims that aesthetic experience induces the free play of the imagination and the understanding, what he means is that the imagination and the understanding are not guided by concepts, that is to say, by rules. A unification of the manifold of intuition occurs, but it takes place without the assistance of concepts—that is, the process is not guided by rules.

This assertion entails that the imagination and the understanding are not constrained to form the material of the manifold of intuitions into objects. The first critique proposed that an object, through the senses, stimulates the imagination to collect all the sensations belonging to the manifold of intuitions into one form of unity (that of the manifold itself) and that the imagination, in its turn, stimulates the understanding to unify the resulting unified manifold into object-representations or object-appearances by following the rules (or by calling upon concepts). However, in the case of aesthetic experience, the unification of the manifold of intuition occurs without the concepts having any role—that is, the process is not rule-guided. This implies, first, that the process that unifies the material of sensation (*Empfindungen*) is always novel—there is no formula we can follow to forge that unique unity. This is the point of Kant's denying that aesthetic objects exhibit objective purposiveness, for, he says, "in order to represent objective purposiveness in a thing, the concept of *what sort of thing it is to be* must come first."[101] The conviction that aesthetic experience involves novel processes of unification helps account for aesthetic experience's engendering a greater vitality in the imagination and the understanding; it also explains why objects we experience as having subjective purpose engender a more vital play of those two faculties. Since concepts have the role of converting the contents of the manifold of intuitions into object-representations, to assert that the harmony of the imagination and the understanding is effected without the mediation of concepts is to say that the sensations are not converted into actual object-representations. This accords with Kant's claim that the judgments of taste are made without reference to the object's possible existence.

Why is it important that our sensations not be converted into object-representations? Because by not being converted into object-representations, they engender a play (*Spiel*) in the mind. Kant reveals in his first critique

what he means by *Spiel*—there he contrasts *Spiel* with *Gestalt* (figure): *Spiel* relates more closely to sensations and *Gestalt* to the objects actually formed from sensations. Thus,

> every form of the objects of sense (both of external sense [i.e., in both space and time] and also mediately of internal [i.e., only in time]) is either *figure* or *play*. In the latter case it is either the play of figures (in space, viz. pantomime and dancing) or the mere play of sensations (in time). The *charm* of colors or of the pleasant tones of an instrument may be added, but the *delineation* in the first case and the composition in the second constitute the proper object of the pure judgement of taste.[102]

Kant characterizes the charm of colours and the pleasant tones of musical instruments as *Spiel*. But he also insists that the play of objects of sense is not aesthetically relevant—he states elsewhere that the charm of colours is a purely subjective pleasure that cannot be universalized. In the passage above, he asserts that the delineation of colours (the spatial shape given to them) and the composition of tones are the proper object of aesthetic judgment. The ground for this assertion is the belief that that the play of sensory forms (or of sensations) does not have the determinate shape that objects possess. The first critique established that the role of the categories is to produce determinate forms and that, in fact, the categories have the nature of rules that guide the understanding in producing such forms; the third critique tells of a free activity of the imagination and understanding unregulated by such rules.

Analogously, when Kant considers the free play of the imagination and understanding, he writes as though he were dealing with a mental operation not directed by rules. The free play that Kant refers to is an activity the imagination and the understanding engage in and does not proceed by rules; accordingly, it cannot engender representations of determinate objects. In this case, the imagination and the understanding, working in concert, engage in play that is free because it is not constrained to produce object-representations; and from this we may conclude that the non-objective forms that artists are free to create are not bound to representing real-world objects.

A genius, Kant points out, is someone who by his or her nature has the capacity to work without the need for definite rules. This is not to say that artistic production is not characterized by a lawfulness: although artistic production follows law-like procedures, there are no external constraints that dictate the rules. The rules are of the artist's devising. The essential trait of genius is originality, and originality consists in following a law of one's own making and arising from one's one nature.

This proposition corresponds to a principle of autonomy that Kant had propounded in the second critique, the *Kritik der praktischen Vernunft*

(Critique of Practical Reason, 1788, one year after the revised version of the *Kritik der reinen Vernunft*). One acts freely when one acts according to one's nature and not because of any external impetus or constraint, Kant proposed. Therefore, if a genius adopts rules for producing art not because of the influence of anything external, but because of his or her nature—if the artist brings them forth from his or her own nature—then he or she may be said to create those rules freely. The activity, then, in relation to the human sensory and imaginative faculties, is law-like (it has the "form of purposiveness") but without purpose (for it is not directed by interest towards any end).

So much for the subjective implications of the phrase "purposiveness without a purpose." Kant also relates the idea of "purposiveness without purpose" to more objective considerations. A topic of recurrent interest in *Kritik der Urteilskraft*—indeed, throughout the three critiques—is the constituting of wholes from parts. Aesthetic experience depends on the discovery that the elements that form the sensuous manifold are so related to one another as to form a whole characterized by totality, completeness, and precision. It depends, then, on the discovery that the parts are mutually adapted to one another and to the whole. (This sense of adaptation depends upon these parts' relations conforming to the human sensory and imaginative faculties.) To say that parts are mutually adapted to one another and to the whole is to say that one element (say, the texture of a particular form) is as it is so as to agree with its colour and its proportions—for example, its base has the texture it does so as to accord with its shape; and to say that that element is adapted to the others is to say, in part, that the shape of that element is what it is to bring it into accord (harmony) with shape of elements at the middle of the work and at its top. At the highest level, all features of all the components in the work are adapted to fit with all other features of all other components of the work and (through increasingly more encompassing levels in the hierarchy of forms) with the whole. The parts seem fitted one to the others, and the notion of fittingness has traditionally been associated with the conception of an end, of a purpose or *telos* (teleology is the overriding theme of the third critique); accordingly, the components of the aesthetic object, and the object itself, display "the form of purposiveness." However, an aesthetic object serves no end, since our experience of it is not mediated by any consideration pertaining to interest. Hence, the mutual adaption of the elements of an aesthetic object one to the others and to the whole displays "the form of purpose" but serves no purpose—it displays "purposiveness without a purpose" (*Zweckmäßigkeit ohne Zweck*).

The experience through which we apprehend beauty is not chaotic; like any ordinary cognitive experience, it is an ordered one. Its order is partly the product of the imagination and the understanding interacting in aesthetic experience in a formally similar manner to their harmonious interaction

in producing knowledge. They interact as though their activities were rule-directed, though in fact this is not the case. Their interaction has the "form of purposiveness" even though their interaction is entirely free ("without purpose"). And if the imagination and the understanding interact in this way, there must be some basis for this interaction in the material furnished by sensation and the imagination.

In the *Kritik der reinen Vernunft*, Kant states that "the object is viewed as that which prevents our modes of knowledge from being haphazard or arbitrary, and which determines them *a priori* in some definite fashion. For insofar as they are to relate to an object, they must necessarily agree with one another, that is, must possess that unity which constitutes the concept of an object."[103] Here Kant relates the organization of the object (the characteristics of which he derives primarily from the activities of the imagination and the understanding) to the organization of our cognitions. Arguably he does just the same thing in the *Kritik der Urteilskraft* when he speaks of the harmony of the object and harmony among the cognitive faculties: a similar harmony as characterizes the object also characterizes the interplay among the cognitive faculties. The cognitive faculties play a cardinal role in forming the object, and from the fact that they do, Kant concluded there must be an affinity between the process that brings unity to a manifold of elements and the elements themselves. This led him to suggest that the unification of the synthesized manifold occurs through the recognition that there are similar marks shared by the manifold and the concept.

Specifically, concerning aesthetic perception, Kant works out in the following way the proposition that a similar sort of unity characterizes the aesthetic object and the interplay among the cognitive faculties. First, he points out that in aesthetic perception we apprehend the parts of the unified form as mutually adapted to one another and to the whole. But we do not arrive at this apprehension through rule-guided procedures (that is to say, concepts have no role to play in this apprehension); rather, we discover the means for bringing the elements of the manifold into a unity immanently, that is, from within the form itself. We allow ourselves to be guided by its unique individual form of unity, and do not follow any formal program.

When our powers of cognition are not directed by rules, we experience their activities as free play: we do follow any program of our own, but discover the means for apprehending the form as a unity immanently, within the emergent unified form itself. Our apprehension of the adaptation of the elements of the form one to the others and to the whole engenders a harmony among our cognitive faculties; thus, the harmony that brings all the components of the form into a unity creates a harmony among our cognitive faculties. Furthermore, that the emergent unified form is such that we can discover

the means for unifying it immanently, within the form itself, implies that its form of unity is adapted to our cognitive faculties—its form of unity is such that the mind, simply through immediate experience and without the assistance of any external rules or any formulae, can discern it. This emphasis on novelty and the belief that the viewer plays an active role in constructing the unity of an artifact were widely accepted among modernists, including those affiliated with the Cubist and Futurist movements.

In summary, an aesthetic experience is one that opens us to novel forms of unity or, what is the same, to novel means for bringing the manifold of intuitions into a unity. The process of bringing the contents of a manifold of intuitions into a unity resembles the process through which we form the contents of experience into objects belonging to the world that we know—in this sense, it has the form of purposiveness (since we formulate objects teleologically, by considering the sort of object it ought to be, which considerations involve its purpose). However, when we bring the contents of the manifold of intuitions into that form of unity which characterizes objects that belong to the world that we know, we do so following rules that relate to the nature of the objecthood (to what it is to be an "external object"), and so to a purpose. On the other hand, when we unify the contents of the manifold of intuition into that form of unity characterizing an aesthetic form, we follow clues immanent in the contents: hence the process is not steered by concepts that inform us, prior to experiencing it, about the nature and purpose of the resulting form (for, in fact, it lacks a purpose); thus, the unity that results from the process possesses the form of purposiveness, but is without purpose. If the means for bringing the contents of the manifold of intuition are to be novel, they must not be guided by any general rule or formula—we must discover the means for forging the manifold of intuitions into a unity anew each time.

In the synthesis of the objects of everyday experience, the contents of the manifold of intuition and their relations must possess such characteristics that the mind can apprehend the means for bringing them into a unity using rules that do not derive from the contents of the experience—the procedures we apply to form the object of aesthetic appreciation, by way of contrast, do depend on the particular character of the contents of the manifold of intuition. Accordingly, in the synthesis of objects of aesthetic experience, for us to be able to unify the elements of the perceptual manifold into a unified form, the contents of the manifold of intuition must be adapted to the cognitive faculties, and the adaptation of the contents of the manifold of intuition to the cognitive faculties must be such that it challenges the cognitive processes to discover, within the contents of the manifold, the means by which to effect this unification. We take pleasure in meeting this challenge.

Kant argued that because artworks lack a determinate form (which is produced by unifying the manifold according to a fixed rule having to do with what it is to be an actual object), they engender in the mind a feeling of vastness. To account for this feeling, Kant uses his notion of aesthetic ideas: to do so, he distinguishes two interrelated classes of ideas, rational ideas and aesthetic ideas. Rational ideas (or "intellectual ideas"), although they are mediated by the concepts of the understanding, are such that experience can never be fully adequate to them. They are large ideas—Kant gives as examples the ideas of invisible beings, the kingdom of the blessed, hell, eternity, and creation. Because they strain beyond the limits of experience, artists attempt to give them the appearance of reality by representing them artistically in sensuous, complex images:[104]

> Such representations of the imagination we may call *ideas*, partly because they at least strive after something which lies beyond the bounds of experience and so seek to approximate to a presentation of concepts of reason (intellectual ideas), thus giving to the latter the appearance of objective reality, but especially because no concept can be fully adequate to them . . . The poet ventures to realize to sense, rational ideas of invisible beings, the kingdom of the blessed, hell, eternity, creation, etc.; or even if he deals with things of which there are examples in experience—*e.g.*, death, envy and all vices, also love, fame, and the like—he tries, by means of imagination, which emulates the play of reason in its quest after a maximum, to go beyond the limits of experience and to present them to sense with a completeness of which there is no example in nature. This is properly speaking the art of the poet, in which the faculty of aesthetical ideas can manifest itself in its entire strength. But this faculty, considered in itself, is properly only a talent (of the imagination).[105]

An example will help here. Suppose we consider the rational idea of the kingdom of the blessed, and try to give it the form of something actual (to "approximate to a presentation of the rational idea") through the image of a cherubic figure with a cornucopia on its lap. This image serves as the aesthetic idea. The image (the aesthetic idea) has many features relevant to the rational idea that it strives to make sensuously real: its lightness (wings) suggests freedom and disencumberment; the cherub's youth suggests innocence; its nakedness implies the goodness of the body; the cornucopia suggests plenty, not having to do without anything at all; its angelic nature suggests being close to God. A wealth of implications can be unravelled from this simple image. While our rational understanding of the kingdom of blessed is vague and limited, the image gives the idea more definite form. While the aesthetic idea carries us beyond what we can know through the understanding—while it carries us out into vastness—it does not provide us with any real knowledge. It makes us *think* about blessedness and the realm of the blessed, but these thoughts

are not mediated by concepts. They have the form of knowledge but do not supply real knowledge.

Kant's aesthetic theories were enormously influential. His third critique influenced Johann Gottlieb Fichte and the Jena Romantics—indeed, for them, the third was the greatest of Kant's critiques. They were not uncritical of it, however. Kant's treatment of one matter in particular, the dichotomy between nature and art, left them dissatisfied. The Jena Romantics believed genius to be a force of nature. Thus, as a product of genius, the work of art represented (embodied) nature in art. For them, a work of genius is characterized by being a creation of the "productive imagination." In the early twentieth century, the idea of the productive imagination as a natural phenomenon was joined to notions derived from electromagnetism, with signal effects. Among those who took artistic theories in this direction were the painters associated with the Cubist and Futurist movements.

Clues to the direction in which the Cubists and Futurists took the idea of productive imagination can be found in the writings of Arthur Schopenhauer and Henri Bergson, which were highly influential in this era. Schopenhauer's writings on aesthetics emphasized sublimity over beauty, and that idea resonated in the art of the Symbolists and their Cubist and Futurist offspring. Furthermore, as I noted in the introduction, Schopenhauer claimed that artistic creativity mimics the dynamics of nature, and that idea, too, influenced both the Cubists and the Futurists.

The conviction that artistic creativity mimics the dynamics of nature had normative implications: Cubists and Futurists (especially the latter) adopted as their cardinal artistic goal imparting a sense of movement rather than accomplishing architectonic feats (which have the effects of stabilizing forms); the dynamics of process rather than stabilities of resolved, harmonious form; and dynamic equilibrium rather than static formal balance. Another aspect of Schopenhauer's aesthetic theory influenced modernism (including the Cubists and Futurists): Schopenhauer had a high estimation of the epistemic value of art: though he did not claim that an artwork could disclose the noumenal world, he did suggest that artworks could adumbrate something of its character. This provided the grounds connecting aspects of Kantian theory of art (Schopenhauer believed his philosophy was the perfect fusion of Kant's and Plato's) with the idea that artworks vouchsafe some form of insight (however tenuous) into ultimate reality. Modernists made those possible connections actual.

According to Bergson, matter is made up of "modifications, perturbations, changes of tension or of energy and nothing else."[106] All that is, is immersed in the same stream of duration—and no thing is really a separate, autonomous entity. Every thing is simply a different modality of a single *élan vital*, and

what marks these different modalities are differing degrees of what Spinoza called "conatus," a sort of life-force. At the core of Bergson's world view are a pair of distinctions—between intuition and intellect, and between time (as durational succession) and space—and two secondary distinctions, between more highly organized and more disorganized bodies, and between vital order and geometric order. Bergson privileges one of each pair: he celebrates intuition over intellect, time (*durée*) over space, organization over disorganization, and vital order over geometric order.[107] From the time of Euclid and Plato until the late nineteenth century, thinkers took geometry as the paradigm for the intellect (Descartes, Spinoza, and Hobbes all did) and so prized spatial over temporal understanding. So it was with Kant: his philosophy accords spatial qualities to time, and misses time's unique, essentially durational quality (Bergson criticized Kant for conceiving of time on the analogy of space).

Bergson combatted this devaluation of time with every resource at his disposal, including reasoned argument, historical survey, cultural critique, and poetic or metaphorical persuasion (Bergson was an excellent writer and received the Nobel Prize for Literature in 1927). He celebrated the experience of duration—which was allied with intuition—as a way of achieving a deeper understanding of reality than was acquired through intellectual, geometric understanding, which is valuable primarily for utilitarian ends. Bergson connected time and life—in his *La pensée et le mouvant* (a collection of essays he wrote between 1903 and 1923, which has appeared in English under the title *The Creative Mind*), he writes that denying the phenomenon of time (which is what conceiving time on the analogy of space is tantamount to) results in philosophies that "are not cut to the measures of the reality in which we live" and could apply equally well to a world in which neither plants nor animals have existence.[108] Needless to say, Bergson's assertion that one achieves a deeper insight into reality through intuition than through reason—and his claim that the reality we understand through intuition is a dynamic one—appealed to thinkers of a spiritual or mystical bend. This is a topic to which we will return.[109]

Finally, I note a remarkable convergence: the language that the modernists used to speak of the aesthetic experience—the intuition of pure form that lifts one out of the here-and-now and towards a higher reality, in which every force, every tension, every energy is known to be exquisitely adapted to every other, and that this recognition transpires in timeless "now," a moment of uncontaminated brevity that, paradoxically, seems to be complete and enduring, that is, that seems to compress the entire temporal compass into a moment of complete simultaneity and complete instantaneity—is similar to the language traditionally used to highlight features of the mystical experience. Or, more to the point, given the ideas that circulated in this period, the

language that modernists used to speak of the aesthetic experience is similar to the language the Theosophists used to speak of the experience of the higher reality (that is energy existing on the astral plane, which is the source of material reality). This convergence grounded an assumption made by many of this period's art world denizens, viz., that the experience of art vouchsafed intimations of a higher reality—that of energy, vibration, dynamism, space-time.

## BASIC THEMES IN CUBISM AND FUTURISM

Several topics arise repeatedly during our exploration of Cubism and Futurism. To understand the importance some of these topics had for artists and thinkers in the early twentieth century requires information about the historical context in which they emerged. For the most part, I have tried to include contextualizing commentary when a topic makes it pressing. However, there are a few such topics for which I choose to present the contextualizing discussion at the outset. I do that partly because presenting the historical background for these topics is more intricate and theoretically demanding, and the lengthy discussion demanded would interrupt the flow of the argument—partly because the connections among these themes makes it simpler and more elegant to present this historical and theoretical material in a block, and partly to highlight the importance of these themes. Furthermore, some material in the next section offers whirlwind summaries of themes developed more fully in *Harmony and Dissent: Film and Avant-Garde Art in the Early Twentieth Century* or in *DADA, Surrealism, and the Cinematic Effect*, the predecessor volumes to this one. I have done my utmost to avoid repeating ideas from one volume in this series in another volume. But I have also resolved that each volume should be self-contained and offer an argument that any reader can follow without having to reach for another of the series' titles. I have found that, because these volumes cover overlapping periods, commentary on a particular feature of the intellectual culture of the era has sometimes been indispensable to the argument of more than one of them. Some of the ideas I am about to present I discussed at greater length in one of the earlier volumes—this material should be considered as offering a summary of salient points in "the argument so far," when those summaries could not be condensed into a sentence or two that could be introduced into later stages of the argument this volume offers.

I now turn to this task.

### The Senses' Disconnection from Reality

A principal claim of this volume is that Cubism and Futurism were affected by a series of shocks that rocked the late-modern world. At the beginning of

the next chapter, I show that social developments and scientific discoveries brought into doubt vision's (and, more generally, the senses') ability to present the world accurately. As they did so, they brought under assault the very foundations of our knowledge of the external world. The scope of the resulting epistemological trauma must not be underestimated. Among the shocks the late-modern world experienced was a crisis of perception that troubled the late nineteenth century—that crisis also gave birth to photography and film. In *Harmony and Dissent*, I provide a more extended discussion of the engendering dynamic than I do here; there I pointed out that the crisis arose out of the recognition that perception did not give us an image of external reality—that a percept is only a sign of the external factor that causes it, not an accurate image of it (to use Hermann von Helmholtz's [1821–1894] formulation). In 1835, Johannes Müller proposed what he called "the law of specific nerve energies," and that research provided the basis of Helmholtz's famous *Optics*, a book that dominated the theory of vision in the second half of the nineteenth century. As Jonathan Crary points out, the theory rested on the discovery that the different sensory modalities are physiologically distinct and so the same cause produces different sensations when it acts on different types of nerves (aural nerves, olfactory nerves, etc.). Equally, different inputs (for example, either light reflected from an object, or electricity) could produce the same sensation when applied to the same (for example, optic) nerve. Crary points out that this seemingly arbitrary relation between stimulus and sensation produced an epistemological scandal. Helmholz's physiology was

> a description of a body with an innate capacity, one might even say a transcendental faculty, to *misperceive*, of an eye that renders differences equivalent.
>
> His most exhaustive demonstration concerns the sense of sight, and he concludes that the observer's experience of light has no necessary connection with any actual light. Müller enumerates the agencies capable of producing the sensation of light. "The sensations of light and colour are produced wherever parts of the retina are excited 1) by mechanical influences, such as pressure, a blow or concussion 2) by electricity 3) by chemical agents, such as narcotics, digitalis 4) by the stimulus of the blood in a state of congestion." Then last on his list, almost begrudgingly, he adds that luminous images can also be produced by "the undulations and emanation which by their action on the eye are called light."[110]

Electromagnetic energy (which everywhere is the same—radiation, in the form of waves that move at the speed of light—and occurs throughout the universe) excites different nerves, and those differing types of excitation have different phenomenal effects. This discovery brought into question the veracity of phenomenal representations. The venerable philosophical distinction between primary and secondary qualities (which historically had

helped engender the subjective idealist epistemology) took a new form, as "nerve theory" and thinkers began to question whether the world is actually coloured, odoriferous, rough or smooth.

Conrad (or Konrad) Fiedler (1841–1895), a renowned art theorist of his century, developed a theory of experience (and art's relation to it) out of a conviction regarding the role language plays in perception. The commonsense conception of language holds that nouns are the key terms of language and that nouns name pre-existing objects. Fiedler rejected the idea that language is a notational system for denoting objects external to language on the grounds of the evolutionary purpose he believed language to play: he maintained that language evolved out of an *Ausdrucksbewegung*, a straining towards expression that developed at a certain stage in psychophysical development, and not as a means to name extra-mental, extra-linguistic objects.

If we look into ourselves and consider experience, we discover that the contents of consciousness are not fixed forms with unchanging properties. Rather, what we experience is in continuous flux. All that is fixed is that which linguistic energies themselves create. It is words that create fixity: we hang on to the word because of its stabilizing effects. However, words belong to the mind itself, and they are incommensurate with anything outside language. Certainly, we can summon words back into consciousness, and when they return to consciousness, they can reanimate the experience with which they were previously associated. But a word does not represent an extra-mental reality or denote the experience with which it is associated—the word forms through experience an association with an idea/feeling about the external world, and that is all. Language is completely autonomous of any possible extra-mental world.

Fiedler and his many followers argued that a host of mistakes follow from the erroneous conviction that language is denotation, and paramount among these errors are incorrect ideas about the relation between the contents of consciousness and the world. That conviction encourages us to conclude, wrongly, that visual representations stand for extra-mental realities and that their accuracy can be assessed by comparing visual sensations with reports from other senses—by verifying that what we are seeing is actually there, and is as our sight presents it, by reaching out and touching the object. But the reports of the different sensory modalities are strictly incommensurate: there is no ground for comparing a tactile experience with a visual experience. Only the proposition that the tactile experience and the visual experience derive from the same object leads us towards the conclusion there is some homology between the different experiences; so our inference is based on a *petitio principia*: we come to the conclusion that the fact that different senses corroborate one another's reports about the nature of an external object proves

that the existence of the object is independent of the mind only by assuming that the fact that the sensations presented by different sensory modalities all stem from the same object must make them commensurate.

Fiedler pointed out that the belief that the object represented in visual perception has an independent, extra-mental existence has influenced artistic theory and practice. Since Classical Greece, an ideal (for the visual arts at least) has been to furnish a correct or accurate image (consider the famous story of Zeuxis and Parrhasius).[111] Nevertheless, the belief that we can appraise the accuracy of a visual representation by comparing it with its model is unfounded: we have no access to extra-mental reality. We are forever locked within the circuit of experience.

By the opening years of the nineteenth century, it was becoming clear that vision could no longer assert radical claims for its value as a source of information about the world. The Western philosophical tradition may often have disparaged the senses—nonetheless, whatever value philosophers attributed to the senses, they generally maintained that, among the senses, vision is supreme. But if vision had once had that status, it was rapidly losing it. In the theories of Fiedler and other exponents of the notion of pure visuality, this crisis of visual perception—and indeed, sensation in general—has become explicit. In response to this epistemological crisis, Fiedler propounded the extreme thesis that vision is altogether wanting when it comes to informing us about the condition of the world beyond our minds—that vision is not so much a cognitive instrument as an aesthetic agent. Vision is autotelic: it represents nothing. This belief played an important role in the modernists' conception of aesthetic experience. The aetiology of that conception of vision is instructive: it developed out of a crisis of vision, that same crisis to answer which photography and film came into existence.[112] This connection alerts us to the close connection that photography and film have to modernism (even though, as media with an affinity for representation, they might seem, *prima facie*, to be the antithesis of modernism).

Fiedler's ideas on sheer visibility (*Sichtbarkeit*), his concern with "seeing for its own sake," his belief that we achieve full seeing only when the ligatures between the images in our mind and objective reality have been severed, were the basis of his aesthetic theory. His purpose was to write a defence of the visual arts; he pursued his questions about image arts to the very core of the phenomenon of representation, that is, the relationship between the model and the related pictorial form (or, as Fiedler called them, between the *Vorbild* and the *Nachbild*). Linguistic theories are founded on a conception of the relation between the signifier and the signified; thinkers now extended this conception of the sign to apply across all significatory modalities, on the assumption that all signifiers represent (directly or indirectly) an extra-mental

reality. However, Fiedler insisted, the painter or sculptor does not juxtapose model and image. The external object belongs to nature, a domain that lies beyond our reach. The external object is not the model (*Vorbild*)—rather, the model is the artist's visual perception.

Fiedler's conclusions about the relation between experience and the object have many similarities with the now better-known ideas of R.G. Collingwood. Fiedler believed that the activities involved in making art continue the processes involved in perception. The artist's hand does not reproduce what the artist's mind has just perceived—the hand actually plays a role in shaping the perception. The artist's activities in making an object are part of the artist's process of experiencing. The bodily gesture is part of the process of articulating a percept, so in artistic perception body and spirit are at one. Artmaking is forming visibility (*Sichtbarkeitgestaltung*). Visible nature is a welter of intuitions and perceptions, but art gives visibility a splendid order. Art, therefore, is nature transformed (nature and natural objects must have form, for, if they did not, they would not be visible). Still, nature's form is rudimentary. Art takes this rudimentary form, which nature offers as a gift, and refines and elaborates it. Thus, artmaking takes perception from confusion to clarity, from indefiniteness to exactitude. Hence, natural form and artistic form are not related to each other as *Vorbild* to *Nachbild*, as model to image, but, rather as a less definite image to a more definite image. Artmaking brings what is incipient in nature to a distinct and well-patterned form that human consciousness can more adequately grasp.

### Time, Reality, and Meaning

For much of its history, the West has conceived of time as one instant following another, as though laid out on a line. Mircea Eliade (1907–1986) noted that ordinarily, traditional societies held a cyclical view of time, according to which significant mythical events were periodically re-enacted; through this re-enactment was effected a *ricorso*—an "eternal return" to an age apparently beyond time.[113] But the West, since Christian times, has been different: here the relation between the eternal and the time-bound has been understood to be that in the distant past humans fell into history, and they await the moment of redemption, when some (or all) will be lifted outside time, into the timeless. While some features of the more common religious view of time as cyclical were retained in the Christian ritual of communion, for the most part the Judaeo-Christian belief systems offered an "innovation of the first importance," Eliade says in Myth and Reality (1963). In Christianity, "Time is no longer the circular Time of the Eternal Return; it has become linear and irreversible Time" (65). Historical time, which in the Judaeo-Christian tradition is sacralized by its beginning in creation, has, for Christians, its centre

in the incarnation (in which the eternal enters time, thereby resacralizing the temporal) and its end in the final consummation. Time has a direction, it moves as narrative does, from a beginning, inexorably towards an end. We see the effects of this new view of history not only in Christianity, but also in Hegel's philosophy, and that of Karl Marx (1818–1883).

By the middle of the nineteenth century, time was beginning to be felt a new way. Baudelaire's poetry, like Impressionist painting, celebrated the contingent and the fugitive—that is to say, the time-bound. Baudelaire's particular interest—it was soon to become common—was in memory's capacity to store fleeting events in the archive of memory, whence they could be retrieved by imagination. As the pace of change accelerated and time obtruded on consciousness ever more insistently, not even the retrievability of the past through memory (however much it was aided by an idealist Symbolist metaphysics that strove to convert the experienced into the real) could assuage the bitterness of the fugitive character of all that is. In "On Some Motifs in Baudelaire," Walter Benjamin writes, "In the *spleen*, time becomes palpable: the minutes cover a man like snowflakes."

It has become commonplace to note that the denizens of metropolises of the late nineteenth and early twentieth centuries experienced the intrusion of train schedules into life, the proliferation of pocket watches, and the standardization of time, as well as life-rhythms that, with the establishment of the Greenwich Meridian and rigorously delineated time zones, were corralled into increasingly rigid diurnal patterns. In *Die fröhliche Wissenschaft* (The Gay Science, 1882), Nietzsche writes of American life that "even now one is ashamed of resting and prolonged reflection almost gives people a bad conscience. One thinks with a watch in one's hand even as one eats one's lunch whilst reading the latest news of the stock market, one lives as one might always 'miss out on something.'"[114] Time had become an exigent phenomenon—and one factor that allowed modernity to tighten its grip on consciousness was the development of global time keeping. The Taylorization of society, to increase productivity and efficiency, depended on precise time-keeping mechanisms that all measured time in exactly the same manner. Photography and cinema elaborated the experience of time—the former by freezing time, the latter by bringing virtually all movement under the regulation of its highly structured (and soon to be precisely measured) pulse. Time became a matter of urgency. For some, experiencing the throb of its passing was like the feeling of the pulse of life-force, ever active, ever new. For others—indeed, for *many*—in the early twentieth century, it was a source of anxiety.

But the changes that made the issue of time urgent did not all have to do with technological innovation. The more important transformations had to do with the way the cosmos was conceived; and this change occurred in stages.

I remarked earlier that while most traditional societies maintained a cyclic view of time, Judaeo-Christian societies offered an "innovation of the first importance" when they embraced the notion of linear, historical time. That is basically correct, but it needs refinement. The Western tradition grew out of synthesis of Judaeo-Christian and Greek ideas, and the Greek ideas of time were different from the Judaeo-Christian ideas. For the Greeks maintained that there are different levels of reality, and for the most part, they conceived of the higher levels as being eternal—beyond time and change. The synthesis of Greek with Judaeo-Christian ideas—the amalgam that constituted the Western tradition—generally reconciled the two views of time by distinguishing two sorts of reality: an eternal one that is beyond change, and a non-eternal one that is subject to change. Often the two realities were conceived of as spatially separate, with the reality that is beyond change belonging to the superlunary realm and the reality that is subject to change residing the sublunary realm. Eternal reality was deemed nobler, so the effects of a linear conception of time were attenuated; furthermore, the progress of the secular world was directed towards a final end, in which time would be overcome and the changeable transformed into the immutable: hence, the Christian world produced artworks depicting the endtime as the end of time.

The nineteenth century saw a momentous transformation: Hegel proposed that all reality undergoes change—the Absolute, the whole, only reaches its truth through history. His argument was this: The truth of the Absolute emerges through a process of the Absolute's self-becoming, a teleological process through which its potential becomes fully actualized. The Absolute is Mind or Spirit (*Geist*) that gives itself its own content—Nature, that which is presupposed by human consciousness—through an act of "othering" or alienation. It subsequently recovers this content for itself through human consciousness, which itself undergoes historical development, gaining, through its growing awareness of Nature, an ever wider and ever deeper understanding of the Absolute. Thus, human consciousness returns Nature (which at the beginning the Absolute alienated from itself) to the Absolute. The Absolute re-assimilates (though the actions of human consciousness) what it originally alienated. Hegel writes:

> The True is the whole. But the whole is nothing other than the essence consummating itself through its development. Of the Absolute it must be said that it is essentially a *result*, that only in the *end* is it what it truly is; and that precisely in this consists its nature, viz. to be actual, subject, the spontaneous becoming of itself."[115]

Through this process, *Geist* accedes to absolute knowledge:

> This last shape of Spirit—the Spirit which at the same time gives its complete and true content in the form of the Self and thereby realizes its Notion as

> remaining in its Notion in this realization—this is absolute knowing; it is Spirit that knows itself in the shape of Spirit, or a *comprehensive knowing*.[116]

Hegel professed to being an orthodox Lutheran, and many of his Christian followers (especially those working in England and Scotland) proposed a metaphysical reading of Hegel, one that "sees a story about the self-realization of God as playing a pivotal role in accounting for [the] intersection of freedom and modern *Sittlichkeit*." *Sittlichkeit* is Hegel's term for the third sphere of ethical life, that of ethical order or ethical substance, the synthesis of the first two, which are negative freedom and Kantian duty.[117] *Sittlichkeit* relies on conventional practices to constitute specific, shareable *forms of life* that are actualized in the lives of particular individuals who, though the process of acculturation (the accession to shared values), internalize these customs. One freely and willingly adopts, and makes one's own, the ethical principles one shares with the community. According to this metaphysical interpretation of Hegel, in enjoying the freedom that modern *Sittlichkeit* affords, we further God's self-realization.

A philosophical anthropology is implicit in this. That anthropology affirms, first, that humans are moral beings with free will. What we do is the result of choices we make, and these choices reflect our beliefs about what we *ought* to do, and our beliefs are shaped by our culture or history. Hegelians are fond of pointing to the dialectical unity of concepts and the concrete world that emerges out of a reciprocity between self and world. We build our environment, and our environment shapes us—the material world we live in forms our beliefs about ourselves and what we owe to others. The Canadian philosopher and theologian George Grant (1918–1988), in his most Hegelian phase, wrote that "individual beliefs as to the nature and destiny of man make, and are made by, the forms of society."[118] And further: "We are formed by [our] new environment at all the moments of our work and leisure—that is, in our total lives."[119] In these comments, Grant is giving voice to the fundamental Hegelian principle that nothing is beyond history. History incessantly evolves a new system of meaning out of its predecessor, and each stage in the historical process is marked by a heightened awareness of the meaning of the whole (another way of saying this is that each stage of history more nearly approaches the absolute knowledge in which historical process culminates). History advances: we learn from our past—from our collective mistakes and our collective successes. We learn, and we reform our social structures. In doing so we become freer.

I commented earlier that many English and Scottish Idealists maintained that Hegel's philosophy offers a tale about the self-realization of God. The Canadian classicist and philosopher James Doull (1918–2001) believed that

Hegel had succeeded in his attempt to articulate in the form of self-developing concepts the inner content of the Christian revelation. For his part, George Grant, explaining the appeal that Hegel's philosophy once had for him, stated:

> At the theoretical level, I had considered Hegel the greatest of all philosophers. He had partaken of all that was true and beautiful and good in the Greek world and was able to synthesize it with Christianity and with the freedom of the enlightenment and modern science. It cannot be insisted too often how hard it is for anyone who believes the Western Christian doctrine of providence to avoid reaching the conclusion that Hegel has understood the implications of that doctrine better than anybody else.[120]

Grant at one time believed that Hegel had reconciled reason and faith by understanding history as a process of the Absolute's self-actualization. The stages of history are the phases in this saga of self-actualization.

But at some point, the belief that history developed towards some end ceased to attract any great number of thinkers. This renunciation occurred in stages. One development was the appearance of Schopenhauer's philosophy. Arthur Schopenhauer's productive years overlapped with Hegel's. Hegel's first statement of his own philosophical system, *Phänomenologie des Geistes* (Phenomenology of Spirit) appeared in 1807, his masterwork *Wissenschaft der Logik* (The Science of Logic) came out in two parts in 1812 and 1813, and an abridged "student version," the Logic section in the *Enzyklopädie der philosophischen Wissenschaften im Grundrisse* (Encyclopedia of the Philosophical Sciences)—the so-called Lesser Logic—appeared in 1817. Schopenhauer's *Über die vierfache Wurzel des Satzes vom zureichenden Grunde* (On the Fourfold Root of the Principle of Sufficient Reason) was published in 1813, and the first edition of his magnum opus, *Die Welt als Wille und Vorstellung* (The World as Will and Representation) appeared in 1819. (Though the publication of this edition had little impact, a second, substantially expanded edition was issued in 1844 and became greatly influential.)

If Hegel's philosophy identified the rational and the real, Schopenhauer's maintained that the universe is not at all rational. Schopenhauer believed that his philosophy was the richest extension of Kant's, and he modelled his distinction between will and representation on Kant's distinction between the noumenal and the phenomenal realms. Nonetheless, the fundamentals of Schopenhauer's philosophy diverge from Kant's. Kant argued that the understanding operates through concepts and judgments and that the understanding and reason are both distinctly human faculties; while Schopenhauer, differing with his intellectual mentor, averred that the understanding is not conceptual and is a faculty that both animals and humans possess. Furthermore, Schopenhauer's commentary on the noumenal realm was much more

expansive than Kant's, and this is largely because Schopenhauer believed that the body, through the experience of will moving the body, vouchsafes us something of the nature of the noumenal realm.

In Schopenhauer's system, the noumenal realm is will (*Wille*). The will is blind—most of its acts are not intentional, nor are they accompanied by conscious representation. In "Essay on Free Will," Schopenhauer cited the adage *quidquo fit necessario fit*—whatever happens, happens necessarily: this idea, which Schopenhauer took from Spinoza, claimed to have scientific warrant and was widely believed to state the truth (indeed, it was so widely believed that the often-used phrase became an allusive token). The adage states a principle that philosophers often call the principle of sufficient reason, which was a central tenet of Schopenhauer's philosophy. That principle maintains that all events occur for a reason, that no event would occur if a reason for its happening did not exist, and that an event would be different if the reason for its happening were different. Schopenhauer's point in using the citation was to suggest that it is ignorance alone that is responsible for the illusion of freedom. He interpreted the principle in a remarkably Kantian fashion, according to it a status similar to that of categories in Kant's philosophy. For Schopenhauer, it showed that the way we represent the world to ourselves results from applying the principle of sufficient reason to four key areas: the interrelations among our sense impressions; our judgments; our spatial and temporal intuitions; and our motivations.

In Schopenhauer's system, to achieve a truer understanding of our representation of the world, we must learn to separate out what is principally responsible for its form—which turns out to be will, not reason or sensation. This acknowledged, it follows that all else of which we are aware is formed by the will and is an objectification of the will. Even the body is an objectification of the will. Human existence is a manifestation of the will, for the will is a force that permeates all reality. Or, to express the idea in yet another way, if human thought and sensation are an objectification of one's will, and if, by a principle of parity, what is true of human beings is true of reality as a whole, then the world itself is a representation of the cosmic will. Human sensation and thought belong to the realm of phenomena, but human will belongs to the noumenal realm. Schopenhauer identifies space and time as the *principium individuationis* (that is, the basis for distinguishing among the individual beings and acts that make up the phenomenal world or the world as representation); the will itself, which belongs to the noumenal realm, is not divided into individuated forms. It is the same everywhere: it is simply relentless, purposeless striving.

In conceiving the will in this fashion, Schopenhauer really had done what he claimed to have done—to have extended Kant's philosophy by exfoliating

principles inherent in it. For Kant, too, had proclaimed that practical reason is the key to the self's true nature, and that it is through the exercise of the will that the self actualizes its potentials. Who, having read the opening sentence of *Laying the Groundwork to a Metaphysics of Morals*—"Es ist überall nichts in der Welt, ja überhaupt auch ausser derselben zu denken möglich, was ohne Einschränkung für gut könnte gehalten werden, als allein ein guter Wille" (Nothing whatsoever, in the world or even beyond it, can be conceived that could be taken as good without restriction except a good will)—could ever forget the exalted place to which Kant elevated the will? Schopenhauer took this elevation of the will with the greatest seriousness, and he deliberated on its consequences.

Kant proposed that the Good was served when will was tethered to reason. The spirit of Schopenhauer's philosophy is different from his master's insofar as reason, for him, is feeble. Schopenhauer rejected the Christian doctrine that the rational plan of a benevolent deity had established the design of the universe. He argued that the universe is the product of a blind will. He even went as far as to pass moral judgments on the will, describing it not just as amoral but as downright malevolent. Schopenhauer claimed, as Nietzsche too did, that each person's appetite for life conflicts with the life-drives of all others. Consequently, suffering is the common lot of all humans and, indeed, of all sentient beings.

Because the will strives without a definite purpose or goal, it is insatiable. And because no satisfaction is possible, the will produces only suffering. Existence is characterized by want—and humans' intellectual power makes the suffering that humans feel clearer and more definite, and therefore more intense. Furthermore, Schopenhauer emphasized the hidden, yet distorting, operations of will in the self's quest for knowledge; he maintained that these cognitive distortions often result in misconceptions that only increase our suffering.

Schopenhauer was among the first philosophers to suggest that existence is fundamentally irrational. Nietzsche developed this irrationalism into a joyful science.[121] Friedrich Nietzsche (1844–1900) testified to the catalytic impact that Schopenhauer's masterwork, *The World as Will and Representation*, had upon him. Late in October 1865, Nietzsche was prowling through a bookshop and found himself irresistibly drawn to the book:

> I took it in my hand as something totally unfamiliar and turned the pages. I do not know which demon was whispering to me: "Take this book home." In any case, it happened, contrary to my principle of never buying a book too hastily. Back at the house I threw myself into the corner of the sofa with my new treasure, and began to let that dynamic, dismal genius work on my mind. Each line cried out with renunciation, negation, resignation. I was looking into a mirror that reflected the world, life and my own mind with hideous magnificence.[122]

Nietzsche was swept away by the book's initial assertions that the world "is my idea [*Vorstellung*, representation]," that the only objects in our direct ken are ourselves, and that we know our bodies as extended in space and time only indirectly. It was Nietzsche's sad fate to be the first thinker to clearly envision, and to thematize, the appalling, abysmal absence of permanence and truth. A defect he believed characterized all previous philosophers, a "lack of historical sense," scandalized him. Nietzsche was the earliest to realize that in the late-modern age, becoming is the rule, even in spiritual matters. Everything that exists, spiritual or material, human or non-human, we consider as having a history. But, as Nietzsche argued in *On the Genealogy of Morals* (1887), "only that which has no history"—that which does not evolve or change—"can be defined." When everything evolves, nothing can be defined. There are no true assertions we can make—and since there are no truths, there is no knowledge. The language of permanence, truth, and being had developed only to mask the primal chaos.

Nietzsche accepted most of the features of Schopenhauer's philosophy heretofore described. One proposition he did *not* accept—and this difference with Schopenhauer affected the entire cast of his philosophy—was Schopenhauer's claim that, through art, we are vouchsafed an intimation of noumenal reality (that is, art adumbrates its nature as ceaseless striving or *Wille*). Nietzsche rejected any claim that what we call knowledge corresponds to the real, or that we can have any acquaintance with the real. Above all else, it is his assertion that what we call knowledge lacks any ground that gives his philosophy its world-historical significance, for it encapsulates a fundamental truth about the condition of thinking in the era of late modernity and postmodernity.

In 1866, a post-Kantian philosopher and natural scientist, F.A. Lange (1828–1875), reinforced the anti-Platonic strain in Nietzsche's developing thought. Lange's *Geschichte des Materialismus und Kritik seiner Bedeutung für die Gegenwart* (History of Materialism and Critique of Its Significance for the Present) argued against Schopenhauer's Platonically inspired conception of the *Ding an sich* (thing-in-itself). He declared the impossibility of drawing a meaningful distinction between appearance and reality. Ultimate reality itself is unknowable, Lange argued, and any conception we can form of it belongs exclusively to the world of appearance, not reality. Anything that enters our minds belongs to the realm of appearances. We cannot attain accurate knowledge even of our own bodies, for our bodies are as much a manifestation of an unknowable reality as any other objects in the visible world. As George Berkeley (1685–1753) and Baruch Spinoza (1632–1677) had argued before him, Lange proposed that everything that enters our minds results from a perceiving organ interacting with the external world and that this interac-

tion occurs on the perceiving organ's terms. Thus, against Schopenhauer's claim that the body's interior knowledge of itself grounds our knowledge of ultimate, cosmic reality, Lange countered that our belief that we possess sure knowledge of the cosmic will is completely without ground.

Nietzsche concurred with the point that Lange's arguments were intended to establish. Accepting it drove him into a thoroughgoing perspectivism that denies the possible existence of any authoritative, independent criterion for evaluating the relative validity of competing systems of thought. Nietzsche concluded from this that many alternative systems of concepts and beliefs can interpret reality equally well. In *Der Wille zur Macht* (The Will to Power), an important book that appeared only in 1901, Nietzsche wrote, "Against Positivism, which halts at phenomena—'There are only facts'—I would say: No! Facts are precisely what there are not, only interpretations."

By 1873, still a young man at twenty-eight, Nietzsche had already arrived at an insight that would become central to twentieth-century philosophy: that words do not deliver objective truths about external reality. What is likely the most frequently quoted passage from his writing asserts this, and more:

> What then is truth? A mobile army of metaphors, metonyms, and anthropomorphisms—in short a sum of human relations, which have been enhanced, transformed and embellished poetically and rhetorically, and which after long use seem firm, canonical and obligatory to such a people: truths are illusions about which one has forgotten that this is what they are, metaphors which are worn out and without sensuous power; coins which have lost their pictures and now matter only as metal, no longer as coins.[123]

The essay in which this passage appears, "Über Wahrheit und Lüge im aussermoralischen Sinn" (On Truth and Falsehood in an Extra-Moral Sense), argues that we have no real, objective knowledge of the interior functioning of our bodies. It is only our nearly unlimited capacity for delusion and deception that allows us to think that we do.

Nietzsche declared that language cannot designate the *Ding an sich* (the thing-in-itself), but only our relations to things. Two intermediaries intervene between words and things: first, the stimulus the thing produced, and second, the percept we form of it. Words refer to percepts, and percepts are already at a remove from external reality. Every other form of animal perceives a different world than humans do, so their worlds and our world are utterly incommensurable. And so are the various competing systems of interpretation that different people form.

Nietzsche's most terrifying proposal concerns the morality of knowledge. Against the Positivists of the eighteenth and nineteenth centuries, who presumed that objective, value-free knowledge exists, Nietzsche offered the view

that knowledge is the product of the will and so subject to being evaluated morally. Our knowledge takes on shapes that reflect the compelling urge to acquire knowledge; this urge is a creative force that moulds what we think of as knowledge. Facts do not exist in themselves. Nietzsche exposes the baselessness of the realists' or naturalists' assertions that their world-pictures meticulously represent the world just as it is. Against those who (like the later *Ausdruckstänzer* [expressionist dancers]) claim to be revealing the secrets of the soul, Nietzsche points out that they actually create those secrets in the processes of articulating them. "This is how I wish the soul to be" is all that they say in the end.

Nietzsche wrote:

> Language depends on the most naive prejudices . . . we read disharmonies and problems into things because we think *only* in the form of language. *We cease to think when we refuse to do so under constraint of language*; we barely reach the doubt that sees this limitation as limitation.
>
> *Rational thought is interpretation according to a scheme that we cannot throw off.*[124]

Nietzsche articulated the beliefs that have shaped—and perhaps undone—postmodern civilization. He uncovered, before anyone else, the views that we postmoderns have accepted at the cost of sacrificing our salutary relation to truth and a hypertrophy of the power of will: that nature itself is without value; that the strength of the will derives from nature; and that those of strong will and great power do not disown the will but acknowledge it is their innermost being and allow it to steer their actions—they are not constrained by the false teachings of sickly humility or by the erroneous conviction that they must submit to a non-existent objective good. Those who have such power of will, the *Übermenschen*, can disencumber themselves of that cargo of shame and guilt with which the belief in the real existence of good and evil (as actualities that exist outside the will) burdens the self. These ideas were central to the aesthetics of Cubism and Futurism.

However, the view that we do not love things because they are good, but rather that they are good because we choose to love them—and that often what we choose to love does not even exist but is only the projection of our desires—assigns an awesome task to the self, that of creating value. Things themselves are pitched into the abyss of valuelessness, and this abyss becomes a constant part of the self's experience—it looms on the horizon of the self's experience when it is not central. The self is understood as the mysterious, free, creating (and value-creating) centre of our being that confronts this abyss of non-existence. On this picture, which really is the *imago hominis* of the late-modern and postmodern eras, whatever belongs to the outer realm is

cast into the darkness of nihilism, while what belongs to the inner realm—the realm of subjectivity, the realm disclosed through self-reflection, but above all else, the realm that Protestant Christianity depicts as the place where the human and the Divine have intercourse—resides in the lighted clearing that is the emptiness within which creative making (creation *ex nihilio*) arises. The inner and outer worlds become detached from each other as the outer world dissolves in raging chaos and the inner world becomes the source of all value and the arbiter of all truths. But the burden placed on the self becomes too great, and the self fragments. The prolific production of pornographic images, with which we are, all of us, all too familiar, is a symptom of this: we have asked Eros to carry the entire burden of giving meaning to life, and it cannot. So, in desperation, our culture produces tawdry images to distract us with more brutal and invasive content even than that of the coarse entertainment offered by depictions of shameless potty-mouth characters and CGI-generated images of exploding flesh that are the staples of the mainstream movie and gaming industries.

In consequence of their place in a divinely ordained order, humans once believed they possessed a distinctively human virtue: love or reason. Nietzsche recognized that when we lost our sense of belonging to a permanent order, we gave up our claim that a cosmic order sustains our system of values. Moderns and postmoderns no longer believe that our purposes and ends have their foundations in the nature of things.

Many thinkers of the nineteenth and early twentieth centuries besides Schopenhauer and Nietzsche had embraced one or another form of irrationalism. Long before Schopenhauer and Nietzsche, the Counter-Enlightenment thinker Johann Georg Hamann (1730–1788) had spurned speculation and sought truth in feeling, faith, and experience. Personal conviction, he averred, is the ultimate criterion of truth, and the solution to the problems of philosophy are not found through reason, but through faith in God. Hamann also identified reason with language, and so initiated a strain of thought that would culminate in Symbolism, which deems ordinary language to be incapable of conveying higher truths.[125] Another precursor was Friedrich Heinrich Jacobi (1743–1819), who extolled *Glaube* (belief or faith) over *Vernunft* (reason) (Jacobi even maintained that while Kant was right to assert that the *Ding an sich* cannot be known, we can, and should, take it on faith). He also exalted the certitude and clarity of faith to the detriment of intellectual knowledge and sensation. In a foretelling comment, he condemned Enlightenment thought as conducive to nihilism.

The historicism and relativism of Wilhelm Dilthey (1833–1911) also challenged the rational scientific understanding of reality as the sole way of truth. He understood that knowledge is conditioned by one's private, historically

embedded perspective—experience in his view is thoroughly historical. His work drew on Friedrich Schleiermacher's (1768–1834) foundational work on hermeneutics (which provided a model for aspects of Marshall McLuhan's media theories). Schleiermacher had sought a theory of the understanding to ground the interpretation not just of sacred texts (as earlier hermeneutical theories had) but of *all* texts and *all* communicative acts. In a move that profoundly influenced later German thinkers, Dilthey further enlarged the domain of hermeneutics. He took more seriously than Schleiermacher had Schleiermacher's own characterization of "every extension of consciousness" as being a form of "higher life"; he did so by enlarging the scope of hermeneutics to the point that every symbolic form was within its province. He sharply distinguished *Geisteswissenschaften* (the humanities) from *Naturwissenschaften* (the natural sciences), and he insisted that the methods of *Naturwissenschaften* are not appropriate to *Geisteswissenschaften*, which depend largely on interpretation. *Geisteswissenschaften* require that we attend to "lived experience" (there are more than a few similarities between Dilthey's hermeneutics and Edmund Husserl's phenomenology). Dilthey's theory of interpretation was grounded in a theory of expression: we encounter objects that have symbolic importance, and the interpreter's task, when encountering such objects, is to apprehend the imaginative or mental or spiritual conditions that produced such forms—to move them from external form to internal thought or feeling, from expression to what is expressed. Dilthey suggested that we do this through experiencing personally the spiritual conditions that led to the production of the forms we encounter. Dilthey maintained that the faculty of understanding is historically conditioned and sought to exfoliate the basic principles of understanding—knowing these principles would allow us to apprehend the conditions that helped bring forth the symbolic constructions we encounter.

The Canadian philosopher James Doull deliberated on the social and political developments of the nineteenth and twentieth centuries that brought into question Hegel's account of history as the fulfilment of reason. He emphasized their roots in the works of earlier German philosophers, including those of Hegel, Schopenhauer, and Nietzsche. In Hegel's thought, culture represents the means that reason uses to accommodate itself to actuality. The philosophies of Schopenhauer and Nietzsche convey the collapse of that view. What has arisen from the rubble is a flattened form of thinking—one that, in being self-aware, is aware mostly of its own enfeeblement. Doull considers this development to be a revolutionary transformation. It has taken many different historical forms, but what all these forms have in common is a belief in a divided or alienated self. The world cannot accommodate reason, and that inability forces on us the choice between self and world, ideality and nature.

This sundering of the ideal and the natural self took concrete form in the Victorian era: the individual Victorian, Doull tells us, "combined a stern personal morality with an unprecedented rapacity in business affairs." Doull notes that we can see the effects of this rupture in the Victorian era's contradictory tendencies towards "national states and languages" and "world economic order," and in the simultaneous push towards socialist political ideals and the radically naturalist counter-movements of "buccaneer capitalism" and "Nietzschean will."[126] The First World War brought the sundered self into general culture, where it "congeal[ed] shortly thereafter into the activist idealism of international Communism, which would enshrine the victory of universal man over nature, and…Fascism, which celebrated the natural will and one's particular national heritage, denying the unity of mankind in the name of racial theories."[127]

Moving beyond the years that birthed Cubism and Futurism, we note that out of the First World War emerged ideologies that made it the primary business of the state to create a new human: the Communist new "man" (there was usually a sexist dimension to the proposals) or the purified member of the new *Volk*. A crisis was upon us, and radical measures were needed. One of the strongest statements of this belief is Martin Heidegger's *Rektoratsrede*, on "Die Selbstbehauptung der Deutschen Universität" (The Self-Assertion of the German University), an exhortation to German students to help the German people seize their own destiny. That address culminates in the statement, "But we fully understand the splendour and greatness of this setting out only when we carry within us that profound and far-reaching thoughtfulness that gave ancient Greek wisdom the word:

> *τά…μεγλα πάντα έπιφαλη…*
> [All that is great stands in the storm…]
> (Plato, *Republic*, 497 d. 9)."[128]

The Canadian religious thinker George Grant maintained that Friedrich Nietzsche exemplifies more markedly than any other philosopher the way one thinks as a modern. In his lucid book, *Time as History*, George Grant examines Nietzsche's philosophy in an effort to make clear to himself (and for us) what it is to live as moderns (I would use the term postmoderns). What makes moderns modern, Grant seems to say, is that they embrace radical historicism. That insight led Grant to examine Nietzsche's philosophy to learn "what it means to conceive the world as a historical process, to conceive time as history and man as a historical being." To understand time as history is to understand that history has brought us into an era whose fundamental condition is that we live in a sundered world.

At one time, James Doull was a colleague of Grant, and he mentored him in reading Plato and Hegel. His tutelage convinced Grant that a historicist

philosophy that maintains that our consciousness is shaped to its core by its historical (temporal) setting will end up avowing that our understanding, in comparison with that of the Greek world, is an impoverished form of awareness. That is so because (as became evident to late moderns, as it was not to Hegel) history is not the progress of Reason. In fact, history has come to an end in an era that is bereft of gods and without forms of experience higher than calculative reason. We have been bequeathed haunting questions: reality is in discord with Platonic, Aristotelian, and Hegelian philosophy? What if reality is thoroughly depleted? What if our fate is to have learned that there is no eternal realm nor anything beyond the corruption of the historical process? What if philosophy can no longer strive to move from opinion about the good to real knowledge of it? What if beings-in-time is all there is? What if change—relentless and purposeless—is all there is?

In time, varieties of relativism and irrationalism led to panic over the loss of reality. The philosophy of Henri Bergson (to which I will often refer in this book, most of all in the chapter on Futurism) was in some measure an effort to contain this effect of relativism and irrationalism, for he celebrated intuition over reason (claiming that intuition carries us right into the heart of reality and furnishes knowledge that reason cannot supply)—and did so even while averring that reason serves a necessary epistemic function and that its employment in everyday life is necessary.

The same questions that convulsed the interwar period (and the years after the Second World War) also troubled the period this book deals with; perhaps they were more pressing for people of that era because of the Great War. Thinkers sought to establish experience on a solid foundation. One response to this crisis of *europäischen Wissenschaften* was the phenomenological method itself. Maurice Merleau-Ponty's famous essay on Paul Cézanne makes evident the connection between the methods and devices that Cézanne developed (which the Cubists adopted and extended) and those of the phenomenologist:

> By remaining faithful to the phenomena in his investigations of perspective, Cézanne discovered what recent psychologists have come to formulate: that lived perspective, that which we actually perceived, is not a geometric or photographic one. The objects we see close at hand appear smaller, those far away seem larger than they do in a photograph . . . To say that circle seen obliquely is seen as an ellipse is to substitute for our actual perception what we would see if we were cameras: in reality we see a form which oscillates around the ellipse without being an ellipse . . . It is Cézanne's genius that when the overall composition of the picture is seen globally, perspectival distortions are no longer visible in their own right but rather contribute, as they do in natural vision, to the impression of an emerging order, of an object in the act of appearing, organizing itself before our very eyes.[129]

To problematize the object's coming-to-appearance is another way of studying the synthetic character of perception, a fundamental theme of the Cubists. Merleau-Ponty's remark highlights in addition the connection between the belief in the active character of perception and the quest for a higher realism: Cubism understands the new art not as imitating the appearance of reality, but rather as offering a homology between the way the painting comes to be (that is, the transformation of reality into art) and the process by which perception is formed and an object emerges in awareness. The homology between these processes suggests the collusion of the senses and the imagination.

### Absolute Space, Relative Space

Questions about the relation between the science of the early twentieth century and the art forms of the period continue to insist on our attention. One view of the relation between the two realms has been particularly troublesome. Perhaps its most forceful statement appears in an often-cited passage in Sigfried Giedion's (1888–1968) *Space, Time, and Architecture* (1941) that connects Cubist painting and Einstein's special theory of relativity.[130] I begin with Giedion's citing a "celebrated statement" by the mathematician Hermann Minkowski (1864–1909), who in 1907 developed the mathematical techniques that allowed the special theory of relativity, which Einstein had worked out in purely algebraic terms, to be presented as a geometry of space-time: "Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a union of the two will preserve an independent reality." Minkowski then proposed the idea of space-time as a way of simplifying the mathematics of Einstein's special theory. Giedion relates Minkowski's mathematical approach to relativity to Cubist and Futurist painting and draws a parallel between Minkowski's mathematics of space-time and techniques that Cubist and Futurist used and the forms they created: "It was just at this time that in France and in Italy cubist and futurist painters develop the artistic equivalent of space-time in their search for means of expressing purely contemporaneous feelings."[131] He characterized the changes that occurred in this way:

> The cubists did not seek to reproduce the appearance of objects from one vantage point; they went round them and tried to lay hold of their internal constitution. They sought to extend the scale of feeling, just as contemporary science extends its description to cover new levels of material phenomena.
>
> Cubism breaks with Renaissance perspective. It views objects relatively: that is, from several points of view, no one of which has exclusive authority. And in so dissecting objects it sees them simultaneously from all sides—from above and below, from inside and outside. It goes around and into its objects. Thus, to the three dimensions of the Renaissance which have held good as constituent facts throughout so many centuries there is added a fourth one—time.

> The poet Guillaume Apollinaire was the first to recognize and express this change, around 1911. The same year saw the first cubist exhibition at the Salon des Indépendents. Considering the history of the principles from which they broke, it can well be understood that the paintings should have been thought a menace to the public peace and have become the subject of remarks in the Chamber of Deputies.
>
> The presentation of objects from several points of view introduces a principle which is intimately bound up with modern life—simultaneity. It is a temporal coincidence that Einstein should have begun his famous work, *Elektrodynamik bewegter Körper* [The Electrodynamics of Moving Bodies], in 1905 with a careful definition of simultaneity.[132]

Giedion's claim wasn't exactly novel: in 1910, the same year Picasso painted *Retrato de Daniel-Henry Kahnweiler* (Portrait of Daniel-Henry Kahnweiler), another work that shows the influence of Jouffret, Metzinger remarked that Picasso "lays out a free, mobile perspective, from which that ingenious mathematician Maurice Princet has deduced a whole geometry."[133] In 1912, Albert Gleizes and Jean Metzinger produced the first book on Cubism, *Du cubisme*; in it the authors proclaimed that the young painters had developed a new approach to representation that entailed "moving around an object so as to register its successive aspects which, when combined in a single image, reconstitute it as time."[134]

I have no doubt that this new form of representation—which builds on the breaking of the representational form into many facets, which are presented as though collectively they are seen from many different points of view—was influenced by changing conceptions of space and time (indeed, I suggested as much in the "Producing Facts" section of this chapter). But, I suggest, this idea of moving around an object so as to register successive aspects is a conflicted one. For one: for one thing, the notion of an itinerary around the object paradoxically elicits ideas both of movement through space and time and of simultaneity. This idea of circumnavigating the object demands examination, for it is a commonplace in writing on Cubism (and a stable of introductory art history classes).

Two art historians have brought that claim under scrutiny and refuted it decisively. One is John Richardson, and the other is Meyer Schapiro.[135] The two accounts of the standard claim's shortcomings overlap each other, so I will focus on Schapiro's refutation.[136] Schapiro points out that Einstein's name does not appear in Gleizes and Metzinger's book, nor does that book mention relativity theory, and that would be strange if Einstein had the importance that, say, Sam Hunter and László Moholy-Nagy (1895–1946) contend he had.[137]

Giedion's remark that Einstein's "Zur Elekrodynamik bewegter Körper" begins with a careful definition of simultaneity, and his suggestion that it is "a

temporal coincidence" that Cubist painting developed around the same time Einstein presented his special theory of relativity, would likely lead a reader to conclude that Cubist paintings were dealing with the same complexities of simultaneity that Einstein did.[138] That is not correct—and for that matter, Cubist painting appeared somewhat later than Einstein's special theory of relativity, not at the same time: "Zur Elekrodynamik bewegter Körper" appeared in September 1905, while Picasso painted *Les demoiselles d'Avignon* in the summer of 1907 (and did not show it in public until years later). And we should be clear about this: even that work is not yet a full-fledged Cubist work, and neither is Braque's *Maisons à l'Estaque* (Houses at L'Estaque, 1908, the work that brought the critic Louis Vauxcelles to condemn the new painting for exhibiting *bizarreries cubiques* [cubic oddities]). Picasso's *Paysage, Horta de Ebro (Le reservoir)* (Landscape, Horta de Ebro [Reservoir]), of 1909 can probably be considered the first fully realized Cubist painting. The first group exhibition by Cubists took place at the Salon des Indépendants in Paris in the spring of 1911 (and it included works by such painters as Gleizes, Metzinger, and Delaunay, but none by Picasso or Braque).

What is more important, Cubist painting does not deal with simultaneity in the way that Einstein does in "Zur Elekrodynamik bewegter Körper." To suggest that it does is simply wrong: Cubist still-life painting deals with highly restricted, highly confined spaces, and in restricted spaces, the Newtonian account is still quite adequate. Einstein was absolutely definite about that. As I noted earlier, the Cubists were interested in the possibility of seeing from a higher vantage point, for they believed it would help them create a new form of sublime art that would convey the spiritual preoccupations of the time. They were absorbed in ideas about the fourth dimension—and about seeing ordinary reality from a higher vantage point—because they believed that such a vantage point would expose the illusory nature of our ordinary experiences and afford access to a transcendent reality.[139]

Giedion's citing Apollinaire seems equally misplaced. Apollinaire did make much of the idea of the fourth dimension in *Les peintres cubistes*, more than we can go into here. However, as I remarked earlier, Apollinaire thought of the fourth dimension as a spiritual realm, not as a physical or scientific reality. The following paragraphs suggest the general character of that commentary:

> Finally, I must point out that *the fourth dimension*—this utopian expression should be analyzed and explained, so that nothing more than historical interest may be attached to it—has come to stand for the aspirations and premonitions of the many young artists who contemplate Egyptian, Negro, and Oceanic sculptures, meditate on various scientific works, and live in the anticipation of a sublime art.

> Wishing to attain the proportions of the ideal, to be no longer limited to the human, the young painters offer us works which are more cerebral than sensual. They discard more and more the old art of optical illusion and local proportion, in order to express the grandeur of metaphysical forms. This is why contemporary art, even if it does not directly stem from specific religious beliefs, none the less possesses some of the characteristics of great, that is to say, religious art.[140]

In saying that the young painters strove to convey intuitions of the fourth dimension, Apollinaire clearly meant that they were seeking to convey the feeling of a transcendent reality. This is very far from what Giedion's commentary would lead us expect. But in fact, it was what artists and cultural thinkers in this era most often meant by Cubism. Meyer Schapiro's most telling point against Giedion's claim is that he (Giedion)

> ignores the absence in the artist's finished work of any cue for a temporal order in his supposed successive sightings of the object and its parts. One cannot disengage from the fractioning, intersections, and overlaps of the planes in the reconstruction of the object-planes represented on the canvas an unequivocal successiveness of points in time, that is, a time dimension, nor an observer's changing position. Perceived together as a simultaneously present whole, the parts of the painting awaken in viewers nothing of the quality of felt time—duration—as a continuous succession, nor do they permit us to infer an ordered sequence of discernible, discrete instants, before and after, in the brushstrokes.[141]

And again,

> Even if Cubist table objects, Futurist isolated figures in motion, or moving machines, or street scenes were regarded as attempts to symbolize relativity space-time relations (contradicting both the works and statements of Braque and Picasso), one would still have to question the argument of Giedion . . . built on the principle of multiple viewpoints; for it would be difficult to find a single painting by Picasso or Braque in which that principle is carried out consistently and offers a legible order of succession.[142]

To be sure, Giedion was not alone in his belief that Apollinaire's interest in the fourth dimension was an effect of the novelty of relativity theory and its rise to pre-eminence. Far from it. For example, Edward Fry, as fine a scholar of Cubism as one could ever hope for, suggests that Cubism derived from "contemporary popularizations" of Einstein; but he also allowed that early efforts at relating the Cubists' interest in the fourth dimension to Einstein's theories, along with Geizes and Metzinger's reference to non-Euclidean geometry, had "ever since served only to obscure the understanding of cubism with a pseudo-scientific mysticism."[143]

I do not want to suggest that there was no connection between the science of the time and Cubism. Absolutely not! Indeed, a theme of the present book is that the science of electromagnetism was transforming culture and that Einstein's momentous (and much discussed) discoveries helped draw public attention to electromagnetism.[144] Furthermore, I acknowledge that non-Euclidean and higher-dimensional geometries were a vogue of the era. However, I do not believe that the Cubist or Futurist painters knew "Zur Elekrodynamik bewegter Körper" intimately, or even that Einstein's theories exerted a direct and immediate influence on the arts of this era.

What I *am* suggesting is that Giedion understood rather too concretely the relation between developments in the sciences and innovations in artistic form. To account for the parallels between the special theory of relativity and the artistic forms of Cubist painting and poetry, we need a theory of homologies: we need a theory of the phenomenon of parallel developments that occur in technology, science, and culture. We need an approach that can appreciate, and explain, the homologies and structural correlations between the two planes (the material plane of scientific and technological developments and the symbolic plane of cultural forms). As I previously noted, Giedion attempted such an approach, by noting that similar changes in notions of space and time were taking place in both the arts and the sciences—in the former, through feeling, in the latter, through thought:

> As was stated at the beginning of this book, it was in 1908 that Hermann Minkowski, the great mathematician, speaking before the Naturforschenden Gesellschaft, proclaimed for the first time with full certainty and precision this fundamental change of conception. "Henceforth," he said, "space alone or time alone is doomed to fade into a mere shadow; only a kind of union of both will preserve their existence."
>
> Concurrently, the arts were concerned with the same problems. Artistic movements with inherent constituent facts, such as cubism and futurism, tried to enlarge our optical vision by introducing the new unit of space-time into the language of art. It is one of the indications of a common culture that the same problems should have arisen simultaneously and independently in both the methods of thinking and the methods of feeling.[145]

But Giedion did not go far enough. Even setting aside the anachronism involved in the suggestion, the claim that the Cubists and Futurists were influenced by Minkowski's mathematical formalization of Einstein's special theory of relativity goes so far beyond the evidence of their own testimony and that of commentators on their work that it strains credibility.[146] The concreteness of the suggested influence undoes the effort to develop a structuralist historiography based on the principle of homology, for it accounts for developments in the plane of symbolic relations by assuming direct, unmediated influence.[147]

Furthermore, it relies on a too-immediate notion of the relation between the monocular perspective system that painters began to use in the Quattrocento and the science of geometric optics. The system of monocular perspective arrived in Renaissance Florence from the Arabic geometrical optics of the eleventh century (in the work of Ibn al-Haythan, among others).[148] It was a highly overdetermined system, and even in its European forms, it had more to do with grand ideas of the harmonic order of the cosmos (especially ideas about the cosmic order that Arabic philosophers had developed from Plato's transcendentalism) than with ray-tracing diagrams. The dismantling of the monocular perspective system also was highly overdetermined—a fact that both Giedion and McLuhan overlooked.

To begin to consider how overdetermined, consider Herbert Read's comments about Picasso's *L'aficionado* (*Le torero*) (The Aficionado [The Torero], 1912). That painting, he notes, is

> "abstracted" in the sense that the fragments or facets into which it is divided have a direct reference to the subject. One may discover not only elements derived from the features (nose, eyes) and clothing (hat) of the the bullfight fan who was the point of departure, but also fragments of typography (Nîmes, where presumably the bullfight took place, and the word TORERO from a poster announcing the bullfight). That is to say, although the composition is derived from reality, there is no immediate perceptual image to be represented—rather a group of visual elements associated with a memory-image. These associated elements may indeed, as Picasso always insisted, be derived from visual experience; but the important distinction is that the painting becomes a free association of images (a construct of the visual *imagination*) and not the representation of a subject controlled by the laws of perspective.[149]

In Chapter 2 I will trace the development of Picasso's and Braque's painting in 1911 and 1912 (the years when Analytical Cubism was at its apogee), and point out the development that occurred, from using legible volumes in which light and mass function as compositional elements (even more than descriptive qualities) to the eventual elimination of all volume and its replacement in Synthetic Cubism by planar fields of colour or texture and a mesh of lines that almost seem independent of the background. The mesh used in the earlier (Analytic) paintings is absolutely required to hold the composition together and to integrate the foreground and background. Picasso's dealer, Daniel-Henry Kahnweiler, in one of the earliest books on Cubism, noted the transition between the two modes of painting; he contended that Cubist painting of the earlier (Analytic) sort strove to create a new type of unity, one between the volume of the real object the painting depicts and the painting's actual lack of volume. Kahnweiler's comment is perceptive, and we can extend it by saying that Picasso's and Braque's paintings of this era offer a commentary

on the act of painting: in making a painting, one attempts (if there is a motif for the painting) to render a three-dimensional scene on a two-dimensional surface. That understanding of the act of painting was almost an obsession at the time—Matisse's windows often suggest the three-dimensional world projected onto a two-dimensional surface, and the *passage* that fascinated the Cubists in Cézanne's work thematizes that very issue. Picasso and Braque discovered one means for emphasizing the solidity and three-dimensionality of the object: they evoked it through the tactile experience of depth that results when the object is divided into facets seen from several points of view. The division of the object into facets and the use of multiple viewpoints make the solidity of the object tangible.

Meyer Schapiro makes a similar point to the one I am making here:

> The forms of the fractioned parts of the represented still-life object, incompatible with a perspective view of the whole object from a single viewpoint, render the separate parts in their broadest and clearest aspect as known rather than as projected in a momentary sighting. In one such painting Picasso has extended a printed label as a detached vertical plane, tangent to its cylindrical bottle and shown in its "real" rectangular planar form, unaffected by perspective foreshortening on the curved surface of the bottle—in accord with an aim often expressed by the Cubist painters to represent the object as it is, in departure from the Impressionist rendering of a simple, momentary aspect in which its form was absent or lost.

Schapiro thus rejects claims that the Cubists' ambition to convey the solidity of a three-dimensional object on a two-dimensional surface should be connected to the idea of moving around the object. Instead, he proposes (as I have) that the Cubists' use of faceting should be related to the effort to make palpable the means for evoking the sensation of a solid object when one is restricted to a two-dimensional surface. He continues:

> It was not by moving around an object before him in the studio and thereby shifting his glance that the Cubist painter discovered such shapes in objects. He had encountered them in older art in the museums and in the work of contemporary self-taught painters, and he understood them as "objective" renderings that supported his own desire to give to figuration a stronger effect of stable, composite reality, in contrast to the ephemeral, Impressionistic semblance. (But like the Impressionists he made his process of conception and execution evident by the distinctiveness of the surface of the painting as a field of operation with marked brushstrokes, flecking, and arbitrary continuities that could be read more as decisions of the painter than as simulations of objects.)[150]

The allegory of the production of the artwork raises the issue of the production of experience. Herbert Read's remark that a painting produced by

this method "becomes a free association of images (a construct of the visual *imagination*)" is very close to right—but I think it needs to be qualified. The production of a painting offered Cubist art in this period a parallel not to free association (as it was understood by the Spiritualists, Theosophists, and Surrealists, by associationist psychologies such as that of David Hartley [1705–1757] and Alexander Bain [1818–1903], or by the psychoanalysis of Sigmund Freud [1856–1939]), but rather to the forming of perception/experience. The Cubists consistently critiqued realism (especially that of Gustave Courbet [1819–1877] and the Impressionists) for suggesting that perception mirrors nature. Experience is not the passive registering of a *species*—here I am using the term in Lucretius's sense, as referring to replicas of an object's appearance sent through the air and projected onto the retina—rather, the *mind* generates perceptions. Consider this passage from Gleizes and Metzinger's *Du cubisme*:

> To estimate the significance of Cubism we must go back to Gustave Courbet… He inaugurated a realistic impulse which runs through all modern efforts. Yet he remains the slave of the worst visual conventions. Unaware of the fact that in order to display a true relation we must be ready to sacrifice a thousand apparent truths, he accepted, without the slightest intellectual control, all that the retina presented to him. He did not suspect that the visible world can become the real world only by the operation of the intellect; and that the objects which most forcibly impress us are not always those whose existence is richest in plastic truths.[151]

The Cubists understood that the mind produces experience by transforming the raw materials of sensation into the percept of which we are conscious. It does so by relying on prior experience: when a cube is set before us, our eye responds to light waves that bounce off it and into our eye—but our mind responds to the incoming sensory information by comparing it to past experiences. Information we have from earlier occasions (invoked by the generic resemblance of newly registered *sensa* to previously registered *sensa*) allows us to recognize that the sensory data come from a cube—it also suggests to us that although we see the cube from a particular point of view, we can walk around it and see it from other points of view. That is, prior experience informs us that although sensation is perspectival, the object itself is a solid three-dimensional form. We have implicit bodily knowledge that informs us that the object could be seen from other points of view. This information is activated almost as soon as the sensory input arrives, and the information from the two sources is combined in creating the percept. To summarize, the percept is forged from immediate sensory input and historical, bodily knowledge. Present experience embeds memory (our understanding that the form we see is a solid) and anticipation (we understand that we could move, and

see the object from another point of view); memory and anticipation inhabit all perception and play a role in forming perception.

The phenomenological philosopher Michel Henry stresses the active role the mind plays in producing experience:

> The subjective life does not just create the idealities and abstractions of science, as with all conceptual thought in general. It gives form to this lifeworld in the midst of which our concrete existence unfolds. Something as simple as a cube or a house is not just a thing that exists outside of us and without us, as if it were on its own as the substrate of its qualities. It only becomes what it is due to a complex activity of perception that goes beyond the succession of sensible givens that we have of it and posits *the* cube or *the* house as an ideal pole of identity to which all these subjective appearances refer. Each perception of a side of a cube or a façade of house refers to the potential perception of other sides that have not yet been perceived, following an indefinite play of relations. The same holds for every object in general and for every transcendent formation. Each time, their existence implies a synthetic operation of transcendental subjectivity.
>
> To be sure, in our daily life we do not pay attention to this consciousness that constitutes the world of our usual environment. We perceive the house and are inattentive to our perception of the house. We are conscious of the world but never conscious of our consciousness of the world. It is the task of philosophy to give proof of this tireless activity of the consciousness that perceives the world, conceives the idealities and abstractions of science, imagines, remembers, etc. It thereby produces all the irreal representations that continually accompany us the course of real life.[152]

With Cubism, visual art assumed philosophy's task of providing proof of the tireless activity of the consciousness—of making us attentive to perception and the role that an active consciousness has in shaping it.

Meyer Schapiro supports this view of the Cubist's (and Futurist's) idea of experience:

> In Giedion's account the time-space interval supposedly represented or evoked by the painting is inferred from the multiple viewpoints in the spectator's perspectives of the different parts of the object in a Cubist work: by a circle as the opening of a cup or bottle, and a horizontal line as its base, by the unforeshortened label of a cylindrical bottle as a plane rectangle with a uniformly lettered name—all conceptual forms. This method of representation, called "conceptual" in distinction from the "perceptual" or perspective method—whereby the fractioned parts of an object are separate forms, independent of a fixed sighting point for the object as a whole—was a familiar feature in many works of ancient archaic and medieval art. At the beginning of the twentieth century, modern painters often spoke of their art as a rediscovery of the primitive's approach to depicting objects as *known* rather than as directly *seen*; and Cubist painters in particular depicted objects piecemeal, in distinct parts, as known by their

> enduring primary qualities rather than as they would appear in a consistent perspective view that deforms and obscures their parts.[153]

This is how the Cubists responded to the crisis that arose around the senses' disconnection from reality: they claimed to be creating representations that embodied higher forms of apprehension. The Cubists conceived of a ladder of understanding. For them, just as in Platonic and Neo-Platonic epistemology, the lowest form of understanding was sensory understanding. To use the example from Merleau-Ponty given earlier, the senses' errors and misapprehensions are set right by reason as the mind corrects the oval form of the lip of a cup or bottle seen from a particular vantage point and recognizes that the object is actually circular. To reinforce the connection that notion has to Platonic Idealism, we could say that reason corrects the sense impression and teaches us that the geometric reality in which the object's form participates is that of a circle. Reason apprehends the geometric reality in the oval form that sense reports and it apprehends a circle: allowing reason to correct the senses' reports sets the mind on its ascent towards a higher noesis—understanding the object from the (transcendental) fourth dimension.

The synthesis of aspects suggested in Cubist painting does not convey what Giedion suggests, viz., a sense of moving around a painting. Rather, it embodies knowledge—some of it implicit (tacit), some of it conceptual—and points to the mind's role in producing experience. This interest in the role that tacit knowledge plays in forming experience was not an effect of relativity theory (or of Einstein's reformulation of the concept of simultaneity). Rather, it was the result of crises of perception. We can find all the evidence we need of the exigency of those crises in the transition from the realist painting of Jean-Baptiste-Camille Corot (1796–1875) and Jean-François Millet (1814–1875) to that of the Impressionists. Suddenly, with Barbizon painting, it became an urgent obligation to render an object precisely: a painting's nonvisual significance (its religious or patriotic or political or social meaning) was no longer important; what mattered now was how the object represented was *seen* (apart from any artistic conventions about its meaning). With the Barbizon school, establishing our ground in nature had become a pressing issue. The Impressionists developed further the interest in capturing experience immediately—of showing us the fleeting changes in light reflected from an object—and insisted, adamantly, that the quotidian (and even its fleeing impression) must be allowed a place in the work of art. Transcendent subject matter had come to seem less important. This tells us that perceptions' ability to capture the fleeting and momentary was no longer universally accepted.[154]

I do not mean by the foregoing comments to suggest that relativity theory did not help shape a new understanding of the cosmos. To the contrary, I

insist that relativity theory, allied with other findings in electromagnetism, challenged the old Newtonian paradigm of reality. Relativity theory proposes a model of the cosmos in which the distinction between matter and energy is blurred; in which acceleration and gravity turn out to be related (this seemed quite implausible to people whose understanding of reality was shaped by the Newtonian model); in which clocks advance at different rates according to whether they are moving or at rest; in which rest and motion are not sharply distinguished. That the presence of mass or energy in a given area of space causes the geometry of that area to change seemed counter-intuitive; that mass and energy are unevenly distributed throughout the universe, and hence that geometry is not uniform across its expanse, challenged received assumptions about time, space, and measurement. That relativity theory treats matter and energy as interconvertible was especially important, for it seemed to many that this finding confirmed that ultimate reality is fundamentally vibratory, and that this vibratory energy sometimes congeals into matter.

A remarkable passage in a late Futurist manifesto provides another, and very telling, comment on artists' motivation for embracing non-Euclidean geometries. That piece admittedly was written much later than the period under consideration here: it appeared during the Second World War (a fact that helps account for the title) and was written by F.T. Marinetti with the collaboration of the mathematician Marcello Puma and the doctor Pino Masnata. The piece served as a sort of "Manifesto della matematica futurista," though its title was "Calcolo poetico delle battaglie: La matematica futurista immaginativa qualitativa" (Poetic Calculation of Battles: Qualitative Imaginative Futurist Mathematics, 1940).

> We deny Euclidean space if devoid of palpable content and insipid straight lines rule and compass
>
> We fight against narcotic symmetry
>
> Mathematicians we invite you to appreciate new geometries and gravitational fields created by masses moving with sidereal velocity
>
> Force-lines of the universe electromagnetic fields the discontinuous atom-universe cine-descriptive geometry as the mathematical basis of cinepainting of aeropainting and aerosculpture
>
> Mathematicians let us affirm the divine essence of CHANCE and RANDOMNESS.[155]

This manifesto explicitly connects the new geometry to gravitational fields, which physicists have long wanted to unify with electro-weak forces (to form—putting the matter loosely—a sort of superset of electromagnetism), though the goal has eluded them. Furthermore, it highlights that the new conception of space, which the Futurists had embraced, repudiated the Euclidean notion

of space that conceived of space as empty—that understanding of space and its influence on Cubism and especially on Futurism is one of the principal topics of the present volume. Just as interesting is the connection the manifesto makes between electromagnetism and "*cine*-descriptive geometry": the peculiarity of introducing a reference to the cinema here tells us that cinema was seen as belonging to the new world of electromagnetism, aeropainting, aeroscultpure, cinepainting, and gravitational waves.

Let's consider again, in light of these ideas, what Apollinaire was doing when he claimed that the Cubists were presenting the fourth dimension. In *Les mamelles de Tirésias* (The Breasts of Tiresias), Apollinaire, anticipating Marshall McLuhan, noted that "when man wanted to imitate walking, he invented the wheel, which does not resemble a leg. In this way, he made surrealism without knowing it."[156] What did he intend by this? Surely he was saying that strict imitation does not allow us to go beyond the object that is imitated (in this case in its speed), that what is required is a functional abstraction that identifies the basic purpose of walking as propelling the human body forward and that finds a novel, and more powerful (more accelerated), means of creating forward propulsion. And why does he call this Surrealist? It is because this abstraction is liberating and produces strong sensations, and Surrealism basically means freedom. For Apollinaire, too, the fourth dimension represented freedom: his idea of the fourth dimension had about as much to do with representing space-time through four mutually orthogonal vectors (or Minkowski tensors) as representations of a wheel do to the foot. To write of the artist's fourth dimension as if it were a version of Minkowskian relativity theory is much like writing about wheels as if they were feet. Willard Bohn, who has written insightfully about Apollinaire's references to the fourth dimension, also puts a distance between Minkowskian space-time and Apollinaire's fourth dimension: he suggests that for Apollinaire, the fourth dimension was simply a metaphor for the imagination and the source of all creative work.[157] I think that claim is close to right.

## Nerves

Another matter that preoccupied thinkers during the years when Cubism and Futurism flourished was a broad, multifaceted cluster of issues around nerves. At the time, the term "nerves," could be taken in two ways (and in large measure, it still can be): it could refer to the peripheral and central nervous system, or to being anxious. We will have to deal with both meanings and their interrelations. The early twentieth century certainly understood itself as "having a case of nerves." In 1902, with the publication of Karl Lamprecht's *Zur jüngsten deutschen Vergangenheit* (On the Most Recent German Past) and Willy Hellpach's *Nervosität und Kultur*, the issue of nerves took a central place in the period's self-analytic culturology—indeed, it became almost an obsession.[158]

To be modern, to live one's life in a metropolis, was to experience nervousness. In a remarkable piece of writing, "Die Großstädte und das Geistesleben," Georg Simmel noted (in a passage I cited earlier, and now cite more expansively) that,

> the psychological basis of the metropolitan type of individual consists in the intensification of nervous stimulation resulting from the swift and uninterrupted change of outer and inner stimuli… Lasting impressions, impressions which differ only slightly from one another, impressions which take a regular and habitual course, and show regular and habitual contrasts—all these use up, so to speak, less consciousness than does the rapid crowding of changing images, the sharp discontinuity in a single glance, and the unexpected onrushing impressions.[159] These are the psychological conditions the metropolis creates.[160]

Thinkers of the later part of the nineteenth century related this nervousness to the phenomenon of nervous energy itself.

The idea that an animal body is operated by an electrical system is of recent vintage. Among the founders of neurology was a figure we have already encountered, Hermann von Helmholtz, a great student of the human sensory apparatus, the sensation of tone, and the visual perception of space.[161] Prior to the work Helmholtz did in 1849, it was generally believed that signals travel along the nerves at an immeasurably rapid pace. Helmholtz conducted experiments to examine the operation of the sciatic nerve of a frog and the calf muscle attached to it. Using a galvanometer, an analog electrical transducer with a pointer on a dial that responds to fluctuations in current passing along a wire (Helmholtz attached a mirror to the needle to reflect a light beam across a room), he this device, he determined that the speed of transmission of the nervous signal is between 24.6 and 38.4 meters per second. Another key researcher on nerves was Ernst Brücke (1819–1892), who proposed in *Vorlesungen über Physiologie* (Lectures on Physiology, 1874) that living organisms are energy systems and, like all organisms, are governed by Helmholtz's law of conservation of energy.[162]

From the late 1850s through to 1900, the term neurasthenia (literally, "weakness of the nerves") was often employed to stake a claim (for a time widely accepted) that a person's feelings of lassitude, anxiety, melancholia, and enervation were consequences of a mechanical febrility rather than an emotional affliction. This (supposedly) organic condition was also known as Americanitis, because Americans, more than other people, were supposed to be prone to it.[163] By now (in the twenty-first century), about neurasthenia that were once so commonplace as to affect how the body was conceived have been so completely eclipsed by psychiatric and psychoanalytic ideas that the earlier image of the human nervous system has been nearly completely obscured; but at the beginning of twentieth century, new (and often popular)

writing on neurasthenia was still appearing at a remarkably brisk pace. Two decades later, such ideas were no longer credited and hardly discussed.[164] A final, highly visible manifestation of it was a remarkable film by Robert Reinert on *Nervenkrankheit* (nerve sickness), titled as this section of the book is, *Nerven*. In this work, filmed on location (something unusual for the time) in Munich, neurasthenia, induced by war and misery, drives people insane. The film presents a cross-section of people, from different classes, who are affected by the disease.

Ideas about an overtaxed, debilitated nervous system, damaged by electrical overload, were still very much alive, though no longer fashionable, in the first two decades of the twentieth century, when Cubism and Futurism flourished. Recovering that image of the human nervous system will help us understand those movements. Neurasthenia was thought to be due to an exhaustion of the nervous system's energy reserves caused by overstimulation, an effect of the acceleration of the pace of life (and, often, the stress of commercial competition).[165] Generally, it was understood to be a result of the pace of life having accelerated—and nowhere was that speed-up more evident than in America.

Neurasthenia was first identified and described by Dr. George Beard (1839–1883), an American neurologist who was smitten with contemporary research in electromagnetism. In 1881, he published the widely read *American Nervousness: Its Causes and Consequences*. Beard maintained that neurasthenia results from the lack of nerve force, or the depletion of nerve energy; this led to fatigue, fainting spells, listlessness, insomnia, drowsiness, flushing, bad dreams, dilated pupils, noises in the ears, atonal voice, abnormal dryness of the skin, joints, and mucous membranes, tenderness of the teeth and gums, nervous dyspepsia, sweating hands and feet accompanied by redness, changes in the expression of the eyes, pain, pressure, and heaviness of the head, neurasthenic asthenopia (eyestrain, induced by the condition), fear of lightning, fear of open places, fear of closed places, fear of being with others, fear of being alone, fear of contamination, fear of fear, loss of ability to make decisions even regarding matters of little importance, hopelessness, loss of mental control, incapacity to swallow, inability to feel thirst and deficiency in swallowing, coldness in the extremities, idiosyncrasies in food preferences, convulsive moments (especially while falling asleep), cramps, a feeling of profound exhaustion, and hypochondria. Francis George Gosling quotes from Beard's colleague A.D. Rockwell on the causes of nervousness:

> In older countries men plod along in the footsteps of their fathers, generation after generation, with little possibility, and therefore little thought of entering into a higher social grade. Here, on the contrary, no one is content to rest with

> the possibility ever before him of stepping higher, and the race of all life is haste and unrest. It is thus readily seen that the primary cause of neurasthenia in this country is civilization itself, with all that term implies, with its railway, telegraph, telephone and periodical press intensifying in ten thousand ways cerebral activity and worry.[166]

Beard himself had described neurasthenia as an affliction of the "indoor-living, brain-working" classes.

The appearance in 1893 of the German text *Handbuch der Neurasthenie*, by Rudolf von Hößlin (1858–1936) and Frans Carl Müller (1860–1913), increased the new disease's official recognition in Europe and throughout the medical world (for Germany was considered the leading nation in scientific research). Wilhelm Erb (1840–1921), perhaps the most influential clinical neurologist of the time, Heinrich Obersteiner (1847–1922), a neurologist who had been one of Brücke's students, and above all Paul Julius Möbius (1853–1907), a neurologist and endocrinologist—and exponent of electrotherapy—introduced the idea into Germany.[167] It was also expounded in Richard Krafft-Ebing's (1840–1902) bestselling book *Über gesunde und kranke Nerven* (On Healthy and Diseased Nerves, 1885), and it dominated neurology from the mid-1860s until the end of the century. The usual treatment prescribed in this period was the rest cure (which involved removing the patient from the damaging environment and putting him or her in a healthier environment, typically a wooded rural spot), though sometimes electrotherapy was used (generally deep brain stimulation with electric currents). Physiologists, specifically neurophysiologists, claimed to have a better means for dealing with neurasthenia and neuropathies—a more scientific means than those of psychiatrists and others who claimed a psychic aetiology for this family of ailments. As a result, German neurologists established a journal, the *Deutsche Zeitschrift für Nervenheilkunde* (German Journal of Neurology, founded in 1891 by Adolf Strümpell [1853–1925] and Wilhelm Erb, who was a leading force in the anti-psychiatry movement among clinicians), which was mandated to exclude psychiatrists.[168] From the turn of the century onward, that view (maintained principally by physiologists) was increasing displaced by the view (maintained principally by psychiatrists) that neurasthenia was a mental, not a somatic, affliction.[169] Nonetheless, Freud, ever striving to develop a monistic theory and longing to develop a biological theory of psychopathy, anticipated arguments that Wilhelm Reich (1897–1957) would offer in *Die Funktion Des Orgasmus: Zur Psychopathologie und zur Soziologie des Geschlechtslebens* (The Function of the Orgasm: The Psychopathology and Sociology of Sex, 1927) by proposing that coitus interruptus and masturbation result in an inadequate libidinal discharge, which leaves a quantity of undischarged nervous energy: this

undischarged energy produces auto-intoxication.[170] In other words, nervous energy—a sexual *noxa* produced by masturbation—could poison the organism and cause neurasthenia. He wrote in a letter to Fliess:

> The second noxa, which affects men at a later age, makes its impact on a nervous system which is either intact or which has been predisposed to neurasthenia by masturbation . . . This second noxa is *onanismus conjugalis*—incomplete intercourse in order to prevent conception. In the case of men all the methods of achieving this seem to fall in line: they operate with varying intensity according to the earlier disposition, but do not actually differ qualitatively. Those with a strong predisposition or persistent neurasthenics cannot tolerate even normal coitus; then intolerance of the condom, of extravaginal coitus, and of coitus interruptus take their toll. After a certain time he behaves like the disposed subject. His only advantage over a masturbator is the privilege of a longer latency or the fact that on every occasion he needs a provoking cause. Here coitus interruptus proves to be the main noxa and produces its characteristic effect even in nondisposed subjects.[171]

The relevance of this scientific field to the focal topic of this book—that is, the effort to demonstrate that film was an aesthetic force that helped generate the shape of Cubism and Futurism—might seem remote. It is not. For one thing, these neurophysiological inquiries developed an image of the human as a being dynamized by an electrical (or an electrical-like) system.[172] This had profound effects on the image of humanity that figures in Cubist and (especially) Futurist painting. Second, it influenced the conception of the pathology of modern existence, for which these vanguard movements would be (in part) a remedy.[173] Third, and perhaps the most important, it offered imaginative ideas about the relationship between the nerve energy that runs the human body and the cosmic energy that dynamizes the universe. Extending the compass of fields to which these developments in neurophysiology and neuropathy were considered relevant into the domain of art, the Surrealists' well-known interest in Judge Daniel Paul Schreber's affliction developed out of their recognition that his case revealed the (literally) fantastic effects that neuropathy could have: his fantasy system reveals the consequences for the imagination that the malfunctioning of an electrical system could have. The significance of this extension of the province of neurophysiology was not really understood until the 1960s, in the work of the Canadian cultural theorist Marshall McLuhan. In 1963, McLuhan told Kay Kritzwiser, a journalist for Toronto's *Globe and Mail*, during an interview, "Today, the central nervous system has been extended outside the body through the age of electricity. Literally, our brain is now outside our skull. We're lashed around by the fury of these extensions. It's like a spinning buzz-saw. It's not known where the

teeth are but we know they're there."[174] Electricity had extended our already jangled nerves beyond ourselves, where they were subjected to new traumas.

In this first chapter I have surveyed a number of topics in early-twentieth-century culturology and tracked their connection to the rise of the electromagnetic paradigm. We now turn to explore how the Cubists and the Futurists took up these topics. Respecting chronology, I begin with the Cubists.

## Notes

1 The literature on the early cinema's relation to popular arts is simply enormous. Three good references on the subject are the classic (and no longer current) volume on the prehistory of cinema and early cinema, C.W. Ceram, *Archaeology of the Cinema*, trans. Richard Winston (New York: Harcourt, Brace & World, 1965)—Ceram mentions *Annabelle Butterfly Dance* and *Annabelle Serpentine Dance* on page 17; Thomas Elsaesser, *Early Cinema: Space Frame Narrative* (London: BFI Publishing, 1990); and David Robinson, *From Peep Show to Palace: The Birth of American Film* (Berkeley: University of California Press, 1998).

The work of Tom Gunning is especially important, not least for exfoliating relations between the cinema and the culture of modernity (including its manifestations in popular culture) and for his understanding of the affinities between early cinema and the avant-garde. See "The Cinema of Attractions: Early Film, Its Spectator and the Avant-Garde," in *Early Film*, ed. Thomas Elsaesser and Adam Barker (London: British Film Institute, 1989), 56–62; "An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator," in *Viewing Positions*, ed. Linda Williams (New Brunswick: Rutgers University Press, 1995), 114–33; "From Kaleidoscope to the X-Ray: Urban Spectatorship, Poe, Benjamin, and *Traffic in Souls* (1913)," *Wide Angle 19*, no. 4: 25–63; and "Tracing the Individual Body AKA Photography, Detectives, Early Cinema and the Body of Modernity," in *Cinema and the Invention of Modern Life*, ed. Vanessa R. Schwartz and Leo Charney (Berkeley: University of California Press, 1995), 15–45.

2 The insistently repeated declaration that the popular arts are as aesthetically rich and spiritually rewarding as the great high arts is a counter-proposal that accepts the characterization of the origins of the cinema but makes a virtue of film's purported provenance in popular entertainment.

3 These ideas were promulgated in France by Guillaume Apollinaire's (1880–1918) circle and in Italy by thinkers associated with the poet and dramatist Gabriele D'Annunzio (1863–1938). Among those in Apollinaire's circle was Ricciotto Canudo (1877–1923), who as early as 1908 saw the cinema as "plastic art in motion." Canudo had proclaimed in "Naissance d'un sixième art: Essai sur le cinématographe" (*Les entretiens idéalistes*, 25 October 1911) that the sixth art would be

> a superb conciliation of the Rhythms of Space (the Plastic Arts) and the Rhythms of Time (Music and Poetry). The theater has so far best realized such a conciliation, but in an ephemeral manner because the plastic characteristics are always different. The new manifestation of art should really be more a *Painting and a Sculpture developing in Time*, as in music and poetry, which realize themselves by transforming air into rhythm for the duration of their execution . . . In a most astonishing apotheosis, the Plastic Art in Motion will appear.

See Canudo, "The Birth of a Sixth Art," trans. B. Gibson, D. Ranvaud, S. Sokota, and D. Young, in *French Film Theory and Criticism*, vol. 1, *1907–1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 58–65 at 59; emphases in original.

Canudo's "Naissance d'un sixième art" was originally published in *Les entretiens idealists*, 15 October 1911, and reprinted as "L'esthétique du septième art" (The Aesthetics of the Seventh Art) in Fernand Divoire's posthumous collection of Canudo's writing, *L'usine des images* (The Image Factory [Paris: Étienne Chiron, 1927], 13–26). (Canudo is generally credited with coining the term "le septième art" for the cinema—the term still has currency in French writing on film). The reason for the discrepancy between the two titles is that Canudo's first enumeration of the arts, which followed Hegel's *Vorlesungen über die Ästhetik* (Lectures on the Aesthetic, 1835), included in the spatial arts architecture, sculpture, and painting and in the temporal arts music and poetry; on a later enumeration he expanded the temporal arts to include dance. Canudo's belief that the cinema is a synthetic art (he used the expression "an art of concilation") resembles D'Annunzio's ideas about cinema: both thinkers thought of the cinema in essentially theatrical terms and were influenced by Wagnerian (theatrical) ideas about a *Gesamtkunstwerk* (a total work of art).

In France, there were three strains in the early celebration of the cinema as being an art with potentials similar to those of the other great high arts. One strain, represented by Canudo, Émile Vuillermoz (1878–1960), and Germaine Dulac (1882–1942), extolled its potential for Romantic creation; another strain, represented by Élie Faure and Jean Epstein (1897–1953), celebrated its plastic dynamism (*cinéplastique* or *photogénie de la mobilité*), which endowed the cinema with the quality of *cinégraphie*; and a final strain, represented by Louis Delluc (1890–1924) and Léon Moussinac (1890–1964), and of a somewhat more populist bent, lauded it for particular features of its realism that gave it a unique character among the arts (this last strain was renewed by André Bazin). The second strain in particular valorized the rhythmic capacities of the cinema, which endued the cinema with a character closer to the aural media than to plastic arts.

4 Faure's work seems especially important: he proposed the notion of *cinéplastique* to extend Canudo's idea of the cinema as being a collective, temporal, and spatial spectacle that synthesizes all the arts. See Élie Faure, "De la *cinéplastique*," in *L'Arbre d'Eden* (Paris: Les Éditions G. Crès, 1922), 304–18. Faure used his concept of *cinéplastique* when he extolled the work of Charlie Chaplin: "Il organise l'univers en poème cinéplastique et lance dans le devenir, à la manière d'un dieu, cette organisation capable d'orienter un certain nombre de sensibilités et d'intelligences et par elles, de proche en proche, d'agir sur tout les esprits" (He organizes the universe into a cineplastic poem and projects into the future, in the manner of a god, an organization that is capable of guiding a certain elite of sensitivity and intelligence, and through them, step by step, of acting on all minds). Faure, "Charlot," in ibid., 277–303, and reprinted *Esprit nouveau* 4–6 (New York: Da Capo, 1968), 658–64 at 659.

5 Clive Bell, "The Aesthetic Hypothesis," in Bell, *Art* (New York: Frederick A. Stokes, 1913), 3–37 at 6–7.

6 The last three or four decades have seen the concept of aesthetic experience under systematic attack: the most recent contender for the role of dragon slayer is the relational aesthetics of Nicolas Bourriaud and his many followers as set out in Bourriaud, *Esthétique relationnelle* (Dijon: Les presses du réel, 1998), English trans. *Relational Aesthetics* (Dijon: Les presses du réel, 2002). Advocates of this position argue that the aesthetic experience, rather than taking place between the individual viewer and the

art object, develops out of the interhuman interactions and dialogic exchanges that take place in the aesthetic process (a polemical term, coined to highlight the fact that the process of interaction has displaced the aesthetic object as the focus of aesthetic interest). The artwork, which emerges through this aesthetic process, is affected by the environment in which it is presented and by the audience members, which as often as not, become collaborators in the production not just of meaning, but of the aesthetic process itself. Where modernists had proposed that artistic meaning emerges in an autonomous realm constituted by a private symbolic space, proponents of relational aesthetics argue that human interactions and social context are of key importance in making meaning. Claire Bishop in *Artificial Hells: Participatory Art and the Politics of Spectatorship* (London: Verso, 2012) offers a bracing critique of this position.

7 Bell, "The Aesthetic Hypothesis," 25–26.
8 Ibid., 27.
9 Ibid., 25.
10 Ibid., 29.
11 Edward Bullough, *Aesthetics* (London: Bowes & Bowes, 1957), 94.
12 Ibid., 99; collected in Oswald Hanfling, ed., *Philosophical Aesthetics: An Introduction* (Oxford: Basil Blackwell, 1992), 160.
13 Ibid., 100; collected in Hanfling, ed., *Philosophical Aesthetics*, 160.
14 Roger Fry, "Retrospect," in *Vision and Design* (New York: NAL, 1974), 298; reprint of the original Chatto and Windus edition (1923, 1956).
15 Fry, "Retrospect." His reference to "our pagan spectator" is humorous, and based on the hypothetical spectator's unconcern for fidelity to the biblical account.
16 Ibid., 298–99.
17 Ibid., 300–301.
18 Harold Osborne, "Semantic Abstraction," in *Abstraction and Artifice in Twentieth-Century Art* (Oxford: Clarendon Press, 1979), 28–41. Oxford: Clarendon Press, 1979.
19 Camille Pissarro, quoted in an article by Robert de Villeherve, *Havre-Eclaire*, 25 September 1904; cited in Osborne, "From Impressionism to Expressionism," in *Abstraction and Artifice in Twentieth-Century Art*, 46.
20 This viewpoint deems the imaginative play that narrative induces to be (generally speaking) deleterious, since it can hinder the absorption an artwork should engender: encouraging a reader/viewer/listener to speculate about the future course of events pulls him or her away from engagement with immediate sensory experience.
21 For my purposes here, I prefer the more obscure term gnosiology to epistemology because it avoids the suggestion embedded in allusions to *ἐπιστήμη* (episteme)—which Plato in the *Theaetetus* (201d) defines as "justified true belief" or "true opinion with logos" (that is, true opinion that has a rational argument to establish it and so conveys absolute certainty)—that real knowledge is grounded in deduction. I hope the term gnosiology avoids the suggestion that the knowledge that matters arises out of deductive reasoning and that it conveys better the idea that the knowledge with which we are concerned (gnosis) comprises phenomenological, personal and transpersonal, subjective, mystical understanding, and even what Plato calls *νοῦς* (noûs).
22 Clement Greenberg, "The New Sculpture," in *Art and Culture* (Boston: Beacon Press, 1965), 139–45, at 144.
23 William James, *The Principles of Psychology* (1890) (Cambridge: Harvard University Press, 1983), 609.
24 Ibid., 631.

25 This immediacy is the basis of a criticism that is often advanced to counter these modernist arguments. That counter-argument is forcefully stated by Gianni Vattimo, who traces the insight back to Hans-Georg Gadamer (1900–2002):

> Thus abstractly defined, aesthetic quality is given to the individual in an experience that has the nature of the *Erlebnis*, namely as a lived, momentary, and ultimately epiphanic experience. Gadamer quotes in this context a relevant passage from Dilthey's *Leben Schleiermachers*: "each one of the *Erlebnisse* is complete in itself, it is a particular image of the universe which eludes and explicative connection." [Wilhelm Dilthey, *Leben Schleiermachers* (1870), vol. 1, ed. Hermann Mulert (Berlin and Leipzig: W. de Gruyter & Co., 1922), 341] But this meaning of the romantic *Erlebnis* is still linked to a pantheistic vision of the universe. The *Erlebnis* of twentieth-century culture, and of Dilthey himself, is instead an experience whose meaning is totally subjective and devoid any ontological legitimation: whether in a poem, in a landscape, or in a musical score, the sovereign subject distils the totality of meaning in an entirely arbitrary way, depriving it of any organic connection with its existential and historical situation or with the "reality" within which it lives. Founding aesthetics on the concept of *Erlebnis* leads to a dissolution into an "absolute series" of discrete temporal points, or discontinuous "punctuality" that "annihilates both the unity of the work of art and the identity of the artist with himself, and the identity of the person understanding or enjoying the work of art."

Gianni Vattimo, "Hermeneutics and Nihilism," in *The End of Modernity*, trans. Jon R. Snyder (Baltimore: Johns Hopkins University Press, 1991), 122–23.

26 Cited in Cecily Mackworth, *Guillaume Apollinaire and the Cubist Life* (New York: Horizon Press, 1963), 86. Note that what Apollinaire states here lends support to the thesis I will soon propose, that plasticity is a mark of postmodern art and thought.

27 Guillaume Apollinaire, *The Cubist Painters*, trans. Peter Read (Forest Row: Artists • Bookworks, 2002), 18–19; the passage also appears in the excerpt from *Les peintres cubistes* in Herschel B. Chipp, *Theories of Modern Art: A Source Book by Artists and Critics* (Berkeley: University of California Press, 1968), 220–48 esp. 223–24.

28 Cited in Edward F. Fry, *Cubism* (New York and Toronto: McGraw-Hill, 1966), 129–30. Tom H. Gibbons points out in "Cubism and 'The Fourth Dimension'" that the use of the term *fourth dimension* to refer to a higher spiritual realm dates back at least to the seventeenth century. The Cambridge Platonist Henry More (1614–1687) wrote of a fourth dimension inhabited by spirits in his *Enchiridion Metaphysicum* (Handbook of Metaphysics, 1671) "that besides those THREE dimensions which belong to all extended things, a FOURTH also is to be admitted, which belongs properly to SPIRITS." Gibbons, "Cubism and 'The Fourth Dimension' in the Context of the Late Nineteenth-Century and Early Twentieth-Century Revival of Occult Idealism," *Journal of the Warburg and Courtauld Institutes* 44 (1981): 130–47 at 134 and 134n22.

29 C.W. Leadbeater, *The Astral Plane: Its Scenery, Inhabitants, and Phenomena* (1895) (Los Angeles: Theosophical Pub. Society, 1918), 3–4.

30 Ibid., 9.

31 Ibid.

32 Quotations in this paragraph are from C.W. Leadbeater, *Clairvoyance* (1899) (Los Angeles: Theosophical Publishing House, 1918), 37. As we will see, this description of the fourth dimension resembles that of Maurice Princet (1875–1973), a geometer who was a fellow traveller with the Cubists and who influenced the Cubists' notions about the scientific/metaphysical nature of their artistic innovations; thus, we will connect Cubism's quasi-scientific interest in attaining a non-anthropocentric viewpoint to Theosophical teachings.

33 André Salmon, *Souvenir sans fin, Première époque (1903–1908)* (Paris: Éditions Gallimard, 1955), 187; *Souvenir sans fin, Deuxième époque (1908–1920)* (Paris: Éditions Gallimard, 1956), 24.

34 Arthur I. Miller, *Einstein, Picasso: Space, Time, and the Beauty That Causes Havoc* (New York: Basic Books, 2001), 4ff. There is a user-friendly book that discusses the influence of Jouffret's treatise on Picasso (focusing in particular on his *Portrait of Daniel-Henry Kahnweiler*, 1910), written by a contemporary artist with an interest in higher-dimension geometries: Tony Robbin, *Shadows of Reality: The Fourth Dimension in Relativity, Cubism, and Modern Thought* (New Haven: Yale University Press, 2006). It offers a vigorous defence for understanding the fourth dimension through projective geometry (as Jouffret understood it) rather than through the more common slicing methods.

35 Esprit Jouffret, *Traité élémentaire de géométrie à quatre dimensions et introduction à la géométrie à n dimensions* (Paris: Gauthier-Villars, 1903). Humanists might find help in Arthur I. Miller's discussion of Jouffret's and Princet's ideas in his *Einstein, Picasso*, 101, 106–17, 122.

36 See Miller, *Einstein, Picasso*, 106–17. Note that Miller more or less suggests that the interest in Jouffret's geometry extended beyond Picasso—that Picasso led the way with *Les demoiselles d'Avignon* (1907) and that many other painters followed. There is no doubt whatsoever that Princet influenced Jean Metzinger and Marcel Duchamp—both artists testify to his influence—as well as the Section d'or group. But how quickly Picasso's synthesis of the discoveries he made while creating *Les demoiselles d'Avignon* actually went out into the art world is hard to judge. Picasso kept the painting in studio until 1916 and was very secretive about it.

37 Leo Stein, *Journey into the Self: Being the Letters, Papers, and Journals of Leo Stein*, ed. Edmund Fuller (New York: Crown, 1950), 123.

38 This is the sort of emphasis analyzed in Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago: University of Chicago Press, 1983).

39 Guilds developed around this time, and acquired political force when they allied themselves with monarchies against the feudal landlords.

40 See Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore: Johns Hopkins University Press, 1957); and Koyré, *La révolution astronomique: Copernic, Kepler, Borelli* (Paris: Hermann, 1961; in English, *The Astronomical Revolution*, London: Methuen, 1973). See also Koyré, *Metaphysics and Measurement: Essays in Scientific Revolution* (Cambridge, MA: Harvard University Press, 1968).

41 Francis Bacon, *The Great Instauration* (1621), in *The Works of Francis Bacon*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath (Cambridge: Cambridge University Press, 2011), iv, 32.

42 Regarding the interrelation of craft and theory in the Renaissance and the during the Scientific Revolution, Clifford D. Conner, *A People's History of Science: Miners, Midwives and "Low Mechanics"* (New York: Nation Books, 2005), is wondrously insightful.

43 Leonardo da Vinci, *The Notebooks of Leonardo da Vinci*, trans. and ed. Edward MacCurdy (New York: George Braziller, 1955), 853.

44 Koyré, *Metaphysics and Measuremen*t, 13.

45 The passage I have just quoted from Leonardo da Vinci continues with an assertion that can be construed as one about the inextricable relations among capital, craft, and knowledge. Addressing the academics who denied him the status of a man of letters, he writes, "if you call [painting] mechanical because it is done for money, who fall into this error—if indeed it can be called an error—more than you yourselves? If you lecture for the Schools, do you not go to whoever pays you the most?" (Leonardo, *The Notebooks*).

46 Edgar Zilsel, "Problems of Empiricism," in *The Social Origins of Modern Science*, ed. Diederick Raven, Wolfgang Krohn, and Robert S. Cohen (Dordrecht: Kluwer Academic, 2000), 171–99 at 174.

Giorgio di Santilla does a splendid job in showing that the motivations for the Church's prosecuting Galileo were not theological (Pope Urban VIII was one of Galileo's champions). The real culprits were the Aristotelians in the universities, who did not like having a rude mechanical (and, worse, a man trained in *desegno*) offering scientific pronouncements. See di Santilla, *The Crime of Galileo* (Chicago: University of Chicago Press, 1978).

47 J.V. Field, "Mathematics and the Craft of Painting: Piero della Francesca and Perspective," in *Renaissance and Revolution: Humanists, Scholars, Craftsmen, and Natural Philosophers in Early Modern Europe*, ed. J.V. Field and Frank A.J.L. James (Cambridge: Cambridge University Press, 1993), 74.

48 Furthermore, as the Greeks did, I believe that the power maintaining beings in existence has to do with their "esse-nce."

49 Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985), 22.

50 Ibid., 23.

51 Ibid., 24; emphases in original.

52 One thinks of Ludwig Wittgenstein's (1889–1951) *Logisch-Philosophische Abhandlung* (Tractatus Logico-Philosophicus, 1921), a work that also arose out of a moral passion about saying what can be said clearly, lest turpitude be the consequence. However, the early Wittgenstein argued that the important questions cannot be put into language, since they do not concern matters that can be known apodictically (that is, can be stated in the form of analytic propositions), nor can they be pictures accurately mirroring the structures of states of affairs (Wittgenstein's technical way of saying that they are not what Hobbes called matters of fact). Consequently, these questions have no meaningful answers. Wittgenstein witnessed the collapse of both Boyle's and Hobbes's programs for achieving certainty on the questions that really matter; that collapse would trouble him his entire life.

53 Thomas Hobbes, *Leviathan*, Bk. 1, Ch. 4, "On Speech," in Hobbes, *Leviathan*, ed. Michael Oakeshott (Oxford: Basil Blackwell, 1960), 21. Shapin and Schaffer quote this passage in *Leviathan and the Air-Pump*, 100 (though using the Harvard Classics edition, rather than Oakeshott).

54 Shapin and Schaffer, *Leviathan and the Air-Pump*, 102.

55 See Martin Heidegger, "Die Frage nach der Technik" (The Question Concerning Technology, 1954; originally presented as a lecture, in Bremen, in 1949). See also Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), in particular its final chapter; and Hans Jonas, *The Imperative of Responsibility: In Search of an Ethics for a Technological Age*, trans. David Herr (Chicago: University of Chicago Press, 1984). Arendt's commentary on technology is especially relevant for our purpose. Arendt sees human activity as having a constitutive role in the making of the human condition. She writes:

> The human condition comprehends more than the conditions under which life has been given to man. Men are conditioned beings because everything they come in contact with turns immediately into a condition of their existence. The world in which the *vita activa* spends itself consists of things produced by human activities; but the things that owe their existence exclusively to men nevertheless constantly condition their human makers. (9)

The "things produced by human activities" become the conditions of their producers. What is made comes to have a role in making the maker.

56 Shapin and Schaffer, *Leviathan and the Air-Pump*, 22.

57 Ibid., 25.

58 Ibid., 45. This position is identical with the *Wiener Kreis*'s famous verificationist criterion of meaning.

59 Shapin and Schaffer, *Leviathan and the Air-Pump*, 225.

60 Ibid., 225.

61 Ibid., 225.

62 Ibid., 333–34.

63 At least one scientist raised questions about how the action of the pump should be interpreted—about how nature responded to the stress the machine put on it. The Jesuit Franciscus Linus published a tract, titled *Tractatus de corporum inseparabilitate, in quo experimenta de vacuo, tam torricelliana quam magdeburgica et boyliana examinantur, veraque eorum causa detecta, ostenditur, vacuum naturaliter dari non posse unde et aristotelica de rarefactione sententia… demonstratur. Accessit solutio difficillimi illius problematis aristotelici de duabus rotis, quae licet valde inaequales, aequales tamen orbitas describunt (autore Francisco Lino)*, that denied that Boyle's air pump produced a vacuum. "Linus said there was no vacuum in the Torricellian space. This was apparent because one could see through that space; if there were a vacuum, 'no visible species could proceed either from it, or through it, unto the eye'" (ibid., 157). To explain the sustained height of the liquid, he suggested there was "a certain internal thread (*funiculus*) whose upper extremity was attached to the finger [blocking the top of the inverted tube] and whose lower extremity was attached to the surface of the mercury" (ibid., 157).

64 Strictly speaking, one can have an *n*-dimensional Euclidean geometry, but non-Euclidean and *n*-dimensional geometries were linked both historically and by the reasons thinkers had for being interested in them.

65 David Galenson, *Old Masters and Young Geniuses: The Two Life Cycles of Artistic Creativity* (Princeton: Princeton University Press, 2007), 9.

66 Ibid., 8.

67 Plotinus, *Enneads* (ca. 250 CE), trans. S. Mackenna (London: Penguin, 1991), IV.8.

68 G.W.F. Hegel, *Vorlesung über die Ästhetik* (Lectures on Aesthetics), ed. H.G. Hotho (Berlin and Leipzig: Duncker und Humblot, 1835–38).

69 Donauschtil (Donau style or Donauschule; Danube School), a school of painters, from the first third of the sixteenth century, including Albrecht Altdorfer (1480–1538), Wolf Huber (1485–1553), Jörg Breu the Elder (ca. 1475–1537), and Rueland Frueauf the Younger (ca. 1470–sometime after 1545).

70 A splendid book about what the Italian painters owed Arabic science is Hans Belting's *Florence and Baghdad: Renaissance Art and Arab Science* (Cambridge: Belknap Press of Harvard University Press, 2011). The subject of Belting's book is the transformation of "a *scientific* theory into an *artistic* practice," of "an Arab *visual* theory into a Western *pictorial* theory" (27). I have some disagreements with the book about the nature of that transformation. Still, it is a remarkable achievement.

71 Translated from Johannes Kepler, *Harmonices mundi*, cited in Max Caspar, *Kepler*, trans. and ed. C. Doris Hellman (New York: Dover, 1993), 265–66.

72 Of course, transcendent and empirical approaches to artmaking coexisted in the latter half of the nineteenth century: Impressionism is a scientific form of painting, one that attempts to capture the transitory play of light on the surfaces of objects—and

it conveys a great deal of optimism about (what at the time was understood as) "the modern." The Cubists were not quite as secure in their beliefs about the realm of the senses—so Picasso turned to painting what he knew (and what he knew he sometimes related to mathematics), not what he saw.

73 Michel Henry, *Barbarism*, trans. Scott Davidson (New York and London: Continuum, 2013), 9.

74 Ibid., 1; emphasis in original.

75 Ibid., 11. Readers will remember that in *Il saggiatore* (The Assayer, 1623), Galileo Galilei asserted that the universe "is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering around in a dark labyrinth." In *Discoveries and Opinions of Galileo*, trans. Stillman Drake (New York: Anchor Books, 1957), 237–38.

76 Henry, *Barbarism*, 12. Italics as in original.

77 Ibid.; italics as in original.

78 Ezra Pound, "Review of Jean Cocteau's *Poésies*," *The Dial* 70, no. 1 (January 1921): 110.

79 The idea that narrative is capable of truly reflecting only pastoral life, not modern existence, is one that still troubles many scholars, though, strangely, they are comfortable with asserting that narrative reflects social existence, which is what the truncated remark can be taken to imply.

80 Georg Simmel, "Die Großstädte und das Geistesleben." In English: "The Metropolis and Mental Life," in *The Sociology of Georg Simmel*, trans. and ed. Kurt H. Wolff (New York: Free Press, 1950), 409–24 at 410. Simmel's writings offer much to students of urban visual culture, and their relevance to the themes of this book are profound. Unfortunately, I cannot take up that topic in this volume. Readers can consult David Frisby, *Fragments of Modernity: Theories of Modernity in the Work of Simmel, Kracauer, and Benjamin* (Cambridge, MA: Harvard University Press, 1986); and (regarding similar ideas on vision) Deena Weinstein and Michael Weinstein, "On the Visual Constitution of Society: The Contributions of Georg Simmel and Jean-Paul Sartre to a Sociology of the Senses," *History of European Ideas* 5 (1984): 349–62.

81 Immanuel Kant, "Critique of the Aesthetical Judgment: Analytic of the Beautiful," in *Critique of Judgment* §7, trans. J.H. Bernard (New York: Hafner Press, 1951), 47.

82 Ibid., §1, 37.

83 Ibid., §18, 73; emphasis Bernard's.

84 Ibid., §19, 74.

85 Ibid., §16, 65.

86 Ibid., §1, 38.

87 Ibid., §20, 75.

88 Ibid., §2, 38.

89 Ibid., §2, 39.

90 Of course, that an object stimulates a pleasurable response and that the pleasure be disinterested are not sufficient conditions to warrant the claim that the object conditions pleasure of a specifically aesthetic sort. This is something on which Kant's *Kritik der Urteilskraft* is not precise: we need a criterion to distinguish aesthetic pleasure from disinterested pleasure that is not aesthetic. One possible ground for distinguishing aesthetic from other pleasures is that aesthetic pleasures derive from sensations that have been formed into ever more encompassing organizations that exhibit emergent properties. This would be consistent with Kant's remarks that deny aesthetic value to "the charm" of mere sensations and that affirm that form alone is aesthetically relevant.

91 Kant, "Critique of the Aesthetical Judgment," §6, 45–46.
92 Ibid., §15, 63.
93 Kant, "Critique of the Teleological Judgment: The Objective Purposiveness of Nature," in *Critique of Judgment*, §6, 205.
94 Kant, "Critique of the Aesthetical Judgment: Analytic of the Beautiful," in *Critique of Judgment*, §15, 62.
95 Ibid., §15, 64.
96 Ibid., §15, 64.
97 Ibid., §9, 53.
98 Ibid., §9, 54.
99 Ibid., §9, 52.
100 I have argued for this claim. I point out, however, that it is not canonical.
101 Kant, "Critique of the Aesthetical Judgment: Analytic of the Beautiful," §15, 63.
102 Ibid., §14, 61.
103 Immanuel Kant, "Transcendental Doctrine of Elements: Transcendental Deduction," in *Critique of Pure Reason*, trans. Norman Kemp Smith (New York: St. Martin's Press, 1929), §§A104–5, 134–35.
104 We have here the germ of ideas that Hegel was later to develop: that artworks give concepts (in the Hegelian, not the Kantian sense) material embodiment and that these concepts have a tendency to become too vast, too general, too complex, too abstract.
105 Kant, "Critique of the Aesthetical Judgment: Analytic of the Sublime," in *Critique of Judgment*, §49, 157–58.
106 Henri Bergson, *Matière et mémoire* (Paris: F. Alcan, 1896). In English: *Matter and Memory*, trans. Nancy Margaret Paul and W. Scott Palmer (New York: Zone Books, 1988), 201.
107 In fact, the artists and thinkers associated with the Cubist and Futurist movements had to read Bergson selectively and to overlook the way that aspects of Cubist and Futurist practice failed to conform to Bergson's aesthetics. A very good article on this topic is Ruth Lorand, "Bergson's Concept of Aesthetics," *British Journal of Aesthetics* 39, no. 4 (October 1999): 400–415.
108 "Les systèmes philosophiques ne sont pas taillés à la mesure de la réalité où nous vivons." Henri Bergson, *La pensée et le mouvant* (1934) (Paris: Presses Universitaires de France, 1985), 1.
109 In the last decade of the nineteenth and the first decade of the twentieth century, Bergson's philosophy was taken up by thinkers associated with various esoteric movements, by the Symbolists, by Futurists, and by Cubists (and artists affiliated with the many schools—for example, Section d'or, Purism, and Synchromism—that developed aspects of the Cubist program or were otherwise influenced by Cubism). However, Bergson's philosophy was not taken up whole, and the elements these groups selected to support their positions do not, when isolated from its whole, accurately represent the character of Bergson's philosophy. Furthermore, they read Bergson almost as a contemporary Schopenhauer. The German philosopher's ideas about the role of art resonated with the Symbolists and were commonly embraced by late-nineteenth- and early-twentieth-century artists. Schopenhauer proposed that the world we know of in experience is a realm of mere appearance, that reality itself is a mercilessly restless striving force he called *Wille* (Will), which impels us to maintain our lives even though they consist, for most part, of nothing other than suffering. However, art enables us, by allowing us to shift our attention to something akin the Platonic forms instead of the illusions of the material world, to be momentarily freed from our service to Will and to become subjects

possessing a higher knowledge. Through art, we experience intimations of the forms of the Will, without actually performing voluntary acts. Schopenhauer argued that music is the highest art of all because it mimics most exactly the Will's restless striving.

Bergson, too, proposed that there is a reality concealed from common (rational) understanding, an *élan vital*, that art releases from daily life's harsh toil; and that music comes closer to conveying this *durée* and the flux of life. Like Schopenhauer, he believed that we are locked into a life of misunderstanding. The agent of this entrapment, however, is *not* a merciless will, but the intellect. Moreover, the intellect is not wholly deleterious, but has a legitimate function—however, we have gone too far allowing it to dominate our lives and, consequently, have neglected intuition. Bergson's philosophy encourages us to afford intuition a wider scope. However, his philosophy is not an exposé of the near savagery of intellect, as Schopenhauer's was of the Will's unrelenting cruelty. Besides, Bergson maintained that art leads us back to the world: instruction in renunciation is not the goal of Bergson's philosophy (as it was of Schopenhauer's). Bergson's philosophy offers something closer to a hierophantic view of reality.

Neither Cubism nor Futurism really preached renunciation, in the way that Symbolism did. That said, Futurism certainly makes a distinction between an absolute reality (dynamism) and the world of appearances (the world of objects) that conforms remarkably well with Schopenhauer's model. The Cubists strained in that direction, especially by embracing ideas of higher dimensionality and space-time. Understood in that way, Schopenhauer can be read as a philosopher of the incipience of electrology. (The Cubists' fascination with the new world of industrial forms provided a counterbalance to any interest in a world beyond time. Note also that this form of novelty was experienced as hierophantic—these industrial forms were the new form of poetry.)

Whatever their distortions of the Bergsonian system, it seems to me the Cubists and Futurists recognized that the creative, participatory relation that Bergson maintained the individual has to the universe can serve as a model for the creative, participatory relation they hoped to bring about between the observer and the artwork. For example, when Apollinaire noted that "le peintre doit avant tout se donner le spectacle de sa propre divinité et les tableaux qu'il offre à l'admiration des hommes leur conféreront la gloire d'exercer aussi et momentanément leur propre divinité" (a painter must first and foremost afford himself the sight of his own divinity, and the paintings he gives me to admire will allow them too, for a glorious moment, to exercise their own divinity), he was thinking in very Bergsonian terms. See Guillaume Apollinaire, *Méditations esthétiques: Les peintres cubistes, première série* (Paris: E. Figuière, 1913); reprinted, Geneva: Pierre Cailler, 1950), 7; in English, *The Cubist Painters*, trans. Peter Reid, 10.

110 Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge: MIT Press, 1990), 90–92. The source for Crary's quotation from Johannes Müller is Müller, *Elements of Physiologie*, trans. William Baly (London: Taylor and Walton, 1848), 1064.

111 The Greek painters Zeuxis and Parrhasius were considered the most skilful painters of the fourth century BCE, when skilful *μίμησις* (*mīmēsis*, imitation) was the criterion by which artists were judged. Pliny the Elder (Gaius Plinius Secundus, CE 23–79) recorded a story concerning a competition between the two. Zeuxis finished his painting first, and a crowd gathered to appraise it. Zeuxis drew aside the curtain covering the painting, revealing an image of a bowl of fruit that included grapes; when he did that, a flock of birds flew down to pluck from the grapes from the bowl. That made Zeuxis certain he would win the competition. When Parrhasius finished his painting, he invited Zeuxis

and the crowd to his studio. When Zeuxis arrived, he asked Parrhasius to draw the curtain covering his painting aside, so he could see the image, but Parrhasius demurred, saying that it couldn't be done. So Zeuxis himself tried to lift the covering, only to discover that an image of a curtain was the painting. Zeuxis allowed that Parrhasius had won the competition because Zeuxis's illusion had only fooled birds, but Parhassius's had fooled a fellow craftsperson.

112 It is worth pointing out that crisis in vision is part of a more general crisis of perception and crisis of reality that I discuss throughout this work. If I stress this one aspect of a more general crisis, it is because the ocularcentric European tradition had accorded special importance to vision, and had analogized vision and knowledge, and the revelation of vision's limitation seemed particularly troubling. The shift from visual to acoustic space, outlined in Marshall McLuhan's historiography, brought into question fundamental epistemological assumptions of the modern era.

113 Mircea Eliade, *Myths, Rites, Symbols*, vol. 1, ed. Wendell C. Beane and William G. Doty (New York: Harper and Row, 1976), 72–73.

114 From Friedrich Nietzsche, *The Gay Science*, #329, "Leisure and Idleness," following the Kaufmann translation (New York: Random House, 1974), 259. Nietzsche was absolutely prescient on this topic. The passage continues:

> "Rather do anything rather than nothing": this principle too is just a noose to throttle all culture and good taste. Just as all forms are visibly perishing by the haste of the workers, the feeling for form itself, the ear and eye for the melody of movements are also perishing. The proof of this may be found in the universal demand for gross obviousness in all those situations in which human beings wish to be honest with one another for once—in their associations with friends, women, relatives, children, teachers, pupils, leaders and Princes: One no longer has time or energy for ceremonies, for being obliging in an indirect way, for esprit in conversation, and for otium at all. Living in a constant chase after gain compels people to expend their spirit to the point of exhaustion in continual pretence and overreaching and anticipating others. Virtue has come to consist in doing something in a shorter time than another person.

The phenomenology of present-day lived reality produces neurasthenia, or even, as in Nietzsche's case, mental collapse.

115 G.W.F. Hegel, "Preface," in *Phenomenology of Spirit*, trans. A.V. Miller (Oxford: Clarendon Press, 1977), Preface §20, 11.

116 Hegel, *Phenomenology of Spirit*, §798, 485.

117 The passage cited is drawn from Allan Patten, *Hegel's Idea of Freedom* (Oxford: Oxford University Press, 1999), 17.

118 George Grant, *Philosophy in the Mass Age* (1959), ed. William Christian (Toronto: University of Toronto Press, 1995), 14. Based on a series of lectures broadcast on the CBC in 1958.

119 Ibid., 5

120 Ibid., 120.

121 If Nietzsche's earliest conception of will differs from Schopenhauer's, it was probably in being a more exalted conception: Nietzsche claimed that when the intellect does not oppress or denigrate it, the will possesses a marvellously free and amoral character; moreover, he celebrated the will's force and power.

122 F. Nietzsche, "*Rückblick auf meine zwei Leipziger Jahre*" (Autumn 1867), qtd. in Ronald Hayman, *Nietzsche: A Critical Life* (Harmondsworth: Penguin Books, 1980), 72.

123 F. Nietzsche, "On Truth and Lie in an Extra-Moral Sense," in *The Portable Nietzsche*, trans. and ed. Walter Kaufmann (New York: Viking, 1982), 46–47.

124 Ibid.; emphases in original.

125 Even before Plato, thinkers proposed ideas about the ineffability of the higher truths. But Plato's remarks on ineffability of the Good in the *Republic* will be familiar to all. A strain in Medieval philosophy known as negative theology also asserts that the attributes of God cannot be expressed in language. There is a direct line from Hamann's thought, through Herder and Goethe, to that of the Symbolists.

126 These characterizations of James Doull's thoughts are drawn from Graeme Nicholson, "Heidegger and the Dialectic of Modernity," in *Philosophy and Freedom: The Legacy of James Doull*, ed. David Peddle and Neil G. Robertson (Toronto: University of Toronto Press, 2003), 378.

127 Ibid., 378.

128 Heidegger's address is printed as Martin Heidegger, "The Self-Assertion of the German University (1933)," in *Philosophical and Political Writigs*, ed. Manfred Stassen (New York and London: Continuum, 2003), 2–11 at 11.

129 Maurice Merleau-Ponty, "Cézanne's Doubt," in *Sense and Non-Sense*, trans. Hubert L. Dreyfus and Patricia Allen Dreyfus (Evanston: Northwestern University Press, 1964), 14. This passage outlines a conception of the genesis of vision that has clear parallels with that of the great American avant-garde filmmaker Stan Brakhage, and Brakhage acknowledged that.

130 Sigfried Giedion studied with the German art historian Heinrich Wölfflin (1864–1945), who laid out the historiographical logic of the change from Baroque (and Mannerist) art into Classical art. Giedion, too, laid out a historiographical logic, though his is different from Wölfflin's: that fact is particularly clear in his *Mechanization Takes Command* (Oxford: Oxford University Press, 1948). Unlike Wölfflin's, Giedion's historiography related changes occurring in the symbolic stratum to changes occurring in the material stratum. Wölfflin and Giedion were significant influences on McLuhan, who in his own way laid out a cultural historiography that, like Giedion's, was concerned with the interrelations of changes on the two strata.

The ideas that Giedion draws on Minkowski first presented in a now famous talk at the 80th Assembly of German Natural Scientists and Physicians delivered on 21 September 1908. A transcript appears in translation in Hermann Minkowski, "Space and Time," in Hendrik A. Lorentz, Albert Einstein, Hermann Minkowski, and Hermann Weyl, *The Principle of Relativity: A Collection of Original Memoirs on the Special and General Theory of Relativity* (New York: Dover, 1952), 75–91; the passage from Minkowski I cite in this paragraph is the second sentence of the address (p. 75).

131 Sigfried Giedion, *Space, Time and Architecture: The Growth of a New Tradition*, 5th ed. (Cambridge, MA: Harvard University Press, 1967), 14.

132 Ibid., 436. Compare Giedion's comment to this remark McLuhan made on the idiosyncratic (and syncretic) Cubo-Futurist author of *Ulysses* and *Finnegans Wake*:

> One of the principal intellectual developments of the past century or so has been the supplanting of linear perspective by a multi-locational mode of perception. Among critics of Picasso this new mode is sometimes referred to as a "circulating point of view" in which a view from above may suddenly become a view from every where at once.

"Inside Blake and Hollywood—*Fearful Symmetry: A Study of William Blake* by Northrop Frye; *Magic and Myth of the Movies* by Parker Tyler," *Swanee Review* 55, no. 4 (October–December 1947), 710–15 at 710.

133 Jean Metzinger, "Note sur la peinture," *Pan*, October–November 1910, 60, cited in Miller, *Einstein, Picasso*, 167. Robbin, *Shadows of Reality*, is the source of my remark concerning the Kahnweiler portrait.

134 Albert Gleizes and Jean Metzinger, *Du cubisme* (Paris: Figuière, 1912); according to the anonymous, but standard, English translation (*Cubism* [London: Fisher Unwin, 1913], 35), this reads: "moving around an object to seize several successive appearances, which, fused in a single image, reconstitute it in time." One of the book's most important features is that it understands Cubism as a realist movement that extended the new realism of Courbet.

135 For Richardson's rebuttal of the prevailing view, see John Adkins Richardson, "Cubism and Logic," in *Modern Art and Scientific Thought* (Chicago: University of Chicago Press, 1971), 104–27.

136 Meyer Schapiro, "Einstein and Cubism: Science and Art," in Schapiro, *The Unity of Picasso's Art* (New York: George Braziller, 2000), 49–149.

137 See Sam Hunter, *Modern French Painting 1855–1956* (New York: Dell, 1956), 194ff.; and László Moholy-Nagy, *Vision in Motion* (Chicago: Theobald, 1947).

138 Against such claims about simultaneity, offered both by Metzinger and by Giedion, Richardson in *Modern Art and Scientific Thought* contends:

> Still, what is most peculiar about Metzinger's theory, in view of its prominence, is that at the very time he was propounding it, Einstein was proving the impossibility of establishing the simultaneity of any two events that do not occur approximately [*sic*], that is, side by side. So far as the Special Theory of Relativity is concerned, the sole difference between it and classical science lies precisely in Relativity's *denial* of the absoluteness of the simultaneity of spatially separated events. Had the Cubists really been consistent with the new developments in physics they would have demolished simultaneity! After all, the presentation of simultaneous images had been common practice in architectural and machine drawing since the Renaissance, by way of elevations and projections which showed at once the top, sides, front and back of an object. (110)

139 Tom H. Gibbons in "Cubism and 'The Fourth Dimension,'" makes an interesting point in this connection:

> As Cecily Mackworth remarks in her biography of Apollinaire: "Occultism was fashionable in intellectual circles… Fortune-tellers, sorcerers, practitioners of the black arts, thrived in Paris at the time, and some of them, like the Sar Péladan and Stanislaus de Guita, had one foot in the world of literature and the other in that of occultism. Apollinaire's circle, with its strong taste for everything bizarre, was in touch with many of these sorcerers and Apollinaire has named some of them in the poem entitled *Sur les prophéties*. (147)

And further:

> It is particularly interesting to learn that "Apollinaire as well as Picasso and Max Jacob had frequented [the "Sar" Péladan] in their Montmartre days" and that Pèladan "had been momentarily interested in Cubism," for there is surely much that the founder of the Symbolist salon of Rosicrucian painters and author of *L'art idéaliste et mystique* would have found congenial in the aspirations of the young Cubist painters. Max Jacob, Picasso's intimate friend of that time, was, as is well known, an earnest student of Cab-Cabbalism and occultism. (ibid.)

Gibbons cites Mackworth, *Guillaume Apollinaire*, 125, for the first passage he cites, and ibid., 126 for the second; the parenthetical interpolation in the second passage is Gibbons's.

140 This passage appears in Herschel B. Chipp, *Theories of Modern Art: A Source Book by Artists and Critics* (Berkeley: University of California Press, 1968), 223–24.

141 Schapiro, "Einstein and Cubism," 54.

142 Ibid., 63.

143 This point is made in Gibbons, "Cubism and 'The Fourth Dimension,'" 131; he cites Fry, *Cubism*, 119, for the first phrase he quotes; and ibid., 111–12, for the second.

144 In that connection, I might point out that "Zur Elekrodynamik bewegter Körper" reconciles Maxwell's equations for electricity and magnetism with the laws of mechanics by introducing major changes to mechanics close to the speed of light.

145 Giedion, *Space, Time and Architecture*, 443–44.

146 As Giedion pointed out, Minkowski offered an alternative formalization of the special theory of relativity that in place of the algebraic treatment that Einstein offered, relied on the new unit of space-time. Minkowski introduced that unit, and it is that concept that is supposed to furnish the connection between relativistic physics and Cubist painting and poetry. In introducing the idea Minkowski famously declared, "The views of space and time which I wish to lay before you have sprung from the soil of experimental physics, and therein lies their strength. They are radical. Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality." Hermann Minkowski, "Space and Time," in Hendrik A. Lorentz, Albert Einstein, Hermann Minkowski, and Hermann Weyl, *The Principle of Relativity: A Collection of Original Memoirs on the Special and General Theory of Relativity* (New York: Dover, 1952), 75–91 at 75.

147 On the anachronisms in the statement, see Linda Dalrymple Henderson, "A New Facet of Cubism: 'The Fourth Dimension' and 'Non-Euclidean Geometry' Reinterpreted," *Art Quarterly* (Winter 1971): 410–33. Henderson writes that

> contemporary popularizations [of the sort Edward Fry alludes to] of the theories of Einstein and Minkowski did not exist [and that] the mistake of art-historians anxious to explain references to the fourth dimension and non-Euclidean geometry has been to read back into Cubist writings of 1911 and I912 a breakthrough in physics which was not published until 1916. (417)

In 1916 Einstein, with the general theory of relativity, embraced and developed the Minkowskian formalization of relativity theory in terms of space-time. Gibbons in "Cubism and 'The Fourth Dimension' adds, citing *The Times*, 8 November 1919 at 12:

> Henderson's argument is supported by the fact that the official index to *The Times* reveals no mention of Einstein until after the 1914–18 war. It was not until 7 November 1919, almost exactly a year after Apollinaire's death, that on page 12 *The Times* carried the announcements: "Revolution in Science: New Theory of the Universe: Newtonian Ideas Overthrown," informing its readers on the following day that "Dr. Albert Einstein['s] . . . astronomical discoveries were described at the meeting of the Royal Society on Thursday as the most remarkable since the discovery of Neptune, and as propounding a new theory of the universe. What was being reported in 1919 was of course the validation of Einstein's General Theory of Relativity (1916) by observations of the total solar eclipse of 29 May 1919." (132)

148 Ibn al-Haythan (965–ca. 1040), known in the West as Alhazen, composed *Kitab al-Manazir* between 1011 or 1021; a Latin translation, *De aspectibus* or *Perspectivae* (Book of Optics), appeared at the end of the twelfth or beginning of the thirteenth century.

149 Herbert Read, *A Concise History of Modern Painting* (New York: Thames and Hudson, 1985), 95–96.

150 Schapiro, "Einstein and Cubism," 59.

151 Gleizes and Metzinger, "Du cubisme," excerpted as "From Cubism, 1912," in *Theories of Modern* Art, ed. Chipp, 207–16 at 207–8.

152 Henry, *Barbarism*, 8–9.

153 Schapiro, "Einstein and Cubism," 60.

154 Regarding the Cubists' alleged indifference to the work of the Impressionists, it behooves one to acknowledge that some of the Cubists felt an affinity with Impressionism: Picasso had a great interest in and respect for Édouard Manet (1832–1883), a painter close to the Impressionists; and Fernand Léger—admittedly a painter whose work differed from Cubism in important respects, but one whose thoughts were aligned with those that gave rise to Cubism—admired the Impressionists very much, most of all for their innovations in handling colour and light and for their interest in modern life. Regarding the crises of perception, I have identified and commented on that matter in the sections titled "The Senses Disconnection from Reality" and "Producing Facts." Over the long run, the question as to whether the senses accurately mirror the world (and the larger issue of the veracity of perceptual reports) became exigent and important thinkers' attention when Helmholtz announced his idea of specific nerve energy. That issue is connected with the rise of the electromagnetic conception of reality.

155 I have introduced the emphasis. The manifesto first appeared in *La gazzetta del popolo* (2 February 1940) and later was published (without any credit going to Puma or Masnata) in a Roman journal, *Autori e scrittori* 6 (June 1941), under the reduced title "La matematica futurista immaginativa qualitativa." An English translation appears as "Qualitative Imaginative Futurist Mathematics," in *Futurism: An Anthology*, ed. Lawrence Rainey, Christine Poggi, and Laura Wittman (New Haven: Yale University Press, 2009), 298–301, at 299; however, the editors state in their notes on the manifesto that its appearance in *Autori e scrittori* was its first publication and give 1941 as the publication date and "La matematica futurista immaginativa qualitativa" as the full title—nevertheless, they note Puma's and Masnata's collaboration with Marinetti.

156 The original comment is "quand l'homme a voulu imiter la marche, il a créé la roue qui ne ressemble pas à une jambe. Il a fait ainsi du surréalisme sans le savoir." Guillaume Apollinaire, *Les mamelles de Tirésias* (1917); reprinted in Apollinaire, *L'enchanteur pourrissant*, suivi de *Les mamelles de Tirésias* et de *Couleur du temps* (Paris: Gallimard, 1957), 94. It also appears in Apollinaire, *Œuvres complètes*, ed. Michel Decaudin (Paris: A. Balland et J. Lecat, 1965–66), 865–66.

157 Willard Bohn, "La quatrième dimension chez Apollinaire," *Revue des lettres modernes* 530–36 (1978), special issue *Guillaume Apollinaire*, 14: 93–103 at 102. He also suggests something I take to be true, viz., that Apollinaire's methods and outlook relied on intuition (these methods were buttressed by the poet's interest in Henri Bergson's philosophy) and were (as Bergson's outlook was) opposed to the belief that science offers a truer picture of reality than an image arising from a participatory experience of reality. Bohn writes, "c'est l'intuition créatrice qui donne naissance à l'œuvre d'art par un procédé tout à fait opposé au raisonnement déductif/inductif de la science" ("La quatrième dimension," 95–96).

158 Karl Lambrecht, *Zur jüngsten deutschen Vergangenheit. Deutsche Geschichte* series (Berlin: Gärtner, 1902; Freiburg im Breslau: Hyfelder, 1904); Willy Hellpach, *Nervosität und Kultur* (Berlin: J. Rade, 1902).

159 This speed-up of life and the piling of images on top of one another are marvellously suggested in Étienne-Jules Marey's chronophotographes made between 1882 and 1904, the very period we are commenting on. See Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830–1904)* (Chicago: University of Chicago Press, 1992).

160 Georg Simmel, "The Metropolis and Mental Life," in *The Sociology of Georg Simmel*, 409–10. Simmel develops this theme in a telling direction. Drawing on Pierre Janet's distinction between lower and higher mental processes, he notes:

> The metropolis exacts from man as a discriminating creature a different amount of consciousness than does rural life. Here the rhythm of life and sensory mental imagery flows more slowly, more habitually, and more evenly. Precisely in this connection the sophisticated character of metropolitan psychic life becomes understandable—as over against small town life which rests more upon deeply felt and emotional relationships. These latter are rooted in the more unconscious layers of the psyche and grow most readily in the steady rhythm of uninterrupted habituations. The intellect, however, has its locus in the transparent, conscious, higher layers of the psyche; it is the most adaptable of our inner forces. In order to accommodate to change and to the contrast of phenomena, the intellect does not require any shocks and inner upheavals; it is only through such upheavals that the more conservative mind could accommodate to the metropolitan rhythm of events. Thus the metropolitan type of man—which, of course, exists in a thousand individual variants—develops an organ protecting him against the threatening currents and discrepancies of his external environment which would uproot him. He reacts with his head instead of his heart. In this an increased awareness assumes the psychic prerogative. Metropolitan life, thus, underlies a heightened awareness and a predominance of intelligence in metropolitan man. The reaction to metropolitan phenomena is shifted to that organ which is least sensitive and quite remote from the depth of the personality. Intellectuality is thus seen to preserve subjective life against the overwhelming power of metropolitan life, and intellectuality branches out in many directions and is integrated with numerous discrete phenomena. (410–11)

161 Earlier developments set the stage for this study of the body as a system operated by electricity. Around 1780, Galvani, working at the University of Bologna, found that electricity applied to a frog's leg (later he extended the study to other animals) would cause its muscles to contract. Helmholtz repudiated the vitalist strain in his teacher's, Johannes Müller's, belief that a nerve impulse can serve as an example of a body's vital function and thus cannot be measured experimentally. Around the same time, Emil Heinrich du Bois-Reymond (1818–1896), another student of Johannes Müller, who is known as the "father of experimental electrophysiology," used a sensitive apparatus he developed to detect what he called "action current" in the frog's nerve. He showed that this current is the cause of muscular contraction. Helmholtz, Du Bois-Reymond, and Brücke developed the theory that the body is a material entity whose operations are electrical in nature. Together, they rejected the assumption that living beings are animated by vital forces of a different nature than those that operate in inorganic nature and that are governed by special biological laws. They resolved to explain all biological phenomena by the same laws as are applicable to occurrences in physical and chemical realms. Sigmund Freud studied medicine with Brücke (as did two of Freud's associates), and that commitment undertaken by the Physikalische Gesellschaft (which the three founded) is reflected in Freud's *Entwurf einer Psychologie* (A Project for a Scientific Psychology, [1895], part of Freud's correspondence with Wilhelm Fliess (1858–1928), first published in German in 1950, and in his efforts to erect a science of psychodynamics.

162 Helmoltz had been Brücke's lab partner and friend in medical school. There is another important thinker who treated the mental apparatus as an energy system. The year before the publication of Brücke's *Vorlesungen*, Sigmund Freud enrolled in medical school at the University of Vienna to study with Brücke, who was then the director of the university's physiological laboratory. For six years, Freud concentrated on biology, doing research under Brücke's supervision. Freud went on to develop a theory that the mind is a dynamic energy system and that among its major concerns were the vicissitudes of psychic energy. John Bowlby, *Separation: Anxiety and Anger* (New York: Basic Books, 1973), notes:

> The psychical energy model that Freud brought to psychoanalysis came, not from his clinical work with patients, but from ideas he had learned many years earlier, especially when he was working in the laboratory of his admired professor of physiology, Brücke. During the 1840s, Brücke had been one of a group of dedicated young scientists, of whom Helmholtz was the leader, who were determined to show that all real causes are symbolized in science by the word "force." Since the achievements of the Helmholtz school soon became famous, it was natural that Freud, working under one of their number, should have adopted their assumptions. (401)

163 Anson Rabinbach, in *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1990), brilliantly lays out the cultural dynamics of complaints of lassitude and the diagnosis of neurasthenia that was given as an explanation.

164 Around 1910, *Every Woman's Encyclopaedia*, which offered entries on "How to Choose a House," "How to Arrange a Table," "An Idea for the Arrangement of Sweets," "The Servant Question," "How to Arrange Chrysanthemums," and "How to Obtain Servants," dispensed advice to women on how to deal with "Children Who Suffer from 'Nerves'"—and did so under the rubric of "Health and Hygiene in the Nursery":

> The nervous child is a far from uncommon phenomenon in the twentieth century. This is the age of neurotic women, who, like the proverbial Irishman, do not know what they want and won't be happy when they get it. It is the century of "rush," of strenuous men working at express speed. The natural result is the prevalence of neurasthenia amongst old and young, men and women alike. Even children are not exempt. The "nervy" child is the natural offspring of neurotic parents. The neurotic temperament is characterised by an abnormal capacity for emotion. Neurotic people feel more keenly joy, sorrow, or pain. They control their emotions with difficulty. Under proper management, the neurotic boy or girl may grow into a brilliant man or woman. Neurasthenia is simply the neurotic temperament run riot. So that, when children suffer from "nerves," they should be taken in hand right away. It depends upon the mother whether the neurotic child, who is generally clever and bright, will degenerate into a faddist, a "cranky," difficult man or woman, or achieve brilliant success in after life. (*Everywoman's Encyclopedia*, vol. 2 [London: W.B. Horner & Son, ca. 1912], 867–68)

165 F.G. Gosling, *Before Freud: Neurasthenia and the American Medical Community, 1870–1910* (Urbana: University of Illinois Press, 1987). On the topic of the exhaustion of energy reserves, see page 9.

166 From A.D. Rockwell, "Some Causes and Characteristics of Neurasthenia," *New York Medical Journal* 58 (1893): 590 *apud* Gosling, *Before Freud*, 12–13.

167 Möbius, who had training in philosophy and theology, was the least anti-psychiatric of this group, and he was one of the first and most forceful advocates of the view there are diseases that have specifically psychological origins (Freud referred to him as the father

of psychotherapy). His analyses of the psychogenetics of hysteria helped shape current beliefs on mental illness. Another view he argued for had both good and pernicious effects: he made the distinction between endogenous and exogenous causes of nervous and mental illness, distinguishing between degenerative conditions in the nervous system itself (his idea of degenerative conditions also implied that these mental diseases get progressively worse over generations) and conditions caused by factors coming from outside the system. (Krafft-Ebing made a related distinction, between predisposing and occasioning or accessory causes.) In large measure, this distinction is still accepted today, but Möbius's writings—for example, *Über die hereditären Nervenkrankheiten* (On Hereditary Neuropathology) (Leipzig: Breitkopf und Härtel, 1879)—gave them a form that made them attractive to the *Nationalsozialisten* and shaped their ideas on mental illness. No less pernicious in its effects was Möbius's extremely popular pamphlet (it went through eight editions during his lifetime) *Über den physiologischen Schwachsinn des Weibes* (On the Physiological Idiocy of Women) (Halle: C. Marhold, 1900), for which he received much commendation but also occasional condemnation; Möbius developed further the arguments of that pamphlet in his *Geschlecht und Kopfgröße* (Sex and Head Size) (Halle: Marhold, 1903) and *Beiträge zur Lehre von den Geschlechtsunterschieden* (Contributions to the Theory of Gender Differences) (Halle: Marhold, 1903–7).

168 As concerns the treatment of female neurasthenics, some physicians, on the grounds of the presumed intimacy of the connection between a woman's reproductive organs and her nervous system, concluded that women suffering from the condition should be referred to a gynecologist. The gynecologist usually prescribed ovariotomies and clitoridectomies. This mode of treatment led to controversies between gynecologists and neurologists, with the neurologists accusing the gynecologists' treatment of being tantamount to abuse. Gosling, in *Before Freud*, points out that Joseph G. Kiernan, a neurologist who taught forensic psychiatry at Kent College of Law, wrote of the "evil effects of laying undue stress on the utero-ovarian manifestation" and that the effect of overemphasizing the role of the reproductive organs was to furnish "new material for morbid anxieties" (22). He also points out that Ludwig Bremer, a St. Louis neurologist, commented even more forthrightly on the situation: in *Journal of Nervous and Mental Disease*, Bremer argued that surgical interference in the genital sphere amounted to "a crime, that its effect upon the woman is that of defloration. Her moral tone, her manner of judging things, is altered and lowered; with the consciousness of there being even the shadow of flaw on her virginity, those subtle qualities disappear which constitute the charm of girlish innocence; her mind is polluted, she is unfit for marriage and all this because her doctor happens to hold the opinion that by manipulating the uterus he can cure neurosis" (qtd. in Gosling, *Before Freud*, 22–23).

169 The deepest way of understanding this change in views about neurasthenia and depression is that it involves a transition from considering these states as products of a natural system to interpreting them as products of a symbolic system that serves to conceal our longings. That transition is of cardinal importance.

170 See Leendert Groenendijk, "Neurasthenia," in *The Freud Encyclopedia,* ed. Edwin Erwin (New York: Routledge, 2002), 361–62, for several references to Freud's ideas on neurasthenia around this time.

171 Sigmund Freud, Draft B, Letter to Wilhem Fliess, 8 Feburary 1893, in Freud, *The Complete Letters of Sigmund Freud to Wilhelm Fliess, 1887–1904*, ed. J.M. Masson (Cambridge, MA: Harvard University Press, 1985), 41–42. Remember, when reading this, that the central problematic of Wilhelm Fliess's scientific inquiries was to formulate

an account of biological phenomena in terms that were consistent with Helmholtz's sciences—that is, to describe them in terms of the (thermo)dynamics of energy. The redoubtable Thomas Szasz, in *Pharmacracy: Medicine and Politics in America* (Syracuse: Syracuse University Press, 2003), offers a compendium of quotations from Freud on the topic (with references):

> "Undoubtedly there exist cases of juvenile neurasthenia *without* masturbation, but *not* without the usual preliminaries of overabundant pollutions—that is, precisely as though there had been masturbation." "The use of a condom is evidence of weak potency, being something analogous to masturbation, it is a continuous cause of his [the patient's] melancholia." "Melancholia develops as an intensification of neurasthenia through masturbation." "The insight has dawned on me that masturbation is the one major habit, the 'primary addiction,' and it is only as a substitute and replacement for it that the other addictions—to alcohol, morphine, tobacco, and the like come into existence." "What would you say if masturbation were to reduce itself to homosexuality?" (102–3)

172 The equivocation here is necessary. Some thinkers interpreted these findings as demonstrating that a human being is a machine that runs on electricity. Others maintained that nerve energy is a distinctive (that is, non-electric) vital force, but that one can learn much about that force from its similarities to electricity.

173 A fascinating book, by Andreas Killen, *Berlin Electropolis: Shock, Nerves, and German Modernity* (Berkeley: University of California Press, 2006), points out that Bismarck's system of social insurance sought to alleviate the health-destroying effects of modernization. Killen argues that socio-historical pressure to contain those harmful effects led to nervousness being understood as a somatic disorder caused by rapid industrialization and urbanization; he also traces the widespread effects that the notion of neurasthenia had on administrative policy (including the operation of factories). Killen does not make the comparison, but Bismarck's social insurance legislation could profitably be compared to another somatic remedy for the afflictions of industrialization, viz., the *Freikörperkultur* movement as an aspect of *Lebensreform*. A historical analogy would be relevant, and instructive, but cannot be pursued here.

174 Cited in David Hayes, "Manufacturing Marshall McLuhan: On McLuhan's Centenary: How One Writer Helped Introduce the Legendary Media Theorist to the World," *This Magazine* 45, no. 2 (September–October 2011): 24.

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# DUDLEY MURPHY, FERNAND LÉGER, AND *BALLET MÉCANIQUE*: VORTICISM, CUBISM, COLLAGE, AND LÉGER'S NEW REALISM

2

## THE NEW VISION

Developments in the means of production often intrigue artists and challenge them to explore uncharted territories. When technological change sweeps through an era and provides artists with fresh materials with which to work, as happened at the beginning of the twentieth century, many embrace the novel formal possibilities they offer. Even artists who continue to work with traditional materials can be stimulated by new technologies to conceive fresh approaches and contrive novel forms.

At the beginning of the twentieth century, artists who attached themselves to various artistic movements, who espoused different aesthetic values and painted in different styles, made common cause in celebrating new technologies. Modern technology, by furnishing the means to produce goods in abundance, promised to end scarcity. It also promised a future of streamlined, accelerated forms. Industrial technology meant speed, plenty, and a hardness that many found appealing—and that appeal was a potent form of reaction against the florid sentimentality that was common in popular culture (as the films of D.W. Griffith make clear). Furthermore, the most advanced industrial technology has always been concentrated in cities, and at the beginning

of the twentieth century, cities still seemed to many to be exciting places to live (while for others, admittedly, it seemed, as Simmel's "The Metropolis and Modern Life" highlights, the source of the deepest problems of modern life). Films such as Alberto Calvacanti's *Rien que les heures* (Nothing but the Hours, 1926), Walther Ruttmann's *Berlin: Die Sinfonie der Großstadt* (Berlin: Symphony of a City, 1927) and Dziga Vertov's *Человек с киноаппаратом* (Chelovek s kinoapparatom; Man with a Cinema Apparatus / Man with a Movie Camera, 1929), and the proclamations of Futurist painters suggest the exhilaration (and travails) of urban life. Its association with the modern city made technology all the more stirring.

A sensibility stimulated by the technologies of movement and speed is a distinctively urban phenomenon. This sensibility, which displayed a need for physical mobility and an enthusiasm about being transported through space, which craved unusual vantage points and, especially, bird's-eye views, was a sensibility prepared to respond to the cinema. Some thinkers disposed to sanguinity responded to the city as to a site where stimulations proliferated, where abundance eliminated want, where every conceivable desire found its match in reality (as the Surrealists so enthusiastically affirmed)—but there was also a less assured response, one that understood that the accelerated condition of urban life was overexciting the nerves and damaging them.

The interest that late-nineteenth- and early-twentieth-century artists took in urban reality was a consequence of changed conditions of living. As late as 1850, Europe was still overwhelmingly rural. Most English, French, and German people, and an even higher portion of Italians, Poles, and Spaniards, lived in the countryside or in hamlets. But within forty years, the machine, and the centralizing force of the Industrial Revolution, had generated mass migration to the cities. Artists, of course, harboured ambivalent feelings about these developments, but what is unchallengeable is that Baudelaire's *fourmillante cité*, a city of people milling about as though caught up in much larger dynamism they could not really understand, was displacing pastoral existence. Thus, the Impressionist paintings of Monet and Renoir are the last great celebrations of nature in European painting (and even they were largely a response to urbanization). Not the landscape but the metropolis came increasingly to command artists' attention. Not the slow growth and sudden decay so typical of natural processes, but synthesis, simultaneity, transformation, and rapid change characterized the subjects in which late-nineteenth- and early-twentieth-century artists took an interest. Fast travel, made possible by the steam locomotive, changed people's sense of space: seeing the world from a speeding train (or, later, a speeding automobile) was different from seeing it on foot or from a horse-drawn carriage. Technologies of mechanical transportation compressed more views into a short period, and the observer

had less time to contemplate each—views had become merely transitional phenomena, each leading to the next. The succession and superimposition of views, the unfolding of landscape in flickering glimpses as one traversed it, and the heightened perspectival effects that motion produced (for example, the immediate, perceptual evidence that the trees lining the track move across the visual field more quickly than the village way off in the distance) became the subject of quotidian perceptual reports.

The reality of change began to outstrip artists' ability to render it; the glorious monuments of the era—edifices such as the skyscraper, the Eiffel Tower (which also helped endow people's imagination with the aerial view), St. Pancras Station, and the Brooklyn Bridge—surpassed what artists could create in their wildest imagination.[1] Poets like Hart Crane and painters like Fernand Léger began to explore forms that would be adequate to this new reality.[2] The same social changes that called the cinema into existence also produced the dynamism of Cubist painting.

Among artists, the avant-garde was especially excited by the speed and energy that propelled the modern world (that is, what at the time was understood as the modern world) into the future. Apollinaire began "Zone" (as a part in the *Alcools* series) with an invocation of modernity:

> A la fin tu es las de ce monde ancien
>
> Bergère ô tour Eiffel le troupeau des ponts bêle ce matin
>
> Tu en as assez de vivre dans l'antiquité grecque et romaine
>
> Ici même les automobiles ont l'air d'être anciennes
> La religion seule est restée toute neuve la religion
> Est restée simple comme des hangar de Port-Aviation
>
> Seul en Europe tu n'es pas antique ô Christianisme
>
> L'Européen le plus moderne c'est vous Pape Pie X
> ("Zone" 1–8)[3]

Those lines seem to speak entirely for the aggressively modern and urban—and, thus, to resemble the poet's "L'anti-tradition futuriste: Manifeste synthèse," which advocated "Epic nomadism urban explorationism *Art of journeys* and of walks," "Book or captive life or phonocinematography or **Wireless imagination,**" "Dance work or pure choreography, Swift pungent characteristic language sung whistled mimed walked or run," "a call to the beyond-man Matter and **physical transcendentalism Analogies and puns** lyrical trampoline of languages."[4] Around the time he wrote "Zone," Apollinaire had been campaigning for a new art. Of that anti-Romantic art, he contended, "Ce n'est pas un art décoratif, ce n'est pas non plus un

art impressionniste. Il est tout étude de la nature extérieure et intérieure, il est tout ardeur pour la vérité."[5] "Zone" is often understood as a celebration of the technological modern: people ordinarily say of it that its motifs of technology and the excitement of modern life (as well as its anomie) had no precedents in serious writing. Apollinaire's vigorous insistence on the right of the contingent and the fleeting to enter artworks on its own terms, and on the legitimacy of current urban speech in literature, would seem to support this claim. "Zone" is commonly said to extol the city as a new aesthetic *topos*, its phantasmagoria of rapidly changing events constituting the model of contemporary experience. In "Zone", it is said, the industrial precinct becomes a site of grace.

But there are grounds to question that view of Apollinaire's great poem. Right at the beginning, a continuity between the present and the past is suggested: the Eiffel Tower is addressed as a *bergère* (shepherdess) amidst a "troupeau des ponts [qui bêle]" (a herd of [bellowing] bridges). Furthermore, religion "est restée toute neuve" (has remained entirely new)—and the poem describes a dispensation coming to earth in the form of an airplane, as birds from all over the earth consort with the new winged creation. Clearly, Apollinaire intends to convince us that what was greatest in the *monde ancien* is re-created in novel forms in this modern world. The technological modern immediately enters the realm of myth. Hans-Robert Jauss notes,

> The "hidden centers" of [Apollinaire's mythopoeic vision] can be found in "the myth of Babel as the primal myth of alienation, and in Pentecost as the myth of the sublation of alienation." This is the basic theme of the death and rebirth of the universe, which the earlier poetry of Apollinaire had already worked through. There the mythic singer Orpheus, the ancient precursor of the Christ of *Zone*, discovers poetry as the possibility of the resurrection and rebirth of the lost world. Even the pronounced modernism of *Zone* has not been able to abrogate entirely this primal model. Apollinaire's new, ungrounded confidence in the beauty and happiness of a modern world just begun appears to be grounded in his orphic poet-myth, except that it is no longer the lyric subject that accomplishes the renewal of the world.[6]

Tacitly, Jauss views Apollinaire's verse as belonging to a strain in imaginative writing noted by several literary historians of the 1950s and 1960s (but now largely forgotten). That strain, critics pointed out, developed as a response to the passing away of a common religion. A result of the loss of a common faith was that the shared mythology of the West was renounced. But humans need myths to help bind them together (this is a point the political philosopher Leo Strauss often made)—so advocates for cultural renewal argued that the remaking of myth had become an urgent task, and the task of mythopoesis

must fall to artists, and above all to poets. It was up to poets to create, through the vitalizing powers of *ποίησις* (poïesis), a new mythology from the broken and (often) despised shards of the old religion. Often, the regenerative power of poïesis was thematized in the modern syncretic myths that embodied a new, and hopefully vital, mythology apposite to the modern age. Apollinaire, Jauss tacitly suggests, assumed that task (and his manner of retelling religious myths in "Zone" underscored poetry's revitalizing abilities). But what is novel in Apollinaire's retelling of the rebirth of a new world from the older, broken world is that the regenerator is no longer the lone Orphic poet, but rather the collective, which is the bearer of a newly poeticized consciousness. Furthermore, Apollinaire, in McLuhanite fashion, relates this poeticized consciousness to collectivizing pressures emerging from new technology: his writing strains towards a view of consciousness as a globalized electromagnetic phenomenon in which all participate. This electromagnetic consciousness will revitalize the world. Jauss notes that

> the *flâneur* in *Zone* is everywhere able, on his walk through Paris, to discover and praise the poetry of technology and the beauty of "industrial art." Yet to the extent that he succumbs to the fascination of the metropolis—from the early morning of the working masses to the stale nightly pleasures of the poor—he must also undergo the experience of having his own self elude him, even as he seeks, in both the "I" and the "You" of his changing voices, to call it to account. The subject that roams the city, and, amid the streaming crowds, euphorically records and relishes every emphatic aspect of contemporary life, seems doomed to encounter every remembered moment of his past life as an alien "I." The high price paid for the unanticipated expansion of limits in the modern experience of the world is the loss of the identity-guaranteeing *Anamnesis*.[7]

This dissolution of the individual into the collective self brought about epochal changes in aesthetic experience and artistic technique. I take up this topic at the end of the chapter on Futurism, but I feel compelled to highlight here, this early in the text, Jauss's brilliant insights into the aesthetic implications and artistic consequences of this shift to the collective self (which I will identify as the electromagnetic self). Jauss proposes

> a new aesthetic of simultaneity, of continuous fragmentation and amimetic montage, in which aspects of reality, citations, and bits of memory can all be included. As if E.A. Poe's maxim, "Epic intention . . . is based on an imperfect sense of Art," were only now to be fully realized, the reader finds himself confronted with a text whose novel obscurity no longer springs from encoded or ambiguous meaning, but from the abrupt shifting (often indicated by an unmediated "now") of appearances, visions, and memories, as well as of the subjects that experience them so directly. Since the occasion determining the kaleidoscopically changing foci of the poem remains hidden from the reader, he is now

> a "third person," in the role of an alien, as it were, for whom the event evoked is entirely unfamiliar. An unusual labor of aesthetic perception is thus required of him: he must now constantly produce for himself hypotheses of meaning, and reorder the irritating actuality of the text in everchanging arrangements. In these different readings or "parcours" through the text the reader catches sight of the new experience of modern life as it springs up in unexpected places.[8]

Here the past mixes with the present so thoroughly as to become part of the present: everything is simultaneous.

> Icare Énoch Élie Apollonius de Thyane
> Flottent autour du premier aéroplane
> Ils s'écartent parfois pour laisser passer ceux que transporte la
> Sainte-Eucharistie
> Ces prêtres qui montent éternellement élevant l'hostie
> L'avion se pose enfin sans refermer les ailes
> Le ciel s'emplit alors de millions d'hirondelles
> ("Zone" 49–54)[9]

This heavenly host appears,

> A tire d'aile viennent les corbeaux les faucons les hiboux
> D'Afrique arrivent les ibis les flamants les marabouts
> L'oiseau Roc célébré par les conteurs et les poètes
> Plane tenant dans les serres le crâne d'Adam la première tête
> L'aigle fond de l'horizon en poussant un grand cri
> Et d'Amérique vient le petit colibri
> De Chine sont venus les pihis longs et souples
> Qui n'ont qu'une seule aile et qui volent par couples
> Puis voici la colombe esprit immaculé
> Qu'escortent l'oiseau-lyre et le paon ocellé
> Le phénix ce bucher qui soi-même s'engendre
> Un instant voile tout de son ardent cendre
> Les sirènes laissant les périlleux détroits
> Arrivent en chantant bellement toutes trois
> Et tous aigle phénix et pihis de la Chine
> Fraternisent avec la volante machine
> ("Zone" 55–70)[10]

Birds from every continent join this carnival. Since this is a festival of resurrection, the phoenix rises from fire, and the dove joins in, to ensure peace. All time and all space is made one—all exist together, in a timeless (simultaneous) realm.

Hans Robert Jauss relates this total integration of space and time to the methods of the Cubists:

> The required labor of reading, in which the dialogue structure of the classical lyric with its focus on the addressee is sublated, is analogous throughout to the observation of a cubist image. Since "the aesthetics of cubist painting rest essentially on the concept of ideal or categorical models which dismember the represented object and rebuild it from perspectives immanent to the image, it thus constitutes a new aesthetic object. Nevertheless, by means of its categorical model, it makes the idea of its object become transparent" [here Jauss has quoted from K. Stierle]. The new aesthetic object can only arise in the eye of the beholder if his active, and analytic, ordering and reordering observation takes up and completes the work of the artist. For this reason, the new, *poi-etic* labor expected of the reader cannot be accomplished merely in the perception of a kaleidoscopic plurality of appearances in the modern big city. It requires, in addition, that the reader abandon the conventional contemplative focus and become productive himself, reconstructing a modern experience of the whole through the destruction of his usual expectations. A reconstruction, that is, of the aesthetic idea of the world that makes the immemorially old recognizable once more in the absolutely new.[11]

Jauss, as we have noted, sees "Zone" as recounting the regeneration of the world. This regeneration belongs to the ancient world of myth: through a collective act of mythopoesis, continuities are forged between the past and present and all time is sublated in the moment of immediate presence. This is the groundwork for Apollinaire's interest in simultaneity—his simultaneism, through which future and past cohabit with the present, arises from, and elicits, highly overdetermined feelings: of the future being both arousingly open and terrifyingly indeterminate, and of the past, because of its fixed character, seeming routinized (even ritualized), but at the same time comfortingly familiar. Take the following lines for an example:

> Maintenant tu marches dans Paris tout seul parmi la foule
> Des troupeaux d'autobus mugissants près de toi roulent
> L'angoisse de l'amour te serre le gosier
> Comme si tu ne devais jamais plus être aimé
> Si tu vivais dans l'ancien temps tu entrerais dans un monastère
> Vous avez honte quand vous vous surprenez à dire une prière
> Tu te moques de toi et comme le feu de l'Enfer ton rire pétille
> Les étincelles de ton rire dorent le fond de ta vie
> C'est un tableau pendu dans un sombre musée
> Et quelque fois tu vas le regarder de près
>
> Aujourd'hui tu marches dans Paris les femmes sont ensanglantées
> C'était et je voudrais ne pas m'en souvenir c'était au déclin de la beauté
> ("Zone" 71–82)[12]

Apollinaire connected this new urban culture with the cinema. In 1916 the editors of the journal *SIC* asked him what he thought about the future of the theatre. Apollinaire replied that the theatre of the future, which would subsume reality in its folds, was the cinema: "The question is too complicated, perhaps," he allowed. Nonetheless, "plays which take place in one room will become less important than before. Perhaps a more violent or more burlesque circus theatre will be born, also simpler in form. However, the great theatre which can produce a total dramaturgy is the cinema."[13]

The Futurists, too, wakened to this McLuhanesque theme. In his 1913 manifesto, "Immaginazione senza fili—**Parole in libertà**" (Destruction of Syntax—Imagination without Strings—Words in Freedom), F.T. Marinetti stated,

> Futurism is based on the complete renewal of human sensibility that has occurred as an effect of science's major discoveries. Those people who today make use of the telegraph, the telephone, the gramophone, the train, the bicycle, the motorcycle, the automobile, the ocean liner, the dirigible, the airplane, the cinema, the great newspaper (the synthesis of a day in the world's life) are not aware of the decisive influence that these various forms of communication, transportation, and information have on their psyches.
>
> An ordinary man, spending a day's time in the train, can be transported from a small town, dead, with empty squares in which the sun, the dust, and the wind divert each other in silence, to a great capital bristling with lights, movement, and street cries. By means of the newspaper, the inhabitant of a mountain village can tremble with anxiety every day, following the Chinese in revolt, the suffragettes of London or New York, Doctor Carrel, or the heroic dogsleds of the polar explorers. The pusillanimous and sedentary inhabitant of any provincial town can allow himself the inebriation of danger by going to the movies and watching a great hunt in the Congo. He can admire Japanese athletes, Negro boxers, endless American eccentrics, and very elegant Parisian women by spending a franc to go to the variety theater. Then, tucked up in his bourgeois bed, he can enjoy the distant and costly voice of a Caruso or a Burzio.[14]

Marinetti understood that the crucial topic his movement addressed was the transformative—indeed epoch-making—pressure the new technologies were exerting on consciousness: technology, he understood, is not a set of implements that exist outside us, which we choose to use to achieve the goals we have set ourselves. Technology has insinuated itself in our innermost being and now shapes our thoughts, our actions, and our experiences.

In "Risposta alle obiezioni" (A Response to Objections), his defence of the "Manifesto tecnico della letteratura futurista" (Technical Manifesto of Futurist Literature), Marinetti offered a telling comment about the ideas concerning energy that had given rise to a new literary form, *parole in libertà*:

"Words freed from punctuation will irradiate one another, magnetic waves intersecting one another according to the ceaseless dynamism of thought."[15] Of course, this is tantamount to a declaration that the future art will embody an electromagnetic conception of the universe. The Cubists shared the Futurists' enthusiasm for the new that had become such a prominent feature of "modern" life: a painting from 1912, by no less than Pablo Picasso, included the slogan "Notre avenir est dans l'air" (Our future is in the air), referring to the development of aircraft that had allowed humans to take wing.

The cinema played an important role in this interest in the new consciousness and new ways of seeing. Its use of multiple viewpoints (reflected in the changing vantage points of individual shots), its incorporation of relentless movement, its constitution as a pattern of light—all these features of the cinema reflect the postmodern dynamics of vision. These features of the cinema are also features of Cubist art (as they are of Futurist art). Furthermore, like Cubist painting, the cinema reflect the new-found recognition that consciousness and reality are dynamic. The idea that consciousness is animated was itself "in the air" when Cubist art and the cinema were in their formative stages. Hence, Bergson made dynamism a central topic of his philosophy: "What is real is the continual *change of* form," he asserted. "*Form is only a snapshot view of a transition*."[16] Bergson understood real time in much the same way as the Cubists understood it. He maintained that time is non-punctate: our understanding of each instant comprises an awareness of what immediately preceded it and what follows it (the American philosopher William James referred to this as the specious present). That is, recollection of the immediate past and anticipation of the immediate future has been incorporated into our understanding of the present. Indeed, this understanding that time is a fluid reality rather than a series of discrete instants made Bergson critical of the cinematic representation of time and perception, which he disparaged for embodying a conventional, but incorrect, understanding. "We may therefore sum up what we have been saying in the conclusion that the *mechanism of our ordinary knowledge is of a cinematographical kind*," he remarked, by way of criticizing the limitations of that form of understanding.[17] But often criticism, the marking out of differences, betrays a deeper affinity—and what we can discern in both the cinematographic understanding and that form of understanding that Bergson held most valuable is that they are both synthetic forms that draw relata into a unity. (We have already seen that Jauss attributes the notion that perception is production to Apollinaire: this idea that consciousness/perception is productive is one we dealt with in the first chapter and to which we will return soon.)

The early advocates of Cubist methods often defended their positions by offering Bergsonian assertions. For example, Jacques Rivière explained why

the effort to capture light's modelling effects on objects (in the manner of the Impressionists) must be renounced:

> It is the sign of a particular instant . . . If, therefore, the plastic image is to reveal the essence and permanence of beings, it must be free of lighting effects . . .
>
> Lighting is not only a superficial mark; it has the effect of profoundly altering the forms themselves . . . It can therefore be said that lighting prevents things from *appearing as they are* . . . Contrary to what is usually thought, sight is a successive sense; we have to combine many of its perceptions before we can know a single object well. But the painted image is fixed.[18]

The conception of perception as production (rather than the registering of external effects) was the grounds for the Cubist attack on Optical Realism. Indeed, Gleizes and Metzinger used it in exactly that way in their pioneering work, *Du cubism*:

> The art of the Impressionists involves an absurdity: by diversity of color it seeks to create life, and it promotes a feeble and ineffectual quality of drawing . . . Here, even more than in Courbet, the retina predominates over the brain . . .
>
> The only possible error in art is imitation; it infringes the law of time, which is the Law.[19]

The Cubists were committed to the principle that imitation is the fundamental error in the arts. The basic reason for this is that they understood perception as production. Even Picasso's famous comment about taking over from nature (cited in the preface) suggests this: artists make; they do not copy—and that goes even for perception. With *Les demoiselles d'Avignon,* Picasso pointed towards a new relation between the representing image and the represented object, a relation mediated by the analogy between perception and artistic fabrication.

There is a short but very wise book by Northrop Frye (1912–1991), *The Educated Imagination*. At its outset, Frye offers a taxonomy of languages. The first, remarkably enough, is "the language of consciousness and awareness."[20] That language, Frye says, is our means of "self-expression," our means of responding to the natural environment, and it furnishes our image of what we take to be "the world as it is." This language produces conversation. Frye, then, accepts that consciousness, awareness, is produced—it has the character of a linguistic production. However, a writer is not content with being self-expressive: "To bring anything really to life in literature we can't be lifelike: we have to be literature-like," Frye notes.[21] Writers learn to write by imitating other writers whose works they know—this is appropriate, even necessary, because "literature can only derive its form from itself: they [conventions] can't exist outside literature."[22] That is, literature imitates literature (which is shaped by the imagination—or we might say for our purposes here, by imaginative

seeing). "Above all is the fact that a poem is an imitation of other poems."[23] "A writer's desire to write can only have come from previous experience of literature," says Frye, "and he'll start by imitating whatever he's read."[24] And because literature draws from literature, "literature can derive its forms only from itself."[25] We do well to apply these comments to painting—and because Picasso was constantly learning anew how to paint, as his many "variations" on "themes" drawn from his predecessors show, Frye's remarks apply paradigmatically to Picasso.[26] We can ask, "What is Picasso doing in developing this new mode of representation, which takes the process by which a painting is formed as analogous to the way that perception is constructed?" His use of shifting (or multiple) viewpoints brought home to him the fact that perception is not, as the Impressionists had it, a way of registering the effects of light. It is an active process, one that involves different viewpoints and different times (memory and anticipation). With *Les demoiselles d'Avignon* Picasso began to inquire into how he could recast traditional painting (there are few painters who surpass Picasso in the extent of his historical awareness, or of the place of his work in the historical succession of painting styles) to suggest this new understanding of seeing. He eschewed the fixed point of view and the Pythagorean proportions that painters had used since the Renaissance to create a stable harmony—*dissensus* became important in his art. He replaced those age-old devices with multiple perspectives and anamorphic distortion, which suggests the mind's/imagination's transforming powers. He showed that a perception arises through the synthesis of different possible viewpoints and that a painting is assembled like a percept.

Braque soon followed suit: in *Maisons à l'Estaque* (Houses at l'Estaque, 1908), he went to work on transforming and extending painting by following the methods Cézanne had employed in his Mont Sainte-Victoire paintings, using strong browns, siennas, ochres, dull browns, and dull greys. He used these muted colours to emphasize the geometric structures of the work (an end served, too, by reducing details, for example, in the foliage). The result is a geometric structure of overlapping, shifting, tilted cubes that seem to project towards the picture plane along different vectors (the picture plane itself is emphasized by the lack of aerial perspective—in fact, the more distant houses tend to be darker, not lighter).[27] The overall effect is that of different perspectival representations being synthesized. To imitate the process of seeing, he has created a composite of different views of the object, synthesized on the canvas as if they were all simultaneous. Through this, Braque evokes a dynamic sense of perception: the canvas no longer presents a single fleeting moment (as Impressionist painting did)—rather the canvas has become like a movie screen, onto which part forms (frames) are projected, which we must synthesize into a single, dynamic form.

Gleizes and Metzinger note,

> We are certain that the least intelligent will quickly recognize that the pretense of representing the weight of bodies and the time spent in enumerating their various aspects is as legitimate as that of imitating daylight by the collision of an orange and a blue. Then the fact of moving around an object to seize several successive appearances, which, fused in a single image, reconstitute it in time, will no longer make thoughtful people indignant.[28]

This is a cinematic manner of understanding experience—for film, it is clear, had quickly become central to the way that people understand reality. A few years after Cubism began, an English journalist described a vogue among the French:

> French intellectuals and aesthetes were very eager to evolve an aesthetic of the Cinema in spite of the obvious fact that the Cinema was, at bottom, a mechanical toy which could never be dissociated from mechanics. It did not matter to them what the war conditions were, that for instance the Germans were but fifty miles off doing their best to persuade Big Bertha to reduce Paris to dust, the advance-guard were up and doing with their constant cry, "Now for the Cinema." Often I sat on one or other of the well-known café terraces, the Café Floré on the Boulevard St.-Germain, the Café Lilas at the corner of the Boul' Mich', the little Café Lapin l'Agile on the heights of Montmartre, while bad Bertha dropped her eggs and spoilt the scenery, human as well as architectural. It was always in the company of enthusiasts, the pick of the insurgents, painters, sculptors, writers, poets, etc. Among the painters were Picasso, Juan Gris, Fernand Leger, Irene Lagut, Othon Friez, Derain, Braque, Severini, Modigliani, Favory, and Herbin. Among the scuptors were Archipenko, Chana Orloff. Among the poets were Jean Cocteau, Blaise Cendrars, Henri Hertz, Alexander Merceau, Paul Dermé, editor of "Nord-Sud," Max Jacob, Reverdy, and Albert Birot, editor of the provocative "Sic" [*SIC*, Son Images Couleurs]. And till the time of his death after returning home from the war, there was Guillaume Apollinaire, the acknowledged leader of the Left to whom one invariably went for news of all the "revolutionary" movements. Finally there were the musicians and composers, Erik Satie and I think, Darius Milhaud, and others. To all these fell the self-imposed task of taking the Cinema as an intellectual not emotional medium of art expression, of discussing its conditions and possibilities, writing articles in little advance-guard sheets, of founding little propaganda journals, and of realizing ideas in out-of-the-way places what time the Censor was not looking.[29]

Among the painters associated (whether more nearly or more distantly) with the Cubist movement who shared the optimism of the new secular, materialist, constructivist eschatology was Fernand Léger. The son of a cattle breeder from Normandy, Léger was a practical man who hailed from a line of practical people. His disposition towards construction is evidenced by his

training and early experience: he studied architecture, served with the French Army Corps of Engineers, and had an interest in new imaging technologies, which led him to work in retouching photographs. He also had enormous enthusiasm for Charlie Chaplin movies and for locomotives.

The Cubists' interest in exploring the mechanics of the perceptual process had little appeal for Léger, and the simplification of form in his works serves not to analyze the structure of objects in the round, but to intensify the paintings' dynamic effects (a principle he learned from the Futurists). Like the Cubists, he eschewed traditional perspective, but not for the same end: he did not wish to demonstrate how our perceptions evolve into the apprehension of a three-dimensional form but rather to animate the surface of the painting. His work was less programmatic than that of the principal Cubists, and this allowed his paintings to assume real diversity: because he was not programmatically committed to an inquiry into perception, he could incorporate into his paintings components that display perspectival features even while, like the painters closer to Cubism's core, he rejected the perspectival system that had ruled over Western painting since the fifteenth century.

## PROSTHETICS FOR THE SENSES: RECONCILING TWO DESCRIPTIONS OF THE WORLD

The drive to capture humans' perceptual processes was fuelled by the momentous changes alluded to above—urbanization and the rapid acceleration of the pace of change—and by another that I have not yet mentioned, one whose implications diverged from the optimistic humanism of the first two. This last factor is the development and popularization of scientific models of the world that implied that the world as it truly is and the world as we see it are vastly different. The truly corrosive effect of that development results when (as in the late modern age) it is joined to the proposition—endorsed (despite a common misconception about the philosophical meaning of relativity theory) by Albert Einstein in his well-known remarks about the huge "out yonder" that exists independently of human being—that science offers a more accurate and more profound description of the reality that underlies sense experiences.[30] For scientific models have long offered descriptions of the material realm that imply that its fundamental structure is different from what we perceive it to be: the Pre-Socratic thinker Anaximenes (ca. 580–ca. 500 BCE) posited that a single material element akin to mist was the basis for all that is and that this element is transmuted into the objects we know through condensation (becoming thereby cold and hard, and forming earth and rock) or rarefaction (becoming thereby fiery, and forming the heavenly bodies). Diogenes of Apollonia (around 450 BCE) argued that the basic matter from which all

things are constituted is air; and Archelaus (fifth century BCE) suggested that all things are made up of hot and cold, mixed in different proportions. The greatest of the Pre-Socratics, Parmenides (ca. 515–480 BCE), argued that reality is Being and that Being is a whole that cannot be partitioned, is undying, motionless, and eternally present—thus, Parmenides's position denies change, while we experience material existents as changeable and, in fact, as undergoing constant change.[31] All of these thinkers, then, proposed that reality is much different from what our experience reports it as being.

For the Pre-Socratic philosophers—in fact, for most thinkers right up to the later modern and postmodern periods—the world presented by the senses was an unreal world, a shadow realm that somehow or another (the conception of how this occurred varied from era to era) reflects a higher world that reason alone knows. Pre-modern (and, to a lesser extent, early modern) metaphysics assert that the "really" real is the realm we learn about through the efforts of reason—a higher realm of spiritual (non-material) essences. By contrast, the metaphysics of the later modern era could offer no distinction equivalent to the one between matter and spirit (let alone map that distinction onto one between illusion and reality). The best modernity could do was distinguish between form (patterns of observed regularities among events) and substance and map that distinction onto one between the loftier (because more rational) knowledge that science provides and the lowlier knowledge the senses provide. Because both forms of knowledge concerned the same domain, that of matter, and because the former sort of knowledge (of observed regularities) had its origins in the latter (in sense data), this distinction was not strong enough to carry the belief that reason could correct the illusions furnished by the senses. Moderns, then, could not petition a higher knowledge to correct the senses' erroneous ways (thus freeing the mind from illusion)—as my discussion of Shapin and Shaffer's *Leviathan and the Air-Pump* showed, the status of scientific knowledge had been downgraded from objectivity (the revelation of what actually exists outside oneself) to intersubjectivity (to what "experts" had agreed they experienced, or, at most, the systematic coordination of those agreed-upon "findings" with theoretical constructs in a scientific model).

So, although scientific descriptions of reality have long differed from the object representations the senses provide, this divergence became even more troubling in the modern period—and became the more troubling the more nearly history approached our own era.

So in the modern era (here I am using the word modern according to the common philosophical periodization), science took on the role of setting the standards for reason, even though it could perform this role only feebly. As it assumed this role, knowledge of its doctrines became more widespread,

and as its doctrines became more widely known, so did recognition of the discrepancies between the world as science represents it and the world as the senses report it. For the ancients, as I remarked, these discrepancies pointed to the difference between a higher realm and the quotidian realm. However, moderns acknowledged no higher realm they could petition to endorse one set of representations and to discredit the other. The irremediable discrepancy between the world of the sciences and the world of the senses thus cast both representations into doubt. Reason does not measure our understanding of a quotidian realm against the sure and certain knowledge of a higher realm. All it does is to observe regularities in appearances (if event A happens, with such and such measurable features, then event B happens, with such and such measurable features), and then, in forming an account of these regularities, empties them of sensuous content by hypothesizing that there exist certain patterns in the movement of particles in space. These hypothetical constructs lack the vibrant immediacy of the revelation of higher forms of consciousness (*νοῦς*, noûs, reason). On this difference, consider the impact that Plato (in the *Republic*, 507b–509b) attributes to prisoners from the cave seeing the sun.

The unsatisfyingly non-sensuous character of these abstract hypotheses had the ironic effect of bolstering the importance accorded to immediate sensory data, which came to be understood as being richer and more vital than the constructs of reason. But, at the same, modernity experienced perception's becoming ungrounded, lacking any ground in a higher being. The intimation that knowledge had lost its basis precipitated a grave crisis: if percepts don't match the world, what is their evidentiary value? Many thinkers were deeply troubled by this. But others found this ungrounding of perception to be liberating—for, they maintained, it allowed perception to be understood as free productivity, unconstrained by any representational demands. This connection between understanding perception as synthesis and the idea of spectatorial freedom has gone pretty much unnoticed. But it is a key to understanding Cubism and Futurism.

One possibility held out hope of overcoming the crisis into which history had swept the nineteenth century—that of claiming that the differences between the two representations are really just differences of scale. Science describes the world as made up of small particles that are mostly empty, while the senses depict the world as made up of solid (non-particulate) and, generally, weighty and impenetrable substances. It might be that these two descriptions are not really incompatible: if the senses were more acute, they might be able to see and feel the particulate nature of matter and discern that the particles composing materials are mostly empty, that the weightiness of matter is simply a relative measure, and that its impenetrability is a matter of packing. It might be that the scientific depiction of the world as composed

simply of particles in motion and the senses' depiction of the world as made up of vibrant colours are not really irreconcilable: if the sense of sight were more acute, it might be able to discern that what we experience as colour is composed of a stream of particles reflected from an object and exciting the eye at a particular vibratory frequency.

If the differences between the two representations of reality were simply a matter of scale, thinkers hoped, a machine that amplifies the power of the senses might make it possible to detect the underlying makeup of reality and reveal that its structure is consistent with the senses' representation of it. Such a machine would reveal, for example, that the perception of colour is a result of the impact of tiny particles that agitate nearby particles that agitate others in turn and, finally, agitate the nerve endings in the eye. The still camera and, even more, the motion picture camera were products of just such a hope, one that the exuberance of Dziga Vertov's writings on *Kino-Eye* (Кино-глаз, Kino-glaz) can still make felt today. Reading Vertov, one can sense the extraordinary hope that a mechanical eye might reconcile the two world-pictures and show, by revealing details undisclosed by the unaided eye, just how the commonsense world-picture maps onto that of science. For other thinkers, the theory of electromagnetism (and the discovery that the basis for sensation is our electric response to an electrochemical excitation of our nerves) was a key to the reconciliation of the two world views—and of course some artists blended these two views in formulating their poetics.

What makes photography, film, and X-rays valuable as a means of reconciliation is partly their indexical character and partly something stranger and more wonderful, whose determinants are to be found in the crossing of electromagnetic theory with esoteric doctrines.[32] For it was not just the failure of the senses to provide an image of the very small, the very large, and the very rapid that provided evidence of their insufficiency; it was also their inability to give us an image of thought or spirit. The interest in the late nineteenth and early twentieth centuries in spirit photography—in photographing ghosts and other spiritual entities—provides ample evidence of this, as does the even more fantastic belief that the photographic image was like ectoplasm, that is, a medium in which spirits were able to manifest themselves.[33] Photography, film, and X-rays were all believed to be capable of penetrating matter and thereby rendering visible the invisible, and film forms (such as those of Léopold Survage [1879–1968], Viking Eggeling [1880–1925], Walther Ruttmann [1887–1941], and even Sergei Eisenstein [1898–1948]) were contrived as homologies to thought processes.[34] If ghosts could be photographed, so too could thoughts and feelings—and film's dynamic form could render with extraordinary exactitude the rhythms and pulsations of thought-processes: the evidentiary powers of the electromagnetic images of thought (furnished

by X-rays and spirit photographs) were thought to be a consequence of their being indices (an index is a sign whose signifier is causally related to what the sign signifies, and so the signified shares its being with the signified): both the thought and the image it produces are manifestations of electromagnetic energy and so have a common being. The rise of the new discursive regime associated with the rise of electromagnetism enabled artists to conceive of a continuum of radiant energy, from X-rays and radio waves to light and auratic emanations—and many imagined that this included thought and feeling radiating from the body, which perhaps could be projected onto the astral plane as thought-forms (a staggeringly widespread belief at the time), captured on a photo-sensitive plate, or even projected into a theatre auditorium as modulating light. Thought and feeling, which up to this time had eluded empirical scrutiny, could thus be brought into the province of science, for the image-generating powers of electromagnetic energy (assuming that is what thought and feeling are) could bring them into the sphere of the publicly observable (recall the discussion of Shapin and Schaffer in the first chapter). Thought-processes and the affairs of the soul would become at last a part of our public lives (a conjecture that, needless to say, elicited as much consternation as jubilation). The excitement over the possibility of making thought visible is conveyed in Gottfried Benn's (1886–1956) comments on the electrotechnical revelation of the identity of thought and matter:[35]

> What the results in their entirety signified was more than completely new knowledge about the meaning of the nervous organs; rather, it concerned the following: one had experimented on bodily tissue and gotten reactions from the realm of the spiritual; one was, during this work, and while entrenched in the realm of physiology, confronted with the psychic; one had come to a place where the two realms of life were knotted together, and one could grope from here into the dark, mysterious realm of the psychic. And thus one stood before something new and unheard of in the history of science: the psychic, the pneuma, that which exists over and beyond things, the absolutely ungraspable became flesh and lived among us.[36]

## CUBISM AND THE CRISIS OF VISION

I have already alluded to a crisis around perception that developed during the mid-nineteenth century. I have laid out my belief that by the early nineteenth century, the difference between two competing descriptions of reality (the scientific description and the description based on quotidian perceptual reports) had become evident, and I have suggested that intellectual developments had made it no longer possible to reconcile the two by petitioning a higher realm whose principles allow us to measure what we believe against what we

know as certain truth. Having completed those tasks, I can turn now to systematically analyze the crisis in perception. Three interrelated developments that impressed themselves on human consciousness in the mid-nineteenth century precipitated this crisis of vision: the pace of change had increased to the point that it exceeded humans' capacity to absorb and adjust to it (this is a key topic raised in Dziga Vertov's *Человек с киноаппаратом* [Chelovek s kinoapparatom]); visual forms accelerated into a mind-numbing profusion; and (as just noted) science had produced a picture of the world altogether different from the image the senses supply. Ralph Waldo Emerson (1803–1882) commented on the state of mind that the crisis brought on:

> It is very unhappy, but too late to be helped, the discovery we have made that we exist. That discovery is called the Fall of Man. Ever afterwards we suspect our instruments. We have learned that we do not see directly, but mediately, and that we have no means of correcting these colored and distorting lenses which we are, or of computing the amount of their errors. Perhaps these subject-lenses have a creative power; perhaps there are no objects. Once we lived in what we saw; now, the rapaciousness of this new power, which threatens to absorb all things, engages us.[37]

This crisis of vision accounted in part (perhaps in large measure) for the acute interest—evident in Impressionism, Pointillism, and Divisionism, and in Cubism, Futurism, and Minimalism—that nineteenth- and twentieth-century artists took in the mechanics of visual perception, as well as for the rise of photography, chronophotography, and film. Film and photography were born of the ambition to re-establish us in the world of objects and to show that objects *do* after all exist. But history has its ironies, and even though the drive to re-establish our relation to reality was the impulse that brought photography into being, that is not what it ended up doing. It was no time before visually aware people began to notice that the rendering of tones in a photograph is different from that which the eye offers (and different again from the rendering of tones in painting); and that photography's system of spatial representation, while based on geometric optics, which purported to be based on the mechanics of seeing and the transit of light rays from object to eye, was different from the space of vision (for one thing, nineteenth- and early-twentieth-century photography flattened objects). Offering further evidence that mechanical reproduction does not deliver objects to us, but something closer to a notation of an object, formed in terms of the properties of the representational system, are X-rays, Eadweard Muybridge's (1830–1904) photographic analyses of motion, and Étienne-Jules Marey's (1830–1904) purportedly scientific *chronophotographie*, all of which present images of realities that the eye cannot see, and—especially in the case of Marey—look

nothing like the images with which the (post-Renaissance) eye presents us. All three contributed to the deepening crisis of vision.

The same crisis of vision played a major role in creating Cubism. That the same conditions that had a role in bringing photography and film into being also played a role in the development of Cubism suggests that Cubism and the cinema had a natural affinity for each other. So it happened that Sergei Eisenstein would describe an (evidently) Cubo-Constructivist theatre piece that tried to impart the qualities of city life—and his own testimony on the piece makes explicit that the quest to capture, using Cubo-Constructivist means, the qualities of urban, industrial existence propelled him into the cinema.[38]

The Cubists formulated their theories about visual perception largely in reaction to the Impressionists' concern to depict the transient optical properties of illuminated surfaces. The Impressionists' methods rested on a belief that the momentary stimulation of the retina alone was responsible for visual perception. That is why Marcel Duchamp contemptuously referred to their art, and that of like-minded precursors and followers, as "retinal art." The core doctrine of Optical Realism (a doctrine and practice that developed in Italy in the fourteenth century) was that visual perception in its purest form, the sort of visual perception that allows us to see what is actually before us, depends on our becoming more aware of the image reflected onto the retina. The Impressionists' belief that the image studied by optics was a nearly perfect model for the retinal image, and so for the phenomenal image, made their conception of the image an extension of Optical Realism; essentially, they took that doctrine and practice to its furthest point of development. The image that optics studies is a nearly perfect model for the retinal image, but not quite: what it lacks is an understanding of vision's temporal attributes. What the Impressionists did was supplement the geometric optics of the Renaissance with an understanding of the optical/retinal effects of colours and their juxtapositions, which change continuously: they maintained that what is actually reflected onto the retina are animated images formed by the constantly changing light bounced from the coloured surfaces of objects. However, they strove to apprehend a single moment in the flux, to freeze it, and to render the frozen moment with exactitude. They aspired towards "true seeing," that is, towards a manner of seeing unaffected by the distortions so often introduced by subjectivity. In attempting to render true seeing they relied on scientific doctrines that expanded on the commonsense belief that visual percepts are *données*—that is, they did not accord the mind a productive role in perception; moreover they did not acknowledge the imperative of conveying the processual character of perception—that perception is an ongoing flux, in which experiences (like Alfred North Whitehead's actual occasions) vanish as soon as they emerge.

A momentous shift occurred at the end of the nineteenth and the beginning of the twentieth century. Several schools of psychologists (among whom the Gestalt psychologists are the best known) argued that our visual percepts do not simply mirror the world around us the way a reflection in a looking-glass reflects the world in front of it, or the way the back wall of a *camera obscura* depicts what lies before it. The mind is not passive in visual perception (or in any other kind of perception); rather, the mind forges visual percepts from the raw material the body provides. This is true even of our most straightforward percepts. If I look head on, from eye level, at a box, I do not see a rectangle; I know from previous experience that the box has three dimensions, and I know that if it were moved slightly to either side, a different facet would become visible. My mind (using the imagination and memory) provides images of what I do not see, so the representation of which I become aware already contains information, based on past experience, about what I would see if I moved to the left, or to the right, or walked around the box, or stood on a chair and looked down on the object.

I pointed out in the introduction that this understanding of perception influenced the Cubists. And before the Cubists, there was Paul Cézanne, whose paintings were among the very first to reflect emerging ideas on vision—and he, before anyone else, rejected the Impressionists' Optical Realism. His methods and his ideas were an important source of the Cubists' ideas on visual perception. He proposed that we do not see surfaces animated by constantly changing light—that instead, we perceive physical reality made of solid volumes in three-dimensional space. He realized, as did Kant and the phenomenological philosophers, that our perception of the world has an understanding of its structure built into it. Our vision of the world amounts to more than is reflected onto the eyeball: a latent understanding about the character of existents (and of space-time) informs it. That recognition is what led Cézanne to suggest that he might be better able to perceive—not understand, but *perceive*—the true structure of a landscape if he had some knowledge of geology.

The problem of how to depict what we perceive through this latent understanding was a vexing one. The methods that Optical Realism developed (from the Renaissance onward) had proved a powerful means of reducing the painted subject to what can be presented on a single, flat, bounded surface—that is, of bringing painting's subject and painting's means to coincide. The whole idea of the *camera obscura*, that tool that played such an important role in the development of Optical Realism, was to reveal how the rays of light reflected from the surfaces of worldly objects project onto a flat surface. Cézanne reopened the gap that had existed before the Renaissance between the painting's surface and the three-dimensional world on which the painting is modelled.[39]

If Cézanne's methods re-created a problem that painters of the early and high Middle Ages had faced, but that the methods of Optical Realism had obviated for a time, his solution to that problem was not entirely different from that of his Medieval precursors. Medieval artists did not think of painting as, say, Leon Battista Alberti (1404–1472) did—that is, as a transparent window through which we look out onto a section of the visible world. Rather, they understood a picture to be a material surface covered with lines and colours that can be interpreted as symbols of what lies outside the painting (whether that "outside" be of this world or of another). Cézanne conceived painting similarly, as a construction of volumes: the way these volumes were juxtaposed or overlapped suggests (but did not depict) the spatial relations they have to one another (rather as the way Cézanne used blue suggests, but does not depict, the effects of aerial perspective). Cézanne's interest in rendering the spatial relations among objects led him to invent a device that would influence how the early Cubists would resolve their motifs into facets: he shattered the contours of the objects he painted, only to subsequently reaffirm their outlines. By doing so, he made the surfaces of his canvases pulsate. Granted, Cézanne's "means of expression" (as he called his manner of realizing his conceptions about visual perception) still concerned themselves with the relationship between the canvas's two-dimensional surface and the world's three-dimensional space, as the "means" of the Medieval painters did not, but both sets of devices (those of Cézanne and those of Medieval painters) shared this characteristic: the commitment not to present what they are about, but to "symbolize" their referents (that is, to refer to them non-iconically).

Thus, Cézanne wrote to Émile Bernard,

> Treat nature by means of the cylinder, the sphere, the cone, everything brought into proper perspective so that each side of an object or a plane is directed towards a central point. Lines parallel to the horizon give breadth, whether it is a section of nature or, if you prefer, of the show which the *Pater Omnipotens Aeterne Deus* spreads out before our eyes. Lines perpendicular to this horizon give depth. But nature for us men is more depth than surface, whence the need to introduce into our light vibrations, represented by the reds and yellows, a sufficient amount of blueness to give the feel of air.[40]

The idea that God spreads out the world before us as "a spectacle" is one I will have reason to refer to later in our discussion of Cubism (it will require me to qualify the canonical characterization of Optical Realism). What is important for our purposes, now, is to appreciate the scope of Cézanne's reductive methods: the proposition that nature should be treated "by the cylinder, the sphere, and the cone" is the most famous and frequently quoted of Cézanne's assertions, and it gives clear evidence he did not want so much to depict reality

as to present an equivalent of its underlying structure. It offers a means for understanding the world's structure as a system of interrelated, solid, tangible volumes. Cézanne's statement that red and yellow serve in his work to indicate the vibration of light (the subject matter of most Impressionist painting) also gives evidence that his concern was less with presenting an accurate likeness than with "symbolic structure" (in the Peircean sense of "symbol," of a sign that is neither iconic nor indexical). It reveals, too, how he moved away from using *chiaroscuro* for modelling effects, as the Optical Realist painters had.

Cézanne rejected the Impressionists' concern to capture the momentary play of light over coloured surfaces, and their ideas about the role that retinal impressions play in visual perception. In doing so, he opened the way for giving the appearance of a much greater degree of architectural solidity than was characteristic of the paintings of his immediate predecessors. In his *nature morte* paintings, he often increased the volume of an object by viewing it from an unexpected angle—and to do so he had to represent the particular object as though from a different vantage point than that which organizes most other parts of the painting. A related means that he employed for increasing the object's mass was to, say, tip a tabletop forward, so that instead of appearing as an object receding into three-dimensional space, it became a massive, trapezoid-shaped plane tipped into a shallow space. By these means Cézanne imbues the subjects of his paintings with an extraordinary monolithic quality, even while they seem to throb with life.

By 1906, in works such as *Jeune femme à la chevelure* (Nude Girl with Long Hair), Picasso had adopted Cézanne's ambition of depicting more monumental figures than we find in Impressionist painting. After he settled in Paris in April 1904, a group of collectors eager to purchase his work formed rapidly. Among them were Gertrude Stein (whose portrait, which reflected his budding interest in monumental figures, he completed in 1906, shortly before embarking on *Les demoiselles d'Avignon*). Her support, and that of Leo and Michael, Gertrude's brothers, made him, in very short order (he was in his mid-twenties), a leading figure among vanguard painters in Paris, only slightly less important than the considerably older leader of the Fauves, Henri Matisse (1869–1954; he was Picasso's senior by twelve years).

Matisse had built a reputation as the most shocking, artistically radical French painter—a reputation that was confirmed when he exhibited his *La femme au chapeau* (Woman with a Hat) at the Salon d'Automne of 1905. The show itself created a scandal: the critic Camille Mauclair declared that "a pot of paint has been flung in the face of the public." The painting that was singled out for the most attacks was the aforementioned *La femme au chapeau*—Matisse, who was despondent over these attacks, was somewhat consoled when Gertrude and Leo Stein bought the work.[41] His reputation as

the leader of Paris's modern painters solidified as Georges Braque (1880–1963), André Derain (1880–1954), and Maurice de Vlaminck (1876–1958) gathered around him, and his reputation as an artistic radical was consolidated when he shocked the French public yet again by exhibiting at the 1907 Société des Artistes Indépendants his painting *Nu bleu, Souvenir de Biskra* (Blue Nude [Souvenir of Biskra]), which he had completed earlier that year (and which, in 1913, would create another stir at the Armory Show).

Picasso was preternaturally competitive, and eager to displace Matisse as the leader of Paris's modern painters. Hilton Kramer notes, in his very fine "Reflections on Matisse," that

> after the impact of *Les Demoiselles d'Avignon*, however, Matisse was never again mistaken for an avant-garde incendiary. With the bizarre painting that appalled and electrified the cognoscenti, which understood that *Les Demoiselles* was at once a response to Matisse's *Le bonheur de vivre* (1905–1906) and an assault upon the tradition from which it derived, Picasso effectively appropriated the role of avant-garde "wild beast."

The assault on tradition ascribed to *Les demoiselles d'Avignon* should be qualified: I can't think of a painter whose knowledge of the painting tradition was deeper than Picasso's. Even *Les demoiselles* is chockablock with historical allusions and reworkings of traditional *topoi*. Cézanne's ambition to depict figures as more monumental than was typical was adopted by Picasso and likely helped inspire *Les demoiselles*. But another likely source for that aspiration towards monumentality was Picasso's interest in archaic art, Pre-Columbian art, ritual objects from the Congo, and the sculpture of the Ivory Coast—all of which he was acquainted with through his Spanish roots.[42] In 1904 the Musée du Louvre created a fuss when it presented Iberian relief-sculpture excavated at Osuna.[43] From March 1907 Picasso had in his possession, albeit only briefly, two heads excavated at Cerro de los Santos (produced between the fifth and the third century BCE), from which, he says, he "took counsel" while producing *Les demoiselles d'Avignon*—Osuna and Cerro de los Santos are both fewer than 800 kilometers from Picasso's Andalusian birthplace, Málaga. Picasso's work from 1906 and 1907 is strongly marked by the influence of early "primitive" Iberian art: that is already evident in his *Portrait de Gertrude Stein* (Picasso painted this work between the autumn of 1905 and mid-August 1906). *Les demoiselles* offers an inventory of "primitivist" effects: the facial features of its three left-most figures are directly influenced by one of the figures unearthed at Osuna, and their lozenge-shaped eyes (which one also sees in Picasso's *Autoportrait* [Self-Portrait, 1907]), are typical of the pre-Roman sculpture of Cerro de los Santos. While these figures on the left are predominantly Iberian in influence, the figures on the right,

with their obvious faceting, are strongly influenced by African sculpture—Picasso visited Paris's ethnographic museum in June 1907, while working on *Les demoiselles*, where he saw some Fang masks, and he was reported to have been very impressed by their magical character. The lower of the two figures on the right, with her back turned towards us, also seems influenced by Pre-Columbian art.

Hilton Kramer, as we have seen, suggested that *Les demoiselles d'Avignon* differs from Matisse's *Le bonheur de vivre* inasmuch as it launches an attack on tradition. But there is another, sharper difference that separates Picasso from Matisse, which Kramer astutely identifies:

> Whereas Matisse had drawn upon a long tradition of European painting—from Giorgione, Poussin, and Watteau to Ingres, Cézanne, and Gauguin—to create a modern version of a pastoral paradise in *Le Bonheur de vivre*, Picasso had turned to an alien tradition of primitive art to create in *Les Demoiselles* a netherworld of strange gods and violent emotions. As between the mythological nymphs of *Le Bonheur de vivre* and the grotesque effigies of *Les Demoiselles*, there was no question as to which was the more shocking or more intended to be shocking. Picasso had unleashed a vein of feeling that was to have immense consequences for the art and culture of the modern era while Matisse's ambition came to seem, as he said in his "Notes of a Painter," more "limited"—limited that is, to the realm of aesthetic pleasure.[44]

*Les demoiselles* is an immensely violent work, one that shocks its viewers by launching an attack on them; *Le bonheur de vivre*, to the contrary, elicits aesthetic pleasure. Whereas Picasso's work descends into the netherworld of aggression, Matisse seeks for harmony. This divide, as Kramer notes, has continued to separate painters, right down to our time.

### Cubism and *Passage*

Cézanne moved away from the Optical Realism of retinal impressions, but he did not renounce realism altogether. He strove instead for a realism committed to truthfulness to the psychological process of visual perception. A process unfolds over a span of time, not in a single moment; so Cézanne's painting method was to observe some motif over time and to distill these separate acts of vision into a residue that is almost as much conceptual as perceptual.[45] Several of these distillates would constitute the subject of a single painting. Cézanne, famously, needed a hundred painting sessions to create a landscape and 150 separate sessions to produce a portrait: he needed that many sessions to produce a sufficient number and variety of distillates. He would then organize these worked-over motifs into a tightly integrated composition; then, in the course of creating such a complex unity, he would

inevitably rework them, reshaping them in the interests of formal contrast or the realization of an overall form.

To suggest the span of time over which a visual perception is formed, Cézanne developed means that dismembered the one-point perspective system that had been the foundation of Western painting since the Renaissance. The different motifs (and sometimes even different parts of the same motif) recede towards different points, suggesting that they are viewed from slightly (and sometimes more than slightly) different vantage points. Such an approach threatens to produce a confusion of forms:

> Now, being old, nearly 70 years, the sensations of colour, which give the light, are for me the reason for the abstractions which do not allow me to cover my canvas entirely nor to pursue the delimitation of the objects where their points of contact are fine and delicate; from which it results that my image or picture is incomplete. On the other hand the planes fall one on top of the other, from whence neo-impressionism emerged, which circumscribes the contours with a black line, a fault which must be fought at all costs. But nature, if consulted, gives us the means of attaining this end.[46]

Here Cézanne refers to his use of "empty" spaces—areas of spatial ambiguity that form a transition from one plane to another. To fill in these spaces would cause objects on different planes to abut and call for some technique as abhorrent (in Cézanne's opinion) as circumscribing the contours of objects with a black line (as Émile Bernard [1868–1941], Paul Gaugin [1848–1903], and Vincent van Gogh [1853–1890], from, say, 1887 to 1890, did) to keep the planes separated.[47] The means Cézanne developed to disarm that threat was to hold surface and depth together through *passage* ("*passage*" refers to the fusing of facets by allowing one coloured plane to bleed into the next, usually by allowing colour to spill out over the lines marking an object's bounds or over the implied edge of an object); thus, *passage* often has the effects of allowing one physical object to penetrate another, by running together planes that are separated in space.

Like Cézanne, the Cubists tried to convey the dynamic process that produces vision by synthesizing various points of view on a single object. Robert Delaunay's (1885–1941) *La Tour Eiffel* (The Eiffel Tower, 1910; Delaunay produced a series of paintings of the Eiffel Tower in 1910 and 1911) provides an easily understood example, but such synthesis was common in Cubist painting of the high Analytic phase. In fact, Picasso employed the technique *before* the Cubist period: as early as 1906 he combined a profile view of the nose with a frontal view of the face, and his *Les demoiselles d'Avignon*, finished in mid-1907, presents, in the two central figures, that same combination of a nose in profile and a face viewed frontally. More radically, on the figure on

the lower right, a mask-like version of a woman's face, breasts, and back all run together in a single figure. Even that early, Picasso's use of multiple vantage points and of *passage* was far more radical than anything that Cézanne imagined. *Les demoiselles d'Avignon* also provides evidence of how completely Picasso had dismissed *chiaroscuro*: Picasso modelled the head and breast of the figure on the upper right by using blue bands of colour, and to suggest the nose's relief, he created bands of red and green where Optical Realist painters would have used *chiaroscuro*.

The following year, 1908, after seeing *Les demoiselles d'Avignon*, Picasso's collaborator in Cubism, Georges Braque, produced *Le grand nu* (Large Nude), a work that also traded in the spatial ambiguities of *passage* and that combined, in the figure of its title, several different points of view. This painting, however, is a transitional work, showing his progression from the Fauve style he had adopted earlier towards the Cubism of his subsequent works; while Cézanne's influence is clear, that of Matisse is still stronger. *Maisons à l'Estaque*, the most famous painting from a series made in the same year at the small fishing village near Marseilles (where Cézanne had often painted), reveals a more thorough assimilation of the use of *passage* and of multiple viewpoints.

Even in these early canvases, Braque's Cubism has a different quality than Picasso's, for Braque used the method of fragmenting less to present different aspects of the objects than to suggest the space the object occupies. Thus, in these paintings, as in his subsequent Cubist works, Braque fragmented the space around objects into hinged facets, in the same way that Picasso analyzed his forms into facets. Braque handled space in this way in order to bring the back plane up to near the picture plane and so make it optically palpable. Furthermore, in the paintings he did in L'Estaque, Braque contrived ways of preventing a representational form from eliciting any sense of recession. For example, objects—buildings, rocks, and trees—are presented above one another (in the canvas's actual space), rather than in front of one another (in a virtual third dimension). Buildings or trees generally reach the top of the canvas (and, the forms suggest, stretch above it), so there is no open space that recedes towards the horizon. Braque also avoided using tones that might suggest aerial perspective—sometimes the objects supposedly nearest to the eye are no darker than those that are supposedly farthest from the eye (indeed, there is no single light source that would allow for suggesting recession by *chiaroscuro* effects); rather, darker tones and lighter tones seemed to be placed side by side arbitrarily.

Picasso, by contrast, focused on the form he was depicting, not, as Braque had, on how it occupies space. Thus, in *Femme nue au bord de la mer (Baigneuse)* (Nude Woman by the Sea [The Bather]) of 1908, a painting in which some of Picasso's characteristic constructions appear for the first time,

he presents a figure in a frontal, three-quarter view, but turns the nearer hip so that it is flush with the picture plane, and twists the buttocks even further, so that the buttock on the far side of the body also comes into view. This twist brings the closer leg into side view, which creates the impression that the leg has been detached and rejoined anomalously at the hip; to balance this twist, Picasso introduces an unnaturalistic crook into the other leg, to draw it up to the picture surface and increase the impression of volume it creates. These transformations have the curious result of making both the pubis and the buttocks, both the belly and parts of the lower back, visible simultaneously. A common subject of mythological painting was the Three Graces, who, as often as not, were presented as three nude women with their arms on each others' shoulders, with the two women on the outside of the line facing towards the viewer and the woman in the middle facing away, her back turned towards the viewer.[48] One reason for the subject's appeal is that it allowed the painter to present a female nude both from the front and from the back, and so to convey the female form in the round. Picasso developed identical sculptural interests through his use of multiple viewpoints, and he extended the means of realizing this interest by combining the various aspects into the representation of a single form. Combining the different aspects in a synthetic form also had the advantage of heightening the tensions among the various aspects.[49] In a stunningly brilliant article on Picasso, "The Algerian Women and Picasso at Large," the art critic Leo Steinberg writes of *Femme nue au bord de la mer* that "we are dealing merely with a diagrammatic symbolization of volume, a graphic device for maximum density of information. Ambiguous simultaneity is part of Picasso's essential approach to the rendering of the external world."[50] Picasso's art was oriented towards the subject, and he quickly realized that the techniques he had developed allowed him to superimpose different aspects of the objects almost calligraphically, in a single "simultaneous" image (to use a descriptor that many early-twentieth-century artists found appealing). It also allowed him to diagram a higher reality, in which all of these aspects appeared all at once, as though within the compass of an enduring instant.

Steinberg's term "ambiguous simultaneity" raises a key topic about Cubist painting. I commented earlier on the great architectural historian and cultural theorist Sigfried Giedion's claims about Picasso's work from the early 1910s. Giedion, I noted, asserted that Picasso was beginning to see objects from several points of view, no single one of which had exclusive authority; rather, he saw them simultaneously from all sides. We might state this idea slightly differently, by saying that he was attaining a transcendental vantage point, from which the object could be seen from several points of view, all adopted simultaneously (almost as in the cinema, where the point of view on an object can change instantaneously).[51]

Picasso's paintings from the summer of 1909—the ones done at Horta, and the portraits that followed—show that he was concerned with the possibilities of exploiting volumes for their own sake. A single painting would use many vantage points, so Picasso could dislocate any mass, rotate it any which way, or otherwise transform it, to endow it with volume.[52] This was the basis of Picasso's method for the next several years, during which he pushed further and further the process of disassembling the object into facets, each of which could be rotated independently, as though it were seen from a unique point of view, until the method threatened to eliminate the subject altogether—he then would regroup, giving full weight to the subject, and then advance again towards forms purified of representation. *Buste de femme* (Bust of a Woman, the 1909 version at the Tate Gallery) has many characteristic features of the landscapes he had done at Horta, but pushes further, by using more geometrical components than any earlier portrait (the eyes are rectangular hollows, for example). Nonetheless, he successfully incorporates these geometric elements into a completely formalized construction. Yet, despite that formalization, the painting is still rich and relishes its motif in a somewhat Cézannesque manner. *Femme aux poires* (Woman with Pears), from the same year, goes even further, for in it, Picasso forsakes such richness and such evident delight in its motif: the physical surface becomes colder than is typical of his earlier portraits, and the hair, flesh, and drapery are expressed with less delight in their organic complexity, and more in terms of geometric structure. Works Picasso had done earlier in the year, such as the Apollinaire-influenced *La Reine Isabeau* (Queen Isabeau, wife of Charles VI of France, who was a common subject of popular novels in the late nineteenth and early twentieth centuries, largely because of Isabeau's reputation as a wanton, licentious spendthrift with a passion for clothes and jewellery), *Arlequin* (Harlequin), and *Femme à la guitare* (Nude Woman with Guitar), all furthered Picasso's formal exploration of volumes, but nonetheless treat the structure of the objects as though for their own sake, not for the sake of a harmonized, integrated whole (which integration might require transforming the representation of the motifs that Picasso in these works analysed so precisely). In *Femme aux poires*, the reconciliation of extrinsic references with internal harmonies is more nearly complete, and Picasso could confidently transform motifs to such an extent that their independence need no longer be pursued: the eyes, for example, are painted as recessed, rectangular areas that would seem false, were it not for the dramatized context.

Braque's paintings of 1909, such as *Le Port*, seem less intense; their structure is less rigorously intellectual, and the challenge of balancing the demands of external reference and internal integration is less exacting. This is simply an illusion—the result of Braque's lyricism that allowed him to resolve faceted

volumes into a whole that seems utterly natural. While Picasso concentrated on volumes that fill space, and emphasized their monumentality, Braque, as I have noted, was also concerned with the spaces between shapes and the relations these spaces have to the picture plane; that is, he was more concerned with the relation that any area of the canvas has to the picture surface (or the implied front plane of the image). His interest in areas between active volumes led to a concern with the way that light—and other factors—interrupt volumes, and this led in turn to interest in phrasing. Consequently, Braque's works have a rhythmic quality that contributes significantly to their lyricism.

## UNDERSTANDING SIMULTANEITY, UNDERSTANDING INSTANTANEITY

James Joyce likely understood the importance of Cubism better than anyone since, and *Ulysses* and *Finnegans Wake* can be taken as Cubism's crowning achievement. If that is so, it is because Joyce was fully aware of the characteristics of the new culture of space and time that was emerging from technological society.[53] Consider the "Wandering Rocks" episode of *Ulysses*—that section is composed of recurring fragments that reappear in new combinations, a technique that forefronts the mental operations required to bring these fragments together. Joyce realized, no doubt, that the Cubists' methods and devices were grounded in the desire to create a homology between the process by which an artwork draws on the real for its components and transposes them into a new, autonomous reality and the process whereby the mind takes sense data and forges them into an integrated perception.

Because literature remains embarrassed that the crowning achievements of early modernism in literature came belatedly, I would like to be precise about how late it was. T.S. Eliot's "The Waste Land" appeared in 1922; parts of *Ulysses* were published, serialized, in *The Little Review* between March 1918 and December 1920, and in its entirety in 1922. Arguably the greatest work of early modernism in English was begun in 1915 and was still being worked on in 1962—I refer to Ezra Pound's *The Cantos*. By way of comparison, Picasso's *Les demoiselles d'Avignon* was painted in 1908, and Igor Stravinsky's (Игорь Стравинский, Igor Stravinskij, 1882–1971) Весна священная (Vesna svyashchennaya, literally Holy Spring, but generally given as Le sacre du printemps or The Rite of Spring) was performed in 1913.

But Roger Shattuck, not a critic whose assessments one should dismiss lightly, suggests, in *The Innocent Eye* (1986), that this feeling of belatedness is baseless: for the crucial work marking the beginning of literary modernism actually appeared in the same year as Stravinsky's great evocation of pagan rituals marking the season of rebirth. In 1913, Guillaume Apollinaire was led by exasperation over printers' errors to a far-reaching insight: punctuation

was unnecessary for the form he was trying to create. Grasping this at last, he removed it all from the proofs of his poetry collection *Alcools* (a work I commented on earlier, but now consider from a different vantage point). The juxtapositions of phrases without punctuation resemble *passage*. The work had a similar impact to that of modernism's other founding works. *Alcool*'s first poem, "Zone," is a stunning mixture of startling imagery, audacious yet grounded prosody, and a close and delighted scrutiny of the everyday: the familiar made new. "A la fin tu es las de ce monde ancien," it begins—"In the end you are tired of this ancient world" (and we might note approvingly that the poem, and the book, begin with the words "in the end"). It then goes on to describe, startlingly, the Eiffel Tower as a shepherdess, with bridges of the Seine imagined as her bleating flock. The cars look old, everything looks old, says the poem—everything except Christianity. And the most modern person in Europe is Pope Pius X.

Apollinaire was remarkable for his good nature. In 1960, Michèle Bernstein, a member of the Situationist International and Guy Debord's wife, published a remarkable *roman à clef* titled *Tous les chevaux du roi* (All the King's Horses). There is a character in it, by the name of Gilles, who represents Debord. When Carole asks Gilles what he is working on, he replies, "Reification." Genevieve, Gilles's girlfriend (and a stand-in for Bernstein) adds, "It's a grave study." "I see," Carole responds, in a tone of admiration. "It's serious work, with big books and lots of papers on a big table." "*Non*," Gilles says, "*je me promène. Principalement, je me promène*" ("No. I walk. Mostly I walk."). Apollinaire might have said the same, but there would have been this difference between Apollinaire's and Debord's *flâneries*: unlike Debord's, Apollinaire's walks were exercises in good will—charity even. He genuinely liked the people he met and the people he observed.[54] He summarized the significance of the new art (what we would call the avant-garde) as showing the rise of a new spirit: a "New Spirit which . . . promises to modify the arts and the conduct of life from top to bottom in a universal joyousness."[55] The New Spirit would revel in the wonder and delight of assuming a higher vantage point, from which all the contingencies of the the quotidian world would be seen as meaningful.

Consider, as an example of that higher vantage point, a passage from "Zone," a work by a writer who helped make simultaneity a central theme of the early twentieth century. In lines 41 to 70, Apollinaire presents vividly the state of mind of a poet who, by dint of his own emotional circumstance, can empathize with the world's suffering and who consequently experiences a celestial scene in which historical and religious figures enact an aerial carnival that renews the world. The opening lines of "Zone" offer an extraordinary paean to the modern (or, according to the periodization I prefer, the

postmodern), yet the poem in its entirety presents, time and again, spiritual figures from the old world erupting into the new world in a renewed and reinvigorated form. The passage concerns the aviator Christ:[56]

> C'est Dieu qui meurt le vendredi et ressuscite le dimanche
> C'est le Christ qui monte au ciel mieux que les aviateurs
> Il détient le record du monde pour la hauteur…
> Et changé en oiseau ce siècle comme Jésus monte dans l'air
> Les diables dans les abîmes lèvent la tête pour le regarder ("Zone" 39–45)[57]

This sort of blending of past and present is perhaps the apogee of simultaneism (of whatever variety)—and simultaneity, as Apollinaire himself remarked, is "l'espace même, la dimension de l'infini."[58] Simultaneity is a creative flux that imparts to us the workings of a creativity immanent in all things. It offers the dispensation remarked on earlier, with the birds fraternizing with a machine ("Zone" 49–70). The poet's elevated (angelic?) consciousness has produced a collage of times and places, experienced as a paradoxical dynamic simultaneity. Another example of divinization through the experience of flux and dynamism appears in a passage of radical metaphoric inventiveness:

> Maintenant tu es au bord de la Méditerranée
> Sous les citronniers qui sont en fleur toute l'année
> Avec tes amis tu te promènes en barque
> L'un est Nissard il y a un Mentonasque et deux Turbiasques
> Nous regardons avec effroi les poulpes des profondeurs
> Et parmi les algues nagent les poissons images du Sauveur
>
> Tu es dans le jardin d'une auberge aux environs de Prague
> Tu te sens tout heureux une rose est sur la table
> Et tu observes au lieu d'écrire ton conte en prose
> La cétoine qui dort dans le cœur de la rose ("Zone" 89–98)[59]

Late-nineteenth- and early-twentieth-century science presented a very different image of nature than the one that guides us in our ordinary lives, or so many (rightly or wrongly) inferred. The old way of understanding the world, it seemed, was in retreat. The use of a single, fixed perspective had provided a way of modelling—that is, of giving a visual form to—our understanding of nature. The juxtaposition of different viewpoints by Cubist painters and their use of forms that suggest perceptions are produced by complex mental processes—processes that, because they require learned skills (and therefore memory), involve references to different moments in time—reflect the epistemological trauma that had resulted from the *dissensus* between the world-as-experienced and the theoretical constructs offered by science (as hypotheses about what the world is really like). One implication of this

Cubist technique—a belief that impelled Cubist painters to use multiple vantage points—is that percepts are relative to the viewer's standpoint. Another is that no vantage point can exhaust reality. Both implications trouble the commonsense view of reality; the idea that two observers' measurements of the time when a given phenomenon occurred or its duration might differ, yet both be correct (relative to that observer's position and instantaneous velocity) seems an outrage to common sense. Progressive artists assumed the traditional responsibility of the arts, which was to help minimize the effects of this trauma on the nervous system; thus, just a few years after the Cubist painters began producing works that compounded viewpoints, Joyce began writing *Dubliners* (1914), which treats time (in a Bergsonian fashion) as influenced by affects and embodies multiple viewpoints: Joyce and the Cubist painters were helping people accommodate themselves to this new world view. We will explore further the links between simultaneity, transcendence, and the presentation of conceptually apprehended forms. But before doing so, we must explore a little more deeply the paintings that Picasso and Braque produced during the Analytical Cubist period and the transition to Synthetic Cubism.

## CUBIST PAINTING BETWEEN STRUCTURE AND REPRESENTATION

Towards the end of 1909, Georges Braque and Pablo Picasso became close friends and began seeing each other nearly every other day to discuss their respective evolving bodies of work, which had grown close in style and technique. At the beginning of this period, any resemblance between the two men's paintings was rather superficial, for the issues the two explored were significantly different: Picasso, as we have noted, was interested in maximizing positive, or active, volume, while Braque was concerned with reconciling the relation of positive and negative volumes to the picture plane. So while Braque's *Chateau de la Roche-Guyon* (Castle at La Roche-Guyon, or View of La Roche-Guyon), painted during the summer of 1909, creates a dynamic impression that considerably alleviates the severity that its geometric conception might have produced, Picasso worked to produce an austere architectonic clarity. Even so, both Picasso and Braque were pushing painting towards a universal architecture that could represent a landscape, a still-life, and a portrait using identical elements. These exchanges impelled Braque's painting to a higher level—it drove him so far, in fact, that he was often the instigator of new methods. In *Broc et violon* (Violin and Pitcher), created in the winter of 1909–10, Braque pushed the faceting of forms to an unprecedented level: to the point that the relations between the planes often were shaped as much by the painting's rhythmic structure as by any concerns with denotation. Any remote semblance of *chiaroscuro* has been discarded, replaced with contrasts

between light and dark that serve no other purposes than those dictated by the demands of the painting's structure. Furthermore, in *Broc et violon*, Braque showed himself ready to violate the outline of the violin, one of the painting's main motifs—something that Picasso's Cézannesque commitments at the time restrained him from doing. That willingness on Braque's part is signal, for it allowed the space around the object to stream onto the picture plane—and thus it set the course of Cubist painting for the next two years.

It was not until his *Portrait d'Ambroise Vollard* (Portrait of Ambroise Vollard), finished in the spring of 1910, that Picasso would follow suit. That painting is constructed from many adjoining and overlapping facets that, because of Picasso's use of *passage*, have ambiguous relations to one another: any one of them might be either in front of or behind any adjacent facet. Moreover, with this portrait Picasso showed himself willing, as Braque had been in *Broc et violon*, to breach the contours of the motifs a painting represents. This confluence of *passages,* and this combination of external references and transformations that integrate the painting's internal elements, results in an extraordinary sense of presence, of weightiness; but unlike the portraits of Vollard done by Renoir or Bonnard, this weightiness has little to do with the painting's depictive features.

In the end, *Portrait d'Ambroise Vollard* turns out, like Braque's *Broc et violon*, to be as much about the construction of the painting itself as it is about what it represents. Neither painting is non-objective, for both do enough to make it possible to discern the objects they draw upon. However, it demands no little effort on the viewer's part to make out the details of what they represent. Thus, both paintings involve a remarkable level of tension between the structure and denotation: one takes delight in the rigour with which the facets of each painting lock into a rhythmically unified structure whose integrity, consistency, and coherence do not depend on any denotational determinants; at the same time, one is fascinated by the challenge of interpreting this structure as offering references to an external world. The effect of the extreme imbrication of facets that characterizes both these works—especially with the faceting often representing different vantage points—hardly strikes a viewer as a "higher realism" of the sort the Cubists set out to produce. This attenuation of reference is reinforced by the use of the radically limited palette the major Cubists adopted during Cubism's Analytic phase (partly because it allowed them to rise above the sensuous effects of colour and to create an art in which structure and geometry have paramount importance, and partly because it enabled them to synthesize different aspects of an object that would otherwise create a too-evident disparity). Hence, even though *Portrait d'Ambroise Vollard* highlights formal means, and even though it realizes an ingenious balance of internal forces, it nonetheless manages to

suggest a sense of bodily attitude and gesture—of the solid, weighty calm of the sitter's bearing.[60]

The use of *passage*—indeed, the very idea of resolving a theme into facets and recombining those facets in an ambiguous or paradoxical form—had another historical determinant. The perspectival deconstruction of the object followed by a reconstitution of it that combines perspectives in such a way as to incorporate ambiguity and paradox into the object—the method we have come to associate with "Cubism"—suggests a higher-level synthesis, one that takes place in the "fourth" dimension. We have mentioned already Picasso's interest in "circumspicuous vision"—in seeing both the back and the front of an object (especially a nude) at the same time. This, too, relates to fourth-dimensional seeing (one of the great topics of the occult): Picasso wanted to see with "circumambient sight," as he would if visual rays could bend around corners. And that is precisely what happens in an Einsteinian world when space is radically warped around densely packed matter and light rays are trapped in a circular motion that does not permit them to reach our eyes. In such a world, an observer would know the thing as a sculptor knows his creation before he makes it—it would be seen as if by an all-seeing eye experiencing the object from all sides at once, as though orbiting it at infinite velocity—and it would be apprehended as though from within. These ideas about spiritual vision (and its relation to the imagination) were in the air at the time.

## THE TRANSITIONAL PHASE: TOWARDS SYNTHETIC CUBISM

Art historians have accepted for some time the distinction, first worked out by Juan Gris, between two principal phases of Cubist art, the Analytic and the Synthetic. John Golding points out that if one accepts this distinction, one must subdivide Picasso and Braque's Analytical Cubism into a formative period, strongly influenced by Cézanne (and, in Picasso's case, by African art), and a second phase that Golding terms "classical" or "heroic," characterized "by a further and more decisive break with natural appearances." This period, which lasted from mid-1910 until the end of 1912, Golding opines was "a moment of perfect poise and balance."[61]

In the heroic period of Analytical Cubism, Braque, who had hitherto painted mostly landscapes, became first and foremost a painter of still-lifes. The paintings he produced in this phase offered arrangements of musical instruments, café tabletops, goblets, pipes, fans, and newspapers—objects of the mundane world; he strove, through these arrangements, to provoke haptic sensations. These sensations, he felt, enabled him to use Cubist space to arouse and resolve tension. As we have seen, from the time he first painted in L'Estaque, Braque often transgressed the boundaries of representing forms

in order to bring space up near to the picture plane and so make it optically solid; despite the anamorphosis this entailed, the spectator was usually able to work out, with greater or less precision, the spatial relations among the various represented forms. In the paintings he made between mid-1910 and 1912 (that is, in the heroic phase of Analytical Cubism), Braque went further in activating the surface of his paintings. The outlines of the representing forms from this period are more linear, and even more loosely determined by the forms they represent, and the result is a grid of interacting verticals, horizontals, and diagonals on which (often semi-transparent) facets are placed. Pictorial space was Braque's great obsession throughout his working life, and issues concerning pictorial space generated most of his painting—and this is no less true of his painting of this period. His great contribution to early Cubism was the discovery of means to evoke on a canvas the sensation of a tactile or manual space that he seems to have experienced in the everyday world, the sensation that the space around objects—the space that separates objects—is just as important as the objects themselves, and just as palpable. (In the concluding section of this work I note some of the scientific discoveries that promoted this view.) His desire to control pictorial space in order to explore the depths of its meaning is what led Braque to abandon the landscape and to take up the still-life, and an interest in pictorial space led him to subject both the object and the space around the object to the same procedures of fragmentation and resynthesis.

Picasso was never as obsessed with space as Braque was, but from mid-1910 to 1912, his painting evolved in a similar direction, towards an ever more radical fragmentation and resynthesis. In fact, Picasso took the tendency even further than Braque did—so far that some of his paintings of this period are almost abstract. He worked out compositional methods that allowed him to carry even further his efforts to adjoin or superimpose different facets of objects; as a consequence, these "simultaneous" images are even freer than Braque's.

The aforementioned *Portrait de Daniel-Henry Kahnweiler*, which Picasso painted in the autumn of 1910, shows the direction in which Picasso was moving during this period. Though the painting's motif can be made out (the work shows a seated Kahnweiler, wearing a watch-fob and with his hands clasped in his lap, with a bottle and glass to his right and, above him and farther to his right, a piece of sculpture), it is much less easy to sort out than even the portrait of Vollard. Picasso allowed facets to run over the boundaries of the objects and even allowed a single facet to represent parts of space at different distances.[62] *Portrait de Daniel-Henry Kahnweiler* also marks a further step towards using *chiaroscuro* non-representationally, to differentiate facets in the painting's structure rather than for lifelike modelling. Furthermore, while Picasso's other works of 1910, such as the paintings of the *Nu assis* (Seated

Nude) and *Femme assise* (Seated Woman) series, use monumental volumes to create dynamic thrusts and counter-thrusts at the interfaces where volumes meet, the Kahnweiler portrait involves more restrained interactions: the picture's motif is as often resolved into planes as into volumes. Consequently, the balancing of the forces of their interaction is more delicate.

Braque's painting of 1910 developed in much the same direction as Picasso's. The contours of the motif gave way to a structure based on interlocked facets. In *Le verre d'absinthe* (Glass of Absinthe, 1910/11) the architecture nearly overwhelms the motif. Braque's use of the oval format for that painting, a format Picasso was to adopt, shows that he understood that his painting no longer resembled a window on the world and had become an object in its own right. In the landscapes Braque painted in the summer of 1910, and in some subsequent still-lifes, he emptied out the corners of the painting, leaving them nearly black; this emptying reduced the influence the outer edges of the painting exerted on its internal relations. As a result, not only are the internal relations more fluid and more plastic, but they are also endowed with a certain quality of self-sufficiency (since the painting's internal relations are not conditioned by the vagaries of its outer edges). This format also solved problems that arise from the way that a painting's corners impose triangular forms; adopting the oval format allowed Cubist painters to work with horizontal and vertical lines and to align their objects, and the spaces around them, on a horizontal and vertical framework.[63]

Braque's paintings of 1910 anticipated Picasso's in moving towards a greater degree of abstraction. They also reveal Braque's discovery of new ways to use light to reinforce the palpability—the tactility—of space. In his paintings of 1909, Braque rendered light in a surprisingly cool, even somewhat powdery, fashion: his siennas and ochres generally tended towards grey. In his paintings from 1910, this light has shifted towards silvery. The light in Picasso's paintings, by way of contrast, is more descriptive, and Picasso more often makes use of traditional sorts of contrasts between dark and light in order to create a sense of relief that separates the object from the ground. The great strength of Braque's handling of light was that it more fully welded the object onto the ground.

Throughout 1910 and 1911, Picasso and Braque continued to push towards ever more complex means of resolving the demands of fidelity to their paintings' subjects with the demands of integrating their many complex internal elements. During the summer of 1910, which he spent at Cadaqués, Picasso painted works in which representational imperatives were overwhelmed by the demands of erecting an architecture that integrates many complex, geometric components. By way of contrast, the paintings he made when he returned to Paris that fall granted greater value to the subject. However,

generally, during 1910 to 1911, both painters' work evolved towards an ideal of purity. Braque took the lead in moving painting in this direction, but it is sometimes hard to distinguish between the two painters' works from the end of the period. Soon after this, each painter's work became more distinct again: by 1912, Picasso was once again primarily concerned with reconfiguring an existing reality to bring it into conformity with a conceptual ideal.

The different treatments of the woman-with-mandolin theme in three paintings, two by Braque and one by Picasso, illustrate the varying relations between the two sets of demands, denotative and abstractive. Picasso's *Jeune fille à la mandoline* (Girl with Mandolin) provides an example of one of his key innovations of this period—the use of *points de capiton* (anchoring point). Key components of the representation (the face of the mandolin, the woman's hand on its strings, the crook of her elbow, and the hand on the mandolin's frets) are presented with considerable fidelity—with greater fidelity, certainly, than that of other, more geometrical contents. These key components tack the signifying form to the signified motif. The need to use such *points de capiton* (clearly delineated elements or collections of elements, such as a row of buttons and a watch chain, or the strings of a guitar stretched over its sounding hole) underscores how nearly complete the separation of structure from reference had become; at the same time, their use indicates that Picasso felt it was important to preserve the subject. Braque's two versions of *La femme à la mandoline* (Woman with Mandolin, both Spring 1910, a rectangular canvas at Museo Thyssen-Bornemisza in Madrid and an oval canvas at Pinakothek der Moderne in Munich) are close to geometric abstractions, and the pleasures they offer depend much less on how the subject is represented and more on appreciating the internal relations in the work—this is true both of the oval version and of the rectangular version, in which the woman's hand is the only form that suggests the painting's motif.

A slightly later work by Picasso, *Clarinette* (Still Life with a Clarinet on a Table), painted in the summer of 1911, continues the evolution marked by the progression from *Portrait d'Ambroise Vollard* (1910) to *Portrait de Daniel-Henry Kahnweiler* (1910). *Clarinette*, rather than dealing with a single, principal motif, incorporates allusions to several objects—a clarinet, a pipe, a bottle, a piece of sheet music, and a fan, all laid on the table. This work provides another example of Picasso's use of *points de capiton*: each object is identified by recognizable, characteristic features. Again, the need to tack the signifying form to the signified motif through the use of identifying features shows how nearly complete the separation of structure from reference had become; at the same time, it indicates that Picasso felt a need to preserve the subject. The challenge of integrating several motifs into a single structure, in which each relates intrinsically to all the others, pushed Picasso towards creating

an architecture of unprecedented intricacy, a development facilitated by the painting's diamond-shaped format.[64] This impetus towards intricacy resulted in an almost non-referential architecture, as the system of interlocking, monochrome facets in these paintings became exceedingly difficult to interpret as presenting motifs (or aspects of motifs). Picasso's *Homme au violon* (Man with a Violin), from late summer 1912, uses *points de capiton* similarly to the way the earlier works had: certain easily identifiable forms—the sitter's ear and goatee, buttons on his coat, and the strings and sound holes of the violin—serve to tack the signifying form to what it signifies. The forms around these *points de capiton*, however, are developed into autonomous structures whose relations to any referent are at best tenuous and difficult to discern.

The conflict in aspects—arising from different parts of an object being presented as though from different points of view—cancelled the depth-making effect of the (what was then) more generally used single vantage point. This conflict resulted in a somewhat flattened image. Thus, the Cubist program, which began with the effort to bring forth a higher realism—one that unlike any realism from the preceding history of painting would not strive to present a mirror-like reflection of reality, but would show the process by which the mind formulated visual percepts—engendered an art that struck many at the time as abstract. Cubists had set out to develop a form of representation that was not limited to capturing the fleeting impressions that light reflected from coloured surfaces makes on the retina and that instead could explore the whole process of visual perception—a form or representation that would take account of the role the mind plays in fashioning visual experience. However, the complex systems of intricately interrelated planes we find in Braque and Picasso's work of 1911 often seem the virtual antithesis of those intentions: the formal complexity of these paintings, because it makes it so difficult to identify the motifs that are denoted, carries these works in the direction of abstraction. Braque and Picasso must have recognized this irony, for in 1911–12 they introduced a very bold solution: collage.

## CUBIST COLLAGE AND *PAPIER COLLÉ*

By 1911 the confusion engendered by intricate architectures of interlocking, monochrome facets was significant enough in itself; to compound it by an almost total flattening of the structure onto the picture plane (an effect of presenting a great number of facets, each of which recedes towards a different vanishing point) was to raise that confusion to a level that threatened to undo the Cubists' aspiration to develop a realism more comprehensive than the Optical Realism of painters from the Quattrocento to the time of Impressionism. Collage, as Clement Greenberg points out, had the advantage for the

Cubists of pushing some contents of the work away from the picture plane even while affirming the work's objecthood and its constructed character. This helped distinguish sets of components from one another and so to make the painting's motifs more recognizable. Incorporating typographical signs made this further evident: the contrast between the absolutely flat typographical signs, letters, or numbers assimilated into the image, and the (shallow) space in which the facets (and groupings of facets) reside, force the facets (which anyway are not absolutely flat) back into space. Braque remarked about stencilled letters that they "were forms which being themselves flat were not in space, therefore, by contrast, their presence in the picture made it possible to distinguish between those objects which were in space and those which were not"—and the same could be said of the *papiers collés* and other similar real-world contents that the Cubists integrated into their paintings.[65]

Braque's and Picasso's paintings from the earlier, formative era of Analytical Cubism had balanced representation and abstraction. The "heroic" or "classical" phase of Analytical Cubism upset that balance. Thus, Kahnweiler reports that during the heroic phase of Analytical Cubism, Picasso "felt that formal experimentation was leading him away from the particular pictorial reality that he was trying to evoke."[66] As their paintings became more abstract, both Braque and Picasso developed new means to draw attention to the reality of their paintings—to the forms the paintings contained and to the real-world objects towards which they pointed. Paintings from late 1910 were the first to show that incorporated real-world objects might serve to anchor the representation offered by a complex nexus of faceted forms, arranged on a scaffolding of verticals, horizontals, and diagonals. In such work (as we have seen), a *point de capiton* brings the subject of the representation, a seated figure or guitar, (more or less clearly) into focus.

Braque's use of stencilled letters in 1911 served similar ends. Braque would incorporate a musician's name or a song title when he treated a musical subject, or the word "BAR" when presenting an arrangement of a bottle, a glass, and a painting card. Incorporating stencilled letters helped bring the subject of the representation into focus and thereby increased its depictive force. It was only a small step from this to collage—to, that is, incorporating material from the everyday world. Collage increases a painting's reality quotient, for the real-world material mediates between the representational contents of the painting and the represented contents of the everyday world. Their physical and tactile properties, their *materialité* (as Braque referred to it), increase the painting's reality.

Yet even this interest in the reality of *points de capiton*—in these *certitudes*, as Braque referred to them in a conversation with Louis Aragon—reminds us that Cubism had its roots in a troubled awareness of the veracity of perception.[67] Picasso explained to Françoise Gilot,

> the purpose of the *papier collé* was to give the idea that different textures can enter into composition to become the reality in the painting that competes with the reality in nature. We tried to get rid of *trompe-l'oeil* to find a *trompe l'esprit*… If a piece of newspaper can become a bottle, that gives us something to think about in connection with both newspapers and bottles, too. This displaced object has entered a universe for which it was not made and where it retains, in a measure, its strangeness. And this strangeness was what we wanted to make people think about because we were quite aware that our world was becoming very strange and not exactly reassuring.[68]

To state his claim in other words, the different hapticities provoke a confusion of realities. The confusion reflects the feeling that the senses give us inaccurate reports about the world (a menace that was the source of Cubists' drive to present as fully as possible the complexities of the perceptual processes).

*Papier collé* offered another solution to a problem that had longed vexed the Cubists. A realist program had instigated Cubism, yet the means the Cubists had developed for realizing that program had pushed increasingly towards abstraction and grown increasingly free of the "real" world and the demands of representation. The monochromicity of the canvases of the later years of Analytical Cubism's formative phase had helped tip the balance between representation and abstraction towards abstraction. For some time, Cubists tried to find some way of reintroducing naturalistic colours without reducing their ability to integrate the myriad facets into which they had resolved the motif. As John Golding points out, *papier collé*, and the flattened forms that derive from it, "released colour from the conventions of naturalism, while allowing it to play a cardinal role in the representational properties of the pictorial complex."[69] He explains this with an example:

> By drawing a bottle over a piece of green paper, the paper becomes related to it: it informs us of the bottle's colour and it gives the bottle a sensation of weight and bulk—by analogy it *becomes* the bottle. But because its contours do not correspond exactly to those of the object drawn over it, it remains simultaneously a flat, abstract area of colour, unmodified by the form of the bottle and acting independently in the compositional and colouristic harmonies of the painting. If we mentally slip the piece of green paper to one side, the bottle continues to exist, but in a weakened, less informative way (we no longer know its colour), while the piece of paper becomes, once again, just an abstract pictorial element.[70]

Braque and Picasso developed the technique of *papier collé* around the same time (and in the same place); however, they used the technique in different ways. For Braque, who first used it in *Compotier et verre* (Still-Life with Fruit Dish and Glass, done between 3 and 13 September 1912), *papier collé* was a way of introducing colour into Cubist painting. Just as important, in

*papier collé*, Braque had found a means to manipulate pictorial space: after using *papier collé*, he began to build forms by layering spatial components one atop another. Sometimes these overlapping forms were qualified in such a manner that they articulated a pictorial "representation"; sometimes they constituted a ground on which a subject was superimposed; and sometimes they had no referential import whatsoever. Thus, in Braque's Cubism, representation and abstraction are not mutually exclusive: sometimes Braque worked from a theme, a recognizable subject, and treated it in such a way that it became almost abstract; and sometimes he began with a spatial constellation, formed of abstracted components, which he managed to imbue with a referential allusion. Picasso on the other hand remained the master at compelling collaged elements to form a single representational complex (though Braque's art often involved a more intricate and delicate balance of representational and abstract forms).

The introduction of *papier collé* and collage took Cubism in a new direction. As so often in Picasso's career, this seismic shift occurred just as he took up a new mistress. In 1911, he moved from the decrepit Bateau-Lavoir (at the top of the stairs at 13, rue Ravignon) to another studio on the same street. Shortly after he moved, Gertrude Stein went to visit him in his new quarters. He was not in, so she left her visiting card. She returned a few days later and found Picasso at work on a canvas, which contained the words "*ma jolie*" written in black paint and, in the lower corner, painted into the picture, Gertrude Stein's visiting card. Stein tells us that she wondered who "*ma jolie*" might refer to, for "Fernande," the woman Picasso was living with, was "certainly not ma jolie."[71] Within a few days she knew—she heard that Picasso had gone off with Marcelle Humbert, a woman who went by the name Eve or Eva.

*Ma jolie (Femme à la guitare)* (My Pretty One [Woman with Guitar]) was not the first of Picasso's works to incorporate letters. During the winter of 1910–11, he had produced *Pipes, tasse, cafetière et carafon* (Still-Life with Pipe-Rack, Cup, Coffee Pot and Carafe), in which he superimposed the word "OCEAN" over a geometric ground and the words "LA AUX DUMAS" (the words refer to "***La*** *Dame* ***aux*** *Camélias par Alexandre* ***Dumas*** *fils*"—a phrase that might be found in the frontispiece of an edition of the Dumas novel) over a line separating the geometric field from a broad segment of pure space. Note that Braque had anticipated Picasso in the bold move of incorporating letters into a painting. In *Le pyrogène* (The Match Holder, 1910), he cut out the letters "GILB" from the title of a newspaper, the *Gil Blas*. And in Braque's renowned *Clarinette et bouteille de rhum sur une cheminée* (Clarinet and Bottle of Rum on the Mantelpiece, 1911), a mantelpiece stretches across the centre of the painting, with the clarinet laid horizontally along it. All we can see of the latter is its top third, consisting of a cylinder with three holes, and

its bottom, which is to the left of the painting. The bottle of rum sits on the mantelpiece in front of the clarinet; it has the letters "RHU" (from *rhum*) on it. On the bottom right of the painting, we see part of the fireplace, a scroll-like moulding similar to the end of a violin neck. The word "VALSE" can be seen in the fireplace, perhaps part of a newspaper being burnt in the fire. The perspective of the piece is challenging: the clarinet and the bottle of rum appear out of proportion with the fireplace, which is comparatively small, and the end of the clarinet is flattened, as if viewed from above, while the tubular part of the clarinet seems to be shown from a different vantage point. In another work, *Le portugais* (The Emigrant, literally The Portuguese Man, autumn 1911–early 1912), Braque stencilled, in the style of an announcement, the letters "[GRAN]D BAL" across the upper right corner, and under them, numerals; the characters are blended into the composition and have, as one of their functions, identifying the depicted object as a newspaper. They also serve to reinforce the two-dimensionality of the object.

Both Picasso and Braque would continue to incorporate words in their paintings throughout 1911, and after. The inclusion of text calls attention to the physical surface of the support on which they are placed; it "literalizes" the surface (Picasso and Braque also highlighted this literalization of the support's surface by leaving portions unmarked). But the literal contents do not occupy the same quasi-diegetic space as the pictorial elements; so incorporating text (as I have noted) also highlights (by contrast) the procession or recession of forms that do occupy pictorial space. As importantly, the letter represents a conventional sign that is hardly subject to transfiguration by the painting's formal system—a letter is taken into a painting as an alien entity that is never to be subsumed in its pictorial space, and because of its stern resistance to being transformed, it imposes itself on its formal system as a quasi-unassimilable content. Letters are what they are, and they remain so even as they are inserted (almost as an alien element) into a formal system—and the only space in which they exist is that of the painting's intractably physical support. This interest in incorporating pre-existing and relatively intractable forms into a formal system that can accommodate only a limited range of diversity became a cardinal motivation in the development of Synthetic Cubism: as Braque and Picasso continued to develop that interest, attendant issues and resolutions brought forth a new mode of Cubism.

To return to it, *Ma jolie (Femme à la guitare)* remains the standard work in the discussion of the transition from Analytic to Synthetic Cubism. The inclusion of text and *papier collé* is not the only feature of *Ma jolie* that has made it a key work in the Cubist canon. As with many Cubist paintings of 1911 and 1912, the space it represents is problematical—and problematized: it is so replete with ambiguities and contradictions that it is extraordinarily

difficult, if not impossible, to make precise determinations of the facets' spatial relations to one another. Consequently, it is also impossible to figure out exactly the relation between the painted forms and their object-model. Pictorial space and natural space are cleaved apart as the tonal values of the work confound our expectations—where our experience of form leads us to expect an area to shade into relative darkness, to suggest recession, there is, sometimes, instead, a light area.

*Ma jolie (Femme à la guitare)* upset the system of modelling effects that painters had developed from the Renaissance onwards. Consequently, the work conditions a different sense of time than most paintings do. Max Kozloff comments,

> Nothing is more evident in the *Ma Jolie* than the striking difference between the rate at which we perceive and the time it takes us to recognize the image. With Impressionism, say, the viewer sees and identifies objects and conditions within the same physiological pulse. It is important that the coherence of the picture depends upon the revelation of one temporal instant. With *Ma Jolie*, what is seen and how it is interpreted are experiences that have been drastically pried apart and proceed at differing, unpredictable paces . . . To be obliged to tell how forms relate to an idea or an appearance, to distinguish which are conventionalized and which are without any known identity, all this initiates a progressively slower, compounded, and denser process of cognition—and an unprecedented challenge.[72]

The idea of slowing cognition, of creating dense forms to challenge and so to enrich perception, was a common one in the first decades of the twentieth century. It was one of the key ideas of the Russian formalist literary critic, Viktor Shklovsky (Виктор Шкловский, Viktor Shklovskij, 1893–1984), who proposed the term of *затруднение* (zatrudnenie; making difficult) to refer to this aspect of an artwork's operation. *Ma jolie (Femme à la guitare)*, and several other Cubist paintings from 1911, make us work at discerning how their parts go together, and through that effort to intuit the form that is held in suspension, as it were, amidst a complex of faceted shapes and broken lines. By analyzing the composition, one arrives at an intuition of a subject that cannot be perceptually apprehended. This leaves the resolution of tension perpetually delayed, or, perhaps, gratified non-cognitively, as one's desire to understand is redirected from content (from identifying the object that a form represents) to structure (grasping the relations between objects immanent to the painting itself). Because it took a long while for people to learn to redirect their interest from content to form (that is, to learn to redirect their desire to a different register), many early spectators of Analytic Cubist paintings felt annoyed. That the painting's motif is not given in immediate vision (indeed,

the very idea of immediate comprehension is repudiated) makes its spatial existence ambiguous: the articulated structure does not belong wholly to the surface of the painting's support, for its facets proceed or recede in relation to one another; but neither is it situated in a spatial cavity hollowed out of the frame (as was traditional in window-on-the-world paintings). The relation between pictorial space and natural space has been strenuously cleaved apart. This ambiguity concerning the status of the object is mirrored in another—one that concerns the nature and function of each of the various facets the painting presents. Of any of these facets, we can ask whether it locks together with the surrounding facets to represent some part of the painting's motif, or whether it is simply an element within the painting's overall geometry.

With any particular painting, whether the smaller facets can be amalgamated into larger forms representing broader areas of the subject can be difficult to discern; the dauntingly overall architecture of the paintings Braque and Picasso created in 1911 and 1912 (along with the indeterminate local articulations that appear in many of them) make the question one that can be answered only by considering each particular work on its own terms, not by following up on generalities about these painters' methods in these years—to express their point in Kantian terms we could say that the rules to be followed in discerning the integrity of the work are completely free, that is, unconstrained by any general principles, and so must be worked out for each work. There may be fragments or episodes in a given painting that are not integrated into the representation (though, of course, they would be formally integrated into the work's global form). But commenting in the broadest of terms, one can say that the perceptual faculties must exert themselves to resolve the contradictions inherent in these various ambiguities, and this difficulty makes us aware of the activities we engage in to arrive at this resolution. The various baffles and obstacles placed in the way towards that resolution serve to arouse and modulate tension.

The Cubists had another, less formal motivation for cleaving apart pictorial and natural space. I have pointed out (partly through the allusion to Kozloff) that by thickening the representing form and making it more complex, and by making the relation of the representing form to the represented object more difficult to apprehend, Cubists extended the time it takes to sort out the relations between the painting and its motif. This extension mirrors, and indicates, an expansion of represented time (so characteristic of the cinema). For the Cubists attempted to include in their paintings more of the features of the process by which we apprehend an object than earlier painters—or, indeed, than thinkers generally—had acknowledged. They recognized that our "immediate" perception of a given object incorporates memories of what an object looked like from an earlier vantage point as well as anticipations

of what that object will look like when we assume a different point of view—it also incorporates information we have from past experiences of similar objects. The time it takes us to sort out the relation between one facet and another suggests the time it takes to pass from one vantage point to another. What is more, the time signals that our perception of depth in space is a synthetic construct that occurs through time and is not given instantaneously (as Impressionist practice suggests it is). The difficulty one meets in discerning the intrinsic relations among the painted facets and in amalgamating these little facets into larger forms that represent broader portions of the object, point up that sight is a consecutive sense, that any visual percept combines a manifold of successive *sensa* into a whole, and that such a synthesis must take place before a viewer can apprehend an object visually.

The idea of dissassembling a whole into fragments and then reassembling those fragments into a new configuration, constituted by new relations amongst the parts, was a feature of the artistic spirit of the time. Consider a poem that appeared not long after these developments in painting, in the April 1913 issue of *Poetry*:

> IN A STATION OF THE METRO
> The apparition of these faces in the crowd :
> Petals on a wet, black bough.[73]

This poem deploys a method similar to that of the Cubist painters. The spacing evidently imitates the experience of subway cars passing. But they also suggest the idea of separating fragments—of experience, and of text—and then reassembling them. In doing so, the poem highlights the edges of the components of which it is composed—one might be tempted to say that the method forefronts the "frames" that demarcate its elements. Of course, the cinema is the paragon of this method of composition.

## SYNTHETIC CUBISM

The year 1912 was an important one for the Cubist movement. The works of 1910–11 had pushed almost to the limit the separation of structure from reference. Moreover, their first use of words, of collage, and of *papier collé* brought Picasso's and Braque's to the threshold of a new style, one that has come to be called Synthetic Cubism. The incorporation of words, the use of collage—taking into the painting real-world materials such as (to use only examples from Picasso and Braque's work) postage stamps, buttons, tobacco pouches, nails, or pieces of linoleum—and the practice of *papier collé* (the use of printed papers, for example, newspapers or wallpaper) all contributed to transforming artmaking into a feat of synthesis. These methods all result in a

common effect: the juxtaposition of different luminosities, different densities, different volumes or planes, and different types of reference (verbal reference being bluntly anti-pictorial). While Picasso's and Braque's paintings of 1910 and 1911 had relatively homogeneous tactile and chromatic characteristics, the constructions from 1912 to 1914 include components that have heterogeneous (and even contrasting) tactile and chromatic attributes. The effect of such radical juxtapositions, Picasso and Braque came to realize, was not like that of juxtaposing complementary colours in an Impressionist painting, for the synthesis was not merely optical but conceptual as well, involving different registers of experience.

In 1912, Picasso, while working on an oval-shaped canvas, decided to introduce into it a piece of an industrial material he had found. The material was a piece of linoleum with a pattern that imitated caning of the sort one might find on a chair seat or back, or a tabletop. The juxtaposition of this material with the painted forms has a startling effect, but, despite that, Picasso managed to integrate all the elements of the work, *Nature morte à la chaise cannée* (Still Life with Chair Caning, May 1912): he did this partly by painting over a section of the linoleum's surface so it appears to be supporting the objects the painted forms represent: this illusion offers the suggestion that the caning represents a table surface. (Thus Picasso turned a real object into a signifier, but one that seems to be made of the same material as the signified, but really is not.)[74] The challenge of integrating the work was made greater by the expanded range of materials and elements from which the painting is composed: at the top of the painting there occur the letters "JOU" (from "*Jour*" or "*Journal*," one would suppose—a reference that reinforces the impression the caning represents a café table, at which the French often read their morning newspaper), and the frame of the oval is fashioned from a length of rope (the texture of which rhymes with the texture of caning, which the pattern on the linoleum represents).

Furthermore, because a collage construction is produced (partly) by assembling pre-existing world elements—components that generally have hard edges—taking real-world contents into a painting results in a tendency towards favouring hard edges that spread to the work's painted forms. Thus, the collage method exerts a pressure for even the drawn shapes to be enclosed within outlines (earlier, the edges would have been merely implied and often, as in *passage*, would have shaded off into another region) and for the shapes to be filled in with strong and nearly homogeneous colours. As local colour areas become more homogeneous, and as their outlines become stronger, a pressure develops to use larger areas (for the contrasts between large, uniformly coloured areas are stronger than those between small, often interrupted, transitional areas). As the homogeneous local areas expand, a force

develops to open up and to leave unmarked spaces between these areas. All of these factors work together to produce a simplified armature that integrates fewer and less complex forms—an armature the viewer can grasp through a relatively (but not completely) immediate act of intellectual intuition. As a result, the paintings Braque and Picasso produced from 1912 to 1914 seem much more direct than those done between 1910 and 1912.

Furthermore, by leaving areas of the canvas unmarked, the Cubists defined the plane beyond which recession could not occur, and this plane coincided with the picture plane. What is more, if the forms could not recede behind the picture plane, they could hardly advance from it either, for otherwise the construction would end up presenting an undesirable, *bas-relief* impression. Since their points of furthest advance and furthest recession coincide (or nearly coincide) with the picture plane, Synthetic Cubist paintings are almost completely flat (whatever spatial effect is produced is very shallow). While Analytic Cubism had used modelling, however subtle, to create (an admittedly shallow) space, Synthetic Cubism used unmodelled colours—usually, but not always, of highly saturated chroma—that suggested no release (either through procession or recession) from the picture plane. The only slight hint of depth arose in areas where different colours overlapped—since the Cubists abstained from mixing colours (preferring purer hues), one or the other of the overlapping colours was assigned to that area and whichever colour was assigned to the overlapping area seems to lie over top of the other.

Another important realization was that if forms could be produced by assembling seemingly interchangeable shapes, one colour or texture could easily be swapped for another. This realization is evident in Picasso's and Braque's use of *faux-bois*. Georges Braque's training as a painter-decorator ensured that he was aware that an area of pigment could be made to resemble wood by combing it (to produce grain). Braque first used this technique to produce the illusory effect of a wooden object; Picasso then used it to produce ambiguity—he combed a bottle-shaped area so it resembles both glass and wood. This collision of realities raised the basic principle of collage, the juxtaposition of realities, to a new level.

Out of the Synthetic Cubist practice of using relatively large homogeneous areas, aligned against the picture plane and sometimes separated by unmarked areas of the canvas, emerged the understanding that a work of art could be a form integrated by contrasts. The relatively large areas of homogeneous, and often bold, colours reduced the painterly demands on the artists—the physical skills required to produce modelling or *chiaroscuro* effects were no longer needed. Making an artwork becomes a process of fitting together pre-existing shapes (consider the analogy to the cinema, and to *Ballet mécanique*). The very concept of a collage is that of an object constructed by assembling

pre-existing parts. It is a form of construction that fits with the mechanical conception of reality (belonging to what I call the modern era). Not until the invention of collage could the juxtaposition of different textures or colours suggest alternative ways of representing reality. Collage changed the painter's role from that of an individual who possesses secrets about how to fashion a likeness of reality, to that of a *bricoleur* who, like other craftspeople, can produce objects from industrially produced materials. Collage allows forms to be created by cutting and pasting, by folding, and by montage. Throughout 1912 and 1913, Picasso and Braque highlighted the pre-existing character of the components they assembled into an integrated form by incorporating diverse materials into their collage compositions: printed texts (through the use of *papiers collés*), tickets, programs, illustrations from books, bits of wallpaper, corrugated cardboard, cloth, calling cards, sand, and advertisements figure among the objects of which the Cubists availed themselves.

Traditionally, the ground of the composition formed the space within which the depicted objects took shape and found their places. The object and the space around the object enter into a visual dialogue, as the space surrounding the object becomes a key attribute of the overall image; it was, as we have noted, this feature of traditional composition that Braque radicalized as he violated the continuity of the boundaries of his representing forms and allowed the space around the represented object to flow onto the picture plane. The unmarked space of Synthetic Cubism is of a different type entirely: it serves simply as the support on which the collage's contrasting elements are fastened—the canvas came to resemble in this regard the cinema screen. It accommodates diverse realities (as the cinema does) but in itself is treated in a highly literal manner. In most of the canvases Léger painted after 1915, he handles the ground in the manner of Synthetic Cubism (or of Purism, which treats the ground similarly and is the more likely source of Léger's continuing interest in this compositional feature).

This approach to handling space led the Cubists to new compositional methods. Manipulating strips of coloured paper and other collage materials brought them to understand that an artist could build up a composition by assembling a few simple shapes to define broad, overlapping areas, arranging them to suggest the represented object (rather as a filmmaker does with successive shots of an object). The paintings of the formative era of Analytical Cubism evolved by a two-stage process, divided into phases of decomposition and recombination: painters first resolved the representing subject into a series of facets (a procedure that helped detach the representing elements from the represented forms); then, more or less freely, they recombined these facets, elaborating the recombination according to some quasi-abstract schema to

produce an intricate formal complex. Most of Juan Gris's works from 1912 and much of 1913 give clear evidence of having been produced this way, for Gris's was a more systematic approach than either Picasso's or Braque's: a tactic Gris often adopted was to bisect the represented objects along their vertical and horizontal axes and to present each facet from a different point of view, and this use of bisectioning made the abstract schema evident.

The development of collage reversed this manner of working from concrete to abstract. Instead of beginning with a scene from the "real world" and subjecting it to fragmentation and recombination, the Cubists began with actual artistic materials (features void of denotative significance); and instead of fragmenting them found ways to combine them to make them allude to "actual" or "real" objects. The analytic methods of the earlier phase (methods that pushed the created form away from representation towards abstraction) gave way to synthetic methods that combined pure materials into forms that articulate allusions to the real world—a process that worked from abstraction towards representation. This change in method favoured the use of bolder and simpler forms (so characteristic of the cinema in this era); it also produced more easily legible results. Picasso sometimes highlighted the abstract character of the shapes he used in the paintings belonging to his Synthetic Cubist phase by creating ambiguous curves and shapes—for example, a contour might be, on the one hand, an outline of a guitar body and, on the other hand, the outline of a human torso. Juan Gris, in both his artmaking and his art theory, emphasized that the paintings of his Synthetic Cubist period had their origins in abstraction. "It is not picture X which manages to correspond with my subject," he wrote, "but subject X which manages to correspond to my picture."[75] He compared his methods with Cézanne's:

> Cézanne turns a bottle into a cylinder…I make a bottle, a particular bottle out of a cylinder. Cézanne works towards architecture [in Gris's vocabulary, this term is used to point out the painting's geometric substructure], I work away from it. That is why I compose with abstractions and make my adjustments when these abstract coloured forms have assumed the form of objects. For example I make a composition with a white and a black, and make adjustments when the white has become a paper and the black a shadow.[76]

Or, rather, he adjusted the white to paper-white so that it came to mean paper, and the black so that it became a shadow. In Synthetic Cubist paintings, reference modifies form rather than the other way around. The reference to paper-white suggests another significant feature of the Synthetic Cubist approach—treating the canvas as a flat surface, as a picture plane that defines the surface from which the various facets recede (usually into only a very shallow space). This generated pressure to leave parts of the canvas exposed,

and in some Synthetic Cubist works, we can see how the painter succumbed to that pressure.[77] An interesting example appears in Léger's work, part of the *L'escalier* series of 1913–14, in *L'escalier* (1914): there, tubular forms outlined with black contour lines (*cloisonné* techniques welcome this highlighting of the canvas as an active force) are given volume by colour patches (in red, blue, and yellow) that only partly cover the surface, leaving other parts exposed.[78]

Because the architecture of Synthetic Cubism is less severe than that of Analytic Cubism, and because any sort of material, appropriately formed, can create allusions to the real world, the Synthetic Cubist approach allowed a much greater diversity of colour and form than Analytic Cubist methods. In this, too, Analytic Cubism drew on Cézanne's example: Cézanne's precise, repeated strokes, and, generally, the textural uniformity of his paintings, homogenized the different painted elements. In the paintings they made between 1908 and 1911, Picasso and Braque likewise eliminated the discrepancies among the various objects in the represented scene by resolving them all into facets and by using *passage*, and a nearly monochrome palette, and shading that creates gradual transitions from shape to shape. By late in 1912, Picasso had acknowledged that the pressures of his new work, with its unmarked ground, its use of larger, homogeneously coloured areas, and its emphasis on the material support, were leading towards a diversity that is also characteristic of the cinema (perhaps the most promiscuous of all the arts). He recognized that the new art he was making was an art of construction; he also realized that he could gauge its strength by the way it synthesizes diverse components in a totally integrated aesthetic unity. Such an art requires the use of highly differentiated (even opposing) spatial and tactile properties—the more apparently incompatible the components, the greater the challenge—and the triumph (if the artist can pull it off)—of integrating this diversity (this became a principle of Sergei Eisenstein's aesthetic of cinema).

Consider Picasso's *Compotier avec fruits, violon et verre* (Still Life with Violin and Fruit, 1913): that work comprises a colour-engraved illustration of pears, a line-drawing representation of part of the body of the violin, charcoal-outlined tuning keys, a section of *faux-bois,* and other components besides. In Synthetic Cubist paintings, there are various relations between the representing tokens and the represented objects: sometimes the relation is that which a schematized, iconic representamen has to what it represents—such a relation obtains when the painting incorporates simplified line drawings; sometimes it is that of a conventionalized icon to what it represents—such a relation obtains when the painting incorporates illustrations or even cheap, wood simulation into the work; sometimes it has the same relation that exemplifying shapes have to their referents—such a relation obtains when the painting

incorporates an ordinarily non-signifying material, such as a piece of metal or corrugated cardboard, cut to a specific, allusive shape; and sometimes, remarkably, it is a relation in which the representing token and the represented object are identical. It is the very diversity of these relations (and the materials that compose them) that makes achieving aesthetic integration such an impressive accomplishment.

The topos of diversity also arises in connection with the Cubist theory of sensation. The Cubists' manner of incorporating material from the world into their work, and the variety of relations that the representing tokens within a single construction have to their motifs, suggest the complex, multivalenced character of visual perception. The Synthetic Cubist constructions that Braque, Picasso, Gris, and others fashioned made evident vision's synthetic character; the diversity, even near incongruity, of the resulting forms suggests the discontinuities and fissures in all experience. Albert Gleizes, in works such as *La dame aux bêtes (Madame Raymond Duchamp-Villon)* (Woman with Animals, 1914), *Femmes cousant* (Women Sewing, 1913), *Femmes assises à une fenêtre* (Women Seated at a Window), *Portrait of Igor Stravinsky* (1914), and the quite extraordinary *New York* (1915) and *On Brooklyn Bridge* (1917), attempted to combine an interest in simultaneous views from different vantage points with the use of broader areas of strong, homogeneous colour. The contributions Gleizes made in this period are unfortunately overlooked (*On Brooklyn Bridge* should have become a staple in introductory art history courses).

The idea that artwork can accommodate diverse materials and form them into relations whose signifiers have a range of different relations to their motifs is a very cinematic conception of artistic unity—the cinema, I like to say, is an extremely promiscuous medium that can take a great variety of materials into itself. Indeed, I believe that the cinema created the environment in which collage and *papier collé* could develop. It is even possible that artists, in developing strategies for incorporating real-world contents into their artworks, were emulating the cinema. Léger's *Ballet mécanique* is almost a demonstration of the fact that the collage constructions that the new painting had adopted had parallels in the cinema—and that the cinema has an inherent proclivity for collage. I will analyze *Ballet mécanique* (this analysis is available online at the WLU Press website) to highlight its use of formal contrast and a wide diversity of forms that have exceedingly great differences in their relations to the real-world contents to which they allude. But before offering remarks on *Ballet mécanique*, I might show that Henri Bergson's interest in *durée* provided the Cubists with another impetus towards accommodating diversity.

## BERGSON'S IMPORTANCE FOR CUBISM

Henri Bergson's ideas on intuition, creative evolution, and duration (*durée*) circulated widely among French and Italian artists in the first two decades of the twentieth century, and during the second decade their influence increased. It must be stressed, though, that before 1912, actual citations of Bergson's ideas by Cubists are few.[79] Bergson conceived reality as a vital process, an *élan vital*, that is constantly evolving: it undergoes continuous growth and change, and in it, nothing is completely static—there is nothing at all in reality that admits of no change whatsoever. The intellect, which apprehends the world using logical methods and explains it through scientific theories and scientific concepts, cannot seize the vital impetus, which is the basis of all life. The intellect operates mechanistically. It formulates rigid rules and constructs systems that cannot accommodate reality, which is flux and change. "Tutto si muove, tutto corre, tutto volge rapido. Una figura non è mai stabile davanti a noi, ma appare e scompare incessantemente" (Everything moves, everything runs, everything changes rapidly. A figure is never stationary before us but appears and disappears incessantly), the great Futurist sculptor and painter Umberto Boccioni (along with other Futurists) wrote.[80] Bergson would certainly have agreed with that sentiment.

Calinescu situates the distinction between the temporality of the inner world and the temporality of the outer world in terms of the political economy of time:

> Modernity in the broadest sense, as it has asserted itself historically, is reflected in the irreconcilable opposition between the sets of values corresponding to (1) the objectified, socially measurable time of capitalist civilization (time as a more or less precious commodity, bought and sold on the market), and (2) the personal, subjective, imaginative *durée*, the private time created by the unfolding of the "self."[81]

His remark likely underestimates at least some of the attributes (and social functions) of objective, socially measurable time that antedate the rise of capitalism. Nonetheless, his remark does remind us that the artists and thinkers who took up Bergson's views were struggling to assert the importance of an inner mode of experience—to maintain the depth of inwardness, of individual being and individual truth, against the conformity and inauthenticity of the social world.[82]

According to Bergson, life is subjectively experienced as a continuous forward movement in time, with the past flowing into the present and the present merging into the future. The Salon Cubists (including Léger) were generally attuned to this concept.[83] In *Du cubisme,* Gleizes and Metzinger explicitly related this sense of time to the ability to assume multiple perspectives that had become one of the foundation stones for the new conception of reality—and to Bergson's insistence on the elasticity of our consciousness of

both time and space. Gleizes and Metzinger gave physical expression to this blurring of distinctions by means of *passage*, by using the faceted treatment of solids and space and by creating effects evoking planar interpretation—all these means convey a physical and psychological sense of the fluidity of consciousness that so fascinated Bergson. These concerns were similar to those of Jules Romains's *Unanimisme*, which stressed the power of collective feelings to break down the barriers between people. A major innovation, one can be sure, was arrived at independently by the Salon Cubists, without their being led to it by other Cubists. That innovation, which concerned "simultaneity," arose from another Bergsonian conviction they harboured: that the divisions of space and time should be comprehensively challenged.

Delaunay's *Cité de Paris* (City of Paris, 1910–12) and Léger's *La noce* (The Wedding, 1910–11), both shown at the Salon des Indépendants in 1912, give palpable form to this concept of simultaneity by presenting different motifs as occurring within a single time frame (as does a sequence of shots in a film). Delaunay's *Cité de Paris* brings together the *quais* on the Seine, the Three Graces, a view across rooftops, and the Eiffel Tower, while Léger's *La noce* unites a wedding group with fragmentary views of a village setting. The subjects themselves are redolent of ideas derived from Bergson and Unanimism: for Romains the city was an Unanimist entity, a psychological as well as a physical fact, a place where responses to the past and the present interpenetrate; and an event like a wedding was a powerful emotional occasion in which the past is precipitated into the future with collective force. The conjunction of such subject-matter with simultaneity aligns the *topoi* of Salon Cubism with early Futurist paintings by Umberto Boccioni, Gino Severini (1883–1966), and Carlo Carrà (1881–1966). These Italian works, though themselves made in response to early Cubist paintings, led in 1911–12 to a similar (but distinctive) application of techniques of simultaneity. This sort of construction is also common in film.

Some indication of Bergson's influence on French art in the 1910s can be found in "Light," a statement by Robert Delaunay, who was affiliated with Cubism, though in this piece he is speaking on behalf of the Simultaneism movement (a relative of Cubism): its relevance to our theme of the cinematic effect leads me to quote from it at length and to provide extensive commentary in an endnote:

> Auditory perception is insufficient for our knowledge of the Universe.
> It lacks depth.
> Its movement is successive. It is a species of mechanism; its
> principle is the time of mechanical clocks which, like them, has
> no relation to our perception of the visual movement in the Universe.
> This is the evenness of things in geometry.

Its character makes it resemble the Object conceived geometrically.
The Object is not endowed with Life or movement.
When it has the appearance of movement, it becomes successive, dynamic.
Its greatest limitation is of a practical order. Vehicles.
The railroad is the image of this successiveness which resembles
parallels: the track's evenness.
…
Art in nature is rhythmic and abhors constraint.
If Art is attached to the Object, it becomes descriptive, divisive, literary.
It stoops to imperfect modes of expression, it condemns itself of
its own freewill, it is own negation, it does not liberate
itself from mimesis.
…
Auditory perception is insufficient for our knowledge of the
Universe since it lacks duration.
Its successiveness fatally commands evenness;
it is a kind of mechanism where depth, and therefore rhythm,
become impossible.
It is a mathematics where there is no space.
Its law is the time of mechanical clocks, where there is no
relationship to the movement of the Universe.
It is the evenness of things of this kind that condemns them to
nothingness.
Its quality resembles the Object.
The object is now endowed with life.
When the object is…there is the successive dynamic, but no
rhythm. It becomes a similitude of movement.
Its greatest limitation is of a practical order. Vehicles.
…
… To see becomes the comprehension [of the] good.
The idea of the living movement of the world which
passes judgement on our soul.
Our understanding is thus adequate to our sight. It is necessary
to look in order to see.
An auditory perception is not sufficient in our judgment to
know the universe, because it does not abide within duration.
Its successiveness leads fatally to its death.
It is a species of mechanism where there is no depth, and
therefore no rhythm. It is a mathematics that lacks space.
It is evenness of this sort that is condemned to death.[84]

This astonishingly Bergsonian prose poem inverts the relation between sight and hearing that Marshall McLuhan would propose four decades later. Here, Delaunay proposes that auditory perception is successive—he even suggests

that it is like a railway train in its linear, one-after-the-other march-past of moments—while McLuhan would propose that Western culture's emphasis on the eye had linearized thinking. Delaunay proposes, too, that the emphasis on hearing fostered a geometric conception of space, while McLuhan would propose that a privileging of the eye led to the Cartesian conception of space and that the growing interest in acoustic phenomena was a key factor in the rise of non-Euclidean geometries. Delaunay associates the clock with acoustic experience, while Marshall McLuhan would associate it with linearized visual experience. For Delaunay, it is hearing that leads us towards dividing experiences into so many equal (or comparable) units, while McLuhan would aver that the eye has that effect, when it usurps an undue portion of the sensory efforts and energy.

In all these beliefs, Delaunay went well beyond Bergson's teachings—Bergson (to my knowledge) wrote nothing that would distinguish the senses in anything like the ways that Delaunay (or for that matter McLuhan) did. The philosopher treated the senses as though they were inputs that fed data into consciousness, and from that material, consciousness (reason or intuition) would forge experience. But the framework within which Delaunay thought about this topic—considering the role that geometry, mathematics, and physics play in the linearization of experience, the condition that makes it possible to believe that reality can be segmented into commensurate units—he shared with McLuhan, and both of them drew it from Henri Bergson.

The most important difference between Delaunay and McLuhan also developed under the aegis of Bergson: Delaunay's contention in "Light" that the chief mischief that bedevils epistemology is the disparaging of intuition. Delaunay asserted the need to participate in the inner life of objects in order to experience the uniqueness of each—he suggested that participation is a way of overcoming the detachment that aural experience generates, in favour of visual experience. McLuhan, of course, would have concurred, except that for him it is visual experience that distances us from the object and hearing that allows us to participate in its inner being and to experience its impulsive—its rhythmic—dynamic. I think that McLuhan was closer to the truth on these matters than Delaunay, but what is striking—and for our purposes of paramount importance—is the extraordinary Bergsonianism of Delaunay's commentary and its insight into the part that changes in the perceptual habits play in restructuring our understanding of the world. I cannot think of any other cultural theorist (or historian of *mentalités*) before McLuhan who worked out that insight so tellingly.

We can get a further glimpse of the deep influence Bergson had on the art world in the early twentieth century by considering another Simultaneist statement.[85] While it is certainly not true of Delaunay's version, most

forms of Simultaneism stood somewhere between Cubism and DADA—the idea of compressing the experience of many aspects of a phenomenon into a compact form whose elements possess a wealth of relations one to another was attractive to the Cubists, while the idea of a form that provokes intense (and a-rational) experience was attractive to the *Dadaisten*. Among those to whom ideas about simultaneity/simultaneism appealed was the Dadaist Raoul Hausmann (1886–1971). In February 1921, Hausmann wrote a Simultaneist manifesto that was published in *De Stijl* (the journal of the Dutch Neo-Plasticists) in September 1921, under the title "Manifeste de PRÉsentisme."[86] The manifesto was directed "against the Dupontism of the Teutonic soul," and so against the anti-democratic bias that Hausmann must have believed was endemic in the German spirit and the consequent proclivity towards allowing wealth to corrupt democracy.[87] This manifesto is more cryptic than Delaunay's, and it will be necessary to parse those segments of it that are most germane to our theme.

The self-proclaimed Dadasoph begins his declaration: "To live means: to compress all the possibilities, all the givens of every second into a tangible energy—Wisdom."[88] From there he moves on to distinguish between eternity, by which (I believe) he means infinitely extended time—it just goes on and on, so the experience of it lacks intensity—and the "present," which, we will see, he uses to refer to the ecstatic present. Because eternity, time that goes on and on, is an infinity of quotidian moments, it can be plotted on the line of time stretching from time immemorial to time beyond our limits of imagining. Eternity, he says, is neither older nor better than the Middle Ages. It "comes from yesterday; it is in the moon or the toothless mouth of the old man, reinforced by the ridiculous bourgeois intelligence just like an air brake!"

He goes on to dismiss the common (even though nearly paradoxical) fusion of nostalgia and the idea of progress: that amalgam is a consequence of the pernicious belief in eternity. To counter that experience, we need to experience time ecstatically: we must penetrate the present moment and feel time's fathomless depth and its brilliance:

> Let's get rid of all the old prejudices, the prejudice that yesterday was something good or that tomorrow it will be better still. No! Let's seize each second today! Time is an onion: under its first skin there appears, in the light, another and still another. But we want the light!

Hausmann's next target is the belief that the eternal is the truly real and that time is merely the moving image of eternity (*κινούμενη εικόνα της αιωνιότητας*), as Plato proposed in the *Timaeus* (37c). The animation implied in the rhetorical flourishes of this passage suggests that Hausmann believed this was a common position, and he was right about that—indeed, it has probably been the

dominant view of philosophers. It was Plato's view (and some later Classical and Medieval thinkers in the Platonic tradition propagated it) that God is the prime reality and He exists apart from, or outside time.[89] He is the Vital Principle, whose life exists all at once, beyond the sequence of passing moments. This was the very position that Bergson attacked when he critiqued traditional philosophy's views on time:

> Radical mechanism implies a metaphysic in which the totality of the real is postulated complete in eternity, and in which the apparent duration of things expresses merely the infirmity of a mind that cannot know everything at once. But duration is something very different from this for our consciousness, that is to say, for that which is most indisputable in our experience. We perceive duration as a stream against which we cannot go. It is the foundation of our being, and, as we feel, the very substance of the world in which we live. It is of no use to hold up before our eyes the dazzling prospect of a universal mathematic; we cannot sacrifice experience to the requirements of a system. That is why we reject radical mechanism.[90]

Hausmann apparently concurred with Bergson's critique. The Manifesto of PRÉsentism continues:

> Man has two essential tendencies: one toward the impossible and the other toward all the innumerable possibilities. He won't succeed in the impossible instantly, in our time, today—whether it is God or the Creative Principle or Living Dynamism that, like a vacuum cleaner compresses the world, life, and events in making them form a possible world.

The impossible, Hausmann implies, is a beyond-reality that somehow, through a force akin to compression (a force that presumably takes an array of possibilities that, when they follow their inherent tendencies, are expansive and extend well beyond any real extent of time), is compelled to enter a strictly delimited temporal span, and in doing so, it becomes a sort of perpetual motion machine, whose motions are mechanically pointless.

Besides the traditional conception of the supreme truth (the Good) as beyond being, Hausmann likely had two other targets (which he compressed, along with Platonism, into a single form). The first was Leibnizian metaphysics, and the second was Symbolism. Leibnizian philosophy was undergoing a revival during the period of Hausmann's intellectual formation, partly because aspects of Leibniz's monadology anticipated aspects of developments in logicism at the time, and partly because aspects of philosophy anticipated *Lebensphilosophien* and incipient process philosophies. Gilles Deleuze in his perceptive study of Leibniz, *Le pli* (The Fold), contends that Leibniz portrayed the world as a body of infinite folds and surfaces, a network of inflexions, or a convoluted form that twists and turns its way through a compressed time

and space. Compression, we might note (and certainly this recognition was central to Leibniz's rationalist philosophy, in which the structure of the world and the structure of thought mirror each other), is necessary to synthesize ideas into a concept—thought operates by contraction.[91]

Leibniz's *Discours de métaphysique* (Discourse on Metaphysics, 1686) depicts the universe as an infinite and infinitely extensible set of monads, each of which comprehends/compresses this infinity into its completely unitary subject (which compression is formed under the monads' own individual concepts). For Leibniz, God is the great compressor: God works by framing the laws that govern the universe, and He chooses that set of laws which is the best (the most nearly perfect)—that is, He chooses that set of principles which are as simple as possible, and the phenomena it comprehends are as rich as possible. Hausmann would have accepted Deleuze's general philosophical counsel that bodies must be understood in immanent terms, that is, without reference to transcendent organizing forces or to organizing schemata derived from transcendent beings (by which I mean here, forces or schemata that are different from—outside of, even opposed to—ordinary reality). Hausmann's specific objection to the Leibnizian God-Compressor was, I believe, grounded in the conviction that for anything to be unique, it must be irreducible, which would entail a form of anarchic thought (thinking for which one cannot conceive a law). Indeed, like Deleuze (though earlier), Hausmann saw the importance of inverting the traditional philosophical relation between identity and difference (which maintains that difference is a deviation from identity) to proclaim that identities are effects of difference.[92] Such an ontology completely controverts the Leibnizian idea of compression.

Like many of the artists whose works are the subject of *Cubism and Futurism*, Hausmann in his formative years took a great interest in the Symbolists. Between 1908 and 1911 he read with enthusiasm the poetry of Hugo von Hofmannsthal (1874–1929), Stefan George (1868–1933), Oscar Wilde (1854–1900), Charles Baudelaire (1821–1867), Maurice Maeterlinck (1862–1949), and Walt Whitman (1819–1892), and he quoted passages from them in his letters to his good friend Hannah Höch (1889–1978). In "PRÉsentismus," Hausmann dismisses the Symbolist yearning for the Impossible Beyond, for the Truth beyond language, and he does so by turning Symbolist conceptions against themselves: we have no access to this realm of beyond-being, he maintains, and to dwell on it saps life of its intensity and its dynamic vitality. He goes on to say,

> Through a ridiculous naivete, man needs to show his nostalgia for the unrealizable ideal, and this unrealizable impossibility is to transform himself into a monstrous ball animated by a perpetual motion, that would hover in space like the sun! Down with this nostalgia, down with the impossible, the unrealizable! Leave it to heroes and heroines!

Adopting a tactic of Bergson, of refusing to conceive of life in mechanical terms and of refusing to turn one's life over to a machine-like existence of seemingly endless repetitive processes, Hausmann declares the explosive transformational potential of allowing one's being to be steered by the unique array of cosmic forces that surges through each individual. This is a stringent process that requires a stern resolve, for its effect is to shatter the ego:

> The individual, considered as an atom, has only one duty; to find his law through no matter what form of work imposed on his own hardened ego—against this ego. In this newly present world we should realize the voluntary abandon of all the forces inherent in the atom!!! (Berlin, February 1920. **Salut aux camarades!** [thus in the German printing])[93]

The interest that Hausmann expresses in this passage, in transcending the anthropocentric sphere (by transcendence here, I mean raised not to a different reality, but rather to a different *experience* of reality, one that does not belong to a self-enclosed, autonomous individual), and in adopting a biocentric position in which one identifies with a more general life-force, was not uncommon in the early decades of the twentieth century. It became a cause for many artists of the era—and for some of those artists at least a reason for affirming that the cinema is the top art. A recurrent theme of writings on cinema in this era was that the cinema is an art in which human being had little or no role (the beneficence—or indifference—of the life-force had raised it above petty human concerns and human folly). Cinema images, so it was thought, are products of a biocosmic life-force, a *natura naturans*, and, by virtue of their ability to present movement, can impart its dynamism.

Bergson was a likely source of these ideas—though, as I noted earlier, references to him by Cubist artists are fewer than might be expected. However, one should not overlook the extent to which a general discourse regime of very broad scope authorized the way that science, technology, space, time, and movement were understood—and generally they were all understood in an ecstatically spiritual manner. In keeping with this discursive regime, the earliest reaction to the telephone maintained that it was a technology that made it possible to be in two places at the same time. Lord Salisbury, the British prime minister, was an aficionado of electrical devices—guests at Hatfield, his ancestral home, marvelled that when alone in their rooms, they could hear their host's spectral voice emanating from a mysterious device on a nearby table (a telephone) reciting "Hey diddle diddle, / The cat and the fiddle, / The cow jumped over the moon." But the prime minister's interests were not simply of a pranksterish sort: he also formulated an acute, albeit somewhat ecstatic, commentary on the implications of a related device, the telegraph:

> You have by the action of the electric telegraph combined together almost at one moment, and acting at one moment upon the agencies which govern mankind, the influences of the whole intelligent world with respect to everything that is passing at that time upon the face of the globe. It is a phenomenon to which nothing in the history of our planet up to this time presents anything which is equal or similar and which is an effect and operation of which the intensity and power increases year by year.[94]

Salisbury anticipated by more than half a century Marshall McLuhan's insight that electricity makes all intelligence available everywhere and that technological evolution would carry us towards the intelligent cloud (an extended memory) and an electronic processing of intelligence. The electronic processing of intelligence has been actualized and become our contemporary environment.

Time was undergoing a change, and this revolution in time transformed the visual arts. Cubism and Futurism were both products of that revolution—but so, too, were photography and the cinema, which were taken up with enthusiasm by vanguard artists. Photography and film trade in paradoxes of space and time: photography seems to make another time co-present with the moment of viewing and to bring another space within the purview of our vantage point—indeed, a photograph can seem to invite us to see both the "there-and-now" and the "here-and-then." Cinema has an even greater capacity to make what it presents seem to belong to the immediate moment; accordingly, it has a curious ability to merge diverse times and spaces into the utterly punctate. Photography and, even more, film seemed to people living in the first years of the twentieth century to involve a peculiar, ecstatic co-temporality, one that, because it invokes the simultaneity of experience, awakens (or revitalizes) a spiritual mode of existence, fusing all times and spaces (as other photo-electric media do). Furthermore, film—along with other technologies (such as X-rays) that the period associated with film—elicited a new form of social being, as electricity made people transparent to one another (that social transparency was sometimes the actual topic being discussed when thinkers asserted that X-rays had made bodies translucent). A new era when humans would have an amplified vision was just around the corner—and once electricity had made everyone transparent to everyone else, then only a form of communalism would do as the appropriate sociopolitical form of society. The community must become totally integrative. Furthermore, it was a commonplace belief in occult circles (for example, in nineteenth-century Spiritualism) that mediums in a state of clairvoyant trance could experience solid objects as transparent: in the discursive regime of the late nineteenth and early twentieth centuries, notions about electromagnetic waves, the energies of departed souls residing in higher realms, and expanded

perceptual powers were all related. The belief that the cinema possessed occult (or electromagnetic) powers, akin to those of X-rays, was authorized by these discursive protocols as well.

## LÉGER AND SYNTHETIC CUBISM

The diversity of constructive modalities in Synthetic Cubist painting drove the artists associated with the movement towards creating forms that balanced representational and abstract features. Of all the Cubist artists who became aware of the issues involved in holding abstraction and representation together in a tension, none worked on them more thoroughly, or more often, than Fernand Léger. Léger did not become alert to the tensions between structure and representation through the same process that Braque and Picasso did, nor did he deal with those tensions in the same concentrated, systematic, focused way. His works display a constant to-and-froing from canvases that evince a high degree of commitment to representational issues to canvases that are nearly purely abstract. Compare two works from 1913, *Modèle nu dans l'atelier* (Nude Model in the Studio) and *Contrastes des formes* (Contrast of Forms): both have the same substructure; both elaborate this substructure into a similar architecture; both are constructed from similar contrasts; both evoke a similar solidity and deploy similar patterns of recurrence; and both use recurrent patterns (as almost all of the paintings Léger made from then on did) as the primary means for organizing contrasts (for rhythm consists fundamentally in the alternation of contrasting components). Yet *Modèle nu dans l'atelier* is representational, while *Contrastes des formes* is abstract. Or compare *Le triangle jaune* (Yellow Triangle, 1926) with *Composition à la feuille* (Composition with Leaf, 1927): these two paintings again have similar compositional substructures, but one is wholly abstract, while the other is predominantly representational. Or take *Les acrobats* (The Acrobats) and *Les plongeurs* (The Divers), both painted in the same period, between 1942 and 1946: both are built on undulating forms (which, like the form that provides the nucleus of *Ballet mécanique*, are relatives of the shape described by a simple, harmonic motion, such as a swinging pendulum). The substructure of both involves circles that expand outward from the picture's centre. Yet the forms that make up *Les acrobats* clearly depict human parts, while the forms that make up *Les plongeurs* are more abstract or sufficiently resistant to being readily identified as to present themselves as abstract.[95] Even more important is the difference between the principles that govern how forms are combined in each of the two paintings: while the combination of forms in *Les acrobats* seems to derive directly from the painting's theme (for it seems to represent the tangle formed by the acrobats' limbs as the pair perform together) and

from the exciting, sexual rhythm of the interlocked bodies,[96] the combination of forms in *Les plongeurs* is more intellectual and seems to derive from "ab(s)-tracted" (from *ab* + *trahere*) elements that subsequent associations interlink.[97] Or consider that in 1953 Léger would swing between abstraction and representation (and the output of that year was in no way atypical in this respect): *Forms dans l'espace* is almost wholly abstract, while the circus paintings *Étude pour l'écuyère noire sur fond bleu* (Study for a Black Rider on a Blue Ground) and *Le jongleur and les deux trapezistes* (The Juggler and the Two Trapezists) are strongly representational. Even within a single work, Léger would often combine representational and non-representational forms—another work of 1953, *Les cinq tournesols* (The Five Sunflowers) provides a fine example.

But it is *Le passage à niveau* (Grade Crossing, 1912) that best shows how Léger thought of abstraction at the moment when Picasso and Braque were developing Synthetic Cubism. He remarked, "In 1912 and 1913 I was struggling to leave Cézanne behind. Cézanne's hold on me was so strong that in order to break away I had to go all the way to abstraction."[98] Nonetheless, Léger's paintings were abstractions in the truest sense, for they drew on real objects and simplified them to the point that they appeared as pure shapes—Gilles Néret points out that the forms in *Le passage à niveau* "were really . . . tree forms [i.e., everyday objects] modulated in contrasted light."[99]

## PROCEEDING FROM SYNTHETIC CUBISM: FERNAND LÉGER AND THE NEW REALISM

The ideas and practices of the young Léger were aligned with the Futurist ideals, and he shared the Futurists' enthusiasm for the changes in the era that industrial technology had brought on. In 1914, in "Les réalisations picturales actuelles," he wrote,

> If pictorial expression has changed, it is because modern life has necessitated it. The existence of modern creative people is much more intense and more complex than that of people in earlier centuries. The thing that is imagined is less fixed, the object exposes itself less than it did formerly. When one crosses a landscape by automobile or express train, it becomes fragmented; it loses in descriptive value but gains in synthetic value. The view through the door of the railroad car or the automobile windshield, in combination with the speed, has altered the habitual look of things [recall Marinetti's "Fondazione e Manifesto del futurismo"]. A modern man registers a hundred times more sensory impressions than an eighteenth-century artist; so much so that our language, for example, is full of diminutives and abbreviations. The compression of the modern picture, its variety, its breaking up of forms, are the result of all this [here Léger steers Marinetti's ideas towards Cubo-Futurism]. It is certain that

> the evolution of the means of locomotion and their speed have a great deal to do with the new way of seeing. Many superficial people raise the cry "anarchy" in front of these pictures because they cannot follow the whole evolution of contemporary life that painting records. They believe that painting has abruptly broken the chain of continuity, when, on the contrary, it has never been so truly realistic, so firmly attached to its own period as it is today [here he proposes a notion of contemporaneity akin to Marinetti's]. A kind of painting that is realistic in the highest sense is beginning to appear, and it is here to stay.[100]

The paragraph above sets out Léger's reasons for saying that a new, higher realism is emerging—he is claiming, basically, that the painting of his day was more firmly attached to its own period than that of any previous era had been. There is surely merit to this assertion—after all, the painting of many previous eras (though not by any means all paintings of Italian Renaissance or the majority of paintings made in the Low Countries of the seventeenth century) had dealt chiefly with historical subjects or mythological themes (and so dealt with subjects belonging to times other than the contemporaneous).

Yet Léger's characterization of his "higher realism" is rather slippery. For it suggests that a work is "realistic" not because it represents the contemporary world with fidelity, but because of the spirit it conveys—even if it is conveyed by presenting an accumulation of fragmentary and abstract forms whose denotative value is attenuated. Léger offers his ideas about the sort of form that might suggest best the sense of rupture and discontinuity that is so central to our experience of modernity—to wit, he suggests using contrasts of every conceivable sort.

In "Les réalisations picturales actuelles," Léger goes on to suggest that current fashions, with their strong clash of black and white, have replaced the monochrome dress of the eighteenth century in which decoration took precedence over contrast. The bourgeoisie, nevertheless, has retained its preference for decoration and the use of tone on tone for sentimental effects and for storytelling. The Impressionists (whom Léger, in contrast to the mainstream Cubists, continued to extol) had liberated painting from "the spell of literature":

> From the day the impressionists liberated painting, the modern picture set out at once to structure itself on contrasts; instead of submitting to a subject, the painter makes an insertion and uses a subject in the service of purely plastic means. All the artists who have shocked public opinion in the last few years have always sacrificed the subject to the pictorial effect.[101]

Thus, Léger valorizes the organization of plastic form, giving it priority over the painting's motif. As we will see, *Ballet mécanique* "uses a subject in the service of purely plastic means."

## LÉGER: CUBISM, QUASI-CUBISM, AND NON-CUBISM

To speak in generalities about Léger's work—to make assertions that are true about all phases of his work—is difficult because Léger's work is so various. He took part in many of the artistic movements of his time, but through his firm commitment to his own artistic beliefs, he escaped being confined even by these passing loyalties. At various times, Léger displayed an allegiance to the ideas and practices of the Fauvists, the Salon Cubists, the Purists, the Futurists, and the Surrealists; and while not a member of the De Stijl movement, he subscribed to many of De Stijl's ideals. This is one reason why Léger's paintings are less highly valued than they deserve to be: for some years after his death, the ruling paradigm of artmaking valued highly the evidence an artwork gave of personal experience. Consistency of style was taken as evidence of a truly personal motivation—indeed, a deep and unconscious one—and changeability was taken as evidence of an impersonal derivation and chameleon dissembling.

Above all, Léger was never a core member of the Cubist circle—he was too independent-minded for that. He should not be considered a true Cubist (or a true affiliate of any movement). The tendency of critics to describe Léger's work as Cubist has had deleterious consequences for his reputation: when one asks about how rigorously Léger handled the key Cubist devices (resolving a painting's theme into simple geometrical shapes and integrating the components arrived at by this resolution into a rigorous architecture; the use of *passage* and of monochromicity to allow for *passage* or for multiple perspectives), one must, to be honest, judge Léger's work as being not as strong as that of many derivative Cubist artists who produced routine, second-hand, programmatic works. The anomaly simply highlights that Léger's paintings cannot be judged according to the criteria we bring to considering orthodoxly Cubist works.

Yet his painting does share features with the art of Picasso, Braque, and Gris (and the legions of painters who soon appeared in their wake). Key features of Léger's work are similar to, and doubtless were influenced by, features of true Cubist painting. Léger drew some of his ideas from the same sources as the Cubists derived theirs: for example, he arrived at Cubist-like techniques independently, by study of Cézanne's works (with which he became acquainted in 1907, through the great Cézanne retrospective at the Salon d'Automne). By 1908 or 1909, as *Le pont* (The Bridge) evidences, he was painting with means similar to those of Braque and Picasso—in fact, he was the only other painter (with the possible exception of Robert Delaunay) in Paris doing so at this early date.[102] *Le pont* shows that Léger understood Cézanne's use of *passage* and how it can be used for spatial construction. Léger later was

to write about Cézanne: "Cézanne, the master of us all! Of all us moderns. I sometimes wonder what contemporary painting would have been without him. I have worked against the background of his painting for some time now. It was always with me, inexhaustible. Cézanne taught me to realise the importance of form and space, made me concentrate on drawing."[103] It was his conception of drawing's importance that led Léger to dispense with what remained of Impressionism and to concentrate on the precise handling of hard, strongly demarcated forms. Against the Impressionists' view that the boundary lines around forms were untrue to the way light, reflected onto objects, bounced from object to object and eventually stimulated the retina, Léger argued for a concern with the reality of the painting itself and with the interaction of a painting's actual (intrinsic) features: even if, as the Impressionists pointed out, there are no lines in nature, this does not mean that a painting's reality is not a construction of delineated forms. (One could draw a parallel here to Northrop Frye's remark that conventions of literary works—including realist works—obtain only in literature).

Léger deployed these ideas when he launched a fierce assault on Robert Delaunay's ideas about simultaneous contrasts of colours (though he did not identify at whom his criticism was aimed):

> It is true that if I look at objects in their surroundings, in the real atmosphere, I do not perceive any line bounding the zones of color, of course; but this belongs to the realm of visual realism and not to the wholly modern one of realism in conception. [Here Léger is hinting at his famous conception of realism of the object, i.e., the painting, which he celebrated as the modern form of realism. It should be noted that when applied to visual art, the term "conception" can also suggest design.] To try deliberately to eliminate specific means of expression such as outlines and forms except for their significance in terms of color is childish and retrograde. The modern picture can have lasting value and escape death not by excluding some means of expression because of a prejudice for one alone but, on the contrary, by concentrating all the possible means of plastic expression on a specific goal. [Note that here Léger defies the modernist conviction that progress is achieved through reduction to an ineliminable essence, and advances a proposition we would now identify as postmodernist.] Modern painters have understood that; before them, a drawing had one special value, and a painting had another. From now on, everything is brought together, in order to attain essential variety along with maximum realism. A painter who calls himself modern, and who rightly considers perspective and sentimental value to be negative methods, must be able to replace them in his pictures with something other than, for instance, an unending harmony of pure tones.[104]

Léger's *Les nus dans la forêt* (Nudes in the Forest, 1909–10), a monumental work done only slightly later than *Le pont* and presenting an image of the

age-old theme of fighting males, was the first of his works to rely extensively on the cylindrical forms (which he used to present limbs and torsos). These forms were to dominate so many of his subsequent paintings that, by the fall of 1911, critics jokingly suggested that his paintings should be called, not "Cubist," but "Tubist."[105] *Les nus dans la forêt* is no more a true Cubist work than any of Léger's other works are: unlike Picasso, Léger did not resolve the objects that his paintings represent into geometric shapes, with a view to subsequently recombining these forms in a rigorous architectural unity that incorporates a multiplicity of aspects; nor did he use such fragmentation and recombination to create more solid, massive spaces, as Braque did. Léger reduced objects to faceted planes partly in order to create simplified forms that could be integrated into a matrix and partly to so simplify them as to imbue them with mythical or allegorical overtones. Many of Léger's canvases trade in the myth of the dynamic city of the future—and his use of geometric forms helps impart the dynamic character of future reality, as he imagined it.

Still, *Les nus dans la forêt* resembles truly Cubist canvases in many respects. Overall, the painting presents a hard, machine-like rhythm (similar to that of *Ballet mécanique*), created by reducing human torsos and tree-trunks to the same cylindrical shape and by juxtaposing polyhedral and cylindrical figures (in the clash of which we can find ample evidence of the distance between Léger's methods and those of the Impressionists). Reducing objects to a common shape strengthens the impression of solidity the painting gives—and that sense is reinforced by the absence of empty spaces and even (except at the edges) of deeply recessive spaces. Léger's manner of spreading forms across the surface of the canvas near to the picture plane, his use of repeated, simplified, mechanical forms, and the hard, jangly rhythm of the work together give the painting great dynamic force.

Léger's "Cubist" paintings also relied on the tension between two-dimensionality and three-dimensionality that characterized the painting of Braque and Picasso of 1909 and 1910. As in contemporaneous work by the principal Cubists (Braque and Picasso), in Léger's *Les nus dans la forêt* some forms stand out from and some recede into a (shallow, illusory) depth behind the picture plane; it is their relation to the picture surface that defines their spatial function.[106] For as much as that painting represented Léger's effort to break from Analytic Cubism, it nonetheless was greatly influenced by Braque's concern with positive and negative volumes. Léger wrote of the work, "I wanted to push volume as far as I could. I finished the painting in 1910. People said there were influences of the Douanier Rousseau in the painting . . . For me, *Nudes in the Forest* was merely the battle of volumes. I had felt that I wouldn't be able to get colour to hold its own, and that's why I concentrated on volume."[107] Also, as much as Léger attempted to break with Cézanne, in *Les nus dans la*

*forêt* the influence of the great precursor is obvious in the theme of the work (several of Cézanne's paintings show a pair or group of nude males playing, often around water).[108] But unlike Cézanne's, Léger's paintings did not achieve their two-dimensionality by resolving their forms into faceted planes. Rather, Léger affirmed the flatness of the painted surface by setting shapeless, often transparent forms and hard, geometric, often tubular forms—for example, clouds or smoke and houses—beside one another. The amorphous shapes had much the same effect as Cézanne's use of *passage*, in that they allowed a transition between ambiguously or incongruously situated spaces. *La noce*, a wedding present for the poet and art critic André Salmon, displays such contrasts and, furthermore, shows again that Léger was not unwilling to violate the closed contours of objects by allowing the forms that represent them to break through or straddle their boundaries. He had learned his lessons about the advantages of *passage*.

The liberation of colour we see in *La noce* continues in two works that Léger painted in 1911, *La femme en bleu* (The Women in Blue) and *Les fumeurs* (The Smokers, 1911–12).[109] *Les fumeurs* is among the first paintings in which Léger began to work out the theory of contrasts that was to play such an important role in his later work (including *Ballet mécanique*). Like the contemporaneous paintings of Picasso, Braque, and Gris, *La femme en bleu* decomposes and rearranges human bodies. Its theme is not atypical: it concerns people sitting in a bar, drinking. However, the conception of the piece is atypical of Cubism: the painting's substructure is determined by the contrast between the simple, geometrical forms of the round bar tables and the complex, biomorphic forms that surround them. This contrast is conveyed not by resolving the human figures and the tables into different sorts of forms—both are represented by geometric shapes. Rather, it is conveyed by the much more complex resolution of the human shapes (in comparison with non-human forms), and by the more jangled, excited rhythm that results from this more elaborate resolution—the central figure is decomposed into so many contrasting masses that the need for *chiaroscuro* is eliminated. The more highly segmented forms that represent the figures are interrupted periodically by larger, flat masses in primary colours (red, blue, yellow, and white). Through the contrast between the smaller but more interconnected forms (representing people) and the larger, more discrete forms (representing bar tables), the painting conveys the perceptual effect of looking across a bar and seeing vital bodies animating the space between the calmer areas that the tables define. The figure is not considered in sentimental or pictorial terms—rather, the decomposition of the figure into elementary shapes and the linking together of these elementary shapes seems motivated chiefly by geometric and rhythmic considerations (as the linking of shots in a cinema

sequence commonly is). *Modèle nu dans l'atelier* (Nude Model in a Studio) of 1912 is similar in its contrast between areas resolved into smaller, linked forms and larger areas and in its use of rhythm as an organizing factor.

## LÉGER, THE OBJECT, AND THE HUMAN BODY

Léger's interest in the decomposition and rearrangement of the human body (as evidenced in *La Femme en bleu*) formed the basis of his initial curiosity about the cinema, and that interest in reconfiguring the human body is still evident in *Ballet mécanique*, especially in the "Charlot cubiste" segment that begins and ends the film, but also in the many sections presenting matte-images of mouths and eyes. Like Cézanne, Léger in his paintings treated the human form as just another object. In "À propos du corps humain considéré comme un objet" (The Human Body Considered as an Object), Léger wrote, "Without wishing to play the role of a prophet, I see no other way out for the future except a *powerful*, human *painting* that can embrace all plastic methods, both old and new. All this within an absolute order, guided by a tranquil will that knows where it is going."[110] The human form, Léger proposed, should be treated purely for its plastic value—as a volume within a harmonious composition of volume, line, and colour.

*Ballet mécanique* treats the human subject in a peculiar manner, certainly, albeit one consistent with Léger's treatment of the human form in his paintings. By emptying their depictions of human forms of all but plastic significance, the makers of *Ballet mécanique* converted human gestures into actions resembling machine movements; then, having done that, they constructed visual rhymes between human and machine movements. This treatment of the human subject reinforces the impression that the film belongs to what Henri Bergson referred to as the low mode—that is to say, the *comic* mode. In an influential essay written in 1900, Bergson explained that "plastic means" can convey an attitude (for example, a humorous attitude towards a human subject): "The attitudes, gestures and movements of the human body are laughable in exact proportion that the body reminds us of a mere machine."[111] Bergson went on to offer these comments, which are germane to *Ballet mécanique*'s comic dimension:

> One finds that [visual art] is generally comic in proportion to the clearness, as well as the subtleness, with which it enables us to see man as a jointed puppet . . . We must distinctly perceive . . . a set up mechanism within a person's interior. But it . . . must continue to give us the impression of a living being. The more exactly these two images, that of the person and that of the machine, fit into each other, the more striking is the comic effect.[112]

At the time Léger began work on *Ballet mécanique*, he felt that the human subject as the Italian Renaissance had understood it had been dislodged from its place of privilege and that the object had taken its place. Objects—that is, their distinctive natures—interested him more than fictional personages. The object had been the chief character in such paintings as *Élément mécanique* (Mechanical Element, 1918–23)—and it would be so again in *Ballet mécanique* (1924). Léger also felt that privileging the object (and treating the human subject as a participant in the contemporary, predominately geometric order) would bring his art art into conformity with the cinema's character. Léger reflected on the experience of working with Abel Gance on *La roue* (The Wheel, 1923):

> The mechanical element plays a major role, and where the machine becomes *the leading character, the leading actor.* It will be to Abel Gance's honor that he has successfully presented an *actor object* to the public. This is a cinematographic event of considerable importance, which I am going to examine carefully.
>
> This new element is presented to us through an infinite variety of methods, from every aspect: close-ups, fixed or moving mechanical fragments, projected at heightened speed that approaches the state of simultaneity and that crushes and eliminates the human object, reduces its interest, pulverizes it. *This mechanical element*, that you reluctantly watch disappear, that you wait for impatiently, is unobtrusive; it appears like flashes of a spotlight throughout a vast, long heartrending tragedy whose realism admits no concessions. The plastic event is no less there because of it, it's nowhere else; it is planned, fitted in with care, appropriate, and seems to me to be laden with implications in itself and for the future.[113]

The idea of making the machine the leading character in his art commanded much attention from Léger. In 1922 he wrote to his dealer, Leon Rosenberg, "The contemporary environment is clearly [dominated by] the manufactured and 'mechanical' object: this is slowly subjugating the breasts and curves of woman, fruit, the soft landscape."[114] And in 1923, when he was completing drawings (set designs) for the laboratory in Marcel L'Herbier's *L'Inhumaine* (The Inhuman, 1924), Léger delivered a talk on the aesthetics of the machine at the Collège de France.[115] However, that same year, Léger also noted that the "mechanical element is *only a means and not an end*. I consider it simply plastic '*raw material* [*matière première*],' like the elements of landscape or a still life."[116] The end—the transformation—he sought (so that essay tells us) was the "*state of plastically organized intensity.*"[117]

*Ballet mécanique* is concerned throughout with the very fragile, very shallow space that, for the most part, its visual forms inhabit, as well as with the picture plane. The reasons are not hard to understand: if forms arrayed across

a canvas or screen are brought up to the picture plane and lie flat against it, the resultant total form can quickly degenerate into a wallpaper-like pattern. This was an insight that led Cubists to use collage forms. Clement Greenberg notes:

> Braque had already been made uncomfortable by the contraction of illusioned space in his pictures of 1910. The expedient he had then hit upon was to insert a conventional *trompe-l'oeil* suggestion of deep space on top of Cubist flatness, between the depicted plane and the spectator's eye. The very un-Cubist graphic tack-with-a-cast-shadow, shown transfixing the top of of the 1910 painting, *Still Life with Violin and Pitcher*, suggests deep space in a token way, and destroys the surface in a token way. The Cubist forms are converted into the illusion of picture within a picture.[118]

Braque understood that with this, he had taken a real step forward. However, Greenberg points out, in 1911 he was still searching for a means to supplement the suggestion that the Cubist forms within a painting seemingly offer a picture within a picture. Greenberg describes the momentous discovery he arrived at:

> *Trompe-l'oeil* could be used to undeceive as well as to deceive the eye. It could be used, that is, to declare as well as deny the actual surface—its real, physical flatness—could be indicated explicitly enough in certain places, it would be distinguished and separated from everything else the surface contained. Once the literal nature of the *support* was advertised, whatever upon was not intended literally would be set off and enhanced in its literalness. Or, to put it in still another way: depicted flatness would inhabit at least the semblance of a semblance of three-dimensional space as long as the brute, undepicted flatness of the literal surface was pointed to as being still flatter.[119]

This new mode of organizing a painting generated an impetus towards what would be called all-over painting in the 1950s. Léger was among the first to respond to that impulse.

## LÉGER AND THE "ALL-OVER" FORM

The greatness of Cézanne's paintings made it almost obligatory for artists to create visual forms that echo the canvas's shape. It was some time before any significant number of painters recognized just how confining the use of boundary-echoing forms can be. In fact, this realization seems to have dawned only in the 1940s when it contributed to the development of Abstract Expressionist painting.

Jackson Pollock (1912–1956) was a leader in this development. His background tells us much about the forces that led him to reject boundary-echoing devices. Jackson Pollock studied with Thomas Hart Benton at the Art Students' League, and Benton's work, along with that of the Mexican mural-

ists, influenced him enormously. His experience of the wide-open spaces of the American West where he grew up also affected him—to convey their impact demanded a grander, more expansive format. These larger formats do not favour boundary rhymes. The idea of space similarly intrigued the poet Charles Olson (1910–1970), a contemporary of Pollock. Olson opened his study of Herman Melville this way:

> I take SPACE to be the central fact to man born in America, from Folsom cave to now. I spell it large because it comes large here. Large and without mercy.
>
> It is geography at bottom, a hell of wide land from the beginning. That made the first American story.[120]

It was a similar feeling—and an imperative arising therefrom, to give the impression of boundless space—that led Pollock to conceive the canvas as an open space that potentially could go on endlessly. It led him to implicitly reject the formally contained, limited space of European painting and to develop forms that embodied a more American sense of space as an immense forum for action. To convey this feeling of the immensity of space was the point of the all-over forms (in which identical or similar visual forms are repeated from one edge of the canvas to the other) that Pollock devised.

But Léger anticipated this development. His sense of the urban environment as a collection of geometric forms as well as his long-standing commitment to Cubist methods led him to spread similar, industrial forms from one frame edge to the other. Such forms have an important implication—which, most likely, Fernand Léger was unaware of (certainly his painting gives no evidence that he was); in fact, it is likely that no painter before Jackson Pollock was aware of it, to the extent of making it a consistent basis of his working method. All-over forms suggest that the visual structure they present is a mere fragment from a great whole, which stretches well beyond both the painter's and the viewer's capacity to take it in all at once (in fact, its field is felt to be potentially infinite). Pollock laid his canvas on his studio's floor and painted close to it: getting close to the canvas made the act of painting more involving. But laying the canvas on the floor had another beneficial effect: it provided a vantage point that precluded awareness of the edges of the format—that is, a point of view from which the painted forms seemed to stretch away, beyond the horizon of awareness.

The first impression that a new viewer of a Pollock canvas has is of its scale: the large scale of his paintings gives them a stunning physical impact. The massive energy they impart simply overwhelms the viewer. This response is no doubt justified, and it puts us in touch with some important features of the painting. Nonetheless, this immediate reaction has an actual ground in the painting's real properties—in fact, in properties that are so deeply connected to

the medium's basic nature that they seem at once traditional and unavoidable (the dynamic characteristics of line can serve as an example). Our immediate response when we see, say, *Number One* (1949) hanging on the wall of Los Angeles's Museum of Contemporary Art is not essentially different from our immediate response to a giant Rubens (say *Liefdestuin*, [The Garden of Love, 1634–35], hanging on the wall of the Prado in Madrid).

However, what happens as we continue to look at a Pollock painting differs from what is usual, even from the experience afforded by other large-scale works, such as many of Rubens's. We isolate strands in the painting, and begin to follow strands, to allow our eyes to bounce from one rhyming form to the next. We allow the painting to choreograph the movement of attention—some viewers even allow it to control their physical movements as they shuttle back and forth before the painting, towards and away from it, under the sway of its dynamics. Our efforts mimic those of the painter, who approaches the canvas, draws back when necessary to get a sense of overall form, then approaches it again. To be sure, a similar choreography of attention (and of physical gesture) occurs as we interact with any painting; what is different is that with other paintings, we try to balance our interest in details of the composition and the relations among parts with an awareness of its overall form.

With the Pollock canvas, on the contrary, we immerse ourselves in the interacting details, attending, say, to a line curving upward to join another curve that makes it seem to hesitate; our interest may then be divided as part of our attention is carried away by the curve that has interrupted its dynamic development, while another part wishes to follow the initial line as it falters into inertia: we enter more into the moment-to-moment evolution of the dynamic forms, and less into balancing that attention with awareness of the overall organization.

Léger's writings, as I have noted, give no convincing evidence that he became aware of these dynamic possibilities. Yet these effects are implicit in the all-over forms he developed before these potentials were thematized by the Abstract Expressionists, and it is reasonable to suppose that such possibilities were among those that led him into the cinema. We cannot take in the whole film at once (any more than we can view a stretch of time synoptically). The format of a film, to use that analogy to painting, can never be held with the compass of our gaze. Like viewers involved with a Pollock canvas, film viewers are aware, first and foremost, of the lines and shapes they see at a given moment, of their moment-by-moment evolution, and only secondarily and, to a greatly attenuated extent, of the overall format of the work.

Still, the most important of all the painterly issues that influenced Léger in making *Ballet mécanique* was the Cubist interest in balancing representation and abstraction, which is our next topic.

## LÉGER'S NEW REALISM

The decomposition of a theme into plastic elements and the recombination of these plastic forms according to geometric principles is a key to Cubist practice; it also formed the basis for Leger's "New Realism" (yet another coincidence of his painterly ambitions with those who, in a stricter sense, were truly Cubist). The New Realism that Léger envisioned would address the technological modern. In "The New Realism Goes On" (1937), he speculated on the characteristics this new art would have: it would have its origin in modern life and would be influenced by industrially produced objects with geometric forms, but these geometric forms, drawn from everyday life, would be transposed "to a realm where the imagination and the real meet and interlace, a realm from which all literary and descriptive sentimentality has been banished, all dramatization such as comes from other poetic or bookish tendencies."[121] Furthermore, it would be an art of multiple plastic contrasts.

*Contrastes des forms* (Contrasting Forms) of 1913 uses mechanical forms as a purely formal principle (rather than according to "a melodious principle").[122] Machine-like forms had appeared as early as *La noce* (1910–11), done when Léger was closest to the Cubism of Braque and Picasso. These forms grew larger and, in *Contrastes des formes*, became rather tubular. Léger, who wished to distance himself from the debate around abstraction that was occurring at this time, averred that his so-called "abstract" paintings (such as this one) were truly realistic—that is, realistic according to what Léger thought was a better definition of the term than we ordinarily assume. The ordinary conception of realism, of *vraisemblance*—what we would most likely call "naturalism"—Léger termed "visual realism." The new reality of the Industrial Age demanded a new realism, which he sometimes called "conceptual realism" and sometimes "constructive realism."[123] Unlike visual realism, conceptual realism would be independent of all imitative qualities. Léger's new realism would not depend on depicting ordinary life, but on the reality of the painted forms; that is to say, it would depend on the arrangement of the great plastic factors of line, form, and colour. A painting's reality content, Léger insisted, affects its quality; however, the reality content in a new realist painting would depend not on representation, but on form, colour, and light. Léger included the word "realism" in his term "conceptual realism" in order to emphasize that though the constructive principles that govern this sort of painting are conceptual and systematic rather than imitative, a conceptual realist painting would nonetheless stress the reality of its actual materials—and, what is more, it would not altogether lack reference to external reality. The modern character of this new realism's painted machine elements would endow a conceptual realist painting with topicality: the rhyme between its

forms and those of the world would adapt the painting to reality—indeed, it would make the painting a reflection of reality—though this relation would be a conceptual, not a visual, reflection.

Léger contended that the new realism would be suited to the new age. All this is already true of the cinema. The theatre belonged to the age of the horse and buggy; the cinema belongs to the era of the machine and embodies its spirit. Abel Gance's *La roue*, with its use of close-ups and fragmentation and its willingness to make an art of objects and of movement, had raised the cinema to plastic art. It had shown the cinema could extend the new vision that this age had brought forth.

Léger evolved his theory of the new realism in stages. His progress towards its expression in painting, in such works as *Nus dans la forêt* (Nudes in the Forest, 1909–10) and *Contrastes des formes,* reveal that he had assimilated Cézanne's lessons in a different way than Picasso and Braque. Cézanne had taught Picasso and Braque to see reality dynamically, as if from multiple vantage points; he taught Léger to construct/assemble forms. In a certain way, Picasso and Braque remained bound to the actual as much as the Impressionists had been. Léger, by contrast, was able to move beyond Impressionism, towards a conception of form as a conceptual and imaginative synthesis. As a result, his compositions often have qualities of reverie. The date of *Contrastes des formes*, 1913, gives evidence of the rapidity with which he moved to that position. With that work, Léger shows that he had understood that once objects are analyzed into interchangeable units, those units can be freely combined, without reference to the underlying object—he had come to see a painting as a montage of elements and, consequently, as an object assembled in much the same way a film is. The montage principle is absolutely central to the cinema, so in steering his painting towards conceptual realism, Léger was reconfiguring painting to resemble the cinema (and he did so even before the cinema, and film theory, of Sergei Eisenstein thematized the cinema's montage character).[124]

Léger worked out his formal interests in larger units than either Picasso and Braque used. Clement Greenberg laid out the difference between Picasso's and Braque's works and those of Léger:

> Though Léger's vocabulary, with its larger units, remained different throughout, his grammar became like theirs, one of straight lines and faired curves. The curves may have predominated in his case, but the sketchy black lines which traced them left Léger's planar forms almost as open in effect as Picasso's and Braque's truncated facets. And the way Léger modeled his roundnesses—with primary blues, reds or greens swatched around highlighted axes of crusty white laid on so dry and summarily that the burlap ground showed through—caused these roundnesses to be felt simultaneously as both curved and flattened planes.

> The different directions in which the cylindrical or conical forms slanted; the interspersed cubes and rectangles; the balance of colors, all of the same intensity; the sense of volumes compressed in ambiguous space and always presenting their broadest surfaces to the eye—all this worked in Léger's case, too, to overcome the distinction between object and background, object and ambiance.[125]

*Les nus dans la forêt* provides a fine example to support Greenberg's claim that Léger's work erased "the distinction between object and background, object and ambiance." This work, more than any by Picasso or Braque from the same time, is composed of stereometric forms. Furthermore, that work seems at first a chaotic assemblage of cylindrical forms. Little by little, we make out three huge naked figures: a kneeling figure, presented frontally, on the left; a seated nude in the middle; and, on the right, a standing nude, viewed from behind, set amid pieces of wood and plants lying on the ground. The time it takes us to configure the congeries of cylinders into these figures testifies to the truth of the claim Greenberg goes on to make—that it requires almost as much effort on the part of a spectator to identify the object matter referred to by the forms in *Les nus dans la forêt* as it does to read Picasso's or Braque's work of their analytical Cubist period.

Much the same can be said of *La femme en bleu* (Woman in Blue, 1912). In that work, the human forms are arrayed largely around the edges of the painting, while in the centre, the form is interrupted by balustrades, tables, and other objects. The construction suggests the equivalence of human with non-human forms, and of the environment with the supposed subject of the painting (Léger consistently rejected the term "subject"). Léger uses the interactions among human and non-human forms, and between the environment and the subject, to produce a fluid, dynamic impression.

## LÉGER AND THE THEORY OF CONTRASTS

Léger's theory of contrasts developed from the founding idea of Synthetic Cubism. The force that allowed Picasso and Braque to make the transition from Analytical to Synthetic Cubism came, as we have seen, from recognizing the effect of juxtaposing different luminosities, different densities, different volumes or planes, and different types of reference (including, even, verbal reference): such juxtapositions allowed—indeed demanded—the use of larger areas of homogeneous colour and a reduction in austere, small-scale geometric forms. Léger radicalized and systematized this direction by developing a theory of composition whose guiding principle was that the value of visual artwork depends on successfully organizing and modulating articulated contrasts. Contrasts could be rhythmically organized, Léger recognized, since rhythm consists of the alternation of bolder and less bold, marked and less

strongly marked, components—and when contrasting forms are organized rhythmically, they contribute to the impression of dynamism.

*La femme en bleu*, *Contrastes de formes*, and *Modèle nu dans l'atelier* (Nude Model in the Studio, 1912–13) are all based on Léger's theory of contrasts. His idea of contrast was inclusive: so important to Léger was this catholicity about the medium's potential that he expressed with withering contempt his thoughts about painters who neglected any of painting's resources. In "Les origines de la peinture contemporaine et sa valeur représentative" (The Origins of Painting and Its Representational Value, 1913), he set out his ideas about pictorial realism (that is, painting that is realistic in the sense that it is contemporary—contemporary in the sense that it employs contrasts): "Pictorial realism is the simultaneous ordering of three great plastic components: Lines, Forms and Colors. No work can lay claim to pure classicism, that is, to a lasting quality independent of the period of its creation, if one of those components is completely sacrificed to the detriment of the other two."[126] In this way, Léger declared his disagreement with Analytical Cubism (which underplayed the role of colour). In highlighting the important part that colour plays in articulating contrasts, Léger revealed that it was his theory of contrasts (in a still inchoate form) that had allowed him to move directly from Cézannesque Post-Impressionism to Synthetic Cubism without passing through the intermediate phase of Analytic Cubism (even though, as Greenberg highlighted, the challenge involved in integrating the rhyming elements in Léger's work was similar to the difficulty Analytic Cubism purposely offered).

Léger's idea of simultanism was similarly imaginative and synthetic. For him, simultanism was an effect of the synthesis of disparate fragments—elements possessing dissimilar physical, visual, or emotional properties—into a single image. That is, it was the pictorial equivalent to the synthesis of sensory elements in a dynamic perceptual form.[127] I remarked earlier on the Cubists' belief in the isomorphism between the synthesizing process that produces a percept and the synthesizing process that produces a (Cubist) painting—in the fact that (to adapt a phrase from the Canadian painter Jack Chambers) a "painting gets put together just like an experience"—from pieces. This is essentially what Léger means by visual simultanism.

As I have noted, Léger criticized Robert Delaunay's ideas about simultaneous contrasts of colours for rejecting sentimental values and the use of perspective.[128] Even sentimental forms, or forms that produce an illusion of depth are usable as elements within a framework of contrasts, Léger declared.[129] This acceptance of forms belonging to different modes (also exemplified in *Ballet mécanique*) was far from common in the second decade of the twentieth century (or even in the several ensuing decades), for this era attempted to define the nature of the media through a process of overcoming such conventional

forms of construction. Against such prevailing doctrines, Léger repeatedly insisted that compositions with multiplied contrasts (an idea resonant of Futurist methods) were the only way to convey the dynamics of contemporary life. Léger told his class at the Académie Vassilieff that from his time on, all developments in art would "converge toward an intense realism obtained by purely dynamic means. Pictorial contrasts used in their purest sense (complementary colors, lines, and forms) are henceforth the structural basis of modern pictures."[130] Léger contended that "present-day life, more fragmented and faster moving than life in previous eras, has had to accept as its means of expression an art of dynamic divisionism."[131]

To explain his notion of dynamic divisionism to his classes, Léger expanded on some of the ideas he presented in his article "Les réalisations picturales actuelles" (Contemporary Achievements in Painting, 1914). Note that it expands on Braque's interest in reconciling positive and negative volumes to a flat surface:

> In order to achieve construction by means of colour, it is necessary that, from the point of view of value (for that finally is all that counts) the two tones are in equilibrium, or, in other words, neutralized: if the green-coloured plane, for example, is more important than the red-coloured plane, there cannot be construction…
>
> Composition by multiplicative contrast, by using all the available pictorial means, affords in addition to a stronger realistic experience the certainty of variety [of course Léger means here "realism of the object," of material and arrangement of materials, and not visual realism]; indeed, rather than opposing two expressive means in an immediate and mutually reinforcing relationship, you compose a picture so that groups of similar shapes are opposed to other contrasting groups. If you distribute your colour, that will accord with the same spirit—that is to say, by setting one group of objects, all in similar tones, against another group of forms in a contrary tone, you obtain collective sources of tones, lines and colours acting against other contrary and dissonant sources. Contrast = dissonances, therefore maximum in the expressive effect.[132]

We will see that this notion of producing *dissensus* through multiplicative contrasts, to ensure maximum expressive effect, connects Léger's methods with those used by the composer of the film's soundtrack, George Antheil (1900–1959).

Léger's choice of the term "dynamic divisionism" makes us aware of the importance of movement in his painting. That interest certainly played a key part in leading him towards the cinema. He conceived of *Ballet mécanique* as a composition of dynamic contrasts within which the moving picture image would be a main protagonist, along with automated sound. He predicted, in an unpublished manuscript, that in the future, films would be constructed

"without scenarios by treating *the moving image* [image mobile] as *the leading character*."[133] He proposed eliminating anecdote so that the plastics of the image would be the central focus of the visuals. In rejecting the scenario, he was developing further an approach that he had taken to his painting: just as in his paintings he sometimes erased the subject from aesthetic consideration by reducing it to purely plastic values, with this film he would eliminate the scenario so that the object-fragment assumed central place. He eliminated story development by the frequent repetition of shots (and he highlighted this principle of repetition in the looped footage of the woman climbing stairs). He noted,

> I am going to say a little about *Ballet Mécanique*. Its story is simple. I made it in 1923 and 1924. At that time I was doing paintings in which the active elements were *objects* freed from all atmosphere, put in new relationships to each other.
>
> Painters had already *destroyed the subject*, as the descriptive scenario was going to be destroyed in avant-garde films. [By subject, Léger means theme or thesis or argument—what the film is about. Following the lead of painting, film, in eliminating the argument, would allow the object, or, more exactly, dynamized objects, to come to the fore.]
>
> I thought that through film this neglected *object* would be able to assume its value as well. Beginning there, I worked on this film, I took very ordinary objects that I transferred to the screen by giving them a very deliberate, very calculated mobility and rhythm [in using the term *calculated*, Léger evokes the harmonic ideas that are at the heart of this work].
>
> Contrasting objects, slow and rapid passages, rest and intensity—the whole film was constructed on *that*. I used the close-up, which is the only cinematographic invention. [The close-up gives film its unique character. The French word for close-up, *gros plan*, makes reference to size, and so it suggests the effect of change of scale; Léger wrote about the close-up, and was aware of the effect of that transformation.] Fragments of objects were also useful; by isolating a thing you give it a personality. [Note how markedly this idea of the fragment differs from that of the Analytical Cubists.] All this work led me to consider the event of objectivity as a very new contemporary value. [His work in film led him to understand that objectivity, which is built into the film's nature, makes it the art best suited for the contemporary world.]
>
> The documentaries, the newsreels are filled with these beautiful "objective facts" that need only be captured and presented properly. [Here Léger relates the photographic image to objectivity.] We are living through *the advent* of the object that is thrust on us in *all those shops that decorate the streets*. [The contemporary world has heightened the importance of the object. Film is disposed towards the object; hence film is eminently suited to contemporary reality.]
>
> A herd of sheep walking, filmed from above, shown straight on the screen, is like an unknown sea that disorients the spectator. [Léger declares his interest

> in a sort of Shklovskian *остранение* (ostranenie; "making strange" or defamiliarizing, a challenging of perception, to make us see objects afresh).]
>
> That is objectivity.
>
> The thighs of fifty girls, rotating in disciplined formation, shown as a close-up—that is beautiful and *that is objectivity.*
>
> *Ballet Mécanique* cost me about 5,000 francs, and the editing gave me a lot of trouble. [I think we should take Léger at his word here, and that brings into question the story that has developed around the film, that Léger's involvement in the filmmaking was slight.] There are long sequences of repeated movements that had to be cut. I had to watch the smallest details very carefully because of the repetition of images.
>
> For example, in "The Woman Climbing the Stairs," I wanted to *amaze* the audience first, then make them uneasy, and then push the adventure to the point of exasperation.[134]

Léger goes on to describe the image of the woman on the swing (Katherine Murphy) as a postcard in motion: postcards were a relatively new, "contemporary" use of photography. The statement also reinforces the point that some of the film's imagery draws on photography's vernacular applications.

*Ballet mécanique* perhaps represents the culmination of Léger's interest in the object (for the cinema is the art of the object *par excellence* and perhaps the inspiration for early-twentieth-century artists' interest in the object). Nevertheless, other items in his *oeuvre* make the same interest manifest: for example, his paintings of the time also show an interest in kitchen utensils.[135]

Léger's text also stresses the role of rhythmic imagery. The recognition that the modern world is characterized by dynamism and the conviction that it is imperative to bring art into the modern age (or to integrate art and life) were commonplaces in artistic movements of the early twentieth century. They helped drive the development of Futurism in Italy and Constructivism in the Soviet Union. They also provided an impetus for Marcel Duchamp to create what became perhaps the best-known painting of the twentieth century, *Nue descendant l'escalier no. 2* (Nude Descending a Staircase no. 2, 1912). Léger's method for engendering a sense of movement owed much to the Futurists. For the Futurists, a painting is an arena for presenting the simultaneous existence of contradictory elements, and paintings often offer a riotous plethora of discordant forms similar to those sometimes encountered in modern life. The *dissensus* of dynamic forms that typified Futurist painting became the multiplied contrasts of Fernand Léger's work. Léger's idea of "dynamic divisionism" was doubtless influenced by the Futurists. Admittedly, for them, as for French painters practising *divisionnisme* [or *chromoluminarisme*, which was Georges Seurat's preferred phrase], and for Italian painters engaged in

*divisionismo*, the juxtaposed elements were vibrating colours rather than dynamic moduli. But a painter and writer as erudite as Léger would not have chosen the term "divisionism" without understanding its place in contemporary discussion: "This naturally leads us to the conclusion that painting cannot exist without Divisionism," proclaimed the Futurist painters. "Divisionism must in the modern painter be a CONGENTIAL COMPLEMENTARISM, which we judged to be essential and necessary."[136] The idea of covering the canvas with complementary (that is, contrasting) forms, and of creating a sensation through the dynamic rhythm of these complementary forms, is a key to the Futurists' paintings *and* to those of Léger, who commented on the power of contrast (complementariness) to create a dynamized sensation (dynamic divisionism):

> I will take as an example a commonplace subject: the visual effect of curled and round puffs of smoke rising between houses. You want to convey their plastic value. Here you have the best example on which to apply research into multiplicative intensities. [Note again the resonances of Futurist terminology in Léger's language.] Concentrate your curves with the greatest possible variety without breaking up their mass; frame them by means of the hard, dry relationship of the surfaces of the houses, dead surfaces that will acquire movement by being coloured in contrast to the central mass and being opposed to live forms; you will obtain a maximum effect.[137]

*La ville* (The City, 1919) is often cited as Léger's masterpiece of dynamic divisionism and visual simultanism. Standish Lawder describes it thus:

> *The City* is essentially a portrait of modern life in which Léger has used the Cubist visual vocabulary of sharp-edged flattened forms to create a simultaneous image of the many characteristic faces of the city. The constant shift of scale and viewpoint, the rush of images assaulting the eye simultaneously, the confusion of the senses, the disjointed space, the depersonalization of the individual, the vision in motion—all of these sensations that so incisively describe city life are realized by Léger here. The painting has a consciously modern note, for Léger was highly sensitive to the images and rhythms of urban life. He attempted to transpose those sensory impressions directly and immediately onto his canvas.[138]

Note that Lawder's characterization of the painting could be applied almost as well to Boccioni's *La strada entra nella casa* (The Street Enters the House, 1911), which is the principal source of the illustration that appears on the cover of this volume. Lawder also connects the perceptual dynamism implied in this synthetic painting to the perceptual dynamism *Ballet mécanique* implies through its use of montage (the process of assembling central to the cinema)—Léger, he says,

> sought to create in film the same discontinuous, fragmented, kaleidoscopic world that his paintings [describe] . . . The pulsating energies of modern urban life, its rhythms and forms . . . all can be felt in *Ballet mécanique* [which is] a spectacle in constant movement . . . a hard, intense, and vitally alive man-made environment, like the city, like [the] painting *The City*.[139]

## THE IDEA OF THE NEW HUMAN AND ITS CONTRIBUTION TO LÉGER'S EVOLUTION

In August 1914, at the age of thirty-three, Léger was mobilized; in 1916, he was gassed; at the end of 1917, he was discharged. While he was in the army, he experienced the life of an ordinary soldier and began to think about what sort of artwork the ordinary soldier might want to have on his or her wall. He recognized that his understanding of painting had been transformed by his comradeship with his fellow soldiers. He wrote of the fraternity he had felt with the soldiers and how his experience at the front had transformed his painting:

> I have made dozens and dozens of drawings. I have felt the body of the metal and my eye has seen the geometry of shapes. It was there in the trenches that I arrived at the objective. I thought again of my first abstract studies, and a wholly new conception of the form, use and purpose of abstract art came to me.[140]

Léger's wartime experiences, and the ruminations they prompted, gave impetus to his mechanical period (1917–19). Out of this emerged such work as *Soldat à la pipe* (Soldier with a Pipe, 1916), *Soldats jouant aux cartes* (The Card Game, 1917), and *Le blessé* (The Wounded Soldier, 1917)—commanding paintings that simply present, without accusation or melodrama, objective forms held together in a complex matrix of tensions. In 1917, he embarked on his mechanical period, painting the modern world that had been transformed by the machine, and filling his paintings with the geometrical forms of motors, grade crossings, scaffolding, smokestacks, railway cars. In these works Léger attempted to make a place in the work of art for the hard, simple geometrical forms of that world—so unlike the soft, organic curvilinear forms that had long constituted the tradition's paradigm of beauty. Léger's aspirations for these paintings were more radical than those of the Impressionists, but they did have one feature in common with the paintings that movement had produced: like the Impressionists, Léger sought to expand the compass of beauty to include more features of the everyday. The Impressionists had taken up as a cause the right of fleeting, momentary conditions, and of scenes that had not been brought into conformity with long-established canons of proportion and harmony, to occupy a place in a

work of art. However, their subjects—the transient effects of light, the configuration of individuals in a crowd, bodies whose proportions were closer to the proportions of actual human bodies than the idealized proportions prescribed, for reasons of harmony, for Renaissance or Pre-Raphaelite paintings—were, usually, closer to the subjects of traditional painting than the hard, geometrical forms of the subjects of Léger's mechanical period. Léger asserted, "My aim is to try to lay down this notion: that there are no categories or hierarchies of Beauty—this is the worst possible error. The Beautiful is everywhere; perhaps more in the arrangement of your saucepans in the white walls of your kitchen than in your eighteenth-century living room or in the official museums."[141]

The idea that there is beauty in the arrangement of your pots and pans and in your kitchen's white walls is one that, as we will see, Léger worked out quite literally in *Ballet mécanique*. His paintings of this period anticipate that film in other ways. *Soldat à la pipe* and *Soldats jouant aux cartes* render human parts mechanomorphically—virtually as machine parts. In fact, *L'escalier* (The Staircase) of 1913, *L'escalier* of 1914, and *L'escalier* of 1919–20 all present mechanical figures on a staircase.[142] (Compare these with the washerworman sequence in *Ballet mécanique*.)

Léger's commitment to the belief that industrial and mechanical forms (and other mass-produced forms) are just as beautiful as a seascape or a nude was unwavering: "Let us suppose . . . that this whole, immense world of engineers, workers, shopkeepers, and display artists became conscious of all the beauty they create and in which they live. The demand for beauty would almost be satisfied by them; the peasant would be satisfied with his beautifully colored mowing machine, and the salesman with his melody of neckties."[143] That declaration charted his evolution: after a brief time (1916 and into 1917) in which he resolved the human form into mechanical elements, Léger stopped painting human beings for a while and instead pursued his interest in transforming the objects of everyday, modern life (much as the Bauhäusler, the Soviet Constructivists, the Dutch Neo-Plasticists, and the French Purists did).

But he did return to the human figure (and *Ballet mécanique* reflects this renewed interest). Until 1921, most of Léger's human subjects had been men; in 1921, his interests shifted towards groups of women, both nude and clothed, reclining in front of highly stylized backgrounds.[144] Léger began to deliberate on the decadence of Renaissance art and on the potency of the female nude as a shameless temptation to representation—and he began to paint women with a cool impassivity, control, and reserve.

## EQUIVALENT TO LIFE: PLASTICALLY ORGANIZED INTENSITY

> My ambition is now to arrive at the maximum of pictorial rendering through a contrasting of all the plastic means… My origins: influence of the impressionists from the point of view of colour (Renoir, Seurat): from the point of view of form (Ingres, David). Before the war: no power of decision, a struggle with influences, with "good taste"—timidity, uncertainty… Three years of War without touching a brush but in touch with the starkest most violent reality… Immediately on discharge I felt the benefit of my probation, grim as it was. I have found a power of decision. I model now in frank local tones and bold volumes without any concessions. I have gone beyond tasteful arrangements, grays, and backgrounds of dead picture-surface… So much the worse for "good form" "good taste" and "style" as it is recognized—if there is any in my pictures someone will find it later on. For the present I am interested in producing "live" organisms. For me a picture is the contrary to a wall, that is to say it should be a noise, movement.[145]

Léger reiterated the point shortly after, in his article "Notes sur la vie plastique actuelle" (Notes on Contemporary Plastic Life, 1923), in which (as I have noted) he stated that he was seeking "l'état d'intensité plastique organisé" (the state of plastically organized intensity).[146] To achieve that, he applied "the law of contrasts, which stipulates an eternal means for realizing an equivalent to life."[147] Léger achieved a plastically organized intensity equivalent to that of life by arranging "the opposition of contrasting values, lines, and curves."[148]

Léger's commentary does not misrepresent his artmaking. His paintings from 1919 onwards articulate tension-building contrasts with an ever-clearer focus. His large-scale painting *La ville* (The City, 1919–20), which is generally taken to be his masterpiece of dynamic divisionism, gathers together myriad opposing features, so the canvas seems crowded, even chaotic. It evokes a welter of simultaneous urban events, largely through the contrasts in the work, which juxtapose differing shapes and colours, and by fragmenting planes to produce a montage construction. *La ville* achieves a revolutionary sort of depth and dynamism, and it does so without such imitative techniques as *chiaroscuro* and modelling; instead, Léger uses overlapping planes to evoke a sense of the riot of forms in urban life, and fragments to suggest the speed of urban experience. The fragments of billboard texts and images, montaged together rather like shots in a film, elicit an experience equivalent to that excited by the multiple stimuli available in the city and by the speed with which life in the city moves. It should be noted that the movements implied in the various fragments sometimes cancel one another, imbuing the painting with a feeling that seems to oscillate between dynamism and listlessness.

I commented earlier that Léger's work with forms analogous to collage led, after *La ville*, to a simplification of forms, to broad areas of colour, and to rhythmic constructions. (The rhythmic constructions and decorative forms in Léger's work during these years have parallels in *Ballet mécanique*.) I turn now to connect these developments to Léger's growing interest in cinema.

Léger himself pointed out that the drive to simplify the major forms in his paintings, which became a marked feature in this period, arose from a comparable feature of the cinema that fascinated him and on which he wrote at some length. Specifically, he derived this simplification from the camera's affinity for close-ups. In his article "Peinture et cinéma" (Painting and Cinema, 1925), he attributed to the cinema painting's new-found interest in representing objects larger than life. "Thanks to the screen, the prejudice against 'things larger than nature' no longer exists," he wrote.[149] He believed that a common law applied to all the plastic arts, including the cinema and painting, and he maintained that both painting and film provided for "the magnification of the frame" and the "individualization of a detail" (techniques he acknowledged using in both media).[150] His experience in filmmaking led him to conclude that the "error of cinema is the scenario." In a film, that is, the scale of an object has a stronger emotional effect than does the drama (or what Léger called the "pathos") of the scene the scenarist wrote and the director filmed. To illustrate his conviction, he pointed out that "a stage door that moves slowly in close-up (object) is more emotional than the projection of a person who causes it to move in actual scale (subject)."[151]

Léger explained the power of a close-up by making use of one of Cubism's founding notions, the idea that the effectiveness of the contemporary artwork depends on its capacity to revivify perception—to get us to see worldly objects in a new, dynamic manner: "True cinema involves *the image of the object* which is totally unfamiliar to our eyes and which is in itself moving, if you know how to present it."[152]

Léger had offered similar ideas three years earlier (1922), when his experiences working on Abel Gance's *La roue* led him to reflect systematically on the cinema. These reflections concerned projection's ability to vivify perception, to make audiences see more intensely what they would ordinarily respond to in a dull, routinized fashion:

> 80 percent of the clients and objects that help us to live are only noticed by us in our everyday lives, while 20 percent are *seen*. From this, I deduce the cinematographic revolution is *to make us see everything that has been merely noticed*. Project those brand-new elements, and you have your tragedies, your comedies, on a plane that is uniquely visual and cinematographic. The dog that goes by in street is only noticed. Projected on the screen, it is seen, so much so that the whole audience reacts as if it discovered the dog.

> The mere fact of projection of the image already defines the object, which becomes spectacle. A judiciously composed image already has value through this fact. Don't abandon this point of view. Here is the pivot, the basis of this new art. Abel Gance has sensed it perfectly. He has achieved it, he is the first to have presented it to the public. You will see moving images presented like a picture, centred on the screen with a judicious range in the balance of still and moving parts (the contrast of effects); a still figure on a machine that is moving, a modulated hand in contrast to a geometric mass, circular forms, abstract forms, the interplay of curves and straight lines (contrasts of lines), dazzling, wonderful, a moving geometry that astonishes you.[153]

That Léger petitioned to the principle of revivifying perception, especially in the context of his deliberations on the effects of close-ups, raises an important point: even though Léger used the principle of revivifying perception to explain the cinema, his deployment of that precept prompts one to consider that, so far as the order of causation (rather than the order of understanding) is concerned, photography and the cinema may have had priority and that they might have generated this interest in intensifying perception: thus, the cinema's capacity to revivify perception by presenting objects in close-up may well have helped form the central goal of Cubist art. Léger's concern was primarily with the object and only secondarily with issues relating to painting's historical evolution—and the importance he attached to the object reflects the advent of photography and (especially) film and their capacity to make us see objects in a new light. His remarks on Gance reflect the enthusiasm he felt for the ability of film and photography to present objects in an unusual way (and the evolution of his painting reflects the same developing enthusiasm). In that sense, it was the cinema that led Léger in Cubism, and not the other way around.

Between 1919 and 1921, Léger's forms become more and more assertive and strongly defined. Broad, unmodulated lines that traverse the picture plane eliminate all modelling from the composition. He reduces his forms to unmodulated facets with geometric outlines, and the compositions as a whole give the impression of a hard-edged, formal severity. Not the least of the reasons for this is that none of the facets recede far from the picture plane—all elements are brought to the immediate foreground, to create a stronger impression; but as important a reason is that the various components are organized into strong—sometimes even violent—contrasts. These paintings also show that Léger had developed the means of creating an impression of depth (however shallow and restricted) without resorting to *chiaroscuro*, and of dynamism without resorting to modelling. This new ability was likely developed in imitation of the cinema, whose images at the time offered compressed volumes and relatively stark contrasts.

Undoubtedly, this simplification was strongly motivated by principles immanent in painting: they were impelled, surely, by the imperative to render contrasts as starkly as possible. But another likely factor (suggested in Léger's writings of this period) was the cinema, which so amplified the montage principle that it became (as Sergei Eisenstein would point out) a qualitatively different principle than that manifested in any of the other arts. There is a fascinating historical dynamic at work in the development of montage (which here should be understood as the art of *mechanical* assembly): early film, knowing that the limits of montage (assembly) demarcated one of the cinema's outer limits, turned to visual arts and poetry for instruction on its nature. But, having taken the lessons, the cinema extended the montage principle until it became something qualitatively different in film than it had been in other arts. Between 1912 and 1921, visual art and poetry took back into themselves the cinematically amplified collage principle, which had first developed as a transformative expansion of paratactical construction.[154] In 1923, Fernand Léger turned *to* the cinema to rework the montage principles that his paintings had taken *from* the cinema.

Among the first of Léger's paintings in which he avoided *chiaroscuro* was *Les disques* (The Disks, 1918). That work launched a trend towards elementarization in Léger's art—one that is also evident *Ballet mécanique* (in which Léger renders a straw boater as a circle (sometimes concentric circles) and a shoe as a flattened ellipse). *Les disques* was inspired by the circular forms of Robert Delaunay's Orphic period. However, the *formes circulaires* in Delaunay's paintings from this period were ideal forms, symbols of light, of suns and moons, and even of absolute reality.[155] Against many critics, I believe that Léger did have an interest in the idealistic connotations of certain visual forms—but he was interested in them more as conventional accretions these forms had assumed through social use (rather like the conventional meanings of the graphemes that appear in *Ballet mécanique*). In Léger's paintings, the circle was not intended to provoke a transcendental experience: when he used a circle, he was not interested in evoking a higher reality, but rather in juxtaposing visual forms that signify in different ways—and the conventional signification of the circle (like the conventional signification of a letter or a word) was among the meanings he imported into his paintings and into *Ballet mécanique* for the purpose of maximizing diversity. By and large, such conventional forms (which sometimes carry religious or spiritual meanings) were imported into his works to indicate the range of significances that visual form can take on and to create contrasts among these different types. He really was not interested in evoking transcendental experiences.

But above all, Léger was interested in form and colour for their own sake and for their connections to the world of the machine. He was not interested in the

questionable "mystical-Oriental seductiveness" of *chiaroscuro*; he preferred instead hard forms and hard light: "The indiscrete spotlight. The sunlights of studios. Sun."[156] Once again, the character of the cinema—its penchant for hard light (especially in this period, when film stocks could not render the subtle graduated tones they could in the 1980s or 1990s)—influenced Léger's understanding of the possibilities of a new form of painting. The forms in his paintings are all flat, but in tension with that flatness is a space articulated by the overlapping forms suggesting foreground/background relations among the elements. His paintings organize contrasts between the grid of verticals and horizontals that provide its substructure and the circle forms on top of them. It is also an arrangement of basic, contrasting colours.

Undoubtedly, Delaunay's Orphism played some role in Léger's renewed interest in colour and chromatic relations (though the "invasion of colour" after the war, as Paris streets, walls, houses, gardens, and objects once again became intensely coloured, played a key role as well).[157] However, the difference with Delaunay on the matter of form applied to colour as well: Léger did not share Delaunay's interest in the transcendental realm.[158] Thus, where Delaunay used colour as a symbol of light, Léger used colour for itself, to create contrasts between forms, rather than as a symbol of something higher or as a means to provoke a transcendental experience (though as I have noted, I believe that Léger did mobilize allusions to conventional meanings as a way of highlighting the range of types of significance that visual forms trade in).

In *Éléments mécaniques* (Mechanical Elements, 1918–23), by contrast, we find modelled three-dimensional forms and even some use of *chiaroscuro*. Even so, it shares features with *Les disques*: as in *Les disques*, mechanical elements are assembled on a simple geometric framework, much as the components of *Ballet mécanique* are assembled in a simple temporal grid (I will show that the beat of the pendulum gives the film its basic structure).

I have already remarked on *La ville*, the most renowned painting of Léger's mechanical period, and the painting that, perhaps, has the most in common with *Ballet mécanique*. To my earlier remarks, I would add a remark on the use of colour in that painting. Like *Les disques*, *La ville* is painted in strong, pure colours, though the arrangement of colours is not restricted to placing complementaries side by side, as so often it was in Delaunay's paintings. Moreover, Léger's elementary forms have a solidity that contrasts with the scenic actions of the city paintings Delaunay had done a few years earlier—*Ville de Paris* (City of Paris, 1910–12) and *Tour Eiffel* (The Eiffel Tower, 1910–11). Furthermore, Léger's colours are clearer and more forceful.

*Disques dans la ville* (Discs in the City, 1920–21) shows the influence of the montage principle, which the cinema of the time employed to such advantage (so, we might presume, the painting was influenced by the cinema). This work

displays features of both *Les disques* and *La ville*. It also makes clear that Léger understood his theory of contrasts as a thesis about assembling basic components (for example, the cylinder, the sphere, and the cone, though he did not limit his conception of painting motifs to those basic forms—his basic elements include colours and tones as well as geometric shapes) to create contrastive relations. Like *La cirque* (The Circus, 1918) and like *Ballet mécanique*, it also incorporates human forms into its predominately geometric composition.

One painting of the mechanical period, done in the year 1919, uses printed type and letters from posters, as *Ballet mécanique* does. Titled *Le typographe* (The Typographer), it is an imaginary figurative composition.[159] In that painting, as in *Ballet mécanique*, type does not serve a merely decorative role; nor does it impose a literal interpretation on visual forms; nor does it serve to generate associations (as the Surrealists' incorporations of text often do). Rather, Léger incorporated printed texts to serve two functions that are absolutely crucial to his painting's architecture. The first is the role that Greenberg recognized that Picasso's and Braque's incorporation of type (and other objects/materials that are literally flat) played—to force, by their contrast with the absolutely flat typographical signs, the facets of objects, which are not absolutely flat, back into the painting's shallow space.

As the Cubists (during the period of Analytical Cubism) carried their decomposition of depicted content further and further, the remote boundary of the picture box approached the picture plane ever nearer: so they needed a device to push the facets back into the illusory picture space (however shallow that space might be). The contrast between the absolutely flat typographic form and the recessive orientation of the facets was one means that Picasso and Braque devised to serve this end. Léger used type for similar ends. But in addition, for Léger, the use of type provided another benefit, that of introducing an additional order of contrast into the multiform contrasts that he thought were necessary to a strong work.

Léger's incorporation of type also had a social function: he was committed to creating paintings that reflected the realities of modern life. He recognized that the modern world is filled with forms produced by the printing trades—both graphic and typographic forms. In 1918, just before painting *Le typographe*, he wrote,

> Peace! Man, worn out and having lost his identity in four long years of suffering, raises his head, opens his eyes and stretches himself; he takes pleasure in life anew, feels the frenzy of being able to dance, spend, at last to stand upright, and shout, and squander. A whole wave of energy is released throughout the world. The canary and the red flower are still there, but out of sight. Through the window the bright colours of the wall opposite hit one in the face. Huge letters twelve feet high invade one's flat. Colour takes a new place and dominates day-

> to-day life. One must adapt oneself… A multicoloured vision of unprecedented corruption batters one's sight. There is no rein, no limit to this onslaught which hits one's retina, blinding and driving one mad; whither next?[160]

Painting needed to reflect this new reality; indeed, it needed to show how to bring that tumult of forms into harmony. Thus, Léger's theory of plastic contrast became a corollary of the theory of harmony. This was another point of connection between Léger's work and ideas and those of George Antheil.

A final point must be made about the paintings of Léger's mechanical period. Many painters' interests aligned with or grew out of those of the Cubists (and among painters of the time, Léger was especially inventive in conceiving of forms that would allow him to achieve their aspirations). Those interests included widespread efforts to expel narrative from the arts, for narrative exemplifies hierarchical form (with the climax serving as a focalizing agent, rather as the vanishing point does in conventional painting). Léger's compositions, we have seen, were concerned with according all the elements in a painting equal importance. Narrative is a hierarchizing form, so using it would be antithetical to efforts to accord all elements in a work the same importance.

The old conventions for organizing spatial form in paintings were based on setting an object against a ground. McLuhan knew that this conception was no longer viable: he understood that the practice of setting an unchanging form against a ground, which had a decidedly secondary status, belonged to the time when the dominant media were based on fixed type (linotype boxes filled with standard, interchangeable forms, the letters of the alphabet). That mechanical conception of the universe had given way to a more organic conception of reality, as being made up of energies that interpenetrate one another. According to this new cosmology, "geometrical space was seen to be continuous, not a pattern of empty gaps interrupted by solid things," and space "penetrates the solids that occupy its single continuous medium." Thus, the relation of figure to ground has been transformed: negative space (ground) has become positive, as Stephen Kern notes in *The Culture of Time and Space 1880–1918*: "This new conception of 'positive negative space'… implies that the background itself is a positive element, of equal importance with all the others."[161] Space now penetrates the entities/events it contains, shaping their being.

This transformation of the relation of figure and ground is what McLuhan was acknowledging when he referred—as he often did—to what at one time had been a contrast but was no longer a contrast. The ground possesses energy that shapes whatever occupies it or is set against it: it gives form to the meanings that emerge from its matrix. And to affirm that is to acknowledge that elements in space are not univocal, bounded, separated entities; rather, they

are plays of forces, continuously interacting with one another and always mutating. Reality is an organic being, in which all events and objects interact with all others. Reality is an all-encompassing field of mutual exchanges, with any event/object interacting with all other events/objects, however near or remote they are.

This effort to convey a sense that space is not a nearly empty container—that it is filled with force and energy—was a product of the age of electromagnetism. The Cubists, we have seen, went a certain distance in conveying that sense, and Léger a step farther. But the degree of interpenetration in Cubist works is radically restricted because these works' spatial forms are confined by the grid form so often adopted in their early painting and by the mechanomorphic forms of their later painting. We will see how that notion was more fully realized in Futurist poetry and painting.

## LÉGER AND PURISM

In 1919, human beings reappeared in Léger's works. Their reappearance was no reversion to the subjects of painting from before the modern era, however. Léger had developed an interest (also evident in *Ballet mécanique*) in depicting human beings in a new, geometrical manner. Reflecting later on this—in 1924, the year of *Ballet mécanique*—he wrote, "*Modern man lives more and more in a preponderantly geometric order. All mechanical and industrial human creation is subject to geometric forces.*"[162] Time and again, Léger's paintings of this era resolve humans into mechanomorphic components, which are organized according to rhythmic and geometric considerations. André Verdet wrote,

> So Fernand Léger may appear to have emerged directly from *L'Homme-Machine* by the encyclopedist La Mettrie. For the latter man is in fact a function. A function understood in the sense of a mechanism, like an organ which is an element of material function independent of divine intervention . . . Nothing in his compositions is either "real" or "abstract." Everything has this common sociological function, everything becomes "functional." The forms which emerge will stem from an organic urge . . . Léger's principal aim is to endow them with stylistic consistency, in which the impassivity of the artist is essentially the calm triumph of the creator over the nature which surrounds us.
>
> Just as in the mind of the painter a house or a machine are tangible objects before they assume the character of architecture, so the human body is a functional entity, endowed with energy, before being a man. Let us take notice of these functional elements, these machine parts—tubes, cylinders, pistons, pulleys, rods, gears, plates, etc; let us observe their arrangement, their profile, their mounting; we cannot but be struck by their relationship with the organs of the human body.[163]

In the paintings of Léger's mechanical period, human beings participate in "the predominant geometric order" not as supreme over its elements, but as the equals of mechanical and industrial forms, and sometimes even as subservient to them. Machines fascinated Léger for many reasons, but among them was that they exemplify the process of creating objects by assembling standard, generally geometric, components. He considered the analogous constitution of human beings: "My job is to put man together sketch by sketch, part by part, just like someone who builds a motor or a house."[164] That, in the end, is the goal of *Le pont du navire* (Boat Deck, 1919), *Les pêcheurs* (The Fishermen, 1921), and, most impressively, *La ville* (1919–20). All of these works drew their inspiration from the quotidian (working-class) urban or industrial environment.

During the postwar era, Léger gravitated more and more towards Purism. After 1918 his formal vocabulary drew extensively on that of the Purists. From De Stijl, he learned that using spare planar compositions (especially in conjunction with the Purist machine aesthetic) could provide an enriched and thoroughly modern type of composition. In 1924, the year that *Ballet mécanique* was first presented, he collaborated with the Purist painter Amédée Ozenfant (1886–1966) in establishing a teaching studio.[165]

The Purists saw themselves as successors to the Cubists. The movement was launched when, in 1918, Amédée Ozenfant and Charles-Édouard Jeanneret-Gris (1887–1965, who went under the name Le Corbusier) published *Après le cubisme* (After Cubism). The accumulation of fragmentary percepts in a Cubist painting highlighted the anxiety-ridden spirit of the time—yet, Ozenfant and Le Corbusier declared, the Cubists had not realized that they were creating a troubled art for a troubled time. The Purists aspired to create a more positive, harmonious art that could lead the world to an epoch of order that would embody *l'ésprit nouveau*. They were for an uplifting art, one that would produce joy by satisfying humans' need for order. The aesthetic values they acknowledged had, as they recognized, Classical foundations. They strove to bring forth a more crystalline art in which clarity and objectivity would be of the essence. Like the artists who founded De Stijl and Constructivism, Ozenfant and Jeanneret (Le Corbusier) advocated an art whose beauty would derive from functional efficiency and precision, an art that would engage the intellect; and, like Theo van Doesburg (1883–1931) and Piet Mondrian (1872–1944), they valorized impersonality and the sensory qualities that evoke what all humans have in common: they did not celebrate, as the Romantics had, the uniqueness of the individual (who, in their view, was relatively unimportant). The movement had much in common with De Stijl and Constructivism but was of a milder cast. Indeed, it was hostile to all forms of extremism.

In Purism, the machine was the dominant motif: they insisted that everything should be made with precision and adapted through number and measure to those traditional canons of harmony and beauty that relate ultimately to the human body and to the senses. This interest in the machine developed out of the characteristic ideals of the movement, which derived largely from Pythagoreanism and which Ozenfant and Le Corbusier extended by reconciling the fundamental tenets of that system to key Kantian beliefs. For the Purists believed that aesthetic order—indeed, *any* form of order—is ruled by number. They believed this for the same reason the Pythagorean philosophers did: because the measures (length, breadth, area, whatever) of elements that form satisfying relations with one another can be represented proportionately by small numbers (for example, 1:2; 2:3; 3:5). However, unlike the Pythagorean philosophers, Ozenfant and Jeanneret (Le Corbusier) believed the reason elements whose relative measures are represented by ratios between small whole numbers satisfy us has to do only with our sensory faculties, and that phenomenon does not necessarily reflect anything about the structure of reality. While the Pythagoreans believed that Pythagoras's discovery—the fact that the relation between the frequencies of two notes separated by an octave is as simple and elegant as it is, along with the fact that humans sense immediately that there is especially intimate, consonantal relation between the two notes the frequency of which, relative to one another, can be represented by the ratio between the two smallest natural numbers—indicates that the order of reality is determined by number and that our senses and our minds are attuned to the order of number. The Purists, especially Ozenfant, rejected this theological assertion (for that, finally, is what it was) and maintained instead that the fact that harmonic relations create satisfaction in being apprehended simply reflects the structure of our minds and our senses. The Purists extended this Kantian proposition to apply even to scientific findings. Humans, they contended, have a need to apprehend order, and the equations of mathematics and physics (for example, Einstein's formula for calculating the contraction of a body with velocity) reveal the human quest for order as much as do the relations apprehended in listening to notes that are in harmony with each other: they reveal that our minds need to conceive equilibrium and our senses to perceive it. The Purists thus maintained that the forms that the human mind and the human senses apprehend as beautiful relate directly to the nature of the human body and to the relations that obtain among its parts and to the structure of the human senses, not to the order and structure of reality as a whole.

Thus, the Purists developed a vocabulary of forms and objects (to the end of producing happiness). They also developed their own version of func-

tionalism to bolster their claims that related beauty to the constitution of the human body:

> Primary sensations constitute the bases of the plastic language… It is a fixed, formal, explicit universal language determining subjective reactions of an individual order which permit the erection on these raw foundations of a sensitive work, rich in emotion. It does not seem necessary to expatiate at length on this elementary truth that anything of universal value is worth more than anything of merely individual value. It is the condemnation of "individualistic" art to the benefit of "universal" art.[166]

The Purists' theory of perception was rooted in their notion of evolutionary "mechanical selection." Like the humanism of the Renaissance (exemplified in Leonardo's sculpture of David), Purism held that the order of the human body is the basis for our ideal of beauty and that its makeup is the pattern humans seek. The nature and structure of our bodily organs—their form—has resulted from their adaptation to functional requirements. As our organs evolved towards ever greater economy of form and function, certain repeated features emerged. These make up what can be considered a stock of fixed features.[167] These forms have been perfected by their adaptation to constant human needs and human desires and have brought to an ideal state the economy of function and desire. The Purists maintained that these forms constitute ideals (which they referred to as *objets types*) and that our notion of beauty is founded on these ideals. Purists sought principally for "primary sensations," which are conditioned in all human beings by the simple play of forms and primary colors.

Machines, because they fulfil a function, are beautiful, and they become so through an accelerated process of adaption and evolutionary selection. But, the Purists said, their beauty lasts only a while. Machines respond to human needs, and new machines come along that respond to those needs in different ways. One new machine supersedes the previous, and when a machine is superseded, its beauty is diminished. The forms of artworks, by contrast, are based in the unchanging structures of humans' perceptual apparatus—in the unchanging structure of the eye that allows it to respond to form, line, or colour, or in the unchanging structure of the ear that allows it to respond to harmony, melody, timbre, rhythm, and intensity. The syntactical structures of artworks are based in an unchanging grammar of human sensation. The effects of arrangements of colours, shapes, and lines do not change through time or across cultures because they are based in optical reactions that all humans share (because they share the same optical apparatus).[168] So, time's passing does not cause the beauty of artworks to fade. Such transhistorical, transcultural practices, because they are universal constants, can be codified. Stable,

universal forms, such as those in which verticals and horizontals dominate, have universal meaning.

The more assertive anti-foundationalists among us argue that this concern with universal, harmonic principles indicates some sort of retrenchment—that it signals a return to Classical principles that offers nothing essentially new or avant-garde (and that in its interest in reconciling humanity with the beauty of the new mechanical order, it weakens the vanguard's critique of the prevailing social order).[169] This strikes me as a very peculiar argument. As for the matter of novelty, that some early-twentieth-century artists set out to create works that manifest transhistorical principles of harmony doesn't mean that these artists repudiate all claims to novelty: such artists could well believe they were creating startling, shocking, potent new harmonic forms—the principles underlying these forms might be transhistorical, but the material means for embodying them was shockingly novel (and anyone who believes in the unity of form and content would have to acknowledge that the new materials these artists employed demanded new forms). And this is not merely a theoretical possibility: many artists did in fact believe this. For example, that was Mondrian's conviction, as *The New Life—The New Art* confirms. And this was Viking Eggeling and Hans Richter's (1888–1976) conviction as they struggled to bring forth "objectless films" that embodied harmonic principles (as "Die schlecht trainierte Seele" [The Badly Trained Soul] will attest)—indeed, for the latter, the idea of dynamizing visual forms, and bringing those dynamic forms under the regulation of harmonic principles, was a stunningly, fascinatingly novel effort. As for the matter of vitiating any critical thrust, an artist could believe, first, that a poor, tawdry social order was preventing the truly revolutionary potential of this new harmony from being realized, and second, that humans were too backward-looking to embrace these radical forms and that they must be re-formed (that is, a new human, or at least a new sensibility, must be brought forth to relish these radical possibilities). Again, reading *The New Life—The New Art* or "Die schlect trainierte Seele" will confirm that these were not mere theoretical possibilities, but were actually espoused. Indeed, these convictions formed the basis of Hans Richter's embrace of leftist art.

Critics of anti-foundationalist persuasion have denied the possibility of a genuinely radical art founded on harmonic principles, and so have critiqued the use of Purist principles, including Léger's use of them, as a retreat from genuinely radical art. They have made the same accusations against *Ballet mécanique*, casting it as a profoundly compromised work. As "À propos de l'élément mécanique" (Notes on the Mechanical Element, 1923) proves, Léger certainly did embrace principles:

> A picture is organized, orchestrated, like a music score, has genuine necessities exactly the same as those of every objective human creation (commercial or industrial achievement). These are the weight of masses, the relationship of lines, the balance of colors. All things that require absolute order.[170]

And he believed that this new harmony was manifesting itself increasingly in the workaday world:

> The relationship of volumes, lines and colors demands absolute orchestration and order. These values are all unquestionably influential; they have extended into modern objects such as airplanes, automobiles, farm machines, etc. Today we are in competition with the "beautiful object"; it is undeniable.[171]

Of course, this could be read as an accommodationist statement: capitalism has brought forth a beautiful mechanical order, and we should learn to appreciate it. Or it could be read as saying that a second nature has emerged, which, because it is artificial, can be formed (by humans) in accordance with deep harmonic relationships; because their form is determined by utility, they have an underlying potential to be formed into truly elegant, truly harmonic relations. They are not yet well ordered, but they have the potential to become well ordered.

Which reading would represent Léger's view? Within a year of "À propos de l'élément mécanique," in 1924 (that is, the same year he made *Ballet mécanique*), he published these reflections: "The visual world of the large modern city . . . is badly orchestrated; in fact, not orchestrated at all. The intensity of the street shatters our nerves and drives us crazy."[172] Or again: "As long as the economic revolution does not give man the hoped for new equilibrium, as long as he is a victim of the machine instead of being its beneficiary, we will witness at daily phenomenon of people hurrying and scrambling to work, to eat, or might rush to a spectacle in order to try to find distraction from their daily exhaustion."[173] That sounds rather like the early Karl Marx's analysis of the labour process (say, the Marx of the Paris manuscript). And furthermore: "The hypertension of contemporary life, its daily assault on the nerves, is due at least forty percent to the overdynamic exterior environment in which we are obliged to live."[174] Between the accommodationist and the call-for-reform alternatives, I think it is clear that Léger did opt for the vanguard option.

Anti-foundationalists might be dismayed that some artists believed that art had the task of cleansing and purifying both societies and human beings and that they had a sense of what sort of order a good society would exhibit. They might prefer a freer revolution, unconstrained by goals. They might be right that the lesson of the October Revolution was "à chacun sa propre révolution." But it does seem far-fetched to deny artists their vanguard credentials just because they believed that a revolutionary new order (in art and

society) could be based on a startlingly new harmonic order (embodying freshly conceived harmonic relationships among startlingly new materials).

But that leaves us with this question: "What would that cleansing consist in, in Léger's view?" One thing is certain: his ideas on harmony and his theory of contrasts were related—for him, to bring elements into balance (harmony) is to bring contrasting (opposing) features into a dynamic equilibrium. The novelty of the new harmonic order would be the result of the high quantity of dynamism that is brought into an equilibrium—or, what is the same, brought into a form of repose. The external order would be brought into balance, and however dynamic the elements might be individually, they would be incorporated into forms that would no longer grate on humans' (or, at least, the new humans') nerves.

The cinema poses a challenge to anyone who asserts that artworks' forms are based in the unchanging structures of the human perceptual and conceptual apparatus. It also offers a new field in which to test the universal applicability of these principles. I believe that this accounts for the strong and long-standing interest Léger took in the cinema.[175] He saw the cinema both as a vehicle for a machine aesthetic that would afford him the opportunity to test the applicability of ideas about the new art he was working out and as a medium that could offer instruction on the principles that would govern new art in whatever medium. On the second matter, what appealed to him specifically as topics on which the cinema might give instruction to the arts were these two issues: showing how "the mechanical element" might assume the leading role, when one worked with visual fragments and composed them into an artistic whole using montage; and showing how introducing time could introduce a modern rhythm into art. An interest in the mechanical element, in working with fragments and composing them into wholes, constituted using modern rhythms, had, as we have seen, long been a feature of Léger's painting. Mechanical art grew out of an interest in integrating hard elements (that is, elements that, when integrated into a gestalt, do not undergo internal change) into mechanical/temporal unities, forms of wholeness that evince the influence. All of this is evidence that the cinema (or, rather, beliefs about the nature of the cinema) were reshaping painting.

The Machine Age would foster a new human—or, more precisely, an *esprit nouveau*. Cendrars and Léger adopted that faith from the Purists, though they modified it to accord the primary agency for this evolutionary transformation to the cinema. Cendrars declared that the cinema and the revolution were one: his "L'ABC du cinéma," ends with the declaration, "Look to the new generations suddenly blossoming like flowers. Revolution. Youth of the world. Today."[176] For his part, Léger was confident that the proletariat (who were closest to the machine and could absorb its *mentalité*) would give birth

to the new spirit (he even suggested that peasants' dress showed that they had maintained a taste for violent contrasts, which were also a feature of the emerging machine-world). The cinema would help make the revolution bloom, provided it did away with the corrupting influence of capital: "the public is better than we think it is, but between the public and the director, there is often an important obstructive character—the producer or the impresario [representing the interests of capital]—who often misunderstands his public and warps everything."[177] Léger's solution, as far as *Ballet mécanique* was concerned, was to protect the spirit of reform by paying for the film from his own pocket.[178]

## TOWARDS THE CINEMA: A MONTAGE OF PRE-EXISTING ELEMENTS

At the end of his mechanical period, Léger's painting took on another quality, one that probably helped draw his interest to filmmaking—and was itself probably influenced by the film. In his disc series *Les disques* (1918–19), *Deux disques dans la ville* (Two Disks in the City, 1919), and *Les Disques dans la ville* (Disks in the City, 1919–20), and in *La ville* (The City), Léger began to recycle set components, which he called "pre-existing elements," assembling them in new contexts and new arrangements to create fresh sensations. His poster for Gance's film *La roue*, which is a variant of this series, makes evident the influence this group of works had on *Ballet mécanique*. The poster also highlights the series' affinity for the cinema. From painting to painting he related spheres to discs, discs to tubes, tubes to ropes, unvariegated surfaces to modulated surfaces, and industrial constructions to humans; of course, this is exactly what he did in *Ballet mécanique* as well. The developmental logic of an aesthetics of assembly would impel him towards the cinema.

*La ville* (as I have noted) is the most radical of all these works, for it presents a complex montage of fragmentary forms whereas the other paintings of this period focus on single objects. It demonstrates that visual forms the cinema had rendered common, as well as a way of seeing with which the cinema is associated, had become embedded in Léger's art. It is understandable that he was so intrigued by this new model of art that he would conceive the desire to work in film.

The cinema interested Léger as a contemporary medium. In the first lecture he gave at the Académie Vassilieff, in May 1913, he quoted from the chapter "Ceci tuera cela" (This Will Kill That) in Victor Hugo's (1802–1885) *Notre-Dame de Paris* (The Hunchback of Notre-Dame, 1831). Claude Frollo, the rather curmudgeonly archdeacon of Notre Dame (and an alchemist), looking up from a book towards the cathedral, remarks, "In the fifteenth century, human thought discovered a way of perpetuating itself not only more durable

and more lasting than architecture but also simpler and easier: Orpheus's letters of stone were replaced by Gutenberg's letters of lead. The book is going to kill the building."[179] A similar change was occurring in the first decades of the twentieth century, Léger believed—perhaps not of identical magnitude, but surely of a similar nature: the visual realism of salon painting, with its near-photographic precision, was being replaced by the new technologies of photographic reproduction.

> Without attempting to compare the present evolution, with its scientific inventions, to the revolution brought about at the end of the Middle Ages by Gutenberg's invention, in the realm of humanity's means of expression, I maintain that modern mechanical achievements such as color photography, the motion-picture camera, the profusion of more or less popular novels, and the popularization of the theaters have effectively replaced and henceforth rendered superfluous the development of visual, sentimental, representational, and popular subject matter in pictorial art.[180]

New forms of expression (the cinema, the popular novel, and popular theatre) were supplanting the traditional arts—and of these, the cinema was evidently the most important.[181]

Léger's concern with dynamism, his commitment to exploring the possibility of creating a work of art by assembling "pre-existing elements," his interest (which he shared with Gertrude Stein) in discovering the effects of incorporating identical components in different contexts, his curiosity about the modern world of machinery, his conception of an artwork as a composition of "multiplied contrasts" (which he shared with the great Soviet filmmaker, Sergei Eisenstein), his belief in the importance of bringing art into the modern age (which he shared with the Futurists, the Constructivists, and the Productivists), and his doubts about the continuing relevance of easel painting (or, at least, of paintings hanging on the walls of museums) all helped to impel Léger towards set design and the cinema.[182] In 1922 he did the décor for Arthur Honnegger (1892–1955) and Jean Börlin's (1893–1970) *Skating Rink*. In 1923 he worked on the sets for *La création du monde*, a work commissioned by Rolf de Maré's (1888–1964) Ballets suédois and based on a scenario by Blaise Cendrars (Frédéric Louis Sauser, 1887–1971). That same year, he began work on *Ballet mécanique*.

## *BALLET MÉCANIQUE* AND THE MECHANICAL BALLET: RHYTHM IN *BALLET MÉCANIQUE*

The form of *Ballet mécanique* is motivated mainly by geometric and rhythmic considerations—a metronomic pulse holds together images of many different sorts (all of them, however, geometricized to some degree). The metro-

nomic pulse serves as a matrix that unites the various sorts of images the work uses, but featuring among the elements it draws into itself are many geometric shapes. In *Ballet mécanique*, Léger uses geometric forms in much the same way that he used "pre-existing elements" in his paintings of around this time—and in much the same way that geometric forms had been used in the paintings and films of Hans Richter, Marcel Duchamp, Man Ray (1890–1976), and Walther Ruttmann. Circular forms and other geometric shapes were part of the common international language of the avant-garde and were used in paintings and films by these artists and many other members of the avant-garde.

*Ballet mécanique* has a steady meter. Sometimes the pulse shifts to a more accelerated or retarded relative, but generally these shifts take us from one pulse to another in the same meter, or from a subtle, understated rhythm to a bold, more striking rhythm in the same meter and tempo. The resulting repetition functions the same way repetition does in Antheil's score for the film, like a revolving machine-part that slows down or speeds up while its rotations remain regular.[183] In this way, meter becomes the stable centre of the film, a nearly fixed element organizing the whirling vortex of images.

Léger's note for the first screening of the film, at the Internationale Ausstellung neuer Theatertechnik (International Exhibition of New Technique [or Technology] in Theatre, Vienna, 1924) stresses the "fixed image." His comments seem to confirm my conjecture that this "image" is a meter fixed by the apparatus itself and by the variations that develop from it.

> The particular interest of the film is centered upon the importance which we give to the "fixed image," to its arithmetical, automatic projection, slowed down or accelerated—additional likeness.
> No scenario—Reactions of rhythmic images, that is all.
> Two coefficients of interest upon which the film is constructed:
> The variation of the speeds of projection:
> The rhythm of those speeds.[184]

The film, then, reflects on the "language" of the cinema (montage) and on the way that language is determined by a metrical pulse set by the flickering apparatus itself. Cendrars, in a piece titled "Poets," presented in Brazil in 1924 (the same year the film was first shown), quoted from the linguist Joseph Vendryes (1875–1960): "There are thus accelerations, jolts, reductions in speed, moments of rest. In other words, language contains within itself a rhythmic principle with strong and weaker tempos."[185] Of course, Vendryes used the term "rhythm" where I (and most students of prosody) would use "meter," but the point he makes here is similar to the one I am making about *Ballet mécanique*.

Rhythm played an important role in Léger's visual art. In *Ballet mécanique*, it provides the matrix that holds together an extraordinary range of images. Léger, as we have noted, was never committed to any single artistic movement over all others—different ideas about art and artmaking coexisted in his mind. This catholicism was central to *Ballet mécanique*: Léger drew up a diagram of the film that charted a steady, very gradual acceleration and indicated that between blocks of ever greater speeds there would be, as transitions, *pénétrations accélerées* and *pénétrations ralenties*. Léger's decision to use geometry and rhythm to hold the diverse images in a tight matrix was overdetermined: Mechanist ideas, Cubist ideas, Constructivist ideas, and even Dada ideas all played a role in this.

The parallels between *Ballet mécanique* and a performance that took place on Friday, 17 August 1923—contemporaneous with Léger & Co.'s work on their film—at the Stadttheater Jena highlights the roles that Constructivist and Dada ideas had in shaping the film. The event was part of a Bauhaus Week celebration, which included a performance of Oskar Schlemmer's (1888–1943) now famous *Das figurale Kabinett* (The Figural Cabaret, 1922). Another work presented, by Kurt Schmidt (1901–1999) and Georg Teltscher (1904–1983), was titled *Das mechanische Ballett* (The Mechanical Ballet). Schmidt described the piece in an article in Eckhard Neumann's *Bauhaus und Bauhäusler: Erinnerungen und Bekenntnisse* (Bauhaus and Bauhausians: Memories and Confessions):

> The rhythm of the movement-forms created by . . . the dancers in *The Mechanical Ballet* was emphasized by their jerky mechanical nature, which resembled those of machines. The tonal organization of the music by H.H. [Hans Heinz] Stuckenschmidt [1901–1988, who also worked as critic and, between 1924 and 1926, authored a number of articles celebrating machine music and predicting the end of instrumental music as it had been known (because controlled irregularity and controlled repetition, important features of new art, could be better achieved using machines and because the collectivist spirit of the age had rendered individualistic interpretation passé); he also wrote admiringly of works by George Antheil such as *Sonata sauvage* and *Airplane Sonata*] developed out of the strong rhythmic base, but it did not forgo a simple melody, which supported the pictorial movement . . . For *The Mechanical Ballet* was presented as though it was taking place on a flat surface. Consequently, the dancers could only move sideways: they could not turn, for if they did the desired planar effect would not have been complete. How then were the abstract forms fastened to the human bodies? A central part formed the base, and it was attached to the belly, while other parts were attached to the arms and legs, and, for two of the figurines, the head also supported a pictorial element. Two figures were set in opposition, while a figure came between them to create a harmonious balance—the effect of this was mechanical, even locomotive, and the movement

> was referred to in that way. If the figure on the right was put together of red and white forms in the manner of a machine, the contrasting figure to the left resembled a windmill by virtue of having two widening wings. The goal of the choreography was to create new forms and new color compositions by means of encounters, contrasts, and shifts. The movements were always coordinated in such a way that what emerged had the appearance of an abstract painting. In the last of the five pieces of choreography comprised by the *Mechanical Ballet*, a large red square and a smaller blue square moved across the stage, first alone, then together with the other figures across the stage. In their rhythmic movements, the two squares offered a play of forms patterned after the music, and eventually the movement came to a climax. The right main figure was wearing a white flat, arm-like form set against a red ground and on its left a flat yellow arm-like form and blue and orange leg shapes… The counterfigurine had a blue body and wore a red and yellow rectangle attached to the arm and orange and green on the legs. The performance… was made possible by a winning collective collaboration between students of the Bauhaus… Creative contributions were due mainly to F.W. Bogler and Georg Teltscher.[186]

Parallels with the performance work of that other Bauhaus artist Oskar Schlemmer—especially with regard to the use of geometric forms (squares) and primary colours—are starkly evident. Stuckenschmidt's comments on the genesis of the Schmidt–Teltscher *Mechanische Ballett* throw these parallels into even sharper relief:

> After the first communal meal, I accompanied Kurt Schmidt to his studio. There stood constructions of the height of a man, made of cardboard, wire, canvas and wood, all basic geometric forms: circles, triangles, squares, rectangles, trapezium, naturally in the elementary colours, yellow, red, and blue. Schmidt put on a red square, fastened it with leather straps, so that he disappeared behind it. Two collaborators did the same thing with a circle and a triangle. Then these geometric figures danced a spirited ball, the people carrying the figures invisible behind them. An old piano stood against the wall. It was out of tune, and clanked abominably. I improvised a couple of chords and sharp rhythms. Immediately the cardboard figures began to react. An abstract dance of square, circle, and triangle spontaneously appeared. After perhaps a quarter of an hour, Kurt Schmidt emerged from his square, somewhat out of breath, but thoroughly content. I had instinctively divined and felt what he had conceived, and what he had in mind: a primitive musical accompaniment, that corresponded somewhat to the elementary geometric forms. Its harmony was forged only by linking triads, its melody from "riffs" from folk tunes, its rhythm from elements of dance music and marches. I employed the piano in the style of George Antheil [!], with very loud explosions and racing glissandos that traversed the keyboard.
>
> From now on this became our daily practice, first in Schmidt's studio, then in a larger room. I notated the pieces I improvised for violin and piano; Lonny

> Ribbentrip worked diligently with us. After two or three weeks the *Mechanical Cabaret* program was mounted and included the *Mechanical Ballet*.[187]

The use of elementary geometric forms (specifically the circle, the square, and the triangle) to suggest the composition of the machine-world, the idea of *l'homme machine*, the interest in the erratic, "jerky" dynamics of the machine, and the focus on the movement of the machine itself are features shared by the mechanical ballets of Schmidt/Teltscher and Léger (or, more truly, of Léger and Dudley Murphy [1897–1968]), and with the performance work of Oskar Schlemmer—all these attributes are features of the cinema. I point out that Schmidt/Teltscher and Léger/Murphy were interested in Antheil's cinematic aesthetics of music.

Much of the photography and performance art produced at the Bauhaus suggests that a new subjectivity was being formed at the end of the Machine Age, when the twinned processes of urbanization and accelerating change were drawing artists' attention to mechanical dynamics. Artists understood that the standardization of interchangeable parts—which was industrialization's enabling dynamic—was leading towards a collective intelligence. (And some artists, perhaps, sensed that the collectivization of intelligence would be vastly extended with the advent of the next technology to come, viz., the computer: the computer's appearance would represent the moment when the last technology of the Machine Age transmuted itself into the key technology of the electrotechnical age.)[188] The Old World was disappearing, and this produced a sense that the mind was losing its grip on reality (and on the inner world's reliable response to external reality). By 1900, language, the medium that had presumed to offer access to the most private space of the human soul, was under scrutiny. Consider in this regard Hugo von Hoffmanthal's (1874–1929) "Brief des Lord Chandos an Francis Bacon" (Letter of Lord Chandos). As the title suggests, Hoffmanthal's text presents as a letter from Lord Chandos to Francis Bacon (possibly the greatest prose stylist England ever produced):

> At first I grew by degrees incapable of discussing a loftier or more general subject in terms of which everyone, fluently and without hesitation, is wont to avail himself. I experienced an inexplicable distaste for so much as uttering the words spirit, soul, or body . . . the abstract terms of which the tongue must avail itself as a matter of course in order to voice a judgement—these terms crumbled in my mouth like mouldy fungi.[189]

This feeling spreads "like corroding rust," until Chandos can no longer distinguish between truth and falsehood. Finally, in an apocalyptic moment, the deep meaning of the present is unveiled: a demonic mechanical demiurge disassembles reality into unimaginable and unfathomable congeries of unrelated parts:

> For me everything disintegrated into parts, those parts again into parts; no longer would anything let itself be encompassed by one idea. Single words floated round me; they congealed into eyes which stared at me and into which I was forced to stare back—whirlpools which gave me vertigo and, reeling incessantly, led into the void.[190]

Language no longer serves to express the intricacies and complexities of inward experience—its vector no longer points from the subject towards the external world. Words are external objects, beyond signification, forms that dance before the mind, bereft of content and eliciting a terrible solitude. Donald Davie notes about Chandos's (Hofmannsthal's) experience that "the only language he can trust is a language broken down into units of isolated words, a language which abandons any attempt at articulation, because that articulation seems to take place only inside a closed system—'they were concerned only with each other.'"[191]

This despair over language became widespread. The forms that vanguard art adopted in this period can be understood as a way of renewing art that did without the belief that words' meanings could convey the intimacies and delicacies of human inwardness. The despair over language downgraded the role that bourgeois subjectivity had played—the extraordinary frequency with which artists of the late nineteenth century disparaged psychological drama is an index of that. With this downgrading, narrative was ushered out of theatre, literature, and painting, while pure music (that is, music that is not program music) was elevated to the position of the loftiest of the traditional arts. Audiences were no longer offered bourgeois characters in the privacy of their drawing rooms or bedrooms. In choreography—and in performance art, which was just in its beginning stage in this era—non-representational movement was accorded an important role. As early as 1912, Oskar Schlemmer had conceived of the possibility of reworking the dance, turning it into a synthetic form that embodied the strife among different artistic modalities: his title for the work *Sieg der reinen abstrakten Form* (The Victory of Pure, Abstract Form) evokes the conflict between those different modalities and suggests that that work unfolds the consequences of such conflict for dance. Alexander Scriabin's (Александр Скрябин, Aleksandr Skrjabin, 1871–1915) *Prometheus* symphony (Прометей: Поэма Огня, Prometej: Pojema Ognja; Prometheus: The Poem of Fire, 1910) was one model for *Sieg der reinen abstrakten Form*'s synthetic character; another was Wassily Kandinsky's (Василий Кандинский, Vasilij Kandinskij, 1866–1944) *Der gelbe Klang* (Yellow Sound, 1909, published 1912). Another of Schlemmer's dance pieces, *Triadische Ballett*, was an example of Cubo-Constructivism in dance (it transformed the human form into a Cubist entity and shaped space in a

decidedly Constructivist/mathematical fashion), and, like his *Das figurale Kabinett* of 1922, it displayed a proclivity for mechanical form and mechanical movement, for the synthesis of human and marionette, of natural and artistic figures. At the same time, there was an Expressionist dimension to this work, so Schlemmer asked Arnold Schönberg (also Schoenberg, 1874–1951) if he would compose the music for it. Consider, too, Schlemmer's *Gestentanz I* and *II* (Gesture Dance 1 and 2, 1926), *Formentanz* (Form Dance, 1926), *Raumtanz I* and *II* (Space Dance 1 and 2, 1926), and, above all, *Stäbentanz* (Danse des barres; Pole Dance, 1927) and *Metaltanz* (Metal Dance, 1929).[192] So strong was the bourgeois humanist tradition in dance (comprising both early modern dance and ballet) that innovative choreographers had an especially difficult time finding acceptance for works aligned with the new sensibility. Schlemmer's dances provide a case in point—as late as 1971, the humanist commentator on dance, Lincoln Kirstein (1907–1996), while granting it had a certain historical importance, could write about Schlemmer's *Das triadische Ballett* (1922, though preliminary and new versions were produced between 1916 and 1932) in a way that suggested it had no artistic worth: "the work is significant as a now familiar statement of dehumanisation, with bankrupt choreography replaced by costume as decor."[193] Schlemmer had maintained that dancers' movements should be determined by the space in which they take place and that there should be an integral interrelation of costume and space (or costume, space, and movement). Kirstein's comment was an attack on the lack of humanist motivation implicit in Schlemmer privileging spatial organization, costume, and movement-forms over human emotion.

Schlemmer identified four basic methods of abstraction for transforming the human figure so that the resultant shape would be well integrated into the surrounding space. One method of abstraction involved transferring the cubic form of most dance spaces to the figure by shaping the various parts of the body into more or less cuboid forms (technically, into right-angled parallelepipeds). The second method involved simplifying various parts of the body into whatsoever simple shapes they most resemble—this simplification would be based on an analysis of the functional laws relating to that body part. "These laws bring about a typification of the bodily forms," Schlemmer wrote. "The egg shape of the head, the vase shape of the torso, the club shape of the arms and legs, the ball shape of the joints." Applying methods of simplification based on functional laws generally resulted in giving the figure a marionette-like appearance.[194] The third method of abstraction was to create movements that reflected the fundamental mathematical laws governing human motion in space. (Schlemmer attempted to recover these laws by analyzing movements in space and resolving them into simple geometric lines or vectors.) The fourth method was somewhat strange, for its possibility

derived from the signatures of parts of the body and their relation to cosmic/metaphysical forms. (Schlemmer did not use the word signature—rather, he described the forms as "the metaphysical forms of expression, symbolising various members of the human body: the star shape of the spread hand, the infinity sign of the folded arms, the cross shape of the backbone and shoulders, the double head, multiple limbs, division and suppression of forms.")[195]

Schlemmer's efforts to transcend the naturalistic theatre and the psychological drama and to replace expressive, delicately nuanced gestures with pure movement forms aimed at creating a purely abstract form of dance, rooted in the relation between dancer and space. He entered this remark into his diary in September 1922: "The theater, the world of appearances, is digging its own grave when it tries for verisimilitude."[196] Interestingly, in writing that, he mentioned that he admired the tales of E.T.A. Hoffmann (1776–1822), a German Romantic whose writings tended towards the macabre fantastic,[197] and the great poet, dramatist, and novelist Heinrich von Kleist (1777–1811), who is best known, perhaps, for *Penthesilea* (1808), a tragedy about the Queen of the Amazons that portrays wild, unbridled passion.[198] With respect to our concern here—that is, the emerging subjectivity—note that Kleist's essay "Über die allmähliche Verfertigung der Gedanken beim Reden" (On the Gradual Development of Thoughts in the Process of Speaking, 1805–06) offers a proto-Freudian notion of an unconscious factor in the soul traducing itself in speaking along with a skeptical critique of reason's power to bear us successfully into the future. Kleist presents consciousness as an emblem of humans' fall from harmony with nature.

The subjectivity whose ballast was the presumed immediacy of inwardness was at its end. The new subjectivity that was emerging in this period—the new consciousness to which the many mechanical ballets of the period paid homage—was associated with the cinema. A cardinal notion in most German and much European art writing in the late nineteenth century was that of *Einfühlung*, which was used to explain how the body's participation in the object of vision shaped the resulting perceptual, and aesthetic, experience. Such modernist writing presumed a solitary spectator with a cultivated sensibility and a developed soul, experiencing a unique work of art in a tranquil environment and giving her whole attention to it so that she might be transported to a higher realm. The rise of the cinema challenged those assumptions. A film is experienced (or, rather, at the time was experienced) collectively, and it generally demands active mental processing (as *Ulysses*, that most cinematic of novels, does), not passive absorption.[199] This difference was thematized by Walter Benjamin, who tried to work through issues around absorption and distantiation in "Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit" (The Work of Art in the Age of Technical Reproducibility, 1936), and

by Bertolt Brecht (1898–1956), whose notion of *Verfremdungseffekt* (alienating effect) made the active character of the contemporary experience of art a topic of political polemics. Empathy and estrangement became central topics in the debates of this period—and it was the emergence of this new medium, the cinema, that pushed that topic to the fore.

Schlemmer's work clearly fell on the side of the new—of the spectator as belonging to the collective. Collectivity was part of the ethos at the Bauhaus, where many significant occasions were celebrated with dress-up parties, and both students and faculty went to great lengths to assemble their costumes for these occasions. Schlemmer's work at the Bauhaus theatre had been instrumental in establishing these participatory spectacles (and helped to sustain them, as a presentation by the theatre students was usually included). A newspaper report on the "Metallic Party" tells us that the guests arrived attired in some sort of metal wrapping or dressed as some sort of metallic device and entered by sliding down a chute into rooms decorated in keeping with the theme (the original title for the event was to have been "Church Bells, Doorbells, and Other Bells Party," but organizers decided to rename it to discourage guests from carrying or dressing as sound-producing devices). There was music everywhere. All in all, the report conveys the degree of effort and imagination the Bauhäusler dedicated to the rituals:

> and everything was glitter wherever one turned. The rooms and studios of two floors, which are normally used for serious work, had been decorated with the greatest variety of forms placed together all over the walls, shinily metallic and fairy-like, the ceilings hung with bizarre paper configurations…In addition music, bells, tinkling cymbals everywhere, in every room, in the stairways, wherever one went.[200]

These activities reflected new ideas about collective production and collective spectatorship that emerged in the 1920s. In 1925, Brecht established his first "Brecht collective," a move that theatre historians generally connect with the Neue Sachlichkeit exhibition mounted in Mannheim that same year. John Willett and Ralph Manheim maintain that this goal of raising a collective to an artistic ideal reflected the social climate of the time,

> with their attitude of *Neue Sachlichkeit* (or New Matter-of-Factness), their stressing of the collectivity and downplaying of the individual, and their new cult of Anglo-Saxon imagery and sport. Together the "collective" would go to fights, not only absorbing their terminology and ethos (which permeates *Man Equals Man*) but also drawing those conclusions for the theatre as a whole which Brecht set down in his theoretical essay "Emphasis on Sport" and tried to realise by means of the harsh lighting, the boxing-ring stage and other anti-illusionistic devices that henceforward appeared in his own productions.[201]

Willett and Manheim also tell us that in 1925, Brecht saw two films that had an immediate impact on him and that continued to exert an influence on him long afterwards: Charlie Chaplin's (1889–1977) *The Gold Rush* and Sergei Eisenstein's *Броненосец «Потёмкин»* (Bronenosets Potyomkin; Battleship Potemkin, 1925).[202] Narrative form in this period began to use a disjointed, fragmentary construction (and, in this respect, moved closer to the poetic forms that more adventurous writers had been using for quite some time): interruptions and montage assemblies drew the spectators out of their isolation and invited them to participate collectively in creating the work's significance. Because in a collective production the relation of the different fragments to reality keeps changing, the subject position is only provisional—no deep, enduring, self-authenticating subject, or even emotional character-type, is possible. Hence, the collective production process produces a provisional emergent self: in a collective production process—that is, in an enterprise involving making meaning together—various individual tendencies and momentary impulses come together to form a whole, but that whole passes from existence almost as soon it emerges. In a related development, Walter Benjamin's "Der Autor als Produzent" (The Author as Producer, 1934) promoted readers to the condition of collaborators, acknowledging that the distinction between author and publisher characteristic of the bourgeois press had begun to disappear and that, at the same time, an *Umfunktionierung* (functional transformation) was occurring that would restore literature to its political role within a society undergoing social transformation. Plato had proposed to banish the poet; the socialist state (Benjamin believed that Soviet communism represented a noble effort to create a truly socialist country) would not go so far, but it would "assign tasks that do not permit him to display in new masterpieces the long-since-counterfeit wealth of creative personality."

Miriam Hansen, in *Babel and Babylon: Spectatorship in American Silent Film* (1994) does a brilliant job of showing that this new, collective spectator evolved out of the cinema and cinema-viewing, which provided an intersubjective context in which particular groups (many composed of individuals who had been disenfranchised by the established arts) could recognize facets of their own experience. The cultural theorist Siegfried Kracauer (1889–1966) had offered a similar insight almost seventy years earlier. His essay "Die Gruppe als Ideenträger" (The Group as Bearer of Ideas, 1922) is a complex deliberation on whether the lone individual or the collective possesses ideas (for him, the group represents the dialectical sublation of those antitheses).[203] In a similar vein, in "Kult der Zerstreuung: Über die Berliner Lichtspielhäuser" (The Cult of Distraction: On Berlin's Picture Palaces), he writes that

"here, in pure externality the audience encounters itself; its own reality is revealed in the fragmented sequence of splendid sense impressions."[204]

Schlemmer, too, takes a dialectical approach to the issue of collective subjectivity, but his view retains more of a Romantic cast. *Das triadische Ballett*, he explained in 1926, "avoids being actually mechanical or actually grotesque and . . . avoids actual pathos and heroism by keeping to a certain harmonious mean, is part of a larger entity—a 'metaphysical revue'—to which the theoretical investigations and the actual work of the Bauhaus stage at Dessau are also related."[205] The meaning of the text can be understood through Schlemmer's reference to harmony and through the mathematical context in which that reference appears. The allusion to the "harmonious mean" evokes at once the idea of the middle way (the moral principle that goodness consists in avoiding extremes) and the golden mean (a Pythagorean idea that relates beauty to fitting proportions). At this time, the idea of the Golden Mean was often used to imply that beauty is transpersonal, transhistorical, and rooted in a cosmic order.[206] The person watching a new dance performance puts aside the solitary self, rising above it to apprehend a cosmic/metaphysical order that intimates the Beautiful. We might even say, with Kracauer, that the shared experience of the Beautiful brings a group into being.

This new subjectivity, less individuated and more aware of its roots in a collectivity (cf. Hegel's *Geist*), was a principal theme of this era's many mechanical ballets, which chose to defy the traditional belief that theatrical dance should use human movement to convey the subtleties of human inwardness (such movement was generally highly individuated and idiosyncratic, as is exemplified by Isadore Duncan's [1877–1927] and Loïe Fuller's [1862–1928] dance, or, in Germany, by Mary Wigman's [1886–1973] dance theatre). Several other mechanical ballets were mounted around the time that Léger, Murphy, Antheil, and Man Ray were at work on their mechanical ballet in Paris. So-called mechanical ballets were being produced by dancers and choreographers, visual artists, theatre practitioners, and filmmakers; most of these were composite works incorporating features from dance, theatre, set design, and visual art.

The form had a prehistory. In 1911, Vladimir Tatlin (Владимир Татлин, 1885–1953) had designed costumes for a theatrical production that revealed an industrial influence; Kazimir Malevich's (Казимир Малевич, 1879–1935) costumes for *Победа над Солнцем* (Pobeda nad Solntsem; Victory over the Sun, 1912) marked a further development of this tendency. Also in 1911, Fortunato Depero (1892–1960) and Enrico Prampolini (1892–1960) founded their Marionette Theatre in Italy. In 1914, Giacomo Balla (1871–1958) presented *Macchina tipografica* (Printing Press), a work in which performers carefully reproduced the mechanical motions of a printing press. In 1917 the Ballet

Russe's adventurous *Parade*, with a script by Jean Cocteau (1889–1963), music by Erik Satie (1866–1925), and costumes by Picasso, displayed mechanical features. That same year, in Russia, a theatrical producer, Aleksandr Tairov (Александр Таиров, 1885–1950), presented his Kinetic Theatre at his Kamerny (Chamber) Theatre in Moscow (founded 1914). Like the Futurists, Tairov saw little relationship between the ideal theatre and everyday life—he believed theatre to be a form of sacred dance or socio-religious ritual. He proposed a "synthetic theatre," founded (like the Futurist Synthetic Theatre) on the notion of simultaneity. He considered the script to be essentially an improviser's guide, a point of departure for performers' creativity. The creator's independence held the highest place in his hierarchy of value—his 1917 pamphlet *Прокламации Художника* (Proklamatsii Khudozhnika; Proclamations of an Artist) contended that the arts should be independent of politics and that current events had nothing to do with real art.

Russia had been undergoing convulsive political changes since the 1890s, and various groups were contending to replace Czar Nicolas. It is likely that most Russian artists had anarcharist leanings (even if, after the October Revolution, many would fall in line behind the Bolsheviks). Between 1917, the year of Tairov's manifesto, and 1924, the old Russian state was almost completely dismantled, and for a time, a new political order, structured almost like an anarchist network of alliances, came forth; cross-connected cells ("creative units") linking artists, scholars, and politicians became the new political reality. Tairov's declaration suggests he was enthusiastic about that sociopolitical development, and his comments are completely in line with the declaration issued by the Federation of Futurists, which read in part, "Separation of Art from the State. Destruction of control over Art. Down with diplomas, ranks, official posts and grades. Universal Artistic Education" (such utopianism coexisted, however uneasily, with the jackboot brutality of the Leninist tyranny).[207] Those with courage sometimes got away with dreaming utopian dreams—reveries of a perfect electric human, of a universal language (the Futurists and the creators of mechanical art shared this fantasy with such European Constructivists as Hans Richter and Viking Eggeling), and of eliminating scarcity through electromechanical production (consider the rapid montage factory scenes in Dziga Vertov's *Человек с киноаппаратом* (Chelovek s kinoapparatom; Man with a Movie Camera).

After the "Last Futurist Exhibition of Pictures 0.10" (Последняя футуристическая выставка картин «0,10»; Poslednjaja futuristicheskaja vystavka kartin «0,10», an exhibition organized by the Russian avant-garde artist Ivan Puni [Иван Пуни, 1882–1956], mounted in 1915), Tairov commissioned the Polish-Russian Suprematist/Futurist painter and designer Alexandra Exter (Александра Экстер; Aleksandra Jekster, 1882–1949) to design sets

and costumes for *Фамира Кифаред* (Famira Kifared; Thamyris the Cithara Player, 1916), a Cubo-Futurist work whose scenography made use of cubes and cones and had blue and black masses rising and falling along stage steps; significantly Tairov/Exter's production made extensive use of colour effects produced by lighting (again suggesting the influence of cinema). Tairov also commissioned Exter to do the sets for Саломея (Salomeja), his staging of Oscar Wilde's *Salomé*; and for *Ромео и Джульетта* (Romeo i Dzhul'etta; Romeo and Juliet, 1921).

According to John Bowlt, Exter managed to transcend the confines of the pictorial surface and to organize forms in depth; Bowlt also points out that she focused on creating a rhythmically organized space in which theatrical plots and theatrical conventions were replaced with kinetic tropes in which actors and objects played equal roles. Exter's work for Tairov was influenced by Constructivism and biomechanics: she created colourful costumes that featured a dynamic variety of lines, shapes, and forms, as well as multilevelled sets and multiple stairways; the spatial configurations of these were always readily apprehensible. Tairov and Exter's collaboration resulted in a theatrical work that embodied a Russian vision of the Italian *sintesi teatrale* (theatrical synthesis), for it fused mechanized sets and a mechanized performance style with Cubist (geometric) costumes and machine-like gestures.[208]

Another Russian Futurist who created theatrical pieces grounded in a machine-aesthetic was the Ukrainian/Russian Futuro-Constructivist choreographer and theatre-maker Nikolaï Foregger (Николай Фореггер; Nikolaj Foregger; full name Фореггер фон Грейфентурн; Foregger fon Grejfenturn, 1892–1939). Foregger was a teacher of choreography and movement who briefly held a position at the Kamerny Theatre; when it closed in 1917, he decided to develop further the interest he had conceived as a student in stylized acting gestures. So he set up the Театр четырёх масок (Teatr chetyrjoh masok; Theatre of the Four Masks), which presented works based on Medieval tales that used the conventionalized gestures of French Medieval court farce and the seventeenth-century *commedia dell'arte*. Among the historical theatrical devices he employed were masks: the effect of having an actor wear a mask shifts the focus of attention from the face to the entire body (rather as does the pratfall in American physical comedy, exemplified by the work of Charlie Chaplin). Foregger then moved from his native Kiev to Moscow, where the atmosphere energized him: in his apartment, he established a studio, Мастфор (Mastfor, short for Мастерская Фореггера, Masterskaya Foreggera; Foregger's Workshop), and there he worked out his peculiar obsession with mechanized theatrical production and performance. After a time presenting theatre pieces on an agitprop train, he returned to Moscow and began mounting political satires. In one of these productions, *Пародии шоу* (Parodii

shou; The Parody Show), he was helped by the film-directors-to-be Sergei Yutkevich (1904–1985) and Eisenstein. In the early 1920s, Foregger worked on productions that aimed to recapture the essence of pre-revolutionary avant-garde design in theatrical productions. This led him to extend the principles of biomechanics and to incorporate highly mechanized physical gestures and dance elements into his works. He was also interested in applying and adapting biomechanics and various training systems for bodily control, in order to facilitate psychological development while improving a performer's ability to perform a mechanical ballet. He referred to the system of training he developed as *tafiatrenage*—French for molasses or taffy-pulling, evidently an allusion to the physical stretching, twisting, and general exertion required. Unfortunately, Foregger left behind no account of the ideas that went into his *tafiatrenage*, but it seems that they resembled Boris Ferdinandov's (Борис Фердинандов, 1889–1959) ideas on metro-rhythm (most often applied to choreography), which we know to have been deeply influenced by the cinema.

Ferdinandov developed his ideas on metro-rhythms at the Experimental Heroic Theatre. Those ideas reflected an interest in bringing mechanical precision to the arts (a mechanical precision that the cinema, by its very nature, possesses) and in producing strictly ordered sensations. A follower of Ferdinandov, V.V. Tikhonovich (В.В. Тихонович; V. Tihonovich), laid out Ferdinandov's ideas in a polemic form:

> The "anarchy" that has reigned in the drama theatre was linked to the fact that in drama people do not dance, but walk, stand, sit, lie, etc., they do not sing, but speak, shout, cry, laugh, are silent, etc.… It has to be said that the dramatic theatre has simply *fallen behind* opera and ballet in its own artistic development… But, say the Old Believers, we shall more or less eradicate the clear boundaries between drama, ballet, and opera. Even better than this is a *compliment* to the Ferdinandov system: it seems to us to lead towards a *synthetic* theatre, a theatre of gesture and dance merged into a single whole, of merged speech and song, a theatre which provides obvious opportunities for the future.[209]

As this passage indicates, the fundamental principle of the Ferdinandov system of metro-rhythms is that theatre should be an integrated dynamic form. Integration would be achieved by subjecting all theatrical elements (all of which should involve movement) to a common rhythmic *gestus*, which would be derived from an interaction of two-beat and three-beat motifs.[210] Ferdinandov also maintained that the relation of the actor to the surroundings could be conceived as a montage, which too should be subject to the same rhythmic principle: "the same laws of metro-rhythm, tempo, accord, theatrical harmony and counter-point also guide the construction of theatrical montage… and its combination with the actor's basic work."[211]

The dramatist Valentin Turkin (Валентин Туркин, 1887–1950) expounded similar ideas about the integrated work of art and the cinematic transfiguration of movement by precision, and in doing so offered what could have served as a theoretical defence for Léger and Murphy's *Ballet mécanique*. In the book *Кино-актёр* (Kino-aktjor, The Cinema Actor, 1925) he wrote:

> The developed technique of montage has enriched the transmission of dance on the screen. Dance has begun to be composed of dismembered moments of movement, filmed from various distances and various angles and alternating *in a proper and measured order*. Its compositional element has become the movement-fragment (i.e., a fragment of cinema film on which the dancer's movement has been recorded: because dance on screen is as much the "dance" of man in individual fragments of film, as the alternation, the "dance" of the actual fragments of film).[212]

And furthermore,

> The question of dance has a special significance for contemporary cinema and, in particular, for the mastery of film acting. The search for strict artistic form in cinema is moving towards the measured construction of the actor's movement on the screen and of the rhythmic montage of the film, i.e., towards the creation from the movement on the screen of a kind of "dance"… Film drama is trying to immerse itself in the culture of dance, in rhythm, so it actually becomes "dance," a sort of contemporary, realist, or if you prefer, analytical or biomechanical ballet.[213]

Turkin's, Ferdinandov's, and Foregger's ideas can be traced back to cinematic experiments conducted in 1917 by Lev Kuleshov. (Clearly, then, the cinema was a force that was reshaping the other arts.) The best known of these experiments involved synthesizing space ("creative geography") and bodies through montage. But Kuleshov's interests were much broader, and he was especially interested in the implications of translating dance to the screen. He conducted a number of experiments that taught him the central importance of rhythm. This led to perhaps the first statement about Jaques-Dalcroze's relevance to film—an utterly remarkable statement—by Anna Lee (Анна Ли, sometimes given as Anna Li) in the *Кино-газета* (Kino-gazeta) for 1918:

> It is necessary for our intuition, our taste, our heart, our intellect—for everything, everything to merge, to vibrate, to blend harmoniously with the tasks of the artist. This is only possible when the symbols, the signs through which he wants us to read his artistic intentions, are rhythmically realized… It is only when he is armed with a knowledge of rhythm, especially screen rhythm, that the actor, like the singer who has mastered the musical sol-fa, will be able to do battle with any element of chance, "for no two things are more hostile to one another than art and chance" (Volkonsky).[214]

The citation from Volkonsky confirms mechanical art's interest in precision—and that interest often extended to electrotechnical art. For his final montage experiment, conducted on 8 March 1921, Kuleshov filmed the ballerina Zinaida Tarkhovskaya (Зинаида Тарховская; Zinaida Tarhovskaja). He set out the conclusions he drew from this effort in Alexander Belenson's (Александр Беленсон; Aleksandr Belenson, 1890–1949) Кино сегодня (Kino segodnja; Cinema Today, 1925):

> Each gesture has its own duration and that duration can be recorded by a sign that can be studied and reproduced. The alternation of accented and unaccented notes will create a temporal metre, which determines the metric system and the temporal character, just as in montage.[215]

The cinema is an analytical instrument that at last allows artists to forge exact, precise meters, and so to bring strict harmony to the arts of time and movement—and time and movement are the cardinal features of modern existence.

To return to Foregger, the choreographer's influence as a teacher of biomechanics is especially instructive for those who would understand the relations between the cinema and radical developments in the other arts, for an impressive number of Foregger's students (or followers) took up important places in the Soviet film industry: Eisenstein; Sergei Yutkevich (Сергей Юткевич; Sergej Jutkevich, 1904–1985), a founder of ФЭКС (FEKS, 1922–26, short for Фабрика эксцентрического актёра, **F**abrika **ek**stsentricheskogo aktjora; Factory of the Eccentric Actor), an experimental theatre company that was greatly influenced by the circus and variety theatre, and that also called for the electrification and mechanization of the theatre; Boris Barnet (Борис Барнет, 1902–1965); Vladimir Fogel (Владимир Фогель; Vladimir Fogel', 1902–1929), the extraordinary silent film actor who played in Kuleshov's (1889–1970) *Необычайные приключения мистера Веста в стране Большевиков* (Neobychajnye prikljuchenija mistera Vesta v strane Bol'shevikov; The Extraordinary Adventures of Mr. West in the Land of the Bolsheviks, 1924), notable for being the Soviet industry's first anti-American work; and the actor-director Igor Ilinsky (Игорь Ильинский; Igor' Il'inskij; Igor Ilinsky, 1901–1987).[216]

Like his contemporaries, Foregger was seeking new modes of performance, but he remained convinced that aligning his productions with the music hall, the variety theatre, and the circus was essential to completing the cycle of interaction between performers and the audience. He combined music, dance, visual projections, and mechanical effects generators in what he intended to be a populist theatre. In Soviet Russia, Foregger, however popular he was with the working classes, was often criticized for overmechanization, for treating anti-Soviet themes, and for borderline obscenity. On New Year's

Eve of 1922, his production of *Хорошее отношение к лошадям* (Horoshee otnoshenie k loshadjam; Be Kind to Horses) opened at the House of the Press. The production was divided into two parts: Yutkevich designed a dynamic "urbanist" "American" set for the first part, and Eisenstein designed the costumes for that part of the production. Yukevitch's urbanist set incorporated moving steps, a treadmill, one trampoline suspended in the air and another on the floor, flashing lights, mobile lights, and, of course (as a token of the art that was shaping the age), movie posters. It gave the appearance of being automated, even though all the moving forms were operated by hand (through ropes and pulleys) from offstage. Eisenstein's costumes for the chorus of singers consisted of ribbons and paper strips connected to hoops of wire. They caused moral outrage, and Мастфор was placed under strict censorship.

Foregger went even further with *Похищения детей* (Pohishhenija detey; The Kidnapping of Children), adding to effects derived from the music hall and the circus others derived (by his own description) from "cinemazation" and "electrification." The tempo of the acting and the scene changes in his productions approached frenetic. To transform static theatrical space into a dynamic filmic space, he placed rapidly spinning disks in front of spotlights to give the impression that film projectors were creating the live performance and its flickering environment.

René Fülöp-Miller wrote the following of Foregger's *Танец машин* (Tanec mashin; in German, *Maschinentänze*; in English, Dance of the Machines):

> Forregger and his disciples endeavoured to resolve the regularity of the machine into rhythmic movement; the result of these attempts sometimes recalled religious ritual: it was as if priests and priestesses were celebrating in dance the new God of the Machine. Their bodies became correctly constructed appliances, they no longer moved, they "functioned." What Forregger accomplishes is *a cinematics of the living organism*, an analysis in dance of the human mechanism, worked out in exhaustive physiological, mechanical, and psychotechnical studies. The new dancing, in Forregger's sense, tries to express the most general movements of the human organism, rhythm no longer individual but universal. All the gestures are, therefore, as far as possible transformed into partial functions of a total movement, and strictly geometrized. The spectator is intended to recognize in the activity of each single group of muscles a motor reflex within the frame of the whole great stage machine. Dancing is intended to be nothing but a vivid demonstration of the adequate organization of the human machine.[217]

One of Foregger and Mastfor's most notable works was *Танцы машин* (Tancy mashin; Mechanical Dances, 1923), in which arms, legs, and bodies underwent mechanical articulations to the accompaniment of his *Оркестр шумов* (Orkestr shumov; Noise Orchestra). In fact, of all his productions, it is Noise Orchestra that received the greatest attention (it visited the United

States in 1923, to favourable comment). It was set up to produce all of the sucking, whirring, grinding, and crushing noises required to imitate machinery. The instruments were made of boxes of broken bottles, packing cases, metal sheets, whistles, paper horns, gongs, sticks of all materials—wood, copper, iron—and a reed pipe. His purposes for this orchestra coincided exactly with those of Sergei Eisenstein in his experiments with a noise orchestra at the Пролеткульт (Proletkul't; Proletkult) studio: both believed that art must serve the people in their efforts to bring forth a new state and new, less rapacious relations among humans; and the utilitarian calculations involved demanded that art speak to people in the language of contemporary life—in factory sounds and engine roars. As early as 1926, René Fülöp-Miller noted,

> The same [utilitarian] idea also ruled the true proletarian music: it, too, emphasized the rhythms which corresponded to the universal and impersonal elements of humanity. The new music had to embrace all the noises of the mechanical age, the rhythm of the machine, the din of the great city and the factory, the whirring of driving-belts, the clattering of motors, and the shrill notes of motor-horns.
>
> Therefore, the Bolshevists very soon proceeded to construct special noise instruments, to form noise orchestras, to give the public a "real, new music" instead of the usual old bourgeois individualistic "patchwork," and in this way to prepare the collective soul for the revelation of the holiest. They imitated all conceivable sounds from industry and technology and united them in peculiar fugues, in which a whole world of noise deafened the ear. In increasingly extended forms the new "machine music" made itself felt, and soon noise symphonies, noise operas, and noise festive performances were composed.[218]

Fülöp-Miller described the mechanical performances of these artists—among them, "a particularly fanatical sect of 'machine worshippers,' the so-called 'engineerists'"—in religious terms. "Reckless gymnastics" were performed among machines and involved short, choppy machine-like movement phrases. This "gesture-speech" could be appreciated "only by the initiated," as spectators lapsed into a state of "supreme excitement and emotion." Fülöp-Miller even resorted to the terminology of sacrifice/the crucifixion: "this was a passion play which represented the sacrifice of the lower individual man on the altar of the mechanized and desouled collectivity."[219] Finally, he connected machine art and electricity: "While the noise orchestra roughly corresponded to the period of economic militant communism, 'electrification' and the 'perfecting of archaic technology' corresponded to the reconstruction in music, and, as the supreme result of these two factors, the 'symphony for factory whistles.'"[220]

In his *New Spirit in the Russian Theatre*, published in New York in 1929, Huntly Carter (1861–1942) suggested that Mastfor's "studies revealed the interesting fact that the popular dances of the day, in particular those that

were fashionable in America—Fox Trott, Jazz, etc.—were being danced all day and night long by machinery in factories and workshops, and that workmen . . . danced these fashionable dances . . . every moment of their leisure hours." He also compared Mastfor's costumes and scenery to the shapes and colours "of a Futurist painter's studio the day after a drunken orgy"; he then compared the actors' movements to those of Futurist marionettes, "very much like mechanical dolls with patches of colour dabbed on their face and bodies, and a sort of cerebral action, as Futurists call it. I mean the action you get after the brain has broken it up."[221] Carter's comments say much both about the way that industrialization was bringing work life and leisure life together, and about the cinema's becoming a model for consciousness/perception (the mechanization of art/entertainment, in the form of the cinema, was having a similar effect). It also provides a valuable suggestion regarding the connection between Fernand Léger's earlier work on the jazz ballet *Création du monde* and his *Ballet mécanique*.

The artists in more industrialized countries (such as France) had a less exuberant response to machine art (and to electrification's impact on the arts) than did artists in Bolshevik Russia, which was only now emerging from a form of feudalism and an agrarian economy. That said, French artists were greatly interested in electric light, as the painting of Edgar Degas (1834–1917) testifies. The period when DADA flourished (1916–21) overlapped that of Synthetic Cubism, and there is plenty of evidence (especially in Picabia's and Duchamp's oeuvres) that French artists had a lively interest in machine art. Léger's painting shows ample signs of outright mechanophilia. Léger and Antheil shared an interest in the machine aesthetic: the 1923 edition of *The Little Review* (edited by Antheil's friend Jane Heap) included an English translation of the first part of a two-part presentation of Léger's declaration "The Esthetics of the Machine," which was dedicated to Ezra Pound, as well as an excerpt from Antheil's *Airplane Sonata* (for piano, 1922).

Other Europeans took an interest in mechanical art. In 1922, the Laboratoire Art et Action was founded by Édouard Autant and Louise Lara. Cocteau's presentation there of *Antigone*, with costumes by Chanel and set decor by Picasso, showed futuristic leanings. That same year, two Italians—Vinicio Paladini and the Futurist/Constructivist painter and architect Ivo Pannaggi (1901–1981)—mounted *Ballo meccanico futurista* (The Futurist Mechanical Ballet), and Giacomo Balla produced *Notte metallica* (Metallic Night). Also that year, Enrico Prampolini issued a manifesto on the aesthetic of the machine, and Pannaggi collaborated with Vinicio Paladini on "Manifesto dell'arte meccanica" (Manifesto of Mechanical Art), which defined the leading principles of Futurism in the 1920s. (The manifesto is interesting as a rare example of a Marxist orientation in Futurist writing.)

Perhaps the most striking of the many art movements of this era that spoke so eloquently of the transformative influence of the cinema was Проекционизм (Proekcionizm; Projectionism), led by the artist and philosopher Solomon Nikritin (Соломон Никритин, 1898–1965). Members of this little-known group included painter-scientist Kliment Red'ko (Климент Редько; Kliment Red'ko, 1897–1956), the painter-sculptor Aleksandr Tyshler (Александр Тышлер, 1898–1980), the painter and filmmaker Sergei Luchishkin (Сергей Лучишкин, 1902–1989), and painters Mikhail Plaskin (1898–1965) and Nikolai Triaskin (Николай Тряскин; Nikolaj Trjaskin, 1902–1995). Projectionism united themes from Cubism, Orphism, Futurism, Productivism, and Constructivism with idiosyncratic ideas largely of their own devising. The term Проекционизм comes from the Latin *projectus*, and was intended as a variant of Futurism, celebrating the urge to rush into the future. But the other meanings of the term are also relevant.[222] Nikritin laid out the fundamentals of their conception of Проекционизм: in true Neo-Pythagorean / Neo-Platonic fashion, Nikritin maintained that art is an outward projection of *νοῦς* (noûs, mind, or a rational principle)—at the Ideal (the highest reality), the *νοῦς* of the individual visionary meets the transcendent *Νοῦς* to bring forth the order of the artwork.[223] The goal of culture (which now comprises technology, he recognized) is to bring forth the rational essence (or rational order) of nature—to release that order that obtains there as *ενεργεια* (energeia, potentiality). Releasing that potential requires a method. Nikritin's Projectionist manifesto asserts,

> The Artist is not a producer of consumer goods (a cupboard, a picture), but of PROJECTIONS of the METHOD—the organization of matter. The method, therefore, invented by the artist, becomes the purpose of the creative process.[224]

The Projectionists, then, maintained that an artist, by following a method whose rationality (*λόγος* can also mean plan, or project) is embedded in the order of things, projects his thoughts into reality. In doing this he actualizes the *ενεργεια* that obtains in potentiality in the ideal, and this actualization realizes the condition for a further project. A basic tenet of Projectionism was that artists should not create things—that is, objects like other objects in the world—but projections that convey their perceptions of materials and the interactions among material forces. Tyshler's *Организованные координаты упругости цвета* (Organizovannye koordinaty uprugosti cveta; Organized Coordinates of the Elasticity/Resilience/Tension of Colour), a series of compositions representing combinations of brightly shining gases, expresses this idea, and it is a paradigmatic instance of the electromorphic art this volume is concerned with. Red'ko referred to his paintings as electro-organized. His *Декларация электроорганизма* (Deklaracija jelektroorganizma;

Declaration on Electroorganism) was published to accompany his entry in a famous exhibition of avant-garde Russian art mounted in Berlin in 1922. A draft of that tract states,

> ART TODAY is the worldview of radio substance, out of which arises potential—energy in all its forms. [This is tantamount to a confirmation of my remarks above concerning *ενεργεια*.] This highest manifestation of matter is light. [This affirms the comment I made above, that at the beginning of the Electromagnetic Age, many artists considered light to have an exalted ontological status. That view contributed to understanding cinema as the *ottima arte*.] . . . Art "today" explains anew the concept of "abstract," just as there exists time in and of itself, and cognition leading to its perception. [This relates to the Bergsonian/electrological views that Delaunay expounded in his tract, "Light."]
>
> Because the contemporary known unit of the velocity of light has overtaken the entire previously known velocity, artists study the elements that form the new periodic states of electromatter [this neologism suggests that many artists at the beginning of the electromagnetic age developed the idea that reality is electricity-energy-matter; while Red'ko doesn't explicitly formulate such a theory, this notion tends towards a neutral monist conception of reality, of reality as *geistig* matter], constructing their works according to the spatial mechanics of two reciprocal forces, compression and expansion, distancing and approach.[225]

In *Russian Pioneers of Sound Art in the 1920s*, Andrey Smirnov and Liubov Pchelkina point out, quite appropriately, that Nikritin's interest in discovering the universal principles of organization (*λόγος*) had much in common with the goals of the Bolshevik Alexander Bogdanov (Александр Богданов; Aleksandr Bogdanov, 1873–1928), the scholarly founder of Пролеткульт (Proletkul't; Proletkult), with which Nikritin had been briefly affiliated. Bogdanov's Пролеткульт practices were founded in his theory of tectology (as propounded in *Тектология: Всеобщая Организационная Наука*; Tektologija: Vseobshhaja Organizacionnaja Nauka; Tektology: Universal Organization Science, 3 volumes, 1922), which had to do with the search for the principles that underlie all organizational complexes and with identifying structural similarities in all spheres of knowledge—an ambition Nikritin, Red'ko, and Tyshler shared. A fully developed tectology, Bogdanov believed, would be capable of unifying the physical, biological, and social sciences (thus Bogdanov anticipated the Wiener Kreis's project of creating a unified science). To highlight the comparison, Smirnov and Pchelkina note,

> What they shared was a desire to develop a universal science of organisation and analysis through a search for structural similarities in all spheres of knowledge. Rejecting traditional arts, Nikritin proclaims the universal principles, common to all future arts, as being related to subjects such as sound, image,

> biomechanics and social engineering. For him, the new language of art was based on terms such as "stream," "dynamics," and "density." Nikritin tried to develop a typology and classification system of human movements and gestures, colour palettes, sounds (mainly related to the human voice) as well as emotional states, based on the principles and terms of biomechanics, musical harmony and acoustics. For instance, he developed biomechanical temperaments and scales for body movements. He also introduced a number of neologisms, combining the languages of acoustics and biomechanics. Nikritin went so far as to attempt in 1924 to chart the process of evolution of consciousness and creative energy of society from simple, primitive states to the perfection of the future classless society. Based on a creative human network [here we see again the anarchist conception of society as a network], it [the classless society] existed without any central authority.[226]

Especially important to Solomon Nikritin was his drive to extend biomechanics to voice training, so that the physiological apparatus of the voice would be as rigorously trained as the large muscles were through gymnastic training. It is likely that this aspiration was influenced by the ideas of Pavel Florensky (Павел Флоренский; Pavel Florenskij, 1882–1937), an extraordinarily gifted philosopher and theologian who was given to developing his core ideas in extravagant directions. Florensky, like many visionaries of his time, became fascinated with electricity. In 1921, after the Bolshevik authorities closed the monasteries where he had worked, Florensky moved to Moscow to work on the famous GOELRO plan (Russian план ГОЭЛРО, abbreviation for Государственная комиссия по электрификации России, Gosudarstvennaja komissija po jelektrifikacii Rossii; State Commission for Electrification of Russia), the Soviet government's first five-year plan (reflecting Lenin's conviction about the central importance of electrification). In 1924 he published a large volume on dielectrics (materials that display a high magnetic polarizability in response to an electrical field); later, he wrote a paper offering a geometrical interpretation (through imaginary numbers) of Einstein's theory of relativity. Florensky believed that Einstein's theory had theological implications: a body that had reached a speed faster than that of light would have attained the Kingdom of God. (In the 1930s he would serve time in the infamous Solovki prison camp for mentioning God's Kingdom; in December 1937 he would be executed.) Like many people at the time, Florensky took electromagnetic theory as a basis for ontology and so he came to the conclusion that the fundamental reality is vibratory. (Florensky was clearly influenced by Vedic ideas, and the fundamental principle of the Vedic theory of cosmogenesis is that sound vibrations produce reality.) Florensky's influence on Nikritin guaranteed that the latter's training program for theatrical movement would incorporate many components that addressed vocal

sounds and that his description of motion would often make use of analogies to vocalization.

The theory of Projectionism found its practical implementation in the Projection Theatre, which Nikritin and Sergey Luchishkin (1902–1989) established on 10 January 1922, at the ВХУТЕМАС—Высшие художественно-технические мастерские (VHUTEMAS—Vysshie hudozhestvenno-tehnicheskie masterskie; VKhUTEMAS—Higher Art and Technical Studios), the state art and technical school founded in Moscow in 1920. After October 1923 the Projection Theatre operated in close collaboration with Alexei Gastev's (Алексей Гастев; Aleksej Gastev, 1882–1939) Центральный институт труда (Central'nyj institut truda; Central Institute of Labour, abbreviated ЦИТ [TsIT]). TsIT was dedicated to the improvement of industrial efficiency. Gastev was a sort of Futuro-Constructivist poet who became first a metal cutter and then a utopian social engineer. In 1928, he organized Установка (Ustanovka; Setup), to practise the установочный метод (ustanovochnyj metod; set-up method). Ustanovka was a joint stock company that conducted audits on workers' industrial performance and made recommendations on the efficient organization of work. The company was so successful that the TsIT operated independently of state funds. Gastev's collaborators included Nikolai Tikonov (Николай Тиконов; Nikolaj Tikonov), who led the photocinematographic laboratory, and the physiologist Nikolai Bernstein (Николай Бернштейн; Nikolaj Bernshtejn, 1896–1966), who headed the biomechanics section and made important contributions to understanding how the central nervous system controls muscle behaviour (he arrived at this understanding by radically limiting, when performing actions, the degrees of freedom that muscles constitutionally possess). Gastev himself was a convinced Taylorist—René Fülöp-Miller keenly noted "the intoxicated enthusiasm with which Russians [in contrast to Europeans] speak of the application of the mechanizing process to the whole of existence."[227] Gastev set out the principles of his biomechanics in his book *Как надо работать* (Kak nado rabotat'; How to Work, 1923). His approach to building the new human was systematic, beginning with the most basic and proceeding step by step—he wrote that we "begin with the most primitive, the most elementary motions and carry out *the mechanization of man himself*. This mechanization we understand in the following manner: the less perfect the motion, the greater the element of deceleration and the less kinetic automatization. The perfect mastery of a given movement implies *maximum automatization*."

René Fülöp-Miller notes,

> Gastev has discovered the basic law of movement: all movements, in his theory, may be traced back to two archetypes, an "up" and a "down." On the basis of

> these two archetypes, a careful analysis is made of all complicated combined processes of work and an investigation of the most rational methods of carrying them out. Anyone entering the front door of this institute as a normal living man, issues from the back door, after passing through countless laboratories, as a completely perfected working machine. But, if so desired, "directive apparatus," "administrative machinery," or "management regulators" can also be produced as well as "labour machines."[228]

The elimination of superfluous movements could triple productivity. This would do away with the "disturbing caprices and eccentricities of the nerves and the soul and purge all constitutional mental obstacles. Machine man would function properly."

Gastev maintained that to bring forth the new human, schools would have to be reformed to "make the conditions of the animate working machine as favourable as those of the inanimate one."[229]

> All the limbs must be individually trained; statics and dynamics will first be taught, then the handling of tools, the movements making up the stroke, the exercise of hand, elbow, and shoulder. In this way the maximum quantity of work for a given supply of strength will be produced. After practice in the tempo and sureness of the stroke, the right and left hands must be made equally skilful. This is followed by intensive practice with hammer and chisel, and here, too, the pupil must be taught to be ambidextrous. This method produces the greatest efficiency in all kinds of fitting and machine work, and can be elevated to a system of instruction and organization, which will lead to a new civilization.[230]

Furthermore, social conditions would have to be reformed, under the principle of maximum utility from the least expenditure of energy. For this, temporal economy would be crucial. According to Fülöp-Miller, Gastev maintained that

> Every member is not only bound to be punctual himself, but also to supervise the punctuality of others, which, it is hoped, will gradually change the direction of the whole of productive life, and also bring about a fundamental reorganization of the individual. Every adherent of the Time League [Gastev's Всероссийский совет ячейки "Лига 'Время'"; Vserossiyskiy sovet yacheyki "Liga 'Vremya'," All Russian Council of the Association of the Time League] must also provide himself with a "chronocard," on which he has to apportion the time at his disposal exactly like a timetable. These chronocards have to be brought to the places where general social work is done, to the universities, for example. Every time a professor is late, it must be noted on the card, and an estimate made of the amount of time wasted in this way. If a member of the League arrives late at his place of work, part of his wages have to be paid as a fine to the League funds.[231]

Gastev extended his principle of maximum automation to thought and language. Language must be shaped according to criteria relating to efficiency, and thought itself must be cleaned up—Gastev sought an "objective hygiene of cerebral activity" that involved tying people's diurnal routines to the clock (everyone would go to bed, wake up, and eat at the same time).[232] He sought to forcibly expel ornate and florid language from Soviet speech: economy of word choice must prevail. "To save time," Fülöp-Miller explained,

> efforts were also made to mechanize language and to introduce short and pregnant expressions instead of the ordinary rambling Russian circumlocutions, Gastev issued a series of appeals and orders for the purpose of stemming the prolix and long-winded methods of writing and speaking used by his comrades, and accustoming them to clear, brief, and easily understood sentences… Gastev was obliged, therefore, to issue dictatorial instructions to speakers and reporters in one of his orders:
>
> "Directions for Speakers.
>
> "No speaker is to get up to speak at a meeting unless he has a proposal to make.
>
> "When you make a report, never end it with a question but always with a proposal. A speech which does not end with a proposal is pure waste of time.
>
> "Important Advice to Reporters.
>
> "Note the date, the hour, and minute of every event!
>
> "Write so concisely that it will be impossible to delete a single word!
>
> "Accustom yourselves to writing clearly, so that others will be able to read your manuscript.
>
> "Accustom yourselves to writing quickly!
>
> "In every announcement, stress the most important points.
>
> "Whenever possible, supplement every report with drawings and graphic representations.
>
> "Do not destroy your notes till they have been used!"[233]

The poet Gastev applied these same principles to his own work. Here is one of the poems he produced by following his counsels on language:

> Equip yourselves, fitters!
>
> Take your tools, the material, and the place of work,
>
> And from these things create a well thought-out organization!
>
> Do you wish to be an organizer?

> Do you wish to be a good organizer?
>
> Do you wish to be a trustworthy organizer?
>
> Choose for yourself a small field of work,
>
> The size of an arshin, and build every detail,
>
> Calculated to a minute, to a fraction of an inch!
>
> Do not take much upon yourself, think well what you do![234]

These principles of temporal economy became basic to Russian Constructivism and Futurism. They derived from new technologies that allowed movement to be recorded and analyzed. The graphs of movement made by Gastev and also by Nikritin and Luchishkin resemble the recordings made by Étienne-Jules Marey with his proto-cinematic chronophotographic gun. It is doubtful whether the notion of temporal economy underpinning Taylorism and biomechanism would have been worked out the way it was if motion-recording devices had not been invented. The near-ubiquity of motion-capture cameras (movie cameras) reinforced the form of Taylorist thinking. The films, sound compositions, and writings of the Futurist-influenced Constructivist filmmaker Dziga Vertov link ideas drawn from Taylorism (or, more exactly, Gastevism) with the theory of electromagnetism as well as technologies for capturing movement. *Мы*: *Вариант Манифеста* (My: Variant Manifesta; We: Variant of a Manifesto) is a piece of writing that incontestably elevates the cinema to the paragonal status of the *ottima arte*. The importance of that document to the argument I am making prompts me to offer a long extract from it, to which I add many comments. In these comments I use term "Gastevize" to suggest the tidying up of movement applying scientific principles of mechanical efficiency, and not the actual application of Gastev's system:

> To the American adventure film with its showy dynamism and to the dramatizations of the American Pinkertons the kinoks [a neologism meaning the "camera-eye men" that Vertov used to refer to members of his collective] say thanks for the rapid shot changes [this concerns bringing art into accord with the accelerated pace of the present; film's penchant for accelerated movements is one of the factors that makes it the *ottima arte*] and the close-ups [the capacity to magnify allows film to show us material reality, which had seemed in danger of slipping away; that ability also elevates the cinema in the paragonal hierarchy, another reason for the kinoks' gratitude]. Good . . . but disorderly, **not based on a precise study of movement** [such unstudied movements have not been appropriately Taylorized/Gastevized, and so lack artistic quality: the cinema should present well-formed movements, and forming elegant, seemly movements well requires study of the sort Gastev proposed.] . . .

WE invite you:…

—to flee—

out into the open, into four-dimensions (three + time) [this statement expresses the popular interpretation of Einstein's theory of relativity—that it is about space-time—but it also connects the idea of space-time to freedom (the kinoks go out into the open)], in search of our material, our meter and rhythm…

In an art of movement we have no reason to devote our particular attention to contemporary man [kinoks should not expend their efforts on poorly executed, poorly formed movements].

The machine makes us ashamed of man's inability to control himself, but what are we to do if electricity's unerring ways are more exciting to us than the disorderly haste of active men, [their movements haven't been Gastevized. However, the cinema and electricity provide the means by which the movements can be apprehended, analyzed, and Gastevized; when that happens, the quotidian activities of ordinary men and women will take on an artistic quality—and, according to the artists who were committed the Bolshevik cause, when that happens, the new state, in which humans truly flourish, will emerge] and the corrupting inertia of passive ones?

Saws dancing at a sawmill convey to us a joy more intimate and intelligible than that on human dance floors [this suggests that dynamic form is rational and can be understood according to harmonic principles; and that machine movements, because they are designed to be efficient, are especially intelligible—the Purists shared this idea with Vertov]…

*Our path leads through the poetry of machines, from the bungling citizen to the perfect electric man* [the new human will come from electricity—at this time the cinema was considered an art of electricity, a fact Vertov's *Человек с киноаппаратом* makes abundantly clear]…

*The new man*, free of unwieldiness and clumsiness, will have the light, precise movements of machines, and he will be the gratifying subject of our films [by this, Vertov is suggesting that sometime in the future, the Gastevized human, her movements aestheticized, will become the cinema's favourite subject].

Openly recognizing the rhythm of machines, the delight of mechanical labor, the perception of the beauty of chemical process, WE sing of earthquakes, we compose film epics of electric power plants and flame, we delight in the movements of comets and meteors [the movements of comets and meteors are celestial, that is, harmonic] and the gestures of searchlights [technology now rivals the cosmos and eventually may claim victory over the sun] that dazzle the stars…

Cinema's unstrung nerves [in a gesture that presages one that Marshall McLuhan will later make, Vertov makes an analogy between this electric art and the nervous system, and like McLuhan, he takes it that this nervous system

needs to be retrained in order to be accommodated to the emerging order] need a rigorous system of precise movement [again, Vertov suggests that the human nervous system must be Gastevized in order to become a truly artistic element; by this he suggests that the cinema, electricity—the nervous system—and sensation have deep formal relations to one another].

The meter, tempo and type of movement, as well as its precise location with respect to the axes of a shot's coordinates and perhaps to the axes of universal coordinates (the three dimensions + the fourth—time) [the cinema can take up an absolute, non-anthropocentric viewpoint] should be studied and taken into account by each creator in the field of cinema.

Radical necessity, precision, and speed are the three components of movement worth filming and screening [Gastevized dynamics are the only truly artistic elements].

The geometrical extract of movement through an exciting succession of images is what's required of montage [montage operates in tandem with the fundamental aesthetic principles of Gastevism].

*Kinochestvo* [another Vertovian neologism, suggesting "cinema-eye-ness"] *is the art of organizing the necessary movement of objects in space as a rhythmical artistic whole, in harmony with the properties of the material and the internal rhythm of each object*.

Cinema is, as well, the *art of inventing movements* of things in space in response to the demands of science; it embodies the inventor's dream—be he scholar, artist, engineer, or carpenter; it is the realization of *kinochestvo* of that which cannot be realized in life.

Drawings in motion. Blueprints in motion. Plans for the future. The theory of relativity on the screen . . .[235]

Nikritin and Luchishkin's biomechanical Projection Theatre (that is, Theatre for Presenting Projectionist Works), which operated in close collaboration with Alexei Gastev's TsIT, engaged in similar multimodal media explorations. The fundamental purpose of the Projection Theatre was to develop a mastery of mind and body—a mission they hoped to take to the whole of society. Documentation of the training program reveals that actors-in-training engaged in a daily regimen of physical and psychological exercises, to master complicated scores of sounds, gestures, movements, and emotional states. Sergey Luchishkin describes how the Projectionists prepared for the abstract show *Трагедия АОУ* (Tragedija AOU; The Tragedy of AOU), which premiered in August 1922:

We started to implement our experimental concepts by working up action scores by analogy with a piece of music, composing them out of different parts together with different rhythmodynamic characteristics. After that, we looked for the form of plastic expression in each part within the movement of the body,

> for the development of this movement, and for its nuances and transitions, including vocal resonance. All this was tinged by the emotional score which became the basis of the entire action.[236]

The actors trained to embody the ideal of the human machine.

Like other performance pieces celebrating the identity of the human beings and machines, *Tragedija AOU* was a mixed-media work. The stage sets incorporated gymnastic apparatuses and a noise orchestra (which, after the manner of Foregger's, incorporated many sound-producing machines) as well as mobile props designed by Nikolai Triaskin. The script for the Projectionist production *Нажим и удар* (Nazhim i udar; Pressing and Impact, 1923) called for large screens at the back of the stage to allow projected characters to interact with real actors.

Most mechanical ballets for the theatre incorporated movements inspired by machines. Sometimes marionettes, or actors dressed like giant puppets, were the principal performers. This was true of Kurt Schwitters's (1887–1948) *Merz-Bühne* and George Grosz's designs for Yvan Goll's (né Isaac Lang, 1891–1950) *Mathusalem ou l'éternel bourgeois* (Mathusalem: Or the Eternal Bourgeois, 1922). In the West, machines in works such as these sometimes represented the dispensations of industrial society, but other times these works offered a dystopic vision of a society that had become overly fascinated by speed and efficiency (fascinated to the point of being dazed into stupidity in allowing itself to take the machine as a sign of the future Utopia). Such works protested against a society that had allowed itself to become enthusiastic about a condition of modern life that, after all, had emerged from the new commercial order and was turning flesh into a standardized machine. Frederick (né Friedrich) Kiesler's (1890–1965) design for Karel Čapek's (1890–1938) play *W.U.R.* (Werstands universal Robots, sometimes given R.U.R, Rossum's Universal Robots, 1920) and John Heartfield's (1891–1968) sets for Ernst Toller's (1893–1939) *Maschinenstürmer* (The Machine-Wreckers, 1922) are two examples. But those were later manifestations of a theme that can be traced back to sometime around 1890, when such companies as Le Théâtre Mécanique Morieux de Paris began to present mechanical marionettes against huge dioramas and moving cycloramas painted with transparent effects (one show presented by the Morieux brothers, at the Paris 1900 World's Fair, offered peculiar mechanical characters depicting Chinese people, Africans, Russian Cossacks, Spanish Bullfighters, and soldiers).

Beyond the mechanical theatre / mechanical ballet, mechanical works were produced in this era, and many paintings and performance works alike offered industrial themes. In 1916 and 1917, the *secondo Futurismo* artist Fortunato Depero did a number of paintings and drawings on this theme.[237]

The Daris Milhaud (1892–1974) / Fernand Léger *Création du monde* (The Creation of the World) appeared in 1923; this was an astonishing amalgam of archaic and futuristic elements. That same year, Sonia Delaunay painted *Dance des disques*. The architect, theatre designer, and sculptor Frederick Kiesler presented his *Railway-Theater* in Berlin, and Enrico Prampolini choreographed his "propeller dance," *Danza dell'elica*. As I have pointed out, the Russian Nikolaï Foregger presented his *Танец машин* at the Internationalen Ausstellungen Neuer Theaterkunst (International Exhibition of New Theatrical Art) in Vienna on 13 February 1923. Foregger's ballet presented groups enacting various industrial processes, playing the parts of gears, levers, cogs, motors, and flywheels. Mechanical ballets were also presented at the 1925 Wiener Theaterfestival and Paris's Exposition Internationale des Arts Décoratifs. In 1926, Kiesler and Jane Heap (1883–1964), an international promoter of literary modernism—and, at this time, the editor (along with fellow partisan Margaret Anderson, 1886–1970) of the art and literature journal *The Little Review*—organized the Machine-Age Exposition at Steinway Hall on New York's 57th Street, which juxtaposed technical advances in the arts with advances in technology and included works by many artists associated with the International Constructivist movement, including El Lissitsky (1890–1941), Alexandra Exter, Picasso, Kiesler himself, Schlemmer, Kurt Schmidt, and László Moholy-Nagy.

Another feature of many mechanical ballets was the use of light as a protagonist (or at least key component) in dance: this interest in creating displays of formed light (light organized into spatio-temporal forms) dates back at least to Alexander Rimington's light organ (built in London in 1893), if not even earlier. An influential expression of that tendency was Loïe Fuller's (1862–1928) presentation in 1912, in Paris, of her *Ballet de lumière*—here, as in other dances, Fuller combined her choreography with voluminous costumes, which she moved skilfully to create intricate dynamic patterns that reflected light from multicoloured stage illumination of her own design.[238] The same year, Wassily Kandinsky created his *Der gelbe Klang* (Yellow Sound). Edward Gordon Craig's (1872–1966) *Art of Theatre* (1904) offered illustrations that embodied this theme of moving coloured light. Given the interest in light and movement, it should not be surprising that many artists who had created mechanized scenery and props (and mechanophilic scenery and props) were eager to transpose their experiences onto the cinema (and among these artists was Fernand Léger).

Film offered an important means of mechanizing dance. The Léger/Murphy *Ballet mécanique* is the best-known example, but it was not the only cinematization of dance. The alliance of film and dance was accepted even

in the milieu of the culture industries: in 1920, Abel Gance created *La dixième symphonie* (The Tenth Symphony), in which Victoria de Samothrake and Isadore Duncan appeared. *Danse macabre*, by Dudley Murphy himself, combined film and dance—though the synthesis is of a wholly Symbolist character and lacks the stylistic features of most machine art; it must be said that in this work, dance (as theatre) leads film and that film's material nature does guide the onscreen dance.

The theatre of the 1920s was greatly influenced by sport, speed, cinematography, the automobile, aviation, and automation. Modernity was often heroized, and it was in this milieu that Moholy-Nagy proposed the idea of kinetic art. The idea of the "American century" was being bruited about Paris at the time (perhaps conditioned in part by the influx of Americans in Paris—between 1921 and 1924 the number of Americans in Paris swelled from 6,000 to 30,000). The enthusiasm was such that when the American painter Gerald Murphy (1888–1964) arrived in Paris, he was commissioned to create sketches for the annual season of Rolf de Maré's Ballets suédois; his sketches would include skyscrapers and electric signals.[239] Fernand Léger had recommended to de Maré that an "American" ballet precede his *La création du monde* and that Gerald Murphy design the sets and costumes for it. On 25 October 1923, the premiere of the ballet *Within the Quota* took place at the Théâtre des Champs-Élysées. Gerald Murphy wrote the scenario, and Cole Porter (1891–1964) the music, in the now-familiar Cole Porter style (its premiere performance was conducted by Charles Koechlin). The Swedish dancer Jean Börlin did the choreography, while Rolf de Maré, the director of the Ballets suédois, coordinated the event.[240] This sixteen-minute work incorporated jazz and film elements to suggest the modern (American) era's penchant for speed. It was intended to round out the running time of the evening's program; as well, de Maré believed it would appeal to American audiences during the transalantic tour he expected the company to undertake in the winter of 1923–24, since it would be designed and executed by Americans.

*Within the Quota* (its working title was *Landed*) has direct connections to *Ballet mécanique*. Léger had thought up the theme for the ballet-sketch; Gerald Murphy would rework it as a celebration of modern urban dynamism.[241] Its title alludes to anti-immigration laws that the United States (like many European countries) had just passed. The ballet, a picaresque, tells the story of a Swedish emigré in New York. The new arrival meets a series of American types: the Cowboy, the Woman Millionaire, the African American Gentleman, the Sheriff, America's Sweetheart, and the child Jazzer. In a surprise ending, the Swedish émigré is transformed into a movie star (America is the land where stories have happy endings). The music is primarily a "third stream" jazz score (not unlike the score that Darius Milhaud did for *La création du*

*monde*), but also incorporates passages whose appeal is primarily rhythmic and whose character derived from the improvisations that pianists played when accompanying silent films. Most striking about this ballet was its visual component: the backdrop offered a parody of the front page of a Hearst newspaper blown up to enormous proportions: one headline was a notice stating, "Unknown Banker Buys Atlantic," and the illustration to its right depicted the largest French ocean liner, the *Paris*, tilted vertically so that it resembled the Woolworth Building in New York, to which (in a gesture that confirmed the work's transatlantic connections) it was juxtaposed.[242] The costumes for the various American types were extremely witty.

*Ballet mécanique* developed in this environment. In his autobiography, Dudley Murphy gives an account of his role in fashioning *Ballet mécanique* that emphasizes the part that rhythm, movement, and choreography would have in pure film. The description begins with his laying out the ideas that he and Léger discussed; that part of the discussion lays out modernist ideas of mediumistic specificity and the centrality of rhythm in film:

> We talked over ideas and I set out with my camera and the film, executing the ideas we had talked over and photographing things that stimulated my imagination around Paris. The premise on which we decided to make the film was based on a belief that surprise of image and rhythm would make a pure film without drawing on any of the other arts, such as writing, acting, painting. In other words, we were going to make a pure film. Our project was called *Ballet mécanique*.

However, he soon veered towards metaphor and more conventional ideas about art:

> I saw an old washerwoman climbing a flight of stone stairs. When she reached the top, she was tired and made a futile gesture. The scene in itself was banal, but by printing it 20 times and connecting the end of the scene with the beginning of her climb, it expressed the futility of life because she never got there. This scene in the editing followed a very intricate piece of shiny machinery, somehow correlated in movement and rhythm to that of hers.
>
> Another scene showed a tremendous piston, brilliant and shiny, plunging up and down in a very phallic movement. This was followed by the bulging stomach of Katharine [Hawley, Murphy's wife], who was now pregnant.
>
> I was intrigued to do something with the artificial legs that exhibit silk stockings and decided to do a stop motion dance with these legs around a clock. In bringing the legs to the studio, I drove through Paris in an open cab, with a leg over each shoulder, screaming.[243]

Léger, as we have seen, spoke of this scene with the washerwoman in more formal-phenomenological terms, as dealing with the dynamic image and with

the way viewers' reactions changed over time, from amazement to exasperation. Léger's commentary has it merits—it seems *prima facie* more modernist, in that it declares the aspiration to astonish and provoke the audience. Nonetheless, Murphy's may in the end be a more tellingly modern comment. *Ballet mécanique*'s machine scenes offer many images reminiscent of images of copulation, fashioned on the movements of cylinders and pistons of the same sort that fill the mind of the wandering Leopold Bloom in the "Ithaca" episode in James Joyce's *Ulysses*, and some of these images testify to an awareness of the comic possibilities (illustrated in these very passages) of analogizing humans to machines.[244] And, as I pointed out earlier, Braque's and Picasso's paintings of the years 1904 to 1914, which insistently related the curves of the body to object-forms (which similarly hover between representation and abstraction), provide the type for treating the human body as a sexual apparatus. Furthermore, the precise repetition created by looping the footage of the washerwoman makes her movement literally repetitive, and that precision makes this movement of pistons and cylinders well adapted to the total satisfaction of the steady, but not maximally intense, arousal that is the bodily state of female desire to which Joyce alluded.[245]

## DIVERSITY IN *BALLET MÉCANIQUE*

*Ballet mécanique* displays features of other works by Léger: the interest in *l'homme machine*, in urban life, and in the beauty of industrial forms. Furthermore, forms that appear in Léger's painting also appear in *Ballet mécanique*.[246] But what strikes a thoughtful viewer first about the film is the remarkable diversity of its visual forms. *Ballet mécanique* is not bound to a single mode: it includes naturalistic images (such as Dudley Murphy's wife in the garden); representational images transformed into non-naturalistic forms (vortographic images and images shot through mattes to create a vertical montage); painted forms that span the range from representational to abstract; graphic forms that present text (the letters in the text "On a volé un collier de cinq millions"); graphic forms that serve as iconic signs (the "O" from the text above that is transformed into an icon of a necklace); and purely abstract forms. Without breaching irrecuperably the principles of aesthetic integrity, it unites forms belonging to these different sorts of categories, as do many of Léger's paintings.

The interest in combining diverse and even contrasting materials and forms that is so marked a feature of *Ballet mécanique* characterizes the works of other artists, and other groups, who shared Léger's enthusiasm for modernity. The productions of the Ballets russes were similarly synthetic, in that they attempted to bring diverse tendencies, diverse forms, and diverse media

together in a single work—architects, painters, composers, and choreographers collaborated in creating the troupe's productions. Sergei (or Serge) Diaghilev (Сергей Дягилев; Sergej Djagilev, 1872–1929), a founder (1898) of the important journal *Мир искусства* (Mir iskusstva; World of Art) and its first editor-in-chief, engaged renowned writers (including Jean Cocteau), composers (Igor Stravinsky, Claude Debussy [1862–1918], Maurice Ravel [1875–1937], Erik Satie [1866–1925], Francis Poulenc [1899–1963]), and artists to work with his company; dance, music, and set design were combined into a *Gesamtkunstwerk*. Among those whose works contributed to the exciting ambience of the time (Paris was the meeting place of many artistic tendencies of the time) were the architects Antoine Pevsner (Антуан Певзнер; Antuan Pevzner, 1884–1962) and Georgi Yakulov (Георгий Якулов; Georgij Jakulov, 1884–1928) with his *décor mécaniste*; the painters Natalia Gontcharova (Наталья Гончарова ; Natal'ja Goncharova, 1881–1962), Larionov (Михаил Ларионов; Mihail Larionov, 1881–1964), Nikolas Roerich (Николай Рерих; Nikolai Rerikh, 1874–1947), Alexandra Exter, Robert (1885–1941) and Sonia (1885–1979) Delaunay, Henri Matisse (1869–1954), André Derain (1880–1954), Georges Braque, Pablo Picasso, Max Ernst (1891–1976), Jean Tinguely (1925–1991), and Giorgio de Chirico (1888–1978)—and all of these artists had an appreciable influence on the Ballets russes at one time or another.

The Swedish Ballet, during the brief period (1921–25) in which it was led by Rolf de Maré, displayed a similar enthusiasm for "the modern world." Like Diaghilev, de Maré involved composers and artists in his productions: his *Les mariées de la tour Eiffel* (Wedding on the Eiffel Tower, 1921) was written by Jean Cocteau and had music by (among others) Darius Milhaud (1892–1972), Arthur Honneger (1892–1955), and Francis Poulenc (1899–1963); *Skating Rink* (the work's title was originally in English, 1922) used costumes and sets designed by Fernand Léger, music by Arthur Honneger, and choreography by Jean Börlin; *Création du monde* (The Creation of the World, 1923) was written by Blaise Cendrars and had music by Darius Milhaud and sets and decors (including life-sized puppets) by Fernand Léger (Léger's costume designs drew inspiration from animal costumes worn by African dancers during religious rites).[247] In 1924 the Swedish Ballet mounted *Relâche*, with music by Erik Satie, decoration by Francis Picabia (1879–1953), and choreography by Jean Börlin. Marcel Duchamp appeared as a nude performer in the production, which included a film, *Entr'acte* (Intermission), by René Clair, as a component. Picabia's script for the film conjoined sequences that lacked strong (readily apparent) relations with one another to episodes presenting (often whimsically) mechanical movement; and (again like *Ballet mécanique*) the finished work is a catalogue of camera effects and of changes in tempo. The Ballets suédois's involvement with the cinema was more extensive yet: the company

was commissioned to create a work to be called *Paul & Virginie, Supercinéma*—Erik Satie, the poet and novelist Raymond Radiguet (1903–1923), a close friend of Jean Cocteau who was quite capable of enraging the senior writer, Jean Cocteau himself, and the erstwhile Fauve painter André Derain (1880–1954, who from shortly after the Great War was involved with the *Retour à l'ordre* movement) were involved in its production.[248] This work, so cinematic in its conception, would have made use of rear-projection.

Cubist art after about 1913 displayed a similar penchant for the diversity evident in these mathematical artworks. I have noted that Picasso's *Compotier avec fruits, violon et verre* from that year comprises a colour-engraved illustration of pears, a line-drawing representation of part of the body of the violin, charcoal-outlined tuning keys, a section of *faux-bois,* and other components besides. Here, as in other Synthetic Cubist paintings, there are various relations between representing tokens and the represented objects: sometimes the relation is that of a schematized, iconic representamen to what it represents; sometimes it is that of a conventionalized icon to what it represents; sometimes it has the same relation that exemplifying shapes have to their reference; and sometimes, remarkably, it is a relation in which the representing token and the represented object are identical. It is the very diversity of these relations (and the materials that compose them) that makes achieving aesthetic integration such an impressive accomplishment. I have also noted that a similar diversity extends to Cubists' ideas about visual perception. The Synthetic Cubist constructions that Braque, Picasso, Gris, and others fashioned made evident vision's synthetic character—the diversity, even near incongruity, of the elements that compose such works suggests the discontinuities and fissures in all experience.

The idea that artwork can accommodate diverse materials and form them into structures whose representamenta have different relations to their motifs is a very cinematic conception of artistic unity—the cinema, as I have said, is an extremely promiscuous medium that can take a great variety of materials into itself.

## ANOTHER APPEAL OF THE CINEMA

The cinema might have appealed to Léger for other reasons as well. One is that his painting had gone into decline around 1923, just around the time he began work on *Ballet mécanique*. *La lecture* (Reading, though the title is generally given as The Readers, 1924) and *Trois figures* (Three Figures, 1924) fail to deploy the range and number of formal contrasts—the "multiplicative contrasts," as he called them—that he had been able to hold in a balance, certainly up to 1921, when he painted *Le grand déjeuner* (Luncheon), and

perhaps even until 1923, when he painted *Le grand remorqueur* (The Large Tugboat).[249] After that, however, a tendency towards larger masses, simplification, and clarity led Léger to compose his paintings somewhat as a fresco painter does—and, more deleteriously, sometimes brought him to adopt the idiom of the cartoon. He likely realized that working in the cinema would force the montage principle to the fore again, and that might allow him to reproduce the rich multiplicative contrasts of his earlier paintings: varied local relations would again take priority over the large-scale simplified vision of Léger's later paintings.

Whether or not the relative doldrums his painting entered around 1923 had a role in enlivening his interest in cinema, that interest outlasted the years when *Ballet mécanique* was made. For *Ballet mécanique* was not Léger's sole "cinematic" project. He also took on another "cinematic" creation of a sort, though this project was never realized: in 1938–39, he created seven studies for a proposed moving mural, which would be projected onto a marble wall in the Rockefeller Center. He referred to the proposed project as a "cinematic mural."

But of all the performance works that influenced *Ballet mécanique*, the piece that affected the film most strongly was *La création du monde*. That work was premiered on 25 October 1923, with the aforementioned American ballet, *Within the Quota*, by Gerald Murphy. *La création du monde* is only indirectly modern: it exemplifies European art's so-called "primitivist" tendency, which developed with the opening up of Africa and the "New World" to Europeans and with Europeans' encounter with the richness of African and Pre-Columbian arts. One ground for the European artists' admiration for pre-modern art was the recognition that, despite the uncontestable richness of these objects, African and Pre-Columbian cultures did not isolate art from everyday life—and Léger (like many avant-garde artists) was committed to reintegrating art and life.[250] (On this topic, recall that in this period—the early 1920s—the cinema's audience was still a *grand publique*.)

Furthermore, a growing recognition by Europeans from the mid-nineteenth century onwards, and especially after the First World War, that European civilization had pervasive shortcomings, added strength to the impulse to consider non-European sculpture, carving, music, and dance with the utmost of care, for many believed that they revealed a culture that had not been affected by the vicissitudes of European history (and above all by the valorization of reason following the so-called Enlightenment). These factors led several French artists of the early twentieth century—for example, Georges Roault (1871–1958), Braque, and Picasso (and, to a lesser extent, other European painters, such as Jean Dubuffet [1901–1985], Paul Klee [1879–1940], and Max Ernst)—to take an interest in new forms the provenance of which lay elsewhere.

*La création du monde* evoked African stories of the genesis of the world and the creation of life. The music composed for the ballet, however, was hardly authentically African: it was inspired by jazz music, which the composer Darius Milhaud heard while in New York. In fact, the ballet was, as a whole, an amalgam of features from African, African American, Brazilian, and European music and dance. The work exemplified interest in "Negerplastik" (Black sculpture) as it was understood by Carl Einstein (1885–1940), a critic whose art theory had affinities both to DADA and to Cubism.[251] The importance of "Negerplastik" for Cubists was twofold. First, Carl Einstein proposed that African sculpture elicits a response that all humans share precisely because it is non-discursive. Second, details of understanding of perception as synthetic that underlie the forms of "Negerplastik" are similar to the Cubists' ideas on the matter. For Einstein, early art implied wholeness, an epistemic unity integrated by a unifying mythic and religious world view, which the modern world was seeking: "for our thinking has become more elementary, more primitive. The human being of today is inclined toward synthesis, i.e., he does not believe that he will discover knowledge or a basis for his existence by dissecting and analyzing everything."[252] This integrity extended right down to the micro-levels of perceptual synthesis, which Cubists shared with the African artists. The essential question Carl Einstein addressed derived from Immanuel Kant and concerned how the subject forged a unified perceptual manifold out of the formless array of disparate stimuli from which percepts are forged.[253] Einstein proposed that this synthesis involves a non-temporal integration of three-dimensional space that implies no circumambulation of the object. It likewise implies no belief in unfettered access to the original object that was the source of stimuli: the integration proceeds in purely formal terms. Georges Didi-Huberman, correctly in my view, makes this into an anti-anthropocentric argument.[254]

The choreography for *La création du monde*, by Jean Börlin, was based on a free interpretation of traditional African mythology. The creators intended it to restore the original purity of the Genesis myth. The work depicted the creation of Heaven and Earth (the set used representations of clouds and mountains whose scale and simplification resembled those of the forms in Léger's paintings of the time) and of life, which appeared through three stages: first, three African deities, Nazmé, Medere, and N'kva, were created; then, animals; and, finally, a man and a woman, who formed a couple (the original nature of their union is suggested through their dance). The décor represented Léger's effort to fuse the painted objects he created with the dance, much as he had tried to fuse the figures and their ambience in *Les nus dans la forêt*. To this end, he used African masks and sculptures as types for his costumes,

then derived background forms from these figures.[255] His sets and costumes intermixed bright colours with motifs inspired by the expressiveness of the forms of African sculpture: he was drawn to African art's frontality, its conventionalization of character and attitude, its symmetry, and its bias towards emphasizing foreground elements and spherical masses.

Léger's contribution had greater importance than the work of scenarists and costume designers generally has, for in this ballet, objects were given the same scenic value as the performers, and the dancers' movements were broken into brief staccato sequences and their faces masked (some were even perched on stilts). This treatment transformed the performers into quasi-mechanical forms. As a result, the spectacle took on a supra-human scale.

## CUBISM, AFRICAN AMERICAN ART, AND INFINITE PLASTICITY

The immediately foregoing section included many references to jazz music, African art, earlier cultures, and the American century. It behooves us to try to understand the interrelations among these phenomena. The jazz historian Stanley Couch makes an intriguing suggestion about African American culture and jazz's place in it. In the essay "Jazz Criticism and Its Effect on the Art Form," he speculates on what occurred when Africans were transported to America. They were, he ventures, "ironically liberated from the tribal enmities and religious conflicts that still bedevil contemporary Africa, allowing for a richly distinctive Negro American sensibility of remarkable national consequence."[256] He goes on to specify what is distinctive in the African American sensibility and in African American arts:

> What existed within the ritual confinements of polytheistic African cultures and has been dubbed "an affinity for distortions" was transformed into what I call *a sense of infinite plasticity*. In Africa, this sense of plasticity has been observed in the stretched necks with rings, the extending of lips with wooden plates, the filing of teeth, the elasticizing of slit earlobes so that they could hold large wooden discs, and so on. The plasticity of stylization in African singing allowed for a scope that included falsetto, whistles, tongue-clicking, shouts, plaintive to joyous slurs, growls, and enormous changes of register, rhythm, timbre, accent, and intensity. That the shifts of meter, tempo, and accent in African drumming reflect this sense of plasticity almost goes without saying, as should any observation about dancing that demands independent coordination of the head, shoulders, arms trunk, and legs.[257]

Ross Russell (1909–2000), the founder of the short-lived (1946–49) but very important jazz record company Dial, in *Jazz Style in Kansas City and the Southwest*, notes the same phenomenon (though without naming it or generalizing on its influence):

> The golden link that bound the jazzmen to the blues tradition was the concept of vocalization. When the jazz musician understudied the blues man, observing the great variety of devices at the disposal of his model—vibrato, variable pitch, microtones, fast turns, and the many sliding, slurring, leaping effects—he found it only natural to try to reproduce these effects on the instrument of his choice, whether it was a trumpet or trombone, or a member of the articulate reed family, the clarinets, alto or tenor saxophones . . . If the experiments were favourably starred and the right road had been stumbled onto, the jazz musician might arrive at an interesting personal style and one reflecting an accumulation of Afro-American vocal procedures.[258]

This "infinite plasticity," this "affinity for distortion," seems an important basis for the appeal exerted by American art and culture, including on Cubist and Futurist art. Of course, it took some time after the emancipation (however miserably limited) of America's blacks before they could contribute so massively to American culture and help make American culture the epitome of modern culture (this resulting fusion would play a key role in making the twentieth century the American century). Europe seems to have recognized the important role that African Americans played in the making of American culture before America itself did. Take, for example, the vernacular mid-nineteenth-century African American dancer William Henry Lane, sometimes known as "Boz's Juba" (Boz was a pen name of Charles Dickens, who offered an extraordinary portrait of him in *American Notes for Common Circulation* [1883]) or, much more commonly, Master Juba (ca. 1825–ca. 1852 or 1853). Juba modified a traditional Irish jig and injected it with percussive patterns. When he performed in London, an astonished dance critic remarked he had never witnessed

> Such mobility of the muscles, such flexibility of joints, such boundings, such slidings, such gyrations, such toes and heelings, such backwardings and forwardings, such posturings, such firmness of foot, such elasticity of tendon, such mutation of movement, such vigor, such variety, such natural grace, such powers of endurance, such potency of pattern.[259]

"Mobility of the muscles," "flexibility of joints," "slidings," "gyrations," "backwardings," "forwardings," "posturings," "elasticity of tendon," "mutation of movement"—what the London critic responds to is the phenomenon of infinite plasticity. Here is Dickens's description:

> Single shuffle, double shuffle, cut and cross-cut; snapping his fingers, rolling his eyes, turning in his knees, presenting the backs of his legs in front, spinning about on his toes and heels like nothing but the man's fingers on the tambourine; dancing with two left legs, two right legs, two wooden legs, two wire legs, two spring legs—all sorts of legs and no legs—what is this to him?

> And in what walk of life, or dance of life, does man ever get such stimulating applause as thunders about him, when, having danced his partner off her feet, and himself too, he finishes by leaping gloriously on the bar-counter, and calling for something to drink, with the chuckle of a million of counterfeit Jim Crows, in one inimitable sound![260]

"Rolling his eyes, turning in his knees, presenting the backs of his legs in front," "dancing with . . . two spring legs"—Dickens, certainly, was impressed by the African American dancer's infinite plasticity. A commentator for *The Manchester Courier and Lancashire General Advertiser*, 18 October 1848, offered several comments comparing Juba's modified jig to Highland sword dances—but then acknowledged that there was more to it, for he could take such "extraordinary positions, that *only a being possessed of the power of Proteus* could calculate upon taking" (emphasis mine).

In a way, African American art—especially jazz—made African and (through a peculiar field effect) other early non-European art seem modern, a part of the American century. African American art highlighted that to be modern was to be involved with plasticity (stretching and bending). Distortions of form seemed novel, fresh, and potent. Picasso's sculpture *Le verre d'absinthe* (Glass of Absinthe, 1914)—which twists in Klein-bottle fashion the glass's inside to the outside—should provide whatever support is needed to connect this infinite plasticity to Cubism. (In the next chapter I will relate these deformations to electromorphic art, thus connecting early and non-European art, Americanness, electromagnetism, and the cinema.)

## CENDRARS AND LÉGER ON LANGUAGE AND CINEMA

*La création du monde* was merely an interlude in Léger's career. His interest in modern life and mechanical objects was too great for him to be swept away by the "primitivism" (lamentable term!) that became the consuming passion of some of his contemporaries (and that led Jean Cocteau to speak of a "Negro crisis" in European art). However, his experiences working on the ballet reinforced his proclivity for the simplified, dynamic forms he had adopted as the vocabulary of the technological modern.

Léger's involvement in *La création du monde* also strengthened his relationship with Cendrars. The two had become good friends in 1912 but had fallen out of contact during the period when both served in the war. They renewed their friendship in 1916, when both returned from the front. They worked together on Abel Gance's *La roue* (though the exact role Cendrars served was a subject of conflicting testimony from Cendrars, who was prone to exaggeration on such matters, and from Gance himself). Cendrars's work shared attributes with Léger's. Like Léger, the poet was interested in urban

experience: his "La prose du Transsibérien," 1913, synthesizes heterogeneous, snapshot-like images of the urban landscape, much as Léger's *Disques dans la ville* (1920–21) did; and *Kodak* (1924) offers a chronicle that, according to Cendrars, collects "mental photographs" (rendered in words). To have formulated such an aspiration testifies that, like Léger, the poet was interested in photographic and cinematic forms as offering models of consciousness.

Cendrars's experience with Abel Gance on *La roue* influenced fundamentally his conception of *La création du monde*. Gance asserted that the wheel alluded to in the title had symbolic and religious significance:

> *La Roue*, it is "the movement of seven forms, each of which revolves one inside the other," said Jacob Boehme. The Circle, the Wheel, does not just sustain life, but endlessly renews it . . . The title is symbolic and positive. In my mind, it is positive because the leitmotif of the film is the wheel of a locomotive, which is one of the film's main heroes, reminding us of fate as something that can never come off the grid of the railway track. In more precisely symbolic terms, it is the wheel of Destiny which is directed against Oedipus.[261]

Cendrars understood the image of the wheel in similarly mythopoeic terms. Years earlier, he had written,

> Without doubt religious motivations and mythological monuments must have played a large role in the question of the *perpetuum mobile*. One need only think of the enormous importance of the symbolism of the ancient religions attached to the wheel, a symbol that incorporates the idea of movement and the idea of eternal return. In the religion of the Vedas, the wheel is the symbol of divinity. The same goes for the ancient Germans and the Celts. Many customs and myths bear witness to the religious origin of the wheel as a symbol, which is compared mostly to the sun, both in its form and its movement . . . One can ascribe religious motives to the theologians of the Middle Ages who attacked with such ferocity the idea of perpetual movement, claiming movement to be finite and declaring the *perpetuum mobile* to be incompatible with the Science of God . . . The human desire for an artificial machine that might work forever goes back to the most ancient times; this desire is perhaps as old as the desire for immortality itself. Outside any technology, the idea of perpetual movement is one of the questions posed by human civilization.[262]

One notes the appearance in the two texts of the idea of eternal return, of life beginning again and again. The idea would prove to be an inspiration for *Ballet mécanique*.

Mikhail Iampolski commented brilliantly on the relation between Cendrars's and Léger's work, largely in terms of the mythology that Cendrars elaborated across his works.[263] He points out that a key work by Cendrars, *Moravagine* (1926), associates the wheel with a goal the *avant-garde* would find congenial.

> A disc is no longer a circle: it becomes a wheel.
>
> And the wheel goes round.
>
> It engenders a new language . . . of words and things, of discs and runes, Portuguese and Chinese, numbers and trade marks, industrial patents, postage stamps, passenger tickets, bills of lading, signal codes, wireless radio—this language is refashioned and takes on body, this language that is the reflection of human consciousness, the poetry that makes known the image of the mind conceiving it, the lyricism that is a way of being and feeling, the demotic writing stimulated by the cinema which speaks to the impatient mass of the illiterate, the papers which bypass grammar and syntax in order to give the eye a more striking picture in the typographical make-up of their advertisements . . .
>
> All things are artificial and real. The eyes. The hand. The immense fur coat of figures in which the banks sprawl and revel. The sexual fury of the factories. The wheel that goes round. The wing that glides . . .
>
> . . . Rhythm. Life.[264]

The spinning (and pounding) machine forms suggest sexual fury: that explains the intertext of machine-forms and dance in *Ballet mécanique*—and the erotic intertext of dance and creation in *La Création du monde*. Cendrars's *Moravagine* (a novel that, by the way, makes the theme of the brain and the nervous system central) offers the following passage, which goes far in explaining the connections that the geometric forms in *Ballet mécanique* have to its dance references, machine dynamics, erotic text, and early and non-European art:

> It was then that I developed a violent passion for objects, for inanimate things [compare Léger on the object] . . .
>
> These objects taught me much.
>
> Soon an egg, a stovepipe could excite me sexually . . . The sewing machine was, as it were, the plan or cross section of a courtesan, a mechanical demonstration of the prowess of a chorus girl in a music hall. I should have liked to part the perfumed quartz like two lips and drink the last drop of primordial honey that the origins of life had deposited in those vitreous molecules, that drop that shifts like an eye, like the bubble in a spirit level. The tin can was a reasoned précis on womankind.
>
> The simplest figures, circles, squares, and their projections in space, the cube and the sphere, spoke to my senses like the scurrilous symbols—red and blue lingams—of obscure, barbarous, ritual orgies.
>
> Everything became rhythm for me, and unexplored life . . . I did Zulu dances.[265]

This quotation connects kitchen utensils to creation and creation to sexuality. The same association is implicit in *Ballet mécanique*—and a similar association can be found in some of Léger's paintings of the late 1910s and early

1920s, including the small canvas *Le petit déjeuner* (Breakfast, 1919), the large canvas *Le grand déjeuner* (Luncheon, 1921); *La mère et l'enfant* (Mother and Child, 1922), and *Le siphon* (The Siphon, 1924). Kitchen utensils, dance and mechanical dance, ritual, eroticized geometrical forms, and sexual desire are all linked in a compelling intertext with Cendrars's mythopoeic work. What is different about the film (and Iampolski seems to me to underestimate this difference) is that the poet incorporates these mythic meanings into his work, while Léger treats them as conventions that inflect our relation to the graphic form, but without becoming part of a overarching mythology (a point he made repeatedly in his writings on the object).[266]

Cendrars saw that rearranging the furniture of the world—rearranging words and things, disks and runes, Portuguese and Chinese numerals and factory labels, industrial patents, postage stamps, tickets, records of shipping and handling—would generate a permutational structure that, to all intents and purposes, has the character of a language. The new language he foresaw (based on the cinema) comprises a collection whose basic constituents, the furniture of the world, exist in complete semantic equivalence. The lexicon of this language comprises all the objects that populate the world, and all of its items would exist in complete semantic equivalence. Every object could be substituted for every other, thereby generating an endless array of signifying strings that could be endlessly transformed by permuting the furniture of the world.

That things can be fashioned into a language of subjectivity is the deepest implication of the montage of pre-existing elements (this is why I said earlier that Cendrars and Léger shared an interest in cinematic forms as offering models of consciousness).[267] The type for this language was the cinema itself, with its affinity for demotic objects. In a paradox that the Surrealists appreciated, this ultimate of objectivity was also a mirror of human subjectivity. The contents of *Ballet mécanique* have a similarly ambiguous status: images collected in the streets of Paris enter into a montage that suggests the permutational syntax of mental operations. (It is not for nothing that commentators have frequently alluded to the film's debt to DADA and Surrealism.)

*La création du monde* embodied years of deliberations by Cendrars on the topic of the destruction and renewal of the world. In fact, Cendrars had considered making a pair of works, *La fin du monde* and *La création du monde*, but soon fused their plot sequences into one comprehensive myth. The poet's interest in the mythic cycle of creation and destruction is evident in his *La fin du monde filmée par l'Ange N.D.* (The End of the World Filmed by the Angel of Notre Dame, 1917), a book with illustrations by Léger.[268] The plot of that novel casts God as a sort of manager of a communication company: because the Great War has ended, he must seek new markets for images of corpses being

manufactured on a mass scale. So he travels to Mars and there presents his best war film. However, the Martians are unimpressed, so he decides to fulfil an ancient prophecy: he sends a telegram to earth (telegraphy, remember, was a wondrous phenomenon in 1917), to the angel of Paris's Notre Dame cathedral, instructing the angel to destroy the earth.[269] The angel carries out the command. The event is filmed and relayed back to Mars; as the film is being projected, God's projectionist Abin (a synthesis of Abel and Cain) handles the projector improperly, causing electrical caprices that result in the film being unspooled, first at erratic speeds, then in reverse (causing evolution to be unravelled). In his booth, Abin, the employee manipulating the lantern, activates the apparatus (or sets the apparatus on fire [*met le feu à l'appareil*]): "A fuse blows. A spring breaks. And the film rolls madly backward."[270] The film's recitation of events, at least as filmed by the angel of Notre Dame and viewed by God, makes those events real, so playing the destruction in reverse results in the world's being re-created from nothing, and speeding up the projection collapses into a brief span a series of cataclysms that take place over an extended period.

The cinema is a machine that creates reality. Thus it represents the artistic process that creates a world. What precedes creation is something that lacks coherence, a realm broken into bits and pieces, like those left by the destruction of the world, a world pulverized into fragments (not unlike the Cubist transformation of the world).[271] The destruction and creation of the world is a cyclic process. That view would later give rise to *Ballet mécanique*'s circular forms, its repetitions, and its repetitive, pendulum rhythm.

Cendrars's ontogenetic fantasy around the cinema reflected his passion for the medium. In 1918 he worked with Léger on Abel Gance's *J'accuse*, and he fell in love with film. That same year he published *L'ABC du cinéma*, in which he extolled the cinema in essentially simultaneist terms: he celebrated montage's ability to fragment space and time and—when the technique was accelerated beyond a certain threshold—to produce a exhilarating visual simultanist dynamism: "A hundred worlds, a thousand movements, a million dramas simultaneously enter the range of the eye with which the cinema has endowed man."[272] An early short poem—written in 1912, just after he began publishing under the pseudonym Blaise Cendrars—titled "New-York in Flashlight" begins "J'ai été en traitement chez un cinématographe" (I was under treatment at the cinematograph), and then straightaway Cendrars comments on the cinematographic basis of his new work: "Depuis lors je me suis procuré un appareil. Je l'emploie souvent. Surtout le soir, quand j'ai vainement peiné sur un poème et que les rimes ne viennent pas" (Since then [his treatment at the cinematograph] I have acquired a camera [or an apparatus]. I use it often. Especially at night when I've troubled myself in vain

over a poem whose rhymes don't come).[273] He even connects the themes of cinematographic poetry and nerves: "Le film ronronne. Les images pleuvent. Le cerveau se gonfle à la pluie. Les nerfs se détendent. Le cœur s'apaise. Les scènes défilent, me cinglent, comme les flagelles glacés des douches… C'est en mon hygiène d'homme-de-lettres trop aigri. Le cinématographe est mon hydrothérapie" (The film purrs. Images rain down. The brain swells. The nerves relax. The heart subsides. The unfurling scenes make me tingle, like the cold jets of a shower… This is my therapy for a too bitter man-of-letters. The cinematography is my hydrotherapy).[274]

He conceives a new, appropriately contemporary means for producing poetry, and his thoughts on the matter resemble those that James Joyce presents in the "Aeolus" section of *Ulysses*:

> Je me suis aussi acheté un gramophone. C'est par épargne. J'y enregistre sur les disques sympathiques le parler des gens qui dialoguent dans la rue [Here he appends the charming footnote, "Dommage pour toi, mon cher Guillaume, avec ton « Lundi, rue Christine »"]. Je n'ai plus aucun frais d'imagination. Mes romans sont dictés par une machine parlante qui, parfois, hausse la voix et hurle l'en-tête redondante d'un journal. Elle me fait de la réclame. J'ai beaucoup de lecteurs. J'ai su combiner les merveilles du monde moderne. J'ai inventé un appareil qui, actionné par les roues des express, déroule ses films transparents, débrouille ainsi, devant les passagers ennuyés, l'écheveau des dernières nouvelles télégraphiques qu'un gramophone grasseye. Pas une minute de perdue. « Time is money. » Je cherche à l'adapter aux besoins du commerce.
>
> I bought a gramophone. To economize. I record on sympathetic disks the speech of people talking in the street. I no longer owe the imagination any fees. My novels are dictated by a talking machine which, at times, raises its voice to shout the newspaper headlines. It celebrates me. I have lots of readers. I know how to combine the marvels of the modern world. I invented an apparatus which, activated by the wheels of express trains, unspools its transparent films, thus disentangling, for bored commuters, the tangled web of telegraphic news sputtered by a gramophone. Not a minute lost. "Time is money." I have adapted to the needs of commerce.[275]

In a letter, he commented to a friend about the new poetry that America had precipitated: "Ce livre est le produit des expériences de mise au point, au fond de mon laboratoire; c'est le premier fonctionnement de la machine… La machine fait tout" (This book is the product of experiences developed in the depths of my laboratory; with it the machine begins to operate… The machine does everything).[276] And he declared, "Je suis prêt à envoyer des impressions, des films, des aperçus cinématographiques de la vie d'une grande ville américaine" (I am ready to send impressions, films, cinematographic insights of the life of a large American city).[277] As his *livre simultané*,

*La prose du Transsibérien et de la Petite Jehanne de France* (Prose of the Trans-Siberian and of Little Jehanne of France, 1913) shows, Cendrars had developed a form of poetry that registered cinematic impressions. His experience working with Gance and Léger further radicalized this style, making it even more cinematic. *J'ai tué* (I Have Killed, 1918) is literally a kaleidoscopic piece, presenting fragmentary impressions of war (the poem is a quasi-autobiographical work relating Cendrars's experience of war): "The curtain is ripped. Everything bursts, cracks, explodes all at once. A general conflagration . . . The flicker of an eyelid. Magnesium eye-wink. A quick instantaneous photo. Everything disappears."[278] In its seemingly mechanized perception, it resembles nothing so much as James Joyce's collideorscape: this coincidence confirms that the idea that the cinema is an automated perception machine was grounds for the interest the period took in the cinema.[279] Furthermore, *J'ai tué* bears a strong resemblance to *L'ABC du cinéma*, which was written just a few months before: "Cinema. The whirling movements in space. Everything falls. The sun falls. We fall after it. Like a chameleon, the human spirit camouflages by camouflaging his universe."[280] Cendrars's efforts at developing a cinematic poetry culminated in *Dix-neuf poèmes élastiques* (Nineteen elastic poems, 1919), short poems—several of which appeared in Apollinaire's *Les soirées de Paris*—written in an associationist style that allows the reader to stretch them to any given length (note the parallel to the idea of infinite plasticity). The work is an early virtuosic display of creating contrasts through montage.

## LÉGER'S COLLABORATORS

There are many versions of *Ballet mécanique*—or, rather, of the principal visual component of the machine-art piece that (as we will see) *Ballet mécanique* was intended to be. The master copy of the most commonly viewed version is a print that Léger donated to the Museum of Modern Art in New York City. Another version of the film is preserved by New York's Anthology Film Archives. The master copy of that version was donated to the archive by Frederick Kiesler's widow. Lillian Kiesler had found, in a closet in her "weekend" house in New York, a 35mm print of Léger/Murphy's *Ballet mécanique,* and had brought it to the attention of Jonas Mekas, the noted filmmaker who, at the time, was Anthology's artistic director.[281] In examining the print, Mekas discovered that it contained hundreds of splices and was longer than any other prints known. Because Kiesler had organized the première showing of *Ballet mécanique*, on 24 September 1924, in Vienna, Mekas surmised that this was likely the print that was shown there (and so proposed that it be taken as authoritative).[282] The master copy of yet another version was held by Dutch Cine-Club; that version differs from those held by MoMA and from the

Kiesler print in that it contains footage depicting details of Léger's paintings.[283] The Museum of Modern Art in New York also holds a second, hand-tinted version, and there is another tinted print in the archives of Rolf de Maré's Swedish Ballet. The Swedish Film Institute holds yet a different version. William Moritz and the Deutschesfilmmuseum in Frankfurt have painstakingly restored another version, which Moritz, after much diligent work, claims accurately represents the version that Murphy and Léger produced together and that is superior to any other print in circulation.[284]

For a long time, many art historians believed that Léger was principally responsible for *Ballet mécanique*. One reason they did so was that prints of *Ballet mécanique* that circulated throughout the world until recently had only Léger's name on the credits. However, earlier versions of the film credit two makers: Léger and Murphy. A disagreement led Léger to issue the film without Murphy's name and with some omissions (including deletions of nude photographs of Murphy's wife). This is the print that the Museum of Modern Art has distributed and that Standish Lawder has so scrupulously analyzed in *The Cubist Cinema*.

Dudley Murphy (1897–1968) had an indisputably important role in making the film—certainly, a more important role than film historians have traditionally acknowledged (though what role exactly he played still seems to me unclear). Who was Dudley Murphy, Léger's collaborator? He was the son of the head of Harvard University's art school and had attended the Massachusetts Institute of Technology and California Institute of Technology. He became a pilot during the First World War and flew bombing missions over Germany. He spent a year as an art director and a camera apprentice in the Hollywood studios, and wrote movie reviews for the *Los Angeles Evening Express*. Like many artists of his time, he became interested in Madame Blavatsky's Theosophy, and in the late 1910s he lived for some months in the Theosophist paradise, the Krotona Colony, which was dedicated to exploring the powers latent in humans. But while Blavatsky's Theosophy steered many artists (such as Piet Mondrian and Lawren Harris) towards abstraction, it took Dudley Murphy in much the same direction that similar spiritual ideas had taken the German painter and experimental filmmaker Oskar Fischinger—towards conceiving of a *Gesamtkunstwerk* that would integrate painting, music, and cinema into a new artistic form (that was generally referred to as visual music). Thus in 1920 he established a film company that he called Visual Symphonies to produce films whose visual forms and soundtracks (which, of course, at the time would have to have been distributed separately) would correspond with each other frame for frame.

The first of Murphy's visual symphonies of which there are still copies is *The Soul of the Cypress* (1920), which was synchronized to Claude Debussy's

*Prélude à l'après-midi d'un faun* (Prelude to the Afternoon of a Faun, 1894). Debussy's symphonic poem offers a variant of the Orpheus myth: the protagonist falls in love with a dryad (a wood nymph whose soul dwells in an ancient tree). Accordingly, the film offers many images of Dudley Murphy's first wife, Chase, being pursued among the trees of California's Point Lobos. So smitten is the protagonist that he wants to become immortal and spend eternity with her, and that longing impels him to cast himself into the sea.[285] When *The Soul of the Cypress* played in New York, the *New York Globe* declared that the film "points the way to a new field of motion picture theater entertainment," and the *Film Daily* stated that "it breaks away completely from the stuff that has been repeated so often, and makes a decided step forward both in an artistic sense, and in pictorial qualities." The *New York Times* praised Murphy's "striking photographic works, distinctively composed and expressive" (although the reviewer complained that "the story . . . is too thin and broken to be effective").[286] At the year's end, the *Times* selected *The Soul of the Cypress* as one of that year's best films, declaring that "the camera can still charm by purely photographic effects," and praised it as a "picture with lyric quality."

The second of the visual symphonies, *Aphrodite* (1920), featured Katherine Hawley, a dancer from the Isadore Duncan school, who two years later would become Murphy's second wife. As Aphrodite was born from the ocean, so the featured performer of Murphy's film rises from the sea at the grottos of La Jolla to dance among the eucalyptus trees above the beaches of Los Angeles. The third of the visual symphonies was based on a prose poem by Charles Baudelaire. Titled *N'importe où hors du monde* (Anywhere out of the World, 1920), it again featured Chase, this time bathing in pools at the bottom of extraordinary canyons near Palm Springs.

Achieving a pictorial effect through photography was one of Murphy's chief concerns. In August 1921, just before setting out for Paris to join the "Lost Generation" there, he spent a month in the physics laboratory at Dartmouth College, conducting research on optical devices. When he arrived in Paris, he carried with him a special lens (or lenses), whose front elements consisted of several bevelled facets (rather than a section of the surface of a large sphere). As we will see, these were not the lenses used to produce *Ballet mécanique*'s multiplied-image effects. Those were produced using a vortoscope, a device developed by Alvin Langdon Coburn with some input from Ezra Pound. Even so, Murphy's interest in unconventional optical devices helped prepare him for filming multiplied-image sequences, which Ezra Pound would plan and shoot with him and others, including Léger.

Another of the company's productions was *Danse macabre*, a dance film set to Camille Saint-Saëns's eponymous composition. The choice of music says much about the distance that separated Murphy's ideas from those of

the others involved in making *Ballet mécanique*. Saint-Saëns (1835–1921) was essentially an academic composer whose work generally is fluent and melodious but lacks either chromatic or harmonic tension. Several of his best-known compositions, including *Le rouet d'Omphale* (The Spinning Wheel of Omphale, 1871–72) and *Danse macabre* (1874), are basically illustrational pieces. Saint-Saëns' *Danse macabre* itself depicts how, at midnight, Death summons graveyard skeletons to revels—we hear Death tuning his fiddle, and when midnight strikes, the spectres rise up to dance to waltz tunes (some parts of which are truly grizzly), the clanking of their bones represented on a xylophone. At dawn, a cock crows and the skeletons return to their graves.

Murphy's film tells largely through dance the tale of Death and the Maiden, drawing, in parts, on the story illustrated by Saint-Saëns's program music. It begins with these titles: "Midnight in plague-ridden Spain—Youth and Love flee from Death who follows their path. / Love feels his uncanny breath and swoons—Youth despairs and prays,—when lo!—the cock of dawn crows and Death fades away into the shadow of his tomb." After that, there is a Symbolist animation sequence representing first, a midnight tower with a bat soaring near it; next, one portrait of Death; then a second portrait, this time almost in profile and playing the violin. We then see a model of a castle, and a tiny figure of a woman entering it.

The opening establishes an unreal location for the drama. What happens next is therefore surprising: the determinants of the film's form change character, as the work shifts into the mode of the cinema of illustration.[287] The action moves to the interior of the castle, where two characters, Youth and Love, perform a dance, redolent of the Spanish style (it uses a fan and a shawl), that illustrates the narrative adumbrated in the introductory titles. The first time that Death (so identified in the credits) appears, he is presented as an apparition in the upper left-hand corner of the screen. He next appears exactly when the Youth and Love are about to kiss—the timing suggests that Death is at once the enemy of Love, allied with Love, and strengthened by Love's ardour. To reinforce this tragic connection, the choreography suggests that while Love is terrified by Death, she is also drawn to him.

A remarkable feature of the work is its insouciance about combining contrasting cinematic modes. Murphy did not accept the homogenization that we now consider requisite to the diegetic illusion. The film combines fantasy elements—realized using animation and superimposition (of the spectral figure of death)—with a resolutely factual presentation of the dance. The inclusion of fantasy sequences and sequences that convey Death's omnipresence are motivated by Saint-Saëns's program music. The artifice of these sequences, however, is not characteristic of the film's predominant style: the formative principles for the dance presentation conform to the observational, even

realistic, protocols that American avant-garde filmmakers accepted more often than did their European counterparts (whose films are generally more formal).[288] And if the film's style integrates antithetical elements, so does the theme of the film, for it concerns the identity of the opposites, Love and Death.

Nonetheless, *Danse macabre* and the other visual symphonies are a long, long way from *Ballet mécanique*, and it seems doubtful that Murphy's role in making the latter work, though significant, was as great as some recent historians have argued. Viewing *Danse macabre* in the context of Pound's (and Wyndham Lewis's) Vorticism, the work appears shockingly sentimental and depressingly dreary. It is easy to find evidence in *Ballet mécanique* that aligns it with Vorticism (and with Cubo-Constructivism)—but concrete similarities with *Danse macabre* are hard to find (as indeed is evidence of the influence of Murphy's previous films). The conjecture that Murphy's contribution to *Ballet mécanique* was the central one seems to me to be very far-fetched indeed.

The history of one strain in the making of *Ballet mécanique* begins with "Murphy's meeting Man Ray at a Dadaist *Soirée du cœur du barbe*. The film Murphy saw there was *Retour à la raison*, and apparently on seeing it, Murphy conceived the desire to work with Ray on a film." He proposed to Man Ray the idea of doing a film together, and Man Ray agreed, but demanded that the two preserve the "Dada approach" of *Retour à la raison*—meaning, of course, that they were to work spontaneously, without a script.[289] (In fact as I go on to show, I believe they began working together on two projects.) This was all quite independent of Fernand Léger. Man Ray later wrote:

> Dudley Murphy said some very flattering things about my work and suggested we do a film together. He had all the professional material, he said; with my ideas and his technique something new could be produced. We became quite friendly, spent a few days together discussing subject matter—I insisted on my Dada approach if we were to work together, to which he readily agreed . . . We took some walks together, I bringing out my little camera and shooting a few scenes without any attempt at careful choice of people or setting, emphasizing the idea of improvisation. For the more tricky effects we planned indoors, Dudley set up an old Pathé camera on its tripod, the kind used in comic shorts of the day. He showed me some complicated lenses that could deform and multiply images, which we'd use for portraits and close-ups [Here Ray describes beginning work on a project with Murphy] . . . When Dudley appeared again, he announced that he was ready to go to work and would I purchase the film. I was surprised, thinking this was included with his technical equipment—that I was to supply the ideas only. He packed up his camera, took it over to the painter Léger's studio, explaining that he himself had no money and that the painter had agreed to finance the film [And here he describes how their footage was blended with Léger's project, a topic I will broach shortly] . . . And that is how Dudley realized [the film] the *Ballet mécanique*, which had a certain success, with Léger's name.[290]

The last sentence reflects the hostility that Man Ray felt for Léger—basically, it states (in a claim lacking somewhat in generosity) that Murphy (with Ray's input on some scenes) made *Ballet mécanique* and that it circulated under Léger's name.

Sometime later, Ezra Pound introduced Murphy and Léger to each other, and this, it seems, was what led to Léger's involvement in the film (and not simply the Americans' lack of funds as Ray himself reports). The collaboration would allow Murphy to become involved in a more radical filmmaking project than he would have undertaken on his own. But bringing Léger and Murphy together was not the sole contribution Pound made to *Ballet mécanique*. He had, earlier, introduced Murphy to the vortoscope (a triangular tube with mirrored inner surfaces that Alvin Langdon Coburn had developed, under the influence of Pound's anti-mimetic aesthetic, while engaged in a portrait session with Pound as the sitter). Pound showed Murphy the vortoscope for a project that the two of them (Pound and Murphy) were doing together. Ray and Murphy working together (and separately from Pound) would avail themselves of the Dadaist potential of the vortoscope and, possibly, use as well the special-effects lens that Murphy had built.[291] Sometime in the summer or fall of 1923, Pound wrote to his parents, noting that "Dudley Murphy, whom I met in venice in 1908, he being then eleven; turned up a few days ago . . . He is trying to make cinema into art. ETC.[292] In November, Dudley Murphy reported on the progress of a film project: "I have practically completed the film with Ezra Pound and it looks quite interesting . . . It is quite abstract—no people—only interesting forms."[293]

Many writers have taken the last two reports I have cited to refer to a project that Murphy, Pound, and George Antheil were to work on and that Man Ray was involved with, which (allegedly) became *Ballet mécanique*. However, Murphy's claim that the film he was working on was almost complete (by late 1923) should raise questions either about the accuracy of Murphy's remarks or about their relevance to *Ballet mécanique*, for that film was not shot until 1924. Assuming that Murphy's remarks are accurate, we should perhaps question that the film he reported to be approaching completion was *Ballet mécanique*. Note that the film, said to be "nearing completion," is described as being "quite abstract—no people—only interesting forms." But even the standard print of *Ballet mécanique* (the print that Léger gave to the Museum of Modern Art) contains shots of people—Alice Prin (a.k.a. Kiki of Montparnasse), a laundry worker, Dudley Murphy, Kathleen Murphy, and Vander Clyde Broadway (a.k.a. Barbette).[294] Further weighing against the supposition that "the film with Ezra Pound" Murphy reports on is the same project that Man Ray and Dudley Murphy were working on (and that Léger would become involved with) is that the latter project began with Murphy

and Man Ray each shooting scenes of the other making love to his respective partner (Man Ray with Kiki, Dudley Murphy with his wife, Katherine). These scenes of lovemaking were intercut with shots of pumping, thrusting pistons.

The supposition that the film Murphy was doing with Ezra Pound was the same project that Ray and Murphy (and later Léger) were doing hardly seems supportable. It is more likely that Murphy and Pound (perhaps with some involvement by Ray and Antheil) were working together on a Vorticist project. Supporting this hypothesis is a comment that Pound made in another letter home—on 29 January 1924, Pound wrote to his parents again, expressing doubts about what would become of the project: "Also work on vorticist film—experiment interesting, but probably Murphy hasn't brain enough to finish the job in my absence or without pushing."[295]

Around this time, Pound suggested to Murphy that Léger might be willing to fund the project (and that Natalie Barney might be willing to underwrite Antheil's score). Léger and Pound had by now become quite close: early in 1921, Pound had moved into a flat a few doors from Léger's, and the two would influence each other's ideas of the machine and machine art. Murphy provides this account of Pound's role in getting the various parties together:

> One day, when I was visiting Ezra Pound and talking about my work, he told me that a friend of his, Ferdinand [*sic*] Léger, wanted to make a movie. Also George Anteil [*sic*], the young protégé of Stravinsky would like to make a movie. So he brought the three of us together and we decided to make one. I had met an attractive American divorcee who had a beautiful house in Paris and who was intrigued with me, Gladys Barbour. I told her of my plans and she lent me the money to buy a movie camera.[296]

Pound wrote his parents again, from Paris, two months later (10 September 1923), saying that he and Antheil "have a new Leger 'projet' [*sic*, French spelling] waiting to be framed."[297] Léger not only agreed to help finance the film but also became involved in the filmmaking (that involvement, I believe, was substantial and would decide the final shape of the film—his involvement was so substantial and his conception so different from Murphy's and Ray's that Pound characterized it as a "new project"): evidently when Léger got involved the project went in a decidedly different direction.[298] Murphy would note in his autobiography that he and Léger had talked over making a pure film; then, after talking with Léger, he "set out with [his] camera and the film, executing the ideas [they] had talked over and photographing things that stimulated [his] imagination." Pound seems to have distanced himself from the project (the Vorticist film project hardly makes an appearance in his correspondence after this). Murphy (and Man Ray) had a number of abstract vortographic shots, and they likely decided to combine these with shots of

Kiki, of Katherine Murphy, and of moving machine-parts, and other shots (for example, the shots in the street and the Luna Park shots) that they had done using Ray's Dadaist approach. Likely Murphy, Ray, and Léger (in pairs, Murphy and Ray, and Murphy and Léger) expanded the repertoire of vortographic images, though Ray seems to have withdrawn from the project shortly after Fernand Léger got involved. In an unpublished text from 1927, Pound wrote,

> The genesis of the "Ballet Mécanique," especially the part finally *rejected* goes back at least to 1916, at which time Alvin Coburn and I invented the vortoscope. In 1920 or 21 **Dudley Murphy applied this simple device to cinematography**. [Actually, this cannot have taken place before the second half of 1923.] We took a few metres of interesting and highly unsatisfactory film. Man Ray with his brilliant record and long experience produced something infinitely better; Murphy combined with Léger got some interesting results…I am ready to take up with any…any photographer in search of abstract design, or a modus of presenting forms moving.[299]

Clearly, it is difficult to say who should be credited for what in the making of *Ballet mécanique*. Some film historians have rejected the earlier view that assigned primary credit for the film to Léger, concluding that his role was slight and that the film was largely a collaboration between Ray and Murphy (indeed, some have gone so far as to characterize Léger's primary role as that of financing the film when the Americans could not afford to finish it on their own).[300] In this, they extend William Moritz's thesis:

> In *Self Portrait* Man Ray wrote: "Dudley realized *Ballet Mécanique,* which had a certain success, with Léger's name." This comes as close to the truth as one can without violating the agreement [between Murphy and Ray, formed at Man Ray's insistence, because he did not want to inflame Léger's passions, believing he would be annoyed if he knew of another artist's participation in the project] not to mention Man Ray's contribution…
>
> In terms of the footage included in *Ballet Mécanique*, what might Léger have planned or had Murphy shoot? Man Ray was adamant that he and Murphy had shot all the footage using Kiki—"You don't loan out your mistress, do you?" he said—as well as all the open-air footage on the streets and in Luna Park. Murphy corroborates this in an interview given at the time of a New York screening of *Ballet Mécanique*. Along with his discussion of "rhythmic and dynamic tempo," Murphy, who identifies himself as the key filmmaker, reproduces pictures of the stocking-model legs and kitchen utensils mirrored in the kaleidoscopic lenses, as well as some machine parts, as examples of his ideas and work [in fact, as we have seen, Léger wrote on the possibility of making cinematic works using only kitchen utensils]…We know more plunging pistons were shot to be intercut with the pornographic footage of Man Ray and Murphy.

> What was left over for Léger to do—except possibly the pure geometric circles and triangles. Of all the supposedly preliminary sketches and plans by Léger, only the animation sequences of geometric forms seem to have been realized.[301]

The interview that Moritz refers to in this passage was conducted by William J. Reilly and published in *Moving Picture World*, 15 May 1926. There Murphy stated that in making *Ballet mécanique*, he wanted to create a moving picture and that a "moving picture should be a definite rhythmic pattern of powerful image value." The article notes the different types of articulation the work employs: exciting articulations created through percussive effects, soothing articulations produced through fluent effects, and dynamic articulations produced through repetition, contrast, and surprise. It also notes that in this film, rhythmic suspense takes the place that dramatic suspense usually has in films (this is a startlingly accurate description of the film). Reilly also reports Murphy's claim that while repetition is a key factor in all of the arts, it has a special place in film because film is an art of time.

One cannot reasonably doubt that Ray and Murphy contributed more to *Ballet mécanique* than they were commonly given credit for by early historians of the avant-garde film. The lightheartedness of some parts of the film, its concern with outlandish cinematographic effects (for example, its use of mattes to blacken all but a small part of the screen), its use of angles that render familiar objects bizarre, and its radical and therefore initially puzzling discontinuities, are likely products of Ray's Dadaist approach to artmaking. Even some of the vortographic images display a Dada impishness that characterizes so much of Man Ray's work in painting, photography, film, and object making. But some other figures, too, had decisive influence. I go as far as to believe that the mechanical dynamism of the work, and the steady, clockwork meter, which forms a sort of vortex, into which and through which images keep rushing, owes something to Pound the Vorticist. And, I think, Moritz's view (which has become the orthodoxy) overstates the case. For one thing, it seems that the cinematic component of *Ballet mécanique* synthesized four projects, the first three being the abstract film project that Murphy and Pound were working on, Ray and Murphy's film project employing Ray's Dadaist approach (street footage and footage from Luna Park), and Ray's and Murphy's diaristic images of lovemaking (almost no images of this sort remain in the film, though there were shots of this sort in early prints). These three projects were brought together, and the footage prepared for them was combined with images and sequences based on Léger's ideas about how to bring harmony to the new industrial, urban reality. To suggest that any of the first three projects became the film *Ballet mécanique* (which is effectively what William Moritz does) is something of a stretch: it is the synthesis of the projects with Léger's

ideas about the novel beauty of the industrial world, and the extraordinary range of visual forms in *Ballet mécanique* resulting from that synthesis, that commands our interest. The diversity of images is so unthinkably radical that I consider it inconceivable that such a synthesis was imagined before the projects were fused. I also believe that Léger's artwork (along with his notion of multiplicative contrasts) forms a model for this synthesis.

A key point against Moritz's view is that *Ballet mécanique* deals with many of the issues that Léger's painting does—and, indeed, with some issues that Léger's painting made central, but that few other Cubists took up. That fact alone suggests that Léger had significant creative input in the film's production. And we know that, from very near the time of its first screening, Léger was listed as the film's principal maker: the film was shown at his first major public screening of Absolute Film, which took place at Berlin's UFA-Palast, at a matinée, on 3 May 1925, under the title, "Der absolute Film," presented by Berlin's Novembergruppe. The printed program for that event lists a film by Fernand Léger and Dudley Murphy, though Léger's name is in a considerably larger typeface. The film is called *Images mobiles*, presumably an earlier title for *Ballet mécanique*, meant to convey the idea of the new beauty of movement.

Furthermore, that rhythm is central to the work's construction hardly means that Murphy was the author of the idea (as he claimed in the interview with William J. Reilly). Consider that Léger gave rhythmic construction a central place in his painting, and that George Antheil, another key figure in the film's production, held beliefs about the importance of rhythm similar to those which Murphy expressed in his interview. (Given the flabby rhythmic qualities of his earlier films, it is doubtful that the progressive ideas about rhythm he expressed in this interview would have occurred to Murphy had Antheil's interest in rhythmic precision not opened him, however briefly, to radical artistic ideals.) Besides, the interest in tempo, and speed, was common in the arts of the day. The speed that characterizes so much of the film is an example of what was referred to as the "American tempo": in a 1924 lecture at the Sorbonne, Léger argued the rhythm of everyday life has such a dynamic, pointing out that reality confronts modern humanity with a whirligig of rapidly changing colours.

Most likely, the competing influences of Léger, Murphy, and Pound on *Ballet mécanique* resolved themselves in the following way. Pound played a key role in bringing together the various parties that would collaborate on the film and in encouraging them to make a film. At first, he and Murphy worked together, sketching out sequences for an abstract film. Pound was likely plumping for a Vorticist film—that is why he would have wanted to have George Antheil compose the film's soundtrack. However, Pound likely

had little to do with the actual filmmaking. Ray and Murphy embarked on the project, realizing (and amplifying) the sketches that Murphy and Pound had prepared, and added some of their own. At the same time, Ray and Murphy were working on a Dada film and a second diary project, on lovemaking (it is unclear whether this footage was meant to be seen by the public). The project that Pound had helped initiate proved too expensive for Murphy, Ray, Pound, and Antheil to continue with. So Léger was contacted—he had previously expressed interest in filmmaking and in creating a film-ballet, so it seemed quite possible he would be interested. His painting at the time was in a doldrum, and that made the prospect of extending the work he had been doing with Blaise Cendrars into a new dimension. Léger joined the group and—in my view this is crucial—insisted that the film incorporate ideas he had been working on for some time. (Moreover, he insisted on being involved in the editing.) Once Léger had joined the project, he and Murphy did most of the actual filming, with some help from Ray.

In sum, the core of the film's most forward-looking aspects began with Pound and Murphy planning some sequences and Murphy, along with Ray, shooting them. (Ray and Murphy were at the same time engaged in shooting urban street scenes and scenes of lovemaking, quite separate from this vortographic film.) Later, Léger became the dominant personality and steered the film towards the concerns that his work had engaged with for many years. Pound's Vorticist ideas receded somewhat into the background (or, rather were integrated into the film as one among its many dimensions). Thus, Pound's fears that, in his absence, Murphy would not bring the project to the conclusion he had envisaged came to pass.

## ANOTHER KEY COLLABORATOR: GEORGE ANTHEIL

We have seen that both Fernand Léger and Dudley Murphy claimed to have been the driving force behind *Ballet mécanique*. George Antheil (1900–1959) too laid claim to having conceived the idea for it. In his autobiography, *Bad Boy of Music*, he asserts that shortly after his first piano performance in Paris, he announced to the press that he was composing a work to be called *Ballet Mécanique* (I follow the convention of giving the title of the concert version of Antheil's piece with an upper-case "M") and that he hoped a filmmaker might propose a film that would be shown when the music was performed. According to Antheil, Léger and Murphy answered the call.[302] Certainly, Antheil was important to the genesis of the film: the centrality of rhythm in the work, with its flexible yet stabilizing character, highlights both his and Léger's contribution to the film (and the important role that rhythm plays in both Antheil's music and in Léger's visual art).

Like Pound, Antheil was an American expatriate, one of the Lost Generation in Paris. A cobbler's son from Trenton, New Jersey, he had begun commuting to Philadelphia at the age of sixteen to study composition, first with Constantin von Sternberg (1852–1924, a composer, once a pupil of Franz Liszt, and an upholder of the European musical tradition who inculcated a staunch discipline into his young student), and later with Ernst Bloch (1880–1959), a seemingly curious choice for Antheil, given Bloch's spiritually based stance against modernity. But at the end of the Great War, Bloch was still considered a leading figure in new and challenging currents in America's musical life. His work was thought to offer vigour, power, and force—antidotes to the debilitating form of modern life that was believed to be developing in urban centres. Antheil's music is certainly committed to vigour and power, even if that vigour seeks industrial expression.

While still living in America, Antheil had begun a series of compositions based on the machine-aesthetic that would form the foundation of his approach to composition until the mid-1920s (and that would be crucial in forging his subsequent alliance with Léger). In America he had learned about the goings-on in the Paris Dada scene. In 1919 he had begun commuting to New York to learn more about radical tendencies in contemporary art; there he had met the uncompromisingly rigorous critic (and member of Stieglitz's circle) Paul Rosenfeld (1890–1946) and the composer-pianist Leo Ornstein (ca. 1892–2002). By 1920 or 1921 he had become acquainted with the work of ultra-modern artists like Ezra Pound, Frances Picabia, and Pablo Picasso, as well as Mary Garden (1874–1967), a Scottish American operatic soprano who favoured the modernist repertoire. She was best known for performing Claude Debussy's operas; Debussy's symphonic poem *L'après-midi d'un faune* (Afternoon of a Faun, 1894) served as the music for Murphy's *The Soul of the Cypress*.[303] By 1921 he could brag about his knowledge of modernist works; he claimed that there were few modern compositions with which he was not at least slightly acquainted and that there were some, such as Bloch's *Suite for Violin and Orchestra* (1919) and Schoenberg's *Fünf Orchesterstücke* (1909), that he knew note for note, by heart. He really had studied modernist compositions that were as yet unknown in America, including several newly printed Stravinsky scores, such as *Renard* (The Fox, 1916) and *Histoire du soldat* (A Soldier's Tale, 1918) and orchestral works by Les Six.[304]

In 1922, Antheil won a Guggenheim Foundation grant, which (along with the patronage of Mrs. Curtis Bok) enabled him to move to Berlin.[305] He was an extraordinary pianist, especially when playing Chopin and Debussy—London's *Daily Telegraph*, Vienna's *Zukunft*, and Berlin's *Borsenzeitung* gave his concerts rave reviews. (Igor Stravinsky, even after the two had a falling-out and Stravinsky dismissed Antheil's work as a composer, continued to laud

his extraordinary playing.) Antheil moved from Berlin to Paris in 1923 to escape the hyperinflation that was spreading economic havoc throughout Germany and to be near his greatest hero, Stravinsky. He lived there with his Hungarian wife, Böski Markus (a niece of the great Viennese playwright Arthur Schnitzler [1862–1931]), in a tiny apartment at 12, rue de l'Odéon (in the Latin Quarter), directly above the bookstore Shakespeare & Co., owned by Sylvia Beach (1887–1962), who published Joyce's *Ulysses*. Beach introduced Antheil to James Joyce and other legendary figures of early literary modernism, including Pound, T.S. Eliot (1888–1965), and Ford Madox Ford (1873–1939).[306]

Besides these writers, Antheil's acquaintances included Léger, Braque, Salvador Dalí (1904–1989), Max Ernst, and Man Ray. Among musicians, Erik Satie was an admirer of Antheil, who reciprocated that respect. Antheil's papers, held by Columbia University, include correspondence with the great Surrealist filmmaker Luis Buñuel (1900–1983); the great quasi-Dada experimental composer and art theorist John Cage (1912–1992); Alexander Calder (1898–1976), the Surrealist-inspired maker of mobiles and fantastic children's shows with mechanized objects; the "Dean of American composers" Aaron Copland (1900–1990); the Surrealist author and filmmaker Jean Cocteau; Dalí; George Gershwin (1898–1937), a composer much influenced by jazz rhythms and by Joseph Schillinger (1895–1943), a neo-Pythagorean who taught a system for applying mathematics to art; the innovative Australian-born American composer Percy Granger (1882–1961); writer Ernest Hemingway (1899–1961); the "new contrapuntalist" composer (and creator of the lost score for Hans Richter's Dadaist *Vormittagsspuk* [Ghosts before Breakfast, 1928]) Paul Hindemith (1895–1963); James Joyce; Fernand Léger; the art historian (and historian of monuments) Paul Léon (1874–1962); Maurice Ravel (1875–1937); the Les Six composer Darius Milhaud; the Surrealist painter Joan Miró (1893–1983); Pablo Picasso; Leopold Stokowski (1882–1977), the "fat sound" conductor (who became involved in Walt Disney's [1901–1966] *Fantasia* [1940]); Igor Stravinsky; the *Gebrauchtsmusik* composer Kurt Weill (1900–1950); and many other important figures in the arts of the twentieth century.

In his "Manifesto of Musico-Mechanico," Antheil averred that he and all progressive composers were done with Satie, Les Six, Stravinsky, and DADA; but there is no more truth to his claim to have put aside DADA than there is to his claim to be done with Stravinsky.[307] Clearly, there was a Dada streak in his personality and in his performances: the persona he wanted to project resembled that of the Dada poet-boxer Arthur Craven (1887–1918?), whose aggressive antics have played such a large role in giving contemporary performance art its character. Antheil often referred to himself as the "bad boy"

of music, and he sometimes lived up to that billing. In the early 1920s, he shocked some and impressed others (including Ezra Pound) with his daring. His first concert in Budapest had caused a riot. So he bought a small 32mm automatic pistol, for which he had a silken holster made to fit under his arm. At subsequent concerts, he would go on stage wearing the holster and ceremoniously place the gun on top of the piano before he began performing. Thus he signalled to audiences what might befall any who cared to protest his extravagances.

Antheil helped Pound write an opera, titled *Le Testament* (1921), with a libretto based on the life and poems of the French Medieval poet François Villon (1431–1463). During the period when the poet was a fervent admirer of the young composer, Pound met and formed a relationship with the violinist Olga Rudge (1895–1996). Soon Antheil was at work on writing music for Pound's companion, at the poet's request: *Violin Sonata No. 1* (for Violin and Piano, 1923) and *Violin Sonata No. 2* (for violin, piano, tenor drum, and bass drum—the drum parts for Pound himself; 1923). Throughout the fall of that year, Rudge and Antheil worked on the compositions almost daily, at Rudge's flat. On 11 December, the pieces, together with Wolfgang Amadeus Mozart's (1756–1791) *Piano Concerto in A Major* (K. 488, 1786), were presented at the venerable Salle du Conservatoire. A review that appeared in the *Chicago Tribune* of 13 December 1923, by an unnamed reviewer, suggests much about his pianistic style: "Hitting the piano keys with his wrist and his palm as well as with his fingers, Mr. George Antheil, young American composer and pianist, drew from the instrument strange barbaric sounds and created a sensation at his recital."[308] On December 15, a longer review appeared in the same paper, signed by Irving Schwerke.

> We also admired [Olga Rudge's] sonority, it is remarkably ample—"pretty," if you will—but more than that did we admire this young artist for having enough courage to sacrifice on the altars of Mr. Antheil's conceited art, personal honors which otherwise might have been hers…
>
> Mr. Antheil's *First Sonata for violin and piano* and his *Second* (both first performances) caused the audience to disagree. They did so quite à la bonne franquette. While we cannot report any "glissando *of* the piano" or any other similarly astonishing phenomena, we can and do make record of this, viz:—that the tone produced by Miss Rudge and Mr. Antheil in the latter's compositions, frequently imposed a severe strain on the naked tympanum; that both pianist and violinist "threw" themselves heartily into their instruments and their music, and that their strenuous exertions had at least this result—the ear drank hence a copious draught of sound, which in the memory of some listeners was classified as "music" pure and absolute, in that of others as degenerate noise and crash.[309]

Earlier that fall, on 4 October 1923, Antheil had presented a concert at the Théâtre des Champs-Élysées, during which he performed his *Sonata sauvage* (for piano, 1922), his *Second Sonata: "The Airplane,"* composed in Trenton in 1921, and, notably, *Mechanisms*, his first piece for pianola (1923–24, now lost). Without informing Antheil, Margaret Anderson, editor and founder of *The Little Review*, and Georgette LeBlanc (1869–1941), a Belgian opera singer, actor, lover of Maurice Maeterlinck, practitioner of The Gurdjieff Work, and, probably, a confidant if not a lover of G.I. Gurdjieff (1866–1949)—both women were Antheil's friends from before he left for Europe and at this time were living in Paris—arranged to have the reaction of the audience stealthily recorded for Marcel L'Herbier's film *L'inhumaine* (1924, in which LeBlanc starred), as an example of a riotous premiere.[310] The audience behaved just as expected (though some believe this was the result of goading by agents whom LeBlanc had hired): just a few bars into the *Airplane Sonata*, the audience leapt to its feet, yelling, howling, and whistling (the severest expression of contempt in France). All of Antheil's Parisian contemporaries were there and staunchly defended their friend's works. Man Ray, seated in front row, punched one protester in the nose, Marcel Duchamp argued with somebody sitting in the second row, and the audience began pulling up the seats and dropping them on the orchestra below. The Surrealists, who liked the music, began punching everyone who objected, until the police entered the hall. Meanwhile, the composer Erik Satie excitedly applauded *Mechanisms*: "Quelle précision! Quelle précision! Bravo!" Antheil had a *succèss de scandale* to his credit and was now on the cutting edge of the Parisian avant-garde. It was likely immediately after this concert (that is, around eleven and a half months before the premiere of the film *Ballet mécanique*) that Antheil met Fernand Léger and Dudley Murphy and began work on the music for the film on which they were working.

George Antheil was a prolific composer (six symphonies, seven operas, two string quartets, five ballets, including two for Martha Graham [1894–1991], several film scores, and many chamber works). Later in life he wrote articles for *Esquire* on endocrinology and did work for the Paris police department on criminal typing (he received an honorary membership in the police department for this work). In the 1930s he wrote a widely read daily advice-to-the-lovelorn column in the *Chicago Sun Times*.[311] An avid reader of military history, he wrote (anonymously) the pamphlet "Germany Never Had a Chance"—composed in June 1939 but as if from the vantage point of 1950—which predicted with impressive accuracy many of the events of the Second World War (he predicted the attack on Pearl Harbor within a month). When his authorship of the pamphlet became known, he was celebrated as a prophet, and that celebrity prompted the editor of the *Los Angeles Daily News* to offer him a position as the paper's war correspondent, a position

that helped him through a time when he was no longer able to find work as a composer of music for films.[312] He wrote an effective detective novel, *Death in the Dark*, which T.S. Eliot edited and published, about the murder of a concert agent (one imagines that one motivation for writing the story was to take revenge on Donald Friede, who had organized the New York debut of *Ballet Mécanique*).[313] His knowledge of endocrinology was good enough that the actor Hedy Lamarr (1914–2000), famous (then as now) for appearing in the ecstatic grip of a spirited orgasm in Gustav Machaty's (1901–1963) *Extase* (Ecstasy, 1933), came to his doorstep, looking for ways to use hormones to enlarge her breasts.[314] They became acquainted, found a common interest in communications technology, and began to collaborate. Antheil contributed his knowledge of timing mechanisms, gained from his failure to synchronize the player pianos for *Ballet mécanique*, while she offered intimate knowledge of German naval intelligence (which she obtained at the dinner table from her ex-husband, Fritz Mandl [1900–1977], the owner of Hirtenberger Patronen-Fabrik, Austria's leading munitions manufacturer and a Nazi sympathizer). Together, they patented a "secret communications system" still in use today (especially in GSM cellular telephones, since it can interleave [multiplex] many messages simultaneously, where it is referred to as "spread spectrum technology"). Lamarr and Antheil's patent was for a radio guidance system for torpedoes that reduced the possibility of the steering signals being jammed.[315] Eventually, starting in the 1960s, their "secret communications technology" became the basis for all secret military communication. In 1997, she and Antheil (posthumously) received a special Electronic Frontier Foundation Pioneer Award.[316]

## POUND'S ANTHEIL: PARALLELS BETWEEN THE FILM *BALLET MÉCANIQUE* AND ANTHEIL'S THEORY OF COMPOSITION

Ezra Pound and George Antheil met in Paris in 1923, and the two immediately took a liking to each other. Pound's attraction to Antheil's music was based largely on its rhythmic character: Antheil's compositions often employed hard rhythms similar to those which the Vorticists extolled and exhibited—they expressed a massive yet dynamic solidity similar to that of Gaudier-Brzeska's sculptures. Pound described Antheil's rhythmic proclivities thus: "hammered down, worn down so that they were indestructible and unbendable."[317] These were characteristics of the music he conceived for *Ballet mécanique* as well.

Other comments by Pound highlighted the features that he believed Antheil's music shared with Vorticist painting:

> His musical world is a world of steel bars, not of old stone and ivy. There are his analogies to Lewis's "Timon," to the "ice-blocks" of Picasso. There is the

> break from the negative (in the geometric sense) or suspended, fluid quality of Chopin and Debussy. There is edge. There is the use of the piano, no longer melodic, or cantabile, but solid, unified as one drum. I mean *single* sounds produced by multiple impact; as distinct from chords, which are sort of chains or slushes of sound.[318]

Instead of depicting the fleeting play of light on coloured surfaces, as the Impressionists did, the Vorticist painters offered volume and force; likewise, instead of offering the flowing musical line that the Romantic composer Frédéric Chopin and the Impressionist composer Claude Debussy did, Antheil constructed hard masses of sound ("ice-blocks") and percussive effects. Furthermore, as the Vorticist painters refused to blend all their forms by using a single vantage point and an overall chromatic and atmospheric harmony, so Antheil refused to create chords that would destroy the individuality of the simultaneously sounding notes. Pound recognized the revolutionary character of Antheil's work, in the July 1924 postscript to the passage just quoted, he wrote,

> The old harmonists made a wire work [Pound is likely referring to wire armature that design students and sculptors use], Antheil wants slabs of sound to construct his active time-machines. It may be necessary to fill in the gaps between the wires (the sacrosanct 1$^{st}$s, 3$^{rd}$s, and 5$^{th}$s,) even if it cause pain to some ears avid of succulence and insensitive to the major form.[319]

As his later patent for a torpedo guidance system shows, Antheil *was* interested in "active time machines"—and, as Erik Satie's "What precision! What precision! Bravo!" suggests, in precision timing in general.[320] In his "Manifesto of Musico-Mechanico," he predicted the day when orchestral machines with a thousand new sounds and thousands of new euphonies would surpass the range of the simple sounds of today, the sounds of strings, brass, and woodwinds. Soon, he believed, all musical performance would be perforated onto a roll of paper—he even foresaw the development of the "humanize" function built into many computer sequencers today, forecasting that for people who found imprecisions in performance something to be cherished, these could be added to the paper roll. That acknowledged, we should recognize that when he was composing the music for *Ballet mécanique*, he embraced what he later described as the precise, anti-expressive, coldly mechanistic aesthetic of the early 1920s.

Pound went on to assert,

> You cannot compare Music since Beethoven with the early thin music which is like delicate patterns on glass. Since Beethoven people have thought of music as of something with a new bulk and volume.[321]

Pound further expounded on the historic changes taking place:

> Antheil is supremely sensitive to the existence of music in time-space. The use of the term "fourth dimension" is probably as confusing in Einstein as in Antheil. I believe that Einstein is capable of conceiving the factor time as affecting space relations. He does this in a mode hitherto little used, and with certain quirks that had not been used by engineers before him; though the time element enters into engineering computations.[322]

To mark out segments of time-space, Antheil created works by assembling blocks: a block was defined by an ostinato figure, and the piece was assembled as a series of these ostinato figures, with the transition from one figure to the next marked by an abrupt and extreme change in dynamics. Henrietta Strauss commented in *The Nation* on the contrasts used to articulate the divisions between these different segments, which she claimed were the basis for Antheil's notion of time-space:

> By this he means we are living more swiftly today, in an age when machinery has entered men's imaginations, and to express this "new propulsion of time spaces [*sic*]" we need a new music. Vertical music will not do it, because vertical music is too static, having reached its climax with Schönberg…He has definitely worked out a series of time-intervals of rhythm, or to use his own term musical "mechanisms," now pounding loudly, now whirring softly in space with the regularity and precision of machines.[323]

Antheil wanted to connect this conception of time-space to ideas from relativity theory (though it is doubtful that the actual connection was very close). In an article titled "My *Ballet Mécanique*: What it Means," he wrote of his ambition to present the audience with the first physical realization of the fourth dimension.[324] How could one do this? For Antheil, driven as he was by love of the machine, the answer was obvious: Machines could do it! Machines operate in time as well as space and therefore represented the ideal medium to express the unfolding of time-space. "Machines acting in time-space," Pound ventured in "Retrospect" (Schafer, 261), "and hardly existing save when in action, belong chiefly to an art acting in time-space. Antheil has used them effectively. That is a *fait accompli* and the academicians can worry over it if they like."

The cinema is an art of the machine, which explains why it appealed to Antheil. He followed this enthusiasm through to its ultimate: for him, the cinema had almost cosmic implications. *This Quarter* (Autumn-Winter 1925–26) contained part of the score he was working on for an opera based on the "Cyclops" episode in James Joyce's *Ulysses*; it shows that the orchestration was to be similar to that of the concert version of *Ballet Mécanique*.[325] We can imagine something of what Antheil had in mind for the opera, for in

the "Cyclops" episode, Joyce wrote about electric lamps being strung in the heavens and lit up from a switchboard to create God—and compares these lights to a giant cinema in the sky, with grand music machines playing that (perhaps like Joshua's horn) could make whole cities shake.

That this expresses exuberance for electromagnetic phenomena is too little acknowledged. But the Canadian literary scholar and art theorist Marshall McLuhan did recognize that fact. McLuhan wrote about the computer as the ultimate electromagnetic device. I would suggest that he was doing so in the following remark—read that way, it suggests much about Antheil's and Pound's beliefs about the cosmic (electrological) character of machine art:

> The computer thus holds the promise of a technologically engendered state of universal understanding and unity, a state of absorption in the logos that could knit mankind into one family and create a perpetuity of collective harmony and peace. This is the real use of the computer, not to expedite marketing or solve technical problems but to speed the process of discovery and orchestrate terrestrial—and eventually galactic—environments and energies.[326]

For Antheil, from a slightly earlier age, the cinema was an art of the machine; for advanced thinkers of his time, the dynamics of the machine were geared to the electromagnetic rhythm of the universe. (This is a difficult notion to bear in mind for those of us who were raised in the era when electrotechnics have constituted our environment and heavy industry seems a relic from the past. But understanding that helps us comprehend why Antheil wanted to follow Joyce in imagining a *deus sive natura* strung together from lights in the heavens connected in one universal switchboard and vast cinemas projecting a new dimension.) Antheil followed this enthusiasm through to its ultimate: for him, the machine art (of which cinema was the exemplar) had almost cosmic implications, connecting us with galactic energies.

The "Cyclops" project would have been an example of the time's enthusiasm for machine art. Robert Forrest Wilson notes of it:

> It is . . . to be performed—as much as it can be performed—without any human players at all, or at least visible ones. The "orchestra" is to consist of a battery of twelve electric pianos, eleven of them hooked up mechanically with the twelfth, which plays the master roll. No singers appear on the stage. They are concealed below, where they vocalize into receivers connected with loud speakers scattered through the auditorium. This device enables the voices to be heard above the din of the pianos and xylophones and also saves the audience the unpleasantness of having to gaze upon the singers who do not in the least resemble characters whose rôles they are assuming.[327]

*Cyclops* was to be scored for electrically amplified voice, electrically amplified chorus, sixteen player pianos operated from a switchboard and synchronized

using a master roll, eight xylophones, also operated from a switchboard, a plethora of gramophones, each reproducing sounds from one of the common orchestral instruments, whose amplification could be controlled remotely, four electromechanical buzzers, four pieces of steel, four bass drums, an electric motor with a piece of wood attached to it, another electric motor, this one with a piece of steel attached to it, and a large symphony orchestra. Antheil wrote to Pound,

> The opera progresses. Orchestras and hugely augmented phoneygraphs [*sic*] both play simultaneously THE SAME THING . . . the orchestra stops, and one discovers the xxxxxxxxxx [*sic*] phoneygraph HAD BEEN PLAYING SOMETHING ELSE. All of the combinations make your belly give up. Colossal orchestra for a change . . . mostly mechanical. Like Ulysses . . . encylopedic. Entirely different from Bal. McK. Must come down in June to show you, after the Bal& Meca.[328]

The remark that the music for *Cyclops* was entirely different from that for the machine-art piece *Ballet mécanique* ("Bal. McK." and "Bal& Meca") requires a gloss that anticipates subsequent points in the argument. Given the evident similarities between the *Cyclops* orchestrations and what most experimental film historians believe was the orchestration for *Ballet mécanique*'s music, and given the machine-music character of both compositions, we would do well to ask why Antheil would tell Pound that the music was entirely different. I believe that the statement that he was using a "colossal orchestra for change . . . mostly mechanical" explains the difference: I will go on to argue that the common view (which most recently has been argued by Paul Lehrman) that the music for *Ballet mécanique* was for a large orchestra is mistaken—I contend that music was to be performed by a special dual-roll player piano with a built-in assortment of noisemakers (and when that plan failed, it was to be performed on a single, single-roll player piano).

The opera Antheil hoped to produce might have been for an augmented symphony orchestra. But the version of the score for *Ballet mécanique* that Joyce first heard, and that stimulated his interest in collaborating with the composer, was a version for solo pianola. Bravig Imbs (1904–1946), an American-in-Paris poet and harpsichordist (and co-author, with André Breton, of a book on Yves Tanguy [1946]), who was a friend of Antheil's, elucidates the conditions. After finishing his work on the film score for the mechanical ballet (dynamic visual forms and automated sound) *Ballet mécanique*, he notes, Antheil spent a month in Tunis, where he wrote a note confidently predicting that the music of the future would be machine music (but produced by machines operating in silence) then sojourned at the Hotel Continentale in Trieste, Italy (located in front of what was then the Joyce family's apartment).

As a publicity stunt, to draw attention to the completed composition, Antheil and Imbs planted a news story that Antheil was missing in Africa, and the story was picked up by English-language papers in Paris.[329] What is interesting about the tale is that it seems Antheil deemed the score for *Ballet mécanique* to be finished (so the composer felt he needed a holiday, yet also wanted to draw attention to the new piece). The very day the newspapers reported that Antheil was missing in Africa (this happened while Antheil was in Trieste), a pianola version of the score for the audio component of *Ballet mécanique* was presented, on 18 September 1925—almost a year after the first screening of *Ballet mécanique*)—to a group of news reporters and to an audience that seems to have been chosen to maximize the possiblity that the work would generate notices (and good notices at that): it included Sylvia Beach, Beach's friend the French poet, publisher, and bookseller Adrienne Monnier (1892–1955), Elliot Paul, the co-editor (with Eugene [1894–1952] and Maria [1893–1987] Jolas) of the literary journal *transition*, and James Joyce himself. Imbs notes that on that date a single-roll (instead of three consecutives rolls) version was presented. He describes Joyce's response to the performance:

> The terrific thumping . . . electrified the audience. Joyce seemed gripped in spite of himself . . . The Ballet was so intense and concentrated, so strange and even irritating to the ear, that there was a gasp of audible relief when the first roll abruptly finished . . . And then (at the end of the third roll) Mr. Joyce asked to hear a part of the second roll again! . . . The girl pumped now and again, making little spurts of sound until she found the measures which had interested Joyce. Heard away from their context these few bars lost none of their peculiar vitality. Mr. Joyce was highly satisfied. "That's like Mozart," he said.[330]

This is the version that so intrigued Joyce and that got Antheil and Joyce working together on an opera based on the "Cyclops" episode. It is also close to the version that was presented on 18 October 1935 at the Museum of Modern Art in New York City.[331]

Despite having an agreement with New York's Provincetown Players that they would mount the *Cyclops* opera, Antheil failed to complete it. Antheil later followed the path blazed by his mentor Igor Stravinsky and produced Neo-Classical (or, in his case, Neo-Romantic) work, such as *Concerto for Piano* (1926) and *Symphony No. 2* (1925–26), along with the well-received opera, a satire on American politics, *Transatlantic* (1930). Shostakovitch and Prokofiev, along with the Neo-Classical Stravinsky, were his models for that work.

*Ballet Mécanique* (the 1926 version, for full orchestra, percussion instruments, and noisemakers, but a single player piano, accompanied by multiple standard pianos) had another major concert performance, this one at Carnegie Hall in New York City. It, too, was a disaster.[332] Antheil struggled to

carry on composing in this vein for some time. He received a Guggenheim study grant and returned to the south of France in 1932 for one more year. This resulted in forty-five piano preludes based on Max Ernst's collage-novel *La femme 100 têtes* (*La femme 100 têtes: 45 Preludes for Piano*, 1932–33). He indulged himself for a while in the good life in the south of France. On his thirty-third birthday, he realized that returning to America was the only answer. "I am through with Europe," he told a reporter in December 1933. (He would not return to Europe again until late in his life.)

Back in New York, Antheil connected with playwrights and screenwriters Ben Hecht (1894–1964) and Charles MacArthur (1895–1956), who had revived the old Paramount movie studio. He scored the films *Once in a Blue Moon* (1935) and *The Scoundrel* (1935). He also produced scores for a series of ballets by George Balanchine (1904–1983), who was introducing the Russo-French balletic style to enthusiastic New York audiences: *Eyes of Gutne* (1934), *Serenade* (music after Tchaikovsky) (1934), *The Seasons* (1935), *Dreams* (1935), and *Transcendence* (music after Liszt) (1935) were produced through their collaboration. He also worked with the modern dance pioneer Martha Graham, and their alliance produced *Course* (1935), an ensemble dance, and *Dance in Four Parts* (1934), which was assembled from his *One Hundred Preludes for a Woman with One Hundred Heads*. Antheil moved to Hollywood in 1936 and wrote music for motion pictures, including films by Stanley Kramer (1913–2001), Ben Hecht, and Cecil B. DeMille (1881–1959).[333] His later works reflect his search for a truly American style. His *Symphony No. 4* (composed in 1942–43) was performed by Leopold Stokowski and the NBC Orchestra in 1944; another, *No. 5* (*Joyous*, 1945) by Eugene Ormandy and the Philadelphia Orchestra in 1948; *No. 6* by Pierre Monteux and the San Francisco Orchestra in 1949. In the 1950s, Antheil returned to the stage, producing four operas. His *Volpone* (libretto by A. Perry after Ben Jonson, 1950–52) is an impressive satirical and "dialogic" work that makes use of several heterogeneous harmonic languages and is characterized by thematic versatility, rhythmic energy, mosaic construction, and a plethora of colourful timbres. His other three operas were *The Brothers* (libretto by Antheil, 1954), *Venus in Africa* (libretto by M. Dyne, 1954), and *The Wish* (libretto by Antheil, 1955). Although he had a heart condition, he refused to slow down, and the inevitable happened: he succumbed to a heart attack in New York on 12 February 1959.

## POUND, ANTHEIL, VORTICISM, AND HARMONY

Years later, Antheil had distanced himself from Pound, who had "fallen into disgrace." Yet Pound continued to praise the composer, using similar terms to comment on his importance. "Antheil," he said,

> did once demand bits of SOLIDITY, he demanded short hard bits of rhythm hammered down, worn down so that they were indestructible and unbendable. He wanted these gristly and undeformable "monads," as definite as the
>
> All the angels have big feet.
> Hump, diddywin tum . . . Hump, bump, stunt.[334]

Think of the short, hard, hammering rhythms of some of *Ballet mécanique*'s visual forms.

Pound was close to the people involved in making the film / machine-art piece *Ballet mécanique*. As we have seen, Antheil was in touch with Pound throughout the period when he worked on the film's music. Pound's notion that Antheil was a Vorticist composer sheds light on the piece of machine art that the film (sound and image) *Ballet mécanique* was meant to be. It behooves us to examine Pound's views on Antheil.

Antheil wrote an amusing description of his encounter with Pound that helps clarify what Pound found enticing in Antheil's ideas and practice:

> [Pound] accompanied me back home and asked if by any chance I had written anything about my musical aims, and I said, "Yes, I have"; which accidentally happened to be the truth, for I had purchased a typewriter in Berlin and had occasionally amused myself with typing out pronunciamentos on art and music which would have blown the wig off any conventional musician; among other things I said that melody did not exist, that rhythm was the next most important thing to develop in music, and that harmony after all was a matter of what preceded and what followed.
>
> Ezra was most delighted with all this and asked if he could keep the "precious sheets" for a while, he would take scrupulous care of them.[335]

The Canadian composer R. Murray Schafer has studied Pound's ideas about music more thoroughly than anyone else. Schafer pointed out that Antheil's idea that harmony "was a matter of what preceded and what followed" became the core thesis of Pound's writings on the composer. Pound realized that Antheil's pronouncement defined an emerging musical aesthetics. He also emphasized Antheil's remark that "rhythm was the next most important thing to develop in music." The priority that Antheil accorded to rhythm matches Pound's estimation of rhythm's importance—Pound, after all, had proposed that the test of a poet's art is her ability to create the proper rhythm for what she wishes to impart.

Pound again related Antheil's importance to the (Vorticist) rhythmic qualities of his work in his essay "George Antheil (Retrospect)":

> The article on Vorticism in the Fortnightly Review, Aug. 1914 stated that new vorticist music would come from a new computation of the mathematics of harmony not from mimetic representation of dead cats in a fog horn (alias

noise tuners [evidently a reference to Luigi Russolo's *intonarumori*, "tuned noisemakers"]). This was part of the general vorticist stand against the accelerated impressionism of our active and meritorious friend Marinetti. [Branding Futurism as "accelerated impressionism" is a good example of Pound the provocateur.] . . .

We had also said that the organization of forms is a much more active and energetic occupation than copying the play of light on a haystack . . . Let us say that chords are like colour. They are a complex of sound occurring at a given instant of time, a minimum audible of time, as colour is a complex of light vibrations thrown off by a given spot, or minimum visible, of space or surface. [Music is built from complex sounds, just as a painting is fashioned from complex mixtures of light—and both sound and light are electromagnetic vibrations. But these materials are also the stuff of impressions—that is what is conveyed by the allusion to light thrown from a surface at a given instant of time.]

There remains the given succession of sounds; and the given delimitation of points, whence lines, surfaces, volumes . . . [But organization/succession is the particular virtue of Vorticism.]

. . .

Here we must emphasize the relation of *raga*, *tala*, and harmony. Any note can follow any other, any ten notes can follow each other in any order you like [this is a way of expressing the idea of infinite plasticity as it applies to music: one can twist notes in an infinite number of ways, as the dancer Boz could create endless sequences from a "unit-form"], but if their arrangement . . . their tone sequence, is of any interest it will *lock* their time intervals, i.e. their individual durations and the rests between them [just as a fixed rhythm gives form to these plastic shapes of jazz dance].

When counterpoint slumped into harmony, Lutheran chorals, etc., and progressively into Schönberg, this fundamental drive in music was obscured. The harmonists gave their attention to the perpendicular values, ending in a technical morass, undefined rhythms, tonal slush . . .

What I am driving at is that Antheil has not only given his attention to rhythmic precision, and noted his rhythms with an exactitude, which we may as well call genius, but he has invented new mechanisms, mechanisms of this particular age . . . [*Ballet mécanique*, we will see, is a film held together by a rhythm, one that the filmmakers relate to machine dynamics.]

In "The Golden Bird" he . . . [succeeded] in making the "solid object" . . . By solid object "musically," I suppose we mean a construction or better a "mechanism" working in time-space [in a unified section], in which all the joints are close knit, the tones fit each other at set distances, it can't simply slide about.[336]

*Ballet mécanique* makes us increasingly aware at once "of form, of form combination, or the precise limits and demarcation of flat forms and of volumes," and of "time-space, the divisions of time-space" (which we become

aware of by considering the film's "tick-tock" rhythm). It demonstrates that any form "can follow any other, any ten [forms] can follow each other in any order you like, but if their arrangement . . . their [visual relations are] of any interest it will *lock* their time intervals, i.e. their individual durations." By using the term "lock," Pound's commentary on Antheil's concept of time-space obscures one of its most revolutionary dimensions. For Antheil's conception of "time-space divisions" was of using repeating patterns that can be cut or stretched, to create tension: and this developed into the idea that, using repetition, one can create the illusion of a boiler factory in one block of time and whirling airplane propellers in another.[337] Thus, the score for *Ballet mécanique* (and the chamber version of it) consists of a number of themes that are repeated a varying number of times, only to be replaced by another repeating motif.[338] Antheil's symphonic version of the music possesses many radical features—it incorporates techniques such as using silence (in Antheil's case, to draw attention to the time-space on which the composition is created), noise elements and extreme literal repetition (all of which came into common use among composers only decades later); the solo pianola score in particular emphasizes extreme repetition.[339] The work consists of a series of patterns that repeat for varying lengths of time, and at the end of the duration for which a given pattern plays, it ends abruptly and is replaced by another pattern. Repetition ensured that although the pulse could not, as Pound put it, simply "slide about," there nonetheless could be a systematic augmentation or diminution of the intervals. This allowed the number of repetitions to be increased or decreased to "fit" a particular motion picture sequence: this highlights the extent to which, at this point, Antheil's conception of musical form was of a device structured by time, not *melos*. (I believe that Antheil considered the greatest achievement of Stravinsky's Весна священная to be its ground-breaking rhythmic / temporal complexity—this view, it seems to me, is not unreasonable: many of the most extraordinary effects of this great piece are achieved by using tone clusters created by superimposing chords whose roots are separated by a semitone, a construction of maximal harmonic tension repeated insistently, and by taking simple theme, often of no more than four notes, and permutating their order and varying their time values to produce what are, in effect, Schillingeresque series.) But this mode of construction had broader formal implications that the structure of the film *Ballet mécanique* makes evident: film's basic rhythmic unit is extremely flexible, and its duration expands and contracts throughout its running time.

The idea that music is constructed from blocks of time is central to the theory and practice of twentieth-century music. This is the essence of the idea of "time-space": it is a space to be filled with sound—and, significantly,

with silence. Antheil anticipated one of John Cage's most radical and daring conceptions, in understanding time (clock time, not pulse time) to be the fundamental space of a musical composition, the canvas on which it is created (though we must acknowledge that Cage's conception implies a more thorough understanding of that principle's implications for rhythm and meter). The concept of time-space became, for Antheil, the foundation of a new way of making music, "a new method of musical engineering," as he called it. A time-space is really just a block of time that interrelates with other blocks of time: one juxtaposes an interval having one aural quality with a longer or shorter interval having another quality:

> The "cantilever" principle *Ballet Mécanique* ignores the tonal, atonal, or 12-tone principle entirely (although vast sections of it are written in pure 12 tone, being one of the first compositions in history so written) and devotes itself entirely to the TIME-SPACE principle, or the theory that TIME rather than TONALITY or anti-tonality, is the main, basic "canvas" of music, the thing that music takes place in, uncoils in, displays its architectural firmness or weakness within. [Antheil disparaged the Schoenbergian aspects of both his concert score and the score for the audio component of *Ballet mécanique*, in order to throw its large-scale (slab) features into relief.] Previously, no one seemed to have bothered with time as a musical ingredient, except to observe whether or not a movement, or a section of tonal music was "too long" or "too short." TIME-SPACE does not leave this to chance, but attacks it mathematically, and upon the basis of structure, musical engineering.[340]

The film component of the machine-art piece *Ballet mécanique* embodies Léger's idea of the choreography of the future—an industrial/mechanical choreography that accorded no privilege to humans. The film and its music also embodies Antheil's notion of the dance of the future as a choreographed series of temporal gestures and resolutions—as gestures were transposed from the dance to music, they were changed from predominantly spatial forms to forms that exist first and foremost in time. The effect of transferring dynamic gestures from the space in which dance unfolds to the time-space of music is to accord greater importance to structured time. So meter as a sort of chronometer became fundamentally important in Antheil's theory and practice—just as throughout his life, chronometry remained a topic that held a special interest for Antheil.

Thus, to Pound's remark in "Notes for Performers" that a "sense of rhythm covers many defects," Antheil offered the scholium "One might say almost all." And regarding Pound's succeeding comment, that "the pain caused to the ear by occasional horrid sounds is quickly obliterated in the succeeding flow of the music," Antheil noted. "This is the whole thing in a nutshell."[341] Pound's ideas on these matters thus coincided with those of Antheil, who, as

we have seen, had declared "that rhythm was the next most important thing to develop in music, and that harmony after all was a matter of what preceded and what followed." The score for the machine-art piece *Ballet mécanique* (and for the chamber version) show that forms belonging to radically diverse orders can succeed one another and constitute a whole, as long as the momentum of the rhythm fuses them. Pound himself remarked that "Rhythm-sense is not merely . . . a clock-work of the bar-lengths. Measured time is only one form of rhythm; but a true rhythm-sense assimilates all sorts of uneven pieces of time, and keeps the music alive." [342] *Ballet mécanique*, too, incorporates disparate lengths into a single pulse.

These considerations led Antheil to emphasize that a piece's harmonic relations (as he understood them) could contribute to its forward movement. He outlines the contribution of his "Treatise on Harmony":

> The former treatises on harmony dealt with static harmony, they may have defined harmony as "simultaneous melody" or they may have sought some other definition, but they did not consider that the lateral motion, the horizontal motion, and the time interval between succeeding sounds MUST affect the human ear, and not only the ear but the absolute physics of the matter. The question of where one wave-node meets another, or where it banks against the course of another wave to strengthen or weaken its action, must be considered.[343]

The Pythagorean comment of the last sentence reminds us of Pound's remark, in the preface to his translation of Guido Cavalcanti's poems, that he believed in an absolute rhythm. However, in the 1910 work Pound related the absolute character of a rhythm to its appropriateness for imparting the exact nature of an emotion; here, to the contrary, he ties rhythm to harmony's underlying physical structures—to the spacing of nodal points on a vibrating string and to the regular intervals between them, and to phenomena of cancellation and reinforcement that account for the occurrences of those nodes.

To stress the priority of rhythm over what is traditionally understood to be harmony in music (dealing with the relations of the frequencies of simultaneously sounding elements), Antheil begins "The Treatise on Harmony" with a polemical remark:

> The element most grossly omitted from treatises on harmony up to the present is the element of TIME. The question of the time-interval that must elapse between one sound and another if the two sounds are to produce a pleasing consonance or an *interesting* relation, has been avoided.[344]

Antheil expresses astonishment at this omission, since

> the simplest consideration of the physics of the matter by almost the simplest mathematician, should lead to equations showing that

> A SOUND OF ANY PITCH, or ANY COMBINATION OF SUCH SOUNDS, MAY BE FOLLOWED BY A SOUND OF ANY OTHER PITCH, OR ANY OTHER COMBINATION OF SUCH SOUNDS, providing the time interval between them is properly gauged.[345]

The first publication of Pound's *Antheil and The Treatise on Harmony* was printed in Paris by William Bird's Three Mountain Press; portions of it had appeared in a series of articles by Pound in *Transatlantic Review*. The chapter "George Antheil: A Retrospect" appeared as an article in *Criterion*, on 7 March 1924 (321–31). Much of the work consists of commentary on a tract that Antheil had written in 1923. Accordingly, Antheil's original text and Pound's commentary of Antheil's works and ideas appeared before Antheil began work on the concert version of *Ballet Mécanique*. These were written closer in time to the film score version of that work—and I would argue, are of more direct relevance to that work—than the concert score.

In "The Treatise on Harmony" the composer stresses time and again that mathematical precision is required for form-building of the sort he is engaged in. Essentially, Antheil extends Pythagorean principles to time (an extension required by our dynamic age). This extension of harmonic principles constitutes a point at which Pound's, Antheil's, and Léger's interests converge. Léger, we have already seen, was greatly concerned with the problem of bringing harmony to the experience of city dwellers, whose sensorium, he feared, had become quite disordered. We will see, however, that the Constructivist-like principles he embraced as a solution to that problem relied on a conception of time that Bergson alleged characterized physicists' (Newtonian) conception of time.[346]

Antheil also notes,

> Any series of chords can follow any other, provided the right time-interval is discovered. The interesting sequences are probably those that DEMAND very set and definite intervals.
>
> That is probably all we have to say in this chapter.[347]

A statement of the first of the "complications" follows, a "corollary" of the Pythagorean propositions that undergird Antheil's understanding of music:

> The duration of the resolving chord must also be considered; and the duration of the various chords in a sequence will be subject to mathematical computations, if people prefer mathematics to judging the sounds by ear.[348]

Many commentators have taken the music for *Ballet mécanique* as representing the sounds of the factory (thus offering a parallel to the images, many of which were shot in a factory, or in factories). That was not Antheil's intention, however. Rather, his goal was to abstract the essence of mechanical

processes, converting them into percussive sounds that could be laid out on a time canvas the way that a painter lays out a visual design. In 1953 he commented that "rather than to consider musical form as a series of tonalities, or as atonalities with a tonal centre, or as tonally centred at all, [the score for *Ballet mécanique*] supposed that music actually takes place in time; and that, therefore time is a real construction principle, as it unreels."[349] The composer offered similar comments in a letter to Nicolas Slonimsky in 1936:

> In the *Ballet Mécanique* [thus in source, though here Antheil is writing of the music he composed for the film] I used time as Picasso might have used the blank spaces on the canvas. I did not hesitate, for instance, to repeat one measure 100 times. I did not hesitate to have absolutely nothing on my pianola rolls for 62 bars [note that "rolls" here is in the plural]. I did not hesitate to ring a bell against a certain section of time or indeed to do whatever I pleased to do with this time-canvas as long as each part stood up against the other. My ideas were the most abstract of the abstract.[350]

As I noted earlier, the filmic component of *Ballet mécanique* is composed of shots that belong to many different orders—some are photographic images of the ordinary, representational sort; some others are photographic shots of the ordinary, representational sort, but shot through mattes or from unusual angles, to emphasize the graphic shapes of the image; some are photographic shots, but not of the ordinary, representational sort since their spatial form has been affected (altered by mattes or affected by their being reflections on curved surfaces); some are static graphic forms, more exemplificatory than straightforwardly representational; and some are animated graphic forms with referential features. Yet the film maintains a steady rhythmic propulsion; one of the film's points of interest is how it accommodates these different sorts of forms by altering the absolute length of the shots to preserve the rhythmic pulse. In this way, the film proves the truth of Pound's point—or, rather, Pound's point transposed to the cinema: any shot may be followed by any other provided that the right time interval is placed between them—or, what is the same, provided that the right time-space intercedes between them. What is more, the placement of recurring images follows a principle of proportion. These compositional ideals, therefore, accord with the Orphist and Purist ideals to which Léger subscribed.

Antheil followed this statement on the ideas that went into his score for *Ballet mécanique* with a second "complication":

> THE HARMONY FOR ONE INSTRUMENT MAY NOT BE THE HARMONY FOR ANOTHER.
>
> Again the competent mathematician could show us that the vibrations of a 'cello where the sound is steadily produced by a drawn bow will combine

> in a different way from those of a horn, a plucked string or an instrument of percussion.
>
> Everybody knows this; but the time is over when we can give more reverence to a person who can detect slight variations of a pitch, than to one who can detect the difference between [two rhythmic patterns, one of which had a rest one-thirtieth of a second longer than the other].
>
> It will make a difference what instrument the sounds are played on; it will make a difference if one note or several notes are played louder in the chord; it will make a difference if the next chord strikes the precedent chord while that chord is still being propelled from the instruments or if the second chord strike [*sic*] the other chord as it fades; and all these things are really in the domain of harmony, that is of active, not static, harmony; and as for the workings of the latter; this time element may upset them or reinforce them in given circumstance [*sic*].[351]

Or, as he put it in a note of January 1920, "rhythm is made not merely by a correct division of music into bars of equal time-length, but also by a pluck and impact of accent."[352]

There is a remarkable affinity among Pound's, Antheil's, and Léger's ideas on composition. Pound's theory of harmony (which he claimed to derive from George Antheil's work) can be reconciled with Fernand Léger's theory of contrasts—all one needs do is work out measures of differences between forms and construe these as indicating degrees of contrast (as Sergei Eisenstein did) and then extend Léger's ideas about composition through contrast by developing further ideas about how much contrast is appropriate at particular harmonic nodes.

## A MECHANICAL BALLET: MUSIC, FILM, AND FILM MUSIC

Antheil's plan for the composition developed ideas he had used in six previous compositions: *Sonata sauvage*, *Mechanisms*, *Airplane Sonata*, *Serpent mécanique* (Mechanical Serpent, composed 1921, unpublished), *Sonata 3* (in three parts, "Steel, "Roads," and "Airplanes") (duo violins and piano, 1924), and *Sonatina: Death of the Machines* (for piano, 1924), and actually draws on material from *Sonata sauvage*, *Mechanisms*, *Airplane sonata*, and *Death of the Machines*.[353] The concert version of *Ballet Mécanique* was a longer work than any of those, and was (in the most widely known of its versions) for full orchestra, two standard pianos, and sixteen mechanically synchronized player pianos (divided into groups of four), as well as percussion instruments (xylophones, bass drums, and tom-toms), electric buzzers, a siren, and the sound of three airplane propellers of wood and metals.[354] (Flight was still considered a modern marvel, and incorporating propeller sounds was a way of celebrating its magic.) The music for the film / machine-art composition was

strikingly different. Antheil intended to compose the first piece of music for machines. It was not for a large orchestra, and indeed was not even a concert piece (in a strict sense). Rather, he conceived a small-scale work, consistent with Léger and Murphy's ideas for the film's visuals, which were influenced by both Cubist and Dada strains, in the simultaneous juxtaposition of radically different motifs. Highlighting the difference between what the mechanical instrument and the human player could do, the composition often used very large chords, with up to thirty-one notes each. These large chords were often cluster chords, which usually were played at high volume, at the resonant bass end of the piano keyboard.

Antheil conceived his composition for the film as a mechanism (or, more exactly, a mechanism within a mechanism) whose gestures resemble machine movements. The earliest idea Antheil had for the piece was that it would be not a concert piece, but rather a sort of chamber work to be performed by machines: he must have believed that having the composition performed by machines would make it similar to a cinematic piece. A film projection, after all, is a mechanized performance—a mechanical ballet. The filmmakers delighted in the irony that results from inverting the usual relation that obtains between objects and people in dance: in the film, machine-parts are generally dynamic while (for the most part) human body parts hardly move (so the juxtaposition of film frames creates a mechanical, not a human, ballet).

To achieve his goal of creating a machine composition, Antheil, with the Pleyel Corporation's cooperation, created the spool rolls that player pianos played.[355] He focused his conception of the machinery for the piece on a motion picture projector and a Fotoplayer (a player piano with organ and noisemakers that could synchronize with a film projector). Having a piano accompaniment, along with electric noisemakers (e.g., an Allefax machine), was common in the presentation of films by this time, but *Ballet mécanique* would be different, inasmuch as the entire presentation would be automated. When Pleyel decided not to produce the Fotoplayer, Antheil decided to focus on composing a piece for a solo dual-roll pianola, and, later, for a single-roll pianola (the latter of which Charles Delacommune would synch with a movie projector), and he sometimes toyed with the idea of supplementing these two machines (pianola and projector) with xylophone, keyboard piano, and sound effects as needed (to make up for the sound effects the Fotoplayer would have provided).[356] On 17 March 1924, more than six months before the presentation, at the Internationale Ausstellung neuer Theatertechnik, of the "program of images" that the makers hoped would become an aspect of the chamber machine-art composition *Ballet mécanique*, Antheil, with William Bird—another member of Pound's circle (Ernest Hemingway had introduced the journalist, connoisseur of French wines, and publisher-to-be to Ezra Pound

in 1922)—applied for a French patent (578.777) for an "appareil et papier pour l'inscription de la musique"—an electrical apparatus that, through contact with a piano keyboard, would record the notes to be played on a moving roll of paper (the patent was granted on 11 July 1924 and published on 3 October 1924). Presumably, this device would have allowed the piano virtuoso Antheil to perform a piano version, which would be recorded and then be played back on a player piano or a version of Delacommune's Ciné-Pupitre. Antheil worked on the piece between 1923 and 1925, which, most film historians suppose (I will have more to say on this matter presently), meant that the final "synchronized musical adaption" of the score was not ready when the film (or an early version of it) was shown in Vienna on 24 September 1924. In fact, one version of the score was finished by sometime in 1924, and it was composed for three (successive) player piano rolls—the three (successive) rolls that in 1925 Pleyel punched onto one combined, flawed roll.

Pound related Antheil's ability at fashioning a time-space form to his (Antheil's) interest in musical mechanisms and with his use of machines as sound-producing devices:

> Antheil is probably the first artist to use machines, I mean actual modern machines, without bathos…
>
> Machines are musical. I doubt if they are even very pictorial or sculptural, they have form, but their distinction is not in form, it is in their movement and energy; reduced to sculptural stasis they lose *raison d'être*, as if their essence…
>
> The lesson of machines is precision…I take it that music is the art most fit to express the fine quality of machines…Machines acting in time-space, and hardly existing save when in action, belong chiefly to an art acting in time space.[357]

*Ballet mécanique* is just such a machine: it acts in time-space, and it hardly exists save when in action. *Ballet mécanique*, performed by a pianola and projector, would have been exactly such a mechanical ballet. I believe this is what Léger, Murphy, and Antheil were aiming for.[358] Concerning the relation of image and sound that Léger wanted, the Pound biographer John Tytell points out that "on Pound's recommendation, Antheil was chosen to compose a compatible score, and Natalie Barney was recruited to pay for Antheil's contribution. According to Léger, what Antheil did was a synchronized adaptation of what was shown on the screen—for instance, a shot of Christmas ornaments multiplied through the prismatic device and moving in synchronization with Antheil's music."[359] Perhaps the most compelling argument for the claim that *Ballet mécanique* was meant to be a piece of machine art, for pianola and projector—besides the fact it would truly be a mechanical ballet, with the music (performed by a machine regulated by punched-paper roll) operat-

ing analogously to the image (performed by a machine, pulling one stencil after another in from of the light and holding it there momentarily)—is that the chances of a film (these flicking shadows) standing up to an augmented symphony orchestra seem essentially negligible.[360]

Sometime in the early winter of 1924, Charles Delacommune was brought in to help work out the details for synchronizing the two component machines (projector and pianola). Delacommune had been working on synchronizing music and film projection using a punched tape similar to that which operates a pianola. Antheil worked on the pianola version from sometime in the summer of 1923 through to end of the summer of 1925. During the summer of 1924, Léger decided he wanted the film shown at the Internationale Ausstellung neuer Theatertechnik and sent it there without sound. It was not intended that the silent version be the last—we know this because Léger, Antheil, and Delacommune continued to work on the problems. In the late summer of 1925, Antheil decided his work was done. However, technical problems remained, and as the list of prints Bruce Posner supplied (see endnote 284) indicates, Léger continued to work with Synchro-Ciné to try to synchronize the film (the spoolroll had already been punched)—indeed, the very fact that name Synchro-Ciné appears on several extant versions of the film (including the one that served as the principal source for the restoration that appears on Bruce Posner's / Anthology Film Archive's *Unseen Cinema* collection) indicates that Léger continued to work with Delacommune's research and production house for many years after the first screening of the moving image component of the machine-art work, *Ballet mécanique*, for it was not until 1928 that Delacommune changed the name of his company from Synchronisme cinématique to Synchro-Ciné. He continued to work on this until, perhaps, 1936. In 1931 or 1932, he was still in touch with Antheil, and supplied him with a new, re-edited print.

After completing the pianola version, and after discovering there were problems with the existing Pleyel rolls, Antheil, late in 1925, became alarmed (probably some weeks after a vacation in Trieste) that further efforts to prepare the rolls might result in similar problems. Despite ongoing efforts to create a version of *Ballet mécanique* for player piano and projector, he became anxious that his work might be for naught.

So, in 1925–26, Antheil redoubled his efforts at reworking the solo-pianola version of *Ballet mécanique* (originally for Fotoplayer) into a concert version, for symphony orchestra augmented by xylophone, airplane propellers, and doorbells, but scored for a single player piano and accompanied by standard pianos (in paired groupings). The complexity of the score was mind-boggling: it was 1,240 measures long, containing up to 1,000 notes per measure, and incorporating some 630 time signature changes. On 19 June

1926 (twenty-one months after Léger and Kiesler first screened the film in Vienna), this version of *Ballet Mécanique* had its première at the Théâtre des Champs-Elysées. Though the film was not projected, Fernand Léger did provide some décor: a full-stage cyclorama represented a view of skyscrapers as if imagined by a European who had never actually seen America. Amid these skyscrapers an enormous spark plug (suggesting electromagnetic reality) seemed to be striving to reach a painted sky crowded with steam shovel buckets. The whole reflected an American modern that was very much in vogue. T.S. Eliot attended the première in the company of his cousin, the very chic, and very influential, Princess Margaret Caetani (née Chapin) of Bassiano (1880–1963), an heir to a fortune, formerly of New York and publisher of the literary magazine *Commerce*; James Joyce was also there, partly because he had been sufficiently impressed with the version for solo pianola that he had proposed collaborating on an opera with Antheil, built around *Ulysses*'s "Cyclops" episode. Ezra Pound sat in the balcony, among other participants in Montparnasse's various artistic revolutionary factions, surveying all the commotion the performance stirred up and ready to rise to Antheil's defence. The response was predictably similar to the one generated by the concert of Antheil's music mounted on 4 October 1923, at the Théâtre des Champs-Élysées (see above). Sylvia Beach, the bookshop owner, publisher, supporter of the advance guard, and Antheil's landlord, recalled the event:

> The audience was strangely affected by the *Ballet Mécanique*. The music was drowned out by yells from all over the house. Objectors on the floor were answered by defenders above; Ezra's voice was heard above the others', and someone said they saw him hanging head downward from the top gallery. [It is said that Pound led the cheering for the pieces, and that every time there was a boo or a hiss heard, he yelled out, "Vous êtes tous des imbéciles!" ("You're all imbeciles").]
>
> You saw people punching each other in the face, you heard the yelling, but you didn't hear a note of the *Ballet Mécanique*, which judging by the motions of the performers, was going on all the time.
>
> But these angry people suddenly subsided when the plane propellers called for in the score began whirring and raised a breeze that, Stuart Gilbert says, blew the wig off the head of a man next to him and whisked it all the way to the back of the house. Men turned up their coat collars, the women drew their wraps about them; it was quite chilly.[361]

In addition, one old, bald gentleman, a particularly disagreeable individual, pulled out his umbrella, opened it, and pretended to struggle with a gale of wind from the electric fans that substituted for propellers. After the concert, fistfights erupted between the composer's supporters and his detractors. Nonetheless, Antheil heard the music over top of the goings-on in the concert hall:

> At the first chord of the [concert version of] *Ballet mécanique* the roof nearly lifted from the ceiling! A number of persons instantly fell over from the gigantic concussion! The remainder of our guests squirmed like live sardines in a can; the pianos underneath or above or next to their ears boomed mightily and in a strange synchronization.[362]

By way of comparison, Pound wrote that the film score for *Ballet mécanique*

> takes music out of the concert hall, meaning thereby that it deals with a phase of life not hitherto tackled by musicians and freighted before the act with reference to already existing musical reference.
>
> . . .
>
> I mean that we have here the chance, a mode, a music that no mere loudness can obliterate, but that serves us, as the primitive chanteys for rowing, for hauling on cables; "Blow the man down" and such like; have served savages or simpler ages, for labours, ashore and afloat. And this is definitely a new musical act; a new grip on life by the art, a new period, a bigger break with the habits of acceptance than any made by Bach or by Beethoven, an age coming into its own, an art coming into its own, "and no mean labour."
>
> The "Sacre" [*sic*; Stravinsky's *Le sacre du printemps*] stands, but its cubes, solid as they are, are in proportion to the *Ballet Mécanique* as the proportions of architecture are to those of town-planning. [Here Pound is commenting on the chamber version of Antheil's composition, not the symphonic version. And he is comparing the respective composers' credentials as Cubists.]
>
> Technically, the fact is, that Mr. Antheil has used longer durations than any other musician has ever attempted to use . . . much longer durations. [Duration may be considered as having a role in the arts of time analogous to that which volume has in the arts of space; so here too Pound is asserting Antheil's Cubist credentials. He is, of course, also arguing that the massive durations from which Antheil constructed the rhythms of his *Ballet mécanique* attest that the work displays a radical aspiration. I believe that I am in a position to vouch both for the importance and for the inassimilability of this radical effort.] . . .[363]

In *The New Age*, Pound wrote at great length (and not without revealing a dismaying Eurocentrism) on machine art's character as the folk music / work song of the industrial cultures:

> The savage has his tribal ceremonies, primitive people have ther [*sic*] sea chanteys and labor songs. Modern man can live, and should live, and has a perfectly good right to live in his cities and in his machine shops with the same kind of swing and exuberance that the savage is supposed to have in his forest . . . Neither is there any reason why the city intuition should be any deader than that of the savage.
>
> As for the machine shop, the boiler works, Antheil has opened the way with his *Ballet Mechanique* [*sic*—here Pound, despite the capital-M, is writing about

> the ideas that went into the film score and the chamber music version]; for the first time we have a music, or the germ and start of a music that can be applied to sound regardless of its loudness. The aesthete goes to a factory, if he ever does go, and hears *noise*, and goes away horrified; the musician, the composer hears noise, but he tries to (?) "see" (no, no), he tries to *hear* what kind of noise it is.

Here Pound picks up the thesis that a crisis of sensation has emerged, as urban dwellers and factory workers encounter new sorts of sounds (etc.). He anticipates the McLuhanite view that the purpose of art is to guide people towards reorganizing their senses so as to adapt to the times. He continues by commenting on the time-sense that one needs to function in modern society:

> "Music" as taught in the academies deals with the organization of smallish bits of sound, of sounds having certain variations inside the second, organised into forms, or bits of form having differences inside a minute or ten minutes, or, in the "great forms," half an hour.
>
> But with the grasp of the *longer durations* we see the chance of time-spacing the clatter, the grind, the whang-whang, the gnnrrr, in a machine shop, so that the eight-hour day shall have its rhythm [Hear! Hear!]; so that the men at the machines shall be demechanized, and work not like robots, but like the members of an orchestra.[364]

Here Pound is propounding the vanguard view that the age that is dawning will allow us to experience the everyday world poetically.

Vincent Sherry, in *Ezra Pound, Wyndham Lewis, and Radical Modernism*, does a very good job of teasing an implication out of *Antheil and The Treatise on Harmony*, including the passage just cited. He points to a contradiction inherent in the text and suggests the means Pound uses to resolve it; his comments allow us to deepen our understanding of Cubism's conflicted character (in both looking forward to electrotechnical art and resisting it).[365] Sherry makes his point by quoting a passage from *Antheil and The Treatise on Harmony*:

> And it is a very good sign that Antheil is annoyed with the term "architecture" when this term is applied to music…
>
> He has, in his written statements about music, insisted that music exists in time-space; and it is therefore different from any kind of plastic art, which exists all at once.
>
> Just as Picasso, and Lewis, and Brancusi made us increasingly aware of form, of form combination, or the precise limits and demarcations of flat forms and of volumes, so Antheil is making his hearers increasingly aware of time-space and the divisions of time-space.[366]

Sherry points out here that "in a single gesture, equally grandiose and self-contradictory, the author of *Antheil and The Treatise on Harmony* categori-

cally dismisses the relevance of architecture or the plastic arts to music and proceeds to describe music in just such terms—in line with the Vorticist painters' (and Brancusi's) combination of forms."[367] He also suggests that Pound generally resolves this contradiction in favour of the spatial-pictorial. He is quite right about this. Indeed, notwithstanding Pound's hyperinflated insistence that the "element most grossly omitted from treatises on harmony up to the present is the element of TIME," and that time distinguishes music from the plastic arts (which, he believed, as we have seen, exist "all at once"), he definitely conceived of time-space through the analogy of visual form. His idea of bringing harmony to time (and this applies to Antheil and Léger as well) remained within the orbit of what Bergson alleged was the (Newtonian) physicists' conception of time. Consider Pound's contrast between two types of music, in which he suggests that Vorticism relies on form and succession, not instantaneous effect:

> There are two aesthetic ideals: the Wagnerian . . . you confuse the spectator by smacking as many of his senses as possible at every possible moment; this prevents his noting anything with unusual lucidity . . . The other aesthetic has been approved by Brancusi, Lewis, the vorticist manifestos; it aims at focusing the mind on a given definition of form, of rhythm, so intensely that it becomes not only aware of that given form, but more sensitive to all other forms, rhythms, defined planes, or masses.[368]

The contrast, evidently, is between immersion and distantiation (as bad and good form respectively). But good form, in Pound's view, has the attributes of visual form and visual space (the very terms, in fact, that Marshall McLuhan uses to distinguish between visual and aural space): it involves distance as well as the clear demarcation of one element within the visual field from another (in other words, it has features antithetical to those of electrological art, as I have been discussing it). Pound, as I have noted, defined harmony as "the time interval that must elapse between one sound and another." A space—an empty space, an interval—must demarcate one element from another (the idea of an empty space, as we will see, is absolutely antithetical to the founding ideas of the electrological conception of reality).

Pound goes to an extreme in analogizing music to visual art:

> A concert in a concert-hall is a performance, a presentation, not an appeal to the sympathies of the audience. It is, or should be, as definitely a presentation or exhibition as if a performer were to bring out a painted picture and hang it before the audience. The music must have as much a separate existence as the painting. It is a malversion of art for the performer to beseech the audience (via the instrument) to sympathise with his temperament, however delicate or plaintive or distinguished.[369]

This idea that an artwork has "a separate existence" is contrary to the electrological paradigm that would become so evident in the work of the Futurists. It is also a strange notion of music. What accounts for this tendency to understand music—and new music in particular—through an analogy to visual arts? One plausible explanation has to do with the analogy between film and music that was formulated by the visual music movement. That movement, I have suggested in *Harmony and Dissent*, was motivated by the birth of the cinema and by the belief that would soon develop that film was the top art, at least for moderns.

## SHOT ANALYSIS OF *BALLET MÉCANIQUE*

I have prepared a detailed analysis (with analytical commentary) for *Ballet mécanique*, which is posted on the WLU Press website. This text offers a painstaking analysis, providing details of the mathematical structure of the work (the metrical matrix which gives form to the work) and the film's extensive use of literal repetition. The analysis confirms points in my theoretical and historical exposition.

## CONCLUSION

We noted earlier that Apollinaire offered an example of "true" creation in his preface to *Les mammelles de Tirésias*—the invention of the wheel: "Quand l'homme a voulu imiter la marche, il a créé la roue qui ne ressemble pas à une jambe" (when man wanted to imitate walking, he created the wheel, which didn't resemble a foot)—a separate and independent form is invented that captures the essence of motion, as it were, without external attributes of the propelling device.[370] That enlarged sense of imitation is central to the Cubist aesthetic: *vraisemblance*, simple realistic representation, should be avoided. Truthful painters "évitent avec soin la représentation de scènes naturelles observées et reconstituées par l'étude," because "la vraisemblance n'a plus aucune importance, car tout est sacrifié par l'artiste aux vérités, aux nécessités d'une nature supérieure qu'il suppose sans la découvrir" (carefully avoid the representation of natural scenes observed and reconstituted by study, because verisimilitude is of no importance, for all is sacrificed by the arts for truths, for the necessity of a higher nature that he undertakes to discover).[371]

The idea that truth is novelty and that novelty is truth is in line with an idea that an avid (but not philosophically meticulous) reader of Bergson's writing might venture. For Apollinaire, to apprehend truth requires an intuitive experience that penetrates beneath external appearances and participates in the inner life of the object. Bergson maintained that the artist, through a form of empathy, experiences the vital life of objects behind the apparent fixity of

objects created by the intellect. Apollinaire rejected the idea that fidelity to outward appearances would disclose objects' inner truth—he maintained to the contrary that the experience of novelty is required in order to grasp *durée*'s vital movement. An art that violates the expectations the intellect has created is more likely to engender a vitalizing experience of novelty.

This vitalization makes Cubist form a rigorous challenge to the Newtonian image of the universe, as such form is built from discrete components assembled according to mechanical principles. Cubist form offered a potent demonstration of the relativity of perception (that is, a percept that synthesizes many facets, drawing them together in an overtly unfamiliar manner, evidently could synthesize them in a different manner). However, that possibility raised the spectre of the loss of reality (the *Verschwindenkeit der Realität*). This sense of loss evoked much anxiety among the Cubists, which they attempted to counter by converting the artwork itself into an exemplary object that, in accordance with the *factum verum* principle, the artist knew through and through (this was the point of the emphasis on the constructed character of the artwork so prominent in this period). So they attempted to re-establish the certainty of the object (or, at least, the art object).

Developments in the sciences and in mathematics offer important parallels to these advances in the art world. We have noted Hermann Minkowski's formalization of Einstein's theory of relativity in terms of space-time through four mutually orthogonal vectors (or Minkowski tensors), which presented space-time through the concepts of surfaces, curves, and (geometric) projections. But underlying this formalization was Minkowski's understanding that Einstein himself understood relativity theory as a further development of electromagnetic theory. The historian of science Peter Galison points out that in a draft for an introductory lecture on complex analysis, Minkowski wrote that "physicists suspect that one day it might be possible to explain all natural phenomena purely electrodynamically so that finally there will be no matter, nothing but electricity in the world."[372] This sense that the object world was threatened by the process metaphysics fostered by the development of the science of electromagnetism was widespread. The response of the Cubists was complex: they embraced the understanding that perception is a formative process, not a passive response that mirrors reality, and they took up the challenge of incorporating dynamic form into their work; but they were loath to abandon the object. Indeed, they contrived means to make the object appear formidable and solid.

The Futurists, however, did not respond with fear to the experience of the loss of the object. On the contrary, they celebrated it as a step towards a truer metaphysics (which, we will see, would be the metaphysics of process, of the sort that Alfred North Whitehead expounded—what joined Whitehead and

the Futurists in developing this metaphysics of process was that both took the field effects very seriously). We will explore the effects of this acceptance in the next chapter.

I pointed out at the outset that Marshall McLuhan insightfully suggested that the Cubists sought a new way of seeing, one that arises from a transcendent, non-anthropomorphic viewpoint. I also suggested that McLuhan was mistaken in identifying the Cubists' quest for a mobile viewpoint that could see all around an object, all at once, with Einstein's relativity theory. He might have been mistaken in crediting the manner in which Giedion worked out the relation between Cubist form and relativity theory (the facets in an Analytical Cubist painting do *not* show the eye travelling around an object). But that is of little importance: for what he was actually celebrating was something much closer to the new media artist's belief that intelligence (and vision) is like a cloud of awareness that envelops the globe and that can see everywhere, all at once. It is like a cosmic awareness, similar to that which HCE experiences in *Finnegans Wake* II.3 (the "Earwicker's pub" section), in which magnetic links (God's voice, in Joyce's reworking) bring a higher form of knowledge (FW 309–10, concerning the radio in Earwicker's pub). In the next chapter, I explore further Futurist ideas of radio-awareness similar to those in Joyce's radio-influenced *Wake*. Suffice it to say for now that Joyce's ideas about radio-intelligence resemble views the Futurists promulgated.

I noted in the preface that humans had asked that the universe provide a home for the soul and solace for human longing. The new electrological view of humans' place in the universe pictured them as organisms within the grand organism that is the cosmos, and, often, as not very significant within the universe's majestic dynamic. Still, this status was often taken as entailing that the human mind participates in the mind of the organism. This participatory conception of consciousness was often taken as implying a psychocosmic proposition that maintains there is a deep structure common to human vitality/human thinking and the cosmos's vitality/nature's thinking (evident in the philosophy of Nikolai Fyodorov [Николай Фёдоров; Nikolaj Fjodorov, surname often Anglicized as Nikolai Federov, 1829–1903]). Even if humans are not very significant when measured against the scale of the cosmos (and even if, as seemed certain, they should not believe the universe was designed to provide them solace), they might, nevertheless, experience the intensity of the life surge, and know its wonder.

This epochal transformation, which displaced humanity from the centre of a human universe, turning it into a relatively insignificant biological phenomenon in a vast universe, altered what a work of art was conceived to be. The earliest fully worked-out theory expounding this conception of the

work of art appeared in Arthur Schopenhauer's philosophy. Schopenhauer proposed that artistic creativity evinces the inner dynamic that drives all nature. That idea influenced both the Cubists and the Futurists. We have seen that Picasso adopted it.

Writings on cinema in the era this volume deals with often emphasized that the cinema is an art in which human being had little or no role—that cinema images are products of a biocosmic life-force and (by their ability to present movement), they can impart its dynamism. An art form that devotes itself to capturing the pulse of Life is likely to accord the cinema special importance, for speed and dynamism are qualities of the cinema. Granting the cinema that importance led thinkers (artists and theorists alike) to conclude that the cinema was an especially privileged art—perhaps the top art—at least for moderns.

I also commented on a seeming anomaly—that of expounding on the role the cinema had in reshaping the artistic practices of an era during which electromagnetic thought came to dominate our new way of understanding, and talking about, the cosmos—by pointing out that there is ample evidence that in the period this book covers, the cinema was understood to be an art of electric light, whose nature associated it with Röntgen rays, perhaps the principal model of electromagnetic reality. In the next chapter, I offer further evidence to support that claim.

## Notes

1 The aerial view, as it reaches sufficient elevation, presents the world as most modernist paintings and photographs soon would, viz., as a flat, patterned surface.

2 On the matter of presenting the world as a flat, patterned surface, seen from an eagle-eye's point of view, consider the Bauhaus photographs and the post-Bauhaus films of Moholy-Nagy.

3

> You are tired at last of this old world
>
> O shepherd Eiffel Tower the flock of bridges bleats at the morning
>
> You have had enough of life in the Greek and Roman antiquity
>
> Even the automobiles here seem to be ancient
> Religion alone has remained entirely fresh religion
> Has remained simple like the hangars at the airfield
> You are weary at last of this ancient world
>
> You alone in all Europe are not antique O Christian faith
> The most modern European is you Pope Pius X
> (Guillaume Apollinaire, *Alcools*, in Apollinaire, *Selected Writings*, trans. Roger Shattuck [New York: New Directions, 1971], 117; the French appears on the facing page, 116)

Readers may want to compare the above with Anne Hyde Greet's canonical translation in *Alcools* (Berkeley: University of California Press, 1965), and with a newer

translation, by Donald Revel, that highlights the mixture of literary and vernacular languages (another means by which Apollinaire reconciled tradition and innovation). For Revel's translation, see *Alcools: Poems by Guillaume Apollinaire* (Middleton: Wesleyan University Press, 1995). However, the combination of precision in capturing the meaning of the individual phrases of Apollinaire's poem and its idiomatic fluency recommends Shattuck's translation for our purposes.

4 Guillaume Apollinaire, "L'anti-tradition futuriste: Manifeste synthèse"; emphases here follow those in the original. This tract was created by Apollinaire in collaboration with *Lacerba* and Ricciotto Canudo journal *Montjoie!*, which served as an unofficial organ of the Orphists. *Lacerba* and *Montjoie!* helped with the design and layout of this tract, whose typographical adventurousness and cryptic humour surpassed that of any text by Marinetti. The piece was finished on 29 June 1913 and published, in Italian, in *Lacerba* 1, no. 18 (15 September 1913): 2–3; it appears in translation in *Futurism: An Anthology*, ed. Rainey et al. (New Haven: Yale University Press, 2009), 152–54 at 153. Some literary historians take the tract (as I do) to be a parody of Marinetti & Co.'s manifestos. One reason why is that Apollinaire's *Méditations esthétiques: Les peintres cubistes* appeared in March of that year, and it contends that Cubism is modernism's central phenomenon and defining style. That work even understands all other styles through their relation to this central fact (which was the book's most controversial feature). Apollinaire offers four trends (he had proposed these categories previously, in his lecture "The Quartering of Cubism"): "Scientific Cubism" (Picasso, Braque, Gris, Metzinger, and Marie Laurencin [1883–1956]); "Physical Cubism" (with its single representative, Henri Le Falconnier [1881–1946]); "Orphic Cubism" (Scientific Cubism aside, the best known and most widely accepted of the four trends, represented by Delaunay, Léger, Francis Picabia, and Marcel Duchamp); and "Instinctive Cubism" (André Derain [1880–1954], late Cézanne, and, seemingly, other European painters, whom Apollinaire does not identify).

Apollinaire was not alone among French artists in producing a purportedly Futurist manifesto. Weeks after he finished his tract, the painter Félix Del Mare (1889–1952), who had shared a studio with Gino Severini in Paris in 1913, produced "Contra Montmartre: Manifeste futuriste" (Against Montmartre: Futurist Manifesto), published in *Comœdia*, 15 July 1913 (Del Mare condemned Montmartre as a "vieille lèpre romantique"). Del Mare also painted the remarkable canvas *Le port* during the winter of 1913–14, inspired by Severini's *Souvenirs de voyage* (1911), a work inspired by hearing about Bergson yet reminiscent of Picasso's *Souvenir du Havre* (Souvenir of Le Havre, 1912). (The Severini impressively integrates Cubist and Futurist elements into a document of consciousness.)

5 "It is not a decorative art any more than it is an Impressionist art. It is a study of external and internal nature and is full of ardour for the truth." The statement appears in Apollinaire's lecture, "L'esprit nouveau et les poètes," reprinted in *Œuvres complètes*, ed. Michel Decaudin (Paris: A. Balland et J. Lecat, 1965–66), 948–49.

6 Hans-Robert Jauss, "1912: Threshold to an Epoch. Apollinaire's *Zone* and *Lundi Rue Christine*," trans. Roger Blood, *Yale French Studies* 74: 39–66 at 41. In original German: *Sitzungsberichte der Heidelberger Akademie der Wissenschaften* 1 (1986).

7 Ibid., 42.

8 Ibid., 43.

9

Icarus Enoch Elijah Apollonius of Tyana
Flutter around the original airplane
They separate occasionally to give passage to those whom the Holy Eucharist carries up

Those priests who rise eternally in lifting the host
The airplane lands at last without folding its wings
The sky fills up then with millions of swallows
(in Apollinaire, *Selected Writings*, trans. Shattuck, 118–19)

10

In a flash crows falcons and owls arrive
Ibis flamingoes and marabous arrive from Africa
The great Roc celebrated by story tellers and poets
Glides down holding in its claws Adam's scull the first head
The eagle rushes out of the horizon giving a great cry
From America comes the tiny humming-bird
From China have come long supple pihis
Which have only one wing and fly tandem
Then the dove immaculate spirit
Escorted by the lyre bird and the ocellated peacock
The phoenix that pyre which recreates itself
Veils everything for an instant with its glowing coals
Sirens leaving their perilous straits
Arrive all three of them singing beautifully
And everything eagle phoenix and Chinese pihis
Fraternize with the flying machine
(Ibid., 118–21)

11 Jauss, "1912," 43–44.

12

Now you walk through Paris all alone in the crowd
Herds of bellowing busses roll by near you
The agony of love tightens your throat
As if you could never be loved again
If you were living in olden days you would enter a monastery
You are ashamed when you catch yourself saying a prayer
You ridicule yourself and your laughter bursts out like hell fire
The sparks of your laughter gild the depths of your life
It is a picture hung in a sober museum
And sometimes ou go to look at it closely
Today you walk through Paris the women are blood-stained
It was and I would prefer not to remember it was during beauty's decline
(Ibid., 121)

13 From an interview with Pierre Albert-Birot, "Les tendences nouvelles," in *SIC* (*Son Idées Couleurs*) 8–10 (August–October 1916): 1, *apud* Standish D. Lawder, *The Cubist Cinema* (New York: NYU Press, 1975), 73.

14 Original in F.T. Marinetti, "Distruzione della sintassi—Immaginazione senza fili—Parole in libertà" (Destruction of Syntax—Imagination Without Strings—Words-in-Freedom); originally published as an independent leaflet in Italian in May 1913 and then presented as a lecture by Marinetti at the Galerie la Boétie on 22 June 1913; reprinted in Marinetti, *Teoria e invenzione futurista*, 2nd ed. (Milan: A. Mondadori, 1983), 65–80 at 65–66. Translated as "Destruction of Syntax—Radio Imagination—Words-in-Freedom," in *Futurism: An Anthology*, ed. Rainey et al., 143–51 at 143.

Rainey and colleagues translate "Immaginazione senza fili," as radio imagination: taking "senza fili" (wireless) to refer to a radio is one possible reading. However, the

"Senza fili" section of the manifesto begins with the words "Per immaginazione senza fili, io intendo la libertà assoluta delle immagini o analogie, espresse con parole slegate e senza fili conduttori sintattici e senza alcuna punteggiatura" (By imagination without strings, I mean the absolute freedom of images or analogies, expessed with unbound words and with no strings of syntax and no punctuation) (138). And that really doesn't sound like a radio.

15 "Risposta alle obiezioni" first appeared as an independent manifesto in August 1912; it appears in an English translation in *Futurism: An Anthology*, ed. Rainey et al., 125–29 at 127.

16 Henri Bergson, *Creative Evolution*, trans. Arthur Mitchell (New York: Henry Holt and Company, 1911; New York: Modern Library, 1944), 328.

17 Ibid., 332.

18 Jacques Rivière, "Sur la tendance actuelle de la peinture," *Revue d'Europe et d'Amérique*, March 1912, 384–406. In English: part of the text appears as "Present Tendencies in Painting," in *Art in Theory 1900–1990: An Anthology of Changing Ideas*, ed. Charles Harrison and Paul Wood (Oxford: Blackwell, 1993), 184.

19 Albert Gleizes and Jean Metzinger, *Cubism* (London: Fisher Unwin, 1913); excerpted in Herschel B. Chipp, *Theories of Modern Art: A Source Book by Artists and Critics* (Berkeley: University of California Press, 1968), 208–9.

20 Northrop Frye, *The Educated Imagination* (Montreal: CBC Enterprises, 1963), 4.

21 Ibid., 91.

22 Ibid., 15.

23 Ibid., 19. He also made this comment, which is in the same vein: "Archetypal criticism is that mode of criticism which treats the poem, not as an imitation of nature, but as an imitation of other poems. It studies conventions and genres, and the type of recurrent imagery which connects one poem with another." Frye, "Forming Fours" (review and commentary on two books by Carl Gustav Jung, *Two Essays on Analytical Psychology* and *Psychology and Alchemy*), first published in *Hudson Review* 6 (Winter 1954): 611–19; collected in Frye, *The Educated Imagination and Other Writings on Critical Theory 1933–1963*, ed. Germaine Warkentin (Toronto: University of Toronto Press, 2006), 203–13 at 209.

24 Frye, *The Educated Imagination*, 40.

25 Ibid., 42.

26 Picasso obsessively reworked paintings by Édouard Manet and Diego Velázquez (1599–1660)—in particular Velázquez's complex and riddling painting of 1656, *Las Meninas*, which embodies a veritable philosophy of art—and deemed Manet the "painter of painters."

27 Cézanne used multiple viewpoints in his work, but Braque so extended this mode of construction that it took on a completely new character. (This is an example of the truth of the claim of the dialecticians that quantitative change, raised to a high enough degree, becomes qualitative change.)

28 From Albert Gleizes and Jean Metzinger, *Cubism*; excerpted in Chipp, *Theories of Modern Art*, 216.

29 Huntley Carter, *The New Spirit in the Cinema* (London: H. Shaylor, 1930), 54–55; Lawder quotes this passage (73–74), but I have introduced corrections.

30 This issue is taken up in Wilfrid Sellars's renowned piece, "Philosophy and the Scientific Image of Man," in *Empiricism and the Philosophy of Mind* (London: Routledge and Kegan Paul, 1963), 1–40 (originally presented as a two-part lecture at the University

of Pittsburgh in 1960). His emphasis in the piece is on consciousness and its relation to neuro-processes and, fundamentally, particles in motion. He distinguishes between two images of the world and of a human being. The *manifest* image depicts the world as made up of persons and things; it is structured by the framework through which we ordinarily experience, understand, and explain the world. The *scientific* image is the world as it is described by sciences—its structuring principles derive from the events and entities that science deems foundational. Sellars sees these two images as being in irreconcilable conflict, and he considers this conflict to be among the pressing philosophical issues of the time.

Sellars writes that the scientific image is far superior and must come to replace the manifest image. Thus, in the end, he argues for a position that aligns itself with Platonism and, more recently, with the Absolute Idealist: "manifest objects are 'appearances' to human minds of a reality which is constituted by systems of imperceptible particles" (26).

I think that Sellars is absolutely right in sensing that the conflict between the two world-pictures is a key philosophical issue, but I think the solution he proposed—of discounting the experienced world in favour of entities and processes posited by reason—reflects exactly the faith that this era has lost (indeed, that it lost at the beginning of the twentieth century). Unfolding my understanding of the crisis of an irreconciliable conflict between these two world-pictures is the purpose of this section of the book.

As further confirmation of the importance the era attached to that problem, I point out that Arthur Eddington's similar description, in *The Nature of the Physical World* (1928), of two tables—the table as ordinarily experienced and the table as described by science—captured the imagination of a generation.

31 The conception of secondary properties, accepted both by rationalists and by empiricists in the seventeenth century, implies this same distinction (between the world as it is and the world as we experience it), for a secondary quality is one that we know only through how a thing affects us (by its warmth or coldness, by its colour), and not as it is itself (for both warmth and colour are simply vibrations).

32 I adopt the term index from C.S. Peirce's theory of semeiosis, which posits, basically, that a signifier is bound to its referent by a cause–effect relationship.

33 Among those who proposed the analogy between photography and ectoplasm was the English cleric and Spiritualist William Stainton Moses (1839–1892).

34 An excellent presentation of these ideas is Sabine Flach, "Experimentalfilme sind Experimente mit der Wahrnehmung, oder Das Sichtbarmachen des Unsichtbaren. Visualisierungstechniken im künstlerischen Experiment am Beispiel der Arbeiten von Leopold Survage, Viking Eggeling und Walter Ruttmann für die UfA," in *Jahrbuch zur Kultur der Weimarer Republik*, vol. 9, ed. Sabine Becker (Munich: Text und Kritik, 2005), 195–221.

35 This issue is of crucial importance to the idea of the spiritualized machine (or, more accurately, the machine become *geistig*).

36 Gottfried Benn, "Beitrag zur Geschichte der Psychiatrie," *Die Grenzboten: Zeitschrift für Politik, Literatur und Kunst* 69 (1910): 92–95; collected in Benn, *Sämtliche Werke*, vol. 3, pt. 1, ed. Gerhardt Schuster (Stuttgart: Klett-Cotta, 1987), 7–13; and in Benn, *Gesammelte Werke*, vol. 1, pt. 4, ed. Harald Steinhagen (Wiesbaden: Limes, 1977), 415–22 at 417. This passage is discussed in Sabine Flach, "Thinking about/on Thinking: Observations on the Thought Photography of the Early Twentieth Century," *Configurations* 18, no. 3 (Fall 2010): 441–58 at 441–42.

37 Ralph Waldo Emerson, "Experience," in *The Portable Emerson*, ed. Carl Bode and Malcolm Cowley (New York: Penguin Books, 1981), 266–94 at 284.

38 In "Through Theatre to Cinema," Sergei Eisenstein describes a piece he worked on that merged the dynamics of the metropolis with the "helplessness of an individual at the mercy of the 'big city'" by creating movable panels depicting the urban environment and attaching them to actors/characters. The idea of mechanically fusing humans and their environment is echoed in the composition and structure of *Stachka* (*Strike*). See Eisenstein, *Film Form*, trans. and ed. Jay Leyda (New York: Harcourt Brace, 1949), 14–15.

39 The *camera obscura* was known in the Arab world from 1038 on. The first known description is by Ibn al Haytham—his description, attributed to Alhazen (a Europeanization of the Arabic name), appeared in Latin translation in Basel in 1572, under the title *Opticae Thesaurus*.

40 Paul Cézanne, "Letter to Emile Bernard," collected in *Cézanne's Letters*, 4th ed. (revised and expanded), trans. and ed. J. Renwald (Oxford: Bruno Cassirer, 1976), 300–301; excepts reprinted in *Art in Theory 1900–1990*, ed. Harrison and Wood, 37.

41 The group's name, Les Fauves, was the result of Matisse's appropriating as an honorific a phrase from the critic Louis Vauxcelles: the group's works were exhibited in a room with paintings by Donatello, and Vauxcelles described the effect as "Donatello au milieu des fauves!" (Donatello among the wild beasts). Donatello here was used as a paradigm of Renaissance serenity, grace, and harmony.

42 Spain had long been culturally detached from the rest of Europe and maintained its contacts with Africa, with Semitic cultures, and with New Spain.

43 The year when the sculptures from Osuna were first exhibited in Paris (and when Picasso first saw them) is often given as 1906, following John Goulding's article "The *Demoiselles d'Avignon*" *Burlington Magazine* 100, no. 662 (May 1958): 155–68, which first connected Picasso's interest in those relief-sculptures, his fascination with the pieces from Cerro de los Santos he briefly (and illicitly) possessed, and *Les demoiselles d'Avignon*. However, Maria Luisa Cantoni has shown the Osuna sculptures were first shown at the Louvre in 1904. M.L. Cantoni, "Paris 1904: Picasso, 'Iberico' e le *Demoiselles d'Avignon*," *Bollettino d'arte* 62–63 (July–October 1990): 117–30.

44 Hilton Kramer, "Reflections on Matisse," in *The Triumph of Modernism: The Art World, 1985–2005* (Chicago: Ivan R. Dee, 2006), 162–63.

45 An interest in the dynamics of vision, the belief that visual perception is understood by considering its development over time, and the conviction that anticipation and recollection are built into every visual percept—that there is no such thing as immediate, punctate vision, for the past and possible futures affect every visual percept—are factors that could prompt one to take up the cinema. For the cinema is a dynamic medium, and the events that occur within a film have a past and future. Léger accepted such beliefs, and they no doubt influenced his decision to make a film.

46 Cézanne, "Letter to Émile Bernard," in *Cézanne's Letters*, 316.

47 In referring to the technique of circumscribing the contours of a form with a black line, Cézanne alludes to the *cloisonniste* technique, which was developed independently by Vincent van Gogh and Cézanne's correspondent Émile Bernard and carried furthest by Paul Gauguin (who gets most of the credit for it). *Cloisonnisme,* so named for its similarity to cloisonné enamels, was a style of painting that relied on the use of strong, flat forms in hard, flat colours outlined by strong black or blue contours to separate areas of local colour.

48 Antonio Federighi's sketch, from 1450, is a classic example—and is interesting for offering five forms to represent *The Three Graces*.

49 A drawing of 1905, *La Lola*, reveals how much Picasso's method owed to the theme of the Three Graces.

50 Leo Steinberg, "The Algerian Women and Picasso at Large," in *Other Criteria: Confrontations with Twentieth Century Art* (New York: Oxford University Press, 1972), 191. There is a basis for Steinberg's remark about the diagrammatic basis of Picasso's methods. The art dealer Leo Stein (Gertrude Stein's brother) offers the following remarks about Picasso's interest in mathematical realities in Analytical Cubism's earliest days:

> There was a friend of the Montmartre crowd, interested in mathematics, who talked about infinities and fourth dimensions. Picasso began to have opinions about what was real and what was not real, though as he understood nothing of these matters, the opinions were childishly silly. He would stand before a Cézanne or a Renoir picture and say contemptuously, "Is that a nose? No, this is a nose," and then would draw a pyramidal diagram. "Is this a glass?" he would say, drawing a perspective view of a glass. "No, this is a glass," and he would draw a diagram with two circles connected by crossed lines. I would explain to him what Plato and other philosophers meant by "real thing" [*sic*] were not diagrams, that diagrams were abstract simplifications and not a whit more real than things with all their complexities, that Platonic ideas were worlds away from abstractions and couldn't be pictured, but he was bent now on doing something important—reality was important whatever else it might be, and so Picasso was off. (Stein, *Appreciation: Painting, Poetry and Prose* [New York: Crown, 1947], 175–76)

51 Regarding the cinema's connection to seeing an object simultaneously from different points of view—and this goes to the topic of why the cinema was seen as exemplifying the new *epistémè* —think of a cut as an instantaneous change of viewpoint. Then think of a series of very short shots (four or five frames each, though at the limit, a singe frame), showing an object or small number of objects from slightly different points of view. One would have a sequence that resembles some of those in Léger's *Ballet mécanique*. Moholy-Nagy was interested in what I have been calling multi-perspectivism (and the idea of "space-time" that is its scientific counterpart), and like Giedion and McLuhan, he linked multi-perspectivism with movement. He argued insistently that painting, sculpture, architecture, and music (along other art forms) all aspire to reproduce "vision in motion"; he also maintained that the issues of "vision in motion" had been made more urgent with the rise of the concept of space-time. He connected "vision in motion" to the increasing importance of electricity and electronics in artmaking.

László Moholy-Nagy was deeply interested in photography and film, and he recognized that technology was creating a *neues Sehen* (a new way of seeing). He remarked, "In our age of airplanes, architecture is viewed not only frontally and from the sides, but also from above—vision in motion. The bird's-eye-view and its opposites, the worm's and fish-eye-views, have become a daily experience. Architecture appears no longer static but, if we think of it in terms of airplanes and motorcars, architecture is linked with movement." Moholy-Nagy, *Vision in Motion* (Chicago: Paul Theobald, 1947), 244–45. Moholy-Nagy recognized that sculpture and painting would have to submit to being reformed by the cinema (and more generally by the *neues Sehen* that photographic technology was producing).

52 I sometimes use the terms a "conceptual" or "higher form" of apprehension rather than multi-perspectivism to avoid any suggestion that the fractioning of objects suggests seeing the part-object from a particular point of view.

53 Here readers might recall the annoyance the protagonist in *Stephen Hero* expresses over a thesis advanced by the Enlightenment aesthetician and literary critic Gotthold Ephraim Lessing (1729–1781). Lessing rejected the Horatian *ut pictura poesis* claim in *Laokoön oder Über die Grenzen der Malerei und Poesie* (Laocoön: An Essay on the Limits of Painting and Poetry, 1766). The force of his argument elevated to common acceptance the distinction between the arts of space and the arts of time. Lessing used that distinction to argue that the forms and devices of the temporal arts should not imitate those of the spatial arts, and vice versa. Joyce's protagonist, Stephen Hero, complains that the extravagant abstractions of Lessing's *Laocoön* irritated him. In *Portrait of the Artist as a Young Man* (serialized 1914–15, 1916), Joyce has Stephen celebrate as the highest value of an artwork its *integritas*.

Lessing's position still maintained something of its hold at the beginning of the Cubist era. But Cubist artists sided with Stephen Hero, launching a critique on Lessing's thesis that was couched in the very terms Stephen Hero/James Joyce hinted at, viz., they were skeptical of wild overgeneralizations regarding the differences among the arts.

Joseph Frank delineated that ways in which writers were challenging the idea that literature is purely a temporal art in his famous article "Spatial Form in Modern Literature." In it, he starts with the Imagist movement, and Pound's much-cited definition of an image as "that which presents an intellectual and emotional complex in an instant of time." Frank maintains that that definition has cardinal importance in modern literature:

> An image is defined not as a pictorial reproduction, but as a unification of disparate ideas and emotions into a complex presented spatially in an instant of time. Such a complex is not to proceed discursively, according to the laws of language, but is rather to strike the reader's sensibility with an instanteaneous impact. Pound stresses this aspect by adding, in a later passage, that only the instantaneous presentation of such complexes gives "that sense of sudden liberation; that sense of freedom from time limits and space limits; that sense of sudden growth, which we experience in the presence of the greatest works of art." (Frank, *Swanee Review 53*, no. 1 [January–March 1945]: 221–40 at 226. Frank's in essay, which has an immense bearing on many of the topics of this book, appeared in three parts in the *Swanee Review*, the other two parts being 52, no. 2 [April–June]: 433–56; and 53, no. 4 [October–December]: 643–53)

That sense of sudden liberation, freedom, and growth to which Pound was alluding truly was abroad. The July 1910 issue of *Camera Work* (a photography journal published by Alfred Stieglitz [1864–1946]) contained an article by Max Weber (1881–1961), an American painter who had lived in Paris from 1905 to 1908 (just as the Cubist movement was getting under way) and who was one of the first Americans to adopt the Cubist method. In that article, "The Fourth Dimension from a Plastic Point of View," Weber defined the fourth dimension phenomenologically: "In plastic art, I believe, there is a fourth dimension which may be described as the consciousness of a great and overwhelming sense of space-magnitude in all directions at one time, and is brought into existence through the three known measurements." The feeling conveyed is that of being lifted out of the limited world, in which events unfold in time, to a realm of utter timelessness and wholeness—it is an experience of everything, all at once. Weber's description of the fourth dimension captures exactly what (I believe) most artists in this period meant by it. They also gave a mystical interpretation to that ecstatic experience.

54 It is quite likely that Apollinaire, in real life a gourmand with a pear-shaped figure, is the red clown near the centre of Picasso's painting *La famille de saltimbanques* (Family of Saltimbanques, 1906), that André Salmon is the tall acrobat, Max Jacob the young boy, and Fernande Olivier the woman in the hat. Every artistic genius needs a knowing and understanding figure to keep him or her grounded—to be a mirror-face (like that of the mother for the infant) that is at once approving and knowing. Early-twentieth-century art was such an upheaval that really only artists—and generally strong artists—could play that role for their genius friends. Apollinaire, a very strong artist, played that mirror-role for the genius Picasso.

The saltimbanque was a common theme among Neo-Impressionists and Post-Impressionists, largely because of the saltimbanque's similarity to the artist-as-outcast. Georges Seurat (1859–1891) produced a superb example, *Parade de cirque* (Circus Sideshow, 1887–88). The family of saltimbanques was a common enough theme in late-nineteenth-century art: Honoré Daumier's (1808–1879) painting *Wandering Saltimbanques* (ca. 1847–1850) has remarkable parallels to Picasso's *La famille de saltimbanques*.

55 Quoted in Roger Shattuck, *The Banquet Years: The Origins of the Avant-Garde in France, 1885 to World War I* (London: Faber and Faber, 1958), 294.

56 As we have seen, Apollinaire made that theme explicit right at the beginning of "Zone."

57

> It is God who died on Friday and rose again on Sunday
> It is Christ who soars in the sky better than any aviator
> He breaks the world's altitude record
> Christ the pupil of the eye
> Twentieth pupil of the centuries he knows how
> And turned into a bird this century rises in the air like Jesus
> The devils in their abysses lift their heads to look at it
> (Apollinaire, *Selected Writings*, 118–19)

58 Guillaume Apollaire, *Méditations esthétiques: Les peintres cubistes, première série* (Paris: E. Figuière, 1913. Reprinted, Geneva: Pierre Cailler, 1950), 11.

59

> Now you are on the shore of the Mediterranean
> Under the lemon trees which blossom all year
> With your friends you take a boat ride
> One from Nice one from Menton and two from Turbie
> We look down in fear at the octopodes on the bottom
> And amid the algae swim fish images of our Saviour
> You are in the garden of an inn on the outskirts of Prague
> And feel completely happy a rose is on the table
> And instead of writing your story in prose you watch
> The rosebug which is sleeping in the heart of the rose
> (Apollinaire, *Selected Writings*, 120–23)

60 The relation between denotative and exemplificatory aspects of the painting changes throughout the period. Thus, while *Femme assise* (Seated Woman, 1909) so emphasizes the dynamic interplay of monumental volumes that it all but obscures any characterization of its subject, *Portrait d'Ambroise Vollard* holds the intellectual and formal concerns of its architecture in equilibrium with the emotional and human interests in its subject.

61 John Golding, "Cubism," in *Concepts of Modern Art*, ed. Tony Richardson and Nikos Stangos (Harmondsworth: Penguin Books, 1974), 62.

62 This radicalization of Cézannesque *passage* provides the basis for Gertrude Stein's use of anacoluthon in her Cubist period.

63 This explains the young Mondrian's interest in the oval and diamond formats.

64 At the same time, Picasso, following Braque's lead, was experimenting with musical forms as a way organizing the many elements into which he had dissolved his theme. We see this in *L'accordéoniste* (Accordionist, summer 1911). Like other paintings by Picasso from this year, the composition does seem baffling, until one picks out first the hands and the keys on the accordion (near the centre and towards the bottom of the painting). The keys provide visual representation of the structure of music, so the combination of components allows Picasso to propose a musical form for the painting (no Lessingesque boundaries between painting and music here).

Braque was deeply in love with music (and in particular with J.S. Bach's compositions), and I think he led the way towards integrating musical elements and musical instruments into his paintings (many musical instruments have simple, schematizable shapes and are immediately recognizable, especially by music lovers—they can serve as *points de capiton* showing us that our love helps attach us to the real). But Picasso went from there to recognizing the possibility of combining the welter of individual forms into an all-encompassing musical form. Picasso was a competitive artist: it was psychologically important to him to keep his status as the master.

65 Max Kozloff, *Cubism/Futurism* (New York: Charterhouse, 1973), 55.

66 Daniel-Henry Kahnweiler stated this in his *Der Weg zum Kubismus* (Munich: Delphin-Verlag, 1920); that work is cited, in the context that I have presented it, in Golding, "Cubism," 63.

67 The original remark is recorded in Louis Aragon, "La peinture au défi" (Painting to the Challenge), in *La peinture au défi* (Lille: Librarie Godon, 1930), preface to the catalogue of an exhibition of collages at the Galerie Goemans, Paris, March 1930. The remark is cited in Golding, "Cubism," 65.

68 Françoise Gilot and Carlton Lake, *Life with Picasso* (New York: McGraw-Hill), 71–72. Note that the remark makes explicit a theme of this volume, that a sense of loss of certainty about perception's grasp on reality had created considerable consternation—and one of the purposes of Cubism (which is in keeping with McLuhan's pronouncements about the value of art) was to help prepare the nervous system to accommodate this reality.

69 Golding, "Cubism," 68.

70 Ibid., 68; emphasis in original.

71 Gertrude Stein, *Autobiography of Alice B. Toklas* (New York: Vintage Books, 1960), 111.

72 Kozloff, *Cubism/Futurism*, 46–47.

73 The poem would appear subsequently, in the *New Freewoman* on 15 August 1913 and in books (starting with the Elkin Mathews edition of *Lustra* [1916]), with more conventional spacing (and at times a semicolon replaced the colon at the end of the second line):

> IN A STATION OF THE METRO
> The apparition of these faces in the crowd:
> Petals on a wet, black bough.

There is still some question which format Pound preferred, the one with the typewriter-era spacing or the conventional spacing.

74 The appearance of chair caning did not result from using real cane, but rather a simulacrum—an image of caning, on oilcloth. So the representing token is not made of the same material as the object it represents.

The integration of elements in this work depends on Picasso's use of linear forms, for the linearity of the still-life objects (emphasized by the shaft of light that impales the painted "U") fits well with the straight lines formed by the caning.

75 This remark was first published in *Der Querschnitt* 1–2 (1925): 77–78; cited in John Golding, "Cubism," in *Concepts of Modern Art*, ed. Richardson and Stangos, 74. To indicate the range of work that Juan Gris could reflect on, I point out that Gris's Synthetic Cubist phase started later than did parallel phases in Braque's and Picasso's careers, appearing only in late 1913 and reaching its apogee in the years between 1921 and his death in 1927.

76 Juan Gris, attributed to Vauvrecy (ordinarily a pseudonym used by Amédée Ozenfant) in an untitled statement, *L'ésprit nouveau* 5 (Paris: 1921): 533–34; cited in Golding, "Cubism," 75. *L'ésprit nouveau* was the Purist journal, founded by Amédée Ozenfant and Le Corbusier in 1920, which continued publishing until 1925.

77 To be sure, the Cubists had precedents for this in Matisse's *Nature morte aux oranges (II)* (Still Life with Oranges [II], ca. 1899), and in Cézanne's painting—for example, his *Les grandes baigneuses* (Large Bathers, 1906). Cézanne was as important an influence on Synthetic Cubism as he was in Analytic Cubism. But taking the broader view, we can discern many examples from van Gogh and the Fauves whose features influenced Synthetic Cubism.

78 Characteristically, it was Marcel Duchamp (here Duchamp-as-member-of-the-Puteaux-circle-aligned-with-Cubism, not Duchamp-the-Dadaist) who saw the most radical possibilities in leaving an expanse of the canvas exposed, to create an interaction between the material support of the painting and the painting itself (indeed, he saw the possibility of sublating the opposition between the two). The quasi-Cubist work in which he took the exploration of that possibility to its furthest extreme is *À propos de jeune sœur* (Concerning a Little Sister, 1911). Nearly the entire right-hand side of the canvas is left exposed—it is offered as a ground interacting with applied colour. Here space itself is charged, and shapes the forms applied to it. I will show anon that this is the conception of space in electromagnetic theory.

79 One might have expected the Cubists to be ardent admirers of Bergson. In fact, they did refer to his writings (and somewhat more frequently after the 1912 exhibition of Futurist paintings at Galerie Bernheim-Jeune), but their references to him are remarkably few—for example, Metzinger uses the Bergsonian terms "duration" and "intuition," though he does not explicitly connect them with the philosopher. A scan through the compendious *Cubism Reader* assembled by Mark Antliff and Patricia Leighten will prove the paucity of mentions of Bergson prior to the Bernheim-Jeune exhibition.

80 Umberto Boccioni, Carlo Dalmazzo Carrà, Luigi Russolo, Giacomo Balla, and Gino Severini, "La pittura futurista: Manifesto tecnico" (April 11 1910). Originally published as a leaflet by *Poesia*, Milan; collected in Boccioni, *Gli scritti editi e inediti*, ed. Zeno Birolli (Milan: Feltrinelli, 1971), 7–11 at 7.

81 Matei Calinescu, *Five Faces of Modernity* (Durham: Duke University Press, 1987), 5.

82 Northrop Frye, in *The Great Code: The Bible in Literature* (Toronto: Academic Press Canada, 1981), points out that a recurrent pattern in the Bible is the story of people seeking, and finding, a home (seeming to attain their supra-historical destiny) only to

find themselves cast down again into the bondage of history, or historical time. This pattern helped shape our views on time and history. We see here that it persists in the postmodern epoch.

83 Besides Fernand Léger, the Salon Cubist painters included Henri Le Fauconnier (1881–1946), who can be considered their leader, Jean Metzinger (1883–1956), Albert Gleizes (1881–1956), Robert Delaunay (1885–1941), Juan Gris (1887–1927), and Jaques Villon (1887–1965). These painters were influenced by the early (1908–11) Cubist paintings of Pablo Picasso and George Braques, but retreated from the threat of the loss of the object it posed. Their response to the threat was to produce paintings with clear, geometrically rendered figures that are somewhat simplified in comparison with those in Picasso's and Braque's works and that have a less ambiguous relation to the background. Moreover, they sometimes have a discursive purpose.

84 Robert Delaunay, "Light" (1912), in *The New Art of Color: The Writings of Robert and Sonia Delaunay*, trans. David Shapiro and Arthur Cohen ed. Cohen (New York: Viking Press, 1978), 81–84.
Re. "a species of mechanism . . . no relation to our perception of the visual movement in the Universe." Here Delaunay invokes the opposition between the mechanism and vitality.
Re. "resemble *the Object conceived geometrically*." This conception of time resembles the number line, with integers laid out on it *more geometrico*.
Re. "of a *practical order*." Delaunay connects the scientific conception of time to utility.
Re. "*the track's evenness*." Such a succession of identical elements is at odds with the continual coming on of novelty, one of the hallmarks of life-philosophies of all stripes.
Re. "depth, and therefore rhythm, become impossible." Here Delaunay invokes the traditional distinction between meter and rhythm, associating the former with mechanism, the latter with vitality. Auditory perception is mechanical.
Re. "comprehension [of the] good." Delaunay calls upon the Platonic idea that vision is the highest sense.
Re. "passes judgement on our soul." Our *geistig* abilities can be assessed by their power to convey the world's vitality.

85 To be sure, there are many specific versions of what here we are generically referring to as simultaneism. An interesting article by Chris Townsend offers precisions on the differences among the Futurist *simultaneità*, Robert Delaunay's *simultanéisme*, and Apollinaire's *simultanéité*. See Townsend, "The Individual and the Crowd in Modernity: Henri-Martin Barzun's Modulation between the Abbaye de Créteil and Futurism," in *International Yearbook of Futurism Studies, 2012,* ed. Günter Berghaus (Berlin: De Gruyter, 2012).

86 Raoul Hausmann, "PRÉsentismus [*sic*]: Gegen des Puffkeïsmus der teutschen Seele" (1920), *De Stijl* 4, no. 9 (September 1921): 136–42. It was originally written in German, and appeared as a separately printed article, likely self-published, under that same title. An excerpt appears in translation in *Manifesto: A Century of ISMs*, ed. Mary Ann Caws (Lincoln: University of Nebraska Press, 2001), 164. Caws does not state that what is published there is only an excerpt.

87 The Du Pont family were famously reactionary. More particularly, they were often associated with conservative anti-democratic tendencies: 1906 saw broken a long legislative impasse that had resulted from the stubborn candidacy of the more liberal office seeker John Edward Addicks, when Henry du Pont was seated in the US Senate (Addicks and du Pont had been vying for the same seat). The means of breaking the impasse was for

both to assume seats. For years after that, the Senate seat for Delaware remained in the Du Pont family. Many saw that solution as a corruption of the democratic process in which Du Pont's wealth had primary culpability.

88 In Hausmann, "Manifesto of PREsentism," excerpted in Caws, ed., *Manifesto*, 164. Subsequent passages by Hausmann in the next three pages are from the same source. Caws somehow overlooked the fact that the original German text was printed and issued (she states it went unpublished); consequently, she used the French publication as the basis for the translation.

89 Among these philosophers were Philo of Alexandria (ca. 20 BCE–ca. 50 CE), who was probably the most renowned exponent of the belief. It was later embraced by Augustine (354–430), Boethius (ca. 480–524 or 525 AD), and Duns Scotus (ca. 1266–1308).

90 Bergson, *Creative Evolution*, 39.

91 Gilles Deleuze, *Le pli: Leibniz et le baroque* (Paris: Minuit, 1988).

92 In 1915, Hausmann met the journalist-philosopher Salomo Friedlaender, a.k.a. Mynona (1871–1946), who at this time was still committed to the Grotesk; and in the same year, he met the philosopher Ernst Marcus (1856–1928), who claimed to be thoroughly intimate will all aspects of Kant's philosophy.

Even before meeting the two philosophers, Hausmann had published two essays in *Der Sturm*; but meeting the two philosophers swayed him to turn his attention to theory and to publishing theoretical tracts (in Franz Pfernpferd's *Die Aktion*, Franz Jung und Richard Oehring's *Die freie Strasse* [The Free Street], Paul Westheim's *Die Kunstblatt* [The Art Paper], Anselm Ruest and Salomo Friedlaender's *Der Einzige* [The Only One], and Walther Rilla's *Die Erde* [The Earth]). Thus, he became the Dadasoph, and Berlin DADA's most important theoretician.

93 The complimentary closing reflects Hausmann's (and Berlin DADA's) hard-left orientation, which otherwise might have been obscured by the religious lexicon of the piece: to attack eternity is to attack power, while to advocate the importance of the individual is to advocate for liberty. What this tells us, of course, is that he considered the vital force to be an emancipatory cosmic force, in the sense that to be on the side of freedom is to be aligned with history's/reality's forward thrust.

94 Lord Salisbury (Lord Robert Cecil, Robert Arthur Talbot Gascoyne-Cecil, 3rd Marquess of Salisbury), quoted from a speech in Anon, "The Institution of Electrical Engineers," *Nature* 41 (7 November 1889): 22; the text also appears *The Electrician*, 8 November 1889, 13; and in *The Electrical Engineer*, 8 November 1889, 366–67.

95 This is so even though we can, on examining the work, interpret certain forms as having some relation to the theme indicated in the title—one can interpret the undulating form on the left as alluding to water, and the dynamic form curving downward across the central axis as suggesting the trajectory and energy of a dive, and several other forms as representing nature.

96 Recall here that Braque's and Picasso's paintings of 1904 to 1914, which insistently related the curves of the female body to the forms of objects and which similarly hover between exemplification and denotation, provide the type for the image of the human body as a sexual apparatus.

97 Taking Braque's and Picasso's painting as the type for machinic body art undermines one of the reasons film historians give for identifying *Ballet mécanique* as a Dada film.

98 Quoted in Gilles Néret, *F. Léger*, trans. Susan D. Resnick (New York: BDD Illustrated Books, 1993), 46. The original French edition appeared in 1990. No source is given for the quotation. (Néret was one of Léger's students at the Académie Vassilieff.)

99 Ibid., 46.

100 Fernand Léger, "Les réalisations picturales actuelles," in *Soirées de Paris* (1914), and included in Léger, *Fonctions de la peinture*, ed. Sylvie Forestier (Paris: Gallimard, 1997), 39–54 at 40–41. In English: "Contemporary Achievements in Painting," in Léger, *The Functions of Painting*, ed. Fry, 11–19 at 11.

101 Léger, "Les réalisations picturales actuelles," in *Fonctions de la peinture*, ed. Forestier, 22. In English: "Contemporary Achievements in Painting," in *The Functions of Painting*, ed. Fry, 13–14.

102 This painting, in the Sidney and Harriet Janis Collection at New York's Museum of Modern Art, is variously dated from 1908 and 1909. Alternative titles for the work are *Paysage*, *Composition #1*, and *Les berges auprès du pont*.

103 Quoted in André Verdet, *Léger* (London: Hamlyn, 1970), 12.

104 Léger, "Les réalisations picturales actuelles," in *Fonctions de la peinture*, ed. Forestier, 46. In English: "Contemporary Achievements in Painting," in *The Functions of Painting*, ed. Fry, 15. It should be noted that Delaunay drew his ideas about colour contrast from Michel-Eugène Chevreul, *De la loi du contraste simultané des couleurs* (Paris: Pitoia-Levrault, 1839); he was interested in the "cinematic" potential of colour contrast to produce the feeling of movement. His ideas on simultanism were much discussed. One place where he used the exact phrase "simultaneous contrasts of color" is in a letter to August Macke, 1912, printed in Delaunay, *Du cubisme à l'art abstrait*, ed. Pierre Francastel (Paris: S.E.V.P.E.N., 1958), 186. In English: Herschel B. Chipp, *Theories of Modern Art: A Source Book by Artists and Critics* (Berkeley: University of California Press, 1968), 317.

105 The quip was made by the art critic Louis Vauxelles in a review he wrote of the show the Cubists had at the Salon des Indépendents.

106 Though perspective, created through the use of foreshortening and *chiaroscuro*, is retained for objects at greater distances, so that the picture is bounded by recessive forms.

107 Quoted in Néret, *F. Léger*, 42. No source given.

108 As a boy, Paul Cézanne would often go skinny-dipping with his school chum, Émile Zola. Cézanne tells us that these occasions were the most delightful of his fraught life. Cézanne's family, however, were strict and frowned on physical intimacy, and, because they provided him with his income, they exercised control over him even after he had attained adulthood. He internalized their prohibitions against physical affection, in a rigid form. There are many stories of Cézanne's aversion to physical contact. One recounts that while walking with his son, he stumbled, and the boy grabbed for his arm: the painter shook off the lad's support with the comment that he did not like to be grabbed at.

These facts have generated speculation that Cézanne came to be troubled by the delight he experienced skinny-dipping with his boyhood chums, fearing that it had a homoerotic basis. This has led to conjectures that many of his figurative works represent an effort to work through the traumatic consequences of experiencing anxiety-inducing sexual feelings. These claims may be true, though a more plausible explanation for the frequency of this theme would be that this boyhood experience provided Cézanne with his only experiences that might serve as a model for paradisiacal experience. Whatever one makes of this, nude males do appear fairly often in Cézanne's paintings.

109 Robert Delaunay's *La tour rouge* (Red Eiffel Tower, 1911–12) has notable formal resemblances to its contemporary *Les fumeurs*—and, as its title suggests, it too releases the

effects of colour. While Léger's paintings can sometimes seem remote from Cubism, comparing these two works can help ensure that one doesn't overestimate the degree of difference involved.

110 Fernand Léger, "À propos du corps humain considéré comme un objet" (1945), in *Fonctions de la peinture*, ed. Forestier. In English: "The Human Body Considered as an Object," in *The Functions of Painting*, ed. Fry, 133.

111 Henri Bergson,"Le rire," in *Œuvres*, vol. 3, 401.

112 Ibid., 401.

113 Fernand Léger, "*La roue*, sa valeur plastique" (1922), in *Fonctions de la peinture*, ed. Forestier, 55–56. In English: "The Human Body Considered as an Object," in *The Functions of Painting*, ed. Fry, 20.

I argue below that *Ballet mécanique* radicalizes the idea of an artwork in which the machine is the *main character* / the *main actor*—it sought to impose on the public an extended conception of the *actor-object*, one in which the entire artwork (comprising the film strip, the pianola rolls, the projector, and the player piano), when set in operation, was the main actor. Note how novel it must have seemed to consider an artwork a machine in operation: the film strip, the pianola rolls, the projector, and the player-piano took on a machinic collective identity as an actor-object. Note as well the date of Léger's article—1922. It was issued before Murphy and Ray met up in Paris, so the particular idea of machine art that motivated the making of *Ballet mécanique* could not have come from them: Léger announces it here. Standish Lawder anticipated aspects of my argument, for he too saw this article, and the film *La roue* itself, as providing the conceptual germ for the film *Ballet mécanique*. See Lawder, *The Cubist Cinema*, 89–95.

114 Cited in Christopher Green, *Léger and the Avant-Garde* (New Haven: Yale University Press, 1976), 244.

115 Marcel L'Herbier himself was a highly intellectual writer on film who, by the time Léger began working with him, had already established a considerable profile as a theorist and defender of the new art. His "Hermès and le silence," *Le Film* 110–11 (28 April 1918), 7–12, is one of the most remarkable paragonal statements to come out of the attempt to explain the richness of the *cinquième art*, which generally accorded primacy to the visual (the image over the word). What is new in the cinema, he argues, is that the cinema is a "machine à imprimer la vie" (7). This curious piece begins by offering seemingly compelling versions of the standard arguments of the time, that film is destroying Art—that it is a vulgar, commercial, too-democratic medium that mechanically stamps out trivial truths about chance ephemera rather than fabricating spiritually enhancing beautiful lies that follow strict principles and that are the personal expressions of genius. But then, while acknowledging the cinema will destroy Art, the essay takes a sudden turn towards valorizing its mechanical anonymity and its capacity to connect viewers to the flow of life, as well as *cinégraphie*'s potential as a universal language. He celebrates the artisans of *cinégraphie*. The cinema triumphs as an expression of a *natura naturans* (L'Herbier even evokes Spinoza!) or, rather, the *natura naturans* become mechanical.

116 Fernand Léger, "Notes sur la vie plastique actuelle" *7 Arts* 20 (Bruxelles), 15 March 1923; collected in *Fonctions de la peinture*, ed. Forestier, 61; in English, "Notes on Contemporary Plastic Life," in *The Functions of Painting*, ed. Fry, 24. I have inserted a note that Léger put the expression *matière première* in italics and between chevrons: if readers need proof that the painter was acquainted with the (still somewhat fashionable) idea of painting as an alchemical act, his use of that term should dispel it.

I would venture that his peculiar use of the term "éléments" in this sentence may be completing that alchemical allusion, with a reference to the planetary metals (gold = sol, silver = luna, etc).

117 Ibid., *Fonctions de la peinture*, 63; ibid., *The Functions of Painting*, 25.

118 Clement Greenberg, "Collage," in *Art and Culture: Critical Essays* (Boston: Beacon Press, 1965), 70–83 at 70.

119 Ibid.

120 Charles Olson, *Call Me Ishmael: A Study of Melville* (San Francisco: City Lights Books, 1947), 11.

121 Fernand Léger, "The New Realism Goes On" (1937); first published in French as "Le nouveau réalisme continue" in *Querelle du réalisme*, ed. Jean Lurçat et al. (Paris: Éditions de sociales, 1936), 73–79. I am using the translation by Samuel Putnam, which appeared in a left-wing American periodical, *Art Front* 3, no. 1: 7–8, which can be found in the Smithonsian Archives of American Art at https://www.aaa.si.edu/collections/art-front-5779. Putnam's translation is included in Léger, *The Functions of Painting*, ed. Fry, 114–16 at 116; the original French text can be found in *Fonctions de la peinture*, ed. Forestier, 195–203 at 199. It is important to point out that "The New Realism Goes On" is a later article, written during a period of political instability, but that (as its title suggests) it restates and extends themes articulated in earlier pieces, such as "Contemporary Achievements in Painting," first published as "Les réalisations picturales actuelles," in *Soirées de Paris*, 1914.

Concerning emptying painting of the subject, in "Les réalisations picturales actuelles," Léger alluded to the possibility of using "le sujet le plus banal, le plus usage" (the most banal, overworked subject) and does so in the context of discussing how multiplicative contrast can be used to enliven even hackneyed subjects. See Léger, *Fonctions de la peinture*, ed. Forestier, 49; in English, *The Functions of Painting*, ed. Fry, 16.

Note that the last sentence from the quotation offers a modernist view of progress in the arts, which proceeds through the progressive elimination from the forms of any particular art influence from the adjacent arts.

122 Cited in Werner Schmalenbach, *Fernand Léger* (New York: H.N. Abrams, 1976), 22. No source for the quotation is given.

123 If one thinks of modern form as marked by "infinite plasticity," then conceptual realism could be the only form of realism one can strive for.

124 I am conscious of using Eisenstein's name as a metonym, to stand for a movement. Russian film theory and practice distinguished itself in the years 1920 to 1935 by developing a distinctive conception of montage. In these years, modernist theory dominated the discussion of progressive arts—and, of course, it exerted a considerable influence on film theory in this period. Accordingly, a key purpose of film theory at the time was to identify what features made film distinctive. "What distinguishes the film medium from adjacent media, such as painting, literature or music, providing the basis for a separate art?," film theorists asked. Montage theorists averred that it is montage. Among the major Soviet montage theorists and practitioners are the well-known Vsevolod Pudovkin (Всеволод Пудовкин, 1893–1953), Dziga Vertov (Дзига Вертов, pseud. of Давид Абелевич Кауфман; David Abelevich Kaufman, 1896–1954—the pseudonym means spinning top), Lev Kuleshov (Лев Кулешов, 1899–1970), and Alexander Dovzhenko (1894–1956), and the lesser-known artists (who were generally less committed to the radical use of montage) Boris Barnet (1902–1965), Ilya Trauberg (1905–1948) and a team associated with ФЭКС (FEKS, short for Фабрика эксцентрического актёра):

Grigori Kozintsev (1905–1973), Leonid Trauberg (1902–1990), the ФЭКС co-founder Sergei Yutkevich (1904–1985), and his ФЭКС colleague Kote Mikaberidze (1896–1973). They were joined by Georgy Kryzhitsky (1895–1975), who went on to work in theatre, including puppet theatre. The youthfulness of the ФЭКС founders causes the mind to boggle: Kozintsev was seventeen, Yutkevich eighteen, and Tauberg twenty; Mikaberidze (likely the least well known now) was the grand old man, at the advanced age of twenty-seven. They averred that Marinetti was right (Marinetti and Italian Futurism influenced ФЭКС deeply): "Old men are always wrong even when they are right and the young are always right even when they are wrong," proclaimed their manifesto "Eccentrism."

The pre-eminent theorist of montage is Sergei Mikhailovich Eisenstein, a former engineering student who started his life in art as a theatrical set designer and then became one of the greatest filmmakers in history. In the course of working out his ideas on filmmaking, he made himself the colossus of classical film theory, an important aesthetician, and a pioneering culturologist. In "A Dialectic Approach to Film Form," Eisenstein writes that "montage has been established by the Soviet film as the nerve of cinema" and that "to determine the nature of montage is to solve the specific problem of cinema." That essay was unpublished in Eisenstein's lifetime; Leyda edited it from two typescripts titled "The Dramaturgy of Film Form" (Eisenstein approved the change of title). A different translation, made from Eisenstein, *Schriften* vol. 3 (October), ed. Hans-Joachim Schlegel (Munich: Hanser, 1973), 200–225, appears as "The Dramaturgy of Film Form (The Dialectical Approach to Film Form)," in Eisenstein, *Writings 1922–1934*, ed. Richard Taylor (London: BFI Publishing, 1988), 161–80.

125 Clement Greenberg, "Master Léger," in *Art and Culture: Critical Essays* (Boston: Beacon Press, 1965), 96–104 at 99–100.

126 "Les origines de la peinture contemporaine et sa valeur representative," lecture at the Académie Vassilieff on l5 May 1913; published in *Fonctions de la peinture*, 26; in English, "The Origins of Painting and Its Representational Value" in *The Functions of Painting*, ed. Fry, 3–10, where the remark cited appears on page 4. In both the original and the translation, the term "aucune œuvre" (no work) begins a new paragraph.

At this point in the development of his thinking, Léger, like many modernists, still saw the cinema as allied to those media (colour photography, dime store novels, the popular theatre) that took up sentimentality, with its proclivity for representational forms that the more advanced art of painting had abandoned, and in doing so contributed to the fragmentation of consciousness (see *Fonctions de la peinture,* 36). By the time of "Les réalisations picturales actuelles," (1914), he had revised his estimation of painting and now maintained that the need for an art that helps us adjust to accelerated perception is exigent.

127 Léger believed that the synthetic character of perception had been made more evident by the dynamic character of modern experience.

128 See Léger, "Les réalisations picturales actuelles," 46; "Contemporary Achievements in Painting," 15.

129 This idea that all sorts of forms, even sentimental images or images that produce an illusory impression of depth, can find their place in a framework of contrasts that constitute a rhythm is a key to *Ballet mécanique*, as I will show.

130 Léger, "Les origines de la peinture contemporaine," in *Fonctions de la peinture*, 25–38 at 32–33. In the original, the phrase "les contrastes picturaux" (pictorial contrasts) starts a new paragraph. In English: "The Origins of Painting and Its Representational Value," 7.

131 *Fonctions de la peinture*, 35; in English, *The Functions of Painting*, 8.

132 Léger, "Les réalisations picturales actuelles" (1914), in *Fonctions de la peinture*, 48. My translation can be compared with that in "Contemporary Achievements in Painting," in *Functions of Painting*, ed. Fry, 16.

133 Léger, "Autour du *Ballet mécanique*," in *Fonctions de la peinture*, 133–39, at 135; in English, "*Ballet Mécanique*," in *Functions of Painting*, 48–51, at 49. The date for this article is generally given as 1924–25, but I doubt that it was written earlier than 1926. Forestier notes, "La datation de ce texte reste difficile. Les manuscrits consultés ne sont pas datés… Paru comme inédit dans *Fonctions de la peinture* en 1965, le texte, selon toutes probabilité, est postérieur à 1924," *Fonctions de la peinture*, 342–43, n2.

134 Léger, "Autour du *Ballet mécanique*," 137–38; in English, "*Ballet Mécanique*," 51.

135 It is highly likely that the cinema was a key inspiration for early-twentieth-century artists' interest in the object.

But among the artists involved in making the film, Léger was not the only one to use kitchen utensils to create a *poésie du quotidien*: Man Ray, another artist-filmmaker, used kitchen utensils in making his rayograms.

136 Boccioni, Carrà, Russolo, Balla, and Severini, "La pittura futurista: Manifesto tecnico." The passage I have translated reads, "Questo naturalmente ci porta a concludere che non può sussistere pittura senza divisionismo… Il divisionismo, nel pittore moderno, deve essere un COMPLEMENTARISMO CONGENITO, da noi giudicato essenziale e fatale" (29–30).

137 Léger, "Les réalisations picturales actuelles," in *Fonctions de la peinture*, 48–49. In English: "Contemporary Achievements in Painting," 16.

138 Lawder, *The Cubist Cinema*, 72.

139 Ibid., 167.

140 Quoted in Verdet, *Léger*, 15. No source given.

141 Fernand Léger, "L'esthétique de la machine, l'objet fabriqué, l'artisan et l'artiste," in *Fonctions de la peinture*, 88. In English: "The Machine Aesthetic: The Manufactured Object, the Artisan, and the Artist," in *Functions of Painting*, 52–61 at 52–53.

142 All these works are from the *L'escalier* series that Léger began before the Great War and resumed after he was sent home and had recovered from being gassed.

143 Léger, *Fonctions de la peinture*, 98–99. In English: "The Machine Aesthetic," 59.

144 The reinstallation of the Poussin and Corot galleries in the Louvre in 1921 has been credited as a possible source for this change in iconography; until then, Léger had used pre-Renaissance painting and Classical frieze-forms as models.

145 Fernand Léger, letter to Leonce Rosenberg, printed in *L'effort moderne*; quoted in James Johnson Sweeney, "Léger and Cinesthetic," *Creative Art* (June 1932): 441–45. Collected in *The Movies*, ed. Lewis Jacobs (New York: Noonday Press, 1960), 175.

146 Léger, "Notes sur la vie plastique actuelle," in *Fonctions de la peinture*, 63. In English: "Notes on Contemporary Plastic Life," in *The Functions of Painting*, 25.

147 Ibid., *Fonctions de la peinture*, 63; ibid., *Functions of Painting*, 25.

148 Ibid.

149 Fernand Léger, "Peinture et cinéma," *Cahiers du mois* 16–17 (1925): 107–8. In English: "Painting and Cinema," in *French Film Theory and Criticism: A History/Anthology, 1907–1939*, vol. 1, *1907–1929*, ed. Richard Abel, 372–73 (Princeton: Princeton University Press, 1988). The passage cited appears in Abel, 372.

150 Ibid.

151 Ibid., 373. *Ballet mécanique* is among the few 1920s avant-garde films done using live action cinematography (in some parts) to not employ actors. It is interesting that Man Ray's films likewise rely on non-actors from his circle of friends.

152 Ibid.

153 Fernand Léger, "*La roue*, sa valeur plastique," 58–59. In English: "A Critical Essay on the Plastic Quality of Abel Gance's Film *The Wheel*," in *The Functions of Painting*, 20.

154 I have chosen 1921 as the end of the period in which the visual arts reshaped themselves by incorporating the cinematic version of the montage principle because in the spring of that year Max Ernst's *Fatagaga* collages were shown at the Au Sans Pareil gallery in Paris: I take these works to be the culmination of all that had been done in collage since 1912, and a point of transition, just as they were the high point of Paris DADA that year, and the beginning of the end of movement.

155 Delaunay had first embarked upon the works stressing circular form just before the First World War.

156 Fernand Léger, "La rue: Objets, spectacles" (1928), in *Fonctions de la peinture*, ed. Forestier, 141–44 at 141–42. A different English translation can be found in "The Street: Objects, Spectacles," in *The Functions of Painting*, ed. Fry, 78.

157 In 1911, Léger joined the Section d'or, sometimes called the Puteaux Group of Orphists, which came to prominence at the controversial Salon des Indépendents in 1911. (The name "Puteaux" derived from the place where the group regularly met—at Jacques Villon's home in Puteaux, at the time a suburb on the Western outskirts of Paris; its members adopted the name to distinguish them from the Cubism of the Montmartre Group around Picasso and Braque.)

Members of the Groupe de Puteaux included (in addition to Léger) Guillaume Apollinaire; Robert Delaunay; Marcel Duchamp; Raymond Duchamp-Villon (1876–1918); Roger de la Fresnaye (1885–1925), who had studied with the Nabi artist and pioneering abstractionist Paul Sérusier (1864–1927); Albert Gleizes; František Kupka; Louis Marcoussis (1878 or 1883–1941); Jean Metzinger; Francis Picabia; and Jacques Villon (1875–1963). In certain respects, the group was the more Cubist-inspired successor to the Symbolist-aligned Abbaye de Créteil, a community of French writers, artists, and composers in operation from November 1906 to February 1908, located in a villa on the banks of the Marne at Créteil, southeast of Paris. Gleizes was a member of the Abbaye; another key member was Alexandre Mercereau (1884–1945), a Symbolist critic and poet who embraced *Unanimisme*, who had published extensively on advanced art (for example, on Matisse), and who was also a founding member of the International Society for Psychical Research (a group founded in 1911 that was devoted to the scientific study of parapsychic phenomena). Between 1908 and 1910, after the Abbaye dissolved, Mercereau gathered around him an important group of Post-Symbolist artists, including Apollinaire, André Salmon, F.T. Marinetti, Constantin Brâncuși (1876–1957), the painter Henri Le Fauconnier (1881–1946), and Robert Delaunay. The group soon came to include Jean Metzinger and Fernand Léger. A focal interest of this group was breaching the Classical unities of time and space through the use of simultaneous, polyphonic lines of development (in whatever medium they worked). Furthermore, they all harboured interests aligned with the Abbaye de Créteil's efforts to create synthetic forms that fused the various arts and, at least for a time, were in general accord with the Abbaye's ideals. One approach to understanding the differences between the Puteaux Group and the Montmartre Group is to take the former as a synthesis of Cubist beliefs and methods with the esoteric and orphic ideals of the Abbaye de Créteil.

Most associates of the Abbaye de Créteil leaned towards *Unanimisme* and the idea of a higher, group consciousness. Another, but related, shared interest was the work of pioneering abstractionist Paul Sérusier (1864–1927), whose ideas on religious art, mysticism, number, and proportion (including his Pythagorean mathematics, based largely on the Golden Section) provided the spiritual foundation for the quest for non-representative art—and when the group began exhibiting, they took the name "La Section d'or." Another key influence was esoterist Édouard Schuré's (1841–1929) *Les grands initiés* (1889)—Apollinaire, following Schuré, took an interest in the figures of Orpheus and Hermes Trismegistus. Esoteric ideas about harmony and unity certainly had a real impact on the Section d'or group and likely influenced Léger as well (by providing him with a stock of images associated with Pythagoreanism). The square (which is implicit in the geometric substructure of many shots in *Ballet mécanique*), the circle, and the triangle (the last two key themes in *Ballet mécanique*) all have rich meanings in alchemical iconography. One alchemical text (*Atlanta fugiens*) states, "Make of the man and woman a Circle, of that a Quadrangle, of this a Triangle, of the same a Circle and you will have the Stone of the Philosophers," and the conjunction of the circle and the triangle represents the fusing of Sol and Luna (that is Sun and Moon, the male and the female principle).

Sérusier was major force in this group. His book *ABC de la peinture* was not published until 1921; but he had been working out the ideas that went into it, and expounding them to friends, for several years before that. He contended that perspective and proportion are wrongly used when the artist strives to hold a mirror to nature: reproducing sight is merely a mechanical process and does not involve the intelligence or the spirit. Like other modernists, he held that the flat surface is an important factor in form creation: the arrangement of elements on a plane does not involve consideration only of position in space and of weight—a plane's flatness affects the forms placed on it and by that shapes the emotional resonance of the piece, so emotion itself is a consideration. (We will see in the third chapter that these ideas articulate central notions in the emerging postmodern, electromorphic aesthetic.) Elements must be assembled to produce harmony, and only their harmonic effects are of any importance. A harmonious arrangement of elements results in an agreeable order of sensations that satisfies both the senses and the spirit. Harmony (a word that acquired a revised meaning in electromorphic aesthetics) results from elements that are in fitting ratios to one another: the fundamental task of the art is to form properly proportionate relations. The external world (including our bodies), Sérusier claimed, is constructed from good proportions—relations that are determined by the first and simplest numbers, their products, their squares, and their square roots (including the square root of 2). The relations that obtain in the external world (including our bodies) provide a model for harmony in art.

Sérusier spoke of art as a universal language expressed in symbols. He adopted many of Schuré's Pythagorean principles. He maintained: 1 is not really a number, but a primal unity that contains and engenders all numbers; 2 expresses the polarity, and the consequent tension between opposing tendencies; 3 is the smallest number that delimits a surface (an equilateral triangle, that signifies God the Creator); 4 gives the simplest solid (a tetrahedron) that does not represent a prime—and according to Pythagoras's Golden Verse, it is the source of nature: furthermore, in the unit square, 1 gives $\sqrt{2}$ as its diagonal, and $\sqrt{2}$ is, Sérusier asserted, the gate of harmony; 5 Sérusier called the Golden Number of Pythagoras because it produces the pentagonal star, which

contains the Golden Sections. Numbers higher than 5 are "composite numbers" that possess qualities of the numbers that form them: for example, 6 is a compound of 2 and 3 and so has their attributes in its constitution; 8 is 2 cubed and so has the properties of 2 and 4; 9 is 3 cubed and has the attributes of 3. The characteristics of numbers beyond 9 are no longer spiritually important.

Commenting on the transition from the Abbaye de Créteil to the Section d'or or the Groupe de Puteaux would tell us much about the aesthetic realignments in the decade from 1904 to 1914. But much that we would learn from that would lie beyond the purview of a book on the role the cinema played in shaping key artistic movements in the early twentieth century.

Léger participated in the Groupe de Puteaux until 1914; between 1911 and 1914 (when he entered the army), his work became increasingly abstract. The visual component of *Ballet mécanique* is built around relations between representational and abstract forms—questions concerning these different modalities are central to that work, as they were to the paintings Léger did in the period during which he associated with the Puteaux group. Frequent topics of discussion among the group were Bergson's philosophy, the fourth dimension, and their relevance to artmaking. The group's leader, Jacques Villon, had worked on illustrations for *L'homme et la terre*, a six-volume work by the anarchist, Freemason, and vegetarian Jacques Elisée Reclus (1830–1905). Allard refers to the Cubists who associated with the Section d'or or the Groupe de Puteaux as "public Cubists," to distinguish them from Picasso and Braque, whom he refers to as "gallery Cubists." He intended this distinction to suggest that the public Cubists treated larger themes and more ambitious subject matter. They introduced significant political content into their work, while Picasso and Braque at this time focused more on plastic and architectonic issues (of course, it is important to recognize that even "pure painting" has political significance, as it can be allied with the interest in experiencing more freely). Marinetti knew many of the Groupe de Puteaux and in particular the Abbaye poets and painters: he took part in their meetings on occasion, and in respect to the use of subject matter of discursive interest, or even overtly extra-aesthetic concern, his work is closer to theirs than to that of Picasso and Braque.

158 Delaunay was greatly influenced by Jules Romains (as was Orphism generally). To get a sense of how close Delaunay's Orphism took him to Futurism, one might compare Gino Severini's *Ballerine gialle* (The Yellow Dancers, 1911) with its depiction of electric light's capacity to dissolve forms' boundaries and Delaunay's extraordinary *La ville de Paris* (The City of Paris, 1912).

159 Actually, *Le cirque* of 1918 also makes use of typography. That work is a predecessor of Léger's mechanical period that (like *Ballet mécanique*) incorporates many of the motifs of the mechanical period but also contains human forms.

160 Quoted in Verdet, *Léger*, 16. No source given.

161 Stephen Kern, *The Culture of Time and Space 1880–1918* (Cambridge, MA: Harvard University Press, 1983), 152.

162 Léger, "L'esthétique de la machine, l'objet fabriqué, l'artisan et l'artiste," in *Fonctions de la peinture*, ed. Sylvie Forestier, 87—102, at 87; English translation, "The Machine Aesthetic: The Manufactured Object, the Artisan, and the Artist," in *Functions of Painting*, 52–61, at 52–3. Emphasis in original, though in the original each sentence is a separate epigrammic paragraph.

163 Verdet, *Léger*, 17–19. Here Verdet is citing something he wrote in an earlier book on Léger.

164 Quoted in Néret, *F. Léger*, 91. No source given.

165 The studio continued the work of the Académie Moderne, which had been founded by the Fauves Othon Friesz (1879–1949) and Raoul Dufay (1877–1953), who were later joined by Amédée Ozenfant and Fernand Léger.

166 Le Corbusier and Amédée Ozenfant, "Purism," in *Modern Artists on Art: Ten Unabridged Essays*, trans. and ed. Robert L. Herbert (Englewood Cliffs: Prentice-Hall, 1964), 58–73 at 61, 62.

167 The art historian and early film theorist Élie Faure was deeply influenced by Purist ideals. I really should deal with his famous essay "De la cinéplastique" (1922), and generally the essays in *Fonction du cinema: L'art de la société industrielle* (1953)—all of which have deep relevance to Léger's ideas on machine art—and *L'histoire de l'art*. I have made a few remarks on Faure's work above, but the relevance of Purism to them deserves more systematic treatment. I have not the space here to do that, though I do deal with it in my contribution to Roxana Preda, ed., *The Edinburgh Companion to Ezra Pound and the Arts* (Edinburgh: Edinburgh University Press).

168 This assertion is overly general: Ozenfant and Le Corbusier distinguished between primary and secondary forms. Primary forms are those that have constant effect and are free of associations that are neither transcultural nor transhistorical—that is, they have the same plastic meaning for everyone. Secondary forms have associations that are culturally or historically relative. A cube is a primary form, while a spiral is a secondary form (for a spiral might evoke an association with a snake in one individual and an association with a whirlpool in another). Primary forms constitute the basis for compositions with universal significance.

169 I state this even though I believe (as I noted) that a radical aspect of early-twentieth-century painting and literature is the idea that artworks can harbour a destructive element, one that leaves the surface of the work soiled and deformed (the opposite of beautiful).

170 Fernand Léger, "À propos de l'élément mécanique" (1923), in *Fonctions de la peinture* (Paris: Éditions Denoël-Gonthier, 1965), 50–52 at 50; reprinted in *Fonctions de la peinture*, ed. Forestier, 81–85 at 82. In English: "Notes on the Mechanical Element," in *Functions of Painting*, ed. Fry, 28–30 at 28.

171 Léger, "Notes sur la vie plastique actuelle," 62; "Notes on Contemporary Plastic Life," 24.

172 Fernand Léger, "Le spectacle, lumière, couleur, image mobile, objet-spectacle" (1924), in *Fonctions de la peinture*, ed. Forestier, 111–31 at 130; in English, "The Spectacle: Light, Color, Moving Image, Object-Spectacle," in *The Functions of Painting*, ed. Fry, 46.

173 Ibid., *Fonctions de la peinture*, 116; *The Functions of Painting*, 38.

174 Ibid., *Fonctions de la peinture*, 130; *The Functions of Painting*, 46.

175 Léger might have used *Ballet mécanique* to confirm his beliefs about the applicability of his artistic principles (for example, his thoughts on multiplicative contrasts) to the entire range of visual arts. Some have claimed that the fact that Léger made only one film shows he had little interest in cinema and, consequently, little involvement in the making of *Ballet mécanique*. But suppose what he was seeking was confirmation that his theory of multiplicative contrasts had universal applicability? Then a single demonstration piece would serve his purposes.

I believe that Léger's interest in film was actually considerably broader and deeper than this conjecture about his goal for making *Ballet mécanique* suggests. But this dynamic, of using *Ballet mécanique* to embody his wide-ranging beliefs about art, was

at play. Film, he understood, epitomized his beliefs, and that suggests he saw film as the culminating expression of the most potent aesthetic factors of his time.

176 A convenient source for this text is Blaise Cendrars, "The ABC of Cinema" (excerpt in English), trans. Serge Gavronsky, *Film Culture* 40 (Spring 1966): 19–20 at 20.

177 It's true: some things never change. Léger, "Le spectacle," 122; *The Functions of Painting*, 41.

178 See Léger, "*Ballet mécanique*" (ca. 1924), in *The Functions of Painting*, ed. Fry, 51.

179 The passage Léger quotes can be found in Victor Hugo, *Notre Dame de Paris*, trans. Isabel Florence Hapgood (New York: T.Y. Crowell & Company, 1888), 199. Here the passage Léger cites is given as follows: "In the fifteenth century everything changes. Human thought discovers a mode of perpetuating itself, not only more durable and more resisting than architecture, but still more simple and easy. Architecture is dethroned. Gutenberg letters of lead are about to supersede Orpheus's letters of stone. *The book is about to kill the edifice*."

180 From Fernand Léger, "Les origins de la peinture et sa valeur representative" (The Origins of Painting and its Representational Value), *Montjoie!* 29 May 1911, 7, and 14–29 June 1913, 9–10. The article also appeared under what seems to me a more appropriate title, "Les origines de la peinture *contemporaine* et sa valeur representative" (The Origins of *Contemporary* Painting and Its Representational Value) in *Der Sturm: Halbmonatsschrift für Kunst und Kultur* 172–73 (Berlin–Paris, August 1913), 76–77 at 77 (this is the version I used for verifying the English text). It was collected again as "Les origines de la peinture et sa valeur representative," in *Fonctions de la peinture*, ed. Forestier, 25–38.

In fact, Léger was far from alone in believing that an analysis of reality into simple units and their resynthesis in an artwork could create a parallel to the process of forming experience. That conviction produced what became a highly valued method in the early modernist era, and virtually defined an international style of the vanguard: it can be seen in Eisenstein's films, in some of the poetry of Apollinaire, and in some writings by Jean Cocteau (1889–1963), Cendrars, Pierre Mac Orlan (1882–1970), Philippe Soupault (1897–1990), Louis Aragon (1897–1982), Tristan Tzara (pseud. Samuel Rosenstock, 1896–1963), Paul Éluard (pseud. Eugène Émile Paul Grindel, 1895–1952), and especially Pierre Reverdy (1889–1960) in France and, in America, William Carlos Williams (1883–1963), Ezra Pound (1885–1972), Gertrude Stein (1874–1946), Yvor Winters (1900–1968), the writer and art collector Walter Arensberg (1878–1954), the poet, journalist, and communist Walter Lowenfels (1897–1976), and Louis Zukofsky (1904–1978), whose poems would have been inconceivable without Eisenstein's films. The method can be found in songs of preliterate people such as American Indians—and, of course, in Cubist painting. (Here I draw upon, though make some changes to, the list given in Morgan Gibson's *Revolutionary Rexroth: Poet of East West Wisdom* [Hamden: Archon Books, 1986]; I have used the expanded Internet edition, at http://www.thing.net/~grist/ld/rexroth/gibson.htm—the list itself appears at http://www.thing.net/~grist/ld/rexroth/rex-03.htm).

Rexroth identifies the goal of that analysis and resynthesis: "Its revolution is aimed at the syntax of the mind itself." Rexroth, "Preface 1949," in *The Art of Worldly Wisdom* (Santa Barbara: Morrow and Covici, 1980; 1st ed., Prairie City: Decker Press, 1949).

181 It is likely that Léger's ideas on history's eras influenced Cendrars's *L'ABC du cinéma*. In that work, Cendrars (like Marshall McLuhan after him) proposes a tripartite division of the history of *mentalités*, determined by the predominant system of communication

in use. The first worldwide revolution came with the invention of writing as a means of retaining something, "a testimony of the sacred initiation, autocratic, individual"; this era lasted from the Mesopotamians down to 1438 and saw the birth of painting as a requisite ancillary. The next revolution occurred with the advent of printing and the resultant refinement of culture—like McLuhan, Cendrars believed that this phase was marked by individualism. The third era was initiated by the birth of photography, Cendrars says. Its beginning is due to "Daguerre, a Frenchman, who invents photography. Fifty years later, the cinema was to come. Renewal! Renewal! The eternal Revolution." Cendrars speculates that photography will lead towards "a new synthesis of the human spirit, toward a new humanity and it seems that a new race of men will appear. Their language will be that of the cinema." Blaise Cendrars, "The ABC of Cinema," *Film Culture* 40 (Spring 1966): 20. I will comment anon on Cendrars's ideas about how humans will be transformed in the cinema era. But it is interesting to note how profound the conversation between the two artists was.

182 It was undoubtedly this coincidence of beliefs that prompted the great Soviet filmmaker Sergei Eisenstein to assert that, among his French contemporaries, none had a truer understanding of the cinema than Fernand Léger. This comment appears, without a source being given, in Sweeney, "Léger and Cinesthetic," in *The Movies*, ed. Jacobs, 173. The text makes it clear that Eisenstein's remarks date from 1930. Eisenstein's comments offer a bracing rejoinder to those who maintain that Léger interest in film was slight.

183 Stravinsky regularly produced compositions based on similar block-like structures. The importance of this method for Antheil (it related to his idea of time-space) makes one wonder whether he might have been responsible for the film's being divided into a number of blocks. But anyone disposed to ask this question should bear in mind that this block-like armature allows contrasting sections to be juxtaposed—accordingly, that episodic architecture also accords with Léger's ideas about contrast. It is likely that Antheil and Léger had separate reasons for composing in blocks; nonetheless, both sound and picture complement each other in that regard. This is probably another occasion on which the composer and the painter each enriched and deepened the other's ideas.

184 Fernand Léger, "Film by Fernand Léger and Dudley Murphy, Musical Synchronism by George Antheil," *Little Review* (Autumn–Winter 1924–25): 42–44. That this note was published in *Little Review* lends support to the hypothesis that Pound had a role in the film, for in the 1920s he was a key recommender of articles and poems for that literary magazine. This passage is cited in Judi Freeman, "Bridging Purism and Surrealism: The Origins and Production of Fernand Léger's *Ballet mécanique*," in *Dada and Surrealist Film*, ed. Rudolf E. Kuenzli (Cambridge, MA: MIT Press, 1996), 38.

185 Blaise Cendrars, "Poètes," in *Œuvres complètes*, vol. 4 (Paris: Denoël, 1962), 214. Joseph Vendryes, who taught Celtic languages at the École Pratique des Hautes Études and founded the journal *Études Celtiques*, was a student of the important Sorbonne linguist Antoine Meillet (1866–1936), who suggested to Milman Parry (1902–1935) that he study the oral poetry tradition of Bosnia. Parry, together with his assistant Alfred Lord, reached the conclusions that are summarized in what is now known as the Parry/Lord Thesis: the repeated formulae of Homeric epic verse are a characteristic feature of all oral composition (the so-called Oral Formulaic Hypothesis). Parry (again following Meillet) deemed oral poetry to be transactional—that is, it acts on listeners. Joseph Vendyes's interest in rhythm's operation can be connected with that tradition of thought.

186 Kurt Schmidt, "Das Mechanische Ballett—eine Bauhaus Arbeit," in *Bauhaus und Bauhäusler*, ed. Eckhard Newmann (Bern and Stuttgart: Verlag Hallwag AG, 1971),

54ff. Cited in Hans Heinz Stuckenschmidt, *Musik am Bauhaus* (Berlin: Bauhaus-Archiv, 1979), 11. The translation, unfortunately, is mine.

187 Stuckenschmidt, *Musik am Bauhaus*, 6–7. Translation mine.

188 I adopt a term from Renato Barilli's writings on recent and contemporary art when I use "electrotechnics": see *Scienza della cultura e fenomenologia degli stili* (Bologna: Il Mulino editore, 1991) and *L'alba del contemporaneo. L'arte europea da Füssli a Delacroix* (Bologna: Feltrinelli editore, 1996). On the topic of the computer's role in producing collective intelligence, see Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964).

189 Hugo von Hofmannsthal, *Selected Prose* (New York: Pantheon, 1952), 133–34.

190 Ibid., 133–34.

191 Donald Davie, *Articulate Energy* (London: Routledge and Kegan Paul, 1955), 4.

It is telling that Hofmannsthal's experience of language's becoming isolated meaningless words has become an iconic text. Maurice Blanchot suggests another importance of "Letter of Lord Chandos": as words lose their meanings, Lord Chandos is drawn into a new, more intimate relation with things. He writes, "a new contact forms with things' intimacy, a presentiment of unknown relations, of another language, capable of expressing the infinite acceptance which the poet is when he becomes the refusal to choose—capable also of enclosing the silence that lies in the deepest recess of things." Blanchot, *The Space of Literature*, trans. Ann Smock (Lincoln: University of Nebraska Press, 1989), 183. One might imagine that the film camera was invented to suggest this new intimate relation with things, one of boundless acceptance.

192 Schlemmer's *Tanzen* are perhaps the closest of all the mechanical ballets to Leger's because they are really abstract ballets (think of *Stäbentanz* and *Raumtanz*). For Schlemmer, space should be a fundamental force shaping choreography. (I show in the next chapter that this is a fundamental principle of postmodern, electromorphic aesthetics.) He notes about his interest in making abstract dance, "Either abstract space is adapted in deference to natural man and transformed back into nature. This happens in the theatre of illusionistic realism. Or natural man, in deference to abstract space, is recast to fit its mould. This happens on the abstract stage." Schlemmer, "Man and Art Figure" (1924), in *The Theater of the Bauhaus*, 2nd ed., ed. W. Gropius and A.S. Wensinger (Middleton: Wesleyan University Press, 1961), 17–32 at 22–32.

193 Lincoln Kirstein, *Movement and Metaphor* (London: Pitman, 1971), 214.

194 Schlemmer, "Man and Art Figure," 26. Schlemmer was aware of, and commented on, Heinrich von Kleist's "Über das Marionettentheater," and he sometimes had students imitate puppets' movements in order to put a distance between their movements and natural movements (which are often expressive).

195 Ibid., 27.

196 Tut Schlemmer, ed., *The Letters and Diaries of Oskar Schlemmer*, trans. Krishna Winston (Middleton: Wesleyan University Press, 1972), 126.

197 Sigmund Freud's "Das Unheimliche" (The Uncanny, 1919) takes Hoffmann's "Der Sandmann" (The Sandman, 1816) as a central object of study.

198 Von Kleist's Medieval romance-drama *Das Käthchen von Heilbronn* (Käthchen of Heilbronn, 1808) and his short stories "Michael Kohlhaas" (1810) and "Die Marquise von O" (The Marquise of O, 1811) are exemplars of the macabre fantastic. Reading either leaves one with intimations of language being freighted with such unusual experiences that it has begun to fail.

199 Of course, any work of art vivifies perception, and one's response to it is never truly passive. Nonetheless, J.S. Bach's *Messe in h-Moll* engenders a contemplative response (one that approaches being a form of meditation), while our response to *Grandma's Boy* (with Harold Lloyd, 1922) or *Safety Last* (also with Harold Lloyd, 1923) or *Robin Hood* (with Douglas Fairbanks, 1922) or *Blood and Sand* (with Rudolf Valentino, 1922)—just to take a few popular films of the era of the *grand publique*—elicited less a meditative than a collective and participatory response.

200 "Something Metallic," *Anhalter Anzeiger* (Dessau), 12 February 1929. In Hans Maria Wingler, *The Bauhaus: Weimar, Dessau, Berlin, Chicago*, trans. Wolfgang Jabs and Basil Gilberty, ed. Joseph Stein (Cambridge, MA: MIT Press, 1969), 157.

201 John Willett and Ralph Manheim, "Introduction," in Bertold Brecht, *Collected Plays: One*, ed. Willett and Ralph Manheim (London: Methuen, 1970), vii–ix.

202 Ibid., xxxiii.

203 "Die Gruppe als Ideenträger" first appeared in *Archiv für Sozialwissenschaft und Sozialpolitik* 49, no. 3 (1922). It appears in translation in Siegfried Kracauer, *The Mass Ornament*. There Kracauer writes of the collective being

> a group individuality that cannot be dissolved into a multiplicity of individuals but rather operates above their heads according to its own laws, often seemingly independent of the claims and (momentary) needs of its adherents. Thus, instead of being made up of fully developed individuals, the group contains only reduced selves, abstractions of people: it is a pure tool of the idea and nothing else…In that very moment, then, in which the group comes into being, a reduction of selves also occurs, and instead of many individuals striving to realize an idea there are now lots of creatures dependent on the idea and living through its grace. These creatures are compelled by the idea itself—but only by this idea—and would have to founder in insubstantiality were they to perceive themselves as something existing apart from it. The idea does not dawn on them but instead creates them. It is not they who realize the idea, but the other way around: it realizes and breathes life into them. (Kracauer, "The Group as Bearer of Ideas," in *The Mass Ornament: Weimar Essays*, trans. and ed. Thomas Y. Levin [Cambridge: Harvard University Press, 1995], 151–52)

This is a truly profound essay, and it really should be read in its entirety by anyone wishing to understand modern subjectivity.

Kracauer ponders some of the same points when he comes to write on his former teacher Georg Simmel:

> Elementary instincts blend into the collective spirit/intellect [*Gesamtgeist*]; the more subtle spiritual [*seelischen*] qualities of the individual must be abandoned when it descends to the social level. How is one to evaluate the primitiveness of the collective and the differentiatedness characteristic of the private self? Depending on the circumstances, they should both be valued equally highly. The former is considered venerable, is sacred by virtue of its age, its pervasiveness, and its incontrovertibility; the latter is respected because it bespeaks a higher spirituality, is rare, provokes us to action, and so on. Simmel follows this with a more detailed presentation of the painful changes in their being that individuals undergo when they become part of a mass. The intellect becomes significantly restrained, while the capacity for feeling, sensitivity, and passion often increases. The mass does not lie, but it lacks a sense of responsibility: it lets itself be guided by its immediate impressions, without any self-criticism; its moral inhibitions are suspended. The status of the social level relative to the individual level is expressed by the following formula: "What is common to all can only be what is owned by those

who possess the least." (First published as "Georg Simmel," in *Logos: Internationale Zeitschrift fur Philosophic der Kultur* 9, no. 3 [1920–21]: 307–38)

As Levin notes (in "Credits," 393), this is the first chapter of an extended and still unpublished book-length manuscript titled *Georg Simmel: Ein Beitrag zur Deutung desgeistigen Lebens unserer Zeit* (Georg Simmel: A Contribution to the Interpretation of the Spiritual/Intellectual Life of Our Time), 1–35. It is collected in *The Mass Ornament*, 225–58, at 243.

204 "Kult der Zerstreuung" was first published in *Frankfurter Zeitung*, 4 March 1926, 1–2 (Erstes Morgenblatt) and was reprinted in Kracauer, *Das Ornament der Masse: Essays* (Frankfurt am Main: Suhrkamp Verlag, 1963), 311–17. It appears in translation in Kracauer, *The Mass Ornament*, 323–28 at 326.

205 Oskar Schlemmer, "The Mathematics of the Dance," *Vivos Voco* 5, nos. 8–9 (August–September 1926). The remark appears in translation in Wingler, *The Bauhaus*, 119.

206 The interest in this period in the idea that beauty reflects the cosmic order is exemplified in the work of Gustav Fechner (1801–1887).

207 "Манифест Летучей Федерации Футуристов" (Manifest Letuchei Federacii Futuristov; The Manifesto of the Flying Federation of Futurists), in *Газета Футуристов* (Gazeta Futuristov; Futurist Gazette), 15 March 1918. An English translation appears in Andrey Smirnov and Liubo Pchelkin, *Russian Pioneers of Sound Art in the 1920s*, catalogue of the exhibition "Red Cavalry: Creation and Power in Soviet Russia between 1917 and 1945" (Madrid: La Casa Encendida, 2011), 1.

208 It is worth pointing out that the Projectionists-Electroorganismists Solomon Nikritin, Kliment Red'ko, Sergei Luchishkin, and Aleksandr Tyshler all studied with Exter in the late 1910s.

209 From V.T. (V. Tikhonovich), "Закономерный театр" (Zakonomernyi teatr; Regulated Theatre) in *Вестник искусств* (Vestnik iskusstv; Herald of the Arts) 1 (1922): 12–13; this passage appears in an English translation in Richard Taylor and Ian Christie, eds., *Inside the Film Factory: New approaches to Russian and Soviet cinema* (London and New York: Routledge, 1991), 46.

210 Re. Schillinger's system: Joseph Schillinger (1895–1943) was a professor and member of the State Institute of the History (Science) of the Arts in Saint Petersburg from 1925 to 1928. In the 1930s and 1940s he was renowned as a teacher of composition that was known as the Schillinger System of Music Composition (though, in fact, his approach was anything but systematic). Although his writings are essentially a grab bag of devices, taken as a whole, they offer an utterly remarkable extension of the Pythagorean notion of harmony. These harmonic devices generalized Schillinger's notion of interference patterns.

211 B. Ferdinandov, "Театр сегодня" (Teatr segodnya; Theatre Today); in *O meampe* (O teatre; On Theatre) (Tver: 2nd State Printing House, 1922), 46. In English: in *Inside the Film Factory*, ed. Taylor and Christie, 46.

212 V. Turkin, *Кино-актер* (Moscow: Kino-izd-vo RSFSR, 1925), 9–10. In English: in *Inside the Film Factory*, ed. Taylor and Christie, 47.

213 V. Turkin, *Кино-актер*, 10; in *Inside the Film Factory*, ed. Taylor and Christie, 48.

214 "Экран и ритм" (Ekran i ritm; The Screen and Rhythm), *Театральный журнал* (Theatre Journal) 7 (1918): 4–5. Cited in English in Mikhail Yampolsky, "Kuleshov's Experiments and the New Anthropology of the Actor," in *Inside the Film Factory*, ed. Ian Christie and Richard Taylor (London: Routledge, 1991), 31–50 at 40.

The Volkonsky cited is Serge Wolkonsky (a.k.a. Сергей Михайлович Волконский, Sergej Mihajlovich Volkonskij, Sergei Mikhailovitch Volkonsky, 1860–1937), a Russian aristocrat (he had the title of Prince) and influential theatrical worker. He was a pupil and friend of Émile Jaques-Dalcroze (1865–1950), among the first proponents of eurhythmics in Russian, as well as the creator of an original system of actor's training that included both expressive gesture and expressive speech.

Yampolsky notes that Anna Lee is the "pen name of Anna Zaitseva-Selivanova, the future wife of Pudovkin" (48). I am uncertain about this identification: my digging around tells me that the artist whose stage name was Anna Lee (Анна Ли) was Anna Semzowa (Анна Земцова, Anna Zemcova), who was married to Pudovkin from 1924 to 1953. I have not been able to sort this matter out, nor to find out any further information about Анна Зайцева-Селиванова (Anna Zaitseva-Selivanova).

215 In A. Belenson, *Кино сегодня*: *Очерки советского кино-искусства (Кулешов-Вертов-Эйзенштейн)* (Kino segodnya: Ocherki sovetskogo kino-iskusstva [Kuleshov-Vertov-Eizenshtein]; Cinema Today: Essays in Soviet Cinema Art [Kuleshov-Vertov-Eisenstein]) (Moscow: 1925), 23; cited in Yampolsky, Mikhail Yampolsky, "Kuleshov's Experiments and the New Anthropology of the Actor" (1921), in *Inside the Film Factory*, ed. Taylor and Christie, 30–50 at 48. Yampolsky's article, on the connection between dance and montage, reveals the depth of Kuleshov's understanding of the cinema as a dynamic art form.

216 Yutkevich, like so many once-valiant avant-gardists, later succumbed to pressure to make mainstream, industrial films, many of them influenced by the physical comedy of the American cinema, including Charlie Chaplin, whose ability to act with the entire body, and hardly involving his face, impressed many participants in Moscow's progressive theatre scene.

217 René Fülöp-Miller, *Geist und Gesicht des Bolschewismus* (Vienna: Amalthea-Verlag, 1926); in English, *The Mind and Face of Bolshevism* (New York: Harper and Row, 1962), 182. I have introduced the emphasis.

Of course, all of this was relentlessly masculinist—it should not be thought that the Bolsheviks' claims to have emancipated women state the truth about that time. Here is Nikolaï Foregger stating some principles that underlie his view of art and dance:

> E. Eras of decline attribute the central position in the dance to women; the eras of construction—to men. The reverie, romance, and finesse of the nineteenth-century dance was transmitted by the ballerina. The validity, reality, and the strength of our times must be demonstrated by the male dancer.
>
> F. The male dancer leads the dance. Precision, boldness, strength define his work. The demand for pre-eminence for the male dancer does not mean the abolition of all female dancers. Male and female elements manifest themselves not through the work records of the performers but in the predominance of various traits of aggressiveness or passivity that are transmitted in the dance. (Foregger, "Experiments in the Art of the Dance" [1926], trans. David Miller, *Drama Review* 19, no. 1, Post-Modern Dance Issue [March 1975]: 74–77 at 74)

218 Fülöp-Miller, *The Mind and Face of Bolshevism*, 183–84.

219 Ibid., 183.

220 Ibid.

221 Quoted in Mel Gordon, "Foregger and The Dance of the Machines," *Drama Review* 19, no. 1, Post-Modern Dance Issue (March 1975): 68–73 at 71, 72; publishing information

and page numbers for the source not given. Gordon notes that Carter reported that "the workers were outraged by the performance, deeming it anti-Soviet and pornographic, and threatened to bring the performance to the attention of the Cheka [*Чека*; the internal police], noting the machine dancing was deemed worthwhile" (73).

222 Significantly, Projectionism also went by the names Электроорганизм (Jelektroorganizm, Electroorganism), which stresses those aspects of the movement that were a reaction against Constructionism, including its organicist (as opposed to mechanical) aspects and its opposition to *вещь* (veshh', thing) aesthetics; and Луминизм (Luminizm, Luminism), which emphasizes the transcendent implications of their beliefs about art.

223 Nikritin did not actually use these Neo-Platonic terms, but the logic of his position suggests he accepted them.

224 *Каталог Первой дискуссионной выставки объединений активного революционного искусства* (Katalog Pervoj diskussionnoj vystavki ob'edinenij aktivnogo revoljucionnogo iskusstva, Catalogue of the First Discussion Exhibition of Active Revolutionary Art), *Тверская* (Tverskaya) 34 (Moscow, 1924): 9. *Тверская* was a periodical named after a busy Moscow avenue, one of the principal streets that radiate from the centre of the city. An English translation of this passage appears in Smirnov and Pchelkina, *Russian Pioneers of Sound Art in the 1920s*, 2. I have altered their translation to bring it into closer conformity with the original.

225 Cited in Irina Lebedeva, "The Poetry of Science: Projectionism and Electroorganism," in Thomas Kren et al., *The Great Utopia: The Russian and Soviet Avant-Garde 1915–1932* (exhibition catalogue) (New York: Guggenheim Museum, 1992), 441–49 at 442. Charlotte Douglas offers valuable comments on Projectionism in "Energetic Abstraction: Ostwald, Bogdanov, and Russian Post-Revolutionary Art," in *From Energy to Information*, ed. Bruce Clarke and Linda Dalrymple Henderson (Stanford: Stanford University Press, 2002), 76–94 at 90.

226 Smirnov and Pchelkina, *Russian Pioneers of Sound Art in the 1920s* (exhibition catalog) (Madrid: La Casa Encendida), 3. I note that Smirnov and Pchelkina do not remark on the Neo-Pythagorean/Neo-Platonist framework of Nikritin's ideas that I detect.

227 Fülöp-Miller, *The Mind and Face of Bolshevism*, 19. Enthusiasm for machines (and the hope that domestic machinery might reduce the burdens of domestic labour) was even more pronounced in the Soviet Union than in Europe or North America: scarcity in Czarist Russia was appalling, and industrialization was seen a way of alleviating want.

228 Ibid., 211.

229 Ibid.

230 Ibid., 211–12.

231 Ibid., 207.

232 Ibid.

233 Ibid., 208.

234 Quoted in ibid., 210.

235 In translation in Dziga Vertov, *Kino-Eye: The Writings of Dziga Vertov*, ed. Annette Michelson, trans. Kevin O'Brien (Berkeley: University of California Press, 1984), 6–8. I have introduced the first (bolded) emphasis; the others are Vertov's.

236 Sergey Luchishkin, *Я очень люблю жизнь. Страницы воспоминаний* (Ja ochen' ljublju zhizn'. Stranicy vospominanij; I Love Life: Pages of Memories) (Moscow: Sovecki xudožnik', 1926), 78–79. The passage is translated into English in Andrey Smirnov and Liubov Pchelkina, *Russian Pioneers of Sound Art in the 1920s*, 6, whence I have taken it.

237 These included the painting *Meccanica di ballerini* (Mechanics of Dancers, 1917) and the charcoal drawings *Studio preparatorio per "prospettiva sotterranea"* (Preparatory Study for *Underground Perspective*, 1917), *Studio per "Silenzio mistico"* (Study for "Mystic Silence," 1916), and *Solidità e trasparenza* (Solidity and Transparency, 1917).

238 The French aesthetician Jacques Rancière devotes a chapter of his imaginatively constructed history of modern aesthetics, *Aisthesis*, to Fuller's earlier performances in Paris, in 1893. Rancière, *Aisthesis: Scenes from the Aesthetic Regime of Art*, trans. Zakir Paul (London: Verso, 2013), 93–109. Fuller's performances, presented right at the beginning of the electromagnetic age that also produced the cinema, in linking artistic and technological innovation (through their use of coloured light), are emblematic of Art Nouveau. Furthermore, Giovanni Lista has assembled a massive (680-page) book of artworks and texts that Fuller inspired, in his *Loïe Fuller, danseuse de la Belle Époque* (Paris: Hermann, 2006).

239 Machine art was considered very "American." "The Machine-Age Exposition Catalogue," published in *Little Review* (1926–29), contained an article by the left-wing (he served on the editorial board of *New Masses*) Russian American painter and printmaker Louis Lozowick (1892–1973), titled "The Americanization of Art" (*Little Review* 12: 18–19). The Machine-Age Exposition took place 16–28 May 1927 at 119 West 57th Street in New York, and was organized by the *Little Review*'s founder and editor, Jane Heap.

240 In 1923, Cole Porter was living in luxury (subsidized by his family's wealth) in Paris, where he had gone to study. This collaboration with Gerald Murphy—and with the radical, highly individualist composer Charles Koechlin (1867–1950), who did the orchestration—was his first "success." The score was one of the first symphonic compositions that incorporated features of jazz.

241 Léger had conceived of a ballet project to be set in the streets of Paris—it was to be titled *Sketches de revue* and designed for Jean Börlin.

242 Suzan Bazargan notes in "The Headings in 'Aeolus': A Cinematographic View" that Joyce's use of headlines in that section of *Ulysses* imitates the way short silent films of the time used intertitles. That section's newspaper headlines are based on historical events, which often occur in extraordinary sites, while "equally lofty in tone were the subtitles introducing the historical persona or the dialogue." Bazargan, *James Joyce Quarterly* 23, no. 3 (Spring 1986): 345–50 at 347.

243 Dudley Murphy, "Murphy by Murphy," unpublished autobiographical manuscript, January 1966. Quoted in Freeman, "Bridging Purism and Surrealism," 31.

244 See James Joyce, Episode 17 ("Ithaca"), *Ulysses* (New York: Random House, 1961), 732. James Joyce was acutely aware of the new culture of time, space, and mechanization exemplified by the cinema.

Regarding the alchemical themes alluded to, their evocation extends the theme evoked by the esoteric implications of the retinal superimposition of circles and triangles, propelling the film into a realm of significations related to the fusing of opposites—including sexual opposites—by electricity and speed.

245 See ibid.

246 The Dutch Cine-Club's print incorporates shots of details of several of Léger's paintings; these shots presumably were included to highlight formal similarities between the film and the paintings. One would speculate that they are later additions by Léger (who, by including them, would be asserting the importance of his role in making the film).

247 Léger's sketches for the sets and costumes are in the collection of New York's Museum of Modern Art.

Concerning *Skating-Rink*: The ballet was based on a poem by Ricciotto Canudo (1877–1923), an early celebrator of the cinema, titled *Skating-Ring* [*sic*] à *Tabarin* (1920), which appeared in a fourteen-page brochure, a part of the *Mercure de France*, on 15 March 1920. The Bal Tabarin referred to in the title was an actual building, a dance hall on the rue Victor Massé. The Futurist Gino Severini presented a dynamic impression of the dancing there in his 1912 canvas, *Geroglifico dinamico del bal tabarin* (Dynamic Hieroglyphic of the Bal Tabarin).

Many artists during this period (including Léger, as we will see) had a lively interest in Charlie Chaplin's work; the choreography and costuming of *Skating-Rink* were undoubtedly influenced by Chaplin's *The Rink* (released in France in 1917 as *Charlot patine* [Charlie Goes Skating]). Chaplin's ability to seemingly dissociate his limbs from one another (to isolate the movement of, say, the left leg from the rest of his body) interested members of the avant-garde, for it furnished a new vocabulary of gestures that, when synthesized, exemplified the modern sundering of the urban self and its reintegration of elements at a higher (more vital) level.

Significantly, Josiane Mas points out the "unanimiste" intention of Canudo's poem and highlights Honneger's faithfulness to it, including Honneger's adopting a "rhythme plastique" (plastic rhythm) corresponding to the prosodic construction of Canudo's original. See Mas, "*Skating Rink*—Une musique cinétique fidèle à l'intention unanimiste et symbolique du poème de Ricciotto Canudo," in *Arthur Honegger: Werk und Rezeption / L'œuvre et sa reception*, ed. Peter Jöst (Bern: Peter Lang, 2009), 275–90 at 278. Mas construes Canudo's interest in the project as an effort to effect a "conciliation" of the arts, thereby elevating cinema out of the realm of popular entertainment into the sacred realm of the high arts. Canudo conceived of the arts as vestiges of the sacred festival in the modern age, and as much needed in a time when the rise of technology has resulted in a decline in religious belief/feeling.

*Skating-Rink* influenced Fortunato Depero and Ernrico Pampolini.

248 On *Paul & Virginie, Supercinéma*, see Robert Orledge, *Satie the Composer* (Cambridge: Cambridge University Press, 1990), 235–38; and Judi Freeman, "Fernand Léger and the Ballets suédois: The Convergence of Avant-Garde Ambitions and Collaborative Ideals," in *Paris Modern: The Swedish Ballet, 1920–1925*, ed. Nancy Van Norman Baer (San Francisco: Fine Arts Museum of San Francisco, 1996), 86–107 at 88.

249 A note regarding "*Le grand déjeuner*"—Léger usually referred to his 1921 painting by this title, but sometimes by "*Les trois femmes*." The English title for the painting is sometimes given as *Three Women (Le grand déjeuner)*.

250 Thus, "primitivism" (a lamentable word) attracted many members of the various avant-garde movements that flourished in the first decades of the twentieth century. I have argued that these vanguard movements developed out of a sense that the culture of modernity had been impoverished by its overemphasis on reason, and that their purpose was to reawaken vital forms of experience that had been eclipsed by reason's dominance. These vanguards viewed Pre-Columbian and African art as embodying a genuine connection with experiential realities that Europe had closed itself to with the Enlightenment. Furthermore, they aimed at integrating art and life, and the stunning richness of sculpture, carving, and music from Africa and the Pre-Columbian Americas, having developed in societies that did not separate art from life, they took as evidence of the feasibility of that project.

251 Carl Einstein presents his thoughts on this topic in *Negerplastik* (Black Sculpture) (Munich: K. Wolff, 1915).

252 Carl Einstein, "Antike und Moderne," in *Werke*, vol. 4: *Texte aus dem Nachlass*, ed. Hermann Haarmann and Klaus Siebenhaar (Berlin: Fannei and Walz, 1992), 140–45 at 142; as the subtitle suggests, the work was unpublished in Einstein's lifetime. For this quotation, and a discussion of it, consult Charles W. Haxthausen, "Bloody Serious: Two Texts by Carl Einstein," *October* 105 (Summer 2003): 105–18 at 113.

253 A fine article by Sebastian Zeidler lays out details of Einstein's account. Zeidler, "'Totality against a Subject: Carl Einstein's 'Negerplastik,'" *October* 107 (Winter 2004): 14–46. Zeidler also points out that Helmholtz influenced the Kantian theme in Einstein's *Negerplastik*.

254 Georges Didi-Huberman, "'Picture = Rupture': Visual Experience, Form, and Symptom According to Carl Einstein," *Papers of Surrealism* 7 (2007): 1–25.

255 While several Parisian artists collected so-called early and non-European art, Léger did not; he relied on books by Marius de Zayas, and above all else on the illustrations in Carl Einstein's *Negerplastik*. Léger analyzed these models closely.

256 Stanley Crouch, "Jazz Criticism and Its Effect on the Art Form," in *Considering Genius: Writings on Jazz* (New York: Basic Civitas Books, 2007), 216–29 at 217. Couch's essay is a critique of a piece by Amiri Baraka (1934–2014), whom Crouch consistently refers to as LeRoi Jones—that origin explains the title.

257 Ibid.

258 Ross Russel, *Jazz Style in Kansas City and the Southwest* (New York: Da Capo, 1973), 40.

259 Cited in Stephen Johnson, *Burnt Cork: Traditions and Legacies of Blackface Minstrelsy* (Amherst: University of Massachusetts Press, 2012), 98.

260 Charles Dickens, *American Notes for Common Circulation* (New York: John W. Lovell Company, 1883), 274–75.

261 Abel Gance, quoted in Roger Icart, *Abel Gance* (Paris: L'Institut Pédagogique National, 1960); reprinted in Georges Sadoul, *Histoire générale du cinéma*, vol. 5 (Paris: Denoël, 1975), 145–46.

262 Blaise Cendrars, *Œuvres complètes*, vol. 4, 96.

263 Mikhail Iampolski, *The Memory of Tiresias: Intertextuality and Film*, trans. Harsha Ram (Berkeley: University of California Press, 1998). The quotations from Cendrars below are cited by Iampolski, though I checked them against a different (more recent) publication, by the same translator, and modified them. I give page numbers for the edition I consulted.

264 Blaise Cendrars, *Moravagine*, trans. Alan Brown (Garden City: Doubleday, 1970), 152–54.

265 Ibid., 46–47. This entire passage is indirect discourse.

266 That is not to say that the *poésie du quotidien* that Léger constructs does not reverberate with the mystery of these mythic figures.

Iampolski comments on the intertext as a cultural anthropologist—a rich intellectual tradition in Russia. However, it seems to me that his anthropological interests steer the discussion in what turns out to be a confining direction, viz., towards emphasizing the mythological dimension of Cendrars's work, about which Léger appears to have had some ambivalence. This leads him away from considering the role the cinema and other new technologies played in shaping Cendrars's (occult) mythology and (what perhaps is more important) the role that ideas about electrotechnical art (the cinema was at the time considered the paragon of electrotechnical art) had in shaping his literary practice.

267 One recognizes with a start why *Ballet mécanique* is often included in programs of Surrealist film (even though making a Surrealist piece would have been the furthest thing from Léger's mind). William Moritz, in "Americans in Paris: Man Ray and Dudley Murphy," in *Lovers of Cinema*, ed. Jan-Christopher Horak (Madison: University of Wisconsin Press, 1995), 118–36, argued that Léger's role in the film was slight, compared to those of Man Ray and Dudley Murphy. One purpose for this was to establish that the film is largely a product of Man Ray's and Dudley Murphy's Dadaist imaginations. As much as I appreciate Moritz's passionate scholarship in animation history, this seems to me an insupportable claim: there are too many continuities between Léger's painting (especially of the years 1923 to 1925) and the film to discount his role to anywhere near the degree that Moritz does. Looking carefully at the film discloses the deep relations between it and the paintings Léger did in the period. Doing that also reveals that *Ballet mécanique* offers a profound meditation on some of the fundamental questions raised by Cubist methods (I hope I have indicated that in the analysis of the film in the appendix to this volume, posted on the WLU Press website). Perhaps there are some Dada and some Surrealist qualities in the film, but the work is much closer to Cubism than to either of those movements.

Many people have accepted Paul Lehrman's claims to have faithfully re-created the music Antheil intended to accompany the film, and that is why the version of the film included with the *Unseen Cinema* DVD set is so often consulted. In his introductory blurb for *Ballet mécanique* written for that set, the English film critic Deke Dusinberre repeats Moritz's claim that the film has a profoundly Dadaist character. That view has become almost canonical. I believe it overstates the case. Like some of Marcel Duchamp's and Francis Picabia's more Cubistic paintings, *Ballet mécanique* possesses Dada and Surrealist qualities, but it is far from being a Dada or Surrealist work.

268 Léger's illustrations for *La Fin du monde filmée par l'ange N.D.* offer evidence that Léger took into account their being illustrations for a literary work, for Léger incorporates typographical elements in the illustrations. These typographical elements sometimes interrupt the composition and sometimes serve to give it its form. The lettering, both handwritten and stencilled, sometimes seems to define city walls, and sometimes seems to be suspended in space, and sometimes gives both appearances at once.

269 Among the themes of the work is that developing a grand vision of the cosmos's integrity can unite a human being with the great order of things. This is a cardinal alchemical theme, exemplified in a beautifully illustrated work by the seventeenth-century Rosicrucian, Robert Fludd, *Utriusque cosmi majoris et minoris historia* (The History of Both the Greater and the Lesser Cosmos), which Cendrars knew. Might Cendrars's interest in film have been the result of a belief that the cinema could create for the technological age a visual-narrative integrity as ontologically (and spiritually) potent as that which alchemical literature offered to pre-Enlightenment seekers?

270 Blaise Cendrars, *Tout autour d'aujourd'hui: Nouvelle édition des œuvres de Blaise Cendrars* (Paris: Denoël, 2001–6), vol. 3, 277.

271 Thus, Léger's set for *La création du monde* also presented, at the beginning of the piece, a cluttered scene, of a world in seeming disarray.

272 Blaise Cendrars, *Modernities and Other Writings* (Lincoln: University of Nebraska Press, 1992), 25.

273 Blaise Cendrars, "New-York in Flashlight" (1912), in *Inédits secrets: 1910–1935* (Paris: Le Club français du livre, 1980), 239–40 at 239.

274 Ibid.

275 Ibid.

276 Miriam Cendrars, *Blaise Cendrars* (Paris: Éd. Balland, 1984), 221.

277 Ibid., 225.

278 Cendrars, *Tout autour d'aujourd'hui*, vol. 3, 19.

279 See James Joyce, *Finnegans Wake* (London: Faber and Faber, 1939; Harmondsworth: Penguin, 1982), 143, ll, 28

280 Cendrars, *Tout autour d'aujourd'hui*, vol. 3, 35.

281 Frederick Kiesler's interest in *Ballet mécanique* developed from a conjunction of interests in machine art and in projection. The same year that Kiesler presented *Ballet mécanique*, he also created a visionary electro-optical-mechanical set for Karel Čapek's (1890–1938) play from 1920, *W.U.R.* (or *R.U.R.*). At the back of the set was a meter-wide mechanical iris, which opened to expose a film projected onto its surface; in the middle, a moving part shuttled back and forth, light bulbs flashed on and off, and a large wheel rotated continually (all of these motifs are repeated in Léger's film). He also made use of a nineteenth-century optical system known as Tanagara and generally used in fairgrounds (e.g., Luna Park). This device employed a concave mirror that allowed the audience to see, at a much-reduced scale, performers positioned behind the set through an image projected on a mirror in the control wall. I have already pointed out that spatial plasticity, which Kiesler generally discussed under the rubric of "continuity," was taken in this era as a brand marking the art of the postmodern era. (The interesting question, of course, is why, and that is a question I have set out to answer in this book. Here I wish simply to make the point that Kiesler's set associates this spatial plasticity with the cinema and with projection.)

282 However, William Moritz points out that Kiesler was involved in other screenings of the film: in Paris in 1926, and in New York also in 1926. He also points out that Kiesler met Léger many years later, in America. This opens up the possibility that Anthology's Kiesler's print is a later, "revised" print (though it is unlikely to be Léger's revision, since, as he recognizes, the titles on the Kiesler print are almost certainly Murphy's: the "*mécanique*" undergoes an Anglicizing misspelling, as "*Méchanique*"). See Moritz, "Americans in Paris," 135n26.

I don't think that the Kiesler print, despite being the print that was exhibited at the first screening of the film, should (*pace* Paolo Usai Cherchi) be taken as the definitive print—the notion sometimes taught to students in film preservation, that the version of a film that was shown at the first screening should be taken as the "genuine version," is simply balderdash. (I have on two occasions produced a celluloid print of a film for a screening I had committed to, even though I knew that the piece required further work.) I believe that the Kiesler print was provisional (the fact that it had splices in it might even suggest that it was a working copy, not a release print). Léger continued to work on the film after the first screening; one of those versions is the one the Dutch Cine-Club preserved—and it seems to me preferable to the Kiesler print, as a silent film and as a sound film (I believe I can say that on reasonably good authority, since I have experimented with syncing versions of Antheil's scores with both those versions of the film).

283 I have based my analysis of the film on the Dutch Cine-Club's print because it contains additional footage that I believe allows one to see clearly the continuity between Léger's paintings and *Ballet mécanique*. And frankly, I believe it is an aesthetically superior version (which would more or less confirm my conjecture that the print presented at the film's first screening was provisional).

284 Here is a draft listing of prints of *Ballet mécanique* that achivist Bruce Posner has sent me—he notes that this is a preliminary list: he is characteristically meticulous and I wouldn't be at all surprised if he has located other prints by the time this volume is published.

| Print Version | Format | Length | Source | Year | Duration | Projection |
|---|---|---|---|---|---|---|
| **Dudley Murphy** | **35mm** | **n/a** | **Murphy** | **(1924–26)** | **unknown** | |

Hand-coloured, Kiki appears, includes sex scenes, nudes, and a pregnant Katherine Murphy, 147 frames of *Charlot Cubiste* appear at the beginning of the film.

**Anthology Film Archives** **35mm*** **18,948** **Kiesler** **(1924–26)** **15:47** **20fps**
Includes 2 titles for the film (one of then is *Images Mobiles*), 3 sequences with Chaplin, many splices.

**EYE Film Institute** **35mm*** **16,257** **Filmliga** **(1929–31)** **13:33** **20fps**
No titles, some hand-coloured, images of Kiki, 11 paintings, 52 frames of *Charlot Cubiste* appear just after the parrot passage.

**Cinémathèque française** **35mm*** **15,584** **Léger** **(1928–)** **12:59** **20fps**
Includes credit for "Synchro," images of Kiki, and French titles at the beginning and end.**

**Cinémathèque française** **35mm*** **15,264** **Léger** **(1928–)** **12:43** **20fps**
Includes credit for "Synchro," images of Kiki, French titles at the beginning and end, their order switched from above.

**Julian Levy** **16mm** **2,000+/-** **Levy** **(1931)** **1:40** **20fps**
Partial print at Museum of Modern Art, New York.

**George Antheil** **35mm** **n/a** **Synchro** **(1932–34)** **n/a**
Possibly edited by Antheil, to create sound-image relations he wanted, then returned to Léger.

**Museum of Modern Art** **35mm*** **15,808** **Langlois** **(1936)** **13:10** **20fps**
Includes a credit for "Synchro," French titles at the beginning; a note on the film, in English, was added.

**Museum of Modern Art** **16mm***** **n/a** **Léger** **(1938–39)** **n/a** **20fps**
Likely prepared for Léger's Yale lecture, with hand colouring by Gustav Brock.

**Léger Museum Biot** **35mm** **14,856** **Léger** **(1955–77)** **12:23** **20fps**
Synchro titles, 2 sequences presenting circles are missing.

**Deutsches Filmmuseum** **35mm** **19,851** **Moritz** **(1994)** **16:33** **20fps**
Includes credits for Kiesler and Filmliga-Synchro, hand-coloured and tinted blue in parts, includes images of Kiki and some blurry erotic images.

* Nitrate positive print.
** End title on both Cinémathèque française prints: "Extrait du film *Le Ballet Mecanique* realisé en 1923 par Fernand Leger copie deposée à la Cinémathèque française par Mr. Fernand Léger."
*** At the time of Léger's lecture at MoMA in October 1935, there may have been two prints, one in 16mm and the other in 35mm, both hand-coloured by Gustav Brock; only the 16mm print was retained by MoMA—they copied the hand-coloured 35mm to black-and-white and returned the 35mm to Léger.

It is worthwhile to note, regarding Léger's 1935 version, that at the time the Museum of Modern Art's film curator was Iris Barry (the film library, now the Department of Film, was established in 1935, after a test program in Hartford, Connecticut, in 1933–34, with Barry as its head). Barry had gotten to know *Ballet mécanique* some time before the founding of MoMA's film library (likely through her mentor, Ezra Pound). She had even written about the film in *Vogue* (January 1925), characterizing it as "a study in comparative motion." Barry, "Paris Screens and Footlights," 37; quoted in Laura Marcus, *Writing about Cinema in the Modernist Period* (Oxford: Oxford University Press, 2007), 287.

285 Murphy's experience with coordinating music and picture undoubtedly influenced George Antheil's approach to *Ballet mécanique*. From 1920 on, the central focus of Murphy's interest was to create a correspondence between image and sound, and he worked obsessively to find a way to synchronize music and cinematographic images (this obsession was the *vix motrix* for his Visual Symphonies). Even before *Soul of the Cypress* was presented in Paris, under the title *Dryade*, Murphy had made contact with a Parisian engineer, Charles Delacommune, who was working on a machine, the *ciné-pupitre* (cinema console) for synchronizing sound and picture using a perforated strip of film.

Murphy's and Delacommune's obsessions were well matched, for the coordination of musical and visual dynamics was Delacommune's principal interest as well. In 1921, Delacommune published an article in *Comoedia* in which he presented his views on the best way to create an "atmosphère musicale vraiment adéquate aux actions qui se déroulent sur l'écran" (musical atmosphere truly equal to the action that unfolds on the screen). In doing this, he was engaging in what was at the time an important debate concerning the appropriate aural accompaniment for film. Delacommune took the position that music allowed the cinema to create "ses effets les plus puissants et les plus sûrs" (its most powerful and certain effects). The *ciné-pupitre* was an attempt to respond to the problems created by the acceleration and deceleration of projectors (Delacommune characterized these as "caprices de l'électricité") and the variations in tempo that are a feature of live performances. His proposed solution was a command post supplied with a window through which the score scrolled. A perforated paper roll, synchronized to the perforations in the 35mm film, illuminated one measure of the score at a time, allowing the conductor to vary the tempo to compensate for these "caprices." In addition, it allowed a technician to vary the electric current to regulate the speed of the film. (Delacommune also produced a sound-making device that would allow its operator to produce sounds mimicking nature to go with a film.)

Simultaneously with his work on the *ciné-pupitre*, Delacommune imagined, and developed the technology for producing, an automated form of visual music, and this interest brought him into contact with Murphy. Notes from London's Film Society, for a program at the New Gallery Kinema for 17 January 1926, list a piece, *The Waltz Mephistophilis of Liszt*, to be accompanied by "piano, under the direction of Charles Delacommune." The Film Society's note explained that a special mechanism would be used to link the piano and the image, and that mechanism was Delacommune's Synchronismes Cinématographiques (patented 1922 and 1923), which "attempted to make a moving pattern each motion of which shall correspond exactly to a note in the Liszt waltz…Mr. Delacommune will supervise the working of his synchronising apparatus." Quoted in *The Sounds of the Silents in Britain*, ed. Julie Brown and Annette Daviso (Oxford: Oxford University Press, 2012), 108. The synchronizing mechanism used a punched paper role to control the piano's performance with the projection apparatus.

*La valse de Mephisto* was likely a collaboration with Murphy, who considered it another of his visual symphonies (he also considered *Ballet mécanique* to be an extension of his visual symphonies). One important fact to take away from this is that Delacommune was working on a means to synchronize a piano (a player piano?) with film. I think that is what he was expected to do for *Ballet mécanique*: to synch the operation of a Pleyel et Cie player piano with the projected images.

Murphy started working with Delacommune before undertaking *Ballet mécanique* and it seems he wanted to continue working with him—it is almost certainly he who introduced Delacommune to Antheil and Léger. On 18 January 1924, Léger paid 300 francs to Delacommune, almost certainly as a fee to help develop an apparatus to synchronize Antheil's score of *Ballet mécanique* with its principal visual component (the film) (Judi Freeman cites Kathleen Hawley Murphy's datebook for 1924 as her source for this information; see Freeman, "Bridging Purism and Surrealism," 34 and 44n28). Revisions to the score continued after that date.

Delacommune first called his company Synchronisme cinémathique, and later (after 1928) Synchro-Ciné—some of the versions of the film have a credit to that company (see previous endnote). In an article in *the* modernist literary periodical, Léger acknowledges Delacommune's contribution by noting that the makers all hoped that his scientific work would allow them to achieve mechanically an absolute simultaneity of sound and image ("Film by Fernand Léger and Dudley Murphy, Musical Synchronism by George Antheil," *Little Review*, Autumn–Winter 1924–25: 44; the term "musical synchronism" in this quotation highlights the makers' engagement with the aesthetics of technology development). Furthermore, in letters to George Antheil and Ezra Pound (the latter, we can see, was still involved), Léger acknowledges Delacommune's role (letters to Pound 22 April, 23 November, and 14 December 1932, Beinecke Library, Yale University; letter to George Antheil, 5 February 1933, George Antheil Archive, El Cerrito, California). These documents are identified in Freeman, "Bridging Purism and Surrealism," 44n26.

As late as 1932 and 1933, the possibility of creating a synchronized performance was still being fussed over (and in a 1935 print that Léger gave the Museum of Modern Art in New York, Synchro-Ciné receives a credit). One would be entitled to ask why, if *Ballet mécanique* was meant to be presented with a large orchestra, as Lehrman and other writers on film claim it was, Léger kept trying to synchronize the sound and the picture after Murphy and Antheil had decamped to America. The answer is to be found in considering what instruments the film was actually scored for. I do not believe that the score was for a large symphony orchestra, numerous player pianos, and noisemakers. Rather, I believe, it was exactly what Antheil said it was, "a chamber piece" for a single, dual-roll Pleyel pianola. (Note that Pound, in the "Note on Antheil" section of "Machine Art" notes that the idea for noise music came to him in part from two compositions by Antheil, one of them "his Ballet Mécanique as played by him first on one Pleyela, and, later on, on ONE Pleyela, with bells, buzzers, and amplifier" [Pound, *Machine Art and Other Writings: The Lost Thought of the Italian Years*, ed Maria Luisa Ardizzone (Durham: Duke University Press, 1996), 76].) The dual-roll Pleyel pianola (the Fotoplayer) would have used a set of perforations to drive the "slave" rolls—the dual pianola rolls—and the movie projector would have to be driven by a variable-speed motor that shared a common pulse controller with the pianola's electromechanical mechanism. (Like the Pleyel Fotoplayer, Delacommune's Synchronisme cinématique apparatus would have used a punched paper roll to synchronize music and image.)

I believe that what Delacommune was hired to do was find a way to synchronize the master roll of the Pleyel Fotoplayer and film projector. (It is interesting that Antheil's device for synchronizing frequency-hopped signals also used punched-paper rolls—though it must be allowed that this was a common means of synchronization at the time.) However, since the dual-roll Fotoplayer did not go into development, Antheil conceived of a version first for a regular dual-roll Pleyela, but very soon after, for a single-roll player piano: the latter is the version that Pleyel punched, introducing many errors in the process. This is the version that we have—what should have been separated (by length) into three spool rolls was punched onto one.

On this scenario, the reason the film was released without sound is not what Lehrman suggests—that the grand concert version could not be realized. Rather, a series of aggravating circumstances arose because the Fotoplayer did not become available. First, Delacommune failed to find a good way to synch the sound and the picture; second, the single pianola-roll version (with what should have been three rolls combined on one paper roll) was inadequate (the job of creating that single pianola-roll was botched, but even if it hadn't been, it could never have the clarity and complexity of the version for a multi-roll player). Léger and Delacommune kept trying to find a way to make the single-roll version work.

It is interesting in this context that the 1935 performance of *Ballet mécanique* that Iris Barry organized at MoMA was for player piano.

286 All quotations in the paragraph appear in Moritz, "Americans in Paris," 122.

287 See R. Bruce Elder, "Modes of Representation," in *Image and Identity: Reflections on Canadian Film and Culture* (Waterloo: Wilfrid Laurier University Press, 1989), 154–83. I raise the topic of the cinema of illustration here in order highlight the radical difference between *Danse macabre* and *Ballet mécanique*. My distinction between these cinematic models (and between them and the cinema of presentation) develops the insight that a work of art has a systematic aspect and that the elaboration of its surface elements and relations is guided by a few basic principles or rules. The three cinematic modes have determinants of fundamentally different sorts; those of the cinema of illustration are the most conventional and those of the cinema of construction the most radical.

288 Consider the film work of Paul Strand (1890–1976) and Ralph Steiner (1899–1986). Paul Strand's films include *Manhatta* (1921) with Charles Sheeler (1883–1965); *Redes* (Waves, 1936), which anticipated Italian neorealism; *The Plow That Broke the Plains* (1936), with Pare Lorentz (1905–1992), a work on the Dust Bowl of the Depression years; and the anti-Fascist *Native Land* (1942). Ralph Steiner's (1899–1986) early films include $H_2O$ (1929); *Mechanical Principles* (1930), which has many similarities to *Ballet mécanique*; *Surf and Seaweed* (1931); and *May Day in New York* (1931). I am tipping the tables in my favour when I make this claim and support it with these examples, for they represent a photographic strain in American independent film, one that has much in common with Canadian experimental filmmaking before the Great Collapse of 1989. This photographic strain represented the greater part of American independent filmmaking activity at its outset but was gradually overtaken by a lyrical, poetic (or sometimes mythopoeic) strain, to the point that by 1942, the latter had achieved such dominance that it relegated the documentary, photographic proclivities of the medium to the realm of the virtually invisible.

289 Man Ray, *Self Portrait* (Boston: Little, Brown, 1963), 266.

290 Ibid., 266–67.

291 Without exception, film historians assert that it was the lens that Murphy brought with him from Europe that was used to shoot *Ballet mécanique*. The multi-image shots in *Ballet mécanique* are never described as moving-picture vortographs. But I think a simple comparison of Coburn's vortographs and the multi-image shots in the film makes clear that that is exactly what they are (and so their presence reflects the influence that Pound's plans for a Vorticist film had on *Ballet mécanique*). We also have Pound's own testimony: as we have seen, Pound claimed in "Machine Art" that he and Alvin Coburn invented the vortoscope in 1916 and that "Dudley Murphy applied this simple device to cinematography." It is also interesting, as concerns the matter of the collaboration on the film (and the important role many historians have attributed to Dudley Murphy in conceiving and implementing *Ballet mécanique*'s multi-image technique), that in his piece Pound disparages Murphy's work and extols Man Ray's work on the early Vorticist film that he, Murphy and Ray were collaborating on, saying (as we noted previously) that he and Murphy produced "a few metres of interesting and highly unsatisfactory film" and that "Man Ray with his brilliant record and long experience produced something infinitely better." He goes on to note that "Murphy combined with Léger and got some interesting results" (Pound, *Machine Art and Other Writings*, 76).

See the online appendix at the WLU Press website for my discussion of influence and Pound's claim to being involved in its conception.

292 The date of the letter is open to question. The letter, in the Beinecke collection at Yale, is undated, though an archivist has added an inaccurate note to the effect that the letter was written in October 1924. Judi Freeman gives July 1923 as the date ("Bridging Purism and Surrealism: The Origins and Production of Fernand Léger's *Ballet Mécanique*," in *Dada and Surrealist Film*, edited by Rudolf E. Kuenzli. [New York: Willis Locker & Owens], p. 31). Moody gives October 1923 as the date, and it has been speculated that was written in late October (Pound, *Ezra Pound to His Parents: Letters 1895–1929*, ed. Mary de Rachewiltz, A. David Moody, and Joanna Moody [Oxford: Oxford University Press, 2011)], 519–20 at 520). That is possible, though weighing against the claim is the letter (mentioned in the following note), from 16 November 1923, in which Dudley Murphy claims that he and Pound have practically finished the Vorticist film they were working on. While it is possible, it seems to me unlikely that, between late October and 16 November 1923, Pound and Murphy would have met, gotten to know each other well enough to agree to work on film project together, planned the project, and carried it to near completion. (In fairness, one should acknowledge that much later, in 'Machine Art' [1927/1930], Pound suggested they took 'a few metres of interesting and highly unsatisfactory film' [Pound, *Machine Art and Other Writings*, 76], which be taken as lending credibility to claims for such an abbreviated time span. Somewhat weighting against that, however, are Pound's comments in a letter from 29 January 1924 [Moody, ibid., 522], in which Pound states that in November and December he had occupied himself, among other activities, with work on the Vorticist film—that suggests that project consumed more than a day's or a few days' work. It should also be pointed out that here Pound seems to have been inclined to slight his part in the project.)

Another fact about Murphy and Pound's collaboration bears comment. Man Ray suggests that he and Dudley Murphy initiated the project that became *Ballet mécanique*, that Léger got involved only when they ran out of money, and that Pound's role was exclusively that of introducing Murphy and George Antheil, the composer of the film's score, to the painter. But a letter that Murphy wrote to father in November 1923 testifies

at that point Pound was paying the costs of the Vorticist film (Dudley Murphy to Herman Dudley Murphy, 19 November 1923; cited in Judi Freeman p. 43n13). All this argues for Pound's having had a larger role in the film than he is usually credited with.

Murphy's beliefs about the value of having a richly significant correspondence between a film's visual dynamics and the dynamics of an existing piece of music reflects an important strain in modernist art theory, viz., that all the arts aspire to the condition of music. But there is also a more specific influence: no matter how conservative Dudley Murphy's own films are, one can detect in his comments on *Ballet mécanique*, the influence of the Purist and Orphic strains of Cubism, with their interest in harmonic form (for music has always been understood as the exemplary harmonic art).

293 Letter from Dudley Murphy to Carlene Murphy Samoileff, 16 November 1923 (Poco Murphy, Sea Cliff, New York). Again, I have taken this quotation from Freeman, "Bridging Purism and Surrealism." It is worth noting whom Murphy identified as the project's moving force.

294 Furthermore, the print of the film Dudley Murphy took with him to America contained nude shots of Katherine (Murphy's wife) and Kiki that are in neither the widely circulated MoMA print, nor the Dutch Cine-Club print, nor the Kiesler print. We know that from the beginning, *Ballet mécanique* included images of people, some of which, quite likely, were people engaged in mechanical actions (perhaps even some suggesting sex). That fact makes it unlikely that Murphy's remark about a nearly completed film that contained no people, only abstract forms, concerned *Ballet mécanique*. So we should question the assumption that the only film that Dudley Murphy and Man Ray were involved with together was *Ballet mécanique*.

It seems that Pound conceived the idea for a Vorticist film some time before the *Ballet mécanique* project began, as he and Coburn were working together. However, the poet and the photographer became estranged from each other (partly because Coburn's interests in pneumatic philosophy had developed to the point that they excluded most any other interests from his life, and partly due to Pound's reserved assessment of his art); then, in 1923, Pound met Dudley Murphy and he realized that Murphy's interest in unconventional optical technology might catalyze the long-delayed project—by September 1923, Pound seems to have sketched out some ideas for the project. The two embarked on a project using the vortoscope. This would have been the work Murphy deemed nearly completed. But this wasn't the only film project that Murphy was working on: in addition to it, Dudley Murphy and Man Ray were also at work on an erotic diary and on a film using Ray's "Dadaist approach," by which Ray meant spontaneous street shooting. Through Pound, Léger became involved—Léger took an interest in the vortoscopic work-in-progress, precisely because of its machine/Futurist/Vorticist nature, and when he got involved with it, he introduced a wider range of imagery into it, turning it into a more complex work that made central issues around the continuity between representation and abstraction (issues that also arise in his painting). (We have seen that Dudley Murphy, George Antheil, and Ezra Pound all staked claims to have instigated *Ballet mécanique*, and that Fernand Léger had been working on an animated film. I think that truth is that all these parties—with Dudley Murphy collaborating with Man Ray and with Ezra Pound—all brought ideas about an avant-garde film project to the collaboration. Léger taught them how the projects could be integrated and developed further.) Léger showed Murphy how to integrate this project with the other film projects he (Murphy) was working on; he also added visual motifs from his (Léger's) paintings and took the lead in editing the film.

295 Letter from Ezra Pound to his parents, 29 January 1924 (Ezra Pound Archives, Beinecke Library). The letter appears in Pound, *Ezra Pound to His Parents: Letters 1895–1929*, 522.

296 Dudley Murphy, "Murphy by Murphy," unpublished manuscript. I have taken this from Freeman, "Bridging Purism and Surrealism," 31. Note the discrepancy between Man Ray's account of the film's origins and Dudley Murphy's.

297 Letter from Ezra pound to his parents, 12 September 1923 (Ezra Pound Archives, Beinecke Library). The letter appears in *Ezra Pound to His Parents: Letters 1895–1929*, 518–19; passage cited at 519.

With the reference to a new "Leger projet," Pound confirms, first, the Antheil-Pound-and-now-Léger project had taken a significantly new direction with Léger's involvement and, second, he gives us his sense of who the project leader is. (Note that it is not Dudley Murphy.)

298 Léger took an interest the work-in-progress because of its machine/Futurist/Vorticist nature, and when he got involved with it, he introduced a wider range of imagery into the work, turning it from a more conventional machine-art film (resembling Ralph Steiner's *Mechanical Elements* or Coburn's vortographs) into a more complex work that made central issues around the continuity between representation and abstraction (issues that also arise in his painting). Man Ray, too, was interested in the continuity between and abstraction, but the particular way that *Ballet mécanique* drains visual forms of representation and turns them towards exemplification strongly suggests the central role that Léger played in making the work.

The aforementioned Natalie Barney's stake in the work might also have reinforced this expanded interest in a more expanded conception of machine art. Natalie Barney (1876–1972) was a radical polyamorous lesbian poet and novelist who for more than sixty years presided over a modernist salon in her Paris home; she helped fund some of Pound and Antheil's work on *Le Testament* and provided financial support port for the score of *Ballet mécanique*.

299 Pound, *Machine Art and Other Writings*, 76; italics in original, bold emphasis mine.

300 By this time, Man Ray's interest in film was long-standing. Man Ray and Marcel Duchamp had worked together in 1920 synchronizing two 35mm cameras to produce a 3D film (*Moustiques domestiques demistock*, thought to be destroyed). In 1921 they worked together on a film experiment that employed rotating spirals, which work foreshadowed their later collaboration, *Anémic cinema* (1926), the high point of creative partnership, made in cooperation with Marc Allegret. That work integrates marvellously punning texts that recirculate phonemes, with ten "roto-reliefs" (spiral forms that, when rotated, produce an impression of depth). Man Ray and Duchamp also collaborated on some *films maudits* in New York.

Francis Picabia was another influence on the work. Picabia was not directly involved in the production, but his ideas were familiar to those artists who produced *Ballet mécanique*. Picabia met Duchamp and the Section d'or group in 1910 or 1911. In 1917 he established an arts magazine that he called *391* (in a gesture that acknowledged the role that Steiglitz's magazine *291* had played in furthering the American avant-garde); the magazine presented work by Man Ray, Marcel Duchamp, and Robert Desnos. The title page of *391* 7 (1917) presented one of Picabia's machine-compositions, whose title was *Ballet Mechanic* (the sculpture was created from parts of a Model T Ford; some claim that Léger took the name for his film from Picabia's work), while *391* 13 (1920) included a photograph by Man Ray of a pearl necklace, titled *Collier*. There are images in Léger/Murphy's *Ballet mécanique* that echo forms that appear in these works.

301 Moritz, "Americans in Paris," 119, 126–27.

302 Mechanical music was in vogue. We have already mentioned the Bauhaus's *Mechanische Ballett*; but *Relâche*, a ballet written by Francis Picabia (who had earlier gone through a mechanomorphic phase in painting) and choreographed by Jean Börlin, for Rolf de Maré's Swedish Ballet, also had mechanical elements, including a cinematic intermission by a young René Clair. Honneger soon followed, with his piece extolling locomotives, *Pacific 231* (1923); and Prokofiev wrote his *Le pas d'acier* (*Steel Step Ballet*, 1925–26).

303 In 1924, Paul Rosenfeld brought out his *Port of New York*, a work that played a crucial role in the development of a distinctively American brand of modernism. It included essays on Stieglitz, and on the early American modernist painters Arthur Dove (1880–1946), Marsden Hartley (1877–1943), John Marin (1870–1953), Georgia O'Keeffe (1887–1986), and various others—artists who, Rosenfeld argued, were signs of an American spirit. Among the attributes of the distinctive American culture Rosenfeld celebrated was speed.

Rosenfeld identified the composers Ernst Bloch, Arnold Schoenberg, and Leo Ornstein as the most important spirits of the new period—Rosenfeld's celebration of Bloch was based in part on the proto-multicultural (indeed almost racialist) view that Bloch's Jewish compositions combined the best in European form with the sensuousness of "Asia" (that is, the Middle East). It may have been Rosenfeld's view that swayed the young Antheil to seek out Bloch as a mentor.

Leo Ornstein was a Russian-born piano virtuoso who helped introduce American audiences to the works of modern European composers like Albeniz, Scott, Schoenberg, Debussy, Ravel, Scriabin, Franck, and Bartok (*Allegro Barbero* was one of Ornstein's signature pieces). A radical modern composer in his own right (for a time his own compositions were considered the equal of Stravinsky's and Schoenberg's), he was among the most important figures in American modern music from 1910 to 1925. In the late 1920s he all but dropped from view.

Some of Ornstein's early compositions—for example, *Wild Man's Dance* or *Dance sauvage* (1913), *À la chinoise* (composed before 1918), *Suicide in an Airplane* (1913), *Pygmy Suite* (1914), *Impressions of Notre Dame* (ca. 1914), *Poems of 1917* (1917), *Impressions of the Thames* (1920), *Arabesques* (1921), *Valse buffon* (1921), *Seeing Russia with Teacher* (1921), *Musings of a Piano* (1924), and *Piano Quintet* (1927)—make prodigious use of literal repetition (especially marked ostinatos), as Antheil's work does (this feature of Ornstein's *Suicide in an Airplane* is certainly reflected in Antheil's *Airplane Sonata*). Many other of Ornstein's compositions—for example, *Cossack Impressions* (ca. 1914), *Dwarf Suite*, (1915; this piece also uses literal repetition), *Six Water Colors* (1921), and *Five Songs for Soprano and Piano* (1927–28)—rely on melodic fragmentation and multitonality to evoke the operation of the mind: they are somewhat Debussy-like pieces of program music that use triadic harmonies (often built on pentatonic scales), parallelism, and fleeting high-pitch ornamentation, and many are furiously paced (as *Ballet mécanique* is). Ornstein's work used tone clusters and dissonances, as *Ballet mécanique* would.

304 Antheil asserts this claim in letters he wrote to Mrs. Curtis Bok, 7 and 10 December 1921; they are quoted in Carol J. Oja, "George Antheil's *Ballet Mécanique* and Transatlantic Modernism," in *A Modern Mosaic: Art and Modernism in the United States*, ed. Townsend Ludington with Thomas Fahy and Sarah P. Reuning (Chapel Hill: University of North Carolina Press, 2002), 179–80.

Antheil likely discovered the modernist aesthetic by being exposed to the machine art of the New York Dada movement. He composed the first of a series of works based on the machine-aesthetic in 1921: his *Second Sonata: "The Airplane,"* for solo piano.

Antheil's extensive use of literal repetition in his musical compositions exerted considerable influence on the images in *Ballet mécanique*. In the final, July 1925 issue of *L'ésprit nouveau*, Léger makes this comment on the goal he and Antheil shared for the film: "We 'persist' up to the point that the eye and mind of the viewer 'can't take it anymore' ['*ne l'accepte plus*']. We exhaust its spectacle value right up to the moment that it becomes unbearable." Léger, "*Ballet mécanique*: Film de Fernand Léger et Dudley Murphy. Synchronism musical de George Antheil," *L'ésprit nouveau* 28 (January 1925): 2337. This point coincides with Léger's remark about wanting to amaze the audience, and then push that amazement to exasperation.

I hope that the shot list provided in the online film analysis (with its details about repeated shots) makes clear how central literal repetition is to *Ballet mécanique*.

305 Mary Louise Curtis Bok (1876–1970), who inherited the wealth of Curtis Publishing Company, was an important patron of the arts. She contributed significant sums to musical undertakings, musicians, and composers. In 1924, she founded the Curtis Institute of Music in Philadelphia, a school unique in the regard that students are chosen solely on the basis of merit (all attend tuition-free, and all keyboard, conducting, and composition students are loaned, free of charge, a Steinway grand piano).

Ernest Bloch brought Antheil's talents to her attention. Bok provided Antheil with a subsidy of $100 a month, and in addition responded to Antheil's many pleas for assistance with projects. Over a twelve-year period she donated the staggering sum of $40,000 (even though Antheil's earnings were sometimes substantial). The composer and the patron also engaged an impressively frank correspondence, which is now in the library of Philadelphia's Curtis Institute.

306 On Sylvia Beach's role in the Lost Generation in 1920s Paris, see Noel Riley Fitch, *Sylvia Beach and the Lost Generation* (New York: W.W. Norton, 1983).

307 Antheil's music for *Ballet mécanique* can be seen in Bloomian terms as a young artist's challenging the work of the teacher/master he has chosen. In this case, Antheil's chosen master was Igor Stravinsky. Antheil wanted to equal or outdo Stravinsky, and in particular Stravinsky's *Весна священная* (Vesna svyashchennaya; The Rite of Spring), which uses "futuristic" percussive rhythms. But other works by Stravinsky were also the target of this Oedipal rivalry. Among them was Stravinsky's *Études pour pianola* (1917; Stravinsky's only truly idiomatic piece for pianola). Stravinsky had been interested in the mechanical piano for several years when he composed the *Études*: he appreciated the precision, velocity, polyphony, and spectacularly sized chords the instrument was capable of (though the composition rarely exploits those possibilities to their fullest). Another target of Antheil's Oedipal rivalry was Stravinsky's *Свадебка* (Svadebka; Les Noces, 1923), which *does* make use of the player piano's unique resources. Antheil heard the first performance of Stravinsky's dance cantata *Les noces* the same evening he arrived in Paris (13 June 1923). That evening, backstage, Antheil renewed his acquaintance with Stravinsky and the Russian composer invited Antheil and his wife Boski (née Markus, 1903–78) to meet him the next day at Pleyel's massive warehouse in Paris. There Stravinsky played for the two of them a version of *Les noces* for Pleyela. (Stravinsky had first conceived of the piece in 1913, as one for augmented orchestra, like *Весна священная*; the inordinate complexity of piece made it impossible for the composer to bring the project to a satisfying conclusion; so, in 1917, he decided to

rework it for a small ensemble, including a mechanical piano, an electric harmonium, and a two-keyboard cimbalom that was to be constructed by Pleyel et Cie. The Parisian piano firm experienced delays in constructing device, so Stravinsky replaced it with two hammered cimbaloms. But these delays, and difficulties with synchronizing the electric-mechanical instruments with the live players, prompted Stravinsky put the piece aside until, in 1922, Diaghilev, seeking a new ballet for his Ballets Russes, induced the composer to resurrect the project. The version that Antheil heard on the evening of 13 June was scored for soprano, mezzo-soprano, tenor, and bass soloists, mixed chorus, and two groups of percussion instruments: pitched percussion, including four pianos, and unpitched percussion.) Antheil was even more taken with version for Pleyela than he had been with the version he had heard the night before, finding it colder, harder and more precise, embodying exactly the values that he was seeking for the new music. Antheil's project for *Ballet mécanique* / *Ballet Mécanique* began by imitating the achievements of the father-figure, especially sharply realized in the Pleyela version of *Les noces*, and then proceeded to overcome him by accomplishing what he could not, *viz*., to create a massive, mechanical, fundamentally time-structured piece using tone clusters, a composition that exploited precisions of the sort the electromechanical age afforded. The original version of the score for *Les noces* is fabulously percussive, using multiple mechanical cimbalons. At first, Stravinsky had hoped to use four pianolas for that piece, and in the original rolls he prepared for it, individual notes repeat at 640 per minute in many instances and one bar repeats three pairs of notes at the rate of 960 per minute. Stravinsky could not get the pianolas to synchronize, and he abandoned that version of the piece. Perhaps in the concert version of *Ballet Mécanique*, Antheil was striving to outdo his mentor, succeeding where he had failed: if Stravinsky had worked with massive machine-made chords, Antheil would produce even more massive chords, using more machines; if Stravinsky had a big orchestra for *Весна священная*, Antheil eventually determined that he would have an even bigger orchestra. (Leo Ornstein's *Suicide in an Airplane* was likely another object that provoked the anxiety of influence.)

308 Quoted in R. Murray Schafer, *Ezra Pound and Music: The Complete Commentary*, ed. Schafer (New York: New Directions, 1977), 246.

309 Quoted in ibid., 247–48.

310 The riot in *L'inhumaine* is set off by the singer's having a nervous breakdown on stage and the audience's protesting. The inhumanity alluded to in the title is the audience's lack of feeling for the unfortunate and distressed singer. The scenes of the audience rioting are interesting for showing what audience outrage in Paris in those days was like—and in it we catch a glimpse of Ezra Pound, members of Les Six, and some Surrealists.

311 Many of his pieces for *Esquire*—for example, "Glands on a Hobby Horse," "Glandbook for the Questing Male," and "The Glandbook in Practical Use"—dealt with ways to meet women. They advised the reader (the intended reader was male, of course) that the "Type A" woman was, like Hedy Lamarr, dominated by the postpituitary (excessive glandular production), and rated her accessibility as extremely high (adding that she had a strong tendency to nymphomania). He used charts to classify women into categories from A to D, and included subclasses related to a woman's outstanding characteristics: her walk, build, height, and bust size.

312 Antheil's brother died in battle, and Antheil found himself unable to compose. His imagination returned towards the end of the war, and he composed much of his *Tragic Symphony* (1943–44, revised 1948) at his news desk.

313 Antheil actually claimed that Ezra Pound, T.S. Eliot, W.B. Yeats, and the Nobel Prize–winning novelist and dramatist Gerhard Hauptmann (1862–1946) edited the manuscript on the Italian Riviera.

314 Antheil wrote a text on endocrinology, *Every Man His Own Detective: A Study of Glandular Endocrinology* (1937), that proposed that an "endocrine criminologist" could study the forensic evidence and immediately determine what hormonal type had perpetrated the crime: the thymocentric was the most dangerous type of criminal—over 70 percent of all prisoners were regulated by the thymus gland (usually other endocrine glands had a role, so some criminals were "thymocentric-pituitary," some "thymocentric-adrenal," etc.), and therefore criminologists should spend 70 percent of their time studying the thymocentric.

315 Lamarr and Antheil worked out the idea of defeating jamming efforts by sending synchronized radio signals on various wavelengths to missiles. The system used punched paper rolls (inspired by player piano technology) to shift radio communications quickly and synchronously between a large number of bandwidths. The inventors were explicit about the connection to the player piano: Antheil and Lamarr's application for a "Secret Communication System" in August 1942 (Lamarr applied under the name Hedwig Kiesler Markey) for a patent (U.S. Patent No. 2,292,387) stated, "we contemplate employing records of the type used for many years in player pianos." The navy declined to adopt the system (the it did appear on Navy ships starting in 1962, and was first used during the Cuban missile crisis), and Antheil conjectured that the military brass might have been troubled by their efforts to put a player piano in a torpedo. The transmitter and receiver could be synchronized by controlling them with two player-piano-type rolls, punched with identical, random patterns of holes: because the "frequency hopping," as Hedy Lamarr called it, was random, the enemy would be unable to detect any pattern in the change. What Lamarr called frequency hopping is now called spread spectrum technology (rapidly switching a carrier among many frequency channels, using a pseudorandom sequence known to both transmitter and receiver); spread spectrum technology is used not only in cellphones but is an enabling technology for Bluetooth, Wi-Fi, and GPS.

316 However, there may be less to their "invention" than meets the eye. A document in the Bundesarchiv/Militärarchiv in Freiburg shows that frequency shifting was discussed in July 1939 at the German firm of Siemens and Halske. Morever, the idea was in the air: in 1929 a Polish engineer, Leonard Danilewicz, proposed to the Polish army a system for secret radio telegraphy; this system involved constant changes of transmitter frequency. In the 1930s a Swiss inventor, Gustav Guanella, proposed a similar idea. And in 1935 two Telefunken engineers, Paul Kotowski and Kurt Dannehl, applied for a patent for a device to hide voice signals under a "broadband noiselike signal produced by a rotating generator." The idea was quite possibly discussed at Fritz Mandl's (Lamarr's ex-husband's) arms firm, too, several years earlier. It is possible that Lamarr was merely passing on ideas that Mandl had discussed with her.

317 Ezra Pound, *Guide to Kulchur* (New York: New Directions, 1970), 94.

318 Ezra Pound, *Antheil and The Treatise on Harmony* (Chicago: Pascal Covici, 1927), 62.

319 Ibid., 63.

320 Antheil's interest in precision timing is also attested to by his work on the timing mechanisms for synchronizing sound and image for *Ballet mécanique* and by his later work synchronizing radio signals using punched paper rolls.

Paul Lehrman has argued the solution to synchronizing music and picture for *Ballet mécanique* awaited the development of MIDI (Music Instrument Device Interface, a

protocol for exchanging musical information among electronic instruments, computers, and recorders). He lays out his view of the issues involved in Léger and Antheil's attempt at synchronizing sound and image:

> There was at the time no standard way of synchronizing music and film. I don't think they worked out how that was going to work, and it didn't. So they put these things together supposedly, and they played them together, and were like, "Oh no. The film and music don't work!" They went off their separate ways. The film was premiered in Vienna. I think it was premiered without any music at all. Years later it was played with other kinds of music. You can get it on various videotape collections with other kinds of music. Antheil did his premieres in Paris, of course without the film. (http://music-mavericks.publicradio.org/features/interview_lehrman.html)

Directly to the point, Lehrman states that when the film and music were played together, Antheil and Léger "were like 'Oh, no. The film and music don't work.' And they went off on their separate ways." But the number of prints generated, after the initial screening, with the Synchro-Ciné logo, and correspondence between Antheil and Léger, and Antheil's account of a screening of the work, complete with music, for Léger and friends, on 18 September 1925 (almost a year after the first screening of the film, on 24 September 1924), indicate that the filmmakers did not abandon the project, but continued for several years after the initial screening to try to make it work.

Antheil did, however, leverage the effort he had put into the project, and prepared a concert version. There is even reason to believe that Antheil's experience with Léger, who, as we have seen, had been involved in the production of Darius Milhaud's *La création du monde*, led him to conceive of a "theatrical dance" version of music for *Ballet mécanique*, for which a large-scale composition would be utterly fitting.

Lehrman believes that Antheil and Léger agreed on using, as the version of the composition to accompany film screenings, the one scored for a percussion orchestra of three xylophones, four bass drums, a tam-tam (gong), two "live" pianists, seven or so electric bells, a siren, three airplane propellers, and sixteen synchronized player pianos. I don't think it is at all clear that that version—the most grandiose—represented their ideal for the musical accompaniment for the film.

321 Pound, *Antheil and The Treatise on Harmony*, 86.

322 Ibid., 56.

323 Henrietta Strauss, "American Music via Europe" *The Nation* 119 (November 1923): 3088.

324 *Der Querschnitt* 5, no. 9 (1925): 789–91. *Der Querschnitt* was the principal journal of German modernism. A very similar article, "My Ballet Mécanique" appeared in *De Stijl* 6, no. 12 (1924–25): 141–44. Both open as follows: "My Ballet Mécanique is a new FOURTH DIMENSION of music. My Ballet Mécanique is the first piece of music that has been composed OUT OF and FOR machines, ON EARTH." The text goes on to suggest what is meant by a piece composed out of and for machines.

It is important to note—and commentators have not—that these articles were written before the concert version was finished (performed June 1926) and probably describe the chamber version of the score (I believe that the finished solo pianola version, performed for a select audience, was presented on 18 September 1925).

325 Antheil also produced a work in collaboration with Joyce's friend W.B. Yeats. The *New York Times* on 14 August 1929 printed a news item sent to it by cable: "*Fighting the Waves* is presented at Abbey Theatre in Dublin." It tells us that previously the play had

been produced only privately in Amsterdam and that now it was being staged in ballet form, with masks by the Dutch sculptor Hildo Krop (1884–1970), and that Antheil was "preparing music for two more 'Plays for Dancers' with Yeats." Antheil's score seems to have been derivative, drawing on Stravinsky's *Histoire du soldat*, a vigorously polyrhythmic work.

The connection between Yeats's *nô*-inspired plays and Cubist aesthetics is an intricate topic that deserves more attention. However, Antheil's connection to the Cubist-influenced writing of James Joyce is the topic of this section. Space does not allow me to explore the influence of Cubism on Yeats.

326 From Marshall McLuhan's interview in Playboy, March 1969 (the year of pop transcendentalism); reprinted in *Essential McLuhan*, ed. Eric McLuhan and Frank Zingrone (New York: Routledge, 1995), 233–69 at 262.

327 Robert Forrest Wilson, "Paris for Young Art," *The Bookman,* June 1925, 403.

328 George Antheil, letter to Ezra Pound concerning *Cyclops*, Beinecke Library, n.d., but likely from early in 1924. In this letter, Antheil writes of his hope to come down and visit Pound (in Italy) in June, so it is likely from the first half of the year. Evidently, the film-with-automated-sound *Ballet mécanique* was still being worked on but nearing completion. That makes it unlikely that the letter was from the first half of 1923. Indeed, Antheil arrived in Paris in June 1923 and so had not even begun working on the score in early 1923.

Careful note should be taken of this comment: "Colossal orchestra for a change . . . mostly mechanical. Like Ulysses . . . encyclopedic. Entirely different from Bal. McK." *Cyclops*, he is suggesting, would comprehensively survey musical resources, using (as we know from the *This Quarter* article) sound makers, sixteen synchronized player pianos, and so on. This, he says, would be entirely different from *Ballet mécanique*. We can conclude from this, I believe, that sometime early in 1924, *Ballet mécanique* was not (*pace* Lehrman) being conceived of as a large-scale work, but as a chamber composition.

*Ballet mécanique*, I believe, was conceived of as a piece of machine art for projector and Fotoplayer, and when the Fotoplayer failed to go into production, the piece was revised for a multi-player pianola, but syncing difficulties remained, and the first projection took place without sound (see note 285). The filmmakers kept trying to develop a means for syncing a player piano with a projector, but when the technical problems of doing that proved intractable, despite much practical effort and theoretical lucubration, Antheil, fearing that his tribulations on "Bal. McK" would go for naught, decided to develop the composition into a concert piece along the lines of *Cyclops*, complete with sixteen player pianos and noisemakers. (Antheil's developing interest in large-scale dance/theatre pieces likely also had a role in this decision.)

*Cyclops* would not have been Antheil's only foray into theatre without live performers. Between 1927 and 1930, he worked on the score for a dance, *Flight*, which was to be performed by marionettes. (I remarked earlier on machine-artists' interest in marionettes, and we will note Futurist examples in the next chapter.)

Mechanical art, since it is linked to industrialization, is sometimes said to be best when it is massive. I once attended a talk that dismissed László Moholy-Nagy's *Licht-Raum Modulator* (Light-Space Modulator, 1930) as powerful mechanical art because it was a small and rickety construction, and *Ballet mécanique* has been derided for its use of kitchen utensils and household objects, which are supposedly too mundane to convey the sense of the industrialized world. I do not believe that in this era, massiveness was seen as

a particular virtue of mechanical art—there was, as the work of the second-generation Futurists show, a place for toy-like, small-scale works. I believe that the ricketiness of "Charlot cubiste" would have been an aspect of its charm; likewise, that quality would have been part of the charm of *Ballet mécanique* as a chamber piece for projector and pianola (with a few noisemakers added).

329 The papers were Paris editions, from 25 September 1925, of the *New York Herald* ("American Lost in Wilds of Sahara Sands: George Antheil, composer, Seeking New Themes, Sends no Word since End of August"), the *Daily Mail* ("Missing Composer Seeking Arab Music in the Desert"), and the *Chicago Tribune* ("Friend of Composer Antheil Fears He Is Lost in African Desert").

330 Quoted in Wilson, "Paris for Young Art," 403.

331 Antheil does seem to have made some revisions to the music before the screening, and Léger certainly revised the film beforehand.

332 There was, to be sure, some favourable informed commentary. Henrietta Strauss wrote that it "displayed a singularly coherent exposition of modern life in a modern city, with all its steady monotony and roar, and all its dynamic energy. The composer's claim that today machinery has entered the imaginations of men is undoubtedly borne out by the life about us; and just as the romantic composer of the nineteenth century tried to imitate the sounds of nature, so the realist of this has tried to embody the Age of Steel. No one has succeeded in doing this better than George Antheil." Strauss, "Sensations—Good and Bad," *The Nation* 124 (27 April 1927): 483–84 at 484.

333 His music for *The Spectre of the Rose* incorporates elements reminiscent of his earlier *style sauvage*.

334 Pound, *Guide to Kulchur*, 94–95.

335 George Antheil, *Bad Boy of Music* (Garden City: Doubleday, Doran and Company, 1945), 117.

336 Pound, *Antheil and The Treatise on Harmony*, 37–49. Regarding the comment concerning "accelerated impressionism," Pound, in *Gaudier-Brzeska: A Memoir* (1916) makes this remark: "Futurism is descended from impressionism. It is, in so far as it is an art movement, a kind of accelerated impressionism. It is a spreading, or surface art, as opposed to vorticism, which is an intensive art. I mean by this, that one is concerned with the relative intensity, or the relative significance of different sorts of expression" (New York: New Directions, 1970, 89–90).

Léger's ideas about multiplicative contrasts was certainly a basis for the filmmakers' incorporating diversity into the work. Nonetheless, it is worth noting that in this description of Vorticism, Pound proposes that a basis for the movement is its concern with "the relative significance of different forms of expression." That interest, too, serves as a motivation for including a wide range of forms in this work. In my analysis, I highlight this feature of the work, and I point out the role that Pound's ideas had in generating it.

337 Antheil's notion of time-space has a parallel in Satie's use of time frames, a feature of his music that John Cage extolled. A time frame is given length of sound and silence. Roger Shattuck described the use Satie made of time frames in his score to René Clair's *Entr'acte*:

> Satie merely used eight measures, as the unit that most closely matches the average length of a single shot in the film. He fills each of these units with one stereotyped phrase repeated eight times. Between the units he inserts a double line, a new signature, and frequently a change in tempo [cf. Antheil's idea about expanding and contracting divisions of time-space]. The transitions are as abrupt and as arbitrary as the cuts in the

> film. Typical measures lend themselves to infinite repetition and do not establish any strong tonal feeling [cf. Satie's famous composition *Vexations*, composed ca. 1893, first printed in 1949 by John Cage in *Contrepoints* 6, first performed in a concert organized by John Cage and Lewis Lloyd at the Pocket Theatre, New York City, 9 September 1963]. (Shattuck, *The Banquet Years: The Origins of the Avant-Garde in France, 1885 to World War I* [London: Faber and Faber, 1958], 134)

Shattuck makes clear that Satie associated the idea of time frames with the cinema—this is another way that the character of the cinema influenced the advanced arts of the twentieth century.

338 Antheil boasted that he repeated one measure one hundred times. But this is clearly a boast: the score shows no measure that repeats more than one-third that number of times. Nonetheless, the score does make extensive use of literal repetition.

339 Antheil's use of silence in the 1926 version of *Ballet mécanique* (the 1924 version for solo pianola makes less use of silence) can be compared with Picasso's leaving parts of his canvas exposed.

340 George Antheil, quoted in the liner notes for the Modern American Music Series recording of Antheil's *Ballet Mécanique* by Carlos Surinach and the New York Percussion Group (1960).

341 The quotations in this passage (both from Pound and from Antheil) come from William Atheling (a pseudonym Pound used as a music critic), "Notes for Performers," and are reprinted in Pound, *Antheil and The Treatise on Harmony*, 78–79.

342 Pound, *Antheil and The Treatise on Harmony*, 79.

343 Antheil, "The Treatise on Harmony," in ibid., 17.

344 Ibid., 9.

345 Ibid., 10.

346 This is further evidence of my claim that the Vorticist/Cubist aesthetic was torn between the modern and postmodern understandings of reality. Antheil strove to convey the reality of life in the electric city, but also to brake the processes leading to the disappearance of the object.

347 Ibid., 14; emphasis in original.

348 Ibid., 20.

349 George Antheil, "Composer's Notes on 1952–53 Re-editing [of *Ballet Mécanique*]," in George Antheil, *Ballet Mécanique* (Water Gap, DE: Shawnee Press, 1961), quoted in Charles Amirkhanian, "An Introduction to George Antheil," *Soundings* 7–8 (July–October 1973): 176–81 at 179. Amirkhanian, a Bay Area composer and musicologist, kept the original manuscript of the 1924 *Ballet mécanique*, along with a large collection of Antheil's papers that Antheil's widow, Böski, entrusted to his care in 1978. He made copies of the scores available to performers under the imprint "Antheil Press"; then, in 1992, he sold the original manuscripts to the Performing Arts Division of the New York Public Library and the publishing rights to G. Schirmer.

350 Antheil, letter to Nicolas Slonimsky, 21 July 1936, in Letters, Antheil Collection, Music Division, Library of Congress, printed in Linda Whitesitt, *Life and Music of George Antheil* (Ann Arbor: University of Michigan Research Press, 1983), 105–6 at 106 and cited in Oja, "George Antheil's *Ballet Mécanique*," 43.

351 Antheil, "The Treatise on Harmony," 21–22. Antheil's remark that "the competent mathematician could show us that the vibrations of a 'cello where the sound is steadily produced by a drawn bow will combine in a different way from those of a horn, a plucked string or an instrument of percussion" is interesting, for its point was confirmed by subsequent research in acoustics. In this passage, Antheil points out the effect of what

acousticians now call the "envelope" of a sound, that is, the pattern through which a musical sound begins, rises, and decays. For many years, acousticians believed that the characteristic sound of a given musical instrument, its "timbre," results from the "harmonic" components of the sound it produces—from its particular combination of overtones and in what amounts. However, as an experiment, acousticians made recordings of different instruments, cut off the beginning and end of the sounds (where the most evident changes in the note's dynamics—its envelope—occur), spliced the remaining middle parts together, and played the results for musicians and informed amateurs. Almost none of the listeners could identify which instrument had produced which sound: this proved that an instrument's timbre is determined by the interaction of the harmonic content of its sound and its envelope, just as Antheil assumed.

352 Pound, *Antheil and The Treatise on Harmony*, 112.

353 He described the work as "Mechanismen, erste Gruppe in 4 Dimensionen." The seven parts were Interrhythmic Mechanism, Cubistic Mechanism, Interrhythmic Elliptic Mechanism, Elliptic Mechanism, Psychoelliptic Mechanism, Sensurorhythmic Mechanism, and Planetary Mechanism.

354 Antheil composed a version of *Ballet Mécanique* with multiple, synchronized player pianos in 1924. Realizing that he could not achieve the synchronization he hoped for, he rescored the composition in 1926 for eight grand pianos, four xylophones, two airplane propellers, doorbells, and other percussion; this was the version performed in Paris in 1926 and at Carnegie Hall on 10 April 1927 (for the latter, whistles, rattles, sewing machine motors, and two large pieces of tin were added). I do not believe that any of these scores were intended to be the music for the film-with-sound, *Ballet mécanique*. See note 356.

355 This information appears in the liner notes for the Modern American Music Series recording of Antheil's *Ballet Mécanique* by Carlos Surinach and the New York Percussion Group.

356 Antheil's first efforts at a concert version of *Ballet Mécanique* were scored for sixteen player pianos linked to a central piano (an ordinary piano, not a pianola). When this arrangement turned out to be technologically impossible, Antheil rescored it for eight pianos and a player piano, which is not played simultaneously.

Some of the effects that Antheil conceived for the film version would have been built into the "Fotoplayer." The Fotoplayer was a musical instrument that Pleyel patented (Patent #207,798, filed in November 1922 in France and in November 1923 in England and granted on 27 November 1924 for Great Britain)—the patent describes a means for synchronizing extra player pianos, phonographs, and/or a motion picture projector with the Fotoplayer, in a master–slave relation: the English patent starts out, "This invention relates to a synchronizing system available for various applications, to automatic instruments or mechanical apparatus, amongst which may be mentioned by way of example: automatic musical instruments, kinematographs (motion pictures), phonographs, these several apparatus being naturally in any number." The description of the device in the patent application suggests it would have been a dual-roll spoolroll pianola with added percussion and organ sounds and made for accompanying the movies, and would have combined the dual spool rolls used in some upright player piano with organ pipes, tympani, and some sound effects.

Though the patent was granted, the instrument was probably never constructed. This was probably in part because by the time the British patent was granted, Lee De Forest (1873–1961) "Phonofilm" shorts were already being made. Phonofilm involved

a variable-density sound-on-film recording process that De Forest, the inventor of the Audion vacuum tube, contended was the first practical amplification device. De Forest established the De Forest Phonofilm Company, located at 314 East 48th Street in New York City, in November 1922, and demonstrated the system to electrical engineers and the press in March and April 1923. However, movie producers showed little interest, and the company declared bankruptcy in 1926, though De Forest continued working on the Phonofilm, along with the Auburn, New York, inventor Theordore Case.

In Germany, the "Tri-Ergon" photo-electric sound-on-film system was developed, starting in 1919. In 1926 it was purchased by William Fox and became the basis for the Fox Movietone sound-on-film system.

Also, in upper New York State, at General Electric's campus in Schenectady ("The City That Electrified the World"), between 1918 and 1922, Charles A. Hoxie (1867–1941) developed the pallophotophone, originally used to transmit transoceanic telegraphy signals, but used in 1921 to record speeches that were broadcast over Schenectady's radio station, WGY. It became the basis of the RCA Photophone sound-on-film system. All in all, interest in synching a non-electrical sound with film simply died out: radio broadcasting, amplified sound, and sound-on-film all became the live issues in the entertainment industry.

The similarity between the effects used in the the symphonic version of *Ballet Mécanique* and the sounds built into the Fotoplayer—door bells, fire sirens, gongs, organ pipes, xylophone-marimba sounds, tympani—suggests that the original scoring for Antheil's composition may have been for Fotoplayer, and at first, Antheil's work on *Ballet mécanique* was for a dual-roll automated piano, almost certainly for the Fotoplayer. Had the Fotoplayer gone into production, a performer (a pianolist) could have executed an essentially automated performance of the pianola sound, motion picture projector, and sound effects, with Pleyel equipment "synchronizing" them all. As Douglas Henderson explains (http://wiscasset.net/artcraft/patent.htm), a projector equipped with a variable-speed electric motor and the music rolls punched with Pleyel's control perforations would have been able to do that. However, the instrument never went into production. The composer rescored the piece for a single-roll pianola, with the composition spread over three successive pianolo rolls. Antheil's notes for the composition still exist and were consulted by Henderson when he prepared a new set of rolls; those notes even indicate at what points a new time-space section was to begin (see Douglas Henderson's analysis of the three rolls at http://wiscasset.net/artcraft/rolls3.htm#MÉCANIQUE and Bravig Imbs commentary discussed elsewhere in this volume); he also kept trying to introduce additional sound/noise producers but was frustrated by problems with synchronization.

In 1924, Charles Delacommune was brought in to try to synch a Pleyel pianola with the projector (to complete the production of a machine that could produce a *ballet mécanique*). In one of their attempts (I think it is unlikely this was meant to be anything more than a working version of the score), a piano roll was prepared that combined the three successive rolls into a single one; this job of punching the roll was not performed well, and moreover, there were problems with using a too-extended pianola roll, for the smooth movement of a roll became more unlikely as the roll became overextended.

There is a further complication to this story, however. For people interested in twentieth-century music, dance, and performance, the New York Public Library—the resource of resources—holds an early version of Antheil's score with the title *Ballet mécanique*. That version, which is dedicated to his (at the time) future wife, Böski

Markus (through a tiny inscription, "pour Böski"), is dated 1924. That score contains only the piano parts—and a comparison of it with the score for the concert version suggests that the first thing Antheil did when undertaking the concert version was to copy these parts. This adds weight to the conjecture that Antheil's first idea for the music was that it would be for piano. However, this score is obviously for human players, not a draft for a player piano version. In fact, it seems to be a sort of chamber piece for four pianists. I believe this score is a sort of intermediary, between the solo player piano piece that was to accompany the film and the concert version.

Paul Lehrman has mounted concerts and produced a CD with sixteen Disklaviers playing Antheil's score for *Ballet mécanique*—a recording of this version is included on the *Unseen Cinema* DVD set. I feel the production lacks vitality, and I know of no textual evidence that justifies the use of sixteen automated music machines. (To hear the single player piano imitating airplanes, heavy machinery, and steam engines is extraordinary, and the composition for film benefits from the rhythmic precision of the solo pianola.) Besides, MIDI is not a particularly fast technology, and "MIDI smear" is audible among the sounds of the various Disklaviers, and cluster-chords are not struck all at once (producing an arpeggiation effect). Worse yet, the Disklavier is not a genuine piano.

357 Pound, *Antheil and The Treatise on Harmony*, 51–54.

358 There are more reasons to believe that the score for the film was written first for a dual-roll pianola and then rescored for a single-roll pianola. Amanda Vaill's *Everybody Was So Young: Gerald and Sarah Murphy—A Lost Generation Love Story* (New York: Broadway Books, 1998) tells us that in the mid-1920s a discussion arose in these circles about whether the ballet was still viable. Hemingway, for one, insisted that "ballet is as dead as the theater." Out of this discussion arose a proposal to stage a ballet in which construction workers, wearing goggles and overalls, and "young toughs in Apache clothes" would dart to and fro across a stage filled with girders, cranes, and warehouse shelving. The artists involved felt that a new medium was needed to present such a choreography. At that point, collaborating on a film became a topic of discussion, and it was then that Fernand Léger became involved. The author explains why: on page 189, Vaill notes that Fernand Léger was contacted because he had already made "a cinematic version of George Antheil's *Ballet Mecanique* featuring a piano and the usual array of noise-makers." Vaill also suggests that film was altered many times and that there were many versions of George Antheil's music.

Proponents of the view that a large concert version of the music was what Léger, Antheil, and perhaps Murphy had in mind throughout the time they worked on the film often point out that the punched spool rolls for *Ballet mécanique* are thirty minutes long—longer than any version of the film. They point to this as evidence that the composer and the painter had gone different ways (and eventually abandoned the collaboration). But Douglas Henderson, an expert on automated piano rolls, questions this (http://www.wiscasset.net/artcraft/roll1-00.htm): his experiences while working with the original 1925 Pleyel piano rolls support the accounts of the people Vaill interviewed, in that the time-space numbers on the score correspond to sections in the film and the "time-space" numbers were moved about to match the ever-changing motion picture—it seems that the length of the film changed time and again, with some sections (and some types of images, such as nudes) being deleted. George Antheil was required to revise his music and change his salon presentations as the film was cut and recut.

Further evidence supporting the claim that Léger and Antheil intended to use a version of the music for solo pianola (to be part of an audiovisual machine-art piece the

two were working on) can be inferred from an unpublished letter that George Antheil wrote to Ezra Pound (it is significant, I think, that Pound is still in the loop) sometime in 1925 (it is undated). In this letter, which Judi Freeman brought to light, Antheil notes: "I hear that Léger has been simply crazy since he heard the Ballet Mécanique several days ago. He heard it for the first time, for I've been very busy with my opera and couldn't go to him. So we arranged a performance of the music several days ago, and after it was over he simply embraced me. Léger expected a great deal, but he said it was beyond his expectations and that it was right as right can be" (Freeman, "Bridging Purism and Surrealism," 33).

A point we can take from this with real confidence is that Antheil had continued working on the sound for the film (not just revising the score for a concert performance) into 1925. One implication for this is that to claim the film was completed in 1924 is not correct. Another point is less certain—it seems unlikely, if a version for large orchestra was to be the film's musical component, and if that is what he presented to Léger as the final score, that he would not mention (especially in a newsy letter) the complexities of organizing the concert at which he presented the music for Léger's approval. That lends support to the assumption that a version for a single Pleyel pianola was what Antheil presented to the painter on that day as the completed score.

As Douglas Henderson notes, this composition for solo pianola is a balanced, wholly integrated work, complete in itself, though extremely dissonant (at times up to thirty-one keys of the piano play at once) to imitate the sounds of heavy machinery: the player piano strikes the piano strings with metallic staccato precision, and the meters are as precise as a machine (Antheil titled *Bad Boy of Music*'s chapter on *Ballet mécanique* "Music of Precision"), and the Cubist effects are in the imagery (the repetitions, the kaleidoscopic/Vortoscopic imagery, and so on balance the music for mechanical piano exquisitely). The solo player piano version possesses a clear architecture, as various patterns resurface again and again to give the complex music coherence. Having multiple musicians and multiple pianos results in a blurring of the rhythm, and the greater number of the strings struck results in a blurring of the percussive sounds that are so crisp in the version for single pianola. Moreover, the more pianos one adds the greater are the cancellation and reinforcement effects from having so many strings vibrating simultaneously—and this fact (which Antheil, like Stravinsky, failed to grasp) caused him much grief.

For the better part of a year, *Ballet mécanique* was shown with the solo pianola accompaniment, even though the Pleyel rolls were badly produced (Henderson's examination of the original manuscript of the score revealed that the rolls were poorly perforated and missing many notes, and Antheil had made assumptions about what a Pleyel could do that were completely unrealistic; Pleyel even skipped over at least one of these passages when punching the rolls). The costs of preparing the rolls had been born by Mrs. Bok, and Antheil likely didn't want to approach her again to have them redone. Among the consequences of Pleyel's botched job is that the player piano's performance gets buried by the "superimposed rhythms" in a muddle of irregular chords. Vaill suggests that a significantly different second version of the movie, with a different score, was produced sometime during the spring of 1927 in another studio, on rue Froidevaux. The MoMA print, I believe, is the result of reworking the film in 1927.

The score Antheil was working on at this time was transitioning from a "chamber work" to a full-dress theatrical piece. We can get a sense of the transition from a description of the instrumentation used in a salon performance on 16 July 1926, organized by Virgil Thomson at the home of the arts patron Mrs. Christian Gross. For

that occasion, Mrs. Gross's house was filled with eight pianos, while xylophones and percussion instruments were put into a room to the side. So many guests crowded into the house that Vladimir Golschmann (1893–1972, a noted advocate of Les Six) had to conduct standing on top of one of the grand pianos.

I believe that the reason for creating a version for multiple pianos (or player pianos) is that when noisemakers and xylophones were added and the work shown in a larger hall, a single pianola was not sufficiently powerful. Furthermore, sometime in the later part of 1926 or early 1927 the film had been re-edited (due, I conjecture, to some falling-out between Léger and Murphy), and several scenes were cut out (including those featuring Dudley Murphy's wife in the nude). Likely this re-editing happened in stages, and the film was recut several times, and as time went by the piano rolls no longer matched the picture. So Antheil demoted the pianola to a machine for producing an automated percussion part (an early "rhythm box," providing sounds that were mixed into the orchestra's), and in keeping with that transformation of the role of the pianola (and in conformity with his Futurist-inspired aesthetic), he expanded the range of machine sounds the work included, to incorporate airplane propellers, live pianos, and door bells. There were thoughts of using this version as the film soundtrack (that I believe is the source of the belief that Antheil wanted a large orchestra, supplemented with noisemakers, to accompany the projection), but this did not work out. But, I believe, it was a version for single pianola (using the spool roll that combined the intended three rolls into one), that was presented at the International Society of Contemporary Music Festival in Baden-Baden in the Summer of 1927, and, along with the film, at the Museum of Modern Art in New York on 18 October 1935.

We also know that Fernand Léger and Dudley Murphy continued to advertise the film, years later, as being accompanied by music.

359 John Tytell, *Ezra Pound: The Solitary Volcano* (New York: Doubleday, 1987), 189–90.

360 One should take into account, too, the unlikelihood of finding a concert hall that was large enough to accommodate the expanded orchestra and that could be equipped with a 35mm movie projector (this was in the days of nitrate, when projector boxes had to be intricately fireproofed) or of finding a movie theatre that could house a greatly augmented orchestra.

361 Sylvia Beach, *Shakespeare and Company* (New York: Harcourt, Brace, 1956), 124–25.

362 In Schafer, *Ezra Pound and Music*, 311.

363 Pound, *Antheil and The Treatise on Harmony*, 145–47.

364 Ibid., 137–38.

365 See Vincent Sherry, *Ezra Pound, Wyndham Lewis, and Radical Modernism* (New York: Oxford University Press, 1993), 180–86.

366 Pound, *Antheil and The Treatise on Harmony*, 41–42.

367 Shelley, *Ezra Pound,* 180.

368 Pound, *Antheil and The Treatise on Harmony*, 44.

369 Ibid., 77. The passage, as it appears in *Antheil and The Treatise on Harmony*, includes interpolated comments by Antheil, essentially indicating his agreement with the points Pound makes here. I have omitted them—for one thing, because they do not state settled views that he maintained over the long term.

370 Preface to *Les mamelles de Tirésias*, in Apollinaire, *Œuvres complètes*, ed. Decaudin, 865–56.

371 Apollinaire, *Méditations esthétiques*, 9.

372 See Peter Louis Galison, "Minkowski's Space-Time: From Visual Thinking to the Absolute World," *Historical Studies in the Physical Sciences* 10 (1979): 85–121 at 92.

# FUTURISM
## 3

On 15 October 1908, Milan's *Corriere della Sera* printed the following notice:

> This morning, a bit before noon, F.T. Marinetti was heading down Via Domodossola in his car. The vehicle's owner was at the wheel accompanied by a 23 year-old mechanic, Ettore Angelini. Although the details of the incident remain sketchy, it appears that an evasive manoeuvre was required by the sudden appearance of a bicyclist, and resulted in the vehicle being flipped into a ditch.

Filippo Tommaso Marinetti (b. Alexandria, Egypt, 1876, d. Bellagio, Italy, 1944) would mythologize his motoring accident, expanding the event to include two bicyclists. At the time, it seemed a singularly modern event. In his first manifesto, he would cast it as an agonic confrontation between two vehicles powered by labour of a beast and one powered by a motor, between old and new; and second, between a feeble, old, wobbling logic and a new, higher, alogical intuition. From this *agon* a new art movement was born, which would be known as Futurism.

On 20 February 1909, Marinetti announced the new movement to the world in a strongly worded manifesto that appeared in the Paris newspaper *Le Figaro*. He also mailed an Italian version of it to hundreds of prominent Italians.[1] At first, the movement consisted of the poets Aldo Palazzeschi

(pen name of Aldo Giurlani, 1885–1974), Paolo Buzzi (1874–1956), and Libero Altomare (1883–1942); together and separately these writers staged many events at which they declaimed their startling poems in a fashion that assaulted the public's sensibility.

Italy, in the decades before the Futurist revolt, was undergoing rapid social and political change. In the late nineteenth century, Italy, the leader of the Classical and Medieval worlds, lagged far behind Britain, France, and Germany in developing automated productive capacities and, consequently, in political and social transformation. Until 1861, Italy was not united: it was divided into minor kingdoms, many of which were controlled by the Habsburg Empire. The repressive and reactionary policies imposed on Italy by the Austrian leader Klemens, Fürst von Metternich (1773–1859), and by the Congress of Vienna (1814–15), which substantially altered the map of Europe, had aggravated popular discontent, and the expansion of Austrian control in Italy stimulated intense anti-foreign sentiment.[2] These conditions gave rise to the Italian unification movement known as the Risorgimento. Revolutionaries and patriots, in particular Giuseppe Mazzini (1805–1872), nicknamed "il cuore pulsante d'Italia" (The Beating Heart of Italy), began to work actively for unity and independence. A series of unsuccessful revolts led in the 1820s by the Carbonari, a conspiratorial nationalist organization, and in the 1830s by Mazzini's Young Italy group, became the background for the Revolution of 1848, which was felt in every major Italian city and throughout Europe. Charles Albert (1798–1849), king of Sardinia (1831–49), declared war on Austria and, along with some other Italian rulers, gave his people a constitution. However, both the war of liberation and the revolutionary republics established in Rome, Venice, and Tuscany were crushed by Austria in 1849. Charles Albert abdicated, ceding his throne to his son, Victor Emmanuel II (1820–1878), who retained the Sardinian constitution.

With the help of the French, the Kingdom of Sardinia (which at that time included Genoa and the Piedmont as well as the island of Sardinia) defeated the Austrians in 1859 and united Italy in 1861. Sardinia's political leader was Count Camillo Benso di Cavour (1810–1861), who had been appointed Minister of Marine, Commerce, and Agriculture in 1850, to which duties those of Minister of Finance had been added in 1851; then in 1852, he was made prime minister. In 1859, after gaining the support of France and England, Cavour, in alliance with the French emperor Napoleon III, seized Lombardy; and in 1860, all of Italy north of the Papal States, except Venetia (Veneto), was added to Sardinia. Also in 1860, Giuseppe Garibaldi (1807–1882), a popular hero and guerrilla leader, led one thousand "Red Shirts" to Sicily and seized the southern part of peninsular Italy, forging that region and the island into the Kingdom of the Two Sicilies. Garibaldi turned his conquests over to Victor

Emmanuel, and in 1861, the Kingdom of Italy was proclaimed. (Only Venetia and Rome were not included in the new state: the former was added in 1866 and the latter in 1870.) A few months after the Kingdom of Italy was formed, Count Cavour died. Without Cavour's leadership, Italy's progress towards industrialization faltered.

Italy was confronted with heavy debts, few natural resources, a high illiteracy rate, an inequitable tax structure, and an almost complete lack of industry or transportation facilities; all of this combined with extreme poverty (among the urban dispossessed in the north, and even more among farmers in the south) to create social unrest and political instability. Regionalism was still strong, and only a fraction of the citizens had the right to vote. There was religious tension as well: the Pope, angered over the loss of Rome and the Papal Lands, refused to recognize the Italian state. In the countryside, banditry and peasant anarchism resulted in government repression, which was often brutal.

Austrian control over regions that many Italians considered part of their nation spurred a nationalist movement to annex *Italia irredenta* (unredeemed Italy), including Trentino, Trieste, Istria, Fiume, and parts of Dalmatia, whose inhabitants were mostly Italian. This led to agitation both in Austria-Hungary and in Italy itself.[3] Meanwhile, during the 1880s, a socialist movement developed among urban workers. For several decades after the 1870 unification, the political situation was characterized by opportunistic manoeuvring by unstable majorities. Groups of liberal politicians sometimes rejigged coalitions—an activity known as "transformismo"—to stay in office for long periods of time. Some economic and social progress was made in the years immediately before the Great World War, but overall, Italy during that era was a dissatisfied and crisis-ridden nation.

Italy began to industrialize in the 1890s, beginning in the northern Italian cities of Turin and Milan, and that process accelerated during the first decade of the twentieth century. Increases in mass consumption followed. By the end of that decade, Italy was emerging as an industrial power, though not without problems. Industrialization had prompted a northward migration (the 1890s saw major industrial expansion begin in the northern Italian cities of Turin and Milan), and that influx—that *immigrazione interna*—into cities in northern Italy resulted in significant social upheaval (there was considerable opposition to "gli immigrati meridionali"—immigrants from the south—and frequent expressions of feelings of "Nordisti contro Sudisti," of northerners opposed to southerners and to having the "immigrants" from the south among them). The already great differences between the impoverished south and the wealthier north widened further. Parliament did little to resolve these problems: throughout this so-called Liberal Period (1870–1915),

the nation was governed by a series of unstable political coalitions. The most notable leaders of the time were Francesco Crispi (1818–1901), who proved to have an authoritarian streak, and Giovanni Giolitti (1842–1928), a relatively liberal figure, whose terms in office were marked by unrest, the expression of which, out of principle, he did little to contain. Marinetti's manifesto would appear just at the cusp all of these changes.

Social problems became widespread, and radical unrest developed in the north. Anti-parliamentary ideology, chauvinistic nationalism, and explosive irrationalism began to take root. In 1882, hoping to increase Italy's international influence and prestige, the country's leaders brought Italy into a Triple Alliance with Germany and Austria. They also tried to turn Italy into a colonial power. In the 1890s, Italy tried unsuccessfully to conquer Ethiopia; and in 1911 it declared war on Turkey in order to obtain the North African territory of Libya, which it promptly invaded. The nationalistic militancy this fostered would influence Futurism, encouraging its adherents to become super-patriots. And this militancy was not the greatest social problem that Italy confronted: more troubling yet was that real democracy was slow to take hold. By 1912 (about three years after the founding document of the Futurist movement appeared), universal suffrage had virtually been achieved, but because of widespread illiteracy and political inertia, most people did not vote. The feebleness of Italy's democracy would prove fateful.

Italy remained neutral for almost a year after the outbreak of the Great War, while the government negotiated with both sides. Then in 1915, Italy joined the Allies, after it was promised the territories it regarded as "Italia irredenta." But the country was unprepared for a major war; though it won a few battles in 1918, in came out of the war having suffered serious losses of men, materiel, and morale. Moreover, despite the efforts of Vittorio Emmanuele Orlando (1860–1952) at the Paris Peace Conference of 1919, the treaties that followed the Great War gave Italy only Trentino and Trieste, a small part of what it had expected. These disappointments produced a powerful wave of nationalist sentiment against the Allies and the Italian government.

Italy was plunged into deep social and political crisis by the war. Veterans, unemployed workers, pauperized peasants, and an alarmed middle class demanded change, and after the 1919 elections, the Socialist and the new Popular (Catholic) parties were suddenly the largest in parliament. Strikes and threats of revolution unsettled the nation, while extreme nationalists agitated for territorial expansion. In 1919, in the midst of all this, Benito Mussolini (1883–1945), a *quondam* revolutionary socialist, founded a new movement called "Fascismo." Through shrewd political manoeuvring as well as violence (perpetrated by Fascist Black Shirt squads), the movement gained increasing support. In October 1922, after the Fascists marched on Rome, King Victor

Emmanuel III (1869–1947) named Mussolini prime minister. Within four years, he had become a dictator, suspended civil liberties, outlawed other political parties, and imposed a totalitarian regime on the country by terror and constitutional subversion. Public works projects, propaganda, militarism, and the appearance of order gained Mussolini considerable prestige, and the Lateran Treaty with the papacy in 1929 further extended his popularity. Mussolini's expansionist foreign policy brought Italy closer to war during the 1930s. In 1935–36, the Italian army invaded and conquered Ethiopia, and in 1936, Italy sent troops to support Generalissimo Francisco Franco in the Spanish Civil War. Later that year, Mussolini and Hitler established the Rome–Berlin Axis. In 1939, Italy captured Albania. The two dictators then forged a military alliance known as the Pact of Steel. In June 1940, nine months after the outbreak of the Second World War in Europe, Italy took up arms as a part of the Axis alliance.

## FUTURISM AND NEW ITALIAN CULTURE

A feeling for the new Industrial Sublime became widespread in the late nineteenth and early twentieth centuries. This was nowhere more evident than in those areas that lagged behind in industrial development: in Russia and Italy and on much of the American frontier. Walt Whitman was America's Futurist *avant la lettre*. Russia developed a strong Futurist movement, after the Italian model; indeed, Italian Futurism became the type for much of the world.

The Italian Futurist movement reflected the risks, and the exhilaration, of the urbanization and industrialization that was finally taking hold in Italy in the last decade of the nineteenth century and first decade of the twentieth. Futurism was the product of Northern Italian cities such as Genoa, Milan, and Turin, where the clash between cultural tradition and the industrial forces of innovation was now part of quotidian experience. The Italian Futurists were determined urbanists: living in the city had the vivifying effect of fragmenting perceptions into myriad disjunctive, even chaotic, sensations. Futurism's founding document, Filippo Tommaso Marinetti's "Fondazione e Manifesto del futurismo" (The Founding and Manifesto of Futurism, 1909), begins with an anecdote recounting how he and his friends had stayed up all night, scribbling with frenzy. Below, I quote from Marinetti's text, offering interpolated comments. A principal theme of my commentary on Futurism will be that the Futurists' beliefs about machines were far, far different than our own (a difference that has yet to be recognized). The Futurists conceived of the machine as having a mental or spiritual or pneumatic nature, besides being a material entity. Perhaps more precisely, they considered the machine to be a vital entity-process, akin to electromagnetism, that could be viewed

as material but also as possessing the attributes of intelligent and intuitive life. That is why I characterize machines as *spiritual*. I will be offering interpolated comments to highlight this aspect of Futurist art that, it seems, has gone unnoticed. I think it is important to highlight this feature of Futurism from the very outset of our inquiry, even though the full meaning of these claims will only be disclosed in the course of our study.

> Suddenly we jumped at the tremendous noise of the large double-decker trams which jolt along outside, shimmering with multicolored lights, like villages on holiday which the flooding Po suddenly strikes and uproots, dragging them all the way to the sea, over waterfalls and through gorges. [The bus, since it is powered by motors, is compared to a torrent of energy. Note too it is the sound of the bus, and lights on it—electromagnetic phenomena—that are used to suggest its energy.]
>
> Then the silence grew more gloomy. But as we were listening to the attenuated murmur of prayers muttered by the old canal and the bones of ailing palaces creaking above their beards of damp moss [the "attenuated murmur of prayers," creaking bones, "ailing palaces," and "beards" all suggest the old world], suddenly we heard the famished automobiles roaring beneath the windows. [The automobile represents the new world, which Marinetti describes as famished—throughout the manifesto, Marinetti uses animal attributes to characterizes machinery: machines, we will see, belong to a biocosmic realm. Clearly, Marinetti's conception of machinery differs from our ordinary one, in ways that justify referring to machines as *geistig*, or spiritual.][4]

The products of industry are utilitarian—their design is determined by considerations relating to their fittingness for the dynamic world of industry. They are sleek, a consequence of their being adapted for speed: this made industrial production fascinating for the Futurists. For them, speed was thrilling, for it generated feelings akin to those of an erotic adventure. Gino Severini, a signatory of Marinetti's founding manifesto, explained that the essence of the technological modern is speed:

> We choose to concentrate our attention on things in motion, because our modern sensibility is particularly qualified to grasp the idea of speed. Heavy powerful motorcars rushing through the streets of our cities, dancers reflected in the fairy ambiance of light and colour [note the peculiarity of this language when applied to machines and industry], airplanes flying above the heads of the excited throng [another evocation of the notion of transcendence, but here, *à nouveau*, alluded to using machine imagery] . . . These sources of emotion satisfy our sense of a lyric and dramatic universe, better than do two pears and an apple.[5]

The Futurists aspired to rejuvenate art with this chaos of dynamic sensations: declarations of their artistic intentions stressed the polymorphousness of

appearances, and in keeping with such convictions, Futurist practices foregrounded, not the purity of each artistic medium, but the interchangeability of materials and even of sensations (synaesthesia was a key theme of the Futurists' proclamations).

The conditions of urban life had encouraged the perceptual faculties to evolve to the point where they could relay information at lightning speed. Thus, the high-speed transmission of highly compacted information became a theme of Futurist writings and paintings. The Futurists pictured the mind as being awobble with the chaotic welter of sensations, and they strove to carry out the task of balancing the toppling pivot. Accordingly, theirs was an avant-garde movement that longed to reach out to the people, to become politically effective, so that they might adapt life to its changed circumstances. To this end, they engaged in polemics, mounted press conferences, staged outrageous theatrical events, and made determined attempts to seek (or to create) publicity. On the occasion of their first exhibition of paintings under the Futurist banner, they issued a proclamation: "If you don't want to cover yourself with shame, giving proof of ignominious intellectual apathy . . . hurry to intoxicate your spirit before *50 Futurist paintings*" (note the response that the Futurists believed their painting would elicit, akin to spiritual intoxication). And, as later movements would do repeatedly, they quoted with pride the official press's denunciation of their work—in their case, the denunciation by the art critic for the *Corriere della Sera*: "The maddest colouristic orgy, the most insane eccentricities, the most macabre fantasies, all of the drunken foolishness possible" (note that the critic's response suggests that they achieved the desired response).[6] Not for them was the isolation of art in a protected, enclosed sphere remote from the public: through their theatrical displays and their publicity seeking, they endeavoured to breach the wall separating the avant-garde from the public. Futurism was the first artistic movement of the twentieth century to aim for a mass audience, and it made use of every available means to address the public.

## FUTURISM: THE VIOLENCE OF THE NEW REPLACING THE OLD

In "Fondazione e Manifesto del futurismo," Marinetti & Co. offered a series of proposals for frogmarching Italy into the twentieth century. It was a ringing (and troubling) declaration of the Futurist sublime, and the ninth action the manifesto proposed—and the most sublime of all—was this: "We will glorify war—the world's only hygiene—militarism, patriotism, the destructive gesture of freedom-bringers, beautiful ideas worth dying for, and scorn for woman." Futurists celebrated bellicose dynamism and reviled passivity. Their advocacy for a warrior's character and disposition reflected their belief

that traditional culture was feminine, refined, passive, gentle, and emotional and, consequently, to be thoroughly despised, while industrial culture, the culture of the future, was masculine, hard, dynamic, and prone to war. All existing cultural institutions were feminine, the Futurists averred, so one must, in order to get rid of them, also attack Woman.

Much in what the *futuristi* proposed is politically suspect (to say the least). Nonetheless the *futuristi*, when advocating "scorn for women," probably meant something at least marginally different from the crass misogyny it can so easily be taken to declare.[7] They probably intended the target of their scorn to be the social role that traditional Italian society had assigned to women.[8] The *futuristi* were hostile towards the present conditions of humanity, both male and female, and they longed for the technological transformation of human being into a new type. Their slogan about women, then, was probably akin to Nietzsche's contemptuous remarks about "the last men"—likely, it was tantamount to a Nietzschean declaration that a new type of being, one who lives beyond good and evil, must come forth. A passage from their "Il teatro di varietà: Manifesto futurista" (Manifesto of Variety Theatre, 29 September 1913) celebrated that new artistic form for exalting man's "rapacious instincts" and for snatching away from woman "all the veils, all the phrases, all the sighs, all the romantic sobs *that mask and deform her.*"[9] By stripping the traditional artifice around the convention that Italian society of the time called "woman," the *teatro di varietà* would allow her to be seen as she truly is: "it throws into relief all of woman's marvelous animal qualities, her power to prey, seduce, betray, and resist."[10]

Another of Marinetti's prose-poems/manifestos, the vibrant "Noi rinneghiamo i nostri maestri simbolisti ultimi amanti della luna" (We Abjure Our Symbolist Masters, the Last Lovers of the Moon, 1915), lends some support to our conjectures about the political and social effects the Futurists hoped their denunciation of women might have. In it, Marinetti condemns the "four intellectual poisons" that corrupt our thinking and acting:

> 1) the sickly, nostalgic poetry of distance and memory; 2) romantic sentimentality dripping with moonlight that is ascending toward an ideal and fatal Woman-Beauty; 3) obsession with lechery, with the adulterous triangle, the spice of incest and the seasoning of Christian sin; 4) the profound passion for the past and the mania for antiquity and collecting.[11]

From among those whose writings display these feminine features, Marinetti picks out D'Annunzio and Mallarmé as especially loathsome.[12] One focus of his contempt is the place these writers assign to women, at the centre of forces that quiet the active drives and that defer pleasure by making such drives seem unattainable. The opacity of the Symbolists' language, which, by

drawing attention to the material of language itself and to the repetitions—the echoes and reflections—that characterize its aural structures, thwarts any sense of forward propulsion and draws the reader's/the listener's mental (erotic) energies away from their primary object and towards a fetishized realm of rare and beautiful language. Symbolist language thus evokes a static ideal that inhibits the drives' expression. The result is an artificial paradise whose fundamental law is that desire must go unfulfilled—and that law is so stringently enforced that the gaze turns inwards and takes as its object desire itself (desire forever arising anew and forever remaining replete/unsatisfied). "Up to now literature has exalted contemplative stillness, ecstasy, and sleep," Marinetti maintains regarding that stasis of desire. "We intend to exalt movement and aggression, feverish insomnia, the racer's stride, the mortal leap, the slap and the punch."[13] Symbolist language had become a paradise in which actual, transient sensory experience was repudiated, for it had no place in the ideal realm of imaginary, almost unchanging (ever arising anew) pleasure. One might recall in this connection a passage from Nietzsche's *On the Genealogy of Morals* (1887):

> All instincts that do not discharge themselves outwardly *turn inward*—this is what I call the *internalization* of man: thus it was that man first developed what was called his "soul." The entire inner world, originally as thin as if it were stretched between two membranes, expanded and extended itself, acquired depth, breadth and height in the name of measure as outward discharge was *inhibited*.[14]

The Futurists' goal was to transform the spirit and sensibility of a culture they considered anachronistic. As youths, the Futurists had experienced the Italian tradition in painting as stultifying: the Italian public, complacent with past artistic glories, paid little attention to the new art. Marinetti's "Fondazione e Manifesto del futurismo" decries the stultified condition of Italian art, which it associates with the omnipresence of museums:

> It is from Italy that we are flinging this to the world, our manifesto of burning and overwhelming violence, with which we today establish "Futurism," for we intend to free this nation from its fetid cancer of professors, archaeologists, tour guides, and antiquarians.
>
> For much too long Italy has been a flea market. We intend to liberate it from the countless museums that have covered it like so many cemeteries…
>
> I declare, in all truth, that a daily visit to museums, libraries, and academies (cemeteries of futile efforts, Calvaries of crucified dreams, record books of broken assaults!…) is as dangerous for artists as a prolonged guardianship under the thumb of one's family is for certain young talents intoxicated with their own genius and their ambitious aims. [Note that here Marinetti likens artistic creativity to spiritual intoxication, and that in doing so, he deploys the trope

> of death and resurrection.] For the sickly, the ill, or the imprisoned—let them go and visit: the admirable past is perhaps a solace for their troubles, since the future is now closed to them . . . But we intend to know nothing of it, nothing of the past—we strong and youthful *Futurists*!
>
> And so, let the glad arsonists with charred fingers come! Here they are! Here they are! . . . Go ahead! Set fire to the shelves of the libraries! . . . Turn aside the course of the canals to flood the museums! . . . Oh, the joy of seeing all the glorious old canvases floating adrift on the waters, shredded and discolored! . . . Seize your pickaxes, axes, and hammers, and tear down, pitilessly tear down the venerable cities![15]

The "Manifesto della cinematografia futurista" (Manifesto of Futurist Cinematography, 1916) celebrates war's capacity to revivify human sensibility. Written during the Great War, it remarks on that terrible episode that the "current conflagration is increasingly streamlining European sensibility."[16]

The Futurists' sublime, their celebration of war—and, more generally, of aggression—owed much to the French social theorist Georges Sorel (1847–1922) and his *Réflections sur la violence* (Reflections on Violence, 1908). Sorel's main point was that violence is not a singular phenomenon but takes many different forms. He was the first to propose that every revolutionary program, and many ameliorationist projects, of the twentieth century espoused violence as a means; that various forms of "structural violence" were practised within state institutions, including the institution of law; and that any oppositional movement must develop its own form of violence—a "violence of principle," practised in the name of morality, admittedly, but a form of violence nonetheless, for it involved confrontation rather than conciliation.

"Il teatro futurista sintetico" (The Futurist Synthetic Theatre, 1915), written by Marinetti, Emilio Settimelli (1891–1954), and Bruno Corra (1892–1976) begins again with a declaration of the Futurist sublime and expresses an aggressive attitude towards audiences similar to what we find in "Noi rinneghiamo i nostri maestri simbolisti ultimi amanti della luna" (which was written in the same year):

> While we await the great war that we have so often invoked, we Futurists have alternated between two forms of activity, violent antineutralist actions that have taken place in city piazzas and universities, and artistic actions that are reshaping the Italian sensibility, preparing it for the great hour of maximum danger . . .
>
> . . . War, which is intensified Futurism, demands that we march and not that we molder [*marciare, non marcire*] in libraries and reading rooms. HENCE WE THINK THAT THE ONLY WAY THAT ITALY CAN BE INFLUENCED TODAY IS THROUGH THE THEATER . . . [W]hat is needed is a FUTURIST THEATRE, one utterly opposed to the passéist theater that makes a monotonous and depressing procession across the sleepy stages of Italy.[17]

The proclamations that conclude Marinetti's founding document are the canonical statement of Futurist thinking and a declaration of Futurism's artistic ideals (which the Futurist painters adapted for their purposes):

> 4. We affirm that the beauty of the world has been enriched by a new form of beauty: the beauty of speed. A racing car with a hood that glistens with large pipes resembling a serpent with explosive breath . . . a roaring automobile that seems to ride on grapeshot—that is more beautiful than the *Victory of Samothrace*.
> 5. We intend to hymn man at the steering wheel, the ideal axis of which intersects the earth, itself hurled ahead in its own race along the path of its orbit. [Note the use of spiritual terminology.] . . .
> 7. There is no beauty that does not consist of struggle. No work that lacks an aggressive character can be considered a masterpiece. Poetry must be conceived as a violent assault launched against unknown forces to reduce them to submission under man.
> 8. We stand on the last promontory of the centuries! . . . Why should we look back over our shoulders, when we intend to breach the mysterious doors of the Impossible? ["The mysterious doors of the capital-I Impossible"—this clearly is an allusion to a super-reality that is ramified in the next two sentences, regarding time, space, and the absolute.] Time and space died yesterday. We already live in the absolute, for we have already created velocity which is eternal and omnipresent.
> 9. We intend to glorify war—the only hygiene of the world—militarism, patriotism, the destructive gesture of anarchists, beautiful ideas worth dying for, and contempt for woman.
> 10. We intend to destroy museums, libraries, academies of every sort, and to fight against moralism, feminism, and every utilitarian or opportunistic cowardice.[18]

## PAINTING BECOMES A FUTURIST SYNTHETIC ART

Futurism was, at first, a literary movement. Marinetti had not considered giving the visual arts a role in his program when he founded the movement. This should not be surprising, given his background: he began as Symbolist writer, and Symbolism (like other late-Romantic movements) had developed a comprehensive aesthetic in which *Dichtung* topped all the arts and sciences, for poetry fused the imaginary richness of the seeing (imagery) with the musicality (the non-referentiality, non-specificity) of hearing.

But in February 1909 the painters Carlo Carrà (1881–1966), Umberto Boccioni (1882–1916), and Luigi Russolo (1883–1947) proposed to Marinetti that the movement be opened to visual art. Marinetti agreed enthusiastically, and these painters, along with their acquaintances Aroldo Bonzagni (1887–1918) and Romolo Romani (1884–1916), issued, through Marinetti's experimental

magazine *Poesia*, a Futurist manifesto of their own, "Manifesto dei pittori futuristi" (Manifesto of Futurist Painters, 1910). It was also endorsed by the painter Gino Severini, a friend of Boccioni then resident in Paris, and by the Roman, Giocomo Balla (1871–1958), already a well-known Divisionist painter and a former teacher of both Boccioni and Severini. The reaction to the broadside caused Bonzagni and Romani to withdraw, leaving Balla, Boccioni, Carrà, Russolo, and Severini as the core Futurist painters. "Manifesto dei pittori futurista" was addressed to the "Young Artists of Italy" and contained bold assertions about the future of painting (even though when it was written, no Futurist painting had been done). Much of it was given over to chastising the various forms of aesthetic reaction they saw as dominating Italian culture.

The *futuristi* asserted that in a world being transformed by scientific and technological developments—by the inventions of Samuel Morse (a former painter, 1791–1872), Alexander Graham Bell (1847–1922), and Thomas Alva Edison (1847–1931), and by discoveries in particle physics, relativistic mechanics, and electromagnetism—changes of this sort ensured that the traditional nude had become an outmoded form. So, in "La pittura futurista: Manifesto tecnico" (Futurist Painting: Technical Manifesto, 1910), Boccioni, Carrà, Russolo, Balla, Severini, and other signatories demanded "*the total suppression of the nude in painting*" for the next ten years.[19] While Albert Einstein and Max Planck (1858–1947) were changing the way people thought about the world, artists were still copying the same age-old themes: nudes, landscapes, surf, and so on.

That this shocking situation must end was the Futurists' most basic belief: changes in consciousness were under way, and the arts must not be left out. Thus, in the 1913 manifesto "Distruzione della sintassi—Immaginazione senza fili—**Parole in libertà,**" Marinetti & Co. declared,

> Futurism is grounded in the complete renewal of human sensibility brought about by the great discoveries of science. Those people who today make use of the telegraph, the telephone, the phonograph, the train, the bicycle, the motorcycle, the automobile, the ocean liner, the dirigible, the aeroplane, the cinema, the great newspaper (synthesis of a day in the world's life), do not yet realize that these various means of communication, transportation and information have a decisive influence on their psyches.[20]

Like Marshall McLuhan, Marinetti was convinced that the new technologies (including technologies of communication) were reshaping consciousness. He embraced new technologies. Thus in 1916 he called for a *cinematografia futurista*, a cinema that would be free from the limits of the photoplay, that would be poetic, that would emphasize simultaneity, and that would escape logical thinking—the form of thinking associated with the technology of text. "Distruzione della sintassi" calls for artists to develop the means to create a

revolution in human sensibility. In its advocacy of means for unifying the subjective and the objective realms, this manifesto is proto-Surrealistic: "As we discover new analogies between distant and apparently contrary things, we will endow them with an ever more intimate value."[21] The Surrealists knew well that the cinema can easily discover analogies between apparently contrary events and between the inner and the outer realms. It is likely that Marinetti, writing a decade before them, knew this as well.

"Distruzione della sintassi" is suffused with the conviction that a complete renewal of human sensibility was taking place. Marinetti conceived his polemical writings in the hope that the (electro)mechanical element would play a role in the future world equivalent to that which the natural forms had played to that time. The mechanical era in Italy was then just at its beginning, and in that era, (electro)mechanical forces would reshape consciousness. From this insight, Marinetti concluded that his movement would have to assume the task of making its era an epochal moment—one that would loosen the subject's ties to tradition and return the subject to its point of origin. Erosion of faith in the immortality of the soul would lead thinkers to reconsider the range of human possibility; romantic love would be overcome, leading to a free expression of sexual desires; humans would stride forward to the tune of the machine-music. Humans would develop a sense for the machine, and human instinct would fuse with the machine's horsepower (animal vitality) to produce the New Man. A new language would be required in order to adequately express this new sensibility—a language that was free of the fetters of old syntax and rules of punctuation and all other connecting wires. Language would be put into flux, and the words of this new, fluid language would be liberated from the fixities of conventional form and standard usage.[22]

The belief (evident in the preceding quotation) that the world was becoming a global village and that means of communication were affecting people's psyches is now broadly accepted. In Marinetti's day, however, it was revolutionary. Its utter novelty does much to explain the rhetorical inflation we encounter so often in his polemical writings. Indeed, we can credit him for inventing the linguistic bombast that would saturate the manifestos and proclamations of many artistic movements of the twentieth century. The rhetorical inflation is humorous at times, conveying a sense of the absurd at the heart of the Futurist enterprise, and amounts to a repudiation of the quasi-religious solemnity of Symbolism. The bombast here is also aggressive, in that it approaches the expressions of a hysteric—for example, it celebrates the aggression inherent in efforts to replace with brutal (but arousing) declarations a lyricism that would equate love with soft speech. No more poems about the moon, Marinetti declared, citing his favourite literary target: a fine subject for a Futurist poem would be a howitzer.

The ordinary person *had* to be reached—that end was crucial to the success of Marinetti's program. To counteract the stultification of a culture dominated by museums, the *futuristi* published shocking manifestos in newspapers in Tokyo, Chicago, London, and Moscow, in which all previous artistic values were rejected, and most moral values as well. Through these publications and through theatrical displays, the *futuristi* strove to overcome the apathy into which conventional taste had fallen and to revivify life. Thus, on 8 July 1910, Marinetti and some Futurist colleagues climbed the clock tower (the Torre dell'Orologio) on the square in front of Venice's Byzantine wonder, Basilica San Marco—that site was chosen because the clock tower had long been a symbol of Venetian power. They carried with them thousands of copies of their manifesto *Contra Venezia passatista* (Against Past-Loving Venice; this philippic, the third of the Futurists' manifestos, had been released on 27 April 1910); when a number of people who had just disembarked from the ferry from the Lido entered the square, the Futurists hurled copies of their manifesto at them. The broadside denounces Venice as "a great sewer of traditionalism" and "the greatest bordello in history." It condemns its canals for being a "jewelled hip-bath for cosmopolitan courtesans." It decries Venice's "leprous, crumbling palaces" and reviles its gondolas as "rocking chairs for cretins." It castigates Venice for its markets hawking fraudulent antiquities, characterizing those shops as "magnetic poles for all the snobs and imbeciles of the world"—this suggests the Futurists already harboured some notions about the irrational power of magnetism—and, significantly, it proposes electrification as the remedy for Venetian *passéisme*. Above all, it condemns Venetians for wanting to "prostrate [themselves] before all foreigners": "Your servility is repulsive," the manifesto declares.

On a Sunday morning later that same year, Marinetti and Futurist colleagues, this time carrying a trumpet and loudspeaker, climbed San Marco's campanile. The choice of this location was equally significant: on 14 July 1902, the bell tower had collapsed in an appalling heap of rubble. Plans to reconstruct the beloved edifice began almost immediately. There were proposals to rebuild it in a modern style and even to erect the new campanile in a different location (these proposals were fought by a contingent who insisted it should remain "dov'era, com'era," where it was, how it was). To the chagrin of modernists, including the Viennese anti-traditionalist, Jugenstil architect Otto Wagner (1841–1918), who had proposed a very forward-looking design, the preservationists and sentimentalists won out, and it was decided to create what is essentially a replica of the original centuries-old construction (though some additional reinforcement was included in the new building, as well as an elevator). For Marinetti and the Futurist band, the decision typified *passéiste* Italy and its epitome, *Venezia passatista*. So they decided to draw attention to

a backwards-looking project that was then still under way.[23] That morning, when the congregation was let out of mass, the Futurist insurgents sounded three blasts on the trumpets, then began hurling insults at the people coming out of the service, decrying the city of Venice for its churchiness, its *passéiste* quality, and its stink.

The Futurists abhorred anything redolent of *passéisme*, anything sentimental, any expression of a generalized, unthinking humanism. They understood that the outcome of the clash between the conservative force of tradition and the innovative forces of industry had already been decided: the future, which meant the age of the machine, would be the victor. History, for them, was a relentless struggle that knows nothing of pity or charity—so if the future was going to be the electromechanical age, one might as well follow the counsels of self-interest and throw in one's lot with the machines. In trying to stir Italians to side with the future, the Futurists gave expression to their nationalist sympathies: if they could reawaken Italians, the new federation would have an opportunity to assume a commanding position in the emerging social order. They attempted a rapprochement with existing authority, for this might allow them to influence the emerging socio-political reality. And they succeeded in that, at least in some measure, for the Fascists, far from denouncing Futurist art (as they did Expressionist, Cubist, and Surrealist art) for being degenerate, embraced some Futurist ideas, and Futurist artists reciprocated: during the Fascist period, propagandistic paintings like Giovanna Tallone Nascimbene's (1901–1961) *Ascoltazione alla radio di un discorso del duce* (Listening by Radio to the Leader's [Duce's] Speech, 1939) and (even more tellingly) Adelina Zentrino's *Stati d'animo creati dal Fascismo* (States of Mind Created by Fascism, 1939) appeared, and glorified the Futurists for having been enthusiasts for Italian participation in the Great War. Like the Futurists, the Fascists celebrated speed, violence, and risk (which connected with Fascist cult of youth). And the bombastic style of Futurist manifestos has much in common with the style of Fascist rhetoric and Fascist oratory (the bombast of which led Eugenio Montale and the Ermetici to adapt, by way of a reaction, an arcane style). The Fascists took lessons in reaching the masses from the Futurists, and in some measure, the Futurists took lessons from the Fascists.

Marinetti was well positioned to undertake the effort of reaching the masses. He was a brilliant agitator and had an instinct for producing outrage. He came from a wealthy family and was the heir to an enormous fortune, most of which, he bragged, had been amassed in the brothels of Alexandria, the place of his birth. The enthusiasm for the exotic that Marinetti displayed in his earlier days as a poet caused him to brag that he had been fed at the breast of a Sudanese wet nurse and that he had been expelled from the Jesuit

college where he had been a student for smuggling in a book by the French naturalist writer Émile Zola (1840–1902).

Whether or not he was actually expelled from his Alexandrian school is an open question. But this much is certain: he did leave Alexandria as a student—his parents sent him to Paris to continue his education. There he developed a deep interest in the artistic activities around him. He completed a degree in letters from the Sorbonne and then moved to Italy, where he did a doctorate in jurisprudence at Genoa and Pavia.

All the while, he continued to commute to Paris to keep up with artistic developments there. Until 1911 or 1912, he wrote his poetry and his plays mostly in French. As a young man he had acquired a taste for the Symbolism then in vogue—in particular for the works of Stéphane Mallarmé and those of the tragically short-lived Jules Laforgue (1860–1887). By the time Marinetti moved to Italy, he had already assumed the vocation of a Vates (a divinely inspired poet/prophet), and he served as a missionary for Symbolist verse. Other influences included Zola's naturalism, Alfred Jarry's (1873–1907) *Ubu* plays (with their wild iconoclasm and their *épater le bourgeois* spirit), and the philosophical writings of Henri Bergson and Friedrich Nietzsche.[24]

The influence of Nietzsche and Victor Hugo is especially evident in *La conquête des étoiles* (The Conquest of the Stars, 1902), at 4,000 lines Marinetti's first major poem.[25] It depicts man (definitely the male half of humanity) as the conqueror of the universe who, with the aid of science—the poem typifies that fascinating fusion of Romanticism, science, technology, and the occult that characterized Symbolism and, later, Futurism—will impose order on universal chaos.[26] The poem declares forthrightly its Symbolist heritage. But its Symbolism is Symbolism-with-a-difference (just as Futurism would be a version of Symbolism, but with even more marked variant features). *La conquête des étoiles* presents the night sky as a mysterious realm whose depths cannot be plumbed; the stars and the romantic moon are charged with meanings that we cannot make precise and definite. Sometimes this poem's sky seems to be what it is in some Symbolist verse—a higher spiritual realm that offers liberation. But here is where the difference I referred to becomes evident: the Symbolists sought to liberate themselves by attuning themselves to the celestial harmonies, which they understood as occurring through an erotic afflatus that would result in identification with the feminine (harmonious) cosmos. Marinetti, like the Futurists who would follow him, believed that hope was in vain: that identification is impossible to attain. They concluded that the hero must conquer the celestial realm, the stars, by asserting his masculinity. *La conquête des étoiles* promulgates that idea.

During the several years after the appearance of his first major Symbolism-with-a-difference work, Marinetti began to publish prodigiously. *La*

*conquête des étoiles* was followed by *La momie sanglante* (The Bloody Mummy, 1904).[27] He founded the literary magazine *Poesia* in 1905, which appeared with a highly Symbolist cover illustration depicting a nude, stout-figured Muse on a mountaintop with a slain dragon below. It presented verse by younger followers of Stéphane Mallarmé (1842–1898) and Paul Verlaine (1844–1896), as well as by British and European Symbolists and occultists, including the splendid Belgian Emile Verhaeren (1872–1960), Gustave Kahn (1859–1936), the extraordinarily musical Algernon Charles Swinburne (1837–1909), the Celtic Revivalist poet and occultist William Butler Yeats (1865–1939), the founder of pataphysics Alfred Jarry, and the Groupe de l'Abbaye de Créteil founder Georges Duhamel (1884–1966); as well, it presented work by the young Italian poets, including a number who followed Marinetti into Futurism: Gian Pietro Lucini (1867–1914), Aldo Palazzeschi, Corrado Govoni (1884–1965), Paolo Buzzi, the poet-boxer Armando Mazzo (1894–?), and Enrico Cavacchioi (1885–1954).[28] But by 1909 Marinetti's ideas had shifted, and he began to spend his vast fortune promoting the idea of Futurism and publishing as many books as possible by his co-factionalists.

Near the end of his pre-Futurist days, Marinetti would have been exposed to a fledgling movement, *Unanimisme*, which was founded around 1908 (about a year before the founding of Futurism) by Jules Romains (1885–1972; he was eight and a half years younger than Marinetti) and Georges Chennevière (1884–1929).[29] *Unanimisme* was a literary movement that opposed individualism and the tendency to celebrate individual particularities. It proposed to transcend such particularities through a universal sympathy with life, and it took an interest in collective consciousness and collective emotion and the phenomenon of crowd behaviour, where several members of a group think or do something simultaneously. Crowd behaviour highlights the transcendent power of collective emotion and brings into evidence the collective life-world of the group as a whole. One might well recall in this connection that in 1895 Gustave Le Bon (1841–1931) published an enormously influential book, *La psychologie des foules* (The Psychology of Crowds).[30] The intensity of the urbanization process occurring at the time had forced the issue of the crowd to the fore, and Le Bon's study had something of the character of a popularized synthesis of findings that had been reported in scientific journals. Le Bon noted the phenomenon that had cardinal importance for Romains too, viz., that "the sentiments and ideas of all the persons in the gathering take one and the same direction, and their conscious personality vanishes."[31] Like Romains, Le Bon noted that no matter how heterogeneous the members of a gathering might be, they tend (under specific circumstances) to fall under the thrall of what Le Bon called the "psychological law of the mental unity of crowds," and when that happens, their individual qualities are subsumed within a

newly formed organism and their individual abilities to reason vanish (or at least are diminished). What takes the place of reason are unconscious operations, the workings of a mental substratum that is the product of hereditary influences.[32] Like Freud, who was working out his ideas in this same period, Le Bon maintained that reversion to the unconscious involved a regression to an earlier state, either to a pre-civilized state or to a less advanced stage of human evolution. Accordingly, Le Bon set out the main characteristics of crowds: "impulsiveness, irritability, incapacity to reason, the absence of judgement and of the critical spirit, the exaggeration of the sentiments, and others besides—which are almost always observed in beings belonging to inferior forms of evolution—in women, savages, and children, for instance."[33]

Le Bon's description of the mental process underlying these irrationalist developments is telling. "A crowd thinks in images, and the image itself immediately calls up a series of other images, having no logical connection with the first"; and, in a similar vein, "Crowds think in images, and these images succeed each other without a connecting link."[34] The ties of logic are unloosed as images evade language. Discursive continuity is set aside, as the force and meaning—the irrational meaning—of the image-flow asserts itself. Le Bon's choice of metaphor to convey this point tells us much about the role of the cinema (in this case, to be sure, proto-cinema) in this new *mentalité*: "The ideas suggested to crowds present themselves then in guise of images and are only accessible to the masses under this form. These image-like ideas are not connected by any logical bond of analogy or succession, and may take each other's place like the slides of a magic lantern which the operator withdraws from the groove in which they were placed one above the other. This explains how it is that the most contradictory ideas may be seen to be simultaneously current in crowds."[35]

Romains, in his novels, strives to present not characters, but life itself in modern times. His best-known work, *Les Hommes de bonne volonté* (Men of Good Will, 1932–46), a novel intended to "reflect a whole generation" (it depicts, essentially, the evolution of modern society between 1908 and 1933), runs to twenty-seven volumes. In its vitalism, and in its proposal to move beyond individualism (to adopt a universal vantage point), Romains's *Unanimisme* resembled other art movements of the time in proposing the importance of assuming a non-anthropocentric view of reality. As Marinetti would, Romains declared that the artist should be the guide who leads people through the convulsive changes taking place, for the artist above all is able to become conscious (*prendre conscience*) of this form of life.[36] These new forms of life make themselves evident in what he named "les unanimes," or collective feelings that create a mosaic of physical and spiritual relationships that

overcome space and time—these ideas have resonances in Futurist writings (as they do in McLuhan's writings).[37] In 1908, the same year that Marinetti composed the "Fondazione e Manifesto del futurismo," Romains published an extended poem, *La vie unanime*, which celebrates those epiphanic moments when one forsakes the individual ego and one's experience merges with that of crowd.[38] The first part of that work is, in fact, titled "Les unanimes," a neological coinage Romains used to refer to those ecstatic moments. "Les unanimes" is divided into three subsections, "Avant" (Before), "Dieu le long des maisons" (God Along the Houses), and "Dynamisme" (Dynamism). The second part, titled "L'individu," is similarly divided into three parts, "Sans moi" (Without Me), "Moi en révolte" (Me in Revolt), and "Nous" (We/Us). In the "Dynamisme" section (Marinetti recounts that he considered calling the Futurist movement "Dinimismo"), Romains writes about the transformations that electricity is effecting:[39]

*The present vibrates.*

Over the boulevard the human twilight
Crystallizes in an electric arc. A thin sound
Quivers. A current that tries to pass
And clings to the bushes of molecules, bleeds.

But, deep with bodies, the cells
Feel wonderful waves ripple
Toward them. The bow, crackling with solar fervor.
Lances into each the desire to be a hero.
Rays that one does not see vibrate, raucous bugles…
The mind yields its strength to the electric impulse.
Suddenly the street is resolves to enjoy itself.
At the corners of crossroads it clots into couples
Germs/Seeds move. Men will sit down.
In small circular groups in taverns.
The crowd dreams of being a village in the sun.[40]

Four decades later, Marshall McLuhan, a disciple of the Futurist-inclined poet Ezra Pound, would similarly remark on the integrating (and tribalizing) effects of the new technologies. By his time, it was possible for a visionary to make explicit—and indeed to thematize—the integrative (and conflict-inducing) effects as the effects of the dawning of the electrotechnical era.

In "La ville," a subdivision of "Dieu le long des maisons," Romains offers a number of portraits of beasts who are stirring (rather as the poets in the "Fondazione" section of the first Futurist manifesto had gone up to their automobiles, "three snorting beasts, to lay amorous hands on their torrid breasts," and pursued Death like "young lions"):[41]

It seems to me that at the end of my streets
Passersby run in the same direction,
And, unravelling the neutral crossroads,
Straighten the twisted boulevards;
So that, less and less divergent,
Despite the walls, despite the frame,
Innumerable forces come together,
And suddenly the total momentum
Sets all the houses in motion.[42]

"Dynamisme" describes (exactly as does the "Fondazione" section of the first Futurist manifesto) the roar of automobiles breaking down individuals' isolation—passengers are carried out of themselves by the intoxicating effects of speed, while onlookers are fused together by the sight of the automobile passing:

The motor lives on obedient explosions;
The atoms of gas fight whilst singing;
Their groups die and are born. Metal trembles…
People who are in the car, elbow to elbow,
Bathed by speed, lose their weight.
They exist more ardently than before…
Along the cold sidewalk, passersby caulk themselves
In a burrow of clothes whose holes they have closed.
But they saw the fierce vehicle running;
They straighten up, like a trampled lawn,
That one soaks.[43]

In the second half of *La vie unanime*, Romains writes about various *unanimes*, blissfully impersonal (or super-personal) experiences resulting from being immersed in the city. In the "Sans moi" subsection, he writes:

Being me no longer, I no longer feel what touches me.
My skin is the sidewalk of the street and the sky…
The wheel of the bus that makes sparks,
And the wheel of the sun that boggles the clouds
Give a rhythm to my impersonal thought;
I am a majestic swirl of images.[44]

The final subsection of "L'individu," titled "Nous," exalts in the transcendence of the self as it is subsumed in a higher collective consciousness:

…I will be
The man who knows how to fly from the soul to other men,
The joyous intersection of unanimist rhythms.
A universal energy condenser…

I want to be at least
In the obscure clutter of cables and wires
The thin strand of consciousness, which fluid
Traverses with incandescent emotion.
And others, here and there, will start to shine.[45]

In Romains's great poem, the individual self is transcended as it is taken up, as an intensely conscious system of receptors, in a transcendent organism made up of a flux of transcendent forces (an experience that Futurist poems and paintings also convey):

…this hot dusk

Where our eyes do not see separate forms,
Where one thinks of nothing but that which seems total
Each thing prolongs another. The metal
Of rails, the dazzling squares, the entrances

To houses, the passersby, the horses, the carriages
Join one another and rejoin my body.
Are indistinct.[46]

The Futurist painters Boccioni, Carrà, Russolo, Balla, and Severini made much the same point, asserting that

> the sixteen people around you in a rolling motor bus are in turn and at the same time one, ten, four, three; they are motionless and they change places; they come and go, bound into the street, are suddenly swallowed up by the sunshine [objects seen against the sun are swallowed by the sun, their particularity overcome—as well as the precise description of a phenomenon, this expression is likely another allusion to the sun being a higher reality that takes back objects into itself. In this way, the phrase suggests a sort of solar mysticism: Boccioni (who is the principal author of the manifesto and almost certainly wrote this passage) thus provides a metaphor that gives a concrete form to the metaphysical framework for the Futurists' notion of universal *compenetrazione* and even goes so far as to indicate the premise on which that metaphysics depends: everything that seems to be an object is really a persistent product of universal vibration and, thus, a persistent of that higher reality—the Peirceans among us would refer to them as iconic signs of that vibratory super-reality.], then come back and sit before you [the objects seen against the sun then emerge from sun again], persistent symbols of universal vibration [but now they are Symbolist-like manifestations of a universality reality, vibration, and energy: the basis of universal *compenetrazione* is universal vibration, or the electromagnetic character of ultimate reality—this is a Futurist articulation of the central idea of vibratory modernism, that cluster of vanguard movements that maintained links to the hieratic conceptions of Symbolism]. Or sometimes we look at the

> cheek of the person with whom we were talking in the street and can see the horse which is passing at the far corner [*il cavallo che passa lontano*: the horse which passes at a distance: among other implications, this statement suggests that the person's expression—perhaps a tightening of facial muscles—reveals that he or she hears a clamour some way off]. Again: Our bodies penetrate the sofas upon which we sit, and the sofas penetrate our bodies, just as the tram rushes into the houses which it passes, and in their turn the houses throw themselves upon the tram and are merged with it [objects/events interpenetrate one another, like clouds of sound interpenetrate one another].[47]

The passage concludes with a remarkable expression of solar mysticism (which is linked to what I have taken to calling electrology, the scientific-cosmological paradigm that developed out of Faraday and Maxwell's electromagnetic science): "Beyond and outside the atmosphere in which we alone live, there is nothing but shadows. We Futurists are ascending to the highest and most radiant summits, and we proclaim ourselves the Lords of Light, for already we are drinking from the quickening sources of the Sun."[48]

In due course we will have reason to revisit this rich passage by Futurism's true theoretical genius. But for now there is another parallel between Romains and the *futuristi* that should be noted. Romains, who was knowledgeable in science, took an interest in the para-scientific phenomenon of extra-retinal or paroptical vision. He first announced this interest while writing *La vie unanime*. Later, in his *La vision extra-rétinienne et les sens paroptique* (Eyeless Sight: A Study of Extra-Retinal Vision and the Paroptic Sense, 1920), he jubilantly declared, "je n'ai plus besoin de mes yeux pour . . . voir [les mouvements]"—"I don't need my eyes to see [movement]."[49] From its beginning, Futurism shared Romain's interest in augmented sensation. In their "La pittura futurista: Manifesto tecnico," Boccioni, Carrà, Russolo, Balla, and Severini wrote, "Who can still believe in the opacity of bodies, since our sharpened and multiplied sensitiveness has already penetrated the obscure manifestations of the medium? Why should we forget in our creations the doubled power of our sight, capable of giving results analogous to those of the X-rays?" As I have already pointed out, Marinetti lamented the inadequacy of the Newtonian way of seeing and adumbrated his hope that a new seeing would come forth in the electromagnetic era: "Here and there a sickly lamplight, behind the glass of a window, taught us to despise the errant mathematics of our transitory eyes."[50]

A matter of special importance for our thesis is a note that Jules Romains wrote on the psychology of the film experience, which described the cinema spectators as a crowd (here the term the crowd [*la foule*] is used in exactly the same sense that he used the term in his socio-aesthetic theory). "La foule au cinématographe" (The Crowd at the Cinematograph) describes the mecha-

nism of identification—in fact, I would have preferred to characterize it as a mechanism of transcendentalization—that the cinema activates:

> The lights go down . . . The group dream now begins [the cinema transports people into an alternative mode of consciousness, where all they see are dream images—what is peculiar about this is that all dream the same dream, because they have taken the montage of light images coming from the screen into themselves: they have collectively merged with the light]. They sleep; their eyes no longer see. They are no longer conscious of their bodies. Instead there are only passing images, a gliding and rustling of dreams. They no longer realize they are in a large, square chamber, immobile, in parallel rows as in a ploughed field [Romains sharpens the contrast between quotidian consciousness and the intensified group consciousness elicited by the cinema]. A haze of visions which resemble life hovers before them. Things have a different appearance than they do outside. They have changed color, outline, and gesture. Creatures seem gigantic and move as if in a hurry. What controls their rhythm is not ordinary time, which occupies most people when they are not dreaming. Here they are quick, capricious, drunken, constantly skipping about; sometimes they attempt enormous leaps when least expected [their consciousness has taken on attributes of the cinema, skipping and leaping about]. Their actions have no logical order [the mode of experience involved in group conscious is alogical]. Causes produce strange effects like golden eggs.
>
> A crowd is a being that remembers and imagines, a group that evokes other groups much like itself—audiences, processions, parades, mobs in the street, armies [identity becomes protean]. They imagine that it is they who are experiencing all these adventures, all these catastrophes, all these celebrations. And while their bodies slumber and their muscles relax and slacken in the depths of their seats, they pursue burglars across the rooftops, cheer the passing of a king from the East, or march into a wide plain with bayonets or bugles ["Je" becomes "un autre"].[51]

Gustave Le Bon wrote that once immersed in a crowd, one finds oneself in a "special state, which much resembles the state of fascination in which the hypnotised individual finds himself in the hands of the hypnotiser."[52] Romains's text offers us a similar view of consciousness as it operates in elevated states, for it shows that, for Romains, the cinematograph acts like a mesmeric device, inducing a special state in the audience.[53] And Romains was not alone in this. Two years later, a remarkably similar text appeared in Russia, by Leonid Andreev (1871–1919), Russia's first professional scriptwriter:

> The miraculous Kinemo! . . . If the highest and most sacred aim of art is to create contact between people and their separate souls, then an enormous unimaginable socio-psychological role is destined to be played by this artistic *Apache* of the present! . . . Having no language, being equally comprehensible to the savages of St. Petersburg and those of Calcutta, it truly becomes the genius

> of international contact, brings nearer the ends of the earth and the spheres of the soul, and gathers into a single stream the whole of quivering humanity [by overcoming natural language, humanity becomes one].[54]

For Romains, the key experience of modern life—its principle dispensation, one might say—was the ecstatic experience of transcending the limited, individual self (the limited, *reasoning*, individual self) and being fused with the crowd.[55] Note the implications of this—though Romains does not lay them out explicitly, they are clear enough: this experience of transcending the limited self is worthy of being sought. It is good in itself. But the cinema spectator does not have to quest for it—he or she receives that dispensation almost automatically. The cinema, almost by a process of induction, engenders in its audience the same experience of the collective. The cinema therefore is a privileged medium. Other media—for example, the traditional media of poetry and painting—should also seek to engender the experience of the collective that the cinema automatically induces; however, they have a harder time inducing *unanimisme* and will have to adopt cinematic forms to do so.

Romains's *Unanimisme* can be interpreted in different ways, of course. But one way is suggested by a tribute paid by a student of William James named Charles T. Semper to the poet Walt Whitman. In Harvard's *Monthly Review*, Semper proclaimed that Whitman had

> spiritualized trade, commerce, the toils of lowly men. The city with its belching furnaces and foundries, its rattling factories, its noise and whir and roar is the incarnation of a human energy which is divine. A lover of nature in all her moods, he loves the city with its streaming multitudes . . . Other poets have denounced the materialism of our age. He has found a soul in its materialism . . . I fancy, from the tone of some of our fiction, he has communicated his own enthusiasm to many of our younger writers who are taking hold of the common life of common men with reverent hands, and making their readers feel, unconsciously perhaps, that the life of our day is as sacred and the soil under our feet as divine as was any ancient period or distant land.

Or, further:

> From the point of view of eternity the world, we may grant, is indeed perfect, but after all, that is not our point of view. We see things in time-relations; history means something to us; we believe in progress and improvement.[56]

To be sure, Semper goes on to praise Whitman's Transcendentalism, including its nature mysticism; nonetheless, the remarks quoted give voice to a nascent view that celebrates the energy that affords groups a collective consciousness; they also pay tribute to the emerging belief that the machine can be spiritualized. This emerging reality, Semper implies, can be appreciated

if we experience it from a higher vantage point.[57] Romains echoes Semper's views on Whitman and connects them to the project to reconnect art to the ordinary person:

> I remember the time when my friends and I—we were still very young—discovered *Leaves of Grass* in Bazalgette's translation. (I was not to read the original until much later.) I must add that we were quite prepared to welcome this book, for we had read some time before the substantial study which Bazalgette [a member of the Groupe de l'Abbaye de Créteil, who first published *La vie unanime*] had devoted to Whitman. Our enthusiasm was aroused by the fact that the American poet renewed the relationship between poetry and man, a relationship which so many poets in recent times had done their very best to break. Walt Whitman's poems are indeed the poems in which the human soul reveals itself with simplicity and vigor (quite different in this respect from Edgar Allan Poe, whose importance and greatness I do recognize, however).[58]

Poets, Romains suggests, integrate art and life: they do so by making quotidian experience seem ecstatic. We have noted the interest that other futuristically inclined artists and writers took in Whitman—and that should not be surprising, for Whitman was among the first poets of the electromagnetic era. He extolled electric sensations' capacity to integrate subject and object: "I sing the body electric," he writes. And again: "Mine is no callous shell, / I have instant conductors all over me whether I pass or stop, / They seize every object and lead it harmlessly through me."[59]

For his part, Marinetti in "Fondazione e Manifesto del futurismo" uses language and phrasing that would have sounded familiar to his American precursor:

> We shall sing the great masses shaken with work, pleasure, or rebellion: we shall sing the multicolored and polyphonic tidal waves of revolution in the modern metropolis; shall sing the vibrating nocturnal fervor of factories and shipyards burning under violent electrical moons [Marinetti conjoins a reference to the violent vibrancy of electrical phenomena with an allusion to changeability]; bloated railroad stations that devour smoking serpents; factories hanging from the sky by the twisting threads of spiraling smoke; bridges like gigantic gymnasts who span rivers, flashing at the sun with the gleam of a knife; adventurous steamships that scent the horizon, locomotives with their swollen chest, pawing the tracks like massive steel horses bridled with pipes [Marinetti again resorts to animal imagery to suggest the spiritual energy that drives machines] and the oscillating flight of airplanes, whose propeller flaps at the wind like a flag and seems to applaud like a delirious crowd.[60]

Note that here Marinetti connects the vitalizing and energizing effects of modern technology to the enthusiasm-inducing effects of crowds. The topic of the crowd (*la folla*) remains central to Marinetti's thought—although his

attitude towards *la folla* oscillates between seeing it as representing the new or as representing the archaic; between seeing it as the collective embodiment of new (urbanized) consciousness or as a horde of conventional thinkers who deserve only the abuse that Marinetti and company heaped on them at the *serate futuriste*; between seeing it as the agent that would transform Italy or as the vast mediocrity that the Nietzschean superman must break with.

## SPEED + ELECTRICITY + COLLECTIVE CONSCIOUSNESS = FUTURISM

Marinetti, I noted, started out as a Symbolist poet and became accomplished in that field. Despite his vehement assertions to the contrary, Symbolist ideas exerted a strong influence on Futurism and shaped its character in fundamental ways. Even after his ideas changed and he began plumping for Futurism, his Symbolist formation remained evident: Symbolist figures appear in his Futurist polemics. The Futurists continued to accept the Symbolists' devaluation of reason (in favour of intuition). Marinetti's entreaties to his fellow Futurists (and fellow Italians) in the "Manifesto tecnico della letteratura futurista" to "odiare l'intelligenza, ridestando in voi la divina intuizione, dono caratteristico delle razze latine" (hate the intelligence and rediscover in you divine intuition, a characteristic gift of the Latin races) gave full expression to the Symbolists' mistrust of (calculative) reason and its celebration of intuition—this is all very far from the orthodox "machine-art" view of Futurism. This common principle, shared by the Symbolists and the Futurists, explains why both the later Symbolists and the Futurists took such a keen interest in Bergson's philosophy. Furthermore, from 1905 on, Marinetti promoted, from the pages of his magazine *Poesia* (Poetry), the idea of *verso libero* (free verse), which was intended to dispense with the regularity of structure, rhyme, and rhythm of past literature. Shortly after the launch of the Futurist movement, *verso libero* gave rise to *parole in libertà* (words-in-freedom).[61]

Robert Michael Brain offers an insightful comment about the relation between those verse forms and scientific investigations into the properties of speech, in his article "Genealogy of 'ZANG TUMB TUMB': Experimental Phonetics, Vers Libre, and Modernist Sound Art." I incorporate a commentary on his text, to make explicit the relevance of his insights to the problematic I am inquiring into:

> Yet behind the bold assertions of discontinuity the avant-gardists concealed a great secret paradox: their acute sense of continuity. The futurist lineage passes through French vers libre, invented by Gustave Kahn, mentor and patron of F.T. Marinetti. The links between Kahn and Marinetti have been duly recorded by scholars, but without much elucidation of what futurist words-in-freedom (*parole in libertà*) owed to free verse (*vers libre*).[62] To grasp this relation, we need

an improved historical account of vers libre.[63] As [poet and literary theorist] Paul Valéry [1871–1945] remembered some fifty years later, the invention of vers libre owed much to . . . the laboratory turn in the study of language, the attempt [as Robert Brain describes it] to turn philology away from the textual artifact and toward spoken language as an in vivo object of laboratory study using graphical recording methods.[64] [Brain thus allies the new poetry with developments in science—that is the very point of labelling this tendency the laboratory turn.] Experimental phoneticians made poetic verse a part of their study, beginning with [physician and physiologist] Ernst Brücke's *Die physiologische Grundlagen der neuhochdeutschen Verskunst* (1871) in the German-speaking world and Paul Pierson's *Métrique naturelle du langage* (1884) in France.[65] [Meter and rhythm have been subjected to scientific study. The assumption behind this is that temporal harmony exhibits regularities that can be quantitatively expressed.] French poets followed the linguists' turn to living language with their own campaign for new verse forms rooted in oral culture and the arts of declamation, rather than the traditional as-read meter of alexandrine poetry. [Patterns other than the conventional alexandrine can be exposed by examining the oral traditional.] As a form of oral, as-spoken poetry, *vers libre* launched a new emphasis on public performance and forged new ties with popular culture, from the folkways of the ancient chanson to the cabaret performances of the Parisian demimonde.

The laboratory turn in poetry formed a flank of a wider Parisian avant-garde attempt in the 1880s to forge radical new forms of art based on the investigation of the human sensorium. [Thus Brain lends support to the claim that in this period new forms in art arose from studying sensation; this claim reflects the fact that the era experienced a crisis in sensation.] Poetry, long anchored in the written page, would become an art of the voice and ear, its forms calibrated to the physiological thresholds of articulation and audition. [Sound has become a subject of scientific analysis; this reflects the rising importance of acoustic space.] Like their friends the neoimpressionist painters, who experimented with an art based on the physiology of line and color perception, the *vers-libriste* poets sought an art based on the externalization of the human sensorium, a projection of functional human physiology into freestanding artworks. [Artistic form comes to be understood as exteriorizations of the human sensory apparatus; this is a very McLuhanite notion.] The artists imagined—and took steps toward realizing—a new public sphere organized around the properties of free, dynamic, and harmonious bodily senses.[66] [Orality connects art to the body, a view that was later proposed by members of the Toronto School of Communication, including Eric Havelock, Northrop Frye, and Marshall McLuhan].[67]

As Marinetti's ideas became more radical, he renounced more and more of his Symbolist convictions (though he never entirely rejected Symbolism's core metaphysics). Among the causes he moved beyond was *vers libre*. In its place, he proposed the radical idea of *parole in libertà* (words-in-freedom),

one of Futurism's lasting contributions.[68] Rallying under that banner, the *futuristi* advocated formal methods for releasing linguistic forms from the iron conventions of syntax and outmoded grammatical constructions. As it applied to performance, the slogan proposed to extend the rapid verbal wit of the *teatro di varietà* and the music hall into the Futurist *sintesi teatrale*. *Parole in libertà* would do away with any impression that language presented a person's inner life; it would suppress readers' apperceptive activities and encourage them instead to scan verbal images so rapidly that several are taken in almost simultaneously. Extended to theatre, the multiplicative compression that characterizes *parole in libertà* would create a remarkably dense form of the theatre, the *sintesi teatrale*.[69] The theatrical synthesis was conceived to suggest the impact of a situation without offering a lengthy description or elaborate explanation. *Sintesi teatrali* eschewed the traditional three-act drama. Instead, they are compact, extremely compressed works that present a series of *attimi* (moments) that capture the essence of an event in a flash (as film does). In their "Manifesto del teatro futurista sintetico," the main exponents of the *sintesi teatrale* as a new form of literary performance—Marinetti, Settimelli, and Corra—declare that they are convinced that "mechanically, by force of brevity, we can achieve an entirely new theater, one harmonized to our swift and laconic Futurist sensibility. An act will last but a moment [*atti—attimi*], only a few seconds long. This essential and synthetic brevity will enable the theater to sustain and even overcome competition from the *cinema*."[70] The three authors envisioned a type of drama whose key attribute would be synthesis—"*Synthetic*. That is, very brief."[71] Certain as they were that traditional theatre had been corrupted and, worse, made dull by barricading itself behind linear logic and far too many words, the Futurists proposed a new theatrical synthesis that would do what the cinema of the time did—present its content synthetically, mostly through gesture, and without words. In 1914, Carlo Carrà even wrote a *sintesi teatrale* titled *Cinamor*e (Cinemalove).[72] And in 1915, Paolo Buzzi produced a remarkable piece, *L'ellisse e la spirale, Film + parole in libertà* (The Ellipse and the Spiral: Film + Words in Freedom, 1915), which includes chapters sequenced as scenes of a film often are and employs many experimental techniques: the last section of that science fiction novel is made up solely of word tables, and it contains a free word poem that, in its spiral form, bears comparison with Marcel Duchamp's *Anémic cinéma*, made sixteen years later.[73]

Settimelli and Corra, the principal advocates of the *sintesi teatrale* besides Marinetti, were leaders of the Florentine *futuristi*, and (as Günther Berghaus points out) the Florentines' ideas for the form differed from Marinetti's.[74] The Futurist leader's notions were more interventionist, while Settimelli and Corra's were (as was characteristic of the Florentine group) more proto-Surrealist.

While the first part of the *sinetesi teatrale* manifesto (Marinetti's part) dealt with rallying the masses to the cause of war, the second part (by Settimelli and Corra) emphasized irrationality and alogicism. Settimelli and Corra conceived of the synthetic theatre as an alogical series of images resembling humans' mental phantasmagoria. The idea that experience resembles a series of images flashed on the screen of consciousness is a cinematic conception. (Among the first writers to create a poetic form that successfully embodied that notion of experience was Ezra Pound, whose *Cantos* rely on what he called *phanopoeia*—literally, image-making—or "a casting of images upon the visual imagination.")[75] The compression, brevity, and speed of the images in a *sintesi teatrale* suggest thought processes—and this form of theatre emerged at the moment when progressive thinkers deemed the mimesis of thought to be the cinema's mission.

This connection between the cinema and the *sintesi teatrale* can be seen in Marinetti's play *I vasi comunicanti* (Communicating Vessels, 1916). In that work, two partitions establish three separate scenes: one shows a priest and some of his congregation praying; another, a woman sitting on a bench; the third, troops huddled in the trenches. The title of the piece speaks to Marinetti's conception of the relations among these different elements: communicating vessels are a sort of philosophical toy that demonstrates that when two or more columns containing the same liquid are linked at the bottom by a tube filled with the same liquid, the height of the liquid in the columns will become the same if liquid is added or removed from one—and will do so even when the columns have different shapes or (within limits) diameters. Often the connecting tube is hidden so that the columns seem to magically communicate their states to one another, as though by a magical or occult resonance (like that between electrical fields). Understood that way, the device alluded to here belongs to that class of phenomena that Futurists were describing when they wrote of the electromagnetic phenomena of *interpenetrazione* and *linee di forza*. Marinetti's play gives form to the feeling that electromagnetic resonance allows physically separate spaces to communicate with one another at such a profound and intimate level (the priest is praying, and the woman is likely waiting for her lover) that they are effectively collocated. Electromagnetic energies annihilate space: it follows that soon enough the three spaces will invade one another. (I discuss in greater detail the connection between lines of force and action at a distance near the end of the chapter.) The juxtaposition of spaces through cinematic collage has a similar effect, and there is no doubt that this form of *simultaneità* was influenced by the cinema—so here, again, ideas about electromagnetism fuse with ideas about the cinema to produce a new conception of time, space, and causality.

## FUTURISM, SYMBOLISM, UNANIMISM, AND BERGSON

Futurism presented itself as a repudiation of Symbolism. Yet as we have seen, Marinetti's thought was deeply imbued with Symbolist ideas. And he was not alone among the *futuristi* in being affected by the Symbolist revolution.[76] Boccioni drew many of his early ideas on painting directly from Gaetana Previati (1852–1920), and even the ideas he worked out later in life drew much (however indirectly) from that mentor. Previati is often viewed as one of the Italian Divisionists, and like the French Neo-Impressionists Georges Seurat (1859–1891) and Paul Signac (1863–1935), he made noteworthy efforts to develop a systematic, scientific understanding of colour and light as it related to technical issues in painting. But it was not the "Divisionist" character of Previati's work that had the greatest influence on the Futurists—rather, it was his Symbolist-inspired belief that painting should devote itself to capturing a higher reality accessible only to exalted forms of consciousness. And Previati shared these religious or metaphysical beliefs with other Italian Divisionist painters. For example, Giovanni Segantini (1858–1899) was a pantheist who called for painters to adopt an ascetic way of life so that they might become privy to loftier spiritual and artistic truths. When "La pittura futurista: Manifesto tecnico" declared "painting cannot exist without Divisionism," it was actually the spiritual side of Italian Divisionism they were lauding—or, rather, the spiritual implications of the dematerialization effected by Seurat's application of Rood's findings in developing chromo luminarism. Nothing in the Futurists' writing or painting suggests that they valorized the Divisionist method, which was based on the use of devices that animate the eye (so that it mixes for itself precisely the colours of the light reflected from the model).[77] Their interest was in the Divisionists' accession to a higher truth, not in fixing a moment culled from the universal dynamism, a tendency the authors dismissed.[78] Boccioni—almost certainly the author of this section of the manifesto—acknowledged that the Divisionists had initiated the quest to paint universal dynamism, but added that they had erred in painting a moment in that universal process, with the result that their canvasses offered an impression of an arrested dynamism. Futurist painting gives no evidence of having been constructed by (the common Divisionist method of) applying first the local colours of the objects represented, then the reflected, incidental light, after that the partly absorbed light, and finally the reflected light from the adjacent objects and the complementaries of the adjacent colours and values—and that, after all, was how the Divisionists had captured light's fleeting impression. In many respects, the Futurists' interests were closer to those of the Florentine Macchiaioli than to the Parisian Impressionists.[79] That said, dissolving an object into spots of light can be understood as dissolving it into an electromagnetic form, and becoming aware of the interaction between an

object's colour and those of its environment can impart the relativity of being. Rood himself, in outlining the ideas that led to chromo luminarism, noted that the method of creating a painting out of differently coloured, appropriately spaced dots is almost "the only practical one at the disposal of the artist whereby he can actually mix, not pigments, but masses of coloured light."[80] Understanding chromo luminarism not as a means for capturing the momentary effects of light on a surface, but of dematerializing a painting in order to convey the interactions of electromagnetic fields (in this case, tiny clusters of energy), turns chromo luminarism into a version of Symbolism (or, perhaps more accurately, a successor of Symbolism). Futurism, like Symbolism, was given to depicting a "sur-reality" so as to make evident the interrelations among all things—their *interpenetrazione*. The Futurists took an interest in the work of Medardo Rosso (1858–1928), a sculptor who has been the victim of appalling critical and curatorial neglect, and that interest related largely to the metaphysical implications of his work. Rosso took particular interest in a sculpture's interaction with its environment. He wrote to a friend, Edmond Claris, "In nature there are no limits, and there cannot be in a work of art. It should capture the atmosphere that surrounds the figures, the colour that animates it, the perspective that fixes it in position. When I do a portrait I cannot limit myself to the lines of the head since this head belongs to a body and exists in an environment that influences it: it is part of a whole that I cannot suppress."[81] This was essentially a Symbolist conception. The declaration the *futuristi* made in their "La pittura futurista: Manifesto tecnico" that "to paint a human figure you must not paint it; you must render its surrounding atmosphere" arose from a similarly Symbolist conception of reality.[82]

The Futurists' interest, so characteristic of the time, in the power of movement to disintegrate form—evident as much in Étienne-Jules Marey's scientific chronophotography as in Eadweard Muybridge's marvellous catalogue of obsessions—was in part an outgrowth of their Divisionist and (more generally) Symbolist heritage (and its quest for a higher reality in which all particulars are dissolved). It also developed from their interest in Rosso's radical wax sculptures, in which forms undergo radical transformations and become fluid, hinting at an undefined unity beyond individual objects. The principal difference separating the Futurists from the Symbolists is not that the former abjured the latter's interest in spiritual reality; rather, it is that the former acknowledged that the experience of forms' disintegration evokes a fear of a latent violence as particular beings lose their definiteness and their individuality as the shocking potency of that which consumes them becomes appallingly evident—more frightfully evident in the age of electromagnetism than it had been in the Symbolist period. In this vein, one difference between the Cubists and the Futurists indicates Cubism's continuing allegiance to the

Newtonian world view—or, at least, their emotional attachment to aspects of that cosmology. Rather like Arnold Schoenberg with his methods based on permutations of a tone row, the Cubists attempted to formulate a new counterstability to the electromagnetic era's impulse to destabilize everything. Thus, they emphasized architectonic features and plastic construction. The Futurists, by contrast, stressed infinite plasticity, states of mind and lines of force, the electromagnetic flux through which fields interpenetrate.

An important Futurist predecessor (who, in fact, briefly affiliated himself with the Florentine *futuristi*) was Romolo Romani.[83] Two of his earlier works are *L'incubo* (The Nightmare, 1904–5), an Expressionist portrait surrounded with auratic emanations, and *Ritratto di Dina Galli* (Portrait of Dina Galli, 1906), which seems to offer luminous ghostly figures resembling aetheric bodies, and behind them a terrifying cosmic-mask-like portrait. Works by Romani as early as *Il silenzio* (The Silence, 1904–5) give evidence of developing pressures towards pure abstraction—in that one, halos forming around objects (seemingly in wavelike emanations) seem almost to displace the objects themselves to become the focus of almost purely exemplificatory interest (i.e., manifesting concern with the materials of the medium themselves). *Lo scrupolo* (The Scruple, 1906) turns similar forms towards expressing the mental reverberations felt in a moment of tension. All of these paintings demonstrate that Romani understood form as almost infinitely plastic. Among his paintings from his mid-twenties are pioneering works of abstraction of the Theosophical variety, and, as is true of almost all works that belong in that category, they give evidence of a deep interest in spiritual states of consciousness (in *stati d'animo*, we might say)—indeed, they suggest, after the manner of Besant and Leadbeater's *Thought-Forms* (1901), the identification of an affect with an electromagnetic field. Examples of this include *La goccia* (The Drop, 1911), which explores the ripple effects produced when a drop plunges into a pool of water. His *Prismi* (Prisms, 1908) is of particular interest.

Walter Benjamin noted that Fascism proposed itself as a secular religion. He was close to the truth, though perhaps not quite close enough. In fact, Fascism was grounded in a spiritual conception of reality, of reality as the One, as Harmony, as a force that unites all existents in a higher reality—in Fascism, politics, ethics, and aesthetics were as one. Hence, Ardengo Soffici (1879–1964), the erstwhile Symbolist turned promoter of Impressionism turned Futurist—and who (at the time he made this comment) was moving towards the anti–avant-garde Return to Order movement—could write that "aesthetic values are the same as those of ethics and politics."[84] That conception united the Fascist thinkers and the avant-garde artists—above all the Florentine Futurists (Corra, Ginna, Settimelli, the poet Mario Carli [1888–1935], and Maria Ginanni [1892–1953])—around such journals as *Il*

*Leonardo* (1903–7), *La Voce* (1908–16), and *Lacerba* (1913–5), published under the direction of Ardengo Soffici and Giovanni Papini (1881–1956), a writer who would soon place himself at the service of Fascism.[85] It also explains the nature of Fascist propagandist scenography (political events staged as rites), the motivation for Fascist propaganda's availing itself of symbols and myths, and the Fascist conviction that primordial reality takes precedence over quotidian forms of consensus reality. Along with Nazism, Fascism was a reaction against modernity's secularizing thrust: it strove to demolish every barrier between religion and politics and to sacralize politics. *La Voce* in particular took up the spiritual nationalization of the masses advocated by the Risorgiomento politician Giuseppe Mazzini, who declared that the Risorgiomento would remain incomplete until it incorporated a religious myth that could command the masses' affection. So it emerged that the Futurists' primary and all-encompassing objective was to provoke primordial experience.

Soffici organized, on behalf of the *La Voce* group, the first Impressionist exhibition in Italy, held at the Lyceum Club in Florence in April 1910. Caroline Tisdall and Angelo Bozzolla have pointed out that Soffici's articles on Impressionism, published in *La Voce* in 1909, influenced the emerging Futurist cause (as did his 1911 article on Cubism in *La Voce*). In one of his articles on Impressionism, the newly minted *futuristi* would have read,

> The movements of a figure must not stop with its contour… The intensity of the play of values and the protrusions of lines of the work should impel it into space, spreading out into infinity the way an electric wave emitted by a well-constructed machine flies out to rejoin the eternal force of the universe.[86]

The idea that all phenomena radiate lines of force and consequently possess only relative natures is key to Futurist thinking; so is the idea that this relativity is associated with their dynamism. Futurists might have extended these ideas and given them a more modern cast, but its provenance is theories of perception that the Impressionists embraced (the Impressionists' belief that phenomena are relative, and their theories about mixing of colours remained important influences on the Futurists, however much they repudiated other aspects of the Impressionist conception of visual perception) as well as in the aesthetico-metaphysical ideas of the Symbolists (many of which were derived from the philosophies of Schopenhauer and Bergson).[87] Soffici helped the Futurists fathom the philosophical depths of Impressionist and Symbolist art and art theory and provided them with a model for modifying theoretical principles derived from those movements (and, equally, from Schopenhauer and Bergson) as they strove to work out their own views.

The electromagnetic view of reality, which by that time was transforming people's understanding, maintained that every field of energy has far-reaching

effects on other fields and ultimately on the whole of reality (in contrast, the mechanical view sees wholes as composites of discrete parts). According to this hyperorganic view, humans' ontological status has epistemological implications of cardinal importance: the human mind (an aspect of the human organism) participates in the mind of the cosmic organism. That ontological status is often taken as implying a psychobiological/psychocosmic theory that maintains the deep structure common to human vitality and human thinking as well as to nature's (or the universe's) vitality and nature's thinking. Moderns, Futurists proposed, might be diminished in comparison with the cosmos's immense scale, but nonetheless humans are able (or will become able) to experience the intensity of the life surge, and know its wonder.

This paradigm shift altered people's understanding of the nature and function of art and of the sort of experience art should furnish. Many thinkers came to believe that the cinema already possessed the features that any art suited to the modern age would have to possess and, accordingly, that the other arts should imitate the cinema by adopting from it those attributes that fitted it for the modern age.

## UNIVERSAL DYNAMISM AND PERCEPTION

Symbolism and Impressionism were not the only sources of the Futurists' interest in phenomena as energy centres—or in the discovery that objects and the environment interpenetrate in fascinating ways. Another source of that interest, one that the Futurists shared with the Symbolists, was Henri Bergson.

On 11 April 1910, two months after their first manifesto on painting, the *futuristi* published in *Poesia* a second manifesto, "La pittura futurista: Manifesto tecnico." This one, signed by Boccioni, Carrà, Russolo, Balla, and Severini, offered more definite propositions than the first. Its core concept was "universal dynamism." I have already cited a brief passage from it on that topic. Below is a more expansive statement (with commentary):

> Indeed, all things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but constantly appears and disappears [phenomenal/retinal forms, which are dynamic, are paramount: they constitute reality]. On account of the persistency of an image upon the retina, moving objects constantly multiply themselves, change shape, succeeding one another, like rapid vibrations [note the allusion to what we experience being vibratory], in the space which they traverse. Thus a running horse has not four legs, but twenty, and their movements are triangular [these phenomenal/retinal forms are synthetized by the mind].
>
> …

> The tram rushes into the houses which it passes and in their turn the houses throw themselves upon the tram and are merged with it [the speeding bus is energy; so are phenomenal/retinal forms] . . . Painters have shown us the objects and the people placed before us. We shall put the spectator in the center of the picture. [88]

The authors of this passage were forging a unified system of thought out of their Symbolist commitments, their Bergsonian convictions, and some scientific ideas about the relation between mind and matter. They deployed the notion of universal dynamism to refute beliefs about the value of capturing the appearance of any single movement. That was exactly what the chronophotographer É.-J. Marey had done, and so (most of) the Futurists criticized his methods for failing to capture the essence of movement (the reasons they gave for judging them failures were similar to those Daniel-Henry Kahnweiler gave). Bergson, too, had criticized the underlying idea of chronophotography, asserting that its efforts result in analyzing motion into discrete steps that cannot be reintegrated into a continuous flow.[89] He maintained that to capture the reality of movement would require methods capable of conveying the inner dynamics of motion. Bergson's objection explains why the *futuristi* declared that they wanted to reproduce on the canvas not a fixed *moment* in universal dynamism, but dynamic sensation itself. Carrà expounded his notion of spatial dynamism:

> The painter of pre-Futurist days who wished to depict the daring leap of an acrobat confined himself to a study of the solidity and elasticity of the springboard; the leaping acrobat was treated as if he were at rest. The painter forgot the plastic phenomenon: the leap. We Futurist painters have been the first to feel the necessity of painting not the springboard nor the still form of the acrobat [as Marey did], but the leap into its plastic expression. This, in its synthesis, is the basis of Futurist deformation and of spatial dynamism [universal dynamism and *compenetrazione* give rise to what I have been calling infinite plasticity].[90]

Underpinning such assertions is the Symbolist belief in the identity, in the realm of ultimate reality (that is, the dynamic realm of energy flows), of consciousness and reality—the belief that in that realm, the sensation of dynamism is dynamism itself, in its very essence.

Thus for Boccioni, É.-J. Marey was an abysmal failure because his scientific approach rendered him incapable of recognizing the (anti-scientific) truths offered by Bergson's philosophy. Fuelled by this anti-scientific animus (which the Futurists' enthusiasm for the technologies of speed required them to leave nebulous and unspecific), the manifesto in the end presents an approach to apprehending universal dynamism that is only a little different from that of the Symbolists:

> In order to conceive and understand the new beauties of a modern picture, the soul must become pure ["Futurist Painting: Technical Manifesto" contains many esoteric allusions: concerning this line, it should be noted that purification of the soul is a goal of alchemy]; the eye must be freed from its veil of atavism and culture, so that it verifies its observations by recourse only to Nature [truth, higher reality], not to the Museum [artifice, derivative reality]!
>
> Then, when that has been done, it will be admitted that brown tints have never coursed beneath our skin; it will be discovered our flesh is shining with yellow [human flesh manifests the same energy as solar radiation], that its red blazes, and that green, blue, and violet dance upon it with untold charms, voluptuous and caressing.
>
> How is it possible still to see the human face as pink, now that our life, redoubled by noctambulism, has multiplied our perceptions as colorists? The human face is yellow, red, green, blue, violet [the face and the environment, coloured by electric light, are one]. The pallor of a woman gazing in a jeweler's window is more iridescent than the glistening prisms of the jewels that fascinate her [electromagnetic radiation, light, blazes forth from everything; humans are especially potent energy centres].
>
> . . .
>
> Your eyes, accustomed to semidarkness, will soon open to more radiant visions of light [we are entering a new era of energy, and our senses will evolve to fit that new age]. The shadows that we shall paint will be more luminous than the highlights of our predecessors, and our pictures, next to those of the museums, will shine like blinding daylight compared with deepest night.[91]

Bergson's manner of working out the central conception of his philosophical system—that is, his conception of time—influenced the Futurists' ideas about universal dynamism: as one would expect of a group committed to working out the implications for the arts of the electromagnetic conception of reality, the Futurists accepted Bergson's ideas about continuity and his belief there exists real continuity in time and in movement.[92] The belief in continuity in movement was one basis for their interest in paths of action (near the end of this chapter we will explore the influence that developments in electromagnetism had on the shape of that belief). Carrà, in *Bozzetto per i funerali dell'anarchico Galli* (The Funeral of the Anarchist Galli, 1911), and Balla, in *Linee andamentali + successioni dinamiche* (Lines of directions + dynamic successions, 1912) and *Velocità astratta + rumore* (Abstract Speed and Sound, 1913), used paths of action to propose a different conception of movement than that embodied in Marey's chronophotography. Boccioni made the same point with his famous sculptures *Forme uniche nella continuità dello spazio* (Unique Forms of Continuity in Space, 1913) and *Sviluppo di una bottiglia nello spazio* (Development of a Bottle in Space, 1913).

A mystical/Symbolist conception of reality lies at the core of "La pittura Furturista: Manifesto tecnico": the passage just quoted asserts a radical Heracliteanism that challenges the commonsense conception of the identity of an object. The *futuristi* rejected our belief that bounded, self-contained objects, some of which move and some of which do not, make up reality. To the contrary, they averred that what actually has ontological and metaphysical priority is movement (or energy). This primary metaphysical reality is formed into paths. A reifying tendency of mind prompts us to picture an agent that performs the action traced out by each of the paths. The strength of this tendency leads us to assume that the object has metaphysical priority and that action is something an agent performs; but in fact the truth is just the reverse: action (force) is first, and the concept of an agent (that performs the action) is something we use to help us collect various simultaneous movements into groups. Expanding on this radical insight, "La pittura futurista: Manifesto tecnico" argues that objects (collections of forces) have different boundaries than we usually think them to have: thus, the body and the environment to which it belongs constitute a single, seamless whole: the body and the sofa on which it rests form a single system of interacting energies.

This interpretation of the passage provides a basis for understanding the differences between the technical practices of the Futurists and those of the Cubists. The Cubists were attempting to present objects in their full solidity, so they depicted them as a mosaic of interacting braces. With these means, they never gave away the least part of the object's solid existence. Indeed, the Cubists followed Cézanne in using multiple perspectives to increase the apparent mass and solidity of the objects their paintings represented. The Futurists, on the other hand, eliminated any sense of volume and mass and presented instead an ephemeral trace of swift passage. Clearly, Soffici was quite accurate in characterizing Futurist art as the dialectical reconciliation of Impressionism, which recorded movement through the transitory effects of light, and Cubism, which conveyed dynamism by crowding the canvas with facets that (according to the beliefs of the time) might be experienced from a higher standpoint as apprehended simultaneously.

While the Cubists adjoined facets to create a solid geometry of interacting masses, the Futurists presented velocity. While Picasso and Braque used set forms and an essentially predefined architectonic (though, admittedly, features of that architectonic underwent evolution), one whose volumetric characteristics were already understood, the Futurists contrived for each piece new strategies for conveying the corporeal effect the impact of force has. This was the grounds of a major difference separating the Cubists from the Futurists: while the Cubists' engagement with the architectonics of painting led to the tight, solid integration of forms featured in their work (and

especially in the work of the "gallery Cubists," Braque and Picasso), the Futurists sought to dissolve objects, to allow the vibratory realm of pure energy to make itself felt. That this vibratory realm has so many features of what we normally take to be the ideal realm (here I use "ideal" in the sense both of best and of mental) made it possible for the Futurists to connect the intensities of this domain with states of mind and to get people to feel what the Romantics also wanted to them to experience, viz., the ecstasy of overcoming the distinction between subject and object. Objects and subjects alike lose their individuality and are subsumed into the whole, and that merger engenders intense experiences. That is the gist of the Futurists' use of the Bergsonian concept of intuition.

Their novel conception of the identity of objects compelled the Futurists to formulate a new epistemology; indeed, this was a primary motivation for their techniques and practices. Though they were contemporaries of the Cubists, and though both Cubists and Futurists strove to bring forth an art of simultaneity (and, thus, an art that would represent seemingly successive moments together on a single canvas), Futurist ideas about perception were influenced at least as strongly by Impressionism (and its offshoot, Divisionism) as they were by Cubism.[93] Impressionist colour theories recognized that no object is isolated from its environment—the light that one object reflects onto another affects the second object's appearance. Every object absorbs features from other objects in its environment, even as it reciprocally affects qualities of those objects.[94] Object and environment are fused in mutual interaction. The Futurists attempted to extend this principle by making action itself the primary source of our knowledge.

Ideas about the relative nature of all existents—according to which the being of each object is dependent on the being of all other objects—appear in the theory and practice of Futurist sculpture. In Greek art, and again in Renaissance art, the nude emerged as the image of the humanist ideal of the autonomous, self-regarding individual.[95] Futurist relativism rejected this long-standing ideal. The key document on this topic is Umberto Boccioni's "La scultura futurista" (Futurist Sculpture, April 1912).[96] Boccioni astutely linked the autonomy of artwork to the autonomy of the isolated individual, and he would have none of it: "Sculpture has not progressed because of the limits which have been imposed on it by the academic concept of the nude. An art that must undress a man or woman in order to produce any emotive effect is a dead art!"[97] His descriptions of how to redeem sculpture from its backwardness were downright mystical:

> We must take the object which we wish to create and begin with its central core in order to uncover the new laws and new forms which link it invisibly

> but mathematically to *external plastic infinity* and to *internal plastic infinity*. This new plastic art will then be a translation, whether in plaster, bronze, glass, wood, or any other material, of those atmospheric planes which bind and intersect things. This vision, which I have called *physical transcendentalism*... will provide the plastic arts with those sympathetic effects and mysterious affinities which create formal and reciprocal influences between the different planes of an object.
>
> Sculpture, therefore, must make objects live by showing their extensions in space as perceptible, systematic, and plastic. No one still believes that one object finishes off where another begins or that there is anything that surrounds us—a bottle, a car, a house, a hotel, a street—which doesn't cut into and sectionalize us with its arabesque of curves and straight lines.[98]

Boccioni argues here for the reality (or, at least, for the phenomenal reality) of the vectors that Futurist painting represented through its use of lines of force and paths of action (dynamic successions). In the introduction to the catalogue for the Futurist exhibition at the Bernheim-Jeune gallery in Paris, Boccioni and his co-authors identified the requirement for rendering dynamic sensation: the spectator must live in the centre of the picture. This goal can be achieved by working with *linee di forza* (lines of force). While the Futurists' theory of perception drew on that of the Impressionists, the Italian artists argued that the French artists' conception of the perceptual effects of the interaction of light bounced from a number of objects was insufficiently radical. The Impressionists were interested in the momentary play of light reflected from the surface of an object and in the instantaneous effects that this bounced light had on the retina. Against this view, the Futurists insisted that the retinal image does not decay instantaneously and that, consequently, motion is not seen as an object occupying successively a series of distinct locations; rather, it is experienced as a blur revealing the motion's trajectory (this is what their process metaphysics led them to accept as more real than the object itself). They concluded that since everything is motion ("Indeed, all things move, all things run, all things are rapidly changing"), and since what our perception responds to is the trace of change, it must be dynamic reality, not the static reality of the object, that perception conveys. The *futuristi* believed that this sort of interpenetration (this sort of mutual influence of object and environment) is not a subtle, almost virtual effect like that of Impressionist paintings, of light bounced off one object subtly altering the colour of neighbouring objects. For them, the influence was an actual physical force: "every object influences its neighbour... by a real competition of lines and by real conflicts of planes, following the emotional law which governs the picture." (Note that this implies emotion and reality, subject and object, are one.)

## THE INFLUENCE OF BERGSON

Dynamism was a key concept of the Futurists' metaphysical theories; thus, the idea of dynamic perception was central to their epistemology. The *futuristi* drew their idea of dynamic perception partly from the spirit of the time and partly from Henri Bergson, whose ideas were very much a part of the *Zeitgeist*.[99] Bergson's metaphysics constituted a radical critique of the tradition descended from Plato that had dominated Western thinking for two millennia. That metaphysics depicted the world of appearances, the world the senses apprehend, as transient and, therefore, as having a lesser reality than the unchanging world of Being underlying this realm of becoming. This higher reality, which, they maintained, only reason can grasp (for the senses can apprehend only what undergoes change), was supposed to be timeless and unchanging. Bergson's philosophy (following that of G.W.F. Hegel and Charles Darwin) offered a radical challenge to the grounding principles of this metaphysic. For, Bergson asserted, what is ultimately real is not Being, but, precisely, *Becoming.* Ultimate reality is a vital force—its vitality insists on change.

Bergson's boldest move was to allow his epistemology to preserve key features of the epistemology that grounded the traditional metaphysic while inverting the traditional metaphysicians' claims regarding the composition of reality. Plato's philosophy, and the metaphysics descended from it, maintained that we apprehend Ultimate Reality in an intuitive act that carries one beyond the representations of the world the senses provide until we reach a universal knowledge of essences. Bergson concurred with the basis of this claim—he, too, believed that we understand ultimate reality through an intuitive act, which, at one time, he described as an act of "*intellectual sympathy* by which one places oneself within an object" (here intellectual sympathy means something like a *geistig* act).[100] But while he accepted this, he diverged from the Platonists regarding the nature of the object this intuition discloses: whereas the traditional metaphysician claimed that intuition grasps entities' essences (what an object has in common with others of its type), Bergson asserted that intuition enters into the object so as "to coincide with what is unique in it and consequentially inexpressible." That is, intuition reveals what is singular, absolute, concrete, and expressible in its noetic correlate, whereas the intellect (or, as he calls it in *Introduction to Metaphysics*) gets at what is relative, external, abstract, and amenable to being represented by (general) concepts.

The difference, for Bergson, between intuition and the knowledge afforded by the intellect (or by analysis) is analogous to the difference between our consciousness of "our own personality in its flowing through time" and the knowledge we have of an object that we view from the outside.[101] The former informs us of the *élan vital*, the latter apprises us only of inert matter.

The Romantic tradition helped shape Bergson's understanding of intuition, for he maintained that while intellect (or analysis) results in propositional knowledge, intuition brings us into coincidence with that which we know through intuition. Thus, Bergson reformulated the Romantics' claim that reason, which seeks verbal expression, opens a gulf between the subject and the object of knowledge, while a primordial, and therefore higher, faculty (which the Romantics consistently identify with visualization or imagination) can overcome that separation by engendering a condition in which the subject and the object are at one. While intellect deals with symbols, and therefore thinks about what a set of phenomena have in common, intuition grasps the concrete particularity of the individual object-in-process.

The Futurists did to the Symbolists pretty much what Bergson did to traditional metaphysics. They agreed with the Symbolists that the purpose of art is to convey insight into a higher reality (just as Bergson had agreed with the traditional metaphysicians that a higher form of knowledge, viz., intuition, leads to insight into a higher reality); but they differed with the Symbolists regarding the nature of that higher reality. What is finally real, the *futuristi* averred, is not what is immobile but, rather, the dynamic principle itself (just as Bergson claimed that what is ultimately real is the *élan vital* itself).

The aesthetics of Symbolism, and of Symbolist poetry in particular, are Neo-Platonic in outline. The Symbolists argued that concrete images (or symbols) in Symbolist writing and painting evoked an ideal, transcendental world of which the material world is a mere shadow. Baudelaire, and other Symbolists after him, proposed that poetry could elicit intimations of this higher realm: Baudelaire claimed (in *Notes nouvelles sur Edgar Allan Poe*, 1884) that the soul could perceive through poetry "les splendeurs situées derrière le tombeau."[102] Baudelaire and his Symbolist followers promoted the idea of the poet as a *voyant* who could see beyond this world into the ideal world of forms and essences. But what elicits this apprehension? Verlaine, Mallarmé, Rimbaud, and Valéry all maintained that it was the musical quality of verse that vouchsafed readers intimations of this higher realm.

The *futuristi* may well have posed questions to themselves about the nature of the object towards the apprehension of which music encourages us. The most plausible answer, it would seem, is not the Neo-Platonic one the Symbolists actually gave (that is, what we grasp through this higher way of knowing are ideal objects belonging to the realm of eternal, unchanging essences). Rather, the most plausible answer would be that what we grasp through the music of language is the universal dynamism that animates the cosmos.[103]

This answer coincides with Bergson's comments on the nature of the object grasped through intuition. Thus, the Futurists' conception of reality synthesized the influences of Symbolism and of Bergson's philosophy.

They agreed with the Symbolists that the purpose of poetry and art is to encourage awareness of a higher reality; and they agreed with Bergson that such apprehension has an intuitive character and that what intuition grasps has a dynamic character. It was precisely Bergson's insight that the nature of ultimate reality is changing—an insight that separated Bergson from the Symbolists—that so excited the Futurists.

Bergson also influenced the Futurists' ideas about time. He contrasted two ways of thinking of time—time as it is conceived by scientists, and time as it is understood in ordinary life. Time as it is conceived by scientists can be measured by the clock, so it consists of discrete moments of equal extent. Such an understanding of time is arrived at by analysis. Time as it is experienced by ordinary consciousness—time as it is experienced inwardly—is something different. It is composed of elements that are heterogeneous to one another, yet continuous—and because they are heterogeneous, they are experienced as being without repetition. While the scientist, in relying on reason, divides and freezes a process into a series of very similar static representations (which Bergson likens to a strip of cinematographic images), consciousness understands reality as an indivisible process.[104] While reason breaks reality down into separate, essentially lifeless segments, intuition presents it as a single, dynamic flow. Real duration, time as it is experienced inwardly, is qualitative (unlike clock time, which is quantitative), dynamic, and irreversible. Time as duration (*durée*)—the more profound time, the time of internal consciousness—is not divided into discrete units: there are no sharp boundaries that mark off past, present, and future in inner time. *Durée* is like a stream in which the past flows into the present and the present flows into the future, with no boundaries separating one temporal modality from the others.

The Impressionists strove to capture and present a fleeting, ever-changing reality. For their part, the Futurists contended that Impressionist art (and the Impressionists' understanding of perception) embodied what Bergson called a "cinematographic principle"; their art, precisely because it was intended to capture (that is, freeze) the moment, had the effect of denying change in favour of instantaneity. While the Futurists accepted the Impressionists' aim of presenting reality as undergoing change, and even agreed with the priority the Impressionists accorded immediate impressions of reality, they rejected the notion of presenting our immediate apprehension of reality as a frozen moment. Instead they endeavoured to present perception as an indivisible flux. Like Bergson, they believed that a non-analytic mode of understanding reality, one that knows reality as a single, indivisible flux (through a process that is itself an indivisible flux), leads to deeper insights into both reality and perception. It was to the celebration of the metaphysical and epistemological merits of dynamic perception that Futurist art dedicated itself. That dedi-

cation, pursued into the most dynamically intense experiences, led to the recognition that the experience of movement fuses the experiencer with the cosmos. This understanding imposed on them the imperative to formulate new pictorial equivalents for each new dynamic phenomenon they treated, for, as Bergson pointed out, duration is irreversible and unrepeatable, its constituents heterogeneous to one another.

Bergson argued that the cinema presents a false impression of continuity: when watching a film, we take the movements we see to be a continuous flow, when in fact the cinema presents us only with a series a snapshots, each presenting an isolated moment. There is no continuum here, only the specious present: in truth, reality is an unending flow of experience, but the cinema breaks that continuum into isolated moments. Nothing can restore that continuum of experience once it has been divided. This was a fault of the cinematographic principle, and a fault of understandings of reality based on it: once the reality of the continuum of existence is violated, it cannot be restored.

Severini went further than other Futurists in rejecting the cinematographic principle:

> It was taken for granted that our efforts were tending towards the attainment of that which has been already realized through the medium of the cinematograph.
>
> This interpretation is both false and absurd.
>
> Synthesis will never be reached by the
>
> Path of analysis. While the cinematograph is an analysis of movement [Severini sees the cinema as operating on the same principle as Marey's chronophotographic sequences], our art is, on the other hand, a synthesis.[105]

Bergson, like the Futurists, proposed that intuition fuses the apprehending subject with the apprehended object. Duration, he explained, is the form of inward experience. When we make contact with an entity through intuition, we experience it as a durative being (that is, as process or flow), not as an object belonging to the realm of spatialized clock-time; that is, we experience it in the form of inward experience. Thus, the early "Gli espositori al pubblico" (Exhibitors to the Public), written on the occasion of the show at Galerie Bernheim-Jeune (1912), states,

> We have declared in our manifesto that what must be rendered is the *dynamic sensation*, that is to say, the particular rhythm of each object, its inclination, its movement, or, to put it more exactly, its interior force [the character of an object/event depends on its inherent energy—the energy that it in fact *is*] . . .
>
> What is overlooked is that all inanimate objects display, by their lines, calmness or frenzy, sadness or gaiety [what we take to be material has an emotional, that is, *geistig* character]. These various tendencies lend to the lines of which they are formed a sense and character of weighty stability or of aerial lightness.

> Every object reveals by its lines how it would resolve itself were it to follow the tendencies of its forces [as *geistig* phenomena follow their daemon].
>
> This decomposition is not governed by fixed laws but varies according to the characteristic personality of the object and the emotions of the onlooker [the energy field that is the object and the energy field that is an observer interpenetrate one another].[106]

Bergson maintained the same conviction. "Does not the fiction of an isolated material object imply an absurdity, since this object borrows its physical properties from the relations which it maintains with all the others, and owes each of its determinations, and consequently its very existence, to the place which it occupies in the universe as a whole?"[107] Denying the reality of universal interpenetration results in absurdity, Bergson averred.

Like the Futurists, Bergson thought of experience as a continuous flow rather than the encounter with an external object. Bergson, too, had conceived the object as a mental construction—he referred to these constructions as "images." At the beginning of *Matière et mémoire* (Matter and Memory, 1896), he states, "Here I am in the presence of images . . . perceived when my senses are opened to them, unperceived when they are closed. All these images act and react upon one another," just as the interpenetration of objects and environment suggests.[108] Bergson challenged the traditional view of experience as pure instantaneous perception (represented in the analogizing of vision and the *camera obscura*). He rejected the idea that experience is a passive registration of *données* that mirrors an external object. This is what he criticized as the conception of experience as a *cinématographe*. He maintained that conception is based on the fiction that "pure perception" is a real possibility—that it is possible to grasp reality instantaneously, absent the intrusions of memory. Such a cinematographic experience would be "absorbed in the present and capable, by giving up every form of memory, of obtaining a vision of matter both immediate and instantaneous."[109] For him, cinematographic perception is the immediate apprehension of an "uninterrupted series of instantaneous visions."[110] But no experience of present reality is unalloyed with memory: that is why reality is experienced as a flow (we have already seen that this is a very electrological notion of vision). Perception is never pure, "never a mere contact of the mind with the object present; it is impregnated with memory-images which complete it as they interpret it."[111] Experience is affected by accumulated memories.[112] Perception is always "enlarged by memories and offers a certain breadth of duration."[113] This duration is what the Futurists' *linee di forza* track.

Bergson extended his ideas about memory with his theory of *durée*, the linchpin of his metaphysical system. While his most renowned presentation of his ideas on duration is *Essai sur les données immédiates de la conscience* (Essay on the Immediate Data of Consciousness, 1889)—I have already

presented some of its ideas—a short book that he composed around 1886, but published only in 1889, *Introduction à la métaphysique* (An Introduction to Metaphysics), provides a more developed and systematic approach to his epistemology and metaphysics. In it, Bergson proposed that there are two modes of knowledge, relative and absolute. We gain relative knowledge of a phenomenon by piecing together fragments of different views; we acquire absolute knowledge from *within* the object (reality) itself, from where intuition has carried us. In *Introduction à la metaphysique*, Bergson described intuition (as we have presented it) as "the kind of *intellectual sympathy* by which one places oneself within an object in order to coincide with what is unique in it and consequently inexpressible."[114] Intuition leads us into the continuous, non-segmented flow of time, time that is not conceived on the analogy to space, in which one part is external to the other and so can be measured. Time is flux that cannot be divided into parts; thus, no quantitative measure can be taken of it.

This electrological notion of *durée*, extended to reality in general, becomes the doctrine that all phenomena have only relational being, and that this relational existence is the consequence of their being essentially dynamic and dependent in the very depths of their being on their context. With this principle, Bergson combatted the traditional view of reality, according to which reality is made up of discrete material bodies that occupy empty space as though installed in a vessel that is unaffected by the bodies that fill it. Bergson believed that reality—that is, process—is not at all indifferent to the presence of objects. Nor is it fixed: reality, as it is disclosed to intuition, is mobile—it flows. For the scientist, reality is composed of fixed and disrete objects; but for consciousness, it is dynamic and continuous (Bergson really means by "the scientist" the Newtonian scientist and by "intuition" the new organ of knowledge brought forth by electrology). The artist, Bergson proposed in *L'évolution créatrice* (Creative Evolution, 1907), bears witness to the possibility of achieving intuition in real life—that possibility, he stated, "is proved by the existence in man of an aesthetic faculty along with regular perception."[115] The artist develops intuition "in placing himself back within the object by a kind of sympathy."[116] Thus, intuition breaks down the barrier between self and world: the self identifies with the world as the world enters the self. This is the experience that Futurist painting and sculpture imparts.

## THE CINEMATIC CONDITION OF FUTURISM

Bergson, we have seen, was critical of the cinematographic conception of time, space, and movement. The Vorticist movement, in London, was heavily influenced by Bergson (whose ideas were passed on to them through T.E. Hulme, 1883–1917). The Vorticists criticized Futurist painting and literature in terms

that Bergson would have found familiar (though one suspects their motivations were less philosophical than Bergson's were). For example, Ezra Pound, writing to James Joyce in September 1915, counselled him to avoid "reading the Young Italians, who seem all tarred with the Futuristic taint, i.e., spliced cinematography in painting and diarrhoea in writing."[117] Wyndham Lewis, that same year, and by now a fierce critic of Joyce, defined Vorticism by highlighting its differences from Futurism: "By Vorticism we mean . . . ESSENTIAL MOVEMENT AND ACTIVITY . . . as opposed to the imitative cinematography, the fuss and the hysterics of the Futurists."[118]

Futurist art was widely understood as having a cinematic character. Nonetheless, its cinematicness was not of the sort that repudiated Bergson's critique of the Newtonian conception of experience. In an article published in 1981, Edward Aiken commented on the frequency with which Futurist painting had been understood as displaying cinematic qualities and reviewed many instances of commentators suggesting that Futurism had been influenced by the cinema.[119] He notes that in 1911 the French critic and poet Roger Allard (1885–1961) opined that the Futurist painters must have "a cinematograph in their bellies," and that in 1912, Allard characterized Futurism as "cinematism" (if one key argument of this book—that the cinema played a central role in shaping Futurism—is true, then this remark implies that within two years of the movement's birth Allard had discerned the inner truth of Futurism).[120] Robert Delaunay, a highly accomplished thinker, made a similar remark in his notebooks, when he wrote of the Futurists, "Your Art has Speed for its expression and film for its means."[121] Horace B. Samuel (1883–?) went even further when he referred to the analogy the Futurists drew between consciousness and the cinema, both of which, they believed, operate by forming nets of images and analogies ("RETI DI IMMAGINI O ANALOGIE" [tight networks of images or analogies]):[122]

> For realising fully that consciousness is a stream and not a pond, and that both cerebral memories and visual impressions are but, as it were, the flying nets hastily created and re-created to catch a word that is perpetually on the run, the Futurists make boldly ingenious efforts to capture the jumping chameleon of truth by portraying, not one, but several phases of the unending series of the human cinematograph.[123]

This insight is trenchant, and Samuel's views of Futurist poetry as embodying the human cinematograph deserve further consideration. His treatment of Futurism is revealing of the way a contemporary, forward-looking thinker understood this art movement (and its basis in the human cinematograph).

Samuel contrasted Futurism with another contemporary art movement, the Arts and Crafts movement, which adopted a critical albeit cautious atti-

tude towards industrialization in tandem with a sentimental stance towards Medieval guilds. He recognized that Futurism's fundamental ambition was to integrate art and life, but, unlike so many of the new media theorists of the present, who offer thin ideas about integrating art and life that would sublate art into life and reduce artwork to just another commodity, consumed in the mode of distraction, as most commodities are (prize-winning chefs' food seems the single exception, as warranting full concentration on its exact sensory qualities), Samuel recognized that the *futuristi* were proposing to integrate art and life in such a way that every moment of life would be experienced with the intensity of an electrifying work of art:

> What the Futurist really wishes is to break down the conventional divorce that is so often thought to exist between ideal Art and actual Life, so as to bring the two elements into the most drastic and immediate contact. Art, in fact, should not be an escape from but an exaltation of the red impetus of life. Art's function is not merely to titillate the dispassionate aesthetic feeling of the dilettante or connoisseur, but to thrill with a keen vital emotion the actual experiencer of life. [Samuel suggests that the Futurists wanted to elicit an experience that was quite different from the elevated, contemplative experience that modernists, with their idea of significant form, sought. The experience they sought to evoke would be vital, in the strictest sense of that term.] Form is not an end in itself, its sole function is to extract the whole emotional quality of its content. And when confronted with the problem of what content is best fitted to be the proper subject of artistic representation, your Futurist would promptly retort that, inasmuch as the tumultuous twentieth-century emotions of "steel, pride, fever, and speed" are those to which the twentieth-century civilisation will naturally vibrate [note the highly significant allusion to vibration] with the most authentic sympathy [here Samuel alludes to the phenomenon of sympathetic vibration, which we can construe as a mode of *interpenetrazione*], those emotions and those alone are the proper subject-matter for twentieth-century art.[124]

This interest in integrating art and life, which is commonly understood to be the defining feature of avant-garde art, is here understood in a special—and an especially valuable—way. Art and life will be integrated when art elicits a sense of life—capital "L" Life, I should think, Life as the vital pulse of true reality. Art should thrill us "with a keen vital emotion" and exalt "the red impetus of life." Samuel's insight is acute, and at the end of this chapter I will have more to say about the biocosmic vitalism that constitutes Futurism's implicit metaphysics. Suffice it to say here that the cinema is splendidly suited for conveying a sense of Life's throbbing vitality. An art that devotes itself to transmitting (the common use of the term has an electrological provenance) the pulse of Life is one that will accord the cinema special importance. And

that is the point of Aiken's article—to show that Futurism's early critics (both those who were favourably and those who were negatively disposed) understood the movement as cinematic.

Aiken provides further examples:

> In book-length studies of modernism, Arthur Jerome Eddy, Willard Huntington Wright, and Charles Marriott associated the cinema with Futurism. Wright saw Futurism as mere "kinematic representation," and he claimed that the Futurists' depiction of motion is really "no more convincing than that obtained by a slowly moving cinematograph film." Marriott stated that after having seen Futurist paintings, "It was difficult to resist the conclusion that Futurism was really an application of the 'movies' to Impressionism or, at most, to Cubism." Writing in the late 1920s, Kazimir Malevich also linked Futurism with the motion picture.
>
> In 1961, Richard Huelsenbeck, one of the original members of Dada, wrote that "the futurists actually invented cinematographic motion." Marianne Martin has more correctly stated the nature of the problem: "The continuous motion of the cinematic form . . . underlies the entire Futurist aesthetic." It is clear that critics of Futurism, whether hostile or sympathetic, have consistently seen in Futurist art the impact of the motion picture.[125]

Aiken also highlights that the Futurists did not agree on the importance of the cinema to their painting: Marinetti, Carrà, and Balla all believed that the motion picture had a central role in Futurism. Boccioni and Severini, on the other hand, strongly objected to linking Futurism with the cinema. Soffici took a middle position. Aiken points out that Balla's interest in cinematic paintings anticipated Futurism by several years (so those convictions could have shaped his Futurist *parti pris*).[126] Soffici, for his part, made his reservations about the cinema clear in an article that appeared in *Lacerba*, and they add further support for the claim on which the argument of this volume rests. For in that article he notes that while Futurist art is in some ways comparable to the cinema, that medium suffers from being mechanical.[127] This is a belief we might expect would be held by someone who, under the influence of electrology, had come to believe that the principal purpose of art is to propose to an artist's contemporaries that they must overcome the limitations of anthropocentric thinking and achieve a transcendent (biocosmic) view—but who nonetheless still harboured reservations about the role of the machine in *bio*cosmic art. Soffici wanted art to encourage humans to adopt a higher viewpoint and experience the biocosmic process from a vantage point that would allow them to comprehend the organic whole; but he harboured doubts about whether a machine could have such a vitalizing pneumatic influence on people. Clearly, then, stimulating people to adopt a transcendental vantage point from which they could apprehend the universal dynamic took priority, for Soffici, over the novelty of the cinematic apparatus. That Soffici would accord priority to the

transcendentalist view of the metaphysical and epistemological value of art implies that the conviction espoused by many art historians—that Futurism was first and foremost an art of the machine (understood as we understand machines) was not one that all Futurists would have endorsed, and we have reason to ask whether it would have been endorsed by any.[128] What, finally, is at stake with all avant-garde movements, and what they have at their core, is a demand for a new metaphysics. What makes Futurism so exhilarating (and disturbing) is the thoroughness with which its exponents worked out, under the aegis of the still-forming electrological paradigm (and what they believed was its paradigmatic embodiment, viz. the cinema), a rich and rigorous process metaphysics that controverted what for five hundred years had been the founding ideas of Western culture with regard to the nature of beings, human being, consciousness, knowledge, subject-object relations, and ultimate reality.[129]

Consider in this connection Boccioni's outspoken opposition to those who advocated expanding the cinema's influence on Futurism:

> There will come a time when a painting will no longer suffice. Its immobility will be an archaism when compared with the vertiginous movement of human life. The human eye will perceive colours as though they were feelings in themselves. Multiplied colours will have no need of forms to be understood, and pictorial works will be whirling musical compositions of enormous coloured gases, which on the scene of free horizon, will move and electrify the complex soul of a crowd we cannot imagine yet [an electromagnetic art, capable of electrifying the collective soul, would be the *ottima arte* for the electromagnetic age].[130]

Had Boccioni overcome his belief that cinematography cannot be anything but an extension of photography, the mechanical production of a likeness of reality, he might have embraced the cinema for presenting multiplied colours without form, whirling musical compositions of enormous coloured gases with the capacity to electrify the soul of a crowd (his choice of terminology is highly significant). That is exactly what Corra did the following year in "Cinema astratto—Musica cromatica" (Abstract Film—Chromatic Music, 1912).[131] The cinema fostered dreams among artists of possibilities that lay far beyond its then-current condition—and that ideal cinema is the one I am referring to when I suggest that the cinema established the agendas of early-twentieth-century art movements (including Futurism).

## FUTURISM'S OCCULT NEW MAN

In *Harmony and Dissent* and in *DADA, Surrealism, and the Cinematic Effect* I characterized German *Lebensphilosophie* and *Lebensreform* as specifically German responses to the crisis of European modernity. Still, it must be acknowledged that similar life-philosophies, and similar movements dedicated to

reforming the way moderns live, arose in other parts of Europe, including in Italy, and that they played a role in Futurism. That fact helps explain Futurism's conceptual/philosophical connection to Fascism.

A leading scholar of Fascism's history has recently argued for "seeing both the European occult revival that produced Theosophy and Anthroposophy, and the 'life reform movement' which cultivated alternative medicine, neopaganism, and yoga, not as symptoms of a peculiarly German malaise, but as local manifestations of pan-European forms of social modernism bent on resolving the spiritual crisis of the West created by materialism and rationalism."[132] Futurism begs to be understood in this context.

The occult and spiritualist revival that North America experienced beginning in the 1860s (and that reached its apogee there around 1880) and that England and France experienced beginning in the 1880s (and that reached its apogee there at the *fin-de-siècle*) also affected Italian society. The most renowned Italian spiritualist was Cesare Lombroso (1835–1909), under whom the Futurist-to-be Giacomo Balla studied in Turin. Lombroso's writing shows the same extraordinary blend of positivism, scientific reason, and esoterism that characterized the work of many European and North American "psychical researchers." Trained as a physician, he conducted positivist studies of criminal types—but, like the highly influential Ludwig Klages (1872–1956), he was also a graphologist and carried out scientific investigations of psychic or paranormal phenomena.[133] Lombroso began investigating phenomena of that sort during the European *fin-de-siècle* enthusiasm for esoterisms of various stripes. As a result of those investigations, he changed from a skeptic regarding the soul's survival after death to a believer in spiritualism. In his book *Ricerche sui fenomeni ipnotici e spiritic* (Research on Hypnotic and Spiritist Phenomena, 1909), he wrote that he had been a convinced materialist for most of his life, until he examined the case of the medium Eusapia Palladino.[134] He came to believe that Palladino was a genuine mystic, and thus became convinced of the existence of spirits: "I am ashamed and grieved at having opposed with so much tenacity the possibility of the so-called spiritistic facts."[135]

The early belief systems of the Futurist avant-garde in Milan were influenced by scientific investigations of occult phenomena and by findings reported in the journal of the Società di Studi Psichici (Society for Psychic Studies). Russolo and Boccioni in particular were strongly influenced by that society's work. These (purportedly) scientific discoveries, especially concerning the influence of electricity and magnetism on the human psyche, drew upon the findings of the Bolognese scientist Galvani, who discovered that the signals transmitted along nerve fibres are electrical. Note well that efforts to find a scientific explanation for occult phenomena called upon the new science of electromagnetism and on neurophysiological findings that the nervous system is in fact an *electrical* system.

If it is easy to overlook the transformative effect of Galvani's findings, that is largely because of the length of time that elapsed between his discoveries (1792) and their assimilation, which took place only in the late nineteenth century. Nearly one hundred years passed after Galvani announced what he had learned about the electric nature of the nervous system before those ideas came to transform humans' understanding of nature and consciousness. But pioneering efforts, both before and after Galvani's momentous discovery, laid the groundwork for the transformation. For example, in 1767, Joseph Priestley (1733–1804), a Dissenter minister, chemist, and supporter of the phlogiston theory of combustion, brought out his 700-page *The History and Present State of Electricity*. The first half of that book presents an overview of the history of the study of electricity to 1766; the second half lays out the state of then-contemporary knowledge of and ideas about electricity. At this time, the study of electricity was still being conducted by private individuals, in dissection rooms or hospital clinics, or in home laboratories, and even clergymen like Priestley could conduct significant experiments that made important contributions to knowledge about electricity.[136] Priestley devoted a portion of the book's second part to some of his own discoveries, including the degrees to which various substances (such as charcoal) were conductive or non-conductive. He claimed that his researches had overturned one of electrical science's most widely accepted maxims—that only water and metals could conduct electricity. Priestley pondered the significance of the fact that thirsty parakeets' feathers become electrically charged, and he deliberated on the possibility that the brain acts as a processor of invisible fluids to convert phlogiston into electricity. His observation that "a current of real air" passed between two electrified points would later interest Michael Faraday and James Clerk Maxwell as they investigated electromagnetism. *The History and Present State of Electricity* served as the standard history of electricity for more than a century. Alessandro Volta (1745–1827), the inventor of the electric pile (or battery), William Herschel (1738–1822), the discoverer of infrared radiation, and Henry Cavendish (1731–1810), the discoverer of hydrogen, all drew on Priestley's work.

Henry Cavendish, a reclusive, painfully shy, and probably depressive scientist who had inherited a family fortune, took a number of approaches to studying electricity. He was extremely able in mathematics and one of the few people in the British Isles who was capable of making contributions to the mathematical theory of electricity. Another approach he took involved studying electric fish. In the early 1770s, there arrived in England reports from South America of an electric eel that could deliver a shock with power enough to kill humans and even horses. British scientists began to wonder whether

this electrical phenomenon might be related to the torpedo ray. That fish is mentioned by Meno in Plato's eponymous dialogue: he tells Socrates, "You seem to me both in your appearance and in your power over others to be very like the flat torpedo fish, who torpifies those who come near him and touch him, as you have now torpified me, I think" (*Meno* 80a). Until the reports of the South American eel reached them, most scientists (and philosophers) thought this fish was a fantastic entity, made of the stuff of myth. As early as the first century CE, the natural philosopher Pliny took delight in discrediting beliefs concerning the torpedo ray's existence and its therapeutic uses.

Soon, though, scientists acknowledged what fishers could have told them for centuries—that torpedo fish are real: they are common in the Mediterranean and off the Iberian coast up to the Bay of Biscay (and are sometimes found in the western Atlantic, along the coasts of Massachusetts, including Cape Cod). They are a benthic species, living in shallow waters, usually near a coast. Several British scientists began investigating the torpedo fish, among them John Walsh (1726–1795). A letter of 1 July 1773 from Walsh to Benjamin Franklin (1706–1790), treating "of the electric property of the torpedo," was read before the Royal Society. In that letter he demonstrated that the torpedo fish's unusual power of benumbing the sense of touch was an electrical phenomenon: the fish sends a shock through conducting substances. He argued that torpedinal electricity was produced by a special pair of organs, each divided into a great number of columns separated by tiny spaces filled with liquids. These two organs, packed with nerves that produce and regulate the ray's electric fluid, function essentially as Leyden jars. On 23 June 1774, a second letter from Walsh was read before the society, titled "Of torpedoes found on the coast of England." Addressed to the pioneering zoologist Thomas Pennant, it was published in a pamphlet form in London in 1773. For these contributions, the Royal Society awarded Walsh the Copley Medal in 1774, and again in 1783.

Many scientists could not accept Walsh's discoveries, partly because the torpedo fish could not make pith balls separate from each other (this electrical phenomenon was well established by this time). Cavendish looked for some means to support Walsh's view that the torpedo ray's shock is produced by electricity. He settled upon creating an artificial torpedo that would mimic the action of the living fish. He soaked pieces of leather in brine and cut them into the shape of a fish. He then attached pewter plates to a battery made of forty-nine Leyden jars, and the plates were in turn attached to the fish by wires that had been insulated by shielding them with a glass tube. Finally, he covered the whole assembly in sheepskin and plunged it into a tank of water. He was excited enough by what he observed that he overcame his characteristic social anxiety and invited scientists into his laboratory, to immerse their arms into

the tank, touch the fish, and receive and electric shock. However, Cavendish knew that his artificial model only demonstrated that the shock created by an actual torpedo ray *could* be electrical, not that it actually *is*. Several scientists, on dogmatic (religious) grounds, asserted that the torpedo ray must have special organs that generate a special vital fluid different from the electrical fluid that Cavendish (in keeping with contemporary views about the nature of electricity) claimed circulated through the fish's body.

The character of this force animating living beings became a prominent topic in late-eighteenth-century science. The ensuing questions were germane to philosophical biology, philosophical anthropology, and the philosophy of life and life-philosophy: Is it possible that living beings could be powered by electricity? Do differences between the world of matter and the world of living nature entail that animal electricity (the charge that travels along an animal's nervous system) differs from electricity that travels along metal conductors? Is it possible that electricity itself (in at least some of its modes) might be a vitalizing, life-giving force? Could it be that animal spirits are electrical? How can will, a spiritual phenomenon, interact with the body, by sending signals (symbolic phenomena, and in that sense *geistig*) to the muscles, instructing them to move, and by receiving information from the external environment through the mediation of the body? Can electricity explain this interaction between mind and body?[137]

Most thinkers at the time believed that electricity (including animal electricity) is a fluid circulating through a charged body. Similarly, the messages that are conveyed from the will to the body and from the senses back to the mind are transmitted through a special nervous fluid, an "animal spirit" flowing along very fine canals. Isaac Newton, however, had proposed another possibility. The universe, he suggested, might be permeated by an invisible particulate aether through which forces are relayed by vibrations. In addition to this particulate or gravitational aether (whose possibility he pondered, but whose existence he did not assert) there might be a lumiferous aether: he speculated that light rays might consist of a stream of particles in rectilinear motion and that the light particles stimulated, or were accompanied by, vibrations in an all-pervading aether.

There were, in fact, myriad competing notions about what exactly the aether is. Aristotle posited that the superlunary realms are made of a fifth substance (besides earth, air, fire, and water) called aether, which, unlike the other four substances, is unchanging and indestructible; furthermore, it cannot be converted into any of the other four substances. René Descartes (1596–1650), too, had argued that an aether exists, but his ideas about it differed significantly from Newton's: he contended that there is no true vacuum or void and that the world is a plenum. Descartes conceived of aether—which he referred

to as a "second matter" or the "second element"—as an all-pervasive, universal fluid that fills any space not occupied by solid bodies and that mediates their interactions through a system of vortices (*tourbillons*). The Cartesian picture of the universe (which believers averred, on theological grounds, could not be empty) portrays it as filled with interlocking spiral-like whorls: the planets, for example, are carried around by a sea of aether, whose coiling vortices produce gravitational effects. All space is a sea filled with matter that swirls in large and small fluid volutes. In 1678 and again in 1690, Descartes's follower, Christian Huygens (1629–1695), proposed a wave theory of light according to which waves propagate longitudinally, at a finite speed, through a stationary aether. This medium, Huygens argued, is continuous throughout space and consists of hard elastic particles that transmit impulses without themselves being displaced; in keeping with his Cartesian propensities, however, he also maintained that gravity was nothing more than "the action of the aether, which circulates around the centre of the Earth, striving to travel away from the centre, and to force those bodies which do not share its motion to take its place." Less well known than Newton, so far as theories of the aether are concerned, Robert Boyle, a few years prior to Newton's intervention, had proposed a notion of the aether that differed from Newton's (though his account is somewhat closer to Newton's than to Descartes's). According to Boyle, the existence of aether was no more than a probable hypothesis, but he conjectured that it consists of subtle particles of one of two sorts: one sort explained the absence of a vacuum and the mechanical interactions between bodies, and the other sort explained phenomena such as magnetism (and possibly gravity) that could not be explained as the mechanical interactions of bodies of a significant size. All of these conjectures were grounded in the modern conviction that reality is matter in motion.

Not of all Newton's ideas on aether were of the tough-minded sort, nor were they all based in mathematical physics. Some of his ideas on aether were linked to his well-known alchemical interests. Newton rejected Descartes's idea of a clockwork universe on the grounds that it lacked any spiritual dimension. In support of his belief that the universe has a spiritual aspect, Newton proposed that it is infused with a "vegetative spirit," or what alchemists called "the pneuma," a mysterious, holy energy from God (or the gods)—it was this that attracted Wilhelm Reich (the psychoanalytic philosopher of body/cosmic energies flows) to Newton's ideas on aether. This vegetative spirit coexists with the aether, through which heat waves, sound waves, planets, and stars travel. It is through the interaction of the aether, which possesses what he called ponderability, or weight, and the vegetative spirit, which is purely pneumatic, that molecules of matter form the chemical reactions observed in nature. (Twenty years after proposing these views, Newton rescinded them,

having come to realize that they made the hypothesis of a transcendent creator irrelevant.) Bishop Berkeley, who was, on so many matters, Newton's adversary, largely sided with England's great mathematician's early views on the matter of aether, describing it as a divine, animate entity, "the vegetative soul or vital spirit of the world."[138]

The theological implications of the aether were important to natural philosophers and natural theologians, especially in Britain: the purpose of natural philosophy, so they understood, was to uncover the laws of nature and thereby reveal the mind of God. Ideas about the aether were often framed to explain God's continuing role in the universe. A doctor from Essex put it this way: "Aether is the Rudder of the Universe, or as the Rod, or whatever you will liken it to, in the Hand of the Almighty, by which he naturally rules and governs all material created Beings . . . Now how beautiful is this Contrivance in God."[139] The historian of science Patricia Fara notes:

> Many [aethers] were so nebulously defined that it is hard to determine what their authors meant. Diverse though they were, electrical aethers did hold several characteristics in common. They were invisible and weightless; they failed to explain all of the experimental observations; and they were only vaguely described. Instead of examining their physical properties, it is more rewarding to explore their theological significance. Modern scientists often claim that their religious beliefs and their scientific work are completely separate, but experimental philosophy originated in attempts to reconcile biblical accounts with evidence drawn from the natural world. Especially in Britain, natural theologians preached that the fundamental purpose of natural philosophy was to celebrate God. Uncovering Nature's laws revealed God the Designer, who had created a wonderful universe for people to live in and care for, a dominion that He ruled wisely and omnisciently.[140]

Newton's conjectures about the aether (or, rather, aethers) raised the possibility that nervous sensations might be vibrations that travel through some medium (perhaps one as occult as the aethers of later eighteenth-century scientists). In the 1740s, scientists' attention shifted from ruminating on the possibility that electricity is propagated through an aetheric medium to considering whether animal spirits might not operate the body through something like electrical vibrations generated by and passing through the organism. This new interest was founded on the belief that electricity is a fluid resembling animal spirits. Galvani, in 1781, showed that when two different metals touch each other in the damp environment of a frog's leg, an electric current is generated, which passes along the nerve fibres in the appendage and makes its muscles contract. He took his experiments as proving the existence of animal electricity and posited that animals' brains produce an electrical fluid that passes along the nerves into the muscles. Galvani, ever diffident,

went over his findings again and again, repeatedly refining the presentation of his ideas. Finally, in 1791, he released his essay, *De viribus electricitatis in motu musculari commentarius* (Commentary on the Effect of Electricity on Muscular Motion), ordering twelve copies to be printed. The flamboyant Alessandro Volta received one of these copies and within two years had become a highly vocal critic of Galvini's findings. He declared that there was no special Galvanic fluid and that the Galvanic current is nothing other than electric current, of exactly the same type that students of electricity studied in the physical world. Moreover, the electric current whose effects Galvani had observed was not formed in the frog's body, but through the contact of the two metals in a damp environment.

Volta's criticism of Galvani's *Commentarius* divided students of medical electricity on three questions: Is Galvanic fluid electrical or not? Is it the product of animals' brains and nervous system? Is nervous fluid identical to electric current? Behind all three questions was the larger issue of vitalism: Are animal spirits reducible to physical processes, or is there a vital life-force distinct from physical phenomena? Galvani's explanation rested on the conviction that the vital force in animals must be different from any processes that take place in inert matter; Volta disagreed, contending that the processes that occur within an animal body are similar to those that go on in other parts of the material realm. To prove his case, Volta developed the electric pile (sometimes referred to as the Voltaic pile), an electric battery, and claimed it showed that the electricity Galvani had studied was the result of the contact of two metals (an anode and a cathode) in a fluid medium; he also claimed the electricity generated thus was the electricity that passed through the frog's nerves, making its muscles contract.

There were many errors in the logic of Volta's argument, but his flamboyant personality and the rhetorical force of his writing allowed him to rally most electrical scientists to his side, and most took it that Volta had discredited Galvani's idea of animal electricity. In March 1800, Volta sent an article to the Royal Society, which it published almost immediately (in the original French) in its *Philosophical Transactions*; in September of that year, the article appeared in English in *Philosophical Magazine*, which circulated among a wider community of scientists. There Volta declared his intention "to combat the pretended animal electricity of Galvani, and to declare it an external electricity moved by the contact of metals of different kinds." At the end of his article he declared that his pile was "at bottom the same as the natural organ of the torpedo."[141] The problems in his argument should have been obvious: even if a Voltaic pile generates electricity through the contact of two different metals in a moist environment, that does not imply that frogs

or torpedoes do not produce a specific kind of electricity in their nervous system. Nonetheless the article won over most European scientists, and Volta effectively silenced Galvani's followers.

Three years after Volta's article appeared, a murderer was hanged at Newgate. His corpse remained suspended in public view for about an hour; it was then taken down and given to a visiting professor of physics, Giovanni Aldini, a nephew of Luigi Galvani. Aldini took the corpse to a laboratory, wired it to a trough battery using metal plates and wires, and showed surgeons that he could make the face twitch, an eye open, a fist beat the air, the legs kick, and the back arch. Over the next few years, this demonstration was repeated, by various people, many times.[142] In this same period, physicians experimented with electrical therapies, testing whether they could make the paralyzed walk or even resuscitate the dead. The idea that electricity is a vital force was abroad, and this soon encouraged enthusiasts to identify electricity with a vital cosmic force. Electricity was treated essentially as a vegetative or pneumatic spirit—or, if not that, then as something that mediated between the spiritual and material dimensions. Even if he used the idea metaphorically, Marinetti picked up on the idea that electricity might be capable of reanimating corpses; in a passage in "Guerra, sola igiene del mondo," he notes about the violent aftermaths of his *serate futuriste* that the *arte-azione* "galvanized mummies," drawing them out of ancient sarcophagi and causing them (exactly like Galvani's frogs) to become bizarrely agitated. "Everywhere, we saw growing in a few hours the courage and the number of men who are truly young, and [we saw] the galvanized mummies that our gesture had extracted from the ancient sarcophagi, becoming bizarrely agitated."[143]

It is in this context that Russolo's art of noises finds its true significance. It is not just that Russolo literally believed in the power of the vibrations of the *intonarumori* (or *intonarumori*-like instruments yet to come) to reanimate the dead.[144] More important is that he saw his project as one of spiritualization, understood in alchemical terms. I quote from the final chapter of Russolo's *L'arte dei rumori* (The Art of Noises, 1916), introducing comments into the passage to highlight how the passage might be understood, if we accept (as I think is beyond dispute) that Russolo conceived of composition (or, at least, noise composition) as an alchemical process:

> First make the senses vibrate and make the brain vibrate as well. [Here again, the notion that thought is vibration appears.] Make the senses vibrate from the unexpected, the mysterious, the unknown [and here the identity of thought and super-reality, as vibration, is introduced: a cosmic, vibrating super-reality induces oscillations in the sensory apparatus, and the soul experiences emotion], and you will have true emotion, and an intense and profound soul!

> Here then is the fateful, absolute necessity to draw the timbres of our sound from the timbres of the noises of life. The only salvation from the poverty of orchestral sounds is here, in the boundless richness of the timbres of noise.
>
> But it is necessary that these noise timbres become *abstract material* in order to shape them into works of art…
>
> The ear cannot relate together the confused and fragmentary noises of life. It is therefore necessary that the ear hears them dominated, enslaved, completely mastered, conquered and forced to become elements of art. (This is the constant struggle of the artist with matter) [like Léger, Russolo was concerned with bringing order, form, to the machine world, which sometimes seemed troublingly chaotic].
>
> A noise must become a prime element [the featureless *prima materia* of alchemical art] to be moulded by the work of art. That is, it must lose its chance character [the character that has come to it by chance, and so is non-spiritual], to become sufficiently abstract [here, featureless] in order to arrive at the condition necessary for the transfiguration of whatever prime element [any *prima materia*] into any abstract artistic element…
>
> We free noise from the necessity that produced it and so dominate it, transforming at will its pitch, volume, and rhythm: suddenly we experience it as autonomous malleable material that can be shaped according to the will of the artist who transforms it into an emotional element, belonging to a work of art. [This is how order could be brought to the industrialized/mechanical world, which sometimes seemed to be in such disarray.][145]

This is a very dense passage, and I should like, on another occasion, to say more about it; but it must suffice for our purpose to point out that Russolo was describing the process by which noises from the world are depleted of their (accidental) character and reshaped by the artist, who, in spiritualizing them (giving them a seemingly purposive character within the artwork), allows them to be raised to a higher level.

Russolo's comrade-in-arms Marinetti actually proposed that a radio receiver is, or could become, a device for capturing and making audible vibrations emitted by people both living and dead, as well as by matter. His "Radia" manifesto (co-authored with Pino Masata in 1933) declares that the radio achieves the following:

> 4). Reception amplification and transformation of vibrations emitted by living beings by living or dead spirits noisy dramas of states of mind without words. [Here Marinetti alludes to the idea that thoughts are vibrations.]
>
> 5). Reception amplification and transformation of vibrations emitted by matter. Just as today we listen to the song of the woods and of the sea tomorrow we will be seduced by the vibrations of a diamond or a flower. [Vibration is universal—all things vibrate. Our senses can learn to experience the beauty of the vibrations that emanate from machines, as we have learned long since

to appreciate the vibrations that emanate from woods or a sea or a diamond or a flower.]

6). Pure organism of radiophonic sensations.

7). An art without time or space without yesterday or tomorrow… The reception and amplification through thermionic valves, of light and of the voices of the past will destroy time… [An artwork is experienced as belonging wholly in the immediate present, beyond space and time: it is spiritual.]

…

9). Human art, universal and cosmic, that is like a voice with a true psychology—spirituality of the noises, of the voices and of the silence.[146] [Note once again that technology is described as spiritual.]

In his "Manifesto della declamazione dinamica e sinottica" (Manifesto of Dynamic and Synoptic Declamation, 1916), Marinetti declared that the Futurist poet-performer (I am inclined to use the term rhapsode) would be tasked with the responsibility of "metallizing, liquefying, vegetalizing, petrifying, and electrifying the voice, fusing it with the vibrations of matter, themselves expressed by words-in-freedom."[147] He also testified to Russolo's ability to "organize spiritually and fantastically our acoustic vibrations."[148]

Just after the Great War, Marinetti developed a strong interest in amplifying the sensory faculties of the new man. Confirming his Lamarckian bent, Marinetti invented *Tattilismo* (Tactilism), physical exercises and activities that he believed would issue in the "discovery of new senses," thus leading to the discovery of new continents. During his January 1921 trip to Paris, he lectured on the topic, making it central to the renewed Futurist program. On 16 January 1921 he published his manifesto "Tattilismo," which begins with a near word-for-word reprise of the scene described in "Fondazione e Manifesto del futurismo," of crashing his automobile and ending up in the mud. Through that immersion, he strikes upon the Futurist imperative:[149]

Last summer, at Antignano, where the Amerigo Vespucci Road (named after the discoverer of America) curves around as it follows the seacoast, I discovered Tactilism. Red banners were snapping over factories seized by workers.

I was naked in the silky water that was being shredded by rocks, by foaming scissor knives razors, among beds of iodine-soaked algae. I was naked in a sea of flexible steel [Marinetti refers to a material that is an industrial product, but alluding to this material is peculiar enough that it should prompt us to wonder why he would compare the water to steel. The obvious ground of the comparison is that the froth on the rocks is silvery, but, given the passage's theme of tactilism, it also refers back to two comparisons drawn in the previous sentence, linking the cold of the water on the skin to metal.] that breathed with virile, fecund breath [the sea of steel is organic and pneumatic]. I was drinking from a chalice of the sea that was full to the brim with genius [Italian: *genio*;

> etymologically, generative spirit or generating spirit (from root *gene-* meaning to produce or beget)—this baptism/communion imparts spirit]. The sun, with its long searing flames, was vulcanizing my body [another solar reference] and welding the keel of my forehead, rich in sails [with his spirit aroused, he is transported].
>
> A peasant girl, who smelt of salt and warm stone, smiled as she looked at my first tactile table. "You're having fun making little boats!"
>
> I answered her, "Yes, I'm launching something that will carry the human spirit to unknown shores." [Here the spiritualization the baptism accomplishes is made explicit.]
>
> Here are my swimmer's meditations.[150]

This passage suggests that Futurism was reborn from the alchemical marriage of the female (water) and male (sun) principles. Furthermore, the image of water can be taken as an allegory for the alchemical stage of ablution, in which the seeker's impurities are washed away, to release a new spirit. The next passages explain the need for a Futurist revival: the Great War had plunged thinkers into pessimism, lassitude, inertia, "an excessively feminine neurasthenia."[151] A renewed Futurism could revitalize its male spirit. The terms in which he argues this position are revealing; he describes thinkers' response to the Great War in this manner:

> The cruder and simpler majority is rushing toward a revolutionary conquest of the communist paradise and is launching its final assault against the problem of human felicity, armed with the conviction that it can be resolved by satisfying all material needs and desires. [Only crude and simple people believe that the solution to the problems of life can be achieved by satisfying material needs—Marinetti was certainly not materialist so far as socio-economic issues were concerned.]
>
> The intellectual minority evinces ironic contempt for this troubled attempt. No longer taking pleasure in the bygone joys of Religion, Art, and Love, which used to be both their refuge and their privilege, they have brought a lawsuit against Life, which they also no longer know how to enjoy [the contemporary intellectual minority have taken a different course in dealing with the problems of life: they have renounced Religion, Art, and Love, but have nothing else that might replace them and serve as their refuge; so, they have becoming embittered at losing contact with capital-L Life], and are abandoning themselves to rarefied pessimism, sexual inversion, and the artificial paradises of cocaine, opium, prostitutes, etc.[152]

The first paragraph dismisses the idea that the remedy for this corrosive psychological/spiritual state will be material. The second paragraph hints at a remedy (though it notes that people have not been able to accept it): the issue is really one of restoring humans' (that is, men's) relation to the life-force. So he counters with this proclamation:

> But to the minority of artists and thinkers [that is, to the elite who will advance the eugenic cause], we cry out loud:
>
> > Life is always right! The artificial paradises with which you hope to assassinate it are worthless [drugs and delusion do nothing to connect us to the true reality, which is Life]. Stop dreaming of an absurd return to primitive life. Stop condemning the superior forces of Society and the marvelous forces of speed [the old will not connect to Life—new means are required, including speed, which is vitalizing]. Instead you should cure the postwar sickness, giving humanity new and nourishing joys. And instead of destroying the urban agglomerations you should try to improve them. Accelerate communications and the fusion of human beings. Destroy the distances and barriers that keep them apart, divided in friendship and love [speed creates the conditions under which all might be one]. Give total beauty and plenitude to those two essential manifestations of life: Love and Friendship.[153]

However, love and friendship cannot accomplish their tasks because our skin is a poor medium of communication:

> In the course of making my attentive and antitraditional observations of all the erotic and sentimental phenomena that unite the two sexes, and of the no less complex phenomena of friendship, I've come to understand that human beings speak with their mouths and their eyes, yet never achieve true sincerity because of the insensibility of the skin, which is still a mediocre communicator of thought.
>
> While the eyes and voices communicate their essences, the tactile parts of two individuals hardly communicate anything in their bumping, intertwining, and rubbing.
>
> Whence the necessity of transforming the handshake, the kiss, and copulation into continuous transmissions of thought [the body must be transformed so that it becomes a medium of thought, continually conveying ideas to centres of feeling/knowing—and through the skin, contact with one another].
>
> I began my own tactile education by submitting my sense of touch to intensive therapy, localizing the confused phenomena of will and thought on the different parts of my body, and especially on the palms of my hands. This education was slow, but also easy, and all healthy bodies can use this education to get precise and surprising results.[154]

"Tactilism" is obviously a gnostic/esoteric text. Italy gave rise to a strain of occultism (specifically, of Rudolf Steiner's [1861–1925] Anthroposophy) that had strong similarities to German *Lebensreform*. A key representative of this strain was Luciano Chimelli (1880–1943), who embraced Steiner's principles of biodynamics and used them to found a movement to reconnect humans to the earth and in doing so to purify them. Chimelli introduced biodynamic

agriculture to Italy and was the chief public representative of biodynamics during the Fascist period. He was an outspoken admirer of Mussolini, particularly his environmental programs. In the 1930s, Mussolini paraded through Italy, proclaiming it must "riscattare la terra, e con la terra gli uomini, e con la uomini la razza" (redeem the soil, and with the soil the men, and with the men the race). Italy's lands were worn out—mountains were flooding, soil was eroding, and fields had become overgrown. These lands must be revived: when they were, the people and the nation would also be revived. Mussolini implemented a program of *Bonifica integrale* (Integral Improvement or Integral Land Reclamation), to revivify the lands and resuscitate the economy.

As its title suggests, Mussolini's *Bonifica integrale* was an integral program: it comprised *bonifica idraulica*, *bonifica agraria*, and *bonifica igienica* (improvement of watercourses, agriculture, and hygiene). *Bonifica idraulica* involved efforts to stabilize watercourses; this required reforestration and the construction of dams. *Bonifica agraria* involved draining, irrigating, and fertilizing land. *Bonifica igienica* focused on draining swamps and preventing malaria.

Mussolini's slogan reflected views that had developed through the 1900s, 1910s, and 1920s. Since 1912, government officials and official commissions had been recommending *bonifica* programs. The Fascist Undersecretary for Agriculture, Arrigo Serpieri (1877–1960), a Bolognese economist and agronomist, had long advocated *bonifica*. From the first years of the twentieth century, he had advocated the importance of restoring and preserving mountain landscapes, mountain economies, and mountain inhabitants. In 1911 the Italian Touring Club had published a pamphlet by Serpieri titled *Il bosco, il pascolo, il monte* (Forest, Pasture, Mountain), and it was reprinted in "Anno XVI N. 165" (that is, the sixteenth year of Mussolini's era, which began in 1922). It presented ideas that Serpieri had written and spoken about as early as 1904, including the counsel that *Bonifica montana* must not provoke an exodus of alpine dwellers. Mussolini took Serpieri's idea of *bonifica* and extended its program for creating conditions favourable to humans' thriving. On 18 May 1924, Serpieri oversaw the passage of a bill that established the *Bonifica integrale*.

Serpieri was a well-trained and able agricultural economist, one of the most able recruits to Mussolini's Partito Nazionale Fascista (National Fascist Party, PNF). He believed that an earlier rural communalism had embodied a delicate harmony, one that ensured peasants and sharecroppers received a direct share of their produce, and that the balance that once had prevailed had been upset by the development of a rural proletariat, who depended on wages alone. On the other hand, he was convinced of the economic utility of capitalism's incentivizing dynamic.

Serpieri's efforts were aligned with a broad European movement promoting the reform of life. Germany's National Socialists were also committed to agrarian reform as part of their effort to bring forth the New Age, the New Reich, and the New Man (and here again, unfortunately, the gender-specific noun is appropriate). In 1935 the National Socialists embarked on a state-sponsored campaign to encourage organic farming and passed the Reich Law for the Protection of Nature.[155] That law established nature preserves and required that development projects be approved by an environmental protection agency. The National Socialists also passed laws protecting endangered species and conserving wetlands and waterways—legislation unparalleled anywhere else in the world. This legislation (like Serpieri's in Italy) reflected a view that married images of the nation with images of the sacred, nurturing land. Like Mussolini, German reactionaries promulgated a politics of purity and connected the notions of ecological and racial hygiene—in the case of the Germans, this was the ideology of blood and soil. The foremost proponent of this blood-and-soil doctrine was the Minister of Agriculture for the National Socialist government, Richard Walther Durré (1895–1953). Other prominent environmentalists were Walther Schoenichen (1876–1956), the Director for the Reich Agency for Environmental Protection, and Alwin Seifert (1890–1972), the Reich advocate for the landscape. Seifert oversaw the building of the *Autobahn* system, ensuring that construction was done in an environmentally sensitive manner.[156] Even aspects of the Nazi perfidy were carried out partly in the name of environmentalism: in 1942, Heinrich Himmler (1900–1945), the cruel leader of the horrible Schutzstaffel, asserted that a deep respect for nature was the motivation for removing Jews and Slavs from the territories conquered by the Germans.

The *Lebensreform* movement in Germany spoke not only for the revitalization of the land, but also for renewal of human being, though nature's vitalizing factors, viz., vitamins. So did the *futuristi*: in 1933, Marinetti and Masnata's "La radia" proposed to "overcome chemistry 'with a nutritional chemistry perfected with vitamins and calories free for all.'" This was the same manifesto that advocated overcoming "the earth 'with an intuition of the means that must be thought out in order to go to the moon'" and overcoming "death 'through the metallicization of the human body and picking up the vital spirit as a mechanical force.'"[157] Similar evolutionary views were promulgated by the principal Italian advocate of biodynamism, Luigi Chimelli; to Marinetti and Masnata's proposals for nutritional chemistry, Chimelli added that ensuring the future of the race must be a central task of agriculture.[158] Chimelli, too, in support of biodynamics, invoked the Duce's views concerning the land and the race: the time was ripe for biodynamics, he maintained, for the spiritual climate created by Fascism was especially hospitable to a

biodynamic approach—Fascism, like biodynamics, was animated by an anti-materialist thrust, and like biodynamics was rooted in spiritual beliefs.

Anthroposophy was portrayed positively in official and semi-official Fascist organs. Most of these celebratory pieces appeared well after the Futurist movement had announced itself to the world, but a time delay of this sort is common: ordinarily, when movements set out to establish themselves they first put forward their more explicitly social doctrines; only later do they reveal their more recondite metaphysical beliefs—and, moreover, it is usually some time before the popular press pays attention to these occulted foundational principles and presents them with any regularity. The Fascist-era entries on Anthroposophy and Steiner in the *Enciclopedia Italiana* (the so-called "Treccani"), edited by the chief Fascist philosopher Giovanni Gentile, were respectful and informed. An illustrated magazine that once a month accompanied Mussolini's own *Popolo d'Italia* published an extremely sympathetic portrait of Anthroposophy, and particularly eurythmy, complete with a large photograph of Rudolf Steiner.[159] In 1937 the hard-line newspaper *Regime Fascista* published a substantial interview with Albert Steffen, president of the Anthroposophical Society, in which Steffen praised Italy and predicted that it would once again advance to spiritual greatness.[160] Much of the interview was devoted to anthroposophical subjects and suggested there was a considerable degree of agreement between Anthroposophy and Fascism.[161] Küfferle pointed out that Steffen's ideas on the deficiencies of "Wilsonism" coincided with *il Duce*'s. Steffen's own statements about Italy, phrased not in political terms but in cultural-spiritual terms, were enthusiastically positive. Steffen visited Fascist Italy regularly.

Significantly, both Fascism and the various esoteric movements that flourished in the first three decades of the twentieth century shared the conviction that they were bringing forth a new man.[162] Notions about the emergence of the new man were usually worked out in evolutionary terms. In fact, the Futurists proclaimed the same ideas about evolution that some new media artists of the present offer: in the past, evolution advanced through accidental mutations that were preserved through natural selection (while non-adaptive mutations were eliminated), but now the time had come for humans to take charge of evolution and steer it towards whatever outcome they would.[163] Thus, some passages in Futurist manifestos can be read as proposals for steering evolution in the "best" direction. For example, Arnaldo Ginna's 1933 text "L'uomo futuro" identifies Futurism with understanding evolution: "Futurismo vuol dire coscienza della legge dell'evoluzione" (Futurism means consciousness of the law of evolution), understood in occult terms.[164] The Futurist, Ginna proposes, is one who, because he possesses a consciousness of evolution, is no longer carried along by the historical current: "It is not

necessary to have a Futurist mentality in order to follow the path of evolution, which as we have seen is a force that no one can escape, but it is necessary to be truly futuristic if one wants to be something more than chaff that is caught in the drift, dragged by an invincible current."[165] The implication is that a Futurist could see and understand the flow, and that understanding would allow him choose where it will carry him.[166] Of course, "l'uomo futuro" would be naturally inclined *futurofascisticamente* (futurofascistically) and would instinctively follow the orders of *il Duce*.[167] Ginna's text also connects these ideas on evolution and the "new man" with alchemy and Theosophy: it asserts that these evolutionary ideas were the result of his being the precise alchemist of infinite and mediumistic researches. In the article, Ginna also notes with approval that "the Theosophists" had hailed Futurism, proclaiming that "the Futurists are the mystics of action." It is telling that Marinetti would refer to that citation, saying that "among the many definitions of futurism, the one given by the theosophists is the one I prefer."[168]

Futurism harboured an evolutionary strain. So did Fascism, Theosophy, and Anthroposophy. That Fascism shared with those esoteric movements a belief that agents of progress should hasten the coming of the new man fitted for the new age is grounds for comparing the *uomo nuovo futurista* and the *uomo nuova fascista*.

Marinetti's assertion in the "Fondazione e Manifesto del futurismo" that "Non v'è più bellezza, se non nella lotta" (there is no beauty, except in struggle) is likely a declaration that struggle alone can produce a shapely and efficient form, a result of applying ideas taken from Herbert Spencer's (1820–1903) Social Darwinism to aesthetics. Marinetti rejected utopian beliefs of the sort that saw evolution as a process that would bring about a *paradiso terrestre* from which all suffering had been eliminated. On the contrary, he viewed suffering as necessary to racial improvement. Nonetheless, in a Schopenhauerian turn of thought, he posited that art could assuage humans' misery by providing spiritual comfort.

Marinetti's social ideals reflected his commitment to the application of evolutionary ideas (of a Lamarckian variety) to society. They also reflected the belief that art could play an important role in bringing forth the new man, as well as the new state that would be his home—when the new state had been created, it would form the environment in which the new man would live. If the state was going to represent an advance to a higher dialectical level, art would have to play a vital part in the lives of its people, for only art could transform some features of human be-ing. We who live in an era that believes that art is simply entertainment/distraction might find this belief extravagant, but when assessing Marinetti's proposals, we can attenuate feelings that Marinetti's ideas on transformative potential of art were completely idiosyncratic

by recalling that on 19 September 1919, Gabriele D'Annunzio, reacting against the Paris Peace Conference of that same year (which left Fiume, a former colony of Venice on the Dalmatian coast, outside Italy's boundaries), led a contingent of iredentists into the city and forced the withdrawal of the inter-Allied (American, British, and French) occupying forces. D'Annunzio wrote a lofty constitution, the *Carta del Carnaro* (Charter of Carnaro, proclaimed on 8 September 1920), for the new republic of Fiume, the Italian Regency of Carnaro, which acknowledged the important role of art, music, and poetry in public life. Though Marinetti had been critical of D'Annuzio until then, he expressed admiration for the poet-soldier who had set himself up as *il Duce* of that republic.

That admiration notwithstanding, Marinetti's beliefs about the state-yet-to-come were different from those embodied in D'Annuzio's *Carta del Carnaro*. D'Annuzio underwrote the Platonic principle that people need a "teacher" to instruct them. He believed that inspired poets are well suited for that role (which led to his nickname "poeta vate" [the vatic poet]).[169] The civic effect of "profetismo" is to produce a hierarchically ordered and therefore closed *polis*. The polity is guided from the top, and individual initiative is not highly regarded, at least as far as concerns the masses. By contrast, the polity that Marinetti foresaw, in *Democrazia futurista: Dinamismo politico* (Futurist Democracy: Political Dynamism, 1919) and in *Al di là del Comunismo* (Beyond Communism, 1920), a pamphlet Marinetti wrote in response to the Bolshevik seizure of power in Russia, would be an open state: the new man (the use of the masculine pronoun is required here) would be freed, to live "il suo migliore romanzo possibile."[170] All art movements are based on a philosophical anthropology (which is sometimes implicit and sometimes explicit), for every art movement has to ask, and attempt to answer, this question: "What responses do we hope to elicit from a fully realized person?" In *Democrazia futurista* and *Al di là del Comunismo*, Marinetti asks what the ideal man of Futurist poetics would be and what state he should live in. His answer: the completed human is a poet. Once the ideal state is realized, artists will accede to power and their statecraft will be such as to nurture human flourishing through art. That state will afford men the possibility of seizing their fate so that they might become what their inner truth destined them to be. The political will have become poetic, endowing lives with the qualities of "sorpresa, giocondità, elasticità spirituale" (surprise, playfulness, and spiritual elasticity). All that had belonged to the category of the political will have been overcome through a sort of poetic anarchy.[171] The playfulness of the Futurists' *serate futuriste*, the deeply ironized rhetorical hyperbolism of manifestos, the sexual fantasies and scatological descriptions that proliferate

in Futurist imaginative literature (such as having the characters in Marinetti's *Gli Indomabli* [The Indominables or The Untamables, 1922] moon the night sky and shoot poetic phrases from their rectums) will have become features of men's everyday lives.[172]

Marinetti's most explicit statement of the conception of the political ideal as poetic appears in *Democrazia futurista: Dinamismo politico* (whose very subtitle connects the book's political thematic to Futurist aesthetics). His ideas on that matter are perhaps most forcefully presented in a section that appeared separately as "Vecchie idee a braccetto da separare" (Old Ideas Are Linked and Need to Separate, published in *L'Ardito* in May 1919). Here he proposes that conventional semantic linkages and conventional semantic bonds have ossified into stupidities that are routinely repeated. The networks of analogies embedded in them have no purchase on reality, and so foster the inbecilities of routinized thought and, worse, delusory political notions. Only a loosening of the taut conventional syntactical links that are repeatedly and routinely remobilized in ordinary language use—a tactic that requires freeing terms from their ordinary semantic bonds so that they might become poetic centres of energy—will release men to think freely and to a establish a true democratic (anarchic) polity.

This crucial text is among the richest that Futurism has left us and was one of the first to announce with such clarity that language has lost its grip on reality and that the purpose of avant-garde linguistic constructions is to destroy the delusion that words mirror reality. But if we take into account Marinetti's urgent desire to prise open the closed conventions of language—and not just language, but also the state—we see the error in reducing Futurist poetics to a poetics that anticipates Fascism. This is not to deny that Marinetti's politics—and the politics of most of his co-factionalists—were abhorrent. But we do well, in trying to discern the roots of their perfidy, to bear in mind that Fascism was fundamentally totalitarian—indeed, the word totalitarianism, *totalitarismo*, was coined (by an opponent) to describe the Fascist ideology—whereas Marinetti's politics were not. Mussolini and his favourite philosopher, Giovanni Gentile, agreed on this matter: values exist only within the state, and there are no values beyond the state.[173] The state coordinates all goal-directed actions. Marinetti's politics, at least as expressed in the "Vecchie idee a braccetto da separare" section of *Democrazia futurista: Dinamismo politico*, disavow that political ideal. Here, Futurist poetics and Mussolini's *totalitarismo* come into conflict: the poetic tactic of freeing terms from their semantic bonds to become poetic centres of energy undoubtedly serves the project of emancipation (though other aspects of the poetics—especially those celebrating the hard male—do not). The poetic devices entailed by *parole in*

*libertà* similiarly serve socially emancipatory, anarchistic ends. Futurists' actual political engagements, by contrast, served the causes of hierarchical organization, coercion, and oppression of the individual.

The *futuristi* connected spiritual, artistic, political, and technological evolution. The avant-garde sensibility, so the *futuristi* thought, was essential for the political regeneration of Italy. Artists alone, through the fire of their intuitive genius, could regenerate the nation and prepare it for the coming Futurist age, Marinetti suggested.[174] The anti-authoritarian, anti-conventionalist artistic spirit would disarm any threat that a closed form might be imposed.

The Futurist theory of the senses was fundamentally evolutionary. They believed that the human senses as we now know them were fitted for an earlier age and that we must develop a new sensibility. Marinetti's "Fondazione e Manifesto del futurismo" states, "The furious sweep of madness drove us outside ourselves and through the streets, deep and precipitous as the beds of spring torrents. Here and there a sickly lamplight, behind the glass of a window, taught us to despise the errant mathematics of our transitory eyes."[175] Marinetti is driving his car, and cannot see: his eyes are not suited for the speed and light of the emerging age—they are fitted for the outmoded mathematics of linear (Renaissance) perspective. A new mathematics has emerged (non-Euclidean geometry), and the historic changes that have occurred with the introduction of industrial-electric technology have rendered the old mathematics and the outmoded sensory faculties obsolete. A new sensorium must emerge, to adapt a new race of animals to the new age. That race will be vitally animal because the new technology is vitally animal—Marinetti insists on that with frequent allusions to the animality of the automobile (in the section on the founding of Futurism), and on the emerging relations between the animality of machines and human animality (which he sometimes casts as that of erotic identification). "We drew close to the three snorting beasts, tenderly stroking their swollen breasts. I stretched out on my car like a corpse in its coffin, but revived at once under the steering wheel, a guillotine blade that menaced my stomach," Marinetti writes.[176] Similarly, in the passage in the "Founding of Futurism" concerning his "occhi perituri": "I screamed: 'The scent, the scent alone is enough for our beasts!' And like young lions we ran after Death, its black hide stained with pale crosses, running across the vast livid sky, alive and throbbing."[177] If the human eye in its present state is inadequate, the animality of the machine, following like a dog a trail of scent, is more able to lead towards the ultimate goal, which is Death—and the *futuristi* themselves, in the speeding automobile, are transformed into "giovani leoni" (young lions).

As I have already noted (when I remarked on the parallels between Jules Romains's Unanimism and early Futurism), the interest in augmented sensory

powers appeared in another early Futurist manifesto, of 1910, "La pittura futurista: Manifesto tecnico," in which Boccioni, Carrà, Russolo, Balla, and Severini asserted that humans (or advanced humans, such as the *futuristi*) had acquired a visual power analogous to that of X-rays.[178] X-rays had made evident that our experience of the world is limited by our sensory faculties (for X-rays, which reveal the world through different wave forms than the human sensory apparatus, can make the world appear differently). Moreover, a staple of belief systems of the time was that X-rays resemble the aetheric vibrations that carry radio signals (and even thought-forms). Indeed, X-rays were extolled for two capacities (both of which relate to photography's, film's, and X-rays' indexical character). First, they can penetrate the surfaces of objects, dissolve the boundaries, and allow vision to penetrate and expose their inner being—this the Futurists took as confirmation of their ideas about the relativity of the object and about penetration (or interpenetration). Second (and what might seem more extravagant), X-rays seemed to suggest the materialization of thought—X-rays penetrate bodies, enter the brain, and make thought visible, and they do so by registering the electromagnetic reality that thought in fact is. This idea might seem preposterous to us, for we have lived with X-rays all our lives. But it circulated broadly in the last decades of the nineteenth century and the first decades of the twentieth. One of its proponents, whose ideas were widely discussed, was Dr. Hippolyte Baraduc (1850–1902), a doctor at the Salpêtrière hospital and a practitioner of thought photography. Baraduc made great efforts to develop a theoretical basis for that enterprise. In May 1896 he reported to the Paris Académie de Médecine that he had photographed thoughts; he later reported on many of these experiments in his suggestively titled *Méthode de radiographie humaine. La force courbe cosmique. Photographie des vibrations de l'éther* (Method of Human Radiography: The Cosmic Force Curve: Photographing Vibrations of the Ether, 1897). His experiments involved subjects' being asked to place their hands on a photographic plate in a darkroom and concentrate on an object. Gale's *Occultism and Parapsychology Encyclopedia* notes, "Many curious markings were obtained, some of them representing the features of persons and the outline of objects."[179] Earlier, before his work with X-rays, Baraduc had investigated spirit photography—photographs produced by invisible soul-emanations, which are invisible to the naked eye but X-rays render visible. When he saw X-ray images he concluded that they, too, had been formed by the soul.[180] Like several other thinkers of the era, Baraduc extended the simple (and obviously true) idea—that the body generates energy, which it emits in the form of vibrations—into an occult idea that every bodily organ is associated with a "radio-activity, a zone of vibration which is particular to each of them."[181] This occult principle was the basis for his belief that an X-ray plate

can record a spirit (or soul) photograph. Radiation, Baraduc maintained, has a tendency to gather itself into identifiable forms—to concentrate and fix itself into visible forms that he called "psychicones" (from the Greek *psykhe*, "breath, spirit, soul," and *eikon*, "likeness, image, portrait"):

> When the thought is simply held in place within an image, then this light-image, the shining mantle of our thought, has a photo-chemical effect which is strong enough to work directly through the glass on the gelatinized film—and certainly in a manner invisible to the human eye. I have named the preserved images psychicons, shining and living images of thought.[182]

Baraduc's electromagnetic cosmism extended further: he maintained that psychicones have a peculiar nature, that of a "somod," which he characterized as "that fluidic spectre, which is the intermediate agent of cosmic life and life personified in one existence; it is the living luminous double of the material body, which it possesses and maintains."[183] Its energy form can affect X-ray plates. Here Baraduc writes of himself in the third person:

> The interesting fact of procuring photographs of the hand showing its skeleton and its form, struck the scientific world with astonishment, it is the faculty which this invisible light had of lighting up the cavity of the body by illumining or by exciting, so to speak, *the intimate and interior light of the fluidic body*, which Dr. Baraduc had iconographed two years before. The vital soul appears so luminous that, alone, the most opaque bodies which possess less luminous life, such as the bones, decide upon the spectral shadow of the totality of the organs: neither veins nor nerves appear, all is immerged in the intensity of the photo-chemical light of the animistic body.[184]

Baraduc believed that X-rays had given science a means to become "acquainted with the luminous body," since they furnished "a link between the purely physical known experiments and those of a more elevated order."[185] He noted the visual similarity between the semi-translucent, cloud-like forms seen in spirit photographs and those seen in X-ray images, and this observation led him to conclude that X-ray flesh was teleplasmic in nature. His ideas on "le corps lumineux" (the luminous body), "la vie lumineuse" (luminous life), "rayonnements divins" (divine rays), and "fantômes lumineux" (glowing phantoms) influenced Annie Besant and Charles Leadbeater's *Thought-Forms* and so, albeit indirectly, had a wide-ranging influence on the art world of the first half of the twentieth century—for example, on Kandinsky's and Mondrian's non-objective art (both men were devotees of that slim volume) and on the work of Anton Giulio Bragaglia (1890–1960) and Man Ray. The body/soul itself came to be understood as a producer of X-ray-like emissions, which were produced by the brain, left the body through the eyes, and functioned essentially like light waves (or X-rays) in the external world.

Baraduc was not alone in this understanding. His French contemporary Commandant Louis Darget (1847–1921) believed that thought emitted "V-rays" and that photographic plates could make V-rays visible. In *Photographie de la pensée* (The Photography of Thought, 1896), Darget presented evidence of what he took to be manifestations of thought energies.[186] He would have his sitter gaze long and hard at an object, to "engrave it firmly on the mind." Then, in a darkroom, he would place the non-emulsified side of a photographic plate against the sitter's forehead while the latter concentrated on a mental image of the chosen object and for fifteen minutes willed it to appear on the plate; then, for a further fifteen minutes, the sitter would place his or her hand on the plate while continuing to concentrate on the mental image he or she had of the object.[187] Darget would then develop the plate. Mysterious, luminous, almost abstract forms duly appeared suggesting the form that the sitter's thought had impressed on the sensitized plate. The art/media historian Sabine Flach notes that "thought is for Darget a 'glowing, creative, almost material force,' which, according to this perspective, causes a vibration in the brain, the rays generated by that vibration being projected externally."[188] A discourse regime that includes such ideas would likely say that film, whose images are created by light (that is, by electromagnetism), can register the rhythms and pulsations of thinking. It would certainly propose that film can register the cosmic life-force in which human thought participates.

The new man the Futurists strove to bring forth would, besides being transparently spiritual, also be metallic. The Futurists' emphasis on the masculine ideal was associated (in a most unfortunate way) with these evolutionary ideas. The ideal of manliness was a common component of nationalist ideologies of the late nineteenth and early twentieth centuries, but the Futurists took this strain of thought in an especially unhappy direction by connecting the dynamism and energetic élan that was so central to their movement to the masculine ideal. Marinetti's writing connected the exhilaration of speed with the beauty of a militant masculinity. The ideal became even more troubling once thinkers connected the masculine ideal with creativity through Otto Weininger's *Geschlecht und Charakter* (Sex and Character, 1906), a book that had a startling impact on the first three decades of the twentieth century. In it Weininger argued that while men are basically rational, women operate only at the level of their emotions and are driven by the urge to seek pleasure for their sexual organs. Weininger also tossed a dollop of anti-Semitism into this delicious mix: Jews, he declared, are like women, infused with femininity; since they are feminine in character they do not possess souls and that they lack any sense of right and wrong.

A man must choose between his masculine and feminine sides—to be truly a man, he must opt exclusively for his masculine side and abjure the

feminine in himself.[189] He must choose between consciousness and unconsciousness, and between the ideal of Platonic love (between men) and sexuality. According to Weininger, sexual excitement has nothing to do with love—indeed, love and sexual desire stand in contradiction. The love between a woman and a man will always end in misery or immorality, and the spiritual life is the only life worth living. Thus a Jew or a woman had no right to life: theirs was, to use the term some Germans would soon be using (in connection with the disabled, the chronically infirm, and the mentally ill), a *lebensunwerten Leben* (life unworthy of life).

S*ex and Character* quickly found a following among the radical Italian right, including several Futurists. Even though it was antithetical in some respects to the Futurist ideal, many Futurists-to-be took from Weininger's thought whatever would support their own position. His encomia to virility, and his insistence that virility is necessarily opposed to the feminine, were well received in *Lacerba* and *La Voce*, whose contributors generally interpreted his texts as expressing the contempt that a youthful, manly elite rightfully has for the average human being.[190] Weininger's sharp distinction between the sexes belongs to the same mode of thinking as that of the *futuristi*. Clarity of statement and decisiveness of purpose prevail over nuance. The Futurists associated virility with the readiness for combat, and in combat there is no place for the lucubration and equivocations of plodding, deliberate, highly nuanced subtle thinking. That said, there is another feature of Weininger's thought that would have appealed to the Futurists: Weininger warned against the tendency to use the ideal male and female types to pigeon-hole and oppress individuals and individuality. This aspect of Weininger's thought appealed to Ludwig Wittgenstein, who, it seems, connected the picture of theory language that he was in process of rejecting when he took up Weininger to a standardization of language (as meaning becomes an ideal that forces itself on phenomena). Wittgenstein used Weininger's ideas on society to help free him from the idea that words have an ideal meaning and to help him formulate the idea of a multiplicity of language games and of meanings developing through different ways of using words. This interest in diversity and an animus against standardization—in language, in sexual identity and social role—would certainly have appealed to the Futurists, whose politics were so anti-hierarchical. Throughout Futurist writing, this interest in diversity and individuality at odds with a stultifying order exists in a curious tension with their more authoritarian tendencies. But, of course, evolution occurs as the life-force produces a new form that differs from its predecessors in being better adapted and it leads the way towards the future. From the early years of Futurism right up to 1938, Marinetti published *misurazioni teatrali* (theatrical assessments or reviews) and *commemorazioni in avanti* (advance commenda-

tions) of the non-Futurist authors he published, along with *collaudi* (probes) of Futurist poets. He also developed a theoretical approach to Futurist poetry in the prefaces to several poetry collections. Reading Marinetti's *misurazioni*, *commemorazioni, collaudi*, and prefaces together, one is struck by the fact that the life sciences have a much larger place in them than physics does (this can be construed as further evidence of the vitalist leanings of the Futurist world view). This affinity in Marinetti's writing (to take him as an example, for it was very widespread) was an effect of a new answer that the philosophers and cultural theorists of his time had provided for the question concerning which science's *Weltbild* descibed the world in the more profound manner. Until the end of the nineteenth century, European thinkers would have answered "physics." That changed in the late nineteenth century, as a result of Charles Darwin's research. Thinkers came to conceive of the universe on a biological model and, indeed, to view it as a biocosmic reality. Increasing numbers answered that question by saying, "biology."

A central notion in the Futurist conception of science is that of "synthesis," and one of the more extravagant bio-scientific syntheses they proposed was the possibility of effecting a spiritual fusion of humanity with the machine and of turning the machine to the purposes of spiritual evolution; this would bring forth a new era and a new human whose spiritual being would be at one with machinic dynamics. In Marinetti's writing, alchemical references to the power of fire, volcanoes, and incandescent matter abound—for him, alchemy was a way of conjuring a new man, akin to a poetic eugenics. The Futurist concept of "synthesis" was an aesthetic analogue to the eugenic theories developed in the life sciences—or rather an aesthetic analogue to the eugenic theories promulgated in the life sciences of the time, but purged of pernicious scientific beliefs about miscegenation resulting in imbecility or about the races infecting one another through crossbreeding. However misguided it might have been, the Futurists' poetic eugenics was wholeheartedly positive towards life and diversity—and these values were entailed in their affirmation of change.[191]

Marinetti carried his Nietzschean ideas about the new man well beyond anything that the original proponent of the *Übermensch* would ever have endorsed.[192] He believed that the new human would be the

> enemy of books, friend of personal experience, pupil of the Machine, relentless cultivator of his own will, clear in the flesh of his own inspiration, endowed with the feline power of following scents, with the ability to make split-second judgments, possessing those instincts typical of the wild—intuition, cunning, and boldness. The children of this present generation, who live out their lives between cosmopolitanism, the tide of trade unionism, and the flights of aviators, are like preliminary sketches of this extended man we are preparing.[193]

This new extended man, a "pupil of the Machine," will evolve superior powers of intuition and augmented noetic capabilities.[194] Anthroposophy shared many fundamental convictions with Futurism, and those similarities help explain the Futurists' peculiar views on evolution. Anthroposophists argue that the spiritual dimension is all-pervasive, animating all of life's dimensions. The dynamics of nature, the unfolding of history, and technological mechanisms are all animated by spiritual forces.

The convergence of political, biological, and (covertly) esoteric themes we see in Futurism was common, even in official documents, in the years leading up to the Second World War (and into the war years). And the ideas that arose through this convergence in turn became increasingly widespread over time: positions advocated by vanguard groups in the first two decades of the century were, by the 1940s, being embraced by some more radical strains in mainstream culture (and this includes the Futurist ideas on evolution and the future of "man"). Take this text from the April 1940 "Race Exhibition" in Rome, sponsored by the Ministry of Education:

> The rise of Fascism has opened a new era of greatness for the Italian people, a greatness which finds its truest expression not only in the physical renewal of the race, but above all in the spiritual strengthening of the race. Under the guidance of the Duce, the race is returning to its role as the center from which a new civilization and a new social organization shine forth.[195]

These views entered the mainstream of Italian culture some years after Futurism was founded. Yet they had become explicit in Futurism only in the 1930s, decades after its founding (and it is certainly important to be aware of which themes animated Futurism at the outset and which themes were later additions). Nonetheless, taking into account the influence of esoteric groups in Italy before Futurism was founded, in its incipience, during the period in which it flourished, and after it foundered results in a picture of Futurism that is significantly different from the common conception—subsequent developments, by revealing the telos of a historical phenomenon, can often tell us about its implicit character. Marinetti's ideas on "extended man" (expressed above) were the basis for an irrationalism that readily connected with the widespread interest at the time in identifying and cultivating a higher noesis.

Ettore Martinoli (1895–1958) was a link between earlier interests in Anthroposophy and those of the Fascist era. His writings indicate how ideas about purification, evolution, and the "new man" that developed prior to or in the early years of Fascism later allied themselves with the Fascist cause.

Martinoli, a lawyer from Trieste, was the founding secretary of the Anthroposophical Society in Italy (established in 1931), and he continued to promote Steiner's work throughout the Fascist period, publishing a lengthy

celebration of Steiner and Anthroposophy in a prominent Fascist journal in 1943. In keeping with Anthroposophy's evolutionary strain, that article explicitly evokes the theme of the new humanity: the goal of the "Jewish conspiracy" is "world domination," it declared, while Fascism fights to "liberate the world" from the Jewish menace and thereby "purify" it. That cleansing would pave the way for "a new humankind."[196] Martinoli was an active Fascist from the movement's beginnings in the wake of the Great War, as well as an enthusiastic supporter of the racial laws promulgated in 1938. He was the director of an anti-Semitic institute in Trieste, the Centre for the Study of the Jewish Problem, and later served as chief of the press and propaganda division in the Fascist racial bureaucracy.[197] He praised Fascism effusively, referring to Mussolini in 1940 as "the genius of the millennium."[198] Like other Italian Anthroposophists, he stressed the spiritual dimension of Fascism, making it a centrepiece of his work. He was a member of the editorial board of the Milan-based Fascist monthly *Tempo di Mussolini*, and he published extensively on spiritual themes (and especially on Fascist mysticism).[199] He was a prominent participant in the School of Fascist Mysticism in Milan.[200] He took part in the February 1940 National Conference on Fascist Mysticism and gave a presentation on the importance of mysticism to the Fascist revolution.[201] The fact that there existed a School of Fascist Mysticism is telling; established in 1930, it was a conspicuous promoter of Italian Fascism's tacit spiritual doctrines. The school and its journal *Dottrina Fascista* enjoyed vigorous support from Mussolini.[202] In 1938 it began offering a series of courses on racial education, besides publishing works on Italian and German racial laws.[203]

In 1940, Martinoli published a book on Fascist mysticism, *Funzione della mistica nella rivoluzione fascista* (The Function of Mysticism in the Fascist Revolution), which, though it made no explicit reference to Steiner, offered many Steinerian ideas and relied heavily on Steiner's vocabulary.[204] In it, Martinoli described "Fascism as a spiritual fact . . . a counter-attack of the spirit against the materialism of the nineteenth century."[205]

Other Anthroposophist authors adopted stances similar to Martinoli's. One was the writer, journalist, art critic, and race theorist Aniceto del Massa (1898–1975), a prominent figure in Florentine artistic circles. Del Massa, who had served in the Great War, leaned towards Fascism from its early days. By the early 1920s he was also a student of Steiner's "spiritual science."[206] After 1923, he collaborated with his fellow esotericists, who included the uncompromisingly anti-egalitarian, anti-liberal, anti-democratic, hypermasculinist, and arch-conservative Julius Evola (1898–1974), as well as the mathematician, Freemason, founder of the Gruppo Theosofica Roma, neo-Pythagorean esoterist, and (like Evola) arch-conservative Arturo Reghini (1878–1946). Reghini's great ambition was bring forth a new society that would synthesize

the ideals of the Classical Roman imperium and the Pythagorean sodality. Though he possessed a degree in mathematics from the University of Pisa, his Pythagoreanism was of the occult variety: he was initiated into the Order of Memphis and Misraim in Palermo in 1902, played an important role in the 1905 founding of the *Lucifero* lodge in Florence, was inducted into the *Schola Italica* (which claimed direct descent from Pythagoras's original circle) in 1910, and took part in the esoteric Ur group in the late 1920s.[207] Del Massa also participated with Martinoli in the Centres for the Study of the Jewish Problem in the early 1940s, and in 1944, he brought out a collection of anti-Semitic works.

Among the foremost Italian Anthroposophists in the second half of the twentieth century was Massimo Scaligero (1906–1980), who, during that period, was widely admired among Anthroposophists in Italy and internationally and the author an autobiography, *Dallo yoga alla Rosacroce* (Of Yoga According to the Rosicrucians).[208] After Scaligero's death, Fausto Belfiori edited a series of volumes containing reverential encomia to Scaligero authored by Scaligero's followers; and in December 2006 the Italian Anthroposophical Society held a conference in Trieste to honour the life and work of Italian Anthroposophical leader on the occasion of the hundredth anniversary of his birth.[209] Seldom mentioned, however, are Scaligero's voluminous publications from the Fascist era.[210]

These writings are deeply aesthetic—but their aestheticism is connected with utopian dreams of cultural renewal, rooted in vitalist (Spencerian) notions about the value of creativity. Scaligero devoted himself to the project of creating the new age and the new man (again, the gender-specific noun is appropriate here). He expressed his racist aesthetic utopianism in the following (not atypical) passage:

> Fascism, constructing an aerial bridge between culture and life, ennobling thought with the virility of action, has from the very beginning created a substantially new aspiration for the formation of the race. Since for Fascism there is no separation between knowledge and labour, culture must necessarily become the deepest formative force of the ethnic element. In the midst of the muddled contrast of scientific sterility and spiritual subversion which afflicts the modern world, Fascism is creating the possibility of a new era in which we see a revival of beauty, wisdom, and a new poetry, together with creative thought, the rainbow-coloured freshness of images and actions that are not contaminated by rhetoric [compare this with Marinetti's remarks on the constricting effects of syntax when advocating for *parole in libertà*]; this creative sense of culture, which is style and way of life, constitutes one of the essential principles of our racism.[211]

These themes were well received—and their esoteric background hardly stirred concern among the authorities.[212] Scaligero even proposed the Aryan

race as the salvation of humankind (they would be the humans for the new age)—and the Jews as its adversary:

> What is needed today is an understanding of the profound difference that separates Mediterranean man (Minoan-Mycenaean-Hellenic-Italic) from Semitic man (Phoenician-Chaldean-Assyrian-Hebraic). For centuries, they battled one another in the ancient Mediterranean, using a range of weapons. A man of the Mediterranean type recapitulates in himself the hero and the priest, he bears the "Apollonian" spirit, the classic spirit, the "solar" spirit [I have highlighted several times the theme of solar mysticism in Futurist writing]; while Semitic man is the merchant, the nomad, the invader, the bearer of obscure "Telluric" cults and of a religion of sensualistic-individualistic sort…These perennial racial values that are Italian—both in the sense of civilization and in a strict biological sense [note this linking of the social and the biological]—have resurfaced in the heroic spiritual climate of the Great War and the Fascist Revolution: Today, through the new racist campaign, they drive towards the fertile union of the Aryan sub-races and provide for the unified and holistic reconstitution of the ancient inextinguishable "solar" race [this reinforces his commitment to solar mysticism].[213]

Nearly every reader, I imagine, might be ready to acknowledge that evolutionary ideas played a major role in the Futurist world view—and some are likely ready to acknowledge that the version of evolutionary theory the *futuristi* embraced was an occult version of Lamarckism (connected to pernicious race-theoretical notions). Far fewer, I think, would be inclined to consent to the claim that from the outset, Futurism incorporated alchemical themes, and that Marinetti's "Fondazione e Manifesto del futurismo" itself contains allusions to alchemy. Yet I think it does—indeed, I believe it contains a staggering mixture of evolutionary and alchemical ideas. To show that, I first make some remarks about evolutionary themes in "Fondazione e Manifesto del futurismo." Leading up to the car crash that the *fondazione* section recounts, Marinetti, as we have seen, tells us that "here and there a sickly lamplight, behind the glass of a window, taught us to despise the errant mathematics of our transitory eyes."[214] I have stressed that Marinetti's manifestos must be read as prose poems—nevertheless, I take this remark literally. I believe he is telling us that human eyes, as they were in October 1908 (the actual date of the car crash), were inadequate to the new realities of speed and light—travelling at high speed, along a road lit by the incandescent lamps of automobile headlights, they couldn't make out the road ahead. Lamarckian evolution would have to produce new eyes that could see the new reality—eyes in the form they were when Marinetti wrote this text would have to perish, and new eyes take their place.

Marinetti consorted with the Symbolists in Paris, and some of the Symbolists were knowledgeable about alchemy. It would be hard to imagine he

wasn't exposed to alchemical ideas, especially given his Orientalist leanings (many believe, and even the name suggests, that alchemy originated in the Middle East). Alchemical allusions first appear in Marinetti's writing in the Symbolist works he produced in Paris and soon after, when he was back home in Milan. Three early works by Marinetti—the collection of his Symbolist poetry, *Distruzione* (The Destruction, 1904), his Symbolist-Futurist novel *Mafarka le futuriste: Roman africain* (1909), and the Futurist manifesto "Uccidiamo il chiaro di luna!" (1909)—call on the sea to destroy the *passatismo* associated with the backwards-looking classicism of the Italian tradition: essentially, they ask for *ablutio* (ablution), the alchemical stage in which impurities (in this case, *passatismo*) are washed away.[215] In this process, the subject is separated into opposing principles, which are then brought together (alchemists used the term coagulated, Futurists the term synthesized) during the stage of *rubedo*, in the *coincidentia oppositorum*, the fusion of opposites. For the alchemist, this involved fusing male and female, *soma* and *psyche*, whereas for the Futurists, it resulted in spiritualizing matter (through a *coincidentia oppositorum* that brings matter and spirit into an identity) and (if I may be permitted so hideous a term) psychicalizing the machine (that is, endowing the spiritualized machine with intelligence). Note that they did not believe that the machine would become non-material, only that it would take on spiritual (*geistig*) attributes as it became intuitive and intelligent. It is worth pointing out in this connection that the "wisdom-tradition" writer Titus Burckhardt (1908–1984) interpreted *albedo* as the end of the lesser work, corresponding to a spiritualization of the body.[216] Both *Mafarka le futuriste* and "Uccidiamo il chiaro di luna!" (Let's Murder Moonlight!) suggest that the destruction involved in the separation of the contrasting principles results in regeneration, and I believe that idea is implicit in the "Fondazione e Manifesto del futurismo."

There is yet more direct evidence. A remarkable number of literary works offering male birth appeared in the last decade of the nineteenth century and the first two decades of the twentieth. The most famous example, surely, is Guillaume Apollinaire's astonishing play *Les mamelles de Tirésias* (written in 1903, it was first presented in 1917). In that work, Thérèse, a woman who doesn't relish the duties of women and balks at the restrictions placed on them, relinquishes her breasts (which rise into the heavens as coloured balloons) and becomes a General Tiresias in Zanzibar. Her husband, through sheer willpower and the desire to repopulate France, gives birth to 40,049 babies, while a citizen of Zanzibar watches, quite unmoved. Another example is Marinetti's "African" novel *Mafarka le futuriste: Roman africain* (Mafarka the Futurist: An African Novel, first published in French in 1909 and in Italian, as *Mafarka il Futurista*, in 1910). Marinetti's novel is his lively response

to Gabriele D'Annunzio's declaration of his *passione africana* (African passion)—and its pornographic features make it a powerful satire. Indeed, so scandalous was Marinetti's novel that the authorities prosecuted it three times for obscenity and for affronting public morals. At the first trial, Marinetti was acquitted; at the second trial, he was given a two-and-a-half-month suspended sentence (his wealth having enabled him to buy his way out of prison time); at the third trial, that sentence was confirmed. The novel's most offensive feature was that Marinetti endowed the novel's protagonist, the despotic King Mafarka el-Bar, with an eleven-meter-long penis, which he wrapped around himself when he slept. Mafarka is an Egyptian dictator who commands thousands of black prisoners. In one troubling scene, the despotic king's men rape the captured African women. The men, the text tells us, fuse into one drunken mass, forcing the African women into the ground, until they merge with it: "It was a fantastic pressing machine of yellowish bodies heaped up in pyramids and collapsing as they exuded their juices like monstrous olives under the burning cogs of the solar wheel [yet another allusion to solar mysticism]."[217] The African women's bodies seem one with the soil—and remarkably, merging with the soil initiates putrefaction: "You saw the lithe glistening bellies of the young women, and their little breasts the colour of burnt coffee, writhing with pain under the heavy fists of the males, whose loins of bronze threshed tirelessly up and down amid the churning dance of putrefaction." Earth or mud is a common alchemical symbol for the *materia prima*, which must be located before transmutation can begin—once it has been, putrefaction starts (that process is often represented as a burial).

The preceding references to she-Mafarka highlight another alchemical thread in the novel: Mafarka is the rebis—the thing again, the *res-bis*, the double-thing, male and female. Mafarka is an aggressive womanizer whose exaggerated sexual drive often turns into sadistic violence, but at the same time Mafarka is motherly, with tender and nurturing feelings towards his younger brother as well as his newborn son. Mafarka is suffused with feminine feelings. Thus, King Mafarka gives birth to a child through his sheer willpower—and by drawing on diverse formations of knowledge, from alchemy to theories of evolution. It is because he is the *res-bis* that he can, without the cooperation of any other human, give birth to Gazourmah. Despite the perverse availability of the African women, Mafarka gives birth to a child all by himself. He (really she-Mafarka) is overwhelmed with feelings of "fecundation" and falls into an "icy, bluish, pristine sleep."[218] Soon afterwards he finds himself allowing an ideal egg he has been harbouring to be fertilized by the sun (another solar allusion).[219] The scene of she-Mafarka being penetrated by the rays of the he-sun is likely based on Marinetti's recollections of his Sudanese childhood.[220]

Gazourmah is the product of the copulation of Mafarka, the father, and the sun. The sun was also a male symbol in alchemy, so here copulation is between male principles (confirming our earlier comments about the dream of Futurist esoterists, that evolution would carry humanity beyond the need for women).[221] Just before the birth of his son, Mafarka remarks, "You must come out of us so as to take hold of matter and change it to our fancy. So we can shape everything around us and endlessly renew the face of the earth. Soon, if you will appeal to your will, you will give birth without resorting to the woman's vulva."[222] The details of the birth involve numerous extraordinary alchemical allusions. Gazourmah represents the Young Prince: he is a metallized bird-man—that is, his being fuses matter (metal) and spirit (his bird nature)—who was conceived through the intervention of the life-giving (that is, vital, male) African sun. Gazourmah has a black face, and perhaps even more striking, he is a machine, an airplane, to be precise—that he has a solar face suggests the alchemical phase of negredo, while being an airplane invokes the idea of volatization, understood in alchemy as the sublimation of aerial elements during distillation (accomplished by the element of fire), a process that is symbolized by things that fly (including the Eagle, the Vulture, and the Flying Dragon). Gazourmah spreads the wings of an airplane, which enable him to produce "total music" made from factory noise or the sounds of traffic.[223] He represents the new race: he is at once Mafarka's son and a new, futuristic superhuman being, who ultimately renders his father Mafarka superfluous. The evolutionary implication of this is that with Gazourmah's birth and development, the old race has been made obsolete and the new race has taken over; its alchemical implications concern self-transformation. Although the super-baby's face has the features of a black male, Mafarka—whose own "face was the colour of beautiful terra-cottas," and who scorns and humiliates black people—finally comes to adore his son as a deity.[224] Then the son kills the father (as Marinetti attempted to abjure his artistic fathers, *i Simbolisti*) and rejects Mother Nature/Mother Moon—in any event, this death was fated because the father allowed himself to become feminized. Gazourmah then is free to fly off towards the future.

Marinetti's alchemical references continue into his Futurist writings. The "Fondazione e Manifesto del futurismo" offers many alchemical allusions:

> "Let's go!" I said. "Let's go, my friends! Let's leave! At last mythology and the mystical ideal have been superseded [mythology and the Mystic Ideal are evoked to suggest the old idea of the transcendent]. We are about to witness the birth of the Centaur [a hybrid form, resembling the human–machine amalgam], and soon we shall see the first Angels fly! [Remarkably, Marinetti, in discussing industry, invokes the idea of angelization: we will witness the *first* flight of angels, he suggests, because at last a real means for transcendence has been

> achieved, the motor. But in describing these new intelligent beings as capable of flight, he connects this evolutionary notion to alchemy: *volatilized* is a key notion of alchemy, related to spiritualization.] . . . We have to shake the doors of life [the portal to a new domain is prominent in alchemical iconograpy], to test their hinges and bolts! . . . Let's leave! Look! There, on the earth, the earliest dawn! Nothing can match the splendor of the sun's red [*rubedo*] sword, skirmishing for the first time with our thousand-year-old shadows! [The shadows suggest an age-old darkness. In alchemy, the stage of *rubedo*, or redness, follows the stages of *negredo*, of blackness, and *albedo*, of whiting through the process of *ablutio*. Furthermore, the "splendor of the sun's red sword" is redolent of solar mysticism.][225]

The tract's description of the muck the car plunges into, its allusions to burying people in mud, and to floods ("like villages on holiday which the flooding Po suddenly strikes and uproots, dragging them all the way to the sea, over waterfalls and through gorges"), its references to the power of fire ("Alone with the stokers who bustle in front of the boilers' hellish fires in massive ships; alone with the black specters who rummage in the red-hot bellies of locomotives launched on insane journeys"), to bird-men ("soli cogli ubriachi annaspanti, con un incerto batter d'ali, lungo i muri della città" [alone with drunkards who flounder alongside the city walls, with the beating of uncertain wings]), to incandescent matter ("large double-decker trams . . . shimmering with multicolored lights"; "red-hot iron of joy!"; "shipyards burning under violent electrical moons"), all articulate alchemical allusions.[226] The "Fondazione" section describes Marinetti flipping his car into a ditch and then offers this lyrical comment:

> Oh! Maternal ditch, nearly full of muddy water! Fair factory drain! I gulped down your bracing slime, which reminded me of the sacred black breast of my Sudanese nurse . . . When I climbed out, a filthy and stinking rag, from underneath the capsized car, I felt my heart—deliciously—being slashed with the red-hot iron of joy! . . . And so, our faces covered with the good factory slime—a mix of metallic scum, useless sweat, heavenly soot—our arms bruised and bandaged, we, still fearless, have dictated our first intentions to all the *living* men of the earth.[227]

As noted earlier, earth or mud is a common alchemical symbol for the *materia prima*. But alchemy also involves the symbolism of seven metals, which are associated with seven planets and seven stages of self-realization. These facts explain why the muck in the above passage is "good factory slime" and why Marinetti mentions he emerged stinking (that is, undergoing putrefaction). The alchemical stage being described here, that of *negredo* (which involves blackening, often depicted as being buried in the ground), leads to the stage of *rubedo*, which involves separating and isolating components (by dissolution

and filtration) and then discarding unworthy material—this might be why the soot that covered his face was celestial in effect. The remark, point 6 in the "Manifesto" section, that henceforth "poets must do their utmost, with ardor, splendor, and generosity, to increase the enthusiastic fervor of the primordial elements" is equally alchemical.[228] Even the transforming agents Marinetti refers to near the end of the manifesto can be identified as alchemical processes: "Go ahead! Set fire to the shelves of the libraries! [Fire is an agent of alchemical transformation.]…Turn aside the course of the canals to flood the museums!…Oh, the joy of seeing all the glorious old canvases floating adrift on the waters, shredded and discolored!" [Ablution results in separation—the alchemical allusions explain why fire and water are—peculiarly—the agents of transformation.][229]

The manifesto's many allusions to electricity and energy further these occult allusions: "domes starred like our spirits, shining like them with the prisoned radiance of electric hearts"; "And like young lions we ran after Death, its black hide stained with pale crosses, running across the vast livid sky, alive and throbbing." So does the reference to the *ouroboros* (an alchemical symbol): "I spun my car around as frantically as a dog trying to bite its own tail."[230] So does the reference to logic's inadequacy and the leap beyond logic: "and there, suddenly, were two bicyclists right in front of me, cutting me off, as if trying to prove me wrong, wobbling like two lines of reasoning, equally persuasive and yet contradictory. Their stupid argument was being discussed right in my path…What a bore! Damn!"[231] And so does the statement (quoted above) that "time and space died yesterday. We already live in the absolute, for we have already created velocity which is eternal and omnipresent."[232]

Marinetti continued to deploy alchemical images in later writings. In "ZANG TUMB TUMB" (1914), the birth of Futurist poetry is initiated by a train ride through the lava of the volcano Etna—lava represents the alchemical element of fire (Parcelsus described alchemy as "the gentle acceleration of growth through the use of the fire of nature"); moreover, this poem suggests that a fusion of opposites—train (metal) and fire—gives birth to a new consciousness (a new poetry). Marinetti reinforced that connection within the year by writing of Futurism as "that great mass of incandescent metals that we have extracted with our bare hands from the depths of a volcano"—this image fuses the alchemical symbols of fire and metal, and does so in a manner that the alchemists would have recognized.[233] There is more: the "Train Full of Sick Soldiers" section of "ZANG TUMB TUMB" describes the lead-up to that generative moment as emanating the "fecal odor of dysentery + the honeyed stench of plague sweats + smell of Ammonia," which suggests that the birth was the result of putrefaction (and, subsequent to that, purification [Ammonia]), a common alchemical *topos*.[234]

The writings of a political theorist and sex magician whom I mentioned earlier, Julius Evola, help elucidate the connection between alchemy (and occult thought in general) and Futurism. His ideas constituted an important underground current among modernity's discontents in the early twentieth century: the Futurist Arnaldo Ginna wrote a short article on him, "Brevi note su Evola nel tempo futurista" (Short Note on Evola in the Time of Futurism).[235] Among today's right-wing factions dismayed by modernity, Evola still holds influence. His ideas have been absorbed by Donald Trump's philosopher Stephen Bannon (b. 1953); the Greek neo-Nazi party Golden Dawn, which includes Evola's books on its lists of recommended readings; and Jobbik (Movement for a Better Hungary), a far-right political party.[236]

Evola in his political writings argued that the purpose of the state is not to serve or represent the people, but to house a link (normally embodied in a divine king, or in an Order of Initiates) to the transcendent, which he conceived as an impersonal source of power. The link creates the state. It even creates the people, from the population that assembles spontaneously around it. He also advocated for all expressions of the essential self, even if they sometimes conflicted with mere self-preservation. He derived this idea of the priority of expression over self-preservation from his beliefs about immortality. Human beings, according to Evola, are not naturally immortal: a shadow of the dead might persist as a ghost for a while, but, for most people, the soul is reabsorbed by the collective spirit of the folk. Another figure who believed in collective but not individual immortality was Alfred Rosenberg (1893–1946), who was the principal author of the National Socialist race theory and the most cogent advocate for their idea of *Lebensraum* (which provided support for their ideas on race), and who played a key role in working out the mechanics of their opposition to *entartete Kunst* (degenerate art). Rosenberg, however, was not troubled by the idea that the individual soul is not immortal, while Evola was. Evola's concern with personal immortality led him to adopt a theurgical stance in politics—and he proposed political rituals designed to produce personal immortality. Evola's *The Metaphysics of Sex* (the title was patterned on Schopenhauer's "The Metaphysics of Love") and *The Yoga of Power* distinguish between two ways of using sexual energy, which he (somewhat amusingly) refers to as "horizontal" and "vertical." This difference relates to whether sexual energy is used to continue the flattened plane of existence or as part of a quest for the transcendent. Used in the horizontal fashion, sexual energy produces children; used in the vertical fashion, it seeks to create the immortal physical body, which is the apogee of self-divinization.

Evola recognized, too, that the quest for personal immortality might conflict with the body's interest in prolonging its form of life. To become immortal, he believed, the spirit must separate from the body in a conscious

state. It can then be fixed with a preservative and thereby lose the ability to die. The result is the Philosopher's Stone, which it is the goal of alchemy to make appear. Meditation can do this—Evola makes that spiritual quest seem like something that St. John of the Cross might have experienced after taking a hallucinogenic agent. The other path is to harden the self through heroic action. Any acute stress can transform the daemon of the hero into an immortal body of light. Athletics can do this. So can the shock of death. In any case, the adept must be absolutely indifferent to the consequences of his actions—self-preservation is not among his goals.

Evola's work helps us understand the connections between spiritualism, evolutionary theories, the hierarchical political theories of the European right, and Futurist image *topoi*. The arcane historiography that underlies all of these is based on a cyclical view of time and on the belief that history moves through cycles of cataclysm and regrowth.[237] The rebirth and development of a civilization is steered by astral forces: the energy of past events (which is conceived in terms redolent of electromagnetism) is stored on the astral plane, where it forms a sort of historical archive, and this energy influences those males (of course) who have the spiritual power to open themselves to them. Those open to the transcendent, whom Evola describes as the Children of the Sun, are pagan and white. Evola's stress on openness to the traditional plan that guides a civilization is the reason he and his followers refer to his political philosophy/philosophy of history as Traditionalism. But soon the tradition's power begins to erode, as people become increasingly concerned with material existence and less concerned with the transcendent. Civilization declines from solar (masculine) civilization to a lunar (feminine) civilization. (I have commented on the prevalence of solar/lunar imagery in the Futurist imaginary.)

Futurism's evolutionary theory likewise reflects a quest for personal immorality, achieved through a sort of angelization, as matter becomes thoroughly pneumatic, though without becoming immaterial.

## FUTURISM, ELECTROMAGNETISM, AND THE ISSUE OF HOMOLOGIES

The technologies of an era shape cultural expression. Electrotechnics, the human use of electromagnetic phenomena to intervene in nature, launched a new era in cultural history. In keeping with philosophical convention, I call this new age the postmodern age. The modern era begins with the Renaissance, with moveable type (1450) and industrial technology, and its cultural expression was marked by a quest for a verisimilar, naturalistic art. Two momentous discoveries just a few years apart are sometimes taken to have marked the beginning of the postmodern age: the first was Galvani's publication in 1792 of his discovery that a form of electric current could cause

the muscles in a frog's legs to contract; the second was Volta's invention of the Voltaic pile.

But it was only in the later part of the nineteenth century (around 1860, Renato Barilli suggests) that this new era began to manifest itself as an intellectual and symbolic force. Given that they were separated by more than six decades, is it possible to maintain that the material and the symbolic strata of culture were connected? That connection must be maintained if we want to argue that the characteristics of postmodern art are connected to electrotechnics. Barilli's *L'alba del contemporaneo. L'arte europea da Füssli a Delacroix* (1996) and *Scienza della cultura e fenomenologia degli stili* respond brilliantly to this problem. Barilli's first tack is to deny that six decades separate the first developments in electrotechnics from the first evidence of changes in culture's symbolic stratum. He does this by offering a staggering insight: the first artists whose works reveal an imagination (and technique) shaped by electromagnetism are William Blake (1757–1827) and the Swiss-English painter Henry Fuseli (German: Johann Heinrich Füssli, 1741–1825). Blake he astutely describes as a "prophet of the wave of energy in human beings about to appear in all expressive graphic and literary forms."[238] In *The Marriage of Heaven and Hell* (1793), among the densest and richest of his wondrous prophetic books, Blake avers that "energy is the only life and is from the Body and Reason [for Blake, a confining agency] is the bound or outward circumference of Energy. Energy is Eternal Delight." Blake wrote this, Barilli notes, at just the moment when nascent discoveries in electrology were appearing with greater frequency.

The visuals of the modern period, from the Renaissance to the final decade of the eighteenth century, were dominated by the idea of drawing bodies by projecting rays from the object onto a two-dimensional plane. Barilli notes,

> Perspectival distance is an integral part of this visual concept insofar as the term *perspectiva* indicates seeing from a distance, crossing an empty medium, and seeing that does not disturb or present obstacles, whether physical or theoretical; conversely, it may also encounter obstacles since space is filled with physical particles, atmospheric gases, and clouds, but in this case, they too become objects that reflect visual rays. The mirror and the *camera obscura* are natural guarantees of the validity of a similar type of "reflection," of representing reality, to which both the theories of artists from Alberti's time onward and "machines," the technological inventions coming to photography and its derivatives, make reference.[239]

Barilli's discussion of the transformation of visual form in the era of electromagnetism can be seen as a brilliant extension of Heinrich Wölfflin's historiography of visual art, which discerned a cultural transformation that occurred as the Renaissance era gave way to the Baroque (*Barock*). Wölfflin

analyzed this cultural shift by identifying differences between the formal properties of works belonging to the Renaissance by comparison with those of works belonging to the Baroque era and by examining what those formal changes suggested about the differences in the world views of the two periods. Among the formal changes he discerned is that linear forms were replaced by painterly forms. In linear art, exemplified in Renaissance art, the boundaries of each element are definite, clear, unviolated. Moreover, each figure is evenly illuminated and stands out boldly like a piece of sculpture—there is no *chiaroscuro*. In painterly art (Baroque art), by contrast, the figures often overlap each other and, because the lighting is not even, because the painter often makes use of *chiaroscuro*, light, shadow, and colour become dominant, often overwhelming contour; thus the figures often merge with one another and *compenetrazione* occurs.[240]

Barilli's commentary on the transition from perspectival art (the art of the modern era) to electrotechnical art (the art of the postmodern era) has parallels with Wölfflin's analysis of the shift that occurred between the Renaissance and the Baroque periods. For one thing, Barilli's method proceeds from identifying changes in the formal properties of work belonging to the modern and to the postmodern era to inquiring into the paradigm shift those formal transformations suggest. For another, Barilli's characterization of those formal changes draws on Wölfflin's identification of the formal changes that took place between the Renaissance and the Baroque period (though his discussion of the matter of which features belong to which era is complex and nuanced). Central to Barilli's method is the conviction that a new discursive regime calls for different forms. Barilli identifies those mandated by electrology with real lucidity:

> Now the concept of the mirror wanes. Humans "know" by sending into the atmosphere beams of concentric waves that quickly envelop objects, constantly changing the point of view and superseding that logic by substituting it with another in which "the centre is everywhere" and three-dimensional objects are physically present, ready to be manipulated. The *perspectiva*, or seeing from a distance, is eliminated completely and no longer needs to be replaced with equally illusory systems because it is the very principle of long-distance simulation that is eliminated. On the other hand, a similarly ubiquitous presence of three-dimensional objects, owing to the possibility of enveloping them with wave trains, acquires a dematerialized quality. In a sense, it is difficult to say whether the objects themselves are physically perceived or are instead "thought" or evoked almost magically. This also falls in with the processes designated by the term "the death of art," understood as the end of the technical, artisanal principles that, in the past, led painters and sculptors to produce images with the aid of graphic signs or patches of colour applied to a physical surface.[241]

The reconception of reality as fundamentally magnetic—or electromagnetic—had momentous implications for the arts. The *topoi* and tropes of the new discursive regime Barilli describes are evident in a remarkable text, "The Plastic Foundations of Futurist Sculpture and Painting," by Umberto Boccioni, which I quote from at length, offering interpolated commentary:

> When I say that sculpture must try and model the atmosphere, I mean that I want to suppress, i.e., FORGET, all the traditional and sentimental values concerning atmosphere, the recent naturalism which veils objects, making them diaphanous or distant like a dream, etc., etc. For me atmosphere is a materiality that exists between objects, distorting plastic values [this can be taken as expressing the idea of infinite plasticity and its connection to electromorphism—I have commented on the Futurist/electrological idea that reality is made up of energy fields (here, atmospheric forces that interpenetrate and reshape one another)]. Instead of making it float overhead like a puff of air (because culture has taught me that atmosphere is intangible or made of gas, etc.), I feel it, seek it, seize hold of it and emphasize it by using all the various effects which light, shadows, and streams of energy have on it. Hence, I create the atmosphere!
>
> When we begin to grasp this truth in Futurist sculpture, we shall see the shape of the atmosphere where before there was only emptiness [this is an allusion to the Newtonian idea of empty space, which has been done away with, since what was formerly thought of as empty space is now thought of as filled with "atmosphere"] or, as with the Impressionists, mist. This mist was already a step toward an atmospheric plasticity, toward a *physical transcendentalism* which, in turn, is another step toward the perception of analogous phenomena that have hitherto remained hidden from our obtuse sensibilities. These phenomena include perceiving the luminous emanations of our bodies, of the kind I spoke of in my first lecture in Rome, and which are reproduced in photographic plates [Boccioni affirms that bodies are really energy and that photographic plates register the energy emanating from bodies].
>
> Now this *tangible measuring* of what formerly appeared to be empty space [here Boccioni alludes to the transition from the Newtonian conception of space to the electromagnetic conception], this clear superimposition of new strata on what we call real objects and the shapes that determine them—this new aspect of reality is one of the foundations of our painting and sculpture. It should now be clear, then, why endless lines and currents [*linee o correnti infinite—correnti* is a term that has a special meaning in the theory of electromagnetism] emanate from our objects, making them live in the environment which has been created by their vibrations [this states the electrological notion that objects are vibrating fields of energy].
>
> The *distances* between one object and another are not just empty spaces, but are occupied by material continuities made up of varying intensities, continuities we reveal with perceptible lines that do not correspond to any photographic

> truth [neither Marey's chronophotography nor Bragaglia's photodynamism registers the differing intensities of energies radiating from objects]. That is why our paintings do not have just objects and empty spaces, but only a greater or lesser intensity and solidity of space [this states the new, electromagnetic conception of space as filled with energy].[242]

The provenance of these ideas is clear: it was the esoteric strain of Bergsonianism that dominated *fin-de-siècle* and early-twentieth-century culture. So Boccioni continues by reformulating Bergson's ideas on the cinematographic conception of movement:

> The charge that we are merely being "cinematographic" makes us laugh; it is vulgar idiocy. We are not trying to subdivide each individual image—we are looking for a sign, or better, a single form, to replace the old concepts of division with new concepts of continuity.
>
> Any dividing up of an object's motion is an arbitrary action, and equally arbitrary is the subdivision of matter. As Henri Bergson has said: "All division of matter into independent bodies with absolutely determined outlines is an artificial division," and elsewhere: "Every movement, inasmuch as it is a passage from rest to rest, is absolutely indivisible."[243]

This passage, together with the remarkable longer text just cited, written by Futurism's true theoretical genius, merits commentary. The statement suggests that the universe is a plenum, for "a materiality . . . exists between objects" and is affected by "streams of energy" that influence the shape of the "atmosphere." This atmosphere, he suggests, is nothing like that of the Symbolists, for whom it is a veil that makes objects appear "diaphanous and distant like a dream."[244] Boccioni's linking of what he conceives as atmosphere with luminous emanations from bodies gives additional reason to believe that the phenomenon he is describing is an electromagnetic field—this explains why he maintains that "endless lines and currents emanate from our objects, making them live in the environment [the electromagnetic field] which has been created by their vibrations." Boccioni also draws on one of the *topoi* of electromagnetic esoterism (one that can be traced back to Neo-Platonist metaphysics and, in fact, to emanationist metaphysics of various stripes): that the different levels of reality are formed of energy that has congealed in different measures. Thus, space—a plenum—is filled with materials (electromagnetic energy) of "different intensities." Boccioni even relates (in a manner consistent with electromagnetic theory) the *linee di forza* of Futurist painting to these varying intensities. He uses passages from Bergson to support this electromagnetic metaphysics—he understands that those passages can be construed as saying that reality is made up basically of varying intensities of energies and motion.

In fact, in this lecture, Boccioni implicitly makes a connection that other early-twentieth-century artists also made, between the phenomena of thought-forms and electromagnetic waves transmitted through the aether. Regarding the new sensitivity that results from rigorous spiritual and religious preparation (a theme of Annie Besant and C.W. Leadbeater's *Thought-Forms*), Boccioni states,

> Between the physical body and the invisible there is a space of vibrations that determine the nature of its action and dictates the artistic sensation. In short, if spirits wander around us and if they are observed and studied; if fluids of power, antipathy, and love emanate from bodies; if deaths are foreseen from a distance of hundreds of kilometres, if premonitions fill us with joy or annihilate us with sadness; if this entire impalpable, invisible, inaudible realm is becoming increasingly the object of investigation and observation—all this happens because in us a marvellous sense is awakening thanks to the light of our consciousness. Sensation is the universal garment of the spirit and it is now appearing to our clairvoyant eyes. And with this the artist senses himself in everything. By creating he does not look, observe or measure—he senses and the sensations that envelop him dictate to him the lines and colours that aroused the emotions that caused him to act.[245]

The ideas and motifs in this passage are extraordinarily close to those of *Thought-Forms*, but the fact that they follow closely remarks on electromagnetic phenomena suggests that Boccioni (like so many other artists from the early twentieth century) believed that thought-forms are electromagnetic events.

Boccioni's connecting what he conceived as atmosphere with luminous emanations from bodies demands further attention, as does his affirmation that "endless lines and currents emanate from our objects, making them live in the environment [the electromagnetic field] which has been created by their vibrations." For this remarkable passage has not been understood for what it actually is, which is a description of space and reality patterned on Michael Faraday's and James Clerk Maxwell's ideas on electromagnetism: in fact the Futurists' term *linee di forza* is a direct translation of Michael Faraday's lines of force, from his 1852 paper "On the Physical Character of the Lines of Magnetic Force" (historians of science generally agree that Faraday formulated the idea lines of force sometime earlier, perhaps as early as 1838)—the Futurists' *linee di forza* lay out the trajectories of influence, just as Faraday's lines of force describe the patterns of magnetic influence. At the very moment that Boccioni was writing this extraordinary text, these ideas were gathering themselves into a force that would transform the material and symbolic cultures of the West. That transformation would be the most momentous since Gutenberg.

Faraday's and Maxwell's findings were epochal. They unified the sciences of electricity, magnetism, and light. They predicted the speed of light

using purely mathematical means, but more important than that, they helped explain the nature of light—Maxwell was primarily responsible for this, and he did it simply by pulling together facts that previous scientists had discovered, giving them mathematical form, and showing their mathematical consistency. This framework brought an extraordinary array of phenomena together under one rubric: the signals in our nervous system, candlelight, lightning bolts, and the spark that passes between my hand and my oven door when, on a cold morning, I walk across the carpet in my slippers can now be explained through the same science as explains radio, television, and radar. Maxwell also showed that electromagnetic waves can be of any wavelength, from zero to infinity: the wavelengths from 0.4 to 0.75 microns comprise all colours of light, and above and below these frequencies are X-rays, infrared waves, microwaves, and gamma waves generated in the Large Hadron Collider, of a length about one one-thousandth of the diameter of an atomic nucleus. All of these wave forms are expanded or contracted versions of all other electromagnetic wave forms.

Many leading physicists opposed the new theory. Lord Kelvin, who had provided Maxwell with the initial clue to the new mathematical formalization, remarked that Maxwell had "lapsed into mysticism." Resistance abated after 1888, when the German physicist Heinrich Hertz was able to produce and detect electromagnetic waves that Maxwell's theory predicted. The telegraph, radio, television, and radar all stem from Faraday's and Maxwell's work. But the most profound change was a new paradigm of physical reality. Beneath what we think of as the "real" world of things we can touch or see there lies another: Beneath the apparent world of objects in space is a world of field quantities inaccessible to our senses. These field quantities, which exist in space and time, give rise to all the familiar forces we experience. Yet they are unavailable to ordinary sense experience. We cannot perceive them: all we can do is represent them using abstract symbols in equations.

Faraday's lines of force are related to the patterns formed when iron filings are spread evenly over a sheet of paper and a magnet is held against the paper. "Hast 'ou seen the rose in the steel dust / (or swansdown ever?)," asks Pound, that great pioneer (along with James Joyce) of electromorphic literature—and he continues: "so light is the urging, so ordered the dark petals of iron / we who have passed over Lethe."[246] In "Vorticism" (an earlier work, from 1915), he writes somewhat less poetically,

> An organization of forms expresses a confluence of forces. These forces may be the "love of God," the "life-force," emotions, passions, what you will. For example: if you clap a strong magnet beneath a plateful of iron filings, the energies of the magnet will proceed to organise form. It is only by applying a

> particular and suitable force that you can bring order and vitality and thence beauty into a plate of iron filings, which are otherwise as "ugly" as anything under heaven. The design in the magnetised iron filings expresses a confluence of energy. It is not "meaningless" or "inexpressive."[247]

In Pound's case, regarding its role in his great long poem (perhaps the greatest written in the English language in the twentieth century), it is clear that the influence of the magnet on the iron filings is an image of the Mystery that charges the material world and that orders it so as to manifest beauty. Pound's essay "Cavalcanti" observes that we "appear to have lost the radiant world, where one thought cuts through another with a clean edge [i.e., a world of *compenetrazione*]"; he continues with a vision of a paradisical realm, "a world of moving energies '*mezzo oscuro rade*,' '*risplende in sè perpetuale effecto*,' magnetisms that take form, that are seen, that border on the visible, the matter of Dante's paradiso, the glass under water, the form that seems a form seen in the mirror, these realities perceptible to the sense, interacting, 'a lui si tiri.'"[248] He contrasts this with the world of modern (I would have used the term postmodern) science:

> For the modern scientist energy has no borders, it is a shapeless "mass" of force; even his capacity to differentiate it to a degree never dreamed of by the ancients has not led him to think of its shape or even its loci. The rose that his magnet makes in the iron filings, [*sic*] does not lead him to think of the force in botanic terms, or to wish to visualize that force as floral and extant (*ex stare*). [Pound is absolutely right that the electromorphic realm is phytomorphic—and he is likely right that scientists, to whom I would add some new media artists, fail to see this.]
>
> A medieval "natural philosopher" would find this modern world full of enchantments, not only the light in the electric bulb, but the thought of the current hidden in air and in wire would give him a mind full of forms, "*Fuor di color*" or having their hypercolours [is Pound referring to electric forms or those of the *εἴδεᾰ*, or is he, as is likely, conflating them?]. The medieval philosopher would probably have been unable to think the electric world, and *not* think of it as a world of forms. Perhaps algebra has queered our geometry.[249]

The final sentence offers a knowing comment. Newtonians would have considered the patterns the iron filings form as showing the cumulative effects of the magnet acting individually on each particular particle—one would take each iron particle, one by one, and calculate the effect on it of the north pole and south pole of the magnet, taking into account the distance of the particle from each pole. That theory (and the computational methods it gave rise to) saw no need to take into account the complex of lines in the entire field. However, that way of approaching electromagnetism makes it difficult to establish why such clear patterns develop (and why there would be evident lines and spaces

between them). Faraday took note that filings arrange themselves (or, rather, are arranged) into curved lines of a particular character. He imagined that a force traced out invisible lines in the field, which the iron filings revealed (and, with the paper cited above, Maxwell confirmed that the force was transmitted along particular lines). For Faraday, a geometric imagination trumped an understanding that aggregated algebraic computations.

Between 1886 and 1889, while a professor at the Technische Hochschule in Karlsruhe, the physicist Heinrich Hertz (1857–1894) conducted experiments that offered experimental confirmation of Maxwell's theories. Maxwell's electromagnetic theory of light had postulated the existence of electromagnetic waves. Hertz took up the challenge of conceiving and constructing electrical devices that could produce and detect electromagnetic radiation (the most famous of these is known as the "Hertz resonator"). He was able to demonstrate that the pulses the apparati transmitted and received had to be electromagnetic waves, specifically, long-wave electromagnetic radiation, or radio waves—which for a period of time were commonly referred to as Hertzian waves. The device he used to prove this consisted of a spark-gap transmitter and a receiver made from a single loop of wire with a spark-gap on each end of the loop (this was placed in a dark box so as to make the spark more visible). The transmitter sent energy to the receiver, which responded with an induced current that produced a spark at a spark-gap. Hertz noted that the reaction at the second spark-gap was much greater than would be the case under the normal laws of the propagation of force (which predict a diminished action with increased distance). From this, he concluded that he was dealing with electromagnetic waves (just as Maxwell had predicted). Hertz wrote a series of papers about waves created by electricity, showing among other things that they move at the speed of light.

The discoveries Hertz announced in these papers were signal, though it seems he had little sense of their importance. He did not believe that Hertzian waves (later known as radio waves) would have practical application. Asked about the utility of his discovery of electromagnetic wave transmission, Hertz is said to have replied, "It's of no use whatsoever . . . This is just an experiment that proves Maestro Maxwell was right—we just have these mysterious electromagnetic waves that we cannot see with the naked eye. But they are there."[250] Asked what he thought would result from his discoveries, he responded, "Nothing, I guess."

Alfred North Whitehead, who probably went further than any other thinker in describing the shape of the postmodern metaphysics, wrote his doctoral dissertation on Faraday and Maxwell. In *The Concept of Nature* he notes, "As long ago as 1847 Faraday in a paper in the *Philosophical Magazine* remarked that his theory of tubes of force implies that in a sense an electric

charge is everywhere. The modification of an electric field at every point of space at each instant owing to the past history of each electron [the topic of this section of the book] is another way of stating the fact."[251] Furthermore, challenging the traditional idea that reality is made up of bounded objects whose substantial existence is confined within a circumscribed range of coordinates, he states, in *An Enquiry Concerning the Principles of Natural Knowledge*, "Time, Space, and Material are adjuncts of events."[252] That is, events, not objects (understood according to the traditional conception of them), are for Whitehead the more fundamental ontological reality.

In 1931, Albert Einstein characterized the epochal shift that had taken place in humans' understanding of reality: "Before Maxwell, physical reality was thought of as consisting of material particles . . . Since Maxwell's time it has been thought of as represented by continuous fields . . . This change in the conception of reality is the most profound and most fruitful that physics has experienced since the time of Newton."[253]

So it is hardly surprising that some artists thought favourably of the paradigm-shattering ideas that were appearing in the work of the founders of the electrological world view. (Furthermore, siding with rebel novelty against the hidebound interests of conventional thinkers ensconced in the academies is a stance that vanguard artists have always found attractive.) In this connection, recall Boccioni's statement that the "measuring of what formerly appeared to be empty space" served as a declaration of the Futurists' complicity with rebel science. And the connection between Boccioni's conception of space and lines of force and those of Faraday and Maxwell can be drawn even tighter. And since it can be done, it must be done, for what is at stake is the nature of space (a topic about which the Futurists made more than a few ringing declarations).

Interacting magnetic fields exert torsion on one another: they pull one field into another. Boccioni's *Forme uniche della continuità nello spazio* and *Sviluppo di una bottiglia nello spazio* show what happens. Understanding the Cubists' and (even more so) the Futurists' interests in electromagnetic field effects puts their interest in plasticity in a new light. I commented earlier on the impact that African American art had on Europe in the early twentieth century, and connected that impact to Stanley Crouch's idea of infinite plasticity. I remarked that African American art—especially jazz—made African and (through a peculiar field effect) some other "primitive" art seem modern, a part of the American century. It also highlighted that to be modern was to be involved with plasticity. Distortions of form seemed novel, fresh, and potent. Now we can see another reason for that sense of the novelty of plastic interests (evident in earlier and sometimes in archaic art, as well as in African American art): as Boccioni's art shows—consider his *Elasticità* (Elasticity, 1912), *Scomposizione di figura di donna a tavola* (Decomposition of a Female

Figure at a Table, 1912), *Studio per Forme umane in movimento (Dinamismo di un corpo umano; Muscoli in velocità)* (Study for Human Forms in Motion [Dynamism of a Human Body; Muscles at speed], 1913), *Dinamismo di un corpo umano* (Dynamism of a Human Body, 1913), *Dinamismo di un ciclista* (Dynamism of Cyclist, 1913) and *Forme uniche della continuità nello spazio* (Unique Forms of Continuity in Space, 1913) as well the remarkable but, unfortunately, no longer extant sculptures *Testa + casa + luce* (Head + House + Light, 1911), *Fusione di una testa e di una finestra* (Fusion of head and a Window, 1911), *Sintesi del dinamismo umano* (Synthesis of Human Dynamism, 1913)—such distortions are common in the electromagnetic realm—we can find convincing proof of that interest in plasticity in Balla's wonderful paean to the modern *Plasticità di luci × velocità* (Plasticity of Lights × Speed, 1913). Early and non-European art was viewed as postmodern because it had avoided the confining and historically bound limitations of Newtonianism-Gutenbergism and was already electromorphic, all the while preserving the traditional richness of cultures that had not succumbed to the Western valorization of reason.

## THE FUTURIST THEORY OF PERCEPTION

The Futurists' theory of perception held that just as there is a physical exchange between the energy nexus the mind represents as an object and the energies surrounding that nexus, there is also a physical exchange between the energies of the perceived form and the energy that animates perceptions (energies originating in the perceiver's body/mind). The Futurists (and Boccioni in particular) posited that any aspect an object presents has a destiny to become an affective image in the perceiver's consciousness. It realizes this destiny by struggling through the refractory medium of space to stimulate (or to become) the perceiver's nerve-energy. But the perceiver does not respond passively to data the senses present—Severini, adopting (and adapting) one of Bergson's claims, wrote that "to perceive is after all nothing more than an opportunity to remember."[254]

The affective image is a composite of past and present components, of remembered and perceived elements, and of energies arising in the area we ordinarily consider to be the perceiver's body interacting with energies from the area of space we ordinarily consider to be outside the observer. Even though their notions about perception drew on those of the Impressionists, the Italian artists argued that the French artists' ideas about perceptual effects were insufficiently radical. The Impressionists were interested in the momentary play of light reflected from the surface of an object and in the instantaneous effects that this bounced light had on the retina. The Futurists

recognized, however, that a retinal image does not decay instantaneously, and, consequently, motion is seen not as an object's successively occupying a series of distinct locations, but as a blur that represents the motion's trajectory. They concluded that since everything is motion ("Tutto si muove, tutto corre, tutto volge rapido"), and since our perception is simply the trace of change, what our senses grasp is a dynamic reality, not a static object or serial snapshots of an object. The next step in the argument strengthens the connection between universal dynamism and the cinema (considered here as an occult device): "Per la persistenza della immagine nella retina, le cose in movimento si moltiplicano, si deformano, susseguendosi, come vibrazioni, nello spazio che percorrono" (On account of the persistence of an image on the retina, moving things in movement multiply and are distorted, succeeding each other like vibrations in the space through which they pass).[255] The idea that Roget's phenomenon underpins the experience of movement was traditionally (though erroneously) used to explain how the cinema, which presents in rapid succession a series of still images, can seem to present movement: one image is superimposed on another, so whatever figure we apprehend is multiplied (*moltiplicano*), as are the legs of the woman and the dog in Giacoma Balla's *Dinamismo di un cane al guinzaglio* (Dynamism of a Dog on a Leash, 1912) or the legs in that most evidently cinematic canvas, *Bambina che corre sul balcone* (Girl Running on a Balcony, 1912). In the passage in "La pittura futurista: Manifesto tecnico" that lays out the Futurist notions of perception and space ("tutto si muove, tutto corre, tutto volge rapido"), Boccioni, Carrà, Russolo, Balla, and Severini (though it is almost certain that Boccioni was the principal author of this section) claim that the multiplication of forms produced by the persistence of vision turns experience into a vibratory phenomenon (which, no doubt, the authors believe reflects the truth about the reality of energy). Cinema is a privileged medium because its material conditions allow it to evince reality as multiplied and vibratory. Efforts to capture the perceptual mechanism that makes it possible for us to see motion in film resulted in two features of Futurist paintings stressed by Edward Aiken: the repetition of forms that is so central in Futurist art (and exemplified in the paintings just mentioned), and the evocation of simultaneity through superimposition.[256]

The temporal modalities of past, present, and future are not the only elements the affective image combines. Such imagery testifies as well to the unity of the subjective and objective poles—to the interaction of subject-energy and object-energy (the unity of what we ordinarily understand as actor and environment). Thus, as we have seen, Boccioni, Carrà, Russolo, Balla, and Severini stated in "La pittura futurista: Manifesto tecnico" that our bodies penetrate the sofa we sit on and the sofa penetrates us, and that we see on the cheek of a person we are talking to a horse passing a long way off. Boccioni

painted *La strada entra nella casa* (The Street Enters the House, sometimes referred to in English as The Noise of the Street Enters the House, 1911) on just this theme.

The Romantic poets and painters strove to accomplish feats of empathy whereby they could enter the inner life of objects around them. The Futurists' idea of perception extended the Romantic ideal of *Einfühlung* (empathy or intuition) by drawing even more closely together the subjective and objective domains: "We don't want to observe, dissect, or transpose into pictorial terms," Boccioni wrote. "We identify ourselves with the thing itself, a profoundly different affair."[257] Carrà contrasted Futurism with Cubism using these Bergsonian concepts:

> The Cubists, to be objective, restrict themselves to considering things by turning around them, to produce their geometric writing. So they remain at a stage of intelligence which sees everything and feels nothing, which brings everything to a standstill in order to describe everything. We Futurists are trying, on the contrary, with the power of intuition, to place ourselves at the very centre of things, in such a way that our ego forms with their own uniqueness a single complex. We thus give plastic planes as plastic expansion in space, obtaining this feeling of something in perpetual motion which is peculiar to everything living.[258]

What distinguished the Futurists' ideas about intuition from those of the Romantics was that the Futurists proposed using action to reveal the mutual reciprocity of the subjective and objective poles of an experience, while the Romantics generally proposed that a contemplative form of experience is the most effective means to this end. But both groups, the Futurists and the Romantics alike, espoused a similar end—that of unifying subject and object so that the subject enters into and acquires a sensation of the inner life of objects.[259] A Romantic lyric typically culminates in an ecstatic sensation through which the apparent dichotomy of the self and the world is overcome. The *futuristi* sought a similarly elemental, primordial experience. Thus, the writer Giovanni Papini lauded the savage, the child, the delinquent, the insane person, and the genius as "the last remains of primary and original man, of true man."[260] The experience of the "true man," he contended, was different from quotidian experience, which is subject to the brute givenness of everyday reality. The true man participates in the life of the object (in the energy nexus that is the inner truth of what the mind ordinarily represents as an object). Consequently, the true man's experience possesses an intensity, a dynamism, that is lacking in the experience of ordinary people. The dynamism of the postmodern world would serve the Futurists as insanity serves the mad person or immersion in the criminal element served the Decadents: as an elemental

form of experience that revealed the essential unity of self and world (or, more accurately, an action and its environment). Through dynamism, they discovered a salvific form of experience, an ecstatic moment in which the brute materiality of objects dissolved into a perfect spiritual unity.

This actional, voluntaristic strain in Futurist thought had correlates in Bergson's philosophy (especially in *L'évolution créatrice* of 1907, one of Bergson's most widely read and frequently cited books). Similar ideas are evident in his anti-deterministic teachings and in his statement that the future is not formed by the brute forces of the past, but affected by the actions of men who have free choice. Bergson's ideas on the *élan vital*, the universal principle of flux and dynamism, were kindred to the Futurists' views on movement. His *Matter and Memory* was the source of another Futurist core idea, that of states of mind. In 1912 the Futurist painters mounted one of their major exhibitions, which opened in February at the opulent Bernheim-Jeune Gallery in Paris, then travelled to the Sackville Gallery in London, then to Berlin, Amsterdam, Zürich, Vienna, and Budapest.[261] Boccioni's contribution to the exhibition included a group of three paintings, a triptych with separate left and right wings: *Stati d'animo: Gli addii* (States of Mind: The Farewells, 1911), *Stati d'animo: Quelli che vanno* (States of Mind: Those Who Go, 1911), and *Stati d'animo: Quelli che restano* (States of Mind: Those Who Stay, 1911).

The paintings celebrate rail travel. They also present movement through space interpreted through one of its most poignant implications—viz., leave taking (hence the subtitles *The Farewells*, *Those Who Go*, and *Those Who Stay*). The triptych evokes the waves of feelings, of different sorts, conditioned by train travel. Painted between the spring of 1911 and the winter of 1912, these works represent the furthest development of the ideas of dynamic sensation and paths of action that the Futurists had expounded the previous year. In the famous introduction to the catalogue for the 1912 exhibition at Galerie Bernheim-Jeune in Paris, Boccioni, likely in reference to his *Stati d'animo* series, wrote,

> The simultaneousness of states of mind in the work of art: that is the intoxicating aim of our art.
>
> Let us explain again by examples. In painting a person on a balcony, seen from inside the room, we do not limit the scene to what the square frame of the window renders visible; but we try to render the sum total of visual sensations which the person on the balcony has experienced; the sun-bathed throng in the street, the double row of houses which stretch to right and left, the beflowered balconies, etc. [here Boccioni uses *The Noise of the Street Penetrates the House* as his example]. This implies the simultaneousness of the ambient, and, therefore, the dislocation and dismemberment of objects [the idea of the isolated, bounded object is destroyed], the scattering and fusion of details, freed from accepted

logic [note the anti-rational, associationist theory of mind], and independent from one another.

In order to make the spectator live in the center of the picture, as we express it in our manifesto, the picture must be the synthesis of *what one remembers* and of *what one sees* [this is Boccioni's most explicit statement of the affective image, a conception of perception as involving temporal interpenetration].

You must render the invisible which stirs and lives beyond intervening obstacles [this is a vitalist affirmation], what we have on the right, on the left, and behind us, and not merely the small square of life artificially compressed, as it were, by the wings of a stage [this is tantamount to the suggestion that what is within a frame / a spatial location is affected by what stretches away beyond the frame / location].

. . .

Furthermore, every object influences its neighbor, not by reflections of light (the foundation of *impressionistic primitivism*), but by a real competition of lines and by real conflicts of planes, following the emotional law which governs the picture (the foundation of *Futurist primitivism*).

With the desire to intensify the aesthetic emotions by blending, so to speak, the painted canvas with the soul of the spectator, we have declared that the latter "*must in future be placed in the center of the picture*." [The spectator's inner being fuses with the daemon of the painting. This overcomes the perspectivism that had dominated painting up to the early twentieth century—this perspectivism, and the assumption of an "outside spectator" peering in at the world, was a legacy of Newtonian science.]

He shall not be present at, but participate in the action. If we paint the phases of a riot, the crowd bustling with uplifted fists and the noisy onslaughts of cavalry are translated upon the canvas in sheaves of lines corresponding with all the conflicting forces following the general law of violence of the picture. [Likely Boccioni is referring to Carrà's 1910 painting, *Funeral of the Anarchist Galli*, a painting in which Carrà depicts a series of rotary movements through curves radiating out of central nodes, rather like bend spokes—curved lines that the Futurists referred to as "lines of force" or "paths of movement."]

These *force-lines* must encircle and involve the spectator [the spectator will be brought into the work's force-field—subject and object will merge] so that he will in a manner be forced to struggle himself with the persons in the picture [the example of the Carrà painting illustrates the effect of radiating lines of force].

All objects, in accordance with what the painter Boccioni happily terms *physical transcendentalism*, tend to the infinite by their *force-lines* [note this second reference to a higher, infinite realm], the continuity of which is measured by our intuition [intuition, not reason, is the cognitive agent that offers us some understanding of this higher realm].

It is these *force-lines* that we must draw in order to lead back the work of art to true painting. We interpret nature by rendering these objects upon the

> canvas as the beginnings or the prolongations of the rhythms impressed upon our sensibility by these very objects.[262]

Boccioni understood states of mind as the result of a synthesizing process that fuses subjectivity and objectivity by melding memory and perception; as a result, a state of mind does not offer an image of how objects look when arrayed in space before us, but rather the evolving dynamics of the feelings they evoke when we project our energy towards them and they project their energy towards us. This radical idea led him to develop a new, and epochal, understanding of artistic representation: namely, that artworks impart emotions or mental activities not by what they show, nor by any propositional statement they assert, but by what they *do* (what they do physically, or, if I may, pneumo-physically)—through the energy exchanged between the subject-field and the object-field. This notion led Boccioni to develop a perlocutionary poetics.

That Boccioni maintained an action theory of artistic meaning is evident in the central panel of the triptych, which presents the poignant feelings evoked by saying goodbye, while the left and the right panels present the feelings remaining with "those who stay" and "those who go"—the spectator is in the middle of it all, fusing the feelings of "those who stay" with the feelings of "those who go" and integrating the past of the act of saying goodbye with act's future, in the (already anticipated) reverberations it will have both in "those who stay" and "those who go."[263]

In *Pittura scultura futuriste (dinamismo plastico)* (Futurist Painting and Sculpture [Plastic Dynamism], 1914) Boccioni wrote,

> The principle of pictorial emotion is in itself a state of mind. It is the organization of the plastic elements of reality [here Boccioni essentially confirms that the idea of "infinite plasticity" is a mark of what, using the more traditional philosophical periodization, I would call the postmodern] interpreted through the emotiveness of their dynamism, not the transcription of images reflecting literary or philosophical ideas. It is the lyrical relativity of the movements of material, expressed through forms.[264]

Boccioni's manner of stating of his conception, one that identifies "pictorial emotion" with "the organization of the plastic elements," itself conveys the mutually reciprocal being of subject and object that was such an important theme in Futurist thought and art.[265] But what is most remarkable, for us, about the idea that artistic meaning results from "the lyrical relativity of the movements of material, expressed through forms," is that it is a notion of expression that would seem congenial to the cinema. In fact, Stan Brakhage made just that idea the core of an Abstract Expressionist, or Projective, cinematic practice.

Boccioni wanted to capture the dynamism of internal processes. His notion of states of mind reflects this concern. So does his series of paintings *Stati d'animo* (States of Mind). The means he developed to convey that dynamism depend entirely on Bergson's ideas of sympathetic identification. Boccioni realized—and this recognition is at the heart of the novelty of Futurist painting I have been commenting on—that if we "get into" the painting and sense its inner being, a sort of kinesthetic empathy allows us to experience the life of the painted forms as well as to feel how the forms of the painting evolved (recall that Bergson proposed a nonpunctal conception of time). Thus, in making *Stati d'animo* Boccioni attempted to capture the dynamism of thought and feeling by finding the means through which "colours and forms . . . [might] express themselves."[266] The series was an effort at freeing painting from its reliance on describing reality. Max Kozloff points out that Boccioni likely developed the idea of states of mind largely in order to overcome the restrictions artists faced when they aspired to capture the dynamism of particular events.[267] To overcome those restrictions (demanded, among other factors, by beliefs about infinite plasticity), the Futurists turned to revealing the dynamics by which the mind combined diverse times and places, fused memory, perception, and fantasy into a dynamic sensation, and melded the energies of the subjective and objective poles of a perception.

Although Bergson wrote discouragingly little about art and developed no formal aesthetic theory (the closest he came was with his wonderful *Le rire. Essai sur la signification du comique*, 1900), he did hold the arts in high esteem. In *Le rire*, he notes that for non-aesthetic perception, interests (arising from everyday necessities) generally impose a screen over reality, concealing its true character. However, intuition, which is what aesthetic perception essentially is, allows for non-interested perception—it allows for a degree of disengagement from workaday concerns and the business of living. Accordingly, the artist, by provoking aesthetic perception, can lift the screen that interests impose over reality and, consequently, can offer us a privileged view of reality (readers will recall Kant's ideas on non-interested perception). Bergson's idea that aesthetic experience is akin to intuition, and his staunch belief in the unique role of intuition, contributed to the Futurists' ideas about the importance of aesthetic perception and aesthetic experience.

Futurists tried to overcome the limitations associated with rendering the dynamism of particular events by representing the synthesis of memories, perceptions, and fantasies. What encouraged Futurists to go beyond and to formulate a conception of artistic meaning as action, was Bergson's influence. Bergson taught them that a cinematographic presentation of discrete moments could never impart the dynamism of real life—that a more intuitive

apprehension of flow, one that involved the synthesis of subject and object, was necessary for one to grasp the dynamics of reality.

The Futurists' notion of synthesis was connected to the idea of analogy (and their beliefs about analogy have important links with their conception of cinema). Marinetti's idea of analogy has a remarkable occult resonance: it resembles the doctrine of signatures or correspondences, which played a key role in Symbolist writing and painting. Marinetti wrote,

> Analogy is nothing other than the deep love that binds together things that are remote, seemingly diverse or inimical.[268] The life of matter can be embraced only by an orchestral style, at once polychromatic, polyphonic, and polymorphous, by means of the most extensive analogies . . . The vaster their affinities, the more images will retain their power to astound. One must—people say—spare the reader an excess of the marvelous. Bah! We should worry instead about the fatal corrosion of time, which destroys not just the expressive value of a masterpiece, but its power to astound.[269]

Marinetti's writings on "immaginazione senza fili" (wireless imagination) proposed to launch "immense reti di analogie sul mondo" (immense networks of analogies in the world)—and he seems to have thought that these were formed by people selecting images from their mental warehouses and organizing them in ways that sparked further comparisons.[270] These analogical networks aimed at conveying objects' movements: to render the successive movements of an object, one must render *the chain of analogies* it evokes, each condensed and concentrated into one essential word.[271] Only a series of analogies, presented in succession, could convey matter's vital movement. But isn't this exactly what the cinema does? The cinema, the paradigmatic analogical art, was showing the way to the new Futurist art.

In "Manifesto tecnico della letteratura futurista," Marinetti noted that literature had hitherto overlooked the importance of noise, weight, and smell. These elements should be exploited. In particular, literature should attempt to render the odours a dog experiences, as well as the noise of engines (another instance where Marinetti linked mechanical with animal vitality).[272] Marinetti's counsel reflected the era's interest in expanded or augmented sensory faculties, an interest that had arisen from the technological developments taking place at the time—developments with which the cinema itself was associated. Film's use of close-ups had revealed a new world, and that medium's ability to play a recording back at different speeds than that at which it was recorded afforded control over time. Why then would it be far-fetched to suggest that a successor medium to the cinema (or an expanded cinema) could convey the landscape of scents that a dog experiences? If one accepts that, then one might well believe that cinema is a

privileged medium participating in the epochal transformation of humans' sensory mechanisms and understanding of reality.

"Manifesto tecnico della letteratura futurista" (in my view, the most radical of all the Futurist manifestos) also takes up the Symbolist idea of the greater self, the self that operates the illusory limited self but that lies beyond the personal self. That anti-Cartesian idea was proposed by the Symbolist poet Arthur Rimbaud, who in a letter to Paul Demeny of 15 May 1871 (one of the "lettres du voyant" [letters of a seer]) proclaimed, "je est un autre" (I is another). The eleventh demand of Marinetti's "Manifesto tecnico della letteratura futurista" (1912) called for the destruction of the literary "I," which in being subjected to logic had been invested with *passéiste* attitudes. This abolition of the "I," accordingly, would make way for intuition.[273]

The *futuristi* tilted against the impoverishment of experience: they protested that sensory vitality and all dynamism had been eliminated, and all that moderns—including the leftover moderns of their time—know are purely intellectual, static abstractions. Such abstractions lend themselves to a geometric determination that is the same for every mind. They would offer, in place of this seemingly univocal, abstract conception of the world, a dynamic understanding of reality that does not segment it into individual objects whose interactions with one another are minimal and, when they do occur, are restricted to nearby objects. To counter the static, geometrical, abstract view of reality that moderns held, the Futurists proposed to create an art that would convey the truth about the incessant dynamism of the world and each of its localized objects-events-phenomena and would convey the richness of their ever-changing, multiple, extended interactions. They would create a postmodern art that would convey the continual coming-on of novelty that results from the incessant flux of these multiple interactions among all that exists.

What qualities must a work of art have in order to impart the flux of sensible, variable, and contingent appearances—the endless play of constantly changing and renewed subjective appearances? The Futurists' answer was clear: it must have the qualities of the cinema.

## THE FUTURISTS, UNIVERSAL RELATIONS, AND SPACE

The Futurists' belief in universal relativity was rooted in Symbolist ideas about a higher plane of ideal existence. What the Futurists added to the Symbolist doctrine was the notion that scientific and technological studies (especially studies in electromagnetism) have enhanced our understanding of this higher domain. I return to Boccioni and colleagues' "La pittura futurista: Manifesto tecnico" to show how Symbolist rhetoric persisted in the Futurists' statements of their artistic program:

> The gesture that we want to reproduce will no longer be a *moment* in the universal dynamism *which has been stopped*, but the *dynamic sensation* itself, perpetuated as such.

Here the Futurist painters were evidently staking the claim that the goal of their program was to *convey* dynamic sensation, not to fix it. But what exactly did that mean? No precisions are offered. But there is plenty of evidence that they were attacking traditional (that is, perspectival) painting for adopting a specific viewpoint, a single, fixed, and limited viewpoint—one among many possibilities. The perspectivism of traditional painting suggested a human way of seeing. "La pittura futurista: Manifesto tecnico" declares the ambition to rise above the human vantage point so that they could apprehend a universal dynamism.

The manifesto continues:

> All is conventional in art, and what was the truth for the painters of yesterday is only a falsehood for us today. We declare, for instance, that a portrait, in order to be a work of art, must not resemble the sitter, and that the painter carries in himself the landscapes which he would fix upon his canvas [note the idealist implication of this assertion] . . . Space no longer exists . . . The sun is thousands of miles away from us; yet the house in front of us can seem to fit into the solar disk [or, more literally, "but perhaps the house before us there is embedded in the solar disk"? In any event, the statement that our development has overcome space, so that the house in front of us fits on the solar disk, implies a phenomenal conception of existents] . . . In order to conceive and understand the new beauties of a modern picture, the soul must become pure; the eye must be freed from its veil of atavism and culture, so that it verifies its observations by recourse only to Nature, not to the Museum! [That is, by escaping the past, the museum culture, and entering the present, one glimpses the true, higher reality, capital "N" nature.][274]

In 1911, Boccioni would realize the ideas about space that he and his colleagues had announced in "La pittura futurista: Manifesto tecnico," in such paintings as *Forze di una strada* (Forces of the Street), *Visioni simultanee* (Simultaneous Visions), and *La strada entra nella casa*. This last painting conveys the Futurists' ideas about space in a particularly cogent manner: it provokes the sensation of what occurs when one opens one's home and all the noises of the street, near and far, rush in simultaneously. It suggests these many simultaneous visual and auditory sensations and incorporates them into a complex of interacting motifs (reflecting the *compenetrazione* [interpenetration] of fields of energy). Also, Boccioni has used a bird's-eye view, a vantage point that, as many historians of the Cubist era have pointed out, modernity made more common. Adopting that vantage point results in a flattening of the painting, for the implied viewer looks down upon a near

surface, rather than away into the distance as one typically does with a scene depicted from the viewpoints typical of linear perspective. The effect is to draw the viewer into the picture—an effect strengthened by including the figure of the woman leaning over the railing. Linear perspective *stages* reality, presenting it as if within a theatrical space. The bird's-eye view that Boccioni uses in this painting has broken through the fourth wall of the proscenium stage (the proscenium was appropriate to the era of *perspectiva*, the age of Newton and Gutenberg, not to an era when sensation is understood as an effect of being immersed in interacting fields of energy).

Thus, the bird's-eye view allows the viewer to enter the picture, to become immersed in the welter of verbal and visual sensations the new urban reality provides, to be at the picture's centre. Recall the passage cited above, from "The Exhibitors to the Public," in which Boccioni asserts that the intoxicating aim of his (Futurist) art is to convey the simultaneousness of states of mind. This provides a pretty good summary of what Boccioni was striving for in his art, and in *La strada entra nella casa* in particular—it is a pretty good summary, except for one thing: Boccioni in that passage underplays complexities regarding the sensory modality the painting addresses. The work alludes to features of aural experience, which commonly combines sounds (fields of energy) occupying the same aural space (and interacting—interpenetrating—one another). It is largely because aural qualities are an important part of what Boccioni wants this painting to convey about experience that the various components of sensation are not spatially separated. Wanda Strauven does a fine job of showing that the work of Boccioni (and other Futurists) suggests that aurality reveals modernity's character as simultaneity more thoroughly than does visuality.[275] Yet the painting, as a visual object, does address the eye: it alludes to visual experiences as well as to aural experiences. What Boccioni touches on here, and what accounts for these indeterminacies regarding the sensory modality of the experience to which the painting refers, is that the experience the painting evokes is actually synaesthetic—so the painting presents visual equivalents for the characteristics of aural experience.[276] *La strada entra nella casa* is not the only Futurist painting that elicits synaesthetic experience through simultaneity: Russolo's *La musica* (Music, 1911–2), with its concentric forms (resembling those Romani used in *La goccia* [The Drop] and *La goccia che cade sull'acqua* [The Drop that Falls on Water, 1911] to represent emanating waves), and Boccioni's *Forze di una strada* (Forces of the Street) and *Visioni simultanee* (Simultaneous Visions) (both from 1911) also do. The Futurist belief that experience harbours the potential for synaesthesia has its provenance in the Symbolists' religio-mystical conception of experience (consider Baudelaire's "Correspondances" from *Les fleurs du mal* [1857]), but in keeping with their modernizing spirit, they attempted to provide the phe-

nomenon of synaesthesia with a scientific rationale. Prampolini's justification of his interest in synaesthesia invoked findings from the science of vibration:

> Just as we have attributed, and still attribute, to the human sense of vision the recognition of chromatic vibrations of optical origin, so must we accept the scientific axiom that states that chromatic vibrations produced by sound exist in the atmosphere and are perceptible by the sense of sight; both are effects of a force which can take influence on the atmosphere and hence on the human mind [the fact that both colour and sound are electromagnetic vibrations makes plausible the proposition that humans are disposed toward synaesthetia, or might develop synaesthetic abilities] . . . Since I have always spoken of vibrations and it is a matter of atmospheric dynamics, I have hopefully succeeded in making clear that the vibrations produced by a force have, as their equivalent, not one colour but a number of colours [all naturally occurring pitched sounds are composed of a number of harmonically related frequencies; the same is true of real colours], since we also know that the atmosphere is composed of seven colours and that vibrations are a resolution of the atmosphere.
>
> In conclusion, therefore, it is absolutely not possible that a sound, a gesture, be equivalent not to a single colour, but to many colours, just as it absolutely not true that the more violent atmospheric vibrations are, the more intense their colours will be.[277]

We will pursue these ideas about energy and synaesthesia that Prampolini advances here into the remaining parts of the manuscript.

## BERGSON, SYMBOLISM, UNANIMISM, AND PRIMORDIAL EXPERIENCE

Synaesthetic experience avoids dividing and categorizing the human sensorium into separate, non-interacting modalities. Accordingly, it is a form of primordial experience, arising prior to reason's imposition of cognitive taxonomies—its "strette reti di metafore . . . troppo appesantite dal piombo della logica" (tight networks of metaphors . . . too weighed down by the lead of logic). The Futurists' primary and most all-encompassing objective was to provoke primordial experience. In May 1911, regarding *pittura degli stati d'animo* (painting of states of mind), Boccioni noted that such painting relied on "identification of the subject with the object" to attain "the primal universal sensation" of a cosmic dynamism. Furthermore, such experience would allow Futurist artists "to return from [their] millennial complexity to primordial simplicity." When the experience of cosmic dynamism is attained, "the individuality of the artist disappears, not because of humility or fear, but because his spirit identifies itself with reality to reveal itself as an entirety by means of pure forms and colors . . . symbols of universal dynamism."[278]

Romains had written of a similar experience—his writing is perhaps less excited in its tone and evinces more of the serenity of a Hindu contemplative—but the description in the "Sans moi" subsection of *La vie unanime* of the blissful effects of the loss of ego and of the absorption into the total (of attaining a transcendental vantage point) is remarkably similar:

> A crowd of intruders has invaded me and lives within me
> Because I have lost the keys which lock my spirit;[279]

or

> I am like a piece of sugar in your mouth
> Greedy city. But I am not afraid of you;
> . . . what joy
> To melt in your immense body where one is warm![280]

The Futurists' interest in synaesthesia, and their realization that the postmodern urban world is one in which, even in a delimited area, many events occur at once, were the grounds for their making "simultaneity" a key feature of their artwork. As were so many of their interests, their interest in simultaneity was bolstered by two key contemporary authorities: the philosophy of Henri Bergson and the practices of the Symbolists. From Bergson, the Futurists learned that objects are not fixed, independently existing entities; rather, they are energies projected into and penetrated by their environment that we misconstrue as independently existing entities. Moreover, these interactions do not obtain simply among contemporaneously existing energies (or spatial regions); they also transmit an inheritance to currently existing energies. Consequently, the past plays a role in forming immediate experience. The mind's tendency towards reification—that is, its tendency to construe as independently existing, autonomous objects the energies it receives from local phenomena—was the underlying error that had beset the tradition. That metaphysical error had been exposed by the technologies of speed and science (and especially by the theory of electromagnetism). The absolute that the new technologies of speed and the theory of electromagnetism had disclosed was different from the reality that scientists traditionally studied. Still, while Futurists took some clues for understanding the absolute from science and technology, they also drew clues from Symbolism, which, finally, provided them with a model for how these various ideas could be integrated. They borrowed from that predecessor's aesthetic the belief that art vouchsafes the absolute (though for Futurists, the absolute was universal dynamism, not a nebulous, perfumy reality, nor a menacing supernatural). The Symbolists, too, believed that space, time, and causality are only relative, the forms of the phenomenal realm. That was the lesson Schopenhauer had taught them: the pessimistic philosopher of will had convinced them (or, at least, provided

conceptual support for, and confirmation of, their inklings) that the absolute is beyond space and time. The phenomenon of hyperacceleration had made the experience of an absolute beyond space and time a palpable everyday reality. As we have seen, Marinetti proclaimed, "Noi viviamo già nell' assoluto poichè abbiamo già creato l'eterna velocità onnipresente."[281]

Elsewhere, Marinetti enumerated places where the absolute was to be found. Though the manifesto in question, "La nuova religione-morale della velocità" (The New Religion-Morality of Speed, 1916), is sometimes taken as tongue-in-cheek, I read it as a witty statement that energy constitutes the higher reality.

> **Places inhabited by the divine:** trains, dining cars (eating while speeding). [Eating is a biological activity that converts energy from one form to another—eating on dining cars links this biological process to an analogous process, one that converts stored energy to kinetic energy.] Railroad stations; especially those of the American West, where trains speeding at 140 km. an hour can take water and pick up mail sacks without stopping [places of energy]. Bridges and tunnels [which allow trains and cars to attain elevated views or to enter a subterranean realm]. The Place de l'Opéra in Paris. The Strand in London [a centre of urban energy]. Automobile races [ritual sites, celebrating energy]. Films [photo-electric dynamism]. Radiotelegraphic stations [vibratory electromagnetic dynamism]. The great turbines turned by columns of mountain water to strip animating electricity from the air [Tesla's electric utilities]. The great Parisian couturiers who create a passion for the new and hate for the already seen through their rapid invention of new fashions. Very modern and active cities such as Milan, a city which Americans think has *punch* (the precise and direct hit that lets a boxer achieve a knockout against his opponent). Battlefields. Machine guns, rifles, cannons, and bullets are divine [the speed of machinic projectiles give them power over life and death]. Mines and swift counter-mines: to blow up the enemy BEFORE he blows up us [invisible explosive power harboured in the earth]. The piston-engines and tires of cars [mechanical energy] are divine. Bicycles and motorcycles are divine. Gasoline [stored energy] is divine. Religious ecstasy that inspires a hundred horsepower [the vivifying effect or ecstacy]. The joy of shifting from third to fourth gear [acceleration is exhilarating]. Joy of pressing the accelerator pedal, roaring with musical velocity [releasing stored up energy]. The disgust inspired by people sleeping deeply [disgust at failing to be vital, energetic]. The repugnance I feel at having to go to bed at night. Every night I pray to my electric lamp [light, vibrations belonging to a specifiable range in the electromagnetic spectrum, is divine], since it harbors a velocity [speed is energy, and energy makes anything divine] which is furiously stirring.[282]

In the same manifesto, he states,

> Our male saints are the innumerable small bodies that are penetrating our atmosphere at an average velocity of 42,000 meters a second. Our female saints

> are light and electromagnetic waves at 3 × 1010 meters a second. The Inebriation of great speeds in cars is simply the joy of feeling oneself merged with the only *divinity*.[283]

The writings of Marshall McLuhan highlight the association of electricity with speed. In *Understanding Media: The Extensions of Man*, he noted that "electric speed in bringing all social and political functions together in a sudden implosion has heightened human awareness of responsibility to an intense degree."[284] Later in the same book, he offered this oracular statement that prophetically and conceptually united electricity, light, movement, and the cinema:

> Today it is the instant speed of electric information that, for the first time, permits easy recognition of the patterns and the formal contours of change and development. The entire world, past and present, now reveals itself as a growing plant in an enormously accelerated movie [note the allusion]. Electric speed is synonymous with light and with the understanding of causes.[285]

One should not take away from this the conclusion that McLuhan consistently celebrated this hyperacceleration. Approaching the point where all that happens, happens instantaneously has its menace: the divine beyond time and change is as much a *mysterium tremendum* as a *mysterium fascinans*, as sublime as it is beautiful. In the Canadian newsmagazine *Maclean's*, McLuhan noted that at the beginning of the 1980s,

> there is a general awareness that the technology game is out of control, and that perhaps man was not intended to live at the speed of light . . . Excessive speed of change isolates already fragmented individuals and the accelerated process of adaption takes too much vitality out of communities [living amidst networked computers and instantaneous data transmission]. Speed of light man has neither goals, objectives nor private identity. He is an item in the data bank—software only, easily forgotten—and deeply resentful.[286]

McLuhan wrote about the period spanning the 1890s to the 1970s, which saw a continual transformation of experience, from one of time and place to one of speed and instantaneity. Life was no longer measured out in distances traversed over an extended time. "Electric speeds tend to abolish time and space in human awareness," he noted. "There is no delay in the effect of one event upon another. The electric extension of the nervous system creates the unified field of organically interrelated structures we call the Age of Information."[287] In the electric age, experience has become a matter of dynamic sensation that presses upon us the vexatiousness of life as all events accelerate towards instantaneity and simultaneity: under such conditions, the reality of time and how we measure synchronism have become issues of grave importance. And

because universal instantaneity does not afford the opportunity to adequately process sensory inputs and evaluate information, uncertainty has become an all-pervading phenomenon. Affect and action have overtaken contemplation and deliberation. Michael A. Moos summarizes McLuhan's earlier views on the sensory effects of electric technology:

> At preelectric speeds, our extended senses, tools, technologies remain separate, closed systems because they are always linked to "mechanism" and enclosure of the body, reliant in their articulation upon extensions of this or that physical organ, and functioning in this respect as "fixed charges" on the psychic life of individual and community alike.[288]

Moos continues:

> At electric speeds…the hybrid mechanoelectric forms of mass media begin to extend elements of our sensorium at speeds commensurate with those of dynamic interplay, clamouring as it were for collective consciousness, for a (public) consensus or conscience that makes rational co-existence possible.[289]

We might note further that, as electromagnetic reality takes hold, causality is transmuted into resonance. Positivism, based on chains of linear cause-and-effect relations, is discredited: many things (closer together and farther apart) in concert influence many other things (so the only plausible world view becomes one that resembles that offered in Alfred North Whitehead's 1929 book *Process and Reality*). What is more, timelessness becomes the essential temporal feature of this realm of pure instantaneity. Under such a temporality, where all is instantaneous, speed itself becomes virtual (though, like any electromagnetic phenomenon, nonetheless real for all that). Needless to say, this discredits narrative—the artistic form that positivist thought assumed.

Writing from within the context of Cubist art theory, the art dealer and critic Daniel-Henry Kahnweiler propounded the impossibility of depicting motion through multiple successive views of an object or process through means like those used by Étienne-Jules Marey. Kahnweiler posited that the Futurists deployed the Cubists' aggregated forms in an effort to represent movement. "Can the impression of a moving form be awakened in the spectator in this way?" he asked. And he answered himself, "No. All these solutions suffer from the same error, making this impression impossible without further ado. In order to sense 'movement,' a minimum of two facial impressions have to exist, one after another, separated in time. However, in Futurism those different phases exist simultaneously in the picture/painting."[290]

The Futurists actually saw the shortcomings of this Kantian belief that time can be represented as a series of successively existing spaces. Bergson had alerted the Futurists (especially Boccioni and Severini, but not Balla) to

the shortcomings of that view. It might seem that Bergson was an unlikely candidate for this role, for he had actually proposed a dichotomy of space and time, and painting, of course, was relegated to being an art of space, not time. However, Boccioni realized that Bergson's idea of intuition could serve as the basis of efforts to endow painting with an extended and non-rational temporality. More than that, Boccioni (and other Futurists) believed that he had laid out a method for apprehending the absolute.

Boccioni was an assiduous and devoted student of Bergson, who read Bergson's writings both in Italian and in their French originals. He (Boccioni) understood that although paintings necessarily exist in space, spatial forms could express duration by avoiding those configurations that engender an analytical frame of mind. Matter, Bergson maintained, is made up of "modifications, perturbations, changes of tension or energy and nothing else."[291] Life is also simply energy, whose forms are somewhat more complex. Life and objects are not different states of being: both are immersed in the same universal flux (which Bergson called *durée*). Bergson impressed on Boccioni the importance of conveying exactly the character of duration and flux. Accordingly, finding a plastic equivalent to a continuous fluxing reality (that is, a fixed form that would convey the reality of continuous change) is the accomplishment Boccioni strove to attain: his extraordinary sculpture *Forme uniche nella continuità dello spazio* of 1913 is likely the culminating attempt at visualizing (giving concrete form to) the flux of duration—the term *continuità* evokes both the Bergsonian idea of *durée* and the electrological idea of space as flux. While *Forme uniche*... marks the apogee of Boccioni's effort to visualize the flux of duration, the attempt to convey an intuitive approach to motion can be discerned in almost every work Boccioni produced during his all-too-brief career.

What did an intuitive approach to motion consist of? Bergson stated, "Nous appelons ici intuition la *sympathie* par laquelle on se transporte à l'intérieur d'un objet pour coïncider avec ce qu'il a d'unique et par conséquent d'inexprimable."[292] Boccioni interpreted that coincidence of mind with object as the Romantics had—that is, as the overcoming of the distinction between subject and object: the object becomes a state of mind. He identified three means of giving visual form to the intuition of motion: (1) *interpenetrazione* (or, sometimes, *compenetrazione*, each offering a slightly different sense of interpenetration), which we might describe as the interaction of psychic states and matter in such a way as to suggest a continuous neutral monist reality (a reality that is beyond the division into material and psychic reality); (2) "absolute" and "relative" motion; and (3) lines of force.

Regarding the distinction between absolute and relative motion, Bergson defined absolute movement in these terms: "When I speak of absolute

movement, I attribute to the object an interior and so to speak, states of the soul [this confirms the suggestion that I made above, that events/phenomena have a *geistig* aspect], and I imply that I am in sympathy with those states and that I insert myself into them by an effort of the imagination." Relative movement he defined as follows: "And I call a movement relative for [this] reason: I place myself outside the object itself."[293] According to Bergson, the modality of time sensed by our intuition is an indivisible time, whereas the intellect operates by making fixed divisions in space, or stoppages (immobile states). Boccioni, in *Pittura scultura futuriste (dinamismo plastico)*, likewise distinguished between absolute and relative motion. What Boccioni meant by relative motion was close to what Bergson called *mouvement relatif*. The painter laid out his conception of relative motion in his manifesto "Moto assoluto + moto relativo = dinamismo" (Absolute Motion + Relative Motion = Dynamism, 1914): "Relative motion is a dynamic law which depends on the object's movement," he wrote. "It is quite incidental whether we are talking about moving objects or the relationship between moving objects and non-moving objects. In fact, there is no such thing as a non-moving object in our modern perception of life."[294] He went so far as to assert that "*a horse in movement is not a motionless horse which is moving, but a horse in movement, which makes it another sort of thing altogether, and it should be conceived and expressed as something completely different*"—a forthright statement of the core idea of process philosophy (and a confirmation of my assertion that what was ultimately at stake in Futurism was a new metaphysics).[295] The idea of relative motion is arrived at by treating time analogously to the way we treat space, and segmenting time into numerous equal units; this is the approach taken by an observer outside the object. A large part of the opening section of *Pittura scultura futuriste (dinamismo plastico)* was devoted to the claim that Cubist art was not the ideal art for the postmodern era because it dealt exclusively with relative motion and could not reach absolute motion. Boccioni asserted that the Cubists painted this way because they took an intellectual approach. Picasso's "study of form," he wrote, was no more than a

> physical analysis, an intellectual impression of pure form. It functions by way of a rotating point of view that makes the artist an analyzer of fixity, an intellectual Impressionist of pure form. Picasso in fact copies the object in its formal complexity, taking it apart and numbering its aspects. In doing so, he creates for himself an incapacity to experience it in its *action*. [He] arrests the life of the object (motion), separates out the elements that constitute it . . . But the analysis of the object is always made at the expense of the object: that is, by killing it.[296]

I doubt there are many more fervent admirers of Picasso than me, but even I have to say that Boccioni's critique of Picasso and Analytical Cubism is

exactly what one would expect of a brilliant, forward-looking artist: Picasso, certainly in this phase of his work, was committed to the object in its formal complexity—to taking it apart and numbering its aspects. Thus, he missed the reality of change, the basis of the new, process metaphysics. Boccioni dismissed the results of the (Analytical) Cubists' deconstruction of the object, contending that their approach relied on rational procedures. Restricted by understanding reality through reason, the Cubist artist cannot avail himself or herself of intuition's resources, which allow a person to extend him- or herself into the realm of the absolute. Cubist procedures were confined within the quantifiable, and this limited the Cubist artist to dealing exclusively with objects' external appearances. The Cubist artist, Boccioni asserted, is unable to reach the *assoluto intuitivo*.[297]

According to Bergson's epistemology, the intellect is best suited to studying inert objects (or immobilized being) and intuition to studying movement, change, and becoming (duration). That is, intuition allows us to understand the flux of reality, while the intellect gives us a necessary, pragmatic grasp of reality. Boccioni, following Bergson, asserted that intuition carries us into the object itself, carries us into the dynamic inner heart of the object (event/phenomenon), and there the mind identifies with the inner energies that constitute the spiritual life of the object. These energies manifest themselves as *linee di forza*, which the mind, when operating according to conventions, forms into concrete representations. The energy-nexus of the local area that we ordinarily interpret as an object and the energy of the surrounding environment exist in a unique dynamic synthesis: its energy projects the object into space, and the electromagnetic (Herzian) energy of the surrounding space projects the circumambient energy into the heart of the object. This synthesis is what Boccioni sought to embody in *Forme uniche nella continuità della spazio* and *Sviluppo di una bottiglia nello spazio*. Boccioni strove to find a visual formula for Bergson's idea that time precedes space and his conviction that the fundamental reality of human existence is the feeling of temporal process.

Many artists who flourished at the beginning of the twentieth century believed that the fourth dimension was a higher reality and took a keen interest in the possibility of actually experiencing it. Boccioni was among them, and on his trips to Paris, he became aware of how many French painters, including the Cubists, were interested in the fourth dimension. As a result, his critique of the Cubists expanded to encompass their particular interests in four-dimensional geometry insofar as it concerned measurable, quantifiable space.

Given the limited interest that Bergson held for the Cubists, plumbing the deep influence the philosopher exerted on Boccioni and the Futurists helps

throw into high relief the sharp distinctions between the two movements. Doing so reveals that the Futurists' idea of *interpenetrazione* (or *compenetrazione*) was formulated partly to critique the metaphysics implicit in Cubism—and that that critique was founded on the fact that the Cubists did not embrace the electrological conception of reality.

> When people tell us that the world has examples of both static and moving objects, and that not everything rushes around at speed, we reply that, in our painting, it is the *conception* which dominates the *visual*, which perceives only fragmentarily, and therefore subdivides. Hence *Dynamism* is a general law of simultaneity and interpenetration dominating everything in movement, that is appearance/exception/shading. We have called ourselves "the primitives of a new and completely transformed sensitivity." This frankly acknowledges a clear view of our creative potential.[298]

Boccioni thought deeply about dynamism, electromagnetism, and reality—so deeply that his thought takes on the qualities of true philosophy. To highlight the rigour and richness of his thought, I turn now to deal with an extended excerpt from *Pittura scultura futuriste*, on which I make extensive interpolated comments:

> It seems clear to me that this succession is not to be found in the repetition of legs, arms and faces, as many people have idiotically believed [this is Boccioni's rejoinder to artists influenced by É.-J. Marey, for example, Bragaglia], but is achieved through the intuitive search for *the one single form which produces continuity in space* [as *Forme uniche della continuità nello spazio* does, through its "infinite plasticity"]. This is the key to making an object live in universal terms. Therefore, instead of the old-fashioned concept of a sharp differentiation of bodies [Boccioni refers to the Newtonian conception of autonomous objects in space], instead of the modern concept of the Impressionists with their subdivision and repetition and rough indications of images, we would substitute a *concept of dynamic continuity* as the only form [Boccioni repudiates the traditional perspectival methods based on the traditional Newtonian idea of bounded, simply located objects, and also the Impressionist method of suggesting the interaction of object and environment by using soft boundaries and repetition of motifs across objects: only methods that convey the complete interpenetration of the force-field that is the event-object and the force-field surrounding it will do]. And it is not by accident that I say "form" instead of "line" since dynamic form is a species of fourth dimension, both in painting and sculpture, which cannot exist perfectly without the complete concurrence of those three dimensions which determine volume: height, width, depth.
>
> I remember reading that Cubism with its breaking up of the object and unfolding of the parts of the object on the flat surface of the picture approached the fourth dimension [here Boccioni makes a point similar to one I made in the previous chapter concerning the Cubists' "higher realism," viz., that the

> collocation or imbrication (through *passage*) of different facets ends up creating an array of elements on a flat surface: the perspectival implications of each of the facets has been eliminated] . . . However, this procedure is nothing but the transcription onto the surface of the canvas, of the planes of the object, which its accidental position prevents us from seeing. It is a rational procedure which exists in relativity, not in an intuitive absolute. The integral notion of the object exists, with this procedure, in the three concepts of height width, depth, thus I repeat, in the relative, in the finite of mensuration. If it is ever possible to approach the concept of a fourth dimension with an artistic intuition [here Boccioni is contrasting, in the manner of Bergson, the rational approach associated with science and mensuration with the intuitive approach artists take], it is we Futurists who are getting there first. In fact, with the unique form which gives continuity in space [note the recurrent emphasis in Boccioni's writings on continuity in space—on space as not being empty intervals but filled with fluxing energy] we create a form which is the sum of the potential unfolding of the three known dimensions. Therefore, we cannot make a *measured and finite* fourth dimension [as the Cubists, influenced by Princet, do], but rather a continuous projection of forces and forms intuited in their infinite unfolding. In fact, the unique dynamic form which we proclaim is nothing other than the suggestion of a form in motion which appears for a moment only to be lost in the infinite succession of its variety.
>
> In conclusion, we Futurists offer a method for creating a more abstract conception which is symbolic of reality, but we do not define the fixed and absolute measure which creates dynamism.[299]

The metaphysics of Futurism is a spiritual metaphysics—more exactly, I believe, it is a neutral monist metaphysics, according to which all events/phenomena (the basic elements of reality) can be considered from one perspective as having material attributes and from another perspective as being *geistig* (mental/intelligent/spiritual). Consider the terminology in the foregoing passage: through motion, the object lives in the universal; Cubist faceting is "a rational procedure which exists in relativity, not in *an intuitive absolute*" (un procedimento razionale che vive nella relatività non in non in *un assoluto intuitivo* [emphasis mine]); "Therefore we cannot make a *measured and finite* fourth dimension, but rather a continuous projection of forces intuited in their infinite unfolding" (Perciò non una quarta dimensione *misurata e finita* noi possiamo dare, ma una continua proiezione delle forze e delle forme intuite nel loro infinito svolgersi [emphasis in the source]). Boccioni conceived of the fourth dimension as an absolute, unmeasurable, infinite phenomenon, not as a measurable and finite and relative reality, which is what the Cubists took it to be. All of this is further evidence that Futurism should be considered an heir to Impressionism, Symbolism, Cubism, and electrotechnics (and Cubist ideas are the smallest ingredient in this mix, with Symbolism and electrotechnics

the largest). Moreover, Boccioni (and at least some of his Futurist colleagues) claimed that the way to apprehend this absolute is through intuition, not the rational procedures of the Cubists, for only intuition allows the artist to apprehend the infinite unfolding of forces and forms. Intuition would lead the artist to produce art that is abstract and that conveys the dynamic properties of an infinite, unfolding, electromagnetic reality.

Confirming this spiritual character of dynamic forms (forms of continuity in space) is a letter that Boccioni wrote to his friend Nino Barbantini from Paris in February 1912:

> This synthesis—given the increasing tendency of the human spirit to present the concrete through the abstract—cannot be expressed except through objective elements *that have been spiritualized*.
>
> This spiritualization will be given by pure mathematical values [in other words, will be abstract], by pure geometrical dimensions, instead of traditional reproductions, over which mechanical methods have prevailed.[300]

Boccioni's spiritual interests led him to describe the experience of absolute motion in notably esoteric terms:

> The plastic construction of the object in this case concerns the motion the object has in itself, whether in motion or at rest [even an object at rest is dynamic, that is, an energy form]. I make the distinction between rest and motion for the purpose of explanation, but in reality, rest does not exist; only motion exists, and rest has no real being, but only that of an appearance or a relativity.[301]

And furthermore,

> This force, this primordial psychology [note the claim that this psychology is elemental], permits us to create in the picture a new subject whose aim is not the narrative reproduction of an episode but instead the coordination of the plastic values of reality, a purely architectonic coordination liberated from influences of literature or sentiment.[302] In this primal state of motion [intuition enters into the very heart of events/phenomena], the object is not seen in its relative motion [note the use of Bergson's term for motion understood as the scientist understands it], but is conceived in its vital lines [in identifying with an object-in-motion, we experience/become its vital being], which reveal how it would decompose according to the tendencies of its forces. Thus we arrive at a decomposition of the object which is no longer a Cubist formula ["schema intellettivo": in using that term Boccioni reaffirms that the Cubist analysis of the object is rational, mathematical, mensurational], but is rather the very look of the object, its interpretation by way of an infinitely refined sensation superior to that of old art [Futurist art is a higher art because it results from an infinitely refined sensation—refined because it is in contact with the vital, energetic heart of reality, not illusory appearances of objects in space].

> This for us is absolute motion, which might be called the breath or the pulse of the object [here Boccioni emphasized that this sensation carries us into the vital heart of the event-phenomenon]. A shy and unconscious whisper of *breath* ["respire," emphasis in original—note the pneumatic allusion] is found in Italian art of all periods. It is the plastic itself [that is, it is not literary and narrative]. When, lately some Cubists have concerned themselves with it, they demonstrate what I have already said about their Gothicness and once again pay tribute to the plastic supremacy of Italians.[303]

This celebration of primordial experience reflects Boccioni's convictions regarding the spiritual value of Futurist art. Throughout this article, he condemns academic methods as "intellectual," dismissing them as the outcome of "static, nostalgic emotions."[304] Intuition is celebrated, Boccioni averred, because through intuition Futurists are able to experience the "violent emotions of movement and speed" that "inspire new plastic ideas."[305] *Futuristi*, he therefore proclaimed, are the "primitives of a new and completely transformed sensibility" attuned to the dynamism of modern life; moreover, their intuition of the "eternal renewal of life" had given them "superhuman energy."[306]

Elsewhere, Boccioni had connected the experience of a vibratory dynamic reality to the ecstasy religious figures have experienced. In another letter to Nino Barbantini, this one dated May 1911, he wrote,

> Again, however, do not hesitate to say that a painting of similar size, animated by a similarly pure intention, which is that of raising to the modern life a new vibrating altar of dynamics, as pure an exaltation as of those who were raised by religious contemplation of the divine mystery, a picture that attempts this this is infinitely superior to any more or less subjective reproduction of real life.
>
> One can always arrive at rather skeptical conclusions concerning the mental constructions of the philosophers, but nevertheless when I think of one who takes and starts from some initial elements or premises that are his inner light, his intuition, and with a pride verging on madness, with an iron law that is simply terrifying, attempts to construct a system, a world, whatever the end result may be of such a work fatally destined to be beaten down to naught in the course of time—I admire him! I admire him always and even if the whole lot of it leads only to the man's breaking his own neck! One needs to forgive an occasional error and occasional unsureness in a man who is trying to fly![307]

Again, note Boccioni's vocabulary: "as pure an exaltation as of those who were raised by religious contemplation of the divine mystery" (altrettanto puro ed esaltatore di quelli che furono innalzati dalla contemplazione religiosa al mistero divino); "but nevertheless when I think of one who takes and starts from some initial elements or premises that are *his inner light*, his intuition, and with a pride verging on madness, with an iron law that is simply terrify-

ing, attempts to construct a system" (ma malgrado ciò quando penso all'uomo che prendendo e partendo da alcuni elementi primi o premesse che sono *la sua luce interiore*, la sua intuizione e su questi con un orgoglio che delira, con una legge ferrea che incute terrore, tenta di costruire un sistema [emphasis mine]). This vocabulary goes well beyond that appropriate for imparting the exhilarating experience of machinic speed—or rather, it has taken that experience and elevated it, to elicit the transcendent.

That benchmark idea of heterodox thought—that ultimate reality is energy/vibration—also appears in *Pittura scultura futuriste (dinamismo plastico)*. The passage just cited alludes to that belief, but the following passage (drawing on theories of electromagnetism) impresses on us the fervour with which Boccioni maintained that conviction:

> Hertzian waves carry thousands of miles across oceans, and through deserts, the feverish pulse of the races [energy operates across space]. The microbe is pursued into the unfathomable depths of matter, studied in his habits, photographed and fixed in his infinitesimal individuality [this activity suggests the lust to penetrate nature—*organic* nature—to its core]. The electrons in the atom, spinning in their tens of thousands, are separated from each other like the planets of the solar system [the macrocosmic and microcosmic scales imitate one another]—how they orbit at a speed inconceivable to our minds, and the atom is already visible to our eyes and to our optical instruments [we have come to penetrate matter, and our sensory mechanisms and sensory instruments have adjusted to this new reality] . . . The continents are cut, the oceans sounded, and some have descended into the throats of incandescent volcanos [note the conjoining of an allusion to electromagnetism (with the term incandescent) and an allusion to the animal being of natural phenomena implied in the choice of the term *throats*—the expression "gole incandescenti dei vulcani" is highly overdetermined] . . . And we artists? We tarry over dividing nature into landscape, figure, etc. ETC. [artists still trade in Newtonian/perspectival forms that place a figure against a ground], to calibrate the perspective of a road, and tremble in terror of not being understood, not being applauded [artists are so cowardly they won't challenge people to experience à nouveau] . . . and quake foolishly if we have to ravish a light, disrupt a form, or construct any work that departs from the traditional aesthetic laws [artists must have the courage to defy convention if they want to reveal the new reality]![308]

Artists who in great numbers are incapable of or unpractised at intuition have been left behind. A new "man" (of course, a male) will have to come forth, a man whose being is attuned to the velocities into which history has carried him.

For Boccioni, intuition is a rigorous experience that makes extreme demands on the soul.

> For every new interpretation or creation, a new effort of intuition is necessary. It forces the artist into a state of terrible tension in order to be able to remain continuously in the interior of the object, living its sensibility and recreating its unity. These forces or directions appear in the form of an infinite number of incidents, which are so many inspirations . . . the mysterious suggestions of lyrical deformation.[309]

Like Bergson, Boccioni thought of reality as flux. We ordinarily misconstrue reality by conceiving it intellectually as French painters (the Impressionists and the Cubists) did. Intuition, that mental ability that the Impressionists and Cubists (as later modernists) could not engage with, allows one to identify with the truth (that is, reality-in-flux). Speed overcomes space and time, for the accelerated speeds of modern life are approaching the condition in which one can instantaneously be anywhere and everywhere at once. The Russian esoterist Pyotr Demianovich (P.D.) Ouspensky (Пётр Демьянович Успенский; Pjotr Dem'janovich Uspenskij, 1878–1947), whose works were much admired by the Italian Futurists' Russian followers, declared that time and space are illusory—that all of reality is accessible from everywhere, without variation, and exists all at once. Boccioni evidently believed the same—or at least that it had become true for those who lived at the speed of light. The accelerated speeds of modern life, electricity, and, of course, the cinema, with its native words-in-freedom character, had cooperated with the radio and other electromagnetic technologies to endow humans with an amplified ability to experience the higher reality that intuition alone among the human faculties divulges.

Once the metaphysics underlying the Futurists' interest in speed and the interrelations among the ideas of *interpenetrazione*, *linee di forza*, and *continuità dello spazio* is grasped, the Futurist movement itself appears quite differently than it does in those presentations that treat it primarily as a product of industrial development (and that, as a consequence, overlook its links to Symbolism's occult metaphysics). Indeed, I suggest that the best way to understand these themes is through Marshall McLuhan's media theories. In *Understanding Media: The Extensions of Man*, McLuhan writes, "The clock and the alphabet, by hacking the universe into visual segments, ended the music of interrelation. The visual desacralizes the universe and produces the nonreligious man of modern societies" (here McLuhan uses the term "modern" as I do, to refer to era ca. 1450–ca. 1875). The Futurists, I suggest, largely under the influence of Bergson—who, like McLuhan, used the figure of the clock to suggest our habit of thinking of even the most basic reality, viz., time, as being divided into discrete segments—were endeavouring to overcome these habits of division so as to apprehend the whole (think about the frequency with which Futurists used the terms the "whole," "unity," and

"totality").[310] They intuited that if they could break the habit of thinking of reality as composed of discrete bundles of matter distributed through space, if they could succeed in encouraging people to experience the whole, and if they could accomplish art's (Lamarckian) evolutionary task of advancing the "race" (*razza*), which would enable people to take up the transcendent vantage point that history (the new science) has afforded, the material of the universe will be resacralized—that is, the *material* of universe would be spiritualized, by being understood within the perspective of the whole.

Once one sets upon this track, one easily accumulates evidence of the Futurists' heterodox interests. "La pittura futurista: Manifesto tecnico" asks whether any contemporary can believe in the opacity of bodies, now that we have acquired new powers of seeing, analogous to X-rays.[311] With this, Boccioni (likely the author of this section of the technical manifesto) likens the heightened powers of intuition (in comparison with reason or analytical thought) to the powers of X-rays, which lead one into the heart of the objects of the circumambient world.[312] In the *Stati d'animo* series (*Stati d'animo: Gli adii* [States of Mind: The Farewells], *Stati d'animo: Quelli che vanno* [States of Mind: Those who Go], and *Stati d'animo: Quelli che restano* [States of Mind: Those who Stay]), he investigated how the intensity (that is, the energy) of Futurist colour and Futurist dynamics could transmit emotion through the phenomenon of *interpenetrazone*.

Boccioni, then, likely associated the newly acquired control over X-rays with the idea of expanding one's sensory abilities. Other Futurists' thoughts on X-rays also associated them with commanding the atomic realm—with governing what was once invisible and unknown. X-rays, understood at the time to be an electromagnetic relative of the cinema, also appear as a topic in a science fiction story by Marinetti. Published in 1915, "La guerra elettrica (Visione-ipotesi futurista)" (Electric War: A Futurist Vision-Hypothesis) offers a vision of a realm about one hundred years hence (that is, ca. 2015) in which electricity has been harnessed so completely that the need for toil has been eliminated.

> La fame e l'indigenza scomparse. La amara questione sociale, annientata. La questione finaziaria, ridotta alla semplice contabilità della produzione. Libertà a tutti di far dell'oro e di coniare monete lampanti.
>
> Finita, ormai, la necessità dei lavori faticosi e avvilenti. L'intelligenza regna finalmente dappertutto. Il lavoro muscolare cessa alfine di essere servile, per non aver più che questi tre scopi: l'igiene, il piacere e la lotta.
>
> Gone are hunger and poverty. The bitter social question, annihilated. The financial question reduced to a simple accounting of production. Freedom for all to make gold and strike gleaming coins.

> The need for exhausting and humiliating work has by now come to a close. In the end muscular work ceases to be servile, so as to have no more than these three goals: hygiene, pleasure and struggle.[313]

The whole earth is regulated electrically—that is, the scope of the will has been extended well beyond humans' physical reach, to take control over the entire globe. "Con una facilità sorprendente," writes Marinetti, "gli scienziati governano le docili masse degli elettroni. La terra che già sapevamo interamente composta di particelle elettrizzate, è regolata come un enorme rocchetto di Rumkorff" (the Ruhmkorff coil is an induction or "spark" coil, a type of transformer used to produce high-voltage pulses from low-voltage direct current; it was widely used in X-ray machines—and in quack-electrotherapy devices).[314] X-rays, we know, were considered to be a spiritual force (or a spiritual force that the postmodern age had materialized). In Marinetti's prescient science fiction, electricity, understood explicitly on the model of X-rays, has coerced all nature, right down to its most minute particles, into complete submission, and a radical extension of the spirit has brought all of nature, once the realm of accidents, under regulation.[315] This detached control over nature suggests transcendence. Agriculture, too, is electrically—that is to say, transcendentally—regulated: trains with horizontally rotating arms sow the surrounding fields with seeds. We have noted that a *topos* of the discursive regime of the early electromagnetic age identified electricity as a vital force. In keeping with this, Marinetti's "La guerra elettrica (Visione-ipotesi futurista)" depicts electricity as a vitalizing energy when it suggests that humans will avail themselves of electricity's ability to propagate and germinate seeds by taking into itself soil's nutritive powers and distributing them to plants. Here Marinetti imagines the once natural (poi-etic) domain of agriculture being brought into an electric order. This is possible because of the affinity between the organic and the electromagnetic realms: "This explains why trees sprout in great numbers from the earth and cluster together in little forests in vast oases, extending their branches . . . Great wooded areas and immense forests arise, matting together like a layer of felt spreading ever higher up the sides of mountains, thereby obeying our Futurist wishes."[316] The earth, under electricity's transcendent governance, is so vitalized that it produces to its full capacity and the earth is galvanized into producing new fruit, such as the "beautiful orange that so long ago was promised to our thirst but now, at least, has been conquered." That last phrase says much about the transcendental powers with which electricity endows the will.[317]

The Italy portrayed in "La guerra elettrica" enjoys a plentiful supply of electricity produced from clean and renewable energy sources. All available sources of clean electric power have been harnessed: "All electricity imma-

nent in the atmosphere above us, and all the incalculable telluric electricity [electricity that runs through underground channels or through the sea] has at last been turned to utility."[318]

Some of the sea's "perpetual motion" is transferred to iron rafts that supply two million motors, while other maritime energy is accumulated in the Apennines in cages of crystal and iron—Marinetti, in a trope that suggests the impact that notions from the science of electromagnetism were having on literary and philosophical idea about consciousness and the human dynamo, described this network of cages and the motors connected to them as an enormous nervous system.[319] From these storage sites, the electrical energy is beamed throughout the world without the aid of conducting cables (a startling prognostication of our wireless world).

In this electronic society, it is engineers and scientists, not artists, who are privileged, for it is they who control the flow of electric currents in high-voltage rooms and who survey the distribution of those currents from monoplanes.[320] Their efforts bring the whole earth under electronic regulation—the earth's Gaia body has become electromagnetically regulated, just as the human body is. Society has been purified: it has discovered its gold or its Philosopher's Stone. Goods are available in such abundance that questions regarding the distribution of wealth have paled to relative insignificance. But those changes have not extinguished the human competitive drive. Rather, they have transformed it into a drive for pure enjoyment:

> Humans, no longer having to struggle to acquire provisions, conceive in the end the pure idea of the ascensional record [note the word choice]. Will and his ambition expand.
>
> All excesses are in play in all souls. Emulation drives relentlessly towards the impossible, purifying itself in a field of speed and danger. All intelligences, having become lucid [the prevalence of electricity renders all intelligence lucid], and all instincts being led to maximum splendor [instinct leads beyond where reason can go, to splendour], jostle each other for a superabundance of enjoyment. Since everyone comes easily to possess all the food he or she needs, all can perfect their lives through innumerable antagonistic efforts. Anarchy of perfections.[321]

In time, this "anarchia dei perfezionamenti," in which "free intelligence reigns everywhere" and there is a "surplus of pleasure," gives way to a devastating electric war.[322] This war is horrible, and the most potent weapons used in it are electrical: enormous pneumatic machines release electricity. The air becomes toxic, industrial cities are crippled by electric discharges, and ports are destroyed. But Marinetti, of course, sees this as furthering evolution: electric war serves a hygienic purpose, for through it "the weak and the infirm are ground up, crumbled, and pulverized by the vehement wheels of intense

civilization."[323] Furthermore, technology in "La guerra elettrica" is applied not just as a weapon but also as a shield from its own destructive effects. Between battles, scientific procedures are applied to eliminate illnesses. With their bodies protected by rubber, lead, and bismuth, radiotherapists "will lean their spectacles made of lead salts over the piercing and curative danger of radium."[324]

Understanding the Futurists' (somewhat covert) allegiance to the extravagant metaphysics of Symbolism even leads us to understand differently the polemical intent behind the name Marinetti took for the movement. Boccioni (and other *futuristi*) accepted an idea that was widespread in heterodox circles in the late nineteenth and early twentieth centuries: that the new age had accelerated the evolutionary process, that a "new man" was about to come forth, and that they (the Futurists) were the early prototypes of the species to come. Boccioni lambasted the skeptics for being too timid to take this step:

> They deny that scientific discoveries have completely remade the fabric of our mental world, that there has been a radical change in our spirit and for the same reason that the changed conditions of existence as animal species have multiplied in form, structure and character with altered conditions of existence, so electricity and telegraphy, steam and aviation have deepened the gap in mental difference between ourselves and our grandfathers (now so much wider than between them and, for example, the century of Aristotle) [note the connection made between electricity, spirituality, and the new *forma mentis*]. And thus our conviction that our time initiates a new era naming us the primitives of a new and completely transformed sensibility
>
> In consequence, this new condition of scientific relativity is responsible for our feelings about seeking the absolute. We painters (for I shall be speaking about painting) feel that we divine in this a psychic force that empowers the senses to perceive what has never been perceived before. We think that *if everything tends toward Unity* [Marinetti's capitalization], man has so far perceived in unity only the miserable, blind, infantile decomposition of things! Science, as we see it, has driven us back into a marvelous higher barbarism which makes us hungry for reality.[325] [Science has been wrong-headed, but its errors have carried us to a higher primitivism; members of the Toronto School of Communication deliberated on the question whether the electric media were effecting a Vichian *ricorso* to barbarism, which would then lead to a new, poetic consciousness and language.]

The Futurists thought themselves to be the primitives of this new sensibility partly because they deemed themselves to be the first of the "new men," that is, the first to have developed a capacity for intuition that the whole new race of humans would soon enough possess. They also understood themselves as *primitives* of the new era for reasons we can understand most easily, perhaps,

by their analogy with Marshall McLuhan's idea that the sensory forms of the new human would lead this new race towards a new tribalism. Here we enter into the terrain where Futurism meets Fascism.

As parlous as these proposals were, we should attempt to fathom their inner meaning, for doing so will strongly suggest why the notion that Futurism was an art of the machine merits a more complex interpretation than it has commonly received. The "new race," whose appearance the Futurists longed to hasten, was not simply an improved human being. It might seem difficult today to understand that the "new age" that would see the birth of this "new race" would be the consequence of suffusing the emerging technologies with spirit, but that belief is central to Futurism. Perhaps the easiest way to understand this idea is by considering the analogy to our time. Many advocates of new media celebrate digital art for the close relationship it draws between mental processes and the structures of artworks: even more than modernist poetry or the cinema, digital art forms are celebrated for imitating the structures of consciousness. Consciousness is understood as a network of interconnected and multilayered circuitry, and digital artworks can assume analogous forms. Not only does this new domain embody or reflect thought processes more truly than media, it has even become an archive of intelligent forms. Artmaking, new media theorists sometimes suggest, has evolved to the stage where (it is believed) an individual artwork can imitate thought and where artworks collectively can record the history of intelligence.

Out of the belief that digital artworks' forms and the dynamics of thought processes are similar has arisen the faith that the new technology has ushered in a new spiritual age: digital technology, because it resembles the processes and contents of mind, is *geistig*, spiritual, and the *geistig* character of the dominant technology of our age has endowed our age with a spiritual form.

The Futurists' ideas about technology's *geistig* character were similar. The technology of their era had accelerated phenomena to the point that matter was being converted by speed into energy. Thus the dominant technology of their era, as it underwent further development, would bring forth a new era possessing a spiritual form, and a new race with a new mentality evolved by this evolutionary process would be at one with the technologies of speed.

Like Symbolism, Futurism sought the unity of all that is, namely the absolute. What distinguishes the Futurist conception of the absolute from the Symbolist concept is that among its fundamental determinants are rigorous ideas about energy drawn from the science of electromagnetism. (But even in this respect, there is a clear filiation between the Symbolists and the Futurists: though the Futurists developed their ideas of velocity, fields of energy, *compenetrazione*, *linee di forza*, and the plenum through a remarkably deep understanding of the implications of Faraday and Maxwell's science, these

ideas are basically an elaboration of the idea, common in the late nineteenth and early twentieth centuries and embraced even by the Symbolists, that the absolute is vibratory energy.) The sometime Futurist Ardengo Soffici, whose writings on Impressionism exerted such a profound influence on the Italian art movement, expressed similar convictions to those we have seen expressed by Marinetti and Balla:

> A body . . . appears . . . not as a concrete, tangible reality, but rather like a nucleus of luminous and iridescent vibrations which diffuse themselves and are differentiated amongst themselves only by having a greater or lesser chromatic intensity. It is apparent that the origin of motion, according to Impressionism, is given solely by the deformation of the bodies by light.[326]

The body, Soffici claimed, dissolves into its aura, its luminous being. Similarly, in an article published in C*ronache d'attualità* in July 1916, Bragaglia wrote about the "vibrante corpo" of the dancer, Thaïs Galizky, a body etherealizing into energy.[327]

All of these writings expound the idea that the experiencing of the self / the body / the individual object dissolving into the absolute, into changeable light and fluxing electromagnetic reality, is felt as an exhilarating liberation, for it is in this way that the Futurist self becomes a conduit for an impersonal–supra-personal dynamism (this is a very Schopenhauerian conviction). The passage from Boccioni's "Fondamento plastico della scultura e pittura futuriste" (The Plastic Foundations of Futurist Sculpture and Painting, 1913; a text of signal importance) quoted above argues for a monism of energy-that-can-be-matter: vibrations fill what coarser human sensibilities take to be empty space, but scientists have come to know and Futurists have come to experience as a pulsing energy. Science, the Futurists argued, had revealed that emanations, light, and other forms of electromagnetic energy form the essential character of reality—this is another instance of the fusion of scientific and occult principles bringing forth a peculiarly Romantic cosmology. Light in Boccioni's thought has a metaphysical status similar to that which the aura has in Theosophical thought: all reality is vibration, energy, or light; sometimes that energy is more congealed (and the coarser sensibilities belonging to humanity's past took this congealed energy to be matter), and sometimes that energy is more diffuse (and closer to what those sensibilities took to be the very nature of energy). Even some Romantic social theorists with a scientific bent adopted the notion, assimilating the transmission of human thought, the spread of ideology, the effects of hypnotism, the phenomenon of somnambulism, electromagnetism, and imitation to the transmission of waves through the aether. The sociologist Gabriel de Tarde (1843–1904) attempted to approach sociology in much the same way that

a chemist approaches his discipline, resolving sociological processes into psychological interactions between individuals—the forces involved in these reactions he termed imitation and innovation. It is his notion of imitation that is germane to our topic, for de Tarde claimed that inspiring human examples "tend to propagate themselves [through imitation] at a more or less rapid, but regular, rate, like a wave of light."[328] Making a similar point, he stated that "imitation plays a role in societies analogous to that of heredity in organic life or to that of vibration among inorganic bodies"—and imitation is propagated like light.[329]

The throbbing, intensified, spiritualized body is at one with this general form of energy. Photographic emulsion, which records spectral being, responds to these energies, and that engendering process endows the photograph with an affinity for spiritual realities. The cinema is a photographically based medium, susceptible to the influence of electromagnetism—but it has the virtue of also recording the pulsing, throbbing nature of kinetic energy. The logic is clear: the cinema is the paradigmatic new (Futurist) art.

Furthermore, this energy, this single reality that permeates the entire universe, the *futuristi* proclaimed, throbs and pulses, and when we recognize that our nature partakes of its character, then we understand that we, too, are destined for the speed, the dynamism, of modern (then contemporary) reality. Boccioni (like the Theosophists) believed that luminous emanations mediate between the physical body and more ethereal forms of energy (and energies of those sorts were commonly understood to be aetheric). This vibratory reality is what Boccioni's Divisionist brushwork reveals. Boccioni used the idea that a single energetic, vibratory reality permeates all things to ground his explanation for the use of plastic analogies in his work: in one passage in *Pittura scultura futuriste (dinamismo plastico)* he develops the idea with an extraordinary rigour. I present an extended excerpt from that text:

> The new plastic will be the translation in plaster, in bronze, in glass, in wood and in any other matter, of the atmospheric planes [we have already seen that by atmosphere, Boccioni means energy field] that bind and cross things. This way of seeing, which I have termed physical transcendentalism, will be able to give plastic form to the mysterious sympathies and connections that produce the mutual shaping influences that objects' atmospheres exert on each other . . . No one can doubt that an object ends where another one begins . . . so, from the armpit of a mechanic will emerge a car wheel; so the line of a table will be able to cut the head of the one who reads and the spreading fan of a book's pages dissect the stomach of the reader. [Reality is not divided into objects as we conventionally understand it to be.]
>
> A valve opening and shutting by itself creates a rhythm as beautiful, but of infinitely greater novelty, than that of an animal's eyelid! . . .

> We do not, as everyone believes, make a painting that is simply abstract and intellectual; rather we strive to render plastic and concrete, by means of a refinement of sensibility, what was considered incorporeal, immalleable, and invisible. [Boccioni asserts that he seeks to materialize the spiritual—this sort of incarnation, the becoming-material of the spiritual is an ordinary phenomenon. (This lends support to my claim that the metaphysics of Futurism is a version of neutral monism.)]
>
> . . .
>
> Dynamic form is a kind of synthesis through analogy that exists at the border between the real object and its plastic-ideal potential and can be understood only through bursts of intuition.
>
> We can affirm and plastically create vibrations, emanations, densities, movements, the invisible halo between the object and its action, the synthesis that proceeds through analogy and exists on the border between the real object and its plastic Ideality [note that Boccioni once again asserts that the boundary between the material and spiritual/Ideal is permeable and that the process of the spiritual's becoming-material is viable], in sum all that represents life.
>
> The latest scientific hypotheses, the immeasurable possibilities offered by the chemistry, physics, biology and all the discoveries of science, the life of the infinitely small, the fundamental unit of energy that gives us life [energy is vital], everything leads us to create awareness of plastic similarities with these new and wonderful conceptions of nature.[330]

I remarked above on the metaphysical significance of the Futurists' effort to render plastic and concrete what is considered incorporeal, immalleable, and invisible. Marinetti confirmed the enduring nature of the aspiration to evoke that metaphysic, for in a very late poem/manifesto, "Poesia simultanea della luce tessuta," he wrote,

> With the utmost speed
> Severity of the control mechanisms
> Delirious vociferation of molecules
> We would give our lives yes our lives cohesion and joyful dance of electrons for a single strand
> We echoed a billion traveling vibrations from the Milky Way that one flowering reflection may bloom among us.[331]

That was written long after Futurism was a vital, transformative force. But (to indicate the relatively high degree of consistency of their views over time) I note that Gino Severini testified to similar aspirations towards transcendentalist, non-objective painting in his manifesto "Analogie plastiche del dinamismo: Manifesto futurista" (Plastic Analogies of Dynamism: A Futurist Manifesto, 1913):

> We want to enclose the universe in the work of art. Individual objects no longer exist for us. [There are no self-contained, simply located objects.]
>
> We must forget exterior reality and our everyday knowledge of it in order to *create* new dimensions, and through our artistic sensibility we will discover their order and extent in relation to the world of plastic creation.
>
> In this way we shall express artistic emotions which are not only related to a particular emotional environment, but connected to the whole universe [in electromagnetic reality, everything affects everything]; for matter, considered in its effects, encloses the universe in an enormously vast circle of analogies, which start with affinities or resemblances and end with specific contrasts and differences. [332]

There is good reason to believe that Severini patterned these ideas on the esoteric idea of signatures. W.P. Swainson explains Paracelsus's version of this esoteric idea:

> The universe is composed of an infinite number of entities, all interacting and interdependent. Everything has an influence, either slight or great, upon every other thing. All things are constantly sending out vibrations which bring them in contact with the human organism, every human organism having a complex vibration peculiar to itself, and determined by its individual signature.
>
> Not only is man influenced by the stars [which Swainson says operate by magnetic influence], but everything by which he is surrounded is ceaselessly sending him vibrations, and so adding to his harmony or discord. They are thus ever leaving their impress, or stamping their signature upon him, by means of these vibrations.[333]

Severini continues:

> Thus the sensation aroused in us by a real object of which we know the volume and blue color can be expressed artistically through its formal and chromatic complementaries, i.e., round shapes and yellow colors.
>
> For exterior reality and our knowledge of it no longer have any influence on our plastic conception, and, as for memory's effect on our sensitivity, it is only the memory of the emotion that remains [the influence of the affecting energy lingers in the affective image], not the memory of the cause that produced it.
>
> Memory, therefore, will act in the work of art as *an element of artistic intensification* and as a true emotive source that is independent of any unity of time or place, and as the sole *raison d'être* of an artistic creation.[334]

We see here, as so often in Futurist thinking, the Symbolist idea of correspondence (or analogy) being extended into an all-embracing metaphysics, in which the individuality of the particular object is annihilated and transformed into emotional resonances (resonances that are as much outside the

experiencer's skin as within it).[335] So Severini continues: "The abstract colours and forms that we portray belong to a Universe outside of time and space."[336]

The character of the higher reality that the Futurist painters strove to evoke is evident as well in the curious appearance of Balla's *Compenetrazione iridescente No. 1* (Iridescent Interpenetration) among his works of 1912. Balla's other work of that year includes the paintings for which he is best known: the charming *Dinamismo di un cane al guinzaglio* (Dynamism of a Dog on a Leash, a.k.a. Leash in Motion), which portrays, with means obviously influenced by Marey's chronophotography, a dachshund scampering beside its mistress, whose skirt is all aswirl; *La mano del violinista* (*Ritmi del violinista*) (The Hand of the Violinist [Rhythms of a Bow]), a painting that depicts several positions of the violinist's moving hand, on a surface whose triangular shape itself elicits an impression of dynamism; and *Bambina che corre sul balcone* (Girl Running on a Balcony), a work whose dynamic effect combines the influences of Marey and Eadweard Muybridge. But among all these works, which strive to capture an action that unfolds through time on a single surface, *Compenatrazione iridescente No. 1* appears exceptional—a completely abstract work and a forerunner of the op art of Bridget Riley (b. 1931) and Richard Anuszkiewicz (b. 1930). In that work, Balla attempted to arrange colours of varying intensity (generally more intense on the right and less intense on the left) into a pattern (interlocking dovetails of tones) to create a vibratory effect. Three of the works I have listed from 1912, *La mano del violinista*, *Bambina che corre sul balcone*, and *Compenetrazione iridescente No. 1*—three works that (although each has a form remarkably different from the others') all treat the subject as matter-becoming-vibration—suggest, first, that intuition, which participates in the inner reality of any material form whatsoever, reveals that material form to be energy, and second, that the sensation of apparent or induced motion (vibration) can serve for Balla much the same role as the representation of an object in motion. We see that the intense apparent or induced motion produced through juxtaposing colour can present form-becoming-energy, just as motion can. That equivalence reveals much about Balla's (and other Futurists') belief in the ideality of the higher reality—as do the Futurists' claims for the importance of the Divisionists (who relied on the phenomenal mixtures of complementary colours to produce vibratory effects). This belief did much to intensify their interest in the contents of consciousness.

Three years after he produced these paintings, Balla reflected on what had brought him to make them and on the next direction that art should take. In "Fu Balla—Balla Futurista" (The Late Balla—Futurist Balla), he contended that the machine arts had destroyed the uni-perspectivism of traditional painting. The art that would serve the immediate future would be a new spiritual

art—dynamic, like the cinema, but with its spiritual character marked by use of purely abstract forms: "With the perfecting of photography, static traditionalist painting has completely fallen from repute; photography kills static contemplation. Watching a cinematographic performance we find ourselves in front of a painting in movement that consecutively transforms itself to reproduce a given action."

Balla thus suggests that photography and the cinema had transformed the arts (which is one of the theses of this present book). What specifically brought about this transformation, he believed, was that the cinema had transformed the character of aesthetic experience. All previous art required serene contemplation, while photography and film disturb us and energize us, making contemplation impossible. Accordingly, they made new forms necessary—and even works realized in traditional media were subject to that imperative. Balla recognized that the cinema was allied with the most radical developments in visual art at the time. His paragonal statement continues:

> Static traditionalist painting was vanquished because it was obliged to transfix one single point among the infinite variety of aspects of nature. Mechanics have overtaken the traditionalist painter and forced him into becoming a pitiable imitator of static and exterior forms. It is imperative therefore not to halt and contemplate the corpse of tradition, but to renew ourselves by creating an art that no machine can imitate, that only the artistic Creative Genius can conceive [note that Balla uncouples the new art from routine machine effects—only Creative Genius matters in conveying the universal flux]. Futurism, predestined force of progress and not of fashion, creates the style of flowing abstract forms that are synthetic and inspired by the dynamic forces of the universe.[337]

Here Balla is giving voice to the Futurist principle we encountered earlier—that the kinetic character of Futurist art reflects the dynamism of the universe, experienced through a higher noetic process. But he goes further, by asserting that the sensation of universal dynamism can be evoked by abstract forms, which can be created only by a Creative Genius. In asserting that this new art must be abstract, he carries the Futurist themes of *interpenetrazione* and *dinamismo universale* to their logical conclusion: the true metaphysics is a process metaphysics, and that metaphysics should be reflected in Futurist art.[338]

Balla continues his deliberation on the impact of photography and the cinema on the visual arts with a summary of past efforts and a declaration of his future direction. The first stage of his career took him from objective, realist work to "Divisionist researches," work that attracted public recognition. But he set aside the work that had brought him so much success and embarked on a second phase of his career, Futurism, which work garnered dismay, ridicule, incomprehension, laughs, insults, incredulity, and public

vituperation. Nonetheless, in creating his Futurist pieces, he conducted his "first plastic researches into movement (speeding automobiles people in movement)." Now, he declares, he will take this work further:

> Continuation researches. Analysis reality abandoned definitively. Creation new Futurist style: synthetic abstract subjective dynamic forms.
>
> Still research more struggle.
>
> ON WITH FUTURISM.[339]

The photograph, Balla avers, allows for too little creativity, and creativity is the very principle of dynamism. Abstract forms are what is required (speed makes all things plastic, and in the end, an interest in infinite plasticity requires that one turn to abstraction). A pulsating abstract photography is difficult to imagine; a film made of moving abstract forms, embodying a universal dynamism, is easier to envision.[340] This is the cinema that Balla and his colleagues would advocate in the following year, in the "Manifesto della cinematografia futurista."

## THE *SERATA FUTURISTA* AND THE VARIETY THEATRE

Marinetti's prodigious activities in publishing Futurist writing notwithstanding, the Futurists' most common means of reaching out to the public was the Futurist evening (*serata futurista*). These *soirées*, which combined theatrical interludes, music, oral delivery of political diatribes and poetic declamations, discussion, taunts, and efforts at provoking a riot, were mounted in cities throughout Italy. A manifesto, "Il teatro futurista sintetico," co-written by Marinetti, Settimelli, and Corra, revealed the role that improvisation played in these presentations, and why it played that role:

> *Dynamic, simultaneous*. That is, born of improvisation, lightninglike intuition, from suggestive and revealing actuality. We believe that a thing is valuable to the extent that it is improvised (hours, minutes, seconds), not extensively prepared (months, years, centuries).
>
> We feel an unconquerable repugnance for desk work, *a priori*, that fails to respect the ambience of the theater itself. THE MAJORITY OF OUR WORKS HAVE BEEN WRITTEN IN THE THEATER. The theatrical ambience is an inexhaustible reservoir of inspiration: the magnetic circular sensation that pervades the gilded emptiness of a theater at a morning rehearsal when the brain is still tired [note the reference to magnetism as activating the theatre/brain/nervous system]; an actor's intonation that suggests the possibility of constructing a cluster of paradoxical thoughts around it [note the allusion to paradox, eliciting the notion of alogic]; a movement of scenery that becomes the starting point for a symphony of lights; an actress's fleshiness that fills our minds with genially full-bodied notions.

> . . . Our Futurist theater couldn't care less about Shakespeare, but it pays attention to the petty gossip of comics; it's put to sleep by a line from Ibsen, but inspired by red or green reflections from the stalls [colour, a form of electromagnetism, is more enlivening than Ibsen's language]. We ATTAIN AN ABSOLUTE DYNAMISM THROUGH THE INTERPENETRATION OF DIFFERENT TIMES AND ENVIRONMENTS . . . In the Futurist synthesis, *Simultaneity*, there are two ambiences that interpenetrate and many different times put into action simultaneously.[341]

Here once again, Futurists were proposing a synthetic form to suggest simultaneity. This ideal was reflected in their valorization of a dramaturgical reduction to produce a work so compact it could seem to occur all at once.

A key influence on Marinetti's conception of the *serata futurista* was the audacious, shocking, and vulgar *oeuvre* of Alfred Jarry. Marinetti's first play, *Le Roi Bombance* (or King Revel, alternatively known as The Feasting King), was staged at the Théâtre de l'Œuvre, the same theatre where Jarry's *Ubu Roi* had caused such a commotion in December 1896. Marinetti's play (written in 1905 and performed in 1909) was almost as controversial: the protagonist of *Le Roi Bombance*, the Idiot Poet, is mocked by the thick-headed hoi polloi because he quests incessantly for freedom. When mounted, the play succeeded in provoking hostilities similar to what its protagonist was depicted as encountering: a principal feature eliciting this outrage were the high-volume sound effects of the second act, which presented the rumblings of a priest's digestive system. While the performance was ending, the audience jeered: "Il est fou! Arrêtez-le! À la Salpêtrière! L'art dramatique est en danger! À bas le Futurisme! Vive Poesia! À bas la pédérastie!"[342]

Another play by Marinetti, a three-act Symbolist work titled *Poupées électriques*, was first performed on 15 January 1909 at the Teatro Alfieri in Turin, in an Italian translation under the title *La donna è mobile* (Woman Is Fickle).[343] In the second act, John Wilson, an engineer in charge of several power plants, and his wife, Mary, share the stage with two purportedly electrified dolls (actually, the dolls were animated by human players). John and Mary discuss the puppets, who suggest what they will become: in the French original, the husband says to the wife, "Au fait, vos mécaniques sont identiques. Et c'est toujours l'électricité qui fait vibrer vos nerfs comme des fils bons conducteurs de volupté" (In fact, your machinery is identical [with the puppet's] . . . And it's always electricity that stirs your nerves likes wires that are good conductors of pleasure).[344] *Poupées électriques* too was very badly received—there were jeers from the audience, and Marinetti, taking a bow after the second act, responded, "Ringrazio gli organizzatori di questa fischiata che profondamente mi onora" (I thank those who organized this booing, which makes me feel profoundly honoured).[345] Marinetti reworked

the play in 1919, compressing it into a single act and renaming it *Elettricità sessuale* (Sexual Electricity). The revised version is more explicit about the play's synthesis of electricity, sexuality, and robotic humanity.

But the main influence on Marinetti's conception of the *serata futurista* was the *teatro di varietà*. He appreciated that this sort of theatre was not bound by tradition and that it constantly revised its materials to deal with topical subjects (and constantly developed new ways of parodying new targets). Marinetti also admired the mixture of forms in the *teatro di varietà*, which included song and dance, clowning, acrobatics, and film. He expressed his thoughts on the revolutionary character of this type of theatre in his famous manifesto on the theatre, "Il teatro di varietà: Manifesto futurista":

> We have a deep distaste for the contemporary theater (verse, prose, and musical), because it oscillates stupidly between historical reconstruction (pastiche or plagiarism) and a photographic reproduction of everyday life; petty, slow, analytic, and diluted theater that is worthy, at best, of the age of the oil lamp.
>
> FUTURISM EXALTS THE VARIETY THEATER because:
>
> 1. The Variety Theater, born as we are from electricity [note the association of the new human with electricity and the attribution of generative powers to electricity], is fortunate in having no traditions, no guiding lights, no dogmas, and in being nurtured by the swift pace of contemporary events.
>
> 2. The Variety Theater is absolutely practical, for it proposes to distract and amuse the public with comic effects, erotic stimulation, or imaginative astonishment [these all intensify sensation].
>
> 3. The authors, actors, and stage technicians of the Variety Theater have only one reason for existing and succeeding: incessantly to invent new means of astonishment. Whence the absolute impossibility of standing still or repeating oneself; whence the persistent competition of minds and muscles in order to break the various records of agility, speed, force, complication, and elegance [the cinematic effect is obvious].
>
> . . .
>
> 5. The Variety Theater, being a profitable shopwindow for countless creative efforts, naturally generates what I call the *Futurist marvelous* [*il meraviglioso futurista*], a product of modern machinism [cf. the Surrealist notion of *le merveilleux*]. Here are some of the elements of this *marvelous*: 1. powerful caricatures; 2. abysses of the ridiculous; 3. improbable and delightful ironies; 4. comprehensive, definitive symbols; 5. cascades of uncontrollable humor; 6. deep analogies between the human, animal, vegetable, and mechanical worlds [one can find similar use of the notion of analogy in Symbolist writings, and specifically the alchemical strain of Symbolism—hence this point is connected to point "4"]; 7. flashes of revealing cynicism [the irony of cynicism, which, as expressed in literature, must be considered a perlocutionary form, is that it can induce epiphany]; 8. plots involving witticisms, puns, and conundrums

> that aerate the intelligence; 9. the entire gamut of laughter and smiles, to relax one's nerves; 10. the entire gamut of stupidity, imbecility, mindlessness, and absurdity, which imperceptibly push intelligence to the edge of insanity; [cf. the Surrealists on madness, and on simulated madness]; 11. all the new productions of light, sound, noise, and language, with their mysterious and inexplicable extensions into the most unexplored regions of our sensibility;… 13. satirical educational pantomimes; 14. caricatures of suffering and nostalgia, deeply impressed into the spectators' sensibility by means of gestures that exasperate with their spasmodic, hesitant, and weary slowness; weighty terms made ridiculous by comic gestures, bizarre disguises, mutilated words, smirks, pratfalls [this description evokes the American cinematic tradition of physical comedy].[346]

Marinetti and his colleagues were most intrigued that this mixture of forms provoked a raw, corporeal, dynamic form of experience. The *teatro di varietà* made no use of a story—Marinetti believed that a storyline would be counter to his purposes, which were to evoke, from moment to moment, new elements that would astonish the audience (a storyline makes a work's development predictable and so engenders a patterned, habituated form of response). Furthermore, the performers in *teatro di varietà* encouraged their audiences to respond actively to what they presented and thereby participate in creating the theatre-piece—sometimes catcalls from the audience would provoke a reply from the *futuristi* involved. The *teatro di varietà* was also anti-academic, naive, and primitive—attributes that Marinetti admired, since they could help destroy the solemnity of museum art.

The Futurists' variety theatre pieces were in a sense an extension of their *arte-azione* events, the *serate futuriste* (Futurist evenings). A *serata futurista* typically began with Marinetti and friends, sheltered by the bulk of the poet Armando Mazza, showering the city's more illustrious citizens with insults and abuse. Perhaps the audience's reaction would force the performers to suspend the rest of the program before this section reached its end. If not, there might follow an exhibition of Futurist painting, or the declamation of manifestos, or a noise concert (rather like the Dadaists' Bruitist efforts); all of this would be accompanied by occasional insults directed at the audience by the artists, and in particular by that master of offence, Marinetti. There might follow another segment devoted entirely to offering insults, in an effort to ensure that the *serata* ended with rioting. Whether the public reacted favourably or unfavourably was not important to Marinetti—all that mattered was that they react. Cultural tradition had made the public passive and submissive; Futurist art would reanimate them. So Marinetti claimed the success of a Futurist *soirée* was best gauged not by the amount of applause

but by the level of abuse received: on one occasion, to ensure vituperation, the Futurists sold every seat for a performance twice.

One famous *serata* took place at Turin's Chiarella Theatre on the evening of 8 March 1910. It included a reading of the "Manifesto dei pittori futuristi" from the stage, accompanied by sirens, whistles, shouts, and even fisticuffs (staged or otherwise), while the audience hurled rancid spaghetti and overripe tomatoes. Another Futurist *serata* that has become legend took place at Florence's Teatro Verdi on 12 December 1913. No sooner had the curtain risen than the volley of fruits, vegetables, and even spaghetti began. Marinetti began to declaim, and, as the Neapolitan Futurist poet and painter (of a comedic bent) Francesco Cangiullo (1884–1977) wrote, "the showers of potatoes, oranges and bunches of fennel became infernal." In response, Marinetti offered quips like, "I feel like a glorious Italian battleship in the Dardanelles, but the strong Turks aim badly."[347] As he made this remark, a potato hit him in the eye. Carrà responded, "Throw an idea instead of potatoes, you fools!" The theatre calmed down somewhat, and Marinetti began reciting Aldo Palazzeschi's (1885–1974) "L'orologio" (The Clock, 1910), "a lyrical and dramatic cry for human liberty, expressing," according to Marinetti, "the feverish and extreme anxiety of The Self striking to break its iron cage of fatality."[348] When he reached about halfway through lines that read "Oh! Com'è bello morire / Con un fiore rosso in fronte!" (Oh, how beautiful to die with a red flower opening at one's temples), someone in the audience offered him a revolver, daring him to shoot himself. Marinetti responded, "If I need a ball of lead, you deserve a ball of shit!" Papini then delivered a tirade; this was followed by another polemic, which Carrà offered "Contro le critiche" (Against Criticism): "Every people has the government it deserves, every people has the critics it deserves, but today Italy has an art it does not deserve at all: Futurist Art." After that, Boccioni delivered a discourse on Plastic Dynamism, then Marinetti began another insulting political diatribe against the conditions to which Italy had fallen (this one lamenting that liberty had become more important to people than Italy). A battle followed that spilled out into the streets and continued until the police carted the Futurists off to the police station, where a befuddled and incredulous Commissioner of Police demanded to know, "Who on earth makes you do this?"[349]

Because outraged responses, such as that which the audiences at the Chiarella and Verdi theatres displayed, were common, the Futurists attained a degree of notoriety. The police were usually on stand-by at these *soirées* for hours before the event began.[350] But they weren't concerned for the performers' security of person, and they rarely moved to protect the artists from the audience—in fact, in Bologna, the police joined with the crowd of 3,000 who attacked the eleven *futuristi*. They were keeping their eyes on Marinetti, who

had caused a scandal with the publication of *Mafarka il Futurista* in 1910. The officials' actions against Futurists reached an apogee with the prosecution of the great Futurist composer Luigi Russolo: the Futurist circle had planned a *serata futurista* at Milan's Teatro dal Verme that was to have included a concert using eighteen of Russolo's *intonarumori*. The civic authorities denied the Futurists permission to mount the concert on the grounds that it would likely produce a public disturbance; however, two parliamentary deputies and a distinguished conductor and operatic composer (he initiated the *verismo* style in opera) Maestro Umberto Giordano (1867–1948) intervened (despite Giordano's having been reviled as an enemy of Futurism in Praetella's "Futurist Music" manifesto) and that won Russolo permission to proceed. The expected brouhaha ensued, and after the concert Russolo ended up in court for striking the Honourable Agostino Cameron and exchanging blows with the editor of a Catholic newspaper. Russolo was convicted and given a suspended sentence. On another occasion, in February 1910 in Milan, Marinetti was arrested on stage for shouting one of the Futurists' rallying cries, "Viva la guerra, sola igiene del mondo" (Long live war, sole hygiene of the world!) before a crowd of "ultra-pacifist clerical conservatives" (to use Marinetti's description). The day after that performance the Austrian and German authorities delivered formal protests to the appropriate authorities.

The formal and material features of variety theatre are important to understanding the interest that Marinetti and other Futurists took in it. But another key factor in that interest was political/promotional. Marinetti possessed a vast fortune, so he could fund his publications from his own resources and give away the entire run of publications to influential people. However, his publications could not reach the masses. Marinetti recognized that the cabaret theatre was the most popular form of entertainment in Italy at the time, so he took to theatre as a way of reaching the people his publications could not reach. And it did this largely by encouraging audience participation.

There are a set of practices in traditional theatre commonly referred to as "fourth wall" conventions. Much traditional drama takes place within a room (a parlour, a library, a dining room, usually from another place and time, supposedly represented on stage). The audience sees three of the room's walls and is supposed to imagine that a fourth wall is present at the front of the stage. The imaginary division between the onstage space and the auditorium prevents the audience from intruding on the action—and it is that illusion that allows the audience to overhear the conversations. Spectators cannot be participants, only (essentially) voyeurs. Marinetti rejected these "fourth wall" conventions; he realized their collective purpose was to sustain the representational status of the onstage actions. The room we see on stage represents a room from another time and another place, and the conventions

of the "fourth wall" announce that what appears on stage stands for something else. Those conventions support the fiction that the on-stage space is not continuous with the auditorium's—that theatrical "reality" is an illusion standing for "another place." This has the effect of converting what appears on stage into a sort of image.

The Futurists, including Marinetti, wanted their work to be not an image, but a machine that produced real, material effects (this was one dimension of Marinetti's idea of *fisicofollia*—"body madness"). For example, the desire to produce real physical effects was what drove Luigi Russolo to construct his *intonarumori* and create an art of noise (*arte dei rumori*). Similarly, it was the desire to make the theatre a productive device that drove Marinetti to dismantle the conventional barrier that separated the theatrical piece from the audience. The active character of the audience's response to variety theatre made evident the form's physical efficacity. Thus, Marinetti's "Il teatro di varietà: Manifesto futurista" (one of the most widely circulated manifestos) contends,

> The Variety Theater is the only spectacle that makes use of audience collaboration. The public is not static like a stupid voyeur, but joins noisily in the action, singing along with songs, accompanying the orchestra, communicating with the actors by speaking up at will or engaging in bizarre dialogues. The actors even bicker clownishly with the musicians.
>
> The Variety Theater uses the smoke of cigars and cigarettes to merge the atmosphere of the audience with that of the stage [that is, the smoke undoes the convention of the fourth wall]. And since the audience collaborates in this way with the actors' imaginations, the action develops simultaneously on the stage, in the boxes, and in the orchestra [the onstage space and the space where the audience sits are continuous—and this stands as a metaphor for the integration of subjective and objective reality in a higher reality].[351]

The spectators were to be forced, willy-nilly, into participation:

> Introduce surprise and the need to move among the spectators of the orchestra, the boxes, and the balcony. Some random suggestions: spread a strong glue on some of the seats, so that the male or female spectator will remain stuck to the seat and make everyone laugh (the damaged dinner jacket or toilette will be paid for at the door). —Sell the same ticket to ten people: resulting in traffic jams, bickering, and wrangling. —Give free tickets to men and women who are notoriously unbalanced, irritable, or eccentric and likely to provoke an uproar with obscene gestures, pinching women, or other freakishness. Sprinkle the seats with dusts that provoke itching, sneezing, etc.[352]

Marinetti and the Futurists were attempting to invent new forms that would render their art active: the art they strove to create would not depend on intellectual or ideational references, nor would it depend on faithful (that

is to say static) representations of past or present conditions, nor on retrospection (as the classic narrative text does). Its meaning would be perlocutionary (that is, its meaning would consist of the actual material effects of the work on the listener's or viewer's body). An interest in bypassing the intellect and addressing the body directly impelled the Futurists to consider the alogical character of the variety theatre (and the other theatrical forms they favoured). The variety theatre provided them with an example of an art whose significance depends hardly at all on verbal meaning—or, more generally, on anything like intellectual meaning. Their desire to produce a different kind of impact than those mediated by the intellect drove them to take an interest in an art of noise, in dynamic forms, in sound poetry, in aggressive movements, insults, and punches, in acrobats, jugglers, and other forms of "body madness." This desire to produce art that has a direct, physical, non-intellectual, non-ideational impact also led them to reject all forms of psychology and to propose a physical theatre. The *futuristi* were every bit as anti-psychological as Artaud, so they anticipated his efforts to develop what he would call "the theatre of cruelty." Like Artaud, Marinetti sentenced to death that literary construction, the authorial "I."[353] A materialist literature would come forth out of the rubble left behind by the collapse of psychological literature. "We systematically destroy the literary 'I' in order to scatter it into the universal vibration and reach the point of expressing the infinitely small and the vibrations of molecules… Thus the poetry of cosmic forces supplants the poetry of the human."[354] Matter in motion—in excited, vital motion—would become the topic of Futurist literature. Poets would stop projecting human emotion onto nature and instead would express the excitement of molecules, intuiting (that Bergsonian term) in matter "its different governing impulses, its forces of compression, dilation, cohesion, and disaggregation, its crowds of massed molecules and whirling electrons."[355] Marinetti came to the startling realization—at once a breathtaking anticipation of postmodern ideas and a statement of a traditional mystical conviction (also held by the Symbolists)—that intuition of—and, ultimately, identification with—the vital movement of reality resulted in the decreation of the self. Again, like Artaud, he believed that realization would allow the new humans to transcend the false distinctions between the organic and the inorganic, the human and the mechanical realms, as a chiasmatic exchange between the domains was initiated. Marinetti's idea of destroying the literary "I" anticipates Deleuze and Guattari's idea of the body without organs. The new body-without-organs would compound (Marinetti's word was "multiply") the male principle and the machine, and from this composition would come a superhuman hybrid adapted to speed and violence. At once an athlete, an aviator, and a warrior, this supermale would possess astonishing physical prowess.[356] Its consciousness, emptied of psychology (which Marinetti, in

1913, deemed "that filthy thing and filthy word"), evacuated of all atavistic and sentimental propensities, would be modelled on the dynamo.[357] The new machinic principle, the transfigured male body, would become the libidinal force, driving towards procreation; the machinic principle would thus take over what once was believed to belong exclusively to the soul.[358] Machine and spirit would be fused into an amalgam: the spirit would become machinic even as the machine became spiritualized—that, I believe, is what Marinetti and Pino Masnata proposed in two controversial, and often misread, statements from the "Radia" manifesto (the term "radia" [or "radio"] was chosen because its etymological root highlights the medium's connection to new technologies and to radiation [X-rays]) "Overcome the machine 'through identification of man and the machine itself destined to liberate him from muscular work and immensely enlarge his spirit'"[359] and to "overcome death 'through the metallicization of the human body and picking up the vital spirit as a mechanical force.'"[360] Note what is implied in the last assertion: the statement associates metallization with purifying the life-spirit—in fact, with the life-spirit *as a machine force*. The dynamism and energy of the machine is seen as a life-force.[361] Marinetti is claiming that humans will evolve towards the materio-spiritual condition of the machine: the human life-force (their spiritual being) will drive their increasingly efficient material being (now metallized) as the (spiritual) energy of the machine drives its (often hyperaccelerated) dynamic. The machinic will reign over space and time, realizing its will without resistance.

The signatories of the "Manifesto dei drammaturghi futuristi" proclaimed that

> 6. … One must introduce onto the stage the reign of the Machine, the great revolutionary shudders that move the crowd, the new currents of ideas and the great discoveries of science that have completely transformed our sensibility and our mentality as men of the twentieth century.
>
> 7. Dramatic art shouldn't be concerned with psychological photography [offering accelerated depiction of fleeting mental states], but rather with moving forward toward an intoxicating synthesis of life in its typical and significant lines [the language suggests a vital electromagnetic dynamism that engenders enthusiasm].[362]

Marinetti's interest in physical theatre as *fisicofollia* was connected to his belief that an enhanced human would result from a synthesis of human and machine. Much earlier than the texts we have been dealing with here—in fact, as early as 1910—Marinetti envisioned bodies "endowed with surprising organs." He also revealed a surprising provenance for this idea, noting that it was linked to spiritualist séances.[363] Even in this early piece Marinetti was proclaiming the evolutionary step that would allow humans to identify with the machine—and promoting enthusiastically the idea that this identification would be of a spiritual nature:

> Hence we must prepare for the imminent and inevitable identification of man and motor, facilitating and perfecting a continual interchange of intuitions, rhythms, instincts, and metallic disciplines [note the extraordinary amalgam of spiritual and machine lexemes] that are absolutely unknown to the great majority of people today [the superman will have to take this step into the future] and are divined by only the most clear-sighted minds [this identification is divulged in higher insight].[364]

Furthermore, he cited Lamarck as the source of these ideas on evolution. Here is an excerpt from this extraordinary text, which even anticipates Marshall McLuhan's understanding that we need altered ways of experience in order to survive the shocks the new age will rain down on us:

> If we grant the transformational hypothesis of Lamarck, we have to recognize that we are aspiring to the creation of an inhuman type, one in which moral suffering, generosity, affect, and love will be abolished, poisonous corrosives that sap the inexhaustible supply of vital energy, interrupters of our powerful physiological electricity.
>
> We believe in the possibility of an incalculable number of human transformations, and we declare without a smile that wings are waiting to be awakened within the flesh of man.
>
> The day when it will be possible for man to externalize his will in such a way that it is prolonged beyond himself like an immense, invisible arm—on that day, Dream and Desire, which today are empty terms, will reign supreme over conquered space and time.
>
> This inhuman and mechanical type, constructed for omnipresent velocity, will be naturally cruel, omniscient, and combative. He will be endowed with unexpected organs: organs adapted to the exigencies of an environment made of continuous shocks. Already now we can foresee an organ that will resemble a prow developing from the outward swelling of the sternum, which will be the more pronounced the better an aviator the man of the future becomes, much like the analogous development discernible in the best fliers among birds. You'll be able to better understand these apparently paradoxical hypotheses by considering the phenomena of externalized will that are continually manifested at spiritualist séances.[365]

## THE FUTURISTS' DYNAMIC VIEW OF REALITY AND FUTURIST DYNAMISM

The passage immediately above articulates a Symbolist-like processual view of reality as unified by an unfolding dynamic that completely dissolves the reality of particular objects. The cinema makes this Symbolist conception real. *Linee di forza* in Futurist paintings can be taken as signifiers, indicating that belief in the substantiality of the physical world is waning. Their use of those

arcs also suggests that electromagnetic form has overtaken geometric form: like the patterns that iron filings form in a magnetic field, lines of force in a Futurist painting resemble lines of energy—and energy and magnetism were often used at this time as analogies for invisible spiritual forces/activities.[366]

Boccioni's *La città che sale* (The City Rises), the large oil painting of 1910–11, deploys lines of force and paths of movement to good advantage.[367] The painting presents a pair of men (along with an assortment of arms and legs at the boundary) and a rather large horse, straining to pull a load.[368] Max Kozloff comments perceptively, offering a highly unorthodox analysis of the painting's significance that connects the work to its Divisionist predecessors:

> The intent is unmistakably symbolic. Far from portraying one particular incident, the artist shows an overall hysteria of effort that laces through both men and animals, materializing, in Boccioni's words, "the fatal striving of the crowds of workers." Light rays needle into the smoke and construction and may ricochet over a muzzle and a fist. And everywhere the images are fine-combed and whisked to let in the light and make them vibrate like a buzz saw. As for color, buoyant red in the horse (the color of proletarian insurgence), blue-black (its yoke), yellow, and milky whites precipitate out of the sun-shocked hazy morning.
>
> Such are a few of the *impressions* given by this apotheosis of muscular energy. What is particularly surprising, however, is that neither density nor weight coexists with bulk and action. The men who almost collapse with the strain of pulling their burden and the beasts who lunge with all their might are as light as chiffon. But if we analyze these impressions we understand that Boccioni does not want to depict brute force as such, but rather to convey the optical phenomena of movement to which it gives rise. The identity of all images is, therefore, subordinate to a stippled froth that extends them slightly in space, as if they are being seen at two very close instants in time. To borrow a term from photography, Boccioni "shot" the event with a shade too slow a shutter speed. He catches physicality itself off guard, even in this heroic context. That is why the indistinct and contradictory spaces, the sudden bleachings, and the blurry gestures appear simultaneously authentic and fantastic. They invoke certain split, distracted moments of unfocused visual consciousness. Instinctively crystallizing information from sense data, the human brain condenses such moments, ejects them from mind. But Boccioni wants to edit perception differently and to recollect precisely such interchronic occasions not with the small nuances of an Impressionist, but as a reflex of sheer animal stress. His presences, whose last traceable contours dissolve in a new abstraction, have a ghostly fury. Beyond this, divisionism alone could not take him.[369]

This interpretation suggests much about the Futurists' desire to capture, not a fixed moment in universal dynamism, but rather "the *dynamic sensation* itself." The bodies in the picture are hardly opaque, for Boccioni's "sharpened and multiplied sensitiveness" has penetrated the obscurity of movement,

giving "results analogous to those of the X-rays." The progress of history has increased humans' ability to see into the heart of reality, and the Futurists knew, as did Bergson, that reality is not composed of frozen objects in space—it is dynamic, and each object flows into every other around it.[370]

Interest in dynamic form also pushed the Futurists towards efforts to incorporate time in static works. We see this, for example, in Balla's *La Giornata dell'operaio* (The Workman's Day, 1904), the three panels of which depict changing light and shadow at different times of day. The Futurists vowed that henceforward they would "put the spectator in the centre of the picture," to increase its dynamic effect; while Cubists sought to dynamize the perception of geometric form in space, and so resolved objects into aspectual facets that they adjoined and then linked with myriad flexed *passages*, Futurists sought to evoke velocity itself, in its very fluidity. While the Cubist canvas is composed of many geometric braces, the Futurist canvas consists of lines of force and paths of movement.

The Futurists' idea of *linee di forza* relates to their notion of analogy, which (as we have seen) turns out to be grounded in their ideas about the cinema. The notion of analogy remained central to the Futurist notion of synthesis. Marinetti's writings on the wireless imagination proposed a notion of networks of analogies: one selects images from one's mental warehouse (this presages comparisons between the mind and the database, and the applications of database technology in artmaking) and (as I pointed out above) organizes them in such a way as to create "STRETTE *RETI* DI IMMAGINI O ANALOGIE" (TIGHT *NETWORKS* OF IMAGES OR ANALOGIES).[371] I pointed out, too, that in the "Manifesto tecnico della letteratura futurista," Marinetti proposed that only a succession of analogies can suggest the vital movement of matter (and in commenting on how this vitality might be conveyed, Marinetti had recourse to the cinema, which he clearly understood as an analogy-making machine).

The grand synthetic ideals of the *teatro futurista sintetico* were carried to an ever more grandiose scale. First, it was extended to the social conditions of modernity. Nearly all the avant-garde art movements of the early twentieth century proposed to integrate art and life. The meaning of this was often misunderstood: such proclamations did not really advocate what they are often taken as doing; they were not calling for aesthetic experience—which on this view was seen as suffering from its remoteness to authentic everyday life—to take on the characteristics of ordinary experience (in its present forms) and thus be brought into the everyday realm. Rather, the Futurists advocated that life (and art) be transformed so that life would take on the intensity—the *vitality*—of art. The belief that the separation of art from life impoverishes both life and art should not be taken in this context as implying that art becomes

poorer as it becomes less like routine, ordinary workaday existence. To the contrary, the Futurists (and other vanguard art groups) declared that life should become poetic—or, rather, should become a form of poetry unlike the poetry of the present, which (according to these vanguard artists) had lost its vitalizing energy by disconnecting itself from the vital body and the energizing richness of true life. Life, they proclaimed, should be a poetry charged with the vital throb of life lived to its fullest.[372] (Recall that Fernand Léger too advocated for the integration of contemporary art and contemporary life.)

Extravagantly, the Futurists maintained that the new life promised by modernity would have the same intensity, vitality, and richness as good poetry. Museums, concert halls, theatres, academies were all exhausted: no longer were they driven by the vital surge. Futurists believed (preposterously in my view) that a life lived in the new world of racing cars, new and colourful fashion, urban living, the typography of modern advertising design, exotic cuisines made possible (like the molecular gastronomy of our time) by technological advances, new, sexy forms of entertainment, sporting matches, and (not least) the noise of the streets, would be a life experienced at the maximum possible intensity. The new, urban life would become a *Gesamtkunstwerk*—one of greater synthetic reach than ever Wagner imagined. That would be the form that integrated art and life.

Accordingly, the *futuristi* continued to extend the reach of the *teatro sintetico*. In a slightly later manifesto, "Ricostruzione futurista dell'universo" (The Futurist Reconstruction of the Universe, 1915), Giacomo Balla and Fortunato Depero posited that the universe is the expression of a universal vibration (thus reiterating the venerable Symbolist idea that artists in Paris, London, Milan, and Rome associated with electricity and the aether). Understanding vibratory phenomena, they proposed, would be the basis for a complete reconstruction/re-creation of the universe, to make it more joyful.[373] This proposal reflected an extraordinary ambition—to find abstract equivalents for all the forms in the universe and combine them according to their whim in dynamic complexes.[374] We have encountered a similar project for a universal reconstruction from an only slightly later time, in Blaise Cendrars's *Moravagine* (1926). Recall that in that work a disc becomes a universal symbol that engenders "a new language . . . of words and things, of discs and runes, Portuguese and Chinese, numbers and trade marks, industrial patents, postage stamps, passenger tickets, bills of lading, signal codes, wireless radio." Cendrars goes on to describe this language as a reflection of the human, as a poetry that presents an image of the mind that conceives it. To be sure, Cendrars's fiction was based on that common fantasy of an Adamic language, which the cinema seemed to make almost real, the fantasy of a language in which the signifiers and referents are identical. Balla and Depero's refashioned

universe similarly would be a "Presence, a new Object, the new reality created with the abstract elements of the universe," a Presence that, like Whitehead's actual events, would be dipolar, possessing both subjective and objective aspects. It would be a concrete language (its tokens would be material) that revealed the operation of a mind as it fashions language. Recall, too, what was even more remarkable, viz., Cendrars's acknowledgment of the impetus for this project for a universal reconstruction: this "demotic language," Cendrars tells us, was "stimulated by the cinema which speaks to the impatient mass of the illiterate . . . the papers which bypass grammar and syntax in order to give the eye a more striking picture in the typographical make-up of their advertisements." In this realm, all things would be artificial and real.[375] Depero (and other Futurists), too, had conceived of an asyntactic language that would present the eye with a more striking picture "in the typographical make-up of their advertisements," whose forms, like the pictures produced by photographic and cinematographic apparati, would be at once artificial and real, at once subjective and objective.

This new language would be potent because, in this language, the referring token and the referenced object would be identical—in using the token, therefore, one would be deploying the referent. The presence of the referent would be immediate, as it is in the cinema. Cendrars conceived the fantasy of inventing so potent a language while working out a dark fantasy of universal destruction and re-creation, which he presented in *La fin du monde filmée par l'ange N.D.* (1917). Balla and Depero's fantasy also had what most of us, I believe, would deem to be a dark side (though they claimed that the feature in question would only add to the joyousness of the reconstructed universe): Balla and Depero believed that the "world-wide" conflict then raging would be prolonged indefinitely. Consequently, children must be trained in new (or, perhaps, much older and long forgotten) ways. Balla and Depero, for their part, would invent Futurist toys, which would accustom children (*inter alia*) "*to physical courage, struggle and* WAR," and they proposed to achieve this "by using enormous toys that do things out in the open, dangerous and aggressive." They also proposed to populate their reconstructed universe with metallic animals.

> THE METALLIC ANIMAL
> Fusion of art + science. Chemistry, physics, unexpected continuous fireworks, automatically speaking, screaming, dancing with new being. We Futurists, Balla and Depero, will contruct millions of metallic animals for the bigger war (a conflagration involving all the creative forces of Europe, Asia, Africa, and America, one which will doubtlessly follow the current marvelous but small human conflagration).

To this they added, "The discoveries contained in this manifesto are absolute creations, completely generated by Italian Futurism."[376]

Like today's cyberneticists, some Futurists—at least occasionally—proclaimed that their attack on tradition served the cause of advancing reason. In doing so, the reason they spoke for is a reason that calculates the utility (the benefits that accrue to a person) of self-interest. Self-interest was the Futurists' highest principle—for them, as for the rationalist-scientific philosopher Thomas Hobbes, it is the principle of reason. They did not shrink from the conclusion that every individual, every class, every institution, and every agency must seek to maximize its own gains. Self-interest's rational potential would be unleashed only when each individual, class, institution, or agency is allowed to seek to further its own ends, unbridled by sickly pieties, cowardly fellow-feelings, and the conservative tendency to valorize the middle way and every form of mediocrity. A maelstrom of energies having been unleashed, the principle of self-interest would be pushed beyond its ordinary limits and thus turn into its opposite. It would unbridle irrationality—and the Futurists, remarkably, did not shrink from accepting even that.

Because they strove to unleash energy, the Futurists celebrated voluntarism of every imaginable sort: they condemned whatever was weak or sentimental; they despised the timid and the hesitant; they loathed "the feminine." They celebrated war and "masculine" assertion; they strove to make themselves audacious and active.[377] The postmodern represented for them the triumph of the electrical over static (or slowly changing) matter, the active over the rustic, bodily energy and bodily force over whatever was slow-moving or slow to change. But there was a more conservative side to their celebration of dynamism than they were prepared to admit. For the world of machines, of dynamism, and of electricity did not represent for them a thoroughgoing materialism; the realm of energy was for them essentially a transcendent, spiritual realm. They believed electricity manifests a poetic spirit; accordingly, dynamism became one of the elements of the new poetry.

Electricity was the dynamizing force driving the new poetic spirit. "Futurism" was not the first name that Marinetti considered for his movement: in 1908, he had considered calling it "Electricism," and then "Dynamism," before settling on the name he proposed to the world.

## THE *SERATA FUTURISTA* AND THE CINEMA

None of the *arte-azione*, the *serate futuriste*, or the variety theatre productions realized the fourth ambition that Marinetti and his colleagues announced in their famous "Il teatro di varietà: Manifesto futurista"—that of enriching the spectacle by incorporating cinema. However, the manifesto's arguing

points suggest that the cinema itself comes close to fulfilling their ideal for the variety theatre: it is electric; it has an affinity for the comedy of actions; it incorporates diverse sorts of scenes; it can act as a shop window, profitably exhibiting the marvels produced by modern mechanics; (resorting now to characteristics not given above, but included in the original manifesto) it is the synthesis of all the means of diversion that humankind had hitherto invented for itself; as we have seen, it exalts men's rapacious instincts and removes all veils from women; and it relishes bodies more than minds. Even specific details of "il meraviglioso futurista" (the Futurist marvellous) could be instructively compared to the characteristics of the cinema of Marinetti's day as well as to features of the cinema in general. In proclaiming as ideal an artistic form akin to that for which the cinema, by its very nature, is suited, the Futurists anticipated a conceptual strategy that many artistic movements of the twentieth century would use—that of identifying (often tacitly) a cultural phenomenon to which it attaches special value and using it as a model for artistic and social transformation. Some Soviet movements took the circus as this model; some artists of 1960s—for example, adherents of the Situationist International movement, who embraced the ideas of the dissident Surrealist Antonin Artaud (1896–1948)—used street theatre in that role. Identifying the cinema as a model for artistic and social transformation, as the Futurists did, reflects the pervasive effect the cinema was exerting on the arts and the way the cinema was transforming the other arts. This influence was highlighted in the Futurists' extension of the variety theatre, the *sintesi teatrale* (commented on above). Writing about the pace of this proposed new form and the brevity of its scenes, Marinetti, Settimelli, and Corra, as we have seen, went so far as to declare that this "essential and synthetic brevity will enable the theater to sustain and even overcome competition from the *cinema*."[378] This is a clear statement of my historical thesis: radical artists and thinkers working in traditional media saw the cinema as a rival, and they proposed to transcast the media with which they worked by endowing them with attributes of the cinema, so that they might stand up to rivalry from the cinema, and perhaps even surpass the cinema: in the Futurists' view, brevity and condensation had to do with force, and the cinema is potent.[379] Marinetti, Settimelli, and Corra also noted that the urban experience had already become cinematic in form:

> In life one never grasps an event entirely, in all its causes and consequences, because reality throbs around us, assaulting us *with bursts of fragments of interconnected events, interlocking together* [joined at right angles], *confused, jumbled up, chaotic*. For example: it's stupid to act out a contest between two persons *always* in an orderly, clear, and logical way, since in daily life we nearly always experience mere *flashes of argument* which have been rendered *ephemeral* by our activities as modern men, passing in a tram, a café, a railroad station, so

> that experiences **remain cinematic in our minds** like fragmentary dynamic symphonies of gestures, words, lights, and sounds.[380]

Another Futurist activity reflected a similar interest in the cinema's potential to transform the arts: Giacomo Balla and Fortunato Depero created sound and motion sculptures. Depero's were witty objects (his lost sculpture of 1915 *Complesso plastico colorato motorumorista simultaneo di scomposizione a strati* is an example) that incorporated humorous moving parts, made noise, and spouted water and smoke. These were important precursors of the metaharmonic sculptures Jean Tinguely made some decades later.

Even the distinction made in "Il teatro di varietà: Manifesto futurista" between psychology and *fisicofollia* related to the Futurists' interest in cinematic forms and in objects possessing attributes similar to the cinema's. The cinema is a medium of dynamic impact: ideas concern the cinema only secondarily, if at all. This, some Futurists declared, gave it an advantage over traditional literature and even traditional painting.[381]

Other Futurist manifestos confirm what "Il teatro di varietà: Manifesto futurista" suggested, viz., that the forms for which the cinema was suited by nature would be those that would dominate an art yet to come. Russolo states in "The Art of Noise,"

> We Futurists have all profoundly loved and enjoyed the harmonies of the great masters. Beethoven and Wagner have shaken our nerves and hearts for many years. Now we are satiated by them, and WE TAKE GREATER PLEASURE IN IDEALLY COMBINING THE NOISES OF TRAMS, EXPLOSIONS OF MOTORS, TRAINS, AND SHOUTING CROWDS THAN IN LISTENING AGAIN, FOR EXAMPLE, TO THE "EROICA" OR THE "PASTORALE."[382]

Here Russolo imagines a cinema addressed to the ear, not to the eye—a cinema that would have to wait for the development of sound recording. This cinema, in fact, would be realized with the German futuristic composition *Weekend* (1930), a "*blinder Film*" by the painter, violinist/cellist, and maker of absolute films Walther Ruttmann.

The *futuristi* associated the cinema with *il meraviglioso futurista*. Among the phenomena that modern mechanics would bring forth as futuristically marvellous, Marinetti lists the following:

> a mass of current events [*cumulo di avvenimenti sbrigati in fretta*, perhaps "a heap" or a "cumulus" of events in a rush] dispatched within two minutes ("and now let's glance at the Balkans": King Nicholas, Enver Bey, Daneff, Venizelos, belly-slaps and fistfights between Serbs and Bulgarians, a chorus number [the original has "un couplet," which could also mean a couplet], and everything vanishes).[383]

Clearly here the cinema is leading the theatre towards new territory: it is difficult to imagine such a sequence presented on stage, but it is easy to imagine it presented on film. Other parts of the same manifesto expound a similarly cinematic conception of the theatre. Let us consider the cinematicness of the idea of *fisicofollia* in its context:

> 7. Among the forms of contemporary spectacle, the Variety Theater is the most hygienic by virtue of the dynamism of its forms and colors (simultaneous movements of the jugglers, ballerinas, gymnasts, colorful riding masters, spiraling cyclones of dancers spinning on the points of their feet) [the *mise-en-scène* of the variety theatre would incorporate a multiplicity of simultaneous elements—it would be pluri-focal]. With its swift, overpowering dance rhythms, the Variety Theater forcibly drags the slowest souls out of their torpor and forces them to run and jump [the pluri-focal character of variety theatre dynamizes the mind] …
>
> 11. The Variety Theater is a school of subtlety, complication, and cerebral synthesis [required to integrate the succession of disparate phenomena] because of its clowns, magicians, mind readers, brilliant calculators, character actors, imitators and parodists, its musical jugglers and eccentric Americans, its fantastic pregnancies that give birth to unexpected objects and mechanisms [implying the compounding of human and mechanical] …
>
> 17. The Variety Theater offers us all the records achieved until now: the greatest speed and the finest gymnastics and acrobatics of the Japanese [in essence, *fisicofollia*], the greatest muscular frenzy of the Negroes [note Marinetti's allusion to what Stanley Crouch calls "infinite plasticity"—to their stretching form, even in their dances], the highest examples of animal intelligence (trained horses, elephants, seals, dogs, birds), the finest melodic inspiration of the Gulf of Naples and the Russian steppes [Neapolitan song and music, which makes extensive use of repetition rather than motivic development, especially repetition of rhythmic mosaics], the keenest Parisian wit, the greatest competitive force of different races (wrestling and boxing) [the cinema ordinarily collocates disparate spaces], the greatest anatomical monstrosity, the greatest female beauty [the early cinema, as Tom Gunning has pointed out, evinced an affinity for marvellous and bizarre attractions] …
>
> 18. While contemporary theater exalts the inner life, professorial meditation, the library, the museum, monotonous crises of conscience, stupid analyses of feelings—and in short, that filthy thing and filthy word psychology; the Variety theater exalts action, heroism, life in the open air, dexterity [all features of the cinema], the authority of instinct and intuition [the seemingly improvised pratfalls of American physical-comedy film seems to suggest improvisation, that is, acting on instinct and intuition]. To *psychology* it opposes what I call *body-madness* [*fisicofollia*].[384]

The celebration of the physical, the valorization of collage, and the exaltation of dynamism in this passage reflect the cinema's character. In this manifesto, Marinetti had described the variety theatre as "a synthesis of speed + transformation," a definition that equally reflects the character of the cinema. Futurists were among the first artists to recognize that after the advent of the cinema, art would have to be reformulated.

The most radical proposal for the reformation of the theatre, Enrico Prampolini's "Futurist Stage" (April–May, 1915), reveals an even more startling parallel with the cinema:

> *Let's renovate the stage*. The absolutely new character that our innovation will give the theatre is *the abolition of the painted stage*. The stage will no longer be a colored backdrop but a *colorless electromechanical architecture, powerfully vitalized by chromatic emanations from a luminous source*, produced by electric reflectors with multicolored panes of glass, arranged, coordinated analogically with the psyche of each scenic action.
>
> With the luminous irradiations of these beams, of these planes of colored lights, the dynamic combinations will give marvelous results of mutual permeation, of intersection of lights and shadows [wouldn't this resemble the absolute film?]. From these will arise vacant abandonments, exultant, luminous corporalities [out of these light shows, luminous bodies will arise—the cinematic effect is evident].
>
> These assemblages, these unreal shocks, this exuberance of sensations combined with dynamic stage architecture that will move, unleashing metallic arms, knocking over plastic planes, amidst an essentially new modern noise [this cinema will incorporate the sounds of the modern world, rather as Ruttmann's film for the blind, *Weekend*, does], will augment the vital intensity of the scenic action.[385]

No cinema that existed at the time embodied these attributes, though Wassily Kandinsky would soon attempt to realize such a cinema, at the Bauhaus. However, the very existence of the cinema, and the pressure to unfold the potentials inherent in the medium that results from its existence, demanded the art of which Prampolini wrote. Even before filmmakers radicalized this ideal, by creating the absolute film, the Futurist Mauro Montalti proposed a theatre that would have similar qualities, in being "electric, vibrating, luminous":

> Since there is no art if there is no creation, and the Electric-Vibrating-Luminous Theatre wishes to be art it later will be able to attain a superior state of technical proficiency, to create dramas, musical symphonies, symbolic dances, etc., for this new form of ultradynamic art. This new art form, if well felt by the artist, will offer him a new way to express his own sensibility and his own thoughts, by means of luminous, aesthetic, and clear vibrations [this theme of vibration is connected to electromagnetism].

> The stage looks like an enormous dark chamber of a camera, that is to say, a floor, backdrop, ceiling, and lateral faces of black planes (of board of velvet) hermetically welded together [this camera obscura resembles a cinema theatre].
>
> The backcloth, which constitutes the scenery and which we shall call "sensitive darkness," is formed from myriads of electric lamps of every color and tonality [the *topos* of electrically generated colour appears again]. The studied distribution of colors and the studied distribution of electrical currents comprise the subject and treatment of the work. Behind the backcloth an electrical cylinder switch works, which, acting like a phonograph cylinder, lights up now one, now another, zone of the sensitive darkness.
>
> It is well to bear in mind that the Electric Theatre, being eminently dynamic and based on color and movement, does not allow its luminous vibrations to be geometric expressions like triangles, squares, trapezoids, etc., etc. Instead, they are light-points, nebulas, straight segments, curves, parabolas, hyperbolas, helicoids, ellipses, ellipsoids, spirals, circles, concentrics, eccentrics, ovals, etc. [they are electromorphic, not rectilinear-geometric].[386]

Oskar Fischinger was to do just about exactly this with his Lumigraph—a device that grew out of his abstract film work (and out of the occult interests from which his film work also arose).

If the Futurists' ideas about reforming the theatre manifest the influence of the cinema, so too do many of their theatrical works. In the "Teatro futurista sintetico" manifesto Marinetti proposed the *dramma d'oggetti* (drama of objects). This theatrical form made objects rather than human characters the dynamic agents; the form resembles that of the comedy of objects, in which the cinema excels (as testified by films from the Futurist period, from the fantasies of Georges Méliès to the physical comedy of Charlie Chaplin and Buster Keaton). Marinetti's *Vengono: Dramma d'oggetti* (They Are Coming: A Play of Objects, 1915) is an example: its principal characters are not the three actors who appear in the piece, but tables and chairs. The play is set in an elegant dining room, and at the beginning, a household's majordomo and his helper, time and again, under directions from the head of the household, arrange and rearrange the eight chairs, an armchair, and a table; in the process, the pieces of furniture become animated. Near the end of the piece, the waiters place the dining room chairs in a row and, trembling, retire to a corner: at the work's conclusion, a spotlight pans over to a line of chairs so that they seem (by these lighting effects and the use of projected shadows) to file diagonally out of the room on their own.[387] Such scenography is revolutionary in the theatre, but is of the sort one often sees in the cinema—and that was true even in Marinetti's time.

*Vengono* is clearly a relative of Marinetti and Corra's *sintesi* titled *Le mani* (Hands, 1915), which used the stage curtain as a mask that revealed only male

and female hands playing out a courtship drama. The piece simply shows actors performing normal hand gestures (shaking hands, writing, praying, greeting, etc.). Another *sintesi*, titled *Le basi* (Feet, 1915), offers a theatrical equivalent to viewing a film scene though a matte: the theatre curtain is raised about halfway up the actors' calves, exposing the lower part of their legs and pieces of furniture: the spectators are expected to infer the drama from what they can see of the legs and their interactions with and on the furniture. Literally, the spectators are expected to complete the scene by imagining—that is, by representing in consciousness—what the theatrical representation of action omitted. *II teatrino dell'amore* (The Little Theatre of Love, 1915) takes place on a puppet stage, and the three principal characters are the stage itself, a buffet, and a credenza. The buffet and the credenza discuss the sounds that occur throughout the house, but never when humans are present. But if the influence of the cinema brought forth the *drama d'oggetti*, then that influence looped back on itself, as the *dramma d'oggetti* came to influence the cinema: Arnaldo Ginna's film *Vita futurista* (Futurist Life, 1916) includes a "drama of objects," with passages that involve exchanges with and among herrings, carrots, and eggplants.

In the mid-1990s, Giovanni Lista discovered an unpublished work by Marinetti, a script for a film to be titled *Velocità* (Speed). Lista estimates that the script was written sometime between late 1916 and mid-1917. He has published the script, in both Italian and English, as well as a commentary on it (also in Italian and English).[388] One finds in the script distinctively Futurist devices: it presents eleven sequences, which develop from the more locally specific to the more universal, each somewhat resembling a *sintesi teatrale*. Quadro 1º: "Passatismo e futurismo" (Scene 1: Passéism [or Traditionalism] and Futurism) is probably the least like a theatrical synthesis—it opens with a grandmother and grandfather in a house that represents the old decaying culture (it is "pregnant with age, austerity, moralism, and boredom"). This somnolent ambience is broken as four brothers, the grandsons of the figures we have met, burst in, bringing sunlight with them. The grandparents chastise the young men, who go off to salve their wounds with creative activity, until Cousin, a young woman, starts striking their faces with a bouquet of flowers. The flowers become a tropical forest, with date palms and enormous phallic bananas, and the young men settle themselves on the forest floor. One brother separates himself from the rest of the group to chase the setting sun and discovers the mouth of a cave, into which he descends. His katabasis, into middle earth, would probably have been presented with true Futurist flourish, with marvellous Futurist devices depicting his descent down phosphorescent stalactites towards a cavern where he witnesses entranced dervishes twirling, their rotations accelerated (in a feat of becoming *moltiplicato*) into swift

gestures. Meanwhile, back at the tropical forest, one brother rides an ostrich, whose plumage blossoms into an enormity, fruit transforms itself into the delicate visages of refined women, and huts become elegant women's hats.[389]

With Quadro 2º: "Uno studio di giovani novatori" (Scene 2: A Studio of Young Innovators), the *atti* (acts) become more like *attimi* (moments)—that is, more like a *sintesi teatrale*. A group of wealthy, conservative men visit the studio of the four brothers we saw in the last scene and expose their contempt for Futurist art. Quadro 3º: "I ricconi dai rigattieri" (Scene 3: The Rich Men at the Second-Hand Store) presents a group of millionaires (the same wealthy men who appeared in Quadro 2º) arriving at a second-hand store in posh automobiles and unwittingly purchasing fake antique furniture, which they handle with fine care. Quadro 4º: "Avanti i giovani!" (Scene 4: Young People, Step Forward) opens by showing lethargic workers at a workshop—their torpor is caused by an ineffective, gout-ridden, *rammollito* (soft, effeminate) director. The director dies, a Futurist engineer takes his place, and production soars.

Quadro 5º: "I diritti del genio" (Scene 5: The Rights of Genius) depicts a school of fine arts, where outdated professors gesture pointlessly before marble statues, until the four Futurist brothers foment a student rebellion. Quadro 6º: "Una città galvanizzata" (Scene 6: A Galvanized City) provides a parallel to Quadro 5º, with its action transposed to a larger scale. As the art school in the previous scene was overrun by the emblems of *passéiste* art and art training, so the disease-ridden city in this scene, a home for tramps and beggars, is overwhelmed with antiquarian symbols—cathedrals, monuments, and tourists like those who haunt Florence, Pisa, and Siena. The four Futurist brothers arrive, leading a contingent of innovators, who collectively create a spirit of renewal and rejuvenation. The brothers organize a *serata futurista*, which is met with the same response that Marinetti and his co-factionists often received (a flurry of fruit, vegetables, and *maccheroni*). The Futurists make a triumphal exit. In Quadro 7º: "Venezia futurista" (Scene 7: Futurist Venice), the four Futurist brothers organize a Futurist reconstruction of Venice: the canals are paved, the old palaces torn down, electricity, trams, and railway lines are introduced (note the expression of enthusiasm for what electrotechnics has made possible).

Quadro 8º: "Voluttà e patria" (Scene 8: Pleasure and Fatherland) begins with a farewell scene in which an Infantry Lieutenant, one of the proposed film's four protagonists, takes leave of his beloved—he comes close to weakening and submitting to the charms of the woman and the pleasures of love, but his steely spirit prevails and he goes off to fight *pro patria*. He is joined in the trenches by one of his brothers, the Painter and Volunteer Soldier; together, they fight valiantly, the Lieutenant declaiming Futurist verse while

the Painter and Volunteer Soldier waves a painting in the air, which is quickly shot full of holes. The scenario includes a montage of images that mock traditional conceptions of love—a series of analogies that somewhat resembles those which Marinetti had advocated in "Manifesto tecnico della letteratura futurista" (though the comparisons are not nearly so far-reaching as we ordinarily expect in Futurist literature, and hardly reach the point of evoking that "deep love that links distant, seemingly diverse and hostile things").

Quadro 9º: "Senilismo e gioventù futurista" (Scene 9: Senility and Futurist Youth) continues to broaden the compass of the film's action. Other scenes may have shown the same characteristics in slightly more restrained form, but this scene is flagrantly sexist, racist, homophobic (or, at least, contemptuous of males who are *rammollito*), and, I suppose, ageist. The ship is harboured in an African port (likely in Libya). An extravagantly beautiful female spy comes aboard, accompanied by guests who include "capi arabi e negri" (chiefs of Arab and Black groups). The spy succeeds in seducing the *rammollito* Admiral, but her efforts with the steely Futurist captain fail: he exposes her treachery and throws her overboard. A number of graphic elements enhance the scene's synthetic character: the pier catches fire; Arab rebels scale rope ladders and almost take control of the ship; and the Futurist Captain rises to the occasion, leading his men to defeat the Arabs, who plunge into the sea. Finally, the Futurist Captain leads the heroic bombing of the African port. Quadro 10º: "La città futurista fra cento anni" (Scene 10: The Futurist City in One Hundred Years) depicts the city to come: houses are destroyed and replaced with what could fairly be described as multiplied buildings—transparent, illuminated buildings that create overlapping images. The streets of the new city are ablaze with electric lights; airplanes and dirigibles appear overhead, while trains travel beneath the streets and elevators transport people within buildings and cars transport them between buildings. Calamities occur—automobiles collide, trains derail, and a bridge collapses—but (just as Marinetti's automobile accident intensified his Futurist spirit) the Futurist engineering mishaps strengthen the engineer's resolve to carry on: he leads the reconstruction, which increases the population's spirit of renewal.

Quadro 11º: "L'uomo futurista fra 100 anni" (Scene 11: Futurist Man in One Hundred Years) focuses on how electricity will change human beings: electric devices will make it possible for the body to recover from its daily round with only five minutes of sleep. The telephone, the telegraph, and the phonograph multiply humans' presence, so they are essentially ubiquitous (similar ideas have been propounded by present-day new media artists, who are enthusiastic about their break with the past).

The script for *Velocità* is much more conventional than one might have imagined. Michael Syrimis comments on it:

> *Velocità* notably distances itself from the aims of the 1916 film manifesto, which rejected narrative, photographic realism, and theatricality. Despite its subdivision into eleven seemingly autonomous segments, some of which deploy abstract imagery and "analogical cinematography," the script may be viewed as a rather coherent story starting with the elaborate exposition of a psychological premise and tracing, from beginning to end, and in an epic manner, the adventures of the same four protagonists. Apart from narrative continuity, however, the thing that from a more practical standpoint situates *Velocità* in the realm of industrial film production is that its realization would have required a high production budget… [Many] scenes would have required complex sets, some perhaps shot on location but many necessitating large-scale studio shooting, as well as large crowds of extras; hence, a production budget comparable to that of feature-length epic or upper-class melodrama that informed the genre cinema of the era. This does not surprise us, given that Marinetti, in envisioning the script's sumptuous style, may have relied on a contract with Cines of Rome [one of Italy's largest production houses at the time, with whom he hoped to launch a series of Futurist films], one that was never realized.[390]

More radical was Giacomo Balla's scenography for a performance of Igor Stravinsky's *Фейерверк* (Feyerverk; Fireworks; commonly Feu d'artifice, 1909) by Sergei Diaghilev's Ballets russes at the Costanzi Theatre in Rome on 12 April 1917. Though he had added his name to the first Manifesto of Futurism and had participated in some Futurist activities, Balla had kept himself at the margins of the Futurist group. He was, in some respects, that movement's senior artist: when the first Futurist manifesto appeared, he was already an established artist and had taught Umberto Boccioni and Gino Severini, members of Futurism's inner circle. Boccioni soon emerged as the movement's principal theorist: he was acutely intelligent and deeply committed to new art, and his incisive understanding helped stamp the movement's character.[391] His role in the movement undoubtedly encouraged his teacher to keep a friendly, respectful distance, to allow his former student the latitude he needed to thrive. After Boccioni died (he was thrown from a horse during cavalry training exercises), his former teacher became more involved in Futurist activities, and his influence became predominant. Indeed, Renato Barilli speaks of a Boccioni phase of Futurism and a Balla phase.

On 2 April 1917, Balla staged *Fuochi d'artificio*, his ballet for lights (but without actors or dancers), perhaps the most famous Futurist performance. The stage set was populated with several monumental three-dimensional objects dominated by a central pinwheel. This design created a three-dimensional non-objective composition (not unlike Balla's non-objective paintings). The backdrop was black. On the floor were several irregular, complex prisms made from wood, covered with cloth, then painted. On top of these

were smaller geometric forms covered with translucent cloth and painted with brightly coloured geometric motifs (zigzags and bars). These smaller forms were illuminated from the inside while external lights illuminated the larger forms on the floor. Balla built a box of switches that a backstage hand could switch on and off, to create a chromatic composition with light—cues for changes averaged one every five seconds.[392] The lights in the auditorium itself were also controlled by switches in this box, so that the space the audience occupied (and in a sense the audience itself) became incorporated into the composition. It was a remarkable example of chromatic music, akin to Scriabin's *Prométhée: Le poème de feu* (Prometheus: The Poem of Fire, finished 1910).[393] This *Lichtspiel* was cinematic to the core.

A project of Prampolini's reflects a machine aesthetic similar to that of Fernand Léger and Dudley Murphy's *Ballet mécanique*. A model for the project was presented at the International Exposition of Decorative Arts in Paris in 1925; it was a non-objective composition of dynamic three-dimensional forms, with light and sound but no actors. The work would have transformed the stage into a huge machine. Prampolini described the project: the Magnetic Theatre, he stated, would be

> made up of a mass of plastic constructions in action which rises from the centre of the theatrical hollow instead of the periphery of the "scenic-arc" [this plastic construction, rather than a human actor, would be given centre stage]. Auxiliary moving constructions rise, first on a square movable platform, standing on an elevator. On this in turn is erected a *moving, rolling platform* going in the opposite direction from the first, and likewise carrying other *planes* and *auxiliary volumes*. To these plastic constructions, *ascending, rotating*, and *shifting* movements are given, in accordance with necessity [these actions, taken together, would constitute a dynamic form]. The scenic action of the chromatic light, an essential element of interaction in creating the scenic personality of space, unfolds parallel to the scenic development of these moving constructions. Its function is to give *spiritual life* [note the connection between the vital and the spiritual] to the environment or setting, while measuring time in *scenic space*. This chromatic ladder will be made with apparatuses of *projection, refraction, and diffusion*.[394]

## FUTURIST PAINTING AND SONIC ART

For the *futuristi*, Nietzschean as they were, artmaking was an act of will. The Futurists' voluntarist views on the questions of aesthetics are expressed with full force in Luigi Russolo's "L'arte dei rumori" manifesto. Russolo's background was as a painter, and yet (or, possibly, *because* of this) his ideas on composing sound figure among the most radical and forward-seeing of the Futurists' ideas.[395] His aesthetic ideals seem to be an organic development

of those Marinetti advocated in the "Fondazione e Manifesto del futurismo." His fundamental notions about art (including the art of sound and the art of noises) resemble ideas that other Futurists propounded—like them, he was deeply convinced that the art of the time was hidebound and backward-looking, and that artmaking, as it had been practised, split an artist's life into two realms and two times, viz., the past of art's traditional methods and traditional approaches and the present in which artists lived. However, though his fundamental convictions were consistent with the main tenets of Futurism, the manner in which he presents his beliefs seems even more historically aware and even more deeply influenced by Symbolist, Spiritualist, and Neo-Pythagorean ideas. The intensely Pythagorean cast of his tracts and the connection he draws between machine art and Pythagorean ideas invite comparison with the theories and practices of the Purists. His deep electrological interests are conveyed in such paintings as *Notturno + scintille di rivolta* (Notturno + Sparks of Revolt, 1910–11), *Solidità della nebbia* (Solidity of Fog, 1912), *Linee-forza della folgore* (Force lines of Lightning, 1912), and *Compenetrazione di case + luce + cielo* (House + Light + Sky, a.k.a. The Houses Extend to the Sky, 1913). The motif of concentric circles and rays intersecting them apparent in these paintings became common in art influenced by electromagnetic theory. Russolo's electrological interests and his use of the motif of concentric circles with emanating rays persisted well after Futurism ceased to be a truly vital force in his painting, as *Aurora Boreale* (1938) shows—that electromagnetic forms persisted in his work after Futurism waned suggests that electrological ideas had a firmer hold on him than ideas relating to Futurist painting style and that he had understood the former as motivating the latter.

The Futurists also anticipated the McLuhanite proposition that history fundamentally alters humans' constitution: humans see differently, hear differently, and think differently because they live with different sights, different sounds, at a different pace, and with a different understanding of nature's constitution.

> In antiquity there was only silence. In the nineteenth century, with the invention of the machine, Noise was born [implicit in this proclamation is the view that art should be composed of contemporary materials]. Today, Noise triumphs and reigns supreme over the sensibility of men. For many centuries life occurred in silence, or, for the most part, mutely. The strongest noises that interrupted this silence were neither intense, nor prolonged, nor varied. In fact, except for exceptional telluric movements, hurricanes, tempests, avalanches, and cascades, nature is silent.
>
> … Today, the machine has created many varieties and a competition of noises, not only in the noisy atmosphere of the large cities but also in the

> country that, until yesterday, was normally silent, so that pure sound, in its monotony and exiguity, no longer arouses emotion.[396]

So claimed Russolo in his "L'arte dei rumori" manifesto, which laid out a visionary program that would be followed by such composers as George Antheil, Darius Milhaud, Arthur Honegger, and Edgar Varèse (1883–1965).[397] Piet Mondrian was present at the June 1921 concert of *intonarumori*, at the Théâtre des Champs-Élysées, and later wrote two articles for *De Stijl* magazine in 1921 and 1922 in which he proposed that Russolo's noise intoners offer an aural analogy to the relation between nature and art and an example of the creation of new abstract languages. He also claimed their abstract sounds for the De Stijl movement.[398]

Russolo maintained that a new age is upon us, one of noise, and a new art appropriate to the spirit of the new age is required. As this is an age of noise, there must be an art of noise:

> [Music] has researched more complicated successions of dissonant chords and has vaguely prepared for the creation of MUSICAL NOISE. This evolution toward "noise-sound" was not possible before today. Man's ear in the eighteenth century was not able to support the disharmonic intensity of certain chords produced by our orchestra (whose performers are three times as numerous); now our ears enjoy it, for they are already educated to modern life, which is full of various noises. Our ears, however, are not content with them and ask for more ample acoustic emotions.[399]

The times need new noise instruments, Russolo proposed. He was not alone among the Futurists in raising this matter. Giacomo Balla also worked on designing noise instruments—a pencil sketch he did in 1914 is titled *Progetto per strumento musicale rumorista* (Project for a Noise-Musical Instrument).

Russolo tried to give readers an inkling of this art of noise by imagining a walk through a city and thinking about the pleasure one might have in forming in one's mind a composition from all the sounds one encounters:

> Let's walk through a large modern capital [compare this to Apollinaire's practice in composing *Alcools*] with our ear more attentive than our eye and find pleasure in distinguishing between the gurglings of water, air, and gas inside metallic pipes, the grumbling of motors that breathe and pulse with an indisputable animality, the throbbing of valves, the rising and falling of pistons, the screeching of mechanical saws, the jumping of trams on their rails, the cracking of whips, the waving of awnings and flags. We shall amuse ourselves by ideally orchestrating together the rattle of a store's rolling shutters, banging doors, the hubbub and patter of the crowds, the different rackets of the railroad stations, of the textile mills, of the printers, of the electrical plants, and of the subways.[400]

Balla's painting *Rumoristica plastica* BALTRR (Plastic Noise: *BALTRR*, 1916–17) is a diagrammatic presentation of that same experiment: it suggests such physical actions as walking and climbing stairs (the ascent indicated by simple pointers) and incorporates syllables denoting sounds associated with those physical actions (such as footsteps, a key turning in a lock, the creak of a window being opened). It offers a record of an ongoing process. Such a record is something the cinema can present more effectively, and the idea of creating a work of art that produces a record of a process was likely stimulated by the advent of the cinema.

Russolo protested the restricted range of sounds of which composers availed themselves. He proposed that music had always advanced by accepting an ever-broader spectrum of sounds. His colleague as a Futurist composer, Francesco Balilla Pratella (1880–1955), to whom Russolo addressed the epistolary "L'arte dei rumori" manifesto, had earlier pointed out that J.S. Bach's (1685–1750) music possesses features that Giovanni Pierluigi da Palestrina (c. 1525–1594) would have judged crazy, that Ludwig van Beethoven's (1770–1827) compositions have attributes that J.S. Bach would have considered mad, and that Richard Wagner's (1813–1883) operas have qualities that Beethoven would have considered outrageous. This pattern of development has allowed a broader and broader range of dissonant tones to have a legitimate place within a musical composition, and has extended further and further the range of dissonant passages; so compositions have become increasing complicated and increasingly persistent:

> Musical art, first of all, looked for and obtained purity, limpidness, and sweetness of sound, then it amalgamated different sounds, occupying itself, however, with caressing the ear with suave harmonies. Today, musical art, complicating itself still more, searches for the amalgamation of sounds more dissonant, strange, and harsh to the ear. Thus, we are always getting closer to "noise-sound."[401]

Over the same period that music had developed towards "noise-sounds," the machine had made noise the aural environment in which humans live. This development had prepared our ears for compositions made of RUMORE MUSICALE (musical noise) (as Russolo termed it). By calling his materials *rumore musicale*, Russolo affirmed that the sounds he intended to use would be controlled and organized: "WE WANT TO SCORE AND REGULATE HARMONICALLY AND RHYTHMICALLY THESE EXTREMELY VARIED NOISES."[402] He contended that even noise-sounds have a dominant pitch, and he proposed that sounds could be organized according to their dominant features (without eliminating the irregular vibrations of tempo

and intensity)—some sounds come in a variety of pitches, and this allows them to be organized into chromatic scales. The chaotic conditions in which most sounds arise make it difficult to appreciate their complexity and to feel what makes them interesting; but when we organize these noises, we can feel the sensuous pleasures they might afford: "Noise . . . coming confusedly and irregularly from the irregular confusion of our life, is never totally revealed to us and keeps innumerable surprises for us. We are certain, therefore, that in choosing, coordinating, and dominating all noises, we are enriching mankind with a new unsuspected voluptuousness."[403] We have seen that Fernand Léger, many of whose beliefs approximated those of the Futurists, also embraced the artistic-spiritual imperative of making the contemporary environment harmonious (according to the new standards of the time).

Russolo proposed that orchestras of noisemaking instruments be created. Just as traditional instruments can be grouped into different families—woodwind, brass, string, percussion—the noises the Futurist noise orchestra will be able to produce can also be divided into families:

1) Roars, Thunders, Explosions, Bursts, Crashes, Booms
2) Whistles, Hisses, Puffs
3) Whispers, Murmurs, Grumbles, Buzzes, Bubblings
4) Screeches, Creaks, Rustles, Hums, Crackles, Rubs

Russolo's fifth category included percussion noises and the notes that they could generate using "metal, wood, skin, rock, terra-cotta." The sixth category he set out comprises sounds resembling the voices of animals and humans, "Shouts, Shrieks, Moans, Yells, Howls, Laughs, Groans, Sobs."[404]

The new instruments Russolo proposed would produce noises that could be joined with or substituted for more traditional musical sounds. He hoped these instruments would be able to mimic existing noises (presumably including those on the list above) but would give performers control over the sounds' frequency (pitch). Thus, composers would be able to use sounds belonging to any of the subclasses above (for example, howls) at any pitch. Futurist music, then, would make use of "microtonal" intervals. Russolo had to invent a new notational system to indicate the sounds he wanted to produce: his *Grafia enarmonica per gli intonarumori futuristi* (Enharmonic Notation for the Futurist Intonarumori*)* introduced a system that is still used (if only rarely) by composers of electronic music.[405]

A portion of Russolo's summary of his thoughts on Futurist music reads as follows:

> 4. Every noise possesses among its irregular vibrations A PREDOMINANT GENERAL TONE. This will be easy to obtain by constructing instruments that imitate a variety of sufficiently wide tones, semitones, and quarter-tones.

This variety of tones will not deprive each noise of its characteristic timbre, but rather increase its texture or range.

5. …When we have found the mechanical principles that produce a certain noise, we shall be able to change the tone, regulating it by the same general laws of acoustics. For example, we shall speed up or slow down the velocity if the instrument has a rotating movement, or increase or decrease the size or the tension of the sound-making parts if the instrument does not have a rotating movement.[406]

Russolo also recognized that the incorporation of new sorts of sounds demanded new rhythms: "It is necessary for the musician's sensibility, liberated from the easy and traditional rhythms, to find in noises the means to increase and renew itself, since each noise offers the union of the most diverse rhythms as well as its dominant one."[407] Thus, he proposed to use polyrhythms. This suggestion was made in 1913, the same year that Stravinsky's *Весна священная* (Vesna svyashchennaya; The Rite of Spring) shocked people with its overwhelming use of polyrhythms.[408]

The importance of occult and alchemical beliefs to Russolo's system of thoughts on music has hardly been recognized—the great exception to this is Luciano Chessa in *Luigi Russolo, Futurist: Noise, Visual Arts, and the Occult*. But occult beliefs clearly provide the groundwork for the three-stage process of musical composition Russolo lays out in *L'arte dei rumori*:

LEVEL I
Incited by the spirits, the **artist/clairvoyant**
spiritualizes noise through mechanical means
—the **intonarumori**—which render it
continuous and and enharmonic
↓
*thought-forms*

LEVEL II
Through a dynamic process of
**synthesis** of multiplicity into unity, of chaos
Into cosmos, the orchestra of the intonarumori
as a whole creates the **Art of Noises**
↓
sound-forms

LEVEL III
The infusion of life energy from the
Art of Noises acts as a spiritual soundtrack, so that
Thought-forms + matter
result in
**materialization**
**incarnation, awakening**[409]

The process begins with sound, vibration, the energy that makes up ultimate reality. The clairvoyant artist—presumably clairvoyance is required to align one's creative energies with the vibratory realities one works with—takes matter (for example, the products of rattling metal plates) and transfigures it into spirit (a process that, as we have noted, some early-twentieth-century artists believed was possible because they understood spirit as being akin to energy and Einstein's famous equation showed that matter and energy are interconvertible). That process of conversion involves the sound material becoming denatured. We noted earlier the passage in which Russolo laid out the alchemical character of noise composition:

> A noise must become a prime element to be moulded by the work of art. That is, it must lose it chance character [the character that has come to it by chance, and so is non-spiritual], to become sufficiently abstract [here, featureless] in order to reach [the state] necessary for the transfiguration of whatever prime element [any *prima materia*] into any abstract artistic element.

The denaturing of the raw material renders it "continuous and enharmonic." Futurists gave a special meaning to the term enharmonic. Ordinarily the term refers to notes, intervals, or scales that are written (or "named") differently but are really the same: for example, F♯ and G♭ are said to be enharmonic equivalents, for they have the same frequency. Balilla Pratella, in the "La musica futurista: Manifesto tecnico" (March 1911) specified a different meaning for the term:

> We Futurists proclaim that progress and the victory of the future will consist in researching and realizing the *enharmonic mode*. Whereas chromatism [*il cromatismo*, which could also be translated as chromaticism] only lets us take advantage of all the sounds contained in a scale that is divided into minor and major semitones, enharmony contemplates still more minute subdivisions of a tone; and hence it not only furnishes our renewed sensibilities with a maximum number of specifiable and combinable sounds, but also new and more varied relations among chords and timbres.[410]

Chessa suggests that by using the term enharmonic, Pratella and Russolo were advocating the use of microtonal intervals, that is, intervals formed by notes less than a semitone apart (or that differ—and here I am assuming just intonation—from the lower adjacent pitch by less that a factor of $\sqrt[12]{2}$, assuming just intonation).[411] That is close, but I don't think it is exactly what Pratella and Russolo intended. Understanding what (I believe) they meant requires at least a little technical understanding. We ordinarily make a distinction between pitched sound and noise (the Futurists wanted to abolish that distinction). A pitched sound is one that is composed of a fundamental (a vibration whose amplitude is the largest of all the frequencies that make up the sound) and a

series of overtones, the most significant of which are small-integer multiples of the fundamental. Suppose that the fundamental for the C below middle-C is 256 Hz: then the overtone series would be vibrations at 512 Hz, 1024 Hz, 2048 Hz, and so on. One factor in the difference in sound (technically in timbre) between a clarinet and an oboe playing the C below middle-C is that the overtones are present in differing amounts.

Pitched sounds, then, are composed of vibrations whose frequencies are harmonically related (most instruments will produce sounds that include some frequencies that are not whole-number multiples of the frequency of the fundamental, but these are present only in tiny amounts). Noise, by contrast, is made up of all frequencies over some range (that is, not just the frequencies that are whole-number multiples of the frequency of the fundamental). White noise is a mixture of all frequencies such that the power spectrum representing them is flat—or, to put the matter more informally, all frequencies are present "in equal quantities." Other sorts of noise have different power spectra (the different frequencies are present in different amounts—for example, the power spectrum of pink noise is linear over logarithmic space, with the range of frequencies from 50 to 70 Hz having the same power as the frequencies from 5,000 to 7,000 Hz).

Level I in the table given above uses mechanical means (the *intonarumori*) to create sounds that are continuous and enharmonic. That is, practices belonging to Level I involve having the composer/performer produce (by means of the *intonarumori*) sounds that have a large quantity of frequencies not related to the frequency with the greatest power by a small whole number ratio—we have already noted that in *Grafia enarmonica per gli intonarumori futuristi* Russolo pointed out that "every noise possesses among its irregular vibrations [noises are generally irregular because mixture in the various frequencies changes], a predominant general tone. This will be easy to obtain by constructing instruments that imitate a variety of sufficiently wide tones, semitones, and quarter-tones. This variety of tones will not deprive each noise of its characteristic timbre, but rather increase its texture or range." These sounds, as the chart states, are spiritualized because the artist produces them with a certain end in view. They are, essentially, "thought-forms," and so have some features of the ideal realm.

Chessa notes the importance of pondering why Russolo (and Pratella) privileged continuity and enharmonicism. Again, I think he comes very close to providing the answer, but misses features of Russolo's proposal. The deep reason for this preference relates to the Futurists' enthusiasm for the new era of electrotechnics. Mechanical technology produced the ruling paradigm of the Gutenberg age, which was based on assembling replaceable parts: combining sounds from discrete, widely spaced frequencies (fundamental and

overtones at twice, three times, four times the frequency of the fundamental) is a practice that properly belongs to the mechanical age. Electrotechnical devices are operated by fields of energy, which flow continuously across space and interact with one another (continuously is here defined in the usual way: given any two arbitrary frequencies, a frequency that falls between the two can be identified by adding the two frequencies and dividing that sum by two).[412]

In Level II of Russolo's table, the sounds produced by an orchestra of *intonarumori* are synthesized to produce a whole, the Art of Noises. Each sounding instrument produces a cloud of sound, and any two sounds/noises, when they flow into the same space, will modulate each other (by the phenomena of cancellation and reinforcement), as occurs on Phil Spector's famous "wall of sound" recordings—for example, on the Ronettes' "Be My Baby" (1963) and on Ike and Tina Turner's "River Deep, Mountain High" (1966). They may even generate sum and difference frequencies. This whole is not the mere sum of the interacting frequencies, but (as the thickening of the texture in "Be My Baby" and "River Deep, Mountain High" shows) something a great deal more.[413] Guided in the interaction by the spiritual (vibratory) understanding of the composer/performer, these different sounds combine to form a structured whole (a cosmos), a sound-form that is the basis of the *arte dei rumori*.

Level III is more or less the reversal of what takes place on the first two levels. The lexicon that Russolo draws on for this passage (words such as clairvoyant, thought-forms, spiritualization, energy, and continuous) tells us that he is thinking in Theosophical terms. Level I culminates with the spiritualizing of the noises the clairvoyant artist generates (using the *intonarumori*). This spiritualization is brought about by denaturing those noises so that they can serve as *prima materia* for the quest to come. Spiritualized, they assume ideal properties—that is, they become pure energy; as I just suggested, they are, to all intents and purposes, thought-forms (in the sense of energies given form by thought or spirit). The second level culminates in the different clouds of frequencies interacting with one another in a guided way to produce a definite and complex form: the chaos of the denatured form (the *prima materia*) is turned into a cosmos, in which each energy and each incipient form has a place and purpose. That is, the ordering of these materialized spiritual forms endows the noise complex with the character of art, with the energy that art has. They become sound-forms, an *arte dei rumori*, a plurality of spiritual elements brought into a structured world (a cosmos).

Most of us, I think, incline towards according matter a measure of ontological priority: ideas, most would say, are the product of chemical exchanges in the nervous system. Matter produces thought, not thought matter. That is not the bent of Theosophists, who maintain that thought (or energy) has

priority and that matter derives from thought/energy (this often led them to an emanationist cosmology akin to that of the Neo-Platonists). They explain this by saying that when a field has enough energy to assume a sufficiently precise and definite form, it becomes the tangible real. This is the process that Level III culminates in: thought-forms and matter result in materialization—the spiritual (the idea) becomes incarnate. It takes on flesh (matter). Thus, Russolo saw the artist as a demiurge, bringing reality (or, at least, *a* reality) into being.

On 2 June 1913, Russolo presented the first prototype of one of his instruments to the public. There was extensive press response to even this small demonstration: articles appeared in the *Daily Chronicle*, the *Evening Standard*, the *Berliner Tageblatt*, *Le Temps*, and *Le Matin*. A good part of this response must have been negative, and Russolo attempted to refute it, asserting that the sound the instrument produced was not unregulated and uncontrolled, or cacophonous, and that its purpose was not to shock the bourgeoisie. His response also noted that he had completed to his satisfaction four categories of noise intoners: the Exploders, the Cracklers, the Buzzers, and the Scrapers. (About a year later, for a series of concerts at the London Coliseum that began on 14 June 1914, he would employ an "orchestra" of twenty-three *intonarumori*, including Buzzers, Whistlers, Rattlers, Exploders, Murmurers, Cracklers, Thunderers, Gurglers, and Roarers.)[414]

Somewhat later, early in 1914, after he had worked on them further, Russolo presented his noise intoners in Marinetti's house to a select audience that, besides most of the Futurist band (Marinetti, Pratella, Boccioni, Carrà, Piatti), included Igor Stravinsky, Serge Diaghilev, and the dancer/choreographer Léonide Massine (Leonid Fyodorovich Myasin, 1896–1979). When a Crackler was turned on, and issued a thousand sparks, Stravinsky exuberantly leapt from the divan, whistling excitedly. When the Rustler began, Massine was so excited that he could not keep his legs still and Diaghilev emitted his highest sign of approval, a faint "Ah! Ah!" Russolo himself was not as satisfied: despite the positive reaction, he announced at the conclusion of the presentation that much work remained to be done. The Milanese Futurist painter Ugo Piatti (1888–1953), who was the source of much of the engineering knowledge that went into the constructions of the *intonarumori*, announced that the experiments would have to begin again, from scratch.

The first public concert of an orchestra of *intonarumori* took place on 21 April 1914 at Milan's Teatro dal Verme. It comprised three pieces whose titles, *Risveglio di una città* (The Awakening of a City), *Si pranza sulla terrazza del Kursaal* (Luncheon on the Kursaal Terrace), and *Convegno di automobili e aeroplani* (A Meeting of Automobiles and Airplanes), at least hint what the pieces were like. There was an afternoon rehearsal for the performance, and,

as I remarked above, the police, on hearing about it, tried to ban the evening concert, fearing that it would create a public disturbance.

Months later, in June 1914, Russolo presented a series of twelve concerts in London, all at the Coliseum. The program consisted of Marinetti lecturing on Futurist music, then the first and third pieces from the Teatro dal Verme concert. The concerts provoked bewilderment. After the evening concert of 15 June, the critic for the *Times* played his expected role, asserting that the music of the

> weird funnel-shaped instruments . . . resembled the sounds heard in the rigging of a channel-steamer during a bad crossing, and it was, perhaps, unwise of the players—or should we call them the "noisicians"?—to proceed with their second piece . . . after the pathetic cries of "no more" which greeted them from all the excited quarters of the auditorium.[415]

## FUTURISM AND THE CINEMA

One might expect that of all the arts of their time, the Futurists would have found the cinema the most congenial. Futurism celebrates "universal dynamism," and in this period, except for dance, film was the only art committed to composing dynamic forms. Futurists were against tradition, and the cinema was an art without a tradition (so long as it remained disencumbered of baggage from literature or theatre). The Futurists craved speed—light has always meant speed, and the cinema is an art of light. Despite these affinities, the Futurists had little involvement in the cinema. Michael Kirby, the author of *Futurist Performance*, suggests a reason for this: the Futurist movement's organizing genius, Marinetti, had no strong interest in the cinema and did not direct his motivational talents, or any portion of his vast fortune, to producing films.[416] This is not entirely true, as we have seen. What has long been known to be true is that Marinetti's "Il teatro di varietà: Manifesto futurista" praised the *teatro di varietà* for incorporating film—pointing out (as we noted above) that "the Variety Theater is unique today in making use of film, which enriches it with an incalculable number of visions and spectacles that couldn't otherwise be performed (battles, riots, horse races, automobile and airplane meets, travels, transatlantic steamers, the recesses of the city, of the countryside, of the oceans and the skies)."[417]

We must try to understand the context for these beliefs about cinema's potential for enriching other media, and especially theatrical forms. The actional, affective image is a key to Futurist ideas on photodynamism and Futurist cinema. The theatre, in the Futurists' view, should be a versatile machine for bombarding the audience with rapid sensations, using spiritualized materials of many different sorts, to produce "an incalculable

number of visions" (numero incalcolabile di visioni), as Marinetti put it in his 1913 "Il teatro di varietà."[418] Despite the many attractions the cinema offered as a new art carrying none of the baggage of the traditional arts, and despite its being an industrial product capable of intensifying movement by using close-ups, despite the Futurists' interest in forms that resembled those which the cinema favoured by virtue of its material nature, Futurist interest in the cinema was rather limited. "Il teatro di varietà" did not consider the cinema to be an independent art with much to offer the *futuristi*: that manifesto presented the cinema as playing only an ancillary role, of furnishing the variety theatre with spectacles that it could not otherwise present, such as battles, riots, and automobile and airplane meets. Likewise, in the "Teatro futurista sintetico" manifesto of 1915, Marinetti, Settimelli, and Corra spoke of the cinema only in paragonal terms, as a competitor, one that the force of the Futurist *teatro sintetico*, intensified by superior concision, would surpass.

The idea of a *teatro sintesi* was further radicalized and that extension led to the *sintesi teatrale* (theatrical synthesis). These theatrical syntheses would be *extremely* brief. Marinetti, Settimelli, and Corra wrote:

> The Futurist Theater of Essential Brevity [*sintesi teatrale*] will not be subject to logic, it will be in no sense photographic, it will be *autonomous*, and will resemble nothing but itself, even though drawing on reality to combine aspects of it in a random manner.[419] Above all, just as for the painter and the composer there exists, strewn all over the external world, a life that is more restricted yet more intense, which is made up of colors, forms, sounds, and noises so too **for a man gifted with sensitivity to the theater, there exists a special sort of reality that violently attacks the nerves**, and this is composed of that which we call **the world of theater. Futurist theater is born out of the two most vital currents** of Futurist sensibility.[420]

The *sintesi teatrale* would capture that special reality, that intense life strewn all over the external world, and deploy it to attack the nerves. It would draw on reality, but it would not be representational; rather it would be *autonomous*, resembling nothing more than itself and formed of vital energies. In essence, it would be abstract cinema.

It was only in 1916 that a manifesto on the subject of cinema, and the first of several Futurist films, appeared. The manifesto declared,

> Film is an autonomous art. The filmmaker, therefore, must never copy the stage. Because it essentially visual, cinema must above all fulfill the evolution that painting has undergone: detach itself from reality, from photography, from the graceful and solemn. It must become antigraceful, deforming, impressionistic, synthetic, dynamic, free-wordist.[421]

The manifesto states explicity the proposition that constitutes the core of my commentary on Futurism, viz., that the cinema is "*the expressive medium most adapted to the complex sensibility of a Futurist artist*."[422] In championing the *polyexpressive* potential of film, it proclaimed that the cinema possesses a quality that served as the ideal of modern creative expression. A Futurist cinema would fuse the most varied elements, "painting, architecture, sculpture, words-in-freedom, music of colours, lines and forms, a jumble of objects and reality thrown together at random." It would be a new art, beyond the influence of theatre and literature. Futurist cinema would free painters and poets from the confines of tradition, allowing them to "break out of the limits of the frame . . . transgress the boundaries of literature . . . and throw a marvelous bridge between the word and the real object."[423]

The assertion that the cinema must fulfil the evolution of painting by detaching itself from reality has special importance. The Futurists recognized that the cinema had already suffered greatly as a result of inheriting the traditions of literary theatre and the mechanical and mimetic properties of photography. All cinema produced up to that point they repudiated as "profoundly *passéiste*." The Futurists foresaw that real innovations in cinema would come about only after film had been freed from its reproductive abilities.

A Futurist group in Russia, Hylea (*Гилея*, Gileja), also recognized the polyexpressiveness of cinema. In 1913, a member of the group, the great poet Vladimir Mayakovsky (Владимир Маяковский; Vladimir Majakovskij, 1893–1930), published a brief manifesto, "Театр, кинематограф, футуризм" (Teatr, kinematograf, futurism; Theatre, Cinematography, and Futurism), in the film periodical *Кине-журнал* (Kine-zhurnal; Cinema Journal). Its paragonal thrust is evident: in it Mayakovsky pointedly asks whether theatre makes sense in a world increasingly dominated by the cinema.[424] He notes that the dynamism of a theatrical production is limited by the "dead backgrounds of (theatrical) decoration."[425] Mayakovsky more or less says that the cinema will show theatre the way, for its movement forms will force theatrical performance space to become dynamic as well. That same year, he published, in the same film periodical, "Разрушение 'театра' по кино как признак возрождения театрального искусства" (Razrushenie "teatra" po kino kak priznak vozrozhdenija teatral'nogo iskusstva; The Destruction of the "Theatre" by the Cinema as a Sign of the Revival of Theatrical Art) and "Отношение сегодняшнего театра и кинематографа к искусству" (Otnoshenie segodnyashnego teatra i kino k iskusstvu; The Relationship of Today's Theatre and Cinema to Art).[426] And almost a decade later, in 1922, he wrote a poem, "Kino i kino" (Cinema and Cinema):

For you a cinema spectacle.
For me almost a *Weltanschauung*
The cinema—purveyor of movement.
The cinema—renewer of literature.
The cinema—destroyer of aesthetics.
The cinema—fearlessness.
The cinema—a sportsman.
The cinema—a sower of ideas.
But the cinema is sick. Capitalism has covered its eyes with gold. Deft entrepreneurs lead it through the street by the hand. They gather money by stirring the heart with whining little subjects [plots].

We must put an end to this.
Communism must rescue the cinema from its speculating guides.
Futurism must steam the dead water—slowness and morality.
Without this we shall have either the imported tap-dance of America or the continuous 'tear-jerking' of the Mosjoukines.
We are tired of the first.
Even more tired of the second.[427]

The Hylea group also produced one of the first avant-garde films: titled *Драма в Кабаре Футуристов №* 13 (Drama v Kabare Futuristov no. 13; Drama in the Futurist Cabaret no. 13, 1913), it was directed by the Rayonist Mikhail Larionov (1881–1964) and the Expressionist-influenced Natalia Goncharova (1881–1962), who at the time belonged to the Russian Futurist movement.[428] Goncharova appeared in the film along with Mayakovsky as well as David and Nikolai Burliuk (Давид Бурлюк; David Burljuk, 1882–1967; Николай Бурлюк, Nikolaj Burljuk, 1868–1917), painters and poets who led the Futuristically disposed Hylea movement. The film, which was shot by Vladimir Kasjanov (Владимир Касьянов; Vladimir Kas'janov, 1886–1913), recorded the activities of a group of dedicated *flâneurs*. Clad in brilliantly coloured waistcoats (of course, it wouldn't have been possible to see the colours on black-and-white film), wearing earrings, and decked out with radishes or spoons in their lapels, the band of *flâneurs* went from shop to café to shop. Their sartorial accessories were partly to parody the Symbolists and the Russian "World of Art" (Мир искусства; Mir iskusstva) painters, who cultivated a taste for the exotic, including a love for lilies and carnations: the Futurists parodied this taste for the exotic by juxtaposing the Symbolists' artificial paradises (their brilliantly coloured earrings) with the concrete reality of life in the street.[429]

But the antics depicted were also strategies that the Burliuk brothers, poet Vasily Kamensky (Василий Каменский; Vasilij Kamenskij, 1884–1961), and their colleagues used in their "fight for Futurism." That struggle had

been launched on 10 October 1913, when members of the group appeared on Kuznetzky Most (an avenue lined with posh shops) in a sort of mummer's parade, splendid in their painted faces, reciting Futurist poetry. While Benedikt Livshits (Бенедикт Лившиц; Benedikt Livshic, 1887–1938), always shy, managed to persuade himself to appear in an outlandish necktie and handkerchief, the theatrical Mayakovsky strutted along the avenue, dressed in a bold yellow shirt that his mother had sewn and a formal coat accessorized with a vegetable and piece of cutlery, reading his poetry in his *basso profondo* voice. The Futurists paraded down the street, ignoring the razzing they received from the crowd that gathered (though it must be said that one little girl honoured the deep-voiced poet in his brightly coloured shirt by giving him an orange, which he peeled and ate).

The Hylea group engaged in four more of these poets' parades before their first event in a recognized hall, at the Society for Art on 13 October 1913. This was billed as "the first recital of speech creators [*rechetvorsy*]." The posters announced that Mayakovsky and David Burliuk would present lectures (really polemical talks), Mayakovsky **"**Перкатча**"** (Perkatcha; Gauntlet) and Burliuk "Доители изнурённых жаб" (Doiteli iznurennykh zhab; The Milkers of Exhausted Toads). In fact, the presentations were more light-hearted, and included Maykovsky's electrologically inspired comments on the Egyptians' and Greeks' habit of stroking cats to produce discharges of static electricity. Livshits and Aleksei Kruchenykh (Алексей Кручёных; Aleksej Kruchjonyh, 1886–1968) read their poems, and Vladimir Burliuk (Владимир Бурлюк; Vladimir Burljuk, 1886–1917) presented his brother's talk, as David was out of town. On 19 October 1913, Mayakovsky inaugurated Moscow's Futurist Cabaret by reading "Нате!" (Nate!; Take This!) at the Pink Lantern—the poem was chosen to offend. On 11 November 1913, David Burliuk, Mayakovsky, and other members of the Russian Futurist movement presented a famous event at Moscow's Polytechnic Museum. Mayakovsky appeared, again in the yellow shirt his mother had sewn for him, to speak on urban life. David Burliuk, dressed (as in *Drama v Kabare Futuristov*) in a morning suit with colourful rags at the collar, had a dog, waving its tail, painted on one of his cheeks; he spoke about new art, focusing in particular on Cubism. Kamensky, one of Russia's first amateur aviators, had an airplane painted on his forehead and wore a cocoa-coloured suit with gold brocade; he spoke on Futurism and addressed the question whether the Russian group had developed in response to Marinetti's manifestos. He claimed that the Hylea group antedated the Italian, since Velimir Khlebnikov (Велимир Хлебников; Velimir Hlebnikov, 1885–1922) had begun publishing Futurist poetry in 1908, a year before Marinetti's first manifesto. The evening at the Polytechnic Museum was followed by a seventeen-city tour, which included a lecture by Maya-

kovsky, "Достижения футуризма" (Dostizhenija futurizma; The Achievements of Futurism) in which the poet argued that Futurism was the poetry of the modern city, that people's souls were being enriched by new urban sensations and new emotions that poets of earlier ages had not experienced, and that since the world was becoming one big city, nature would soon be obsolete, making the poetry of nature outmoded. A new poetry, in new rhythms, foretold the promise of the new world, which he enjoined poets to bring forth. The language of this new, magical poetry would not be mimetic, but active: a word would no longer be a symbol but an active organism. Mayakovsky's talk also included attacks on the Symbolists, especially Konstantin Balmont (Константин Бальмонт; Konstantin Bal'mont, 1867–1942) and Valery Bryusov (Валерий Брюсов; Valerij Brjusov, 1873–1924). David Burliuk offered a relatively scholarly lecture, on Cubism and Futurism, which he illustrated with slides of work by Cézanne, van Gogh, and the Impressionists.

*Drama v Kabare Futuristov* turned out to be unique as a Russian Futurist film. The Italian Futurists similarly committed little energy to filmmaking, though they did recognize the affinities of their artistic activities and aesthetic ideals for the cinema: they commented extensively on the cinema, and what they said reveals both their strong understanding of what the cinema might offer their enterprise and a keen sense of how the potential for cinema had been betrayed. (Perhaps the latter explains the Italian Futurists' reluctance to get involved in filmmaking.)

The Italian *futuristi* did produce one film that seems to have been genuinely Futuristic: *Vita Futurista*, produced, directed, and photographed by Arnaldo Ginna in 1916 (though, because no print is known to have survived, we can only speculate on its credentials as a Futurist work from descriptions of it). (This work is discussed later, when I can compare it with Bragaglia's work in film.) Artists with looser ties to Futurism also made film. For example, Anton Guilo Bragaglia established a production company, La Novissima, and made (with the help of relatives) four films in the year 1917: *Thaïs*; *Un dramma nell'Olimpo* (An Olympian Drama); *Il mio cadavere* (My Corpse); and *Il perfido incanto* (The Wicked Enchantment or The Evil Spell). The sets for two of these films were done by Futurist designer Enrico Prampolini, and those sets were striking. But this work seems not to have been completely Futurist in its conception. And besides these quasi-Futurist productions, there are lost works by the brothers Bruno Corra and Arnaldo Ginna (Bruno and Arnaldo Ginanni Corradini)—*important* lost works, of a genuinely Futurist character—that I comment on in the next section.[430]

Still, we must reflect on the paucity of Futurist film production, for it would seem to contradict the main thesis of this book. That reflection must take us back to the Italian Futurists' principal document devoted exclusively to

cinema: "Manifesto della cinematografia futurista" (1916), signed by Marinetti, Corra, Settimelli, Ginna, Balla, and the painter Remo Chiti (1891–1971). Chiti, like Ginna and Corra, was associated with Florence's Futurist movement (to which Corra, Ginna, M. Carli, Settimelli, and Maria Giannini [1892–1953] also belonged).[431] The authors of this manifesto note that one might easily be tempted to believe that the cinema is well suited to serve as a Futurist medium: "At first look the cinema, born only a few years ago, may seem to be Futurist already, lacking a past and free of tradition." The "Manifesto della cinematografia futurista" starts with a declaration that the book will inevitably die, to be replaced by the new medium:

> For a long time the book, an utterly passéist means of preserving and communicating thought, has been fated to disappear, along with cathedrals, towers, crenelated walls, museums, and the pacifist ideal. A static companion to those who are sedentary, nostalgic, and neutralist, the book cannot entertain or exalt the new Futurist generations intoxicated with revolutionary and bellicose dynamism.[432]

The authors of the manifesto recognize the vivifying potential of a hard-driving, mechanical dynamism and determine that the cinema has much the same enlivening—indeed redemptive—powers that war does:

> The Futurist cinema that we are preparing—a joyful deformation of the universe, an alogical and momentary synthesis of everyday life—will become the best school for children: a school of joy, speed, force, courage, and heroism. It will develop, sharpen sensibility, will accelerate creative imagination, endow intelligence with a prodigious sense of simultaneity and omnipresence. In so doing, the Futurist cinema will collaborate in the general renewal, replacing the literary review (always pedantic) and drama (always predictable), and killing the book (always tedious and oppressive). Propaganda needs may still oblige us to publish a book every now and then. But we prefer to express ourselves through the cinema, through great screens of words-in-freedom [*parole in libertà*] and mobile illuminated signboards.[433]

The new cinema, the *cinematografia futurista*, would be dynamized words-in-freedom. However, the manifesto's authors go on to note that *passéiste* forms have already taken hold of the cinema:

> In reality, because film has appeared in the guise of a *theater without words*, it has inherited all the most traditional rubbish of the literary theater. Consequently, everything we have said and done about the stage applies to the cinema. Our action is legitimate and necessary insofar as the filmmaker up to now *has been and tends to remain profoundly passéist*... Filmmakers have done no more than inflict on us the most backward-looking dramas, lengthy or brief. The same scenario whose brevity and variety can make it seem advanced, in most

> cases is nothing but the most trite and pious *analysis* [the cinema should be synthetic, but subjecting it to traditional conventions has made it analytic].[434]

But that is not all there is to the cinema the manifesto's authors grant: they see in it the possibility of a true Futurist art, perhaps even *the* paradigmatic Futurist art.[435] As we have seen, making the cinema a Futurist medium would require making it visual, thus fulfilling the evolution of painting. It would have to detach itself from photography and become "antigraceful, deforming, impressionistic, synthetic, dynamic, free-wordist."[436]

The Futurist attitude towards photography, that other means of mechanical reproduction, was even less enthusiastic than that which they harboured towards cinematographic reproductions. Boccioni (who was more extreme than other Futurists on this topic) was convinced that photography was an inferior medium to painting; he accused photography of being materialist and alleged that mechanical means of recording facts were numb to their nature.[437] Over the course of some thirty years, the Futurists' relationship with the medium shifted time and again as they tried to resolve this fundamental difficulty of using an art that stilled movement to capture universal dynamism: at one time, the use of emblematic portraiture seemed an effective solution; at another, the use of aerophotography; at still another, photography as propaganda. The attempt that has garnered the most long-lived respect was Bragaglia's photodynamism.[438] A visual artist, Anton Giulio Bragaglia with his brother Arturo (1893–1962) began producing photodynamic works (photographs and, later, film) within two years of the movement's inception. Soon after, he proclaimed these to be Futurist works.[439] Bragaglia's photodynamic images, such as *Salutando* (The Greeting, 1911), *Il falegname che sega* (Carpenter Sawing, 1911), *La dattilografa* (The Typist, 1911), *Mano in movimento* (Hand in Movement, 1911), *Cambiando positura* (Change of Positions, 1911), *Il fumatore—il cerino—la sigaretta* (The Smoker—the Match—the Cigarette, 1911), *Il chitarrista* (The Guitarist, 1912), *Lo schiaffo* (The Blow, 1912), and *Il violoncellista* (The Cellist, 1913), were made using a long exposure, during which the subject moved. The effect is familiar by now: the parts of the subject that move become a spectral, dematerialized blur, while the areas where there is no movement appear in fine, highly resolved detail. Photodynamism focuses on the transmitting of energy and rhythm, what Bragaglia called "the algebra of movement." Anton Giulio and his younger brother actually invented "photodynamism" before either had met Marinetti. In 1912, when he learned of their work, the Futurist leader decided to finance photodynamic research. This led to photodynamic portraits of Futurist members, including the famous 1913 "polyphysiognomical" portraits of the Futurist Poet Luciano Folgore (*Ritratto polifisionomico del poeta futurista Luciano Folgore*) and

Boccioni (*Ritratto polifisionomico del Umberto Boccioni*): both impressive efforts at imparting the impression of a *uomo moltiplicato*.

The actual photodynamic images, usually attributed to Anton Giulio, were likely executed, and possibly conceived, by Arturo and, possibly, a third brother, Carlo Ludovico (1894–1998). Anton Giulio Bragaglia's contribution to the enterprise seems to have been less practical. He was the most theoretically engaged of the three, and it was he who expounded the conception of photodynamism in the essay "Fotodinamismo futurista" (Futurist Photodynamism, written in 1911, published on 1 July 1913).[440] Since I am dealing here with conceptual foundations of photography and photodynamism, I will henceforth write of Anton Giulio Bragaglia.

A.G. Bragaglia offered photodynamism as an answer to the limitations of cinema and traditional photography that Futurist critiques of those media had revealed. The Futurists recognized photography as technologically innovative (and therefore felt its appeal), but at the same time, under the influence of Bergson, they saw it as a visual language that appeared to petrify life, stopping time and offering passive recordings of reality. Bragaglia responded to this implicit critique by deploying Bergsonian ideas against their Bergsonism: he contrasted his conception of photodynamism with cinematography and with Étienne-Jules Marey's chronophotography. He claimed that photodynamism was able to render a sense of the natural continuity of movement, rather than break it down into a series of sequentially ordered positions as Marey had done.

Bragaglia's ideas on photodynamism had much in common with the Futurists' more general ideas on universal dynamism; nonetheless, the latters' antipathy towards mechanical reproduction was so great that, except for Marinetti, the core group of Futurists rejected Bragaglia's claims that there could be a genuinely Futurist photography. Thus, in *Lacerba*, on 1 October 1911, six painters belonging to the Milanese group of Futurists—Boccioni, Carrà, Balla, Russolo, Severini, and Soffici—wrote, "Warning. Given the general ignorance in matters of art, we Futurist painters declare that everything referred to as 'photodynamic' has to do exclusively with innovations in the field of photography. Such purely photographic researches have nothing to do with the PLASTIC DYNAMISM invented by us, nor with any form of dynamic research in the fields of painting, sculpture or architecture."[441] The painters' distinction between photodynamism and Plastic Dynamism is spurious: both were devoted to conveying the impression of universal dynamism. There is, moreover, something odd about these exponents of the new arts of the machine rejecting mechanical reproductions, and even more about their confining to one particular art the ability to impart the phenomenon of dynamism (though their insistence on that perhaps can be explained by

the paragonal anxieties elicited by contemplating the relative standing of arts based in artisanal methods in comparison to the arts of mechanical reproducibility in a future that would valorize technological art). But whatever the real reason for it, the Futurist painters' rejection of Bragaglia's claims for photodynamism as a Futurist art was total.

Marinetti alone among Futurist artists continued to champion Bragaglia's work. He funded Bragaglia's photographic research, wrote the copy for Bragaglia's exhibition of photodynamic images at the Sala Pichetti, and sometimes invited Bragaglia to participate in a *serate futurista*, when Boccioni was not present. Bragaglia was undaunted by his rejection by most Futurists. He contended that "inert photodynamism," even better than cinematography, could capture the essence of universal dynamism. The 1 July 1913 issue of *Lacerba* contained an advertisement on the next-to-last page: "Published yesterday: 'Futurist Photodynamism' by Anton Giulio Bragaglia with 16 magnificent plates. Special introductory price for this edition: 10 soldi."[442] The text the book includes suggests paragonal anxieties: it insists that, compared to photodynamism, the cinema lacks Futurist attributes:

> cinematography does not trace the shape of movement. It subdivides it, without rules, with mechanical arbitrariness, disintegrating and shattering it without any kind of aesthetic concern for rhythm. It is not within its coldly mechanical power to satisfy such concerns.
>
> Besides which, cinematography never analyses movement. It shatters it in the frames of the film strip, quite unlike the action of Photodynamism, which analyzes movement precisely in its details. And cinematography never synthesises movement, either. It merely reconstructs fragments of reality, already coldly broken up, in the same way as the hand of a chronometer deals with time even though this flows in a continuous and constant stream.[443]

All in all, Bragaglia deemed the cinematograph lifeless compared to a photodynamic work. He claimed that his work confirmed the findings of Bergson's exposé of the cinematographic conception of time and movement. He also insisted that the photodynamic technique could capture the essence of universal dynamism: photographs done using this technique exhibit rhythm and movement; more importantly, the results show the dematerialization that follows from speed (and greatly increased velocity of motor-powered technologies—like the motor-car that Marinetti flipped on the evening of 15 October 1908 or the machines that Léger, Murphy, and Ray recorded for *Ballet mécanique*—had made universal dynamism a palpable reality for the postmodern world). Photodynamism conveys the fluidity of change, which is something that neither cinematography nor Marey's chronophotography can do. Bragaglia invoked Bergson when arguing for this point, as he considered the

limitations of chronophotography and cinematography from a Bergsonian vantage point. He believed that both cinematography and Marey's chronophotography shared the same limitations, since chronophotography is simply cinematography on a single plate (or on a strip of film that is not sectioned by frame lines). Both cinematography and chronophotography analyze a continuous action into discrete parts: consequently, neither captures the continual transformation that is the essence of change. Bragaglia pointed to a clock to explain what was missing from cinematographic and chronophotographic depictions of motion: "To put it crudely chronophotography could be compared to a clock on the face of which only the half-hours are marked, cinematography to one on which the minutes too are indicated, and Photodynamism to a third on which are marked not only the seconds, but also the intermomental fractions existing in the passages between the seconds."[444] Cinematography and chronophotography, then, grasp only frozen instants (thus he described them as offering a glacial reproduction of reality). Of the two erroneous methods of apprehending change, chronophotography and cinematography, the former is the less intellectually and spiritually deleterious. (One might well ask whether this conclusion was not motivated by paragonal anxieties about photography's status vis-à-vis the cinema.)

Bragaglia claimed that his blurred-motion photographs impart the essence of movement, for the blurring suggests what happens in the interval between instants, in the interval where real change occurs. "We are involved only in the area of movement which produces sensation, memory of which still palpitates in our awareness," he wrote.[445] The blur of the moving forms in his photodynamic images draws attention to the energy and rhythm of action, to what happens in the intervals between stases.

To reinforce this, Bragaglia made photodynamic images that depict movements having successive stages. Such an image might, for example, present a person receiving applause: that image would show a person sitting, a person standing, and a person taking a bow, with blurring between the areas that depict those successive stages. The blurring has the effect of dematerializing the agent—the object that (or, more often, the person who) performed the action—and of suggesting that the intervals between stases convey the essence of the movement itself. Ultimately, what is shown in a photodynamic image is not the movement of an individual object that assumes a series of discrete spatial locations across a temporal interval—that is what film or chronophotography presents. Rather, in the photodynamic image the agent has dematerialized and we are offered pure (objectless) movement.

Bragaglia believed that photodynamic images convey the sensation of motion. For him, the question of whether they accurately reproduce motion had no aesthetic import. Indeed, like the Futurist painters, he believed in

the importance of freeing artistic constructions from the demands of reproduction: for him, images' aesthetic value depends not on their representational value but on their potential as action—on their ability to cause actual, dynamic effects, not on representational accuracy. This potential can sometimes be enhanced by deforming the representing form, drawing it away from faithful representation.

Bragaglia believed that speed made objects immaterial—that it turns matter into energy. Photodynamic images, by capturing motion, become visual transcriptions of energy. They present the essence of gesture and movement in a single image and register the dynamism of speed as vibration, sensation, and emotion. In the early twentieth century, such interests in energy and vibration were commonly associated with beliefs in a higher spiritual reality. In Italy at this time there was a well-developed interest in experimental scientific photography that centred on two possibilities: using photography to investigate the psychic or spiritual contents of the image, and using photography to capture movement within a single frame. These preoccupations were widespread, among both scientists and photographers. Technical journals such as *Il dilettante di fotografia* and *Il progresso fotografico* (The Amateur Photographer and The Photographic Process, respectively) charted the progress of para-scientific experiments, spiritualist photography, and Marey's chronophotographical work. They also explored means for creating "multi-portraits," double exposures, and montage effects.

Like the authors these journals published, Bragaglia believed that his photographs captured phenomena associated with spirits. During this period, photography was experienced as an uncanny medium that undermined the unique identity of objects, creating a parallel world of phantasmal doubles; so the possibility of producing spirit photographs did not seem nearly as implausible then as it might seem to people now. Furthermore, the 1870s had seen the birth of parapsychology as a field of serious scientific study, and many well-known scientists were among early researchers in this field. The work of Dr. William Crookes illustrates this blurring of the boundaries between traditional science and the supernatural. Crookes (whom I mentioned in the introduction) was a distinguished British scientist, the discoverer of the element thallium (which was essential to the later development of the cathode-ray tube); he was also a keen photographer and pioneered the use of the magnesium flash. In the 1870s he undertook a series of experiments during séances with the medium Florence Cooke that resulted in forty-four photographs of the materialization of the departed spirit of Katie King. They possess an erotic charge that suggests that Crookes was enraptured and charmed by the revenant.

Media—and especially electric media—seem to elicit Spiritualist ideas. They are invested with powers over resurrection, time, and death. They are

time machines, and the cinema itself is a special machine that makes permanent spectral traces of fleeting occurrences. The past endures in films, in photographs, and in digital images as a double of the present—collectively, these images embody prolifically multiplied times. Stereo photography brings about the artificial reconstitution of space. Media provide means for preserving the past. Is it then so strange that people believed in the literal possibility of travel in time—believed that the past exists and endures in a place that we do not know and where we cannot go?

Bragaglia shared in the era's occult interests, and consequently adopted (and modified) the Symbolist idea that art's purpose was to induce effects, not to transmit meanings. He referred to photodynamism as "an active transmitter." No doubt part of what he meant relates to the Futurist idea of the action image—of an image whose visual form allows it to have dynamic effects. That was not all he meant, however. In his writing he made frequent mention of occult and Spiritualist phenomena (phenomena that appealed to many of Bergson's followers). As we have seen, "La pittura futurista: Manifesto tecnico" avers that "our bodies penetrate the sofas upon which we sit, and the sofas penetrate our bodies." Bragaglia took this idea even further, asserting that "when a person gets up the chair is still full *of his soul*." A photograph likewise is full of the sitter's soul—and it is a record of the photographer's thought. A photodynamic image transmits either the photographer's or the sitter's thought (intuition) to the spectator. Bragaglia conceived of this thought transmission as being akin to the transmission of radio waves.

Bragaglia was something of a polymath among artists. Shortly after publishing his "Futurist Photodynamics," he brought out a book about the great inventions of the seventeenth century. He went on to publish several books on other subjects, spanning a range from pantheism to prophecy, and he foretold the invention of televisual communications. He collaborated with Pirandello. But the most constant, and the deepest, of Bragaglia's interests was the cinema. At the age of sixteen, long before Futurism had been born, he had joined his father's (Francesco's) cinema company, La Società Italiana Cines, and he stayed there for some time, leaving only when he was ready to pursue his experiments in photodynamism. In 1916, after his *contretemps* with the Futurists, he returned to filmmaking, setting up his own film company, La Novissima.[446] As I noted earlier, the films that company produced were aligned with the Futurist program: *Thaïs* (January 1917), *Un dramma nell'Olimpo* (January 1917), *Il mio cadavere* (July 1917), *Il perfido incanto* (July 1917).[447] Soon after, he switched to commercial filmmaking.

None of Bragaglia's silent films have been seen for decades (the Cinémathèque Française may have a complete print of *Thaïs*, in addition to a print that includes only thirty-four of its seventy minutes). Bragaglia's cinematic

output of this era (*Thaïs* aside) is known principally through stills, contemporary reports, and retrospective impressions. Bragaglia's daughter Antonella stated that *Thaïs* mingled abstract (geometric) images and hallucinatory images: "Geometric shapes were formed and dissolved by movement, steam rose from walls, and mist disrupted perspective. The Mouth of Truth breathed out clouds of smoke. There were the shortest of captions, fragments of Baudelaire. Black and white alternated with dark blue or fiery orange toning."[448]

The film concerns a beautiful Russian countess, Thaïs Galizky (not Galitzky, as is commonly given), who is an evil seductress. Its sets are startling abstract constructions, but their geometric forms are integrated with the story and help motivate the action. In the final scene, the protagonist impales himself on the vertical and horizontal stripes of the background. The film's dynamic geometry reflected the Futurists' machine-aesthetic; that same aesthetic impelled Bragaglia to attempt mounting Stravinsky's *Фейерверк* (Feyerverk; Fireworks, 1908) with dynamic mechanico-morphic forms replacing human dancers. The production remained unrealized.

*Il mio cadavere* was as phantasmagoric as *Thaïs*. Based on a Neapolitan popular novel of the late nineteenth century, it tells the story of a nasty baron who is assaulted by tormenting visions, including images of death. Antonella Bragaglia characterized this film as expressing "changing states of psychic obsessions"; thus, it arose from the Futurists' interest in states of mind, and, as other Futurist artworks do, bends those concerns towards the occult.[449] *Il perfido incanto* depicts a series of episodes, some idyllic, some violent, that take place in an enchanted castle owned by the Grand Magician Atanor (the name offers an alchemical allusion). The magician is assisted by the sorceress Circe, who is the daughter of his former companion and who has lived with him since she was a child. Her hieratic priestly powers ensure Atanor's reputation as a soothsayer and magician, so he falls in love with her—and the plot develops from there. Plot incidents include a murder, a bank robbery, rape, sorcery, and a descent into madness. This film, Bragaglia's most experimental production, also incorporated sets designed by Prampolini, which, photographs show, were large and imposing and made the actors seem tiny. The film also used photodynamical techniques as well as effects produced with distorting lenses and prisms (we see again that infinite plasticity serves as a marker for the postmodern). This work gives evidence that the Futurists glimpsed the possibility of using the cinema as a model for mental processes.[450]

Ginna's *Vita futurista* was more experimental even than Bragaglia's *Il perfido incanto*. It endeavoured to apply the techniques of the variety theatre to the cinema.[451] Like most works for the variety theatre, it set a burlesque tone. In one of its episodes, the actors engage in fisticuffs. Another, which makes use of a split-screen, contrasts the ways that a Futurist and a *passéiste* sleep.

Still another, an example of Marinetti's filmed drama of objects, is animated by distorting mirrors (again, testimony to infinite plasticity serving as a mark of the postmodern): it depicts Balla's love affair with a chair. In another such drama (Sequence 6), a foot, a hammer, and an umbrella engage in a discussion; yet another episode (Sequence 5) extends the efforts to dramatize the inorganic (an implication of the Futurists' machine aesthetic) by presenting young women in metallic costumes that reflect light—thus, they blend into the background, thereby achieving a transparency that destroys the ponderousness of bodies (double-exposure in that sequence serves the same end). Yet another sequence (Sequence 7) developed out of the Futurists' conviction the cinema could be used to imitate (and to induce) "states of consciousness": this effort at introspective research into states of mind involved tinting the film deep violet.

## ARNALDO GINNA, BRUNO CORRA, AND SYNAESTHETIC CINEMA

States of the mind or soul also intrigued the brothers Arnaldo Ginna and Bruno Corra, artists from Ravenna. At the age of eighteen, Ginna, assisted by Corra, began painting a series of abstract canvasses titled *States of the Soul*. The brothers had attended lectures at the Theosophical Society in Florence and Bologna and were acquainted with Édouard Schuré's conception of the "theatre of the soul" and Annie Besant and Charles W. Leadbeater's idea of "thought forms." Besant and Leadbeater's book *Thought-Forms* suggested that thoughts and emotions create distinct patterns of colours in the human aura (colours surrounding the body, created by energy radiating out of it) and that these colours can be perceived by evolved human spirits with the requisite sensitivity (involving clairvoyant abilities). The human aura, Besant and Leadbeater claimed, is composed chiefly of two bodies, which they call the "mental body" and the "astral body." The mental body is the agent of all mental activity, while the astral body is the vehicle of the emotions. Each thought and each emotion causes a corresponding vibration in the mental and the astral body respectively, and these vibrations (like those in the luminous range in the electromagnetic spectrum) lend a cast to the aura one emits at any given moment. Highly evolved people, whose thoughts, because they proceed on an elevated plane, are refined, subtle, and selfless, display radiant, clear, rippling colours in their aura, while less evolved and therefore insensitive persons display heavy, dull, muddy colours in their aura. Furthermore, the quality of the thought determines the colour of the thought form, the nature of the thought determines its shape, and the clarity of the thought determines its outline.

Bragaglia's films, I have noted, are based on the belief that the cinema imitates the activities of consciousness when it is in an extreme state. Ginna's

brother, Bruno Corra, another Futurist artist who made films, shared this interest in conveying consciousness's extreme operation. Corra too believed these extreme states were registered in auratic phenomena.

Corra developed the most advanced thinking on the cinema among the *futuristi*, which he articulated in his manifesto "La musica cromatica e i film astratti" (Chromatic Music—Abstract Film, 1912).[452] His notion of cinema was close to that of the German makers of *Lichtspielen* (for example, Ludwig Hirschfeld-Mack [1893–1965]) and of Absolute Films (for example, Walther Ruttmann and Oskar Fischinger [1900–1967]). Accordingly, he proposed the idea of a chromatic harmony—of harmonious moving colours describing dynamic figures that have harmonious relationships with one another:

> A new and more rudimentary form of pictorial art can be created by placing masses of colour harmoniously arranged in relationship to each other over a surface, so as to give pleasure to the eye without representing any image. This would correspond to what in music is known as harmony, and we can therefore call it chromatic harmony… We decided to make a serious attempt to create a music of colours… We traveled untrodden roads, letting intuition guide us for the most part, but always proceeding concurrently, in order not to be led astray, with our study of the physics of light and sound, the works of Tyndall and of many others.[453]

Corra took what he referred to as the "law of parallelism" in the arts extremely literally. According to this law, each of the arts employs forms that are structurally similar to those used in all the other arts. The basis for this principle lay in a theory of sensation that Corra shared with several other Futurists, including Carlo Carrà: all sensation, they believed, is caused by vibrations. But a vibration is an activity, so including vibrations of different rates and intensities (producing tastes, sounds, and smells as well as colours) in a painting will enhance its dynamism. In "La pittura dei suoni, rumori e odori" (The Painting of Sounds, Noises, and Smells), Carlo Carrà proposed that sounds, noises, and smells are all vibrations of different sorts and different force, and that all might be organized in arabesques, if we knew how to measure the intensity of these different vibrations.[454] The proposition that sensation results from vibrations—indeed, that reality is ultimately vibratory—was common among the Symbolists. It was also widespread among the Futurists: Mauro Montalti and Enrico Prampolini proposed a Futurist theatre that would be based on that conviction (and thus their proposals have similarities to Arnaldo Ginna and Bruno Corra's abstract cinema). Montalti's manifesto "Per un nuovo teatro elettro-vibro-luminoso" (For a New Theatre: Electric-Vibrating-Luminous, 1920) carried the principal of creating parallel structures among the different sensory/vibratory modalities to a radical conclusion:

> Not all men, in fact, have their own sensitivity equitably distributed in the five senses, so that they indifferently perceive a work of art that the artist created according to his own ability. For example, since not all men completely perceive a dramatic-auditory action with characters on stage, the Electric-Vibrating-Luminous Theatre *translates* the same dramatic conception, with its equivalent emotional power, in such a way that the deaf can also perceive the different cerebral vibrations that gave rise to the dramatic concept… This new art form, if well felt by the artist, will offer him a new way to express his own sensibility and his own thoughts, by means of luminous, aesthetic, and clear vibration.[455]

I noted in the first chapter, in the section "Nerves," that Hermann von Helmholtz, one of the nineteenth century's most eminent scientists, had compared nerves in the human body to telegraphy wires and proposed the doctrine of specific nerve energy (the idea that a uniform cause, electricity, would differently excite different sorts of nerves). Jonathan Crary's *Techniques of the Observer* points out an interesting proposal that arose from the doctrine of specific nerve energies: in the 1850s, around the time of Charles Baudelaire's "Correspondences," Émil du Bois-Reymond (1818–1896), a German physician and physiologist, researcher in animal electricity (his dissertation was on the topic of electric fishes), and a colleague of Helmholtz, explored the possibility of electrically cross-connecting nerves, thus allowing the ears to see and the eyes to hear. Montalti's manifesto "Per un nuovo teatro elettro-vibro-luminoso" was an artistic application of this idea. For his part, Marinetti claimed that everybody knows that the five senses (sight, smell, hearing, touch, taste) are simply modifications of a unified, highly perceptive faculty, responsive to a range of vibrations. He maintained that originally all senses were one, but that the original sense had split into senses that are responsive only to a narrow range of vibrations.

Theosophical and occult ideas were of great importance to several of the *futuristi*. In 1910, a pamphlet titled *Metodo* appeared in Ravenna—its authors were identified only by the initials A.B.C. (no doubt to suggest the elementary and methodical character of the tract's instruction). Actually, its authors are **A**rnaldo (Ginna) and **B**runo **C**orra. *Metodo* offers instruction on the means for attaining the knowledge requisite for individual growth. The path it lays out towards developing the higher self includes spiritual advancement, through gymnastics, diet, yoga, meditative practices, and reading Eastern philosophy—in addition, it mentions hypnotism (the comte de Puységur, 1752–1809, is named) and animal magnetism (Franz Mesmer, 1734–1815, is cited as well). *Metodo* expounds the occult electromagnetic metaphysics that undergirds Futurism, for it declares that force (energy) pervades all of nature. Force is the result of atoms (particles of matter) vibrating, and this vibration of atoms manifests itself to us as "light, heat, electricity, attraction, repulsion,

harmony, dissonance, magnetism, thought, etc."[456] If the atomic vibrations that produce our thoughts are inharmonious, we suffer the pernicious effects of the inharmonious actions to which those thoughts lead.

These occult notions about harmony—cardinal ideas for the postmodern age—helped produce some of the earliest abstract paintings, first *Nevrastenia* (Neurasthenia, 1908), and then, some three years later, *La musica della danza* (The Music Dance, ca. 1911, which is very close in time to the visual music film *La danza* that Ginna and Corra made together). Arnaldo Ginna would later claim to have created "i primi quadri *non rappresentativi*, ma costruiti con forme astratte, irreali, *occulte*" (the first pictures that were *not representational*, but were constructed of abstract forms, unreal, and *occult* [emphases mine]). He even characterized his paintings as *pittura occulta*.[457] One must be clear about chronology here. The first abstract paintings were made by Mr. John Varley, Mr. Prince, and Miss Macfarlane and presented in Annie Besant and Charles Leadbeater's *Thought-Forms*, published in 1901. The Corradini brothers were undoubtedly familiar with that peculiar volume (they were, as I noted, students of Theosophy and deeply learned in the occult sciences generally). The first abstract paintings by an "officially recognized painter" cannot be identified with any certainty, but Francis Picabia, František Kupka, and Wassily Kandinsky all painted abstracts in 1910, and by 1912, many painters had taken up abstraction as a cause. For example, around 1913 the Cubist artist and co-founder of the Section d'or (and later *peinture musicaliste* or *peinture effusioniste*) Henry (Henri) Valensi (1883–1960) was promoting pure abstraction as both a form and a means. Considered in this context, Arnaldo Ginna's *Nevrastenia*, completed in 1908, may well be the first abstract painting completed by an acknowledged "fine" artist for non-illustrative purposes.[458] Why the early date is important for us is that it shows that the peculiar fusion of occult enthusiasms (of course, as the example of Crookes makes evident, this sometimes took the form of a particular sort of interest in the science of electromagnetism) with a passion for moving coloured light (for we will see that in these years the Corradini brothers were interested in coloured light performances) may have had a role in creating abstract art.

*Metodo* connects these electromagnetic ideas to the traditional notion of the cosmic dance (which plays out at all scales, from the macrocosmic to the microcosmic), for it proposes that an artwork is "passions formed into reciprocal relations so as to form a system identical to those that revolve in the Heavens or those constituted among molecules of matter."[459] This remarkable idea was a founding principle of Symbolist poetics, as Arnaldo Ginna and Bruno Corra recognized. It offers the Romantic view of the artist as one who draws on nature's fundamental elements and who is aware of the correspondence between them and his feelings.

Five years later, Arnaldo Ginna was even more explicit about the Theosophical framework for his artistic production:

> Certainly, human thought and feeling are vibrations that are not delimited by our physical bodies. It is both apparent and experimentally proved that they are forces similar to electricity or Hertzian waves that propagate itself [*sic*] indefinitely in the ether. The living forms this vibratory force create[s] are the essence of our tremours of hate, love, lust, mysticism, fear, courage, self-abnegation, sacrifice, etc. Accordingly, I paint not the stances of humans, contorted in pain, but the vibration of their pained soul, or PAIN ITSELF.[460]

An event (even an object-event of the sort what we ordinarily think of as a simple object) produces vibrations that affect us and in doing so engenders sensations. A vibrating form (such as the heat from the element on a stove) can cause pain, for example. But a fleeting chromatic form in a film is similarly made up of vibrations, and these vibrations might cause an equivalent pain. This was a grounding idea of the "Abstract Cinema—Chromatic Music" manifesto, and it had occult roots. In fact, much of the conceptual armature for that manifesto stemmed from esoteric sources. Less than a year after "Manifesto della cinematografia futurista" appeared (and still in 1916), most of its signatories, along with some other Florentine Futurists, published "La scienza futurista"—this time the manifesto was signed by Bruno Corra, A. Ginanni (Arnaldo Ginna), Remo Chiti, Settimelli, Mario Carli, and Nerino Nannetti (1889–1982), one of the editors of *Italia Futurista*. That manifesto makes clear just what the Futurist conception of science was. One of its key declarations is "We draw the attention of all audacious minds to that less probed zone of reality that forms the phenomena of mediumship, psychism, water-divining, divination, and telepathy."[461]

Synaesthesia became a prominent theme of the Futurist conception of cinema. Ginna and Corra proposed means more concrete than séances or hypnotism to elicit synaesthetic experience: between June and October 1911, they experimented with applying paint directly to a film strip that had no emulsion.[462] Seemingly from the outset, their ideas about film gave primacy to organizing movement according to musical principles, for they produced four films by painting directly on the projected medium, and in all of them, the trajectory of colour development followed musical lines. In *Il pastore, il gregge e la zampogna (Digressioni sul libro di Thovez)* (The Shepherd, the Flock and the Bagpipe [Digressions on Thovez's Book], 1912), Corra and Settimelli outlined the ideas about cinema they, along with Ginna, had formulated and described Ginna and Corra's filmmaking experiments—for it seems that a primary reason for the pair to undertake these experiments was to confirm ideas the three had worked out. The monograph, published in Bologna by

Libreria L. Beltrami, was an attempt to take the ideas of their Florentine coterie to the public by writing in an almost journalist form.[463] One of the filmmaking experiments described in the work was *Una corda di colore* (A Chord of Colour), a "sviluppo tematico di un'armonia di colori" (thematic development of a harmony of colours), a colour music composition based on a painting by Giovanni Segantini, a Divisionist/Symbolist painter renowned in the late nineteenth century for his Alpine landscapes.[464] Of this piece, Arnaldo Ginna wrote, "il divisionismo era un punto base per gli studi sull'accordo cromatico, sinfonia cromatica ecc. perché diversi puntini o trattini, formavano, appunto, una corrispondenza con le diverse note musicali. Ecco ciò che ci accostava a certe zone di colore del Segantini" (pointillism was a basepoint for chromatic chord studies, a chromatic Symphony etc.—for a cluster [of his] dots or dashes were matched with a cluster of different notes. Note that we approximated certain of Segantini's colour zones).[465] *Studio degli effetti tra quattro colori, due coppie complementari* (Study of Effects between Four Colours, Two Complementary Pairs) was a study of complementary colours, red and green against blue and yellow. A third film they described was *Canto di canti* (Song of Songs), a colour music composition based on motifs from Felix Mendelssohn's (1809–1847) "Frühlingslied" (Spring Song), interwoven with a theme from Frédéric Chopin (1810–1849). The musical compositions were apparently chosen for their tonal colours, to form the basis of the aural-visual correspondence. The final experiment described was *I fiori* (The Flowers), a "traduzione di *Fiori* di Mallarmé in colori" (translation of Mallarmé's *Les Fleurs* into colours).[466] The length of these films ranged from approximately 180 to more than 200 meters—between approximately 10 minutes to just over 12 minutes in running-time (at the more or less standard projection speed of the time).

It was partly—perhaps largely—Ginna's and Corra's interest in synaesthesia, and what synaesthesia reveals about nerve energies, that led them to embrace the cinema. The cinema's composite, multisensory character certainly helped stimulate an interest in multisensory and synaesthetic art. Thus, the cinematic effect motivated efforts to transform painting, to make it multisensory. Similar impulses were evident in Carlo Carrà's theory and practice. He contended that a new approach to painting was needed in order to enhance painting's dynamic qualities. He called this new approach "the painting of sounds, noises and smells." This multisensory painting would be as revolutionary as the other forms (such as the variety theatre) that the Futurists had invented—certainly as novel as the remarkably progressive "words-in-freedom" literature. Bringing the elements of sound, noise, and smell to painting would open new paths. Modern life was alive with sounds,

noises, and smells, the Futurists pointed out. The *futuristi* had taught artists to love this new dynamism and thereby had destroyed

> the stupid mania for the solemn, for humans draped in togas, for the serene, the hieratic, and the mummified: in short, for everything purely intellectual. *The wireless imagination, words-in-freedom, the systematic use of onomatopoeia, antigraceful music without continuous steady rhythm, and the art of noises* are all derived from the same Futurist sensibility which has generated the paintings of sounds, noises, and smells.[467]

Because Carrà's "La pittura dei suoni, rumori e odori" is such an important paragonal statement, I will consider it in detail. In it, Carrà acknowledges that there were precedents for the new painting he was advocating. Impressionist canvases had sometimes suggested the character of modern life, but the effect of movement they created was rather feeble. To succeed in full measure in conveying the nature of modern life, they would have to drop their "extremely vulgar, *trompe-l'oeil* perspectives . . . [their] *sentimental mimicry of apparent nature* . . . Anecdote and detail, which . . . has almost always dragged them into a form of photograph."[468]

To create a stronger impression of dynamism than had been previously achieved, the painting of sounds, noises, and smells would have to do away with features of traditional (and Impressionist) painting that made the canvas inert. Carrà's manifesto rejects (1) all subdued colors, even those obtained directly and without the help of tricks such as patinas and glazes; (2) the banality of velvets, silks, and flesh tints, which are too human, too fine, too soft, along with flowers, which are excessively pale and drooping; (3) greys, browns, and all muddy colors; (4) the use of pure horizontal, pure vertical lines, and all other dead lines; (5) the right angle, which is deemed passionless; (6) the cube, the pyramid, and all other static shapes; and (7) the unities of time and place.[469] Having listed the features of painting that he eschewed, Carrà then sets out a program for replacing these inertia-inducing features, and proposals shout out the influence of the electromagnetic conception of the cinema (which is necessarily synaesthetic). To create a new form of painting free of those stultifying influences, he called for:

> 1. Reds, rrrreds, the rrrrredest rrrrrrreds that shouuuuuuuut.
> 2. Greens, that can never be greener, greeeeeeeeeeeens, that screeeeeeeam; yellows as explosive as possible; polenta yellows, saffron yellows, brass yellows.
> 3. All the colors of speed, joy, revelry, and fantastic carnivals, fireworks, cafés chantants, and music-halls, all colors that are seen in movement, colors experienced in time and not in space [colour is dynamic in nature, and its dynamism should be liberated: swirling, or at least moving colours will be the material of the new painting].
>
> . . .

> 7. The sphere, helixes that whirl, upside-down cones, spirals, and all the dynamic forms which the artist's infinite powers of genius can discover [note the assertion that the powers of intuition are infinite; the basis for this claim is that intuition connects individual intelligence with a higher intelligence].
>
> 8. Perspective obtained not as a way of objectifying distances but as a subjective interpenetration of hard and soft, sharp and dull forms [here Carrà refers once again to the phenomenon of interpenetration].
>
> 9. Signifying the painting's dynamic construction (its polyphonic architectural whole), conceived as every painting's universal subject and its sole reason for being.[470]

That last point was derived from the Futurist conviction that all things move and that dynamism is the universal subject of the painting of sounds, noises, and colours. At this point in the manifesto, Carrà points out that his conception of architecture is not of something static, but of something dynamic, a structure that interrelates dynamic forms, as Pratella's musical architecture does. Understood as an art of harmoniously related dynamic forms, Carrà says, architecture can be found in moving coloured forms, smoke rising from a chimney, and even in metallic structures, "when they are experienced in states of mind that are violent and chaotic."[471]

I have dwelled on the proximity of Futurist ideas to Symbolist ideas. Carrà's list of features that allow an artwork to operate as a dynamic form that viscerally affects its viewers—of features that thwart and features that enhance the dynamic effect of a painting—offers a concrete case showing how close these movements are. Georges Seurat, the Symbolist/Divisionist painter and influence on Carlo Carrà, wrote,

> Art is Harmony, Harmony is the analogy between Opposites and the analogy between Elements Similar in tonal value, color and line; tonal value, that is, light and shadow; color, that is, red and its complement green, orange and its complement blue, yellow and its complement violet; line, that is, directions from the Horizontal. These diverse harmonies are combined into calm, gay, and sad ones; gaiety in terms of tonal value is a luminous dominant tonality; in terms of color, a warm dominant color; in terms of line, lines ascending (above the Horizontal); calmness in terms of tonal value is an equal amount of dark and light, of warm and cool in terms of color, and the Horizontal in terms of line. Sadness in terms of tonal value is a dominant dark tonality; in terms of color, a cold dominant color; and in terms of line, downward directions. Now, the means of expression of this technique is the optical mixture of tonal values, colors and their reactions (shadows), in accordance with very fixed laws, and the frame is no longer, as at first, simply white, but contrasts with the tonal values, colors and lines of the motif.[472]

The following passage from "The Painting of Sounds, Noises and Smells" offers similar examples of what makes painting seem speedy, joyous, or fantastic, and it does so through citing examples of what "Opposites" produce what effects: in fact, it is easy to imagine it as piece written by painter who, in his youth, had read Seurat carefully and adopted from him notions about how to work out ideas on what a painting can do, and later had encountered an example of vigorous, dynamic writing in the hyperbolically rhetorical manifestos of F.T. Marinetti, which caused his writing style to explode.

Carrà enumerates shapes whose dynamism results from unifying opposites:

> 11. The collision of two cones at their apexes (the natural shape of a water spout), cones that are bending or are formed with curving lines (a clown jumping, dancers).
> 12. The zigzag and the wavy line [dynamic forms that synthesize opposites] …
> 14. Lines, volumes, and lights considered as part of a plastic transcendentalism, that is according to their special kind of curving or obliqueness, as shaped by the painter's state of mind. [The term "plastic transcendentalism" (*transcendentalismo fisico*) is signal. Note that Carrà connects that idea to subjectivity (*stato d'animo*).]
> 15. The echoes of lines and volumes in movement [the affective image brings with it reverberations from the past and its effects are transmitted into the future].
> 16. Plastic complementarism (for both forms and colors), based on the law of equivalent contrast and on the clash of the most contrasting colors of the rainbow [a synthesis of opposites] …
> 17. Continuity and simultaneity in the plastic transcendencies of the animal, mineral, vegetable, and mechanical kingdoms [all orders of being will be seen as one, for all are movement and energy—and that will result in the transcendence of ordinary matter, and even the kingdom of the mechanical].
> 18. Abstract plastic wholes, that is, those which correspond not to sight, but to sensations which are generated by sounds, noises, and smells, and all the unknown forces involved in these.[473]

Carrà seems to have been unable to make up his mind regarding the status of colours and shapes in the painting of sounds, noises, and smells. We might think of the different positions he proposes as a similarity and a causal interaction theory. Point 16, for example, offers a similarity theory of the relation of colour to sound and smell: he contends that colours can provoke experiences resembling aural or olfactory experiences—the dynamic forms of all perceptions evolve out of a clash of opposites, so visual forms (for example) can take on shapes isomorphic to those that sounds or smells typically have (by involving homologous forms that integrate contrasting energies). In the end, when propounding the similarity theory of synaesthesia, he seems to

be arguing (much as Suzanne Langer would later) that the virtual shapes of these visual experiences can be made to resemble the virtual shapes of aural or olfactory experiences (and so evince their plastic equivalence to them). This similarity, he seems to be suggesting, would enable visual forms to stand for auditory or olfactory realities.

In the next section of the manifesto, Carrà develops this similarity theory by offering a synaesthetic conception of artmaking, contending that Futurist painters believe that sounds, noises, and colours are implicit in the lines, volumes, and colours of a visual work, in the same way that lines, volumes, and colours are incorporated into the structure of a musical composition. Visual art, evidently, follows the same structuring (or integrative principles) as music. Futurist canvases present plastic equivalents to the "sounds, noises, and smells found in theaters, music-halls, cinemas, brothels, railroad stations, ports, garages, hospitals, factories, etc., etc."[474] That is, the energy form in a painting has energy equivalent to the object/phenomenon itself. Presumably that means that the energy form in the painting and the energy of the object/phenomenon exert the same (deforming) effects on environing energy fields.[475] Considered from that point of view, sounds, noises, and smells can be concave, convex, or triangular, or assume other spatial-geometric forms (presumably because the characteristics of these sounds and smells have equivalents in plastic forms—that is, they elicit the same corporeal effects). Sounds and smells can be yellow, green, or blue. "In railroad stations and garages, and throughout the mechanical or sporting world, sounds, noises, and smells are predominantly red; in restaurants and cafés they are silver, yellow, and violet. While the sounds, noises, and smells of animals are yellow and blue, those of a woman are green, blue, and violet."[476]

However, in the comments immediately following this passage, he goes further than this idea of plastic equivalence to offer a causal interaction theory of synaesthesia. He contends that visual forms can actually provoke aural and olfactory experiences—and that the new painting will synthesize these effects. It is no exaggeration, he suggests, to claim that smell alone can set the mind into motion:

> If we are shut up in a dark room (so that our sense of sight no longer works) with flowers, gasoline, or other things with a strong smell, our shaping imagination will gradually eliminate remembered sensations and construct a very special plastic whole which corresponds perfectly, in its quality of weight and movement, with the smells contained in the room—they can even become environmental forces.[477]

That is, the induced visual phenomenon will have the same substantive and dynamic properties as the smells that induce it.

Carrà goes on to identify artworks that have achieved the status of paintings of sounds, noises, and smells:

> Such bubbling and whirling of forms and light, both infused with and composed of sounds, noises, and smells, has been partially rendered by me in *Anarchical Funeral* [*Il funerale dell'anarchico Galli*, 1911] and *Jolts of a Taxicab* [*Sobbalzi di fiacre*, a.k.a. *Sobbalzi di carozza*, 1911]; by Boccioni in *States of Mind* [the *Stati d'animo* trilogy mentioned above, to which Boccioni devoted much of his—and the vanguard's—*annus mirablis*, 1911] and *Forces of a Street* [Carrà uses the title *Forze d'una strada*, but probably intends *La strada entra nella casa*, 1911]; by Russolo in *The Revolt* [*La rivolta*, 1911, a more abstract piece than *Il funerale dell'anarchico Galli*—here reds, forces of revolution, thrust against the blues and brown of inert convention] and Severini in *Pan-Pan* [or *Bang Bang*—though Carrà cites *Pan Pan*, there is no Severini painting with that title, so he probably intends *La danza del pan pan al Monico*, 1911], all paintings which were violently debated in our first exhibition in Paris in 1912.[478] This kind of bubbling over requires a great emotive effort, almost a delirium, on the part of the artist [once again, Carrà suggests that the role of the Futurist is to convey consciousness as it operates in extreme states], who in order to render a vortex, must be a vortex of sensation himself [the artist himself must become a whorling energy field], a pictorial force and not a cold, logical intellect [Carrà attributes a stunning, vertiginous effect to dynamism that has a power of unifying diverse elements].
>
> Know, therefore! In order to achieve this *total painting*, which demands the active cooperation of all the senses, *a painting which is a plastic state of mind of the universal* [note this affirmation that a painting can embody the mind of the universal], one must paint, as drunkards sing and vomit, sounds, noises, and smells![479]

The artistic ideas expounded in these passages draw on esoteric ideas about synaesthesia. Bruno Corra applied similar ideas about the correspondences among the different sensory modalities, and about the law of parallelism among the arts, when considering the structural similarities among painting, music, and film, and that led him to reflect on the arbitrariness of divisions of the continuous electromagnetic spectrum. He writes of work he did with his brother, Arnaldo Ginna:

> We knew, however, that the chromatic scale consists of only one octave, and that, on the other hand, the eye, unlike the ear, does not possess *the power of resolution* (although, rethinking this point, I realize that one must have reservations). Yet we felt the obvious need of a subdivision of the solar spectrum [the peculiarity of identifying white light with the solar spectrum makes this another solar reference], even an artificial and arbitrary one (since the effect stems principally from the *relationships* between the colours that impress the eye).[480]

Corra continues with a commentary on a form of colour/light music that he and his brother tried before turning to the cinema. They conceived of a scale of colours equivalent to a music scale and chose lights that they thought could serve as equivalents to notes on a piano. They called this device a chromatic piano. Its conception was grounded in ideas about harmony: to realize it, they divided the spectrum into four octaves—four reds, four oranges, four yellows, four greens, four blues, four indigos, and four violets. The principle for doing this seems to have been to arbitrarily divide the "solar spectrum" into four, and to divide each quarter into seven subdivisions, which (peculiarly) they identified with the seven notes in an octave that can be played on the white keys on a piano (this strikes me as peculiar because it implies an unequal subdivision of each of the quarters, though Corra gives no evidence that that is how this unequal division was accomplished). They then arrayed twenty-eight coloured electric lights, one bulb for each of the seven colours, at all four octaves, to correspond to each of the twenty-eight piano keys, behind each of which they placed an oblong reflector (to intensify the light directed to the viewer). In the course of their experiments, they realized the benefit of placing a sheet of ground glass in front of each bulb, to diffuse the coloured light (that way the concentration of the light in the centre of the image would be reduced and the image would not suggest so strongly the shape of the light bulb being used to produce it). A keyboard, like that of a piano but with twenty-eight rather than eighty-eight keys (or forty-eight keys over four octaves) was constructed. By pressing keys simultaneously, the brothers were able to apply harmonic principles to the interaction of the colours in the electromagnetic spectrum:

> This chromatic piano, when it was tried out, gave quite good results, so much so that at first we were under the illusion that we had resolved the problem definitively. We amused ourselves by finding all sorts of chromatic mixtures, we composed a few colour sonatinas—*notturni* in violet and *mattinate* in green. We translated, with a few necessary modifications, a Venetian barcarolle by Mendelssohn, a rondo by Chopin, a Mozart sonata.[481]

The Corradini brothers were not alone among the Futurists in holding views of this sort. Boccioni's lecture in Rome presented related ideas. Despite his reservations about the cinema, Boccioni came (partly through the influence of Besant and Leadbeater's *Thought-Forms*) to ideas about the future of art similar to those which the Corradini brothers (along with other *futuristi*) would soon propound:

> There will come a time when a painting will no longer be enough. Its immobility will be an archaism when compared with vertiginous movement of human life. The eye of man will perceive colours as feelings in themselves [this is very

> reminiscent of Besant and Leadbeater's *Thought-Forms*]. Multiplied colours will not have need of forms [I take this to mean that such abstract colour paintings will not need to contain forms that allude to objects-in-external-space] to be understood, and pictorial works will be whirling musical compositions of enormous coloured gases, which within a tableau with a free [mobile?] horizon, will move and electrify the complex soul [another allusion to electromagnetism, and the idea that the soul is operated by electromagnetism] of a crowd [here Boccioni invokes the postmodern idea that the crowd possesses a single soul] that we cannot yet imagine.[482]

For a brief interval, the Corradini brothers thought their colour piano had brought them success in bringing about a synthesis of the arts. But they soon came to realize that the colours the bulbs emitted did not fuse well, because the bulbs were not bright enough; however, when they tried using stronger bulbs, they discoloured too quickly. Consequently, they began thinking about the cinema. Corra's explanation for turning to the cinema involved a paragonal assertion: the cinematic medium "slightly modified, would give excellent results, since its light potency was the strongest one could desire."[483] What that remark states, in essence, is that the cinema is the most potent medium that articulates light. Furthermore, since coloured light is vibration, and since reality is ultimately vibration, coloured light is akin to ultimate reality: in working with coloured light, one is working with reality reduced almost to essential character. That is what one does in making a film—one works with an energy that is like the energy that informs reality.[484] That conviction was basic to the Futurists' conception of cinema and crucial to the belief that some of them, at least, held, that film had already attained the status of the *ottima arte* (some others believed that the cinema had the potential of reaching that point but had not yet achieved it).

The Corradini brothers realized, too, that a strong art of chromatic harmony would need to have hundreds of colours available; the cinema, with its "multiplied" character resulting from the persistence of vision, would allow them to create a wide variety of colours through a mingling of colours persisting on the retina. The cinema, because it makes it possible for artists to mix lights of any chroma, would allow colours to mix and merge in an endless variety of ways—one would not need to have hundreds of tubes of colour paint to create endless gradations of hue (so in this respect as well the cinema is better than painting). In stressing this feature of the cinema, Corra was suggesting that the cinema facilitates the interpenetration of colours. That is another feature that made the cinema (at least potentially) the *ottima arte*. The brothers believed they would be able to achieve this chromatic flux by exposing film to a coloured light (putting a coloured light in front of lens) for one-tenth of a second. "In this way with a simple cinematographic

instrument, with a machine of small dimensions, we would have obtained the innumerable and extremely powerful effects of large musical orchestras, the true chromatic symphony"—that is, they would be able to create colour mixtures as numerous as tonal mixtures in orchestral music.[485] That, they hoped, was how they would be able to create chromatic music.

> In practice, the results, after we had acquired the camera, procured many hundreds of metres of film, removed the gelatin and applied the colour, were, as always, mixed. To achieve a harmonious, gradual and uniform sequence of chromatic themes we had removed the rotating switch and had managed to get rid of the shutter action, too; but this was exactly the reason for the failure of the experiment, and meant that in place of the expected marvellous harmony there exploded over the screen a cataclysm of incomprehensible colours.[486]

Analyzing the reasons for this failure, the Corradini brothers came to understand that they had overlooked one crucial factor in the musical structure, viz., its temporal articulation as crucial to harmony (Corra cites music's use of the bar, essentially deploying a reference to that device as a synecdoche for temporal articulation): the importance of temporal as well as chromatic harmony (and here I am using the term chromatic in both senses of the word) is a recognition that the advent of the cinema forced on many thinkers. They replaced the parts of a camera they had removed to make the film run continuously rather than intermittently, and, they tell us, they "decided to consider the film to be coloured as divided into bars, each one as long as the space between four perforations, which corresponds at least in films of the Pathé gauge, to one complete rotation of the switch. We prepared another length of film and tried again."[487]

The results were still disappointing. The colours fused well, but the effect was "not all that good." The turn that the document takes at this point is remarkable—and those inclined to take Futurism essentially as a machine art movement (conceiving machines not in the way I have recommended throughout this book, but in the more common manner) will find it even more stunning: it suggests that what was missing was the capacity to project the mind onto the screen, and that this could be done only through the hand: "we could not reasonably expect much, unless one had the ability, acquired only by long experience, to mentally project on to the screen the development of a motive as it is gradually applied with the brush on to the celluloid," presumably because that would allow for the gradual transformation of one definite colour into another.[488] The work of the hand would allow for the mental (*geistig*) fusion of many colours into one and the resolution of a hue into its many components—that is, it would allow for transformation by synthesis and transformation by analysis. This led them to once again rework the

projection ensemble—that is to say, the projector and the screen—in the hopes that it would become an effective device for transmitting mental (*geistig*) content into the world:

> We merely replaced the [projector's] arc lamp we had used until then with another arc lamp three times as strong. We made repeated experiments with the screen, using a simple white canvas, a white canvas soaked in glycerin, a tinfoil surface, a canvas covered with an impasto that resulted, by reflection, in a sort of phosphorescence, an approximately cubical cage of very fine gauze penetrable by the light rays, which gave a fluctuating effect of clouds of white smoke. At last we returned to a white canvas stretched over a wall. All furniture was removed and the entire room, walls, ceiling and floor, painted white. During the rehearsals we wore white shrouding drapes (incidentally: once chromatic music is established, be it our works or those of others, a fashion will follow encouraging the well-dressed spectator to go to the theatre of colour dressed in white. Tailors can get to work on it now). To date we have not been able to achieve better results, and we have continued to work in our white room, which, in any case, serves us quite adequately.[489]

This is a remarkable anticipation of immersive environments for new media presentations that contemporary artists are exploring.

At this point Corra turns "Abstract Cinema—Chromatic Music" towards a description of films he and his brother intended to make. He notes that they had already produced a number of sketches towards these projects. Presentations of the completed work would start with similar sketches, about fifteen chromatic motifs in total, each of a minute's duration, and each demarcated from the others. These sketches would be accompanied by suitable explanations. Corra explained the purpose of these introductions would be to help convince the public of the legitimacy of chromatic music and "to help it grasp its mechanisms and put it in the right frame of mind to enjoy the colour symphony which will follow, simple at first, then little by little more complex."[490]

Corra goes on to describe the work he had been preparing:

> To hand I have three chromatic themes sketched in on strips of celluloid. The first is the simplest one could imagine. It has two colours only, complementaries, red and green. To begin with the whole screen is green, then in the centre a small red six-pointed star appears. This rotates on itself, the points vibrating like tentacles and enlarges, enlarges until it fills the whole screen. The entire screen is red, and then unexpectedly a nervous rash of green spots breaks out all over it. These grow until they absorb all the red and the entire canvas is green. This lasts a minute. The second theme has three colours—pale blue, white and yellow. In a blue field two lines, one yellow, one white, move, bend together, detach themselves and curl up. Then they undulate towards each other and intertwine. This is an example of a linear, as well as chromatic, theme. The

> third is composed of seven colours, the seven colours of the solar spectrum in the form of small cubes arranged initially on a horizontal line at the bottom of the screen against a black background. These move in small jerks, grouping together, crashing against each other, shattering and reforming, diminishing and enlarging, forming columns and lines, interpenetrating, deforming, etc.[491]

The idea of creating an abstract, dynamic art accords well with the cinema's nature—it is one of the potentials the cinema offers. But the Futurists extended this idea to all of the arts, and this extension points to how the character of the cinema influenced the advanced arts in the early twentieth century (and that influence would not wane over the century). Evidence that the *futuristi* really did understand the arts in this profoundly cinematic way can be found in the "Ricostruzione futurista dell'universo" manifesto of 11 March 1915. This manifesto is a reflection of the phase of visual Futurism when Balla was leader, a phase concerned with transforming all of life into an intensely experienced artwork by constructing coloured and mobile objects:[492]

> We Futurists, Balla and Depero, want to realize this complete fusion in order to reconstruct the universe, cheering it up, i.e. recreating it entirely [Marinetti took conflict and force as manifesting the life drive; Balla and Depero maintained that joy—cheerfulness—manifests the life principle]. We shall give flesh and blood to the invisible, the impalpable, the imponderable, the imperceptible. We shall find abstract equivalents for all the forms and elements of the universe, then combine them together according to the whims of our inspiration in order to create plastic complexes that we will put into motion . . . **Noise-making.** Simultaneous plastic noise-making together with plastic expression . . . **Exploding,** simultaneous bursts of apparition and disappearance. [493]

This idea that the language of the cinema has its roots in the analogies among objects scattered throughout the universe, and that the cinema, in producing its own analogies among objects (in using its language), re-creates the universe, is one that cinema has often inspired. We saw in the last chapter that Blaise Cendrars propounded a version of it.

In 1912 the Corridini brothers made two films that were not simply experiments: they were finished works. Like their earlier experiments, these were made by painting directly on film. The two films together were about 400 meters in length (8 minutes, at 16 frames per second, a relatively common though by no means universal projection speed at the time). It is likely there was to be a third, to make up a half-hour-long program, with a Futurist sound composition accompanying it. One of the completed films was *La danza*, the other *L'arcobaleno*. Corra's manifesto provides an admirably precise description of the Futurists' most radical cinematic works:

> These are two films, both of about two hundred metres. The first is entitled *The Rainbow*. The colours of the rainbow constitute the dominant theme, which appears occasionally in different forms and with ever-increasing intensity until it finally explodes with dazzling violence. The screen is initially grey, then in this grey background there gradually appears a very slight agitation of radiant tremors which seem to rise out of the grey depths, like bubbles in a spring, and when they reach the surface they explode and disappear. The entire symphony is based on this effect of contrast between the cloudy grey of the background and the rainbow, and the struggle between them. The struggle increases, the spectrum, suffocated beneath the ever blacker vortices which roll from background to foreground, manages to free itself, flashes, then disappears again to reappear more intensely close to the frame. Finally, in an unexpected dusty disintegration, the grey crumbles and the spectrum triumphs in a whirling of catherine-wheels which disappear in their turn, buried under an avalanche of colours. The second is called *The Dance*, the predominant colours being carmine, violet and yellow, which are continually united, separated and hurled upwards in an agile pirouetting of spinning tops.[494]

Take note of the vocabulary Corra uses to describe *L'arcobaleno*: tremoring colours follow fluid paths; colours struggle up to the picture surface; the spectrum suffocates beneath vortices, then triumphs. This is the vocabulary of that wondrous synthesis of esoterism and electromagnetic theory that had seized the era's imaginary.

All of this suggests that the traditional account of the rise of abstract art, the view that Clement Greenberg put forward with greater rigour and cogency than anyone else, may be sorely mistaken. The development of abstraction, *pace* Greenberg, may well be linked to the general effort to liberate art from the confines of modern experience, to return art to its archaic roots, which electrology had made newly vital. Some artists attempted to escape modernity by adopting occult beliefs that they considered to be a form of ancient wisdom. Other artists tried to reawaken more savage, archaic, irrational modes of experience. Abstract forms appealed to both groups because they seemed to transcend the everyday world and to provide insight into a realm that is higher, purer, more vital, more direct, and more immediate than the world with which we daily have intercourse.

## FUTURISM AND THE ANTI-ANTHROPOCENTRIC ASPIRATION

The aspiration to transcend the anthropocentric sphere and to adopt a biocentric position, in which one identifies with a more general life-force, was not uncommon in the early decades of the twentieth century.[495] It became a cause for many artists of the era—and for some of those artists at least, it was a reason to affirm the cinema is the top art. For a recurrent theme of writings

on the cinema in this period is that the cinema is an art in which human being had little or no role: cinema images are products of a biocosmic life-force that (by virtue of their ability to present movements) can convey its dynamism. Marinetti himself embraced that theme in the "Manifesto tecnico della letteratura futurista." The importance of this document to the central argument of this book (and the fact that few have grasped its true meaning) prompts me to quote at length, and to offer numerous, and extended, interpolated comments, highlighting meanings that have been overlooked:

> DESTROY THE "I" IN LITERATURE**:** that is, all psychology. The sort of man who has been damaged by libraries and museums, subjected to a logic and wisdom of fear, is absolutely of no interest anymore. We must abolish him in literature and replace him once and for all with matter, whose essence must be seized by strokes of intuition, something which physicists and chemists can never achieve. [Clearly, Marinetti is relying on a different conception than physics and chemistry employ. On Marinetti's view, matter is understood through intuition, not logic; as the next sentence suggests, matter breathes and possesses instincts. I pointed out above that the only ontology I see as adequate for Marinetti's notions of matter is some version of neutral monism, according to which matter is also, when viewed appropriately, *geistig* (spiritual/mental/intellectual).]
>
> Capture the breath, the sensibility, and the instincts of metals, stones, woods, and so on [matter is pneumatic, associated with "in-spiration" (from *in-* "in" + *spirare* "to breathe"—often the breath that was taken in was understood to be the divine breath)], through the medium of free objects and capricious motors. Substitute, for human psychology now exhausted, THE LYRICAL OBSESSION WITH MATTER**.**
>
> Be careful not to assign human sentiments to matter, but instead to divine [that is, to probe through intuition—the word divine is used to suggest an epistemology similar to Bergson's] its different governing impulses, its forces of compression, dilation, cohesion, disintegration, its heaps of molecules massed together or its electrons whirling like turbines [electric reality own whirling, mechanical movement; hence its psychology is different]. There is no point in creating a drama of matter that has been humanized. It is the solidity of a steel plate which interests us as something in itself, with its incomprehensible and inhuman cohesion of molecules or electrons which can resist penetration by a howitzer [this psycho-material being is interesting, even puzzling, for its resistance to penetration—in this, as the next sentence suggests, it is different from women]. The heat of a piece of iron or wood leaves us more impassioned than the smile or tears of a woman.
>
> We want literature to render the life of a motor [a motor is driven by a life-force], a new instinctive animal [note again Marinetti resorts to a trope that suggest the literal vitality of the motor] whose guiding principle we will recognize when we have come to know the instincts of the various forces that compose it [here Marinetti analogizes instinct and force].

> Nothing, for a Futurist poet, is more interesting than the action of a mechanical piano's keyboard. [Here Marinetti embarks on a series of paragonal reflections.] *Film offers us the dance of an object that disintegrates and recomposes itself without human intervention.* [This is akin to what Léger was striving for with *Ballet mécanique*.] *It offers us the backward sweep of a diver whose feet fly out the sea and bounce violently back on the springboard. Finally, it offers us the sight of a man driving at two hundred kilometers per hour. All these represent the movements of matter which are beyond the laws of human intelligence, and hence of an essence which is more significant* [film is closely allied to these psycho-material movements].[496]

At this point, Marinetti proposes the importance to Futurist literary endeavours of phenomena that have been overlooked by literature: noise, weight, and smell. The reasons he thinks these are so important are revealing. Noise is important for manifesting the dynamism of objects. Weight, he says, is interesting because it reveals the "capacity for flight in objects": later in the manifesto he suggests that some objects have a lightness of being that seeks flight, so here he is proposing that the words and phrases that compose this new literature should seek to imitate their nisus towards flight. Smell is important for revealing the "capacity of objects to disperse themselves." What makes the capacity of objects to disperse themselves important for literature? Objects follow the law of entropy set out in the kinetic theory of gases—odours emitted from objects penetrate the atmosphere around them, diffusing themselves and becoming one with their surroundings (the kinetic theory of gases explains this increment in entropy, or, to express that idea in an alternative fashion, the increasing loss of objects' autonomous, simply-located being through this diffusion). The new literature, Marinetti proposes, should take into account this dispersive / entropic capacity of objects (this capacity for *compenetrazione*). Marinetti also suggests that literature should strive to convey the odours of the environment as a dog perceives them: presumably, by this he is suggesting that one way the new literature can take account this sort of entropy/interpenetration is by considering how different forms of awareness experience it—for example, how dogs experience it. In stating this, Marinetti is confirming that the Futurist theory of perception is based on the notion of interpenetration, of how dog-energy interacts with the energy that leads objects to disperse themselves. He also counsels artists to attend to the sounds of engines and to reproduce their "speech." He chooses the term *speech* to suggest that engines communicate—communication is another form of interpenetration: engines give off energy in the form of noise, and that noise disperses through the atmosphere. The new literature can incorporate this energy into itself, creating equivalents to it. He protests against the I's self-involved sense of autonomy and distance (a way of protesting against the Newtonian system). He goes on to say,

> Profound intuitions of life linked together one by one, word by word, according to their illogical surge [an arational, illogical dynamic marks the life-force]—these will give us the general outlines for an INTUITIVE PSYCHOLOGY OF MATTER. That is what was revealed to me from the heights of the airplane. [That matter is driven by a life-force was disclosed to Marinetti when he attained a supra-human vantage point. It should be noted that the unity of mind/*Geist* and matter implied in that view can be considered another form of interpenetration.] Looking at objects from a new vantage point, no longer head on or from behind but straight down, foreshortened, I was able to break apart the old shackles of logic and the plumb lines of the old form of comprehension.[497]

The "I" must be destroyed for matter to assume primacy. This is a straightforward statement of an argument that constitutes the bone structure of this volume*:* the new task of art is to suggest an anti-anthropocentric, electromagnetic experience; the cinema is the art most suited to this task because it is suited to presenting a cosmic, electromagnetic viewpoint on matter, one unbridled by the limitations of the human senses and untethered from a human vantage point. The cinema delivers matter as both object and energy, without human involvement: the other arts (literature in the case of the "Manifesto tecnico della letteratura futurista") should be reformulated to take on the attributes of the cinema. The cinema shows the way to reformulate the other arts; the Futurists would outline their program for recasting literature (and the other traditional arts) in their manifestos. Carlo Carrà's great Cubo-Futurist collage-painting-poem *Manifestazione interventista* (*Festa patriottica–dipinto parolibero*) (Interventionist Demonstration [Patriotic Holiday–Freeword Painting], 1914) gives evidence of the effect on an artist of assuming a higher vantage point: dark spaces at its centre endow its space with special significance—along with the circular composition and the contracting of forms as they approach the centre of the composition, that darkness suggests a centripetal dynamic (typical of electromagnetic vortices).[498] In its use of different typefaces, different sizes of lettering, different orientations (vertical, horizontal, diagonal, along arcs of circles of different sizes, upside-down and rightside-up) of the letters, the work offers an analogue to Marinetti's free-word poem *ZANG TUMB TUMB*. In that regard, the work can be considered a concrete poem, a work that straddles the boundary between visual and literary art. But this visual (words-in-freedom) poem is also a sound construction, composed of sounds such as TRRRRRRR and TRrrrrrrrrrr, SSOOOOOOO, BBBRRRRRR, and so on. Indeed, like Marinetti's poem, this *Lautgedicht* mixes actual words with precise referents, letters/sounds sequenced for onomatopoeia (so the set of letters acquires meaning through its sound—as EEEVVVIVA invokes aerial bombardment), and sequences of letters, like those immediately above, that offer pure sounds (pure insofar as

they do not form words belonging to any known lexicon). All in all, the work shows different modes of representation (arbitrary, motivated, and graphic) and different sensory modalities interpenetrating one another.

Linda Landis is correct to suggest that this composition resulted from a new form of vision that aviation had made possible. We can read "aviatore" (aviator), "Italia," "battere il record" (break the record), and "eliche perforanti" (perforating propellers).[499] A final point about this composition: many Futurists considered the cinema to be a synthaesthetic medium, and the radically intermedia/intersensory qualities of this work, along with its collage character and its extraordinary dynamism, suggest the influence of the cinema. They suggest how the cinema is reforming painting: the camera readily accommodates even the vantage points that electricity and motors made possible (Dziga Vertov's quasi-Futurist *Человек с киноаппаратом* [Chelovek s kinoapparatom; Man with a Movie Camera, 1929] proves that splendidly)—once film and photography began using unusual vantage points, photographic and cinematographic imagery changed painting accordingly.

Likewise, literature should be reconfigured to become multisensory—it should take on the attributes of cinema:

> Wireless imagination and words-in-freedom will transport us into the essence of matter. With the discovery of new analogies between things remote and apparently contradictory, we shall value them ever more intimately. Instead of *humanizing* animals, vegetables, and minerals (a bygone system) we will be able to *animalize*, *vegetize*, *mineralize*, *electrify*, or *liquefy* our style, making it live the very life of matter. For example, to render the life of a blade of grass, we might say: "I will be greener tomorrow." But with words-in-freedom we might have: **Condensed Metaphors. —Telegraphic images. —Sums of vibrations. —Knots of thought. —Closed or open fans of movement. —Foreshortened analogies. —Color Balances. —The dimensions, weights, sizes, and velocities of sensations. —The plunge of the essential word into the water of sensibility, without the concentric eddies produced by words. —Intuition's moments of repose. —Movements in two, three, four, five different rhythms. —Analytical explanatory telegraph poles that sustain the cable of intuitive wires.**[500]

The "Manifesto della cinematografia futurista" confirmed again the importance of the cinema in overcoming anthropocentrism:

> Our films will be:
>
> 1. **Cinematic analogies** that make direct use of reality as one of the two elements in an analogy. Example: If we should want to express a character's state of anguish, instead of showing him in various stages of suffering, we would give an equivalent impression with the view of a jagged and cavernous mountain.
>
> Mountains, seas, woods, cities, crowds, armies, squadrons, airplanes—these will often be our terrible expressive words: **the universe will be our vocabulary.**

> [In the Chapter on Cubism, we discussed the idea that the cinema realizes the Cabalist language, in which words and things are identical: what appears on the cinema screen is the thing itself. One possible motivation for proposing this is the belief that many artists of the time actually adopted, that a form that appears on the cinema screen possesses energy identical with the energy of the thing itself—some, like Oskar Fischinger, went so far as to suggest that the onscreen event is actually very nearly pure energy equivalent to the particular energy that individuates some event or object.]
>
> Examples. We want to give a sensation of whimsical cheerfulness: we show a chair cover as it playfully flies around an enormous coat stand, until at last the objects embrace each other.[501]

Writing further of the films they intended to make, Marinetti, Corra, Settimelli, Ginna, Balla, and Chiti noted that their works would provide inspiration for painters who were attempting to liberate their art from the confines of the frame. As those painters advanced towards painting, music, and the art of noises, the authors predicted, they would mobilize words-in-freedom to smash the frontiers of literature and create marvellous relations between words and real objects.[502] In other words, their films would show painters, writers, and composers how to transform their art forms so that they take on qualities of the cinema. And perhaps the most important transformation they would bring about would involve incorporating everyday objects into their art: composing objects (energies) comes naturally to the cinema.

They even made explicit the idea that has been at centre of this book—that cinema could offer instruction on how to transform the traditional arts, because the cinema is *the ottima arte*, for the Futurist sensibility at least (and, therefore, for the new age that will soon come):

> **We must liberate film as an expressive medium** in order to make it the ideal instrument *of a new art*, immensely vaster and nimbler than all the existing arts [this is a paragonal assertion]. We are convinced that only thus can it attain the *polyexpressiveness* toward which all the most modern artistic researches are moving [this is an even more forthrightly paragonal assertation]. *Futurist cinema* is creating, precisely today, the **polyexpressive symphony**.[503]

We have noted already Marinetti's declaration that matter is boldness, will, and absolute force. That remark we can understand as a masculinist expression of the idea that the fundamental reality is a field whose force generates form (rather as a magnet creates a pattern among iron filings). The development of the sciences of electromagnetism and electrodynamics was a technical achievement homologous with developments in the symbolic sphere in the late nineteenth and early twentieth centuries—developments that included a renewed interest in the conception of the divine as *natura naturans*, Theosophical ideas

about projecting thought and feelings into the aether, the flourishing of ideas about magnetic personalities, spiritualism, and telepathy, and the analogizing of consciousness and light.[504] That homology also accounts for the rise of a biomorphic modernism—and for the development of the electromorphic forms that have been the subject of this chapter.

I noted in the introduction that Futurism generated much greater consternation than Cubism. No doubt this was largely due to the Futurists' politics (including their misogynist sexual politics and their advocacy of war as the only way to cleanse the world). But, I suggested, Cubism seems an art of the past, while Futurism still seems somehow contemporary. This is evident in the interest that digital artists have taken in the work of Umberto Boccioni, Arnaldo Ginna, Bruno Corra, and Luigi Russolo (for example). We have now come to a point at which I can be specific about that "somehow." Renato Barilli notes,

> The Cubist phase of Picasso and Braque's technomorphism (1907–1914) represents a giant step forward because technology is given direct visual representation, but there is also what I would not call a step back but a deviation or pause since Picasso and Braque make a diagnosis that is only half-right for the times, with its limited capacity for predicting the future. In fact, they "bet" on the inevitable and lasting primacy of mechanical technology; for them, "machines" are a sort of unavoidable *a priori* of all human activity and so trees, bodies, and faces have to be reconstructed according to these "mechanical" parameters. Nature is "defective" or at least it is guilty of wasting energy precisely because it habitually uses unusual and complicated curves to produce its objects. In the twentieth century, technology, art and human culture have to do more and they have to do it better. The modules of artificial production need to go outside their own areas and be applied in all possible acts of creation. This is the task taken on by the Cubists.[505]

Cubists, Barilli says, had bet on the primacy of mechanical technology. The *futuristi* were demonstrably aware that a new era of form—of electromorphic forms, appropriate to the technetronic age—was upon them.

Among the pioneers in giving literary expression to the new consciousness emerging from this new paradigm was Guillaume Apollinaire. Hans Robert Jauss comments on Apollinaire's devices for importing into literature that new consciousness, which dissolved the Orphic consciousness of the solitary visionary into a higher collective standpoint:

> We have here the prototype of the "poème-conversation" in which, as Apollinaire once put it, "the poet, placed in the middle of life, records whatever the poetry of things and of voices brings to him." But the second, and no less bold innovation is that the poet himself is now no longer quite tangible as a stable reference point or as a privileged perspective. If the lyrical 'I' in *Zone*

> was already dismembered and dispersed in the transitoriness of a wandering, erratic point-of-view, the subject still remained for the reader the origin of a glance directed both inside and outside . . . In *Lundi Rue Christine*, with the renunciation of this degree-zero of perspectival orientation, the lyrical subject has become absolutely indeterminate. Now it is up to the reader to search for the lost subject, dissolved in the pure contingency of an alien speech.
>
> . . .
>
> Apollinaire himself pointed out that this novel literary effect, at the time the modern trend par excellence, is entirely analogous to the concept of orphic painting his friend Delaunay used to move from cubist to abstract painting. With the complete departure from perspective, the simultaneous contrasts of colors are set so free that "the form of the image and the stimulation of the eye fall together . . . The image is, more immediately than ever before, a development of seeing in general . . . The play of simultaneous contrasts in painting which unfold "like sentences in color" . . .: "This synchronic action thus designates the Subject, which is the representational harmony." For Delaunay, light itself is the only enduring reality: "I paint the sun which is pure painting," for Apollinaire it is the "lyrisme ambiant" of an orphic *Urpoesie* or, if one likes, his redemption of the modern significance of the sublime.[506]

Hans Robert Jauss highlights the enigmatic character of many of the elements transmitted by a poetry of things and voices. This is not because of an unbridgeable gap between what is said and what is meant, but because of their number and their unfathomable interactions. And that, too, is a thoroughgoingly electrological belief.

## IN LIEU OF A CONCLUSION

In this book I have examined the influence that a conception of the cinema had on advanced artistic practices in the early twentieth century, in particular on Cubism and Futurism. I have shown that in the early twentieth century the cinema was taken as an electromagnetic device for shaping light into intelligent/intelligible forms.

I have argued that Cubism and Futurism developed in an era when many thinkers concluded that existing cognitive abilities had proved to be inadequate to deliver the information regarding reality that we think we require. One factor precipitating this crisis was that sensory reports had been brought into question, on naturalist grounds (to use that word in the way that epistemologists use it): science had discredited the veracity of its own reports. The idea that the senses are deceptive was nothing new in philosophy. But, generally speaking, the philosophical tradition maintained that reason (science, deduction) had been assigned the role of correcting the senses. A second factor precipitating this crisis around cognition was that reason had been

reduced to the faculty of apprehending regularities in observations: basically, reason (understood on the prevailing Baconian model) allows us to predict that if X is observed, it is likely, based on past observations, that Y will be observed (reason can also formulate theorems regarding the likelihood of the prediction). Furthermore, the model that was used to coordinate these observations was one that had been founded on the postulate of matter in motion. This model had the effect of disenchanting the cosmos. Newtonian science had left us with a notion that reality is utterly different from what we experience it as being. Reality, in the Newtonian view, is made up of moving particles that lack the attributes of warmth or coldness, colour, odour, flavour, texture. Those qualities are all the result of the way the mind responds to matter in motion. They are not of properties of matter itself. Whitehead summarized the Newtonian view by saying that it depicts Nature as "a dull affair, soundless, scentless, colourless; merely the hurrying of material, endlessly, meaninglessly."[507]

The idea that reality is a dull affair is hardly one that artists would find appealing. Yet Whitehead is correct that this is the view of reality offered by the metaphysics bequeathed to us by the seventeenth century. Artists affiliated with the Cubist and Futurist movements concluded that people needed to rise above the human vantage point and assume a transcendent perspective and that from that perspective, reality would disclose itself to be very like what Whitehead's own metaphysics describes it as being, viz., process. A new metaphysics, one that made clear what it is like to see the world from a higher vantage point, would show that reality (far from purposeless) actually has an aim and that its aim is aesthetic (it seeks to allow the events and occasions subsumed in the processual nexus to experience reality as throbs of sensation that give pleasure).

> "Creativity" is the principle of novelty. It is the universal of universals characterizing ultimate matter of fact. It is that ultimate principle by which the many, which are the universe disjunctively, become the one actual occasion, which is the universe conjunctively. It lies in the nature of things that the many enter into complex unity. The many become one and are increased by one. This Category of the Ultimate replaces Aristotle's category of "primary substance."[508]

Creativity is the highest category of reality—it is the bare, ardent desire to advance towards greater beauty. Many artists of the electrological era would find themselves in agreement with the view that reality is the continuous coming-on of novelty. In accordance with that interest in the flow of novelty, film was accorded special privilege. Film, thinkers and artists concluded, would show the way towards art forms capable of conveying the experience of the continuous emergence of difference. The early electrological era had

an affinity for cinematic experience, in which the continual coming-on of novelty could be felt immediately and vividly. Much of this book has traced the consequences that affinity had for the traditional arts.

Throughout this volume, I have highlighted the historical transition through which ideas about electromagnetic fields came to shape a new world view and a new discursive regime. This emergent paradigm reflects the shift from a Newtonian conception of reality to one based on electromagnetic theory. (The experimenters Michael Faraday and Nikola Tesla, along with the mathematical physicist James Clerk Maxwell, I have treated as exemplary thinkers who laid the groundwork for the postmodern paradigm.) Among the core beliefs of the world view that emerged from the work of late-nineteenth- and early-twentieth-century experimentalists are the convictions that reality is constituted from energy, that fields of energy interpenetrate, that when they do so they warp one another and bend space, that there is an affinity between the electric energies of the nervous system and the electromagnetic energy that makes up reality (some occult thinkers took this discovery as establishing that thought-forms, projected by human minds, persist in the aether), and that energy fields form consciousness and matter alike.

Thinkers began to note that we live our lives in the earth's geomagnetic field. That field is like the water in which all fish swim without being aware of it: we are bathed by this whirling vortex of energy, though we are seldom conscious that the earth's core is a glowing iron-nickel source of geomagnetic radiation and that from it issues a flux of radiant energy. Compass needles line up with that enveloping force-field—and some artists and thinkers (the Surrealists among them) came to believe that our thoughts are also influenced by it. The sworling glow of the Aurora Borealis makes this energy visible (the flux of the geomagnetic field is made visible by the ionized gases it illuminates). One reason for the fascination that scientists and lay people alike have had for that luminous phenomenon is that it makes apparent that the Earth is surrounded by a magnetosphere that interacts with a stream of energy particles carried on the solar wind. This serves as a chromatic demonstration that the universe is not formed of empty space populated with inert, insensate matter that is pushed around by mindless forces. Rather, it is fundamentally energy. Those inclined towards pneumatic beliefs (and in the early twentieth century, such beliefs were amazingly common) take this notion even further, contending that these vibrations are intelligent through and through (as is shown by the fact that our thinking results from the modulation of electromagnetic energy). Since the fluxing and transforming energies and vibrations that make up reality can be conscious, gone is the idea of a bifurcated universe, composed of lifeless matter on the one hand and spiritual beings on the other. Media forms could be intelligent. Light has long been a symbol of thought—we commonly

say, "I've seen the light" when we mean "I've had an idea." Of all media of the first half of the twentieth century, film—fluxing light, energy shaped into intelligent/intelligible forms—was taken as the most thorough embodiment of intelligence.

I have also pointed out that typically, when progressive artists deliberate on changes that are taking place, instead of thematizing them in speculative, abstract thought, they fasten onto some specific and concrete effect of those changes. In this regard, early-twentieth-century artists could look to a scientific precedent from the dawn of the age of electromagnetism: the radio served scientists like Sir Oliver Lodge and Sir William Crookes as a model for the connection between electromagnetic phenomena and intelligence. That these scientists resorted to investigating a hypothesis about consciousness and intelligence—the hypothesis that they are products of electromagnetic processes—using an electrotechnical device as a model is testimony to how sweeping were the effects of the paradigm shift that was getting under way and to the need to seize on a concrete manifestation of the transition to help understand the implications of that massive change. It certainly lends support to the assertion that these electrotechnical models themselves became change agents—a claim that finds additional confirmation in Joyce's use of the radio as a model for the stream of consciousness in *Finnegans Wake*. The same phenomenon occurred at the beginning of the computer age, as thinkers like Daniel Dennett (b. 1942) explored the naturalist hypothesis that a philosophical reduction of the illusion of consciousness (and of the philosophical idea of qualia that is often associated with the intentional stance) could be conducted using an account of evolution that understands it as an algorithmic process—the way that these thinkers developed their idea of an algorithmic process owed much to the computer. The *idea* of the computer—what people thought a computer to be—became a change agent, affecting how human being, mind, and nature are understood.

Crookes believed that thinking results from brain waves and that these brain waves resemble radio transmissions—in his view, this made plausible the conjecture that radio broadcasts, which use electromagnetic instruments to manipulate the aether, can reproduce and transmit thought. If that is so, others, including artists, surmised, then surely the cinema, this medium that moulds light—that is, those electromagnetic vibrations that are most like thought—provided an even more cogent example of the analogy between thought's dynamic character and the fluid forms of electromagnetic media.

Many people connected the cinema to these beliefs, which themselves drew together (and in many cases, identified) thought and electromagnetic waves. Some concluded that because cinema is an art of light—traditionally thought of as having a high measure of ontological reality but now as simply

a part of the electromagnetic spectrum—the cinema is a privileged medium. People who espoused this view also stressed the light-borne character of cinematic forms and their dynamism. In sum, the idea developed that the cinema, whose forms are compounds of fluxing, changing light, had a privileged relation to thought and to ultimate reality. Artists and thinkers came to believe that cinematic experiments in moulding light (the highest form of electromagnetic energy) can instruct us about ultimate reality as thought-process. Accordingly, the cinema was seen as a machine that could produce aetheric light (and later sound) waves capable of cognition and communication. That belief accorded the cinema a privileged status and motivated artists and thinkers to study the cinema and ponder the forms it should assume. These questions about the forms suitable for the postmodern, electromagnetic age spread to the other arts as artists strove to turn them into media capable of reflecting the intelligent dynamics of electromagnetic realities. The cinema provided them with a model for accomplishing this, for it displayed qualities that other media might adopt if they were to be converted into art forms fitted for the electromagnetic age.

This interest in identifying the cinema's electric qualities was encompassed in a broader discussion that took place in the early part of the twentieth century regarding the status of this new medium. I have questioned the common view that the cinema provoked an embarrassed response from artists and thinkers who felt that its lowly provenance and its ability to furnish, with minimal effort, a remarkably accurate likeness of reality condemned it to remain a medium offering merely popular, artistically unworthy mimetic forms. I have pointed out that, while that embarrassed reaction constituted one strain in thinkers' response to the birth of the cinema, many writers and artists immediately embraced the cinema, proclaiming it to be the art best suited to the postmodern era. The privileged status accorded the cinema by virtue of its intimate connection with the electromagnetic fields that generate both ideas and the objects of the everyday world (or, rather, the *appearances* of objects, for the furniture of the world was widely understood to be congealed electromagnetic energy) linked up with the conclusion of the paragonal debate that erupted at the beginning of the twentieth century, which extolled the cinema as the *ottima arte* (the top art), at least for moderns. The cinema, artists concluded, actually demonstrates that objective appearances, which is what the cinema offers, are nothing but shapes of congealed light (for the appearances of objects in a film frame are simply the result of a brief flash of immobilized light). Those artists who deemed cinema the *ottima arte* asked themselves how the art media they worked with could be formed so as to take on electromagnetic qualities, thereby following the path that the cinema had blazed. By analyzing a sample of the tracts written by Cubists and a number of

vibrant Futurist manifestos, I have shown that we can read these writings as proposals on how to reform painting, dance, literature, sculpture, and music so that they might become electromagnetic arts, like the cinema.

Seen in this way, the artistic forms that the Futurists contrived to impart this new sense of reality (and that they explained in highly poetic ways in their speculative manifestos, which were so strongly inflected by the new science of their time) seem more radical than those of the Cubists. The painters and sculptors affiliated with the latter movement were possessed by a nostalgia for the real. Only a few among them—and those few only sometimes—longed to see the material object ephemeralizing into light or movement. Only rarely did their work convey an exhilaration with speed. By and large, they continued to form the scaffolding of their works into the grid frameworks characteristic of the Euclidean/Newtonian universe. Their efforts contrast sharply with the breathtaking leap of understanding taken by the Futurists, who intuitively embraced the new understanding of reality as fluxing fields of energy interpenetrating and modulating one another. This passage from "Uccidiamo il chiaro di luna!" (Let's Murder the Moonlight, April 1909), Marinetti's shocking retort to the critics of the "Fondazione e Manifesto del futurismo" and his encomium to the agonistic process involved in bringing forth a new age, seems to typify their enthusiasm:

> A cry went up in the airy solitude of the upper plateau: "Let's murder the moonlight!"
>
> Some of us ran to nearby waterfalls; gigantic wheels were hoisted, and turbines transformed the velocity of the waters into electromagnetic spasms that climbed up wires suspended on high poles, until they reached luminous, humming globes.
>
> So it was that three hundred electric moons, with rays of blinding chalky whiteness, canceled the old green queen of love affairs.[509]

In a remarkable essay, "The Eye Is Part of the Mind," the art theorist Leo Steinberg writes of the abstract painter's sources in a realm of nature prior to the visual—a creative realm where nature gestates images. He challenges the view that in so-called non-objective art, the connection to the world outside the frame is severed. He also points out that even when the non-objective artist strives to find shapes and forms analogous to his emotional and sentient being, what he or she fastens onto are forms similar to those of scientific images (from enormous magnifications of infinitesimal textures to submarine images, X-ray photograms, and telescopic imagery). "It is apparently in these gestating images, shapes antecedent to the visible, that many abstract painters recognize a more intimate manifestation of natural truth," Steinberg notes:[510]

> But the affinity [of non-objective painting] with science probably goes further still. It has been suggested that the very conceptions of twentieth-century science are finding expression in modern abstract art. The scientists's sense of pervasive physical activity in space, his intuition of immaterial functions, his awareness of the constant mutability of forms, of their indefinable location, their mutual interpenetration, their renewal and decay—all these have a found a visual echo in contemporary art; not because painters illustrate scientific concepts, but because an awareness of nature in its latest undisguise seems to be held in common by science and art.[511]

We have read these terms before—pervasive physical activity, the mutability of forms, indefinable location, mutual interpenetration: they are the characteristics of the electromagnetic conception of the universe. Indeed, Steinberg as much as says what Marshall McLuhan also claimed, that art teaches the nervous system to adapt to experiences yet to come.

> Thus the art of the last half-century may well be schooling our eyes to live at ease with the new concepts forced upon our credulity by scientific reasoning. What we may be witnessing is the gradual condensation of abstract ideas [from advanced scientific theories] into images that fall within the range of sensory imagination, trajectories and vectors, lines of tension and strain. Form in the sense of solid substance melts away and resolves itself into dynamic process. Instead of bodies powered by muscle, or by gravity, we get energy propagating itself in the void. If, to the scientist, solidity and simple location are illusions born of the grossness of our senses, they are so also to the modern painter. His canvases are fields of force; his shapes the transient aggregates of energies that seem impatient to be on their way. In the imagery of modern art waves of matter have usurped the place of tangible, visible things.[512]

"Form in the sense of solid substance melts away and resolves itself into dynamic process. Instead of bodies powered by muscle, or by gravity, we get energy propagating itself in the void"—this, I hope I have shown, is exactly the electrological conception of reality. Embodying this conception of reality is what Cubist art was moving towards and what Futurist art achieved.

The cinema is fitted to be an art of dynamic process. Cubists and (especially) Futurists used the cinema as an avatar for the electrological world view: to think seriously about the cinema would advance our understanding of the electrological conception of reality, and to work with forms for which the cinema is fitted would advance our understanding of reality and humans' place in it even further. At the beginning of the twentieth century, this dynamic medium was so bracingly new that it became a model for thinking about broader scientific or cultural change. In the process, the model assumed a historical power that throughout this text I have referred to as the cinematic effect. Assessing its potency has been the principal goal of this project.

## Notes

1 There were, then, almost four months between the accident on the Via Domodossola and the printing of Futurism's founding manifesto. The manifesto seems to have been written rapidly, in Milan (but on the letterhead of a Paris hotel), most likely immediately after the accident. One wonders, given its excited tone, why Marinetti would have kept the document from the public eye for so long (especially considering that Marinetti had appointed himself publicist for all that was new).

A part of the answer, certainly, had to do with the time required to marshal all the resources needed to launch the first attack on bourgeois sensibilities. But that is not likely the whole story. Another part likely had to do with the earthquake that occurred early on the morning of 28 December 1908, the Monday after Christmas weekend: though centred on the Sicilian city of Messina, it also caused heavy damage in Reggio Calabria, on the Italian mainland. The earthquake measured 7.5 on the Richter scale: the ground shook for 30 to 40 seconds, and the tremors wreaked destruction throughout the area within a 300-kilometer radius of the epicentre. Moments after the earthquake, a 12-meter-high tsunami struck nearby coasts, causing more devastation. Ninety-one percent of the buildings in Messina were destroyed, and between 70,000 and 100,000 residents were killed. It was one of the deadliest earthquakes in European history.

The first Futurist manifesto advocated destroying traditional Italian culture (and the museums that housed it). The weeks after the Messina earthquake and tsunami would have harboured little tolerance for such rhetoric.

2 After the Napoleonic wars, all the members of the Congress (Austria, Britain, Russia, and Prussia) except France were frightened by the possibility of the latter country's regrouping, so they wanted to create strong border states to hem it in. The Netherlands and the Italian Kingdom of Piedmont were created to contain French power, and Prussia was given the west bank of the Rhine. In addition, Austria was strengthened by giving it territory in northern Italy, including Tuscany and Milan, while the Bourbons, in an anti-Napoleonic gesture, were restored in Spain.

3 The liberation of *Italia irredenta* was perhaps the strongest motive for the entry of Italy into the First World War, and the Treaty of Versailles satisfied most of the irredentist claims.

4 Filippo Tommaso Marinetti, "The Founding and Manifesto of Futurism," originally published in *Le Figaro*, Paris, 20 February 1909; reprinted in translation in [hereafter Rainey] *Futurism: An Anthology*, eds. Lawrence Rainey, Christine Poggi, and Laura Wittman (New Haven: Yale University Press, 2009), 49–53 at 49.

Marjorie Perloff argues against a position that I lay out below, viz., that Futurists maintained many more features of Symbolism than they cared to admit. She claims that the Orientalist imagery in Marinetti's first manifesto is entirely ironic and that Marinetti speaks for a collectivist spirit (she notes the manifesto's use of "we"), whereas Symbolism celebrated the lone, solitary artist-visionary. See Perloff, "'Violence and Precision': The Manifesto as an Art Form," in *The Futurist Moment: Avant-Garde, Avant Guerre, and the Language of Rupture* (Chicago: University of Chicago Press, 1986), 67–102 at 71–72. "The 1909 Manifesto thus reflects Marinetti's programme for the future rather than his own poetic practice. As a lyric poet, he was a mediocre late Symbolist; as a thinker, he was almost wholly derivative, his extravagant statements being easily traceable to Nietzsche and Bergson, Jarry, and Georges Sorel. But as what we now call a conceptual artist, Marinetti was incomparable, the strategy of his mani-

festos, performances, recitations, and fictions being to transform politics into a kind of lyric theatre"(ibid., 68). Perloff omits entirely any reference to Marinetti's originality in synthesizing the ideas she cites with a newly imagined electrotechnical art.

5 Gino Severini, "Introduction" (1913), in *The Futurist Painter Severini Exhibits His Latest Works* (exhibition catalogue, Malborough Gallery, London, April); collected as G. Severini, "Introduction," in *Archivi del futurismo*, vol. 1, ed. Maria Drudi Gambillo and Teresa Fiori (Rome: De Luca, 1958), 113–15. In English: in Joshua C. Taylor, *Futurism* (New York: Museum of Modern Art, 1961), 11.

6 Joshua C. Taylor, "The Futurist Goal, The Futurist Achievement," in *Major European Art Movements, 1900–1945: A Critical Anthology*, ed. Patricia E. Kaplan and Susan Manso (New York: E.P. Dutton, 1977), 164–92, at 176–77.

7 Marinetti acknowledged the looseness of his manner of stating his convictions on this matter in the August/September issue of *Poesia*; he complained about "the terrible nausea we get from the obsession with the ideal woman in works of the imagination, the tyranny of love amongst latin people, and the monotonous *leit-motif* of adultery! A nausea which we have expressed in a perhaps too laconic way by these words: *Scorn for women*." Quoted in Peter Nicholls, *Modernisms: A Literary Guide* (Berkeley: University of California Press, 1995), 89. Nicholls drew the quotation from Cladia Salaris's anthology, *Le futuriste: Donne e letteratura d'avanguardia in Italia (1909/1944)* (Milan: Edizioni delle donne, 1982), 23.

8 In a very much later text, "Il manifesto della cucina futurista" (Manifesto of Futurist Cuisine, first published in *La gazzetta del popolo* [28 December 1930]), Marinetti and Fillìa (pseudonym of Luigi Colombo [1904–1936], the leader of the Turino *futuristi*) write,

> We think it is necessary to prevent Italian men from becoming stolid, leaden hunks, dull and insensitive. They need to be more in tune with the Italian female, who is a slender, spiraling transparency of passion, tenderness, light, strong will, impulsiveness, and heroic tenacity. We must make the Italian body agile, in keeping with the lightweight aluminum trains that will take the place of the heavy iron, wood and steel trains currently in use.
>
> We Futurists are convinced that in the likely event of future wars, it would be the most lithe, agile peoples who will be victorious. (In English: in Marinetti, *Critical Writings*, trans. Doug Thompson, ed. Günter Berghaus [New York: Farrar, Straus and Giroux, 2006], 394–99 at 395).

The logic of this text commits Futurists to believing that women will be the better soldiers in the war to come (the text was written 1930, at a time when Mussolini was seeing storm clouds on the horizon). I recognize that questions about the relevance of this text might be raised, given its late date. But it is completely consistent with the Futurists' embrace of Lamarckian ideas about evolution.

9 An English translation appears as "The Variety Theatre" in Rainey, 159–64 at 161. Emphasis mine.

10 Ibid.

11 Marinetti, "We Abjure Our Symbolist Masters, the Last Lovers of the Moon," in ibid., 93–95 at 94.

12 Marinetti, *Les Dieux s'en vont, D'Annunzio reste* (The Gods Have Gone, D'Annunzio Is Still Here) (Paris: E. Sansot, 1908). This sarcastic work decries the widespread admiration for the poet. To be sure, Marinetti's relationship with Gabriele D'Annunzio was

not simple. For example, Marinetti supported D'Annunzio's *Impresa di Fiume* (Fiume Exploit, 1919–20) and his assuming (by force of arms) the role of "commandant" of the "Reggenza Italiana del Carnaro."

13 Marinetti, "The Founding and Manifesto of Futurism," 51. The reference to the *salto mortale* links the *fisicofollia* of the populist theatre (and the *commedia dell'arte*) to risk and death. The dynamic physicality of such gestures overcomes the proclivity of idealizing forms towards stasis.

14 Friedrich Nietzsche, *On the Genealogy of Morals* (1887) and *Ecce Homo* (1888), trans. Walter Kaufmann (New York: Random House, 1969), 16. Emphases follow Nietzsche's original.

15 Marinetti, "The Founding and Manifesto of Futurism," 52–53.

16 Marinetti, Filippo Tommaso, Bruno Corra, Emilio Settimelli, Arnaldo Ginna, Giacomo Balla, and Remo Chiti. "Manifesto della cinematografia futurista." Originally published as "La cinematografia futurista" 11 September 1916 and reprinted in *L'Italia futurista,* no. 9 (15 November 1916). Reprinted several times, including as "Manifesto della cinematografia futurista," in Marinetti, *Teoria e invenzione futurista,* 138–44; as "La cinematografia futurista," in Gambillo and Fiori eds., *Archivi del futurismo*, vol. 1, 96–99; as "La cinematografia futurista" in M. Verdone, ed., *Manifesti futuristi e scritti teorici di Arnaldo Ginna e Bruno Corra*, 211–215; and as "La cinematografia futurista," in *Filippo Tommaso Marinetti e il futurismo*, 189–94. In English: "The Futurist Cinema," in R.W. Flint, ed., 130–34. A different translation appears (with the same title) in Rainey et al., eds., 229–32.

17 Filippo Tommaso Marinetti, Emilio Settimelli, and Bruno Corra, "Il teatro futurista sintetico (Atecnico-dinamico-simultaneo-autonomo-alogico-irreale)" (four-page pamphlet), 11 January–18 February 1915; collected in Marinetti, *Teoria e invenzione futurista*, ed. Gambillo and Fiori, 97–104. In English: "The Futurist Synthetic Theatre," in Rainey, 204–9 at 204. I have changed the manner of emphasis to conform to *I manifesti del futurismo*.

18 Marinetti, "The Founding and Manifesto of Futurism," 51–52.

19 "Noi esigiamo, per dieci anni, la soppressione totale del nudo in pittura." This was originally the concluding line of Boccioni, Carrà, Russolo, Balla, and Severini's "La pittura futurista: Manifesto tecnico." In most collections of Futurist manifestos—including in Marinetti, *I manifesti del futurismo* (Florence: Editioni di *Lacerba*, 1914)—this sentence is omitted and replaced with the important (McLuhaneque) claim that the Futurists are the primitives of a completely transformed sensibility (a claim that is discussed below).

The manifesto appears under variant titles: sometimes it is referred to as "Manifesto tecnico dei pittori futuristi" (Manifesto of the Futurist Painters), and sometimes it is referred to as "Manifesto tecnico della pittura futurista" (Technical Manifesto of Futurist Painting)—in fact, both "La pittura futurista: Manifesto tecnico" and "Manifesto tecnico della Pittura [*sic*, with upper case] futurista" appear in Marinetti's *I manifesti del futurismo*, the former as the title on page 27 and the latter page 76. I restrict my references to it to "La pittura futurista: Manifesto tecnico" and "Futurist Painting: Technical Manifesto."

20 From Marinetti, "Distruzione della sintassi—Immaginazione senza fili—Parole in libertà," in *I manifesti del futurismo*, 132–33. Since my translation from Italian is not to be relied upon, here is the Italian: "Il Futurismo si fonda sul completo rinnovamento della sensibilità umana avvenuto per effetto delle grandi scoperte scientifiche. Coloro che usano oggi del telegrafo, del telefono e del grammofono, del treno, della bicicletta,

della motocicletta, dell'automobile, del transatlantico, del dirigibile, dell'aeroplano, del cinematografo, del grande quotidiano (sintesi di una giornata del mondo) non pensano che queste diverse forme di comunicazione, di trasporto e d'informazione esercitano sulla loro psiche una decisiva influenza."

21 "Collo scoprire nuove analogie tra cose lontane e apparentemente opposte noi le valuteremo sempre piú intimamente." In ibid., 139.

22 I have already noted that I believe Joyce's writings can be taken as the epitome of Cubism applied to literature. They also display features of Futurism. In this connection, Donald Theall notes that "the action of the *Wake* dramatizes how electricity, machinery, mechanics, and chemistry perform central functions in everybody's body." Theall, *James Joyce's Techno-Poetics* (Toronto: University of Toronto Press, 1997), 59. These electrical and chemical processes sometimes take on a dramatic character (by functioning as metaphors and symbols), and then they can be taken as the "dreams" that make up the story of the *Wake*. The wireless functions symbolically, by connecting Earwicker's body to the *Wake*'s narrative.

In his early commentary on Joyce, Harry Levin makes the important point that "the radio lends [*Finnegans Wake*] a spasmodic continuity, comparable to the influence of the film on *Ulysses*." Levin, *James Joyce: A Critical Introduction* (Norfolk: New Directions, 1941), 176. He is exactly right. *Finnegans Wake* II.3 (the Earwicker's pub section) begins with the moment when HCE, the dreamer, having returned to the conditions of the earliest men, first hears the sound of God's voice. This voice-of-God beginning suggests a Vichian account of the beginnings of language; accordingly, in the next sentence, Joyce connects the origins of language (consciousness) with the wireless signal: HCE experiences a turbulence in the aether, through which pass the radio waves that bring God's voice—the aetheric desert here is also HCE's brainspace, now identical with the cosmos, filled with rarefied air (an aetheric matter we can take as electric field, charged with energy) (*FW* 309.10–11). Thus, Joyce suggests that the experience of early humans was a cosmic awareness (and that awareness was electromagnetic). This passage in *Finnegans Wake* is a great Cubo-Futurist-Unanimist text—one that helped guide Marshall McLuhan towards his transcendentalist aesthetic. After all, it performs a phenomenology of the era's primordial experience (the basis of the electrological cosmology). Donald Theall points out that the various "interpretations of this episode" all "interact so as to clarify how 'everybody' (HCE) is a machinic assemblage of machinic assemblage." Theall, *James Joyce's Techno-Politics,* 78.

23 An image at https://timeline.com/venice-bell-tower-collapse-5789fb4434b9 ("The new Campanile di San Marco under reconstruction in 1911") gives a good idea of what the building looked like when F. T. Marinetti and his fellow *futuristi* used it to denounce Venetian conservatism, sentimentality, and decadence.

24 The plays belong to Alfred Jarry's Ubu cycle: *César-Antéchrist* (Caesar Antichrist) (1895), which introduces Père Ubu; *Ubu roi* (Ubu Rex, 1888; revised 1896); *Ubu cocu, ou l'archeopteryx* (Ubu the Cuckold or the Archaeopteryx, 1897); *Ubu enchaíné* (Ubu Bound, 1899); and *Ubu sur la butte* (Ubu on the Mount, 1906), a two-act adaption of *Ubu roi*, which was mounted at a cabaret, the Quat'z'Arts, as a marionette show (Jarry's preferred way for presenting his plays)—it ran for sixty-four performances, beginning on 27 November 1901. The only stagings of an Ubu play with live performers with which Jarry was involved were two performances of *Ubu roi* at the Théâtre de l'Œuvre, on 9 and 10 December 1896. This production featured stage set design and masks by the *Nabi* painters Pierre Bonnard (1867–1947), Paul Sérusier (1864–1927), Édouard

Vuillard (1868–1940), and Paul Ranson (1864–1909), and the Bohemian (and sometimes Decadent) Henri de Toulouse-Lautrec (1864–1901), along with Jarry himself; the music was composed by Pierre Bonnard's brother-in-law, the Offenbachesque composer of operettas Claude Terrasse (1867–1923). It closed after two nights because of the uproar it caused. Jarry was a savage writer with a wicked sense of the absurd, and both those qualities appealed to Marinetti. Jarry's plays are also full of malapropisms, which relate to their illogic—Jarry is another great example of a twentieth-century vanguard writer who was deeply troubled by the inability of logic and language to apprehend reality. The ineffability of what is ultimately real was one of the great themes of Symbolism and part of its legacy to Futurism.

25 Marinetti, *La conquête des étoiles* (Paris: Éditions de "La Plume," 1902).

26 This amalgam of Romanticism, science, technology, and the occult was characteristic of the time. Consider Antonin Artaud's "Alchemical Theatre" (Chapter 3 of *The Theater and Its Double*, trans. Mary Caroline Richards [New York: Grove Press, 1958], 48–52), which notes the fundamental similarity that theatre has to alchemy: both are doubles—the science of alchemy is not in itself effective, but it serves as a double for something that does not exist, just as theatre serves as a double for life that does not exist. From this, Artaud concludes that theatre should not try to imitate real life, but should depict a realm on which humans have no effect. (Artaud's comments on the virtuality of theatre and on theatre depicting a realm on which humans have no effect are in line with a claim this book has staked, viz., that avant-garde artists in this period were interested in raising art above those viewpoints that represent narrowly limited human interests.)

Furthermore, consider the ways in which some artists responded to the announcement, by Ernest Rutherford (1871–1937) and Frederick Soddy (1877–1956), that one element can change into another through radiation (technically, Rutherford and Soddy's finding was more limited), a finding widely reported in the popular press. The magus Eliphas Levi had emphasized the importance to alchemy of the idea of transmutation, so Marcel Duchamp (formulating a variant of the Romantic conception of *natura naturans*) took Rutherford and Soddy's discovery that some elements can transform into others as proof of the alchemical hypothesis that nature transforms itself relentlessly and mechanically and as an explanation of the process by which that transformation occurs.

Joyce's *Finnegans Wake* offers the "alchemist" Shem, whose oneiric meditations focus on the scientific and mathematical theories of Helmholtz, Rutherford, Poincaré, Werner Heisenberg (1901–1976, a founder of quantum mechanics), Max Planck (1858–1947, another founder of quantum mechanics), and Bertrand Russell (1872–1970). Joyce's reading notes show that he read Russell's *Introduction to Mathematical Philosophy* while working on *Ulysses* and that he was aware of Georg Cantor's (1845–1918) work on transfinite numbers, Poincaré's work on non-Euclidean geometry, Minkowsky's formalization of Einsteinian relativity theory (which itself developed out of Hendrik Lorenz's [1853–1928] aether theory) and his derivations of the transformation equations that Einstein used to describe space and time, and Guiseppe Peano's work on the axiomatization of arithmetic.

27 Marinetti, *La momie sanglante* (Milan: Édition du Journal *Verde e Azzurro*, 1904).

28 Marinetti continued to laud the work of Emile Verhaeren even after he claimed to have abjured Symbolism. He admired Verhaeren for his Decadent-inflected verse and for celebrating the lowly, vulgar, and even base elements of life (including the machinery of modern existence).

Armando Mazza was a boxer from Palermo and a Futurist *provocateur*. Between 1910 and 1912, he got involved in fisticuffs defending Futurists and Futurism, edited the anti-Bolshevik journal *I nemici d'Italia* (The Enemies of Italy, 1919–20), and published four books of free-word poetry (1919–20).

29 On the topic of Marinetti's, and Futurism's, links with Unanimism, see Marianne W. Martin, "Futurism, Unanimism, and Apollinaire" *Collage Art Journal* 28, no. 3 (Spring 1969): 258–68. While there is much that I disagree with in this article, it remains (after all these years) the best treatment of this topic.

Chris Townsend has written an article that argues that Henri-Marin Barzun's ideas on subjectivity and the crowd can be distinguished from those of Jules Romains; in the course of developing that argument, he shows that Barzun's ideas were more closely aligned with Marinetti and the Futurists' ideas on selfhood. See Townsend, "The Individual and the Crowd in Modernity: Henri-Martin Barzun's Modulation between the Abbaye de Créteil and Futurism," in *International Yearbook of Futurism Studies, 2012*, ed. Günter Berghaus (Berlin: De Gruyter, 2012).

30 Gustave Le Bon, *Psychologie des foules* (Paris: Alcan, 1895). This book was extraordinarily widely discussed among the French intelligentsia and was almost immediately translated into English as *The Crowd: A Study of the Popular Mind* (London: T. Fisher Unwin, 1896). There is little doubt that Le Bon influenced Romains. However, there were profound differences in outlook between the two: Le Bon was deeply, deeply conservative. Readers might consult *Psychologie du socialisme* (1898) to see just how reactionary he really was—he characterized socialism as a formidable destructive force, condemned its economic proposals as feeble, and suggested that its appeals were due only to the chimerical fantasy system it offered at a time when science had displaced traditional religions and when human beings longed for a sense of belonging to something higher. He also asserted that socialists' commitment to a fantastic belief system made them resistant to arguments.

31 Le Bon, *The Crowd*, 23.

32 Ibid., 26.

33 Ibid., 35–36.

34 Ibid., 41, 60.

35 Ibid., 61–62. Le Bon, to be sure, assessed the phenomenon of an image-culture (in which images flow like music) from the point of view of a scientist committed to reason—and as a scientist he understood reason to be the thought process by which, when it is rightly regulated, we discover regularities in nature. More speculative thinkers of the time deemed it necessary to reject that conception of reason—that repudiation was required by a historical dialectic that (they believed) was restoring to humans the capacity for ways of experiencing that, although modernity had disempowered them, are nonetheless necessary for human flourishing. The cinema (or, in this case, the proto-cinema, in the form of the lantern display) had a role in this.

36 Some readers, I am sure, will notice that these thoughts resonate in Marshall McLuhan's *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), which, like Romains's *Les hommes de bonne volonté*, was occasioned by the sweeping changes taking place in its time.

37 "When information moves at the speed of signals in the central nervous system, man is confronted with the obsolescence of all earlier forms of acceleration, such as road and rail. What emerges is a total field of inclusive awareness. The old patterns of psychic and social adjustment become irrelevant." McLuhan, *Understanding Media*, 143. And

furthermore, of real relevance to the Futurist experience, "anybody moving into a new world loses identity… So loss of identity is something that happens in rapid change. But everybody at the speed of light tends to become a nobody. This is what's called the masked man. The masked man has no identity. He is so deeply involved in other people that he doesn't have any personal identity." McLuhan, quoted in P. Beneditti and N. DeHart, *Forward Through the Rearview Mirror: Reflections on and by Marshall McLuhan* (Cambridge, MA: MIT Press, 1996), 168. This was the experience that Marinetti understood the Italian people would have to go through to become modern. Or again, there is this from McLuhan's best-known book: "It is a principal aspect of the electric age that it establishes a global network that has much of the character of our central nervous system. Our central nervous system is not merely an electric network, but it constitutes a single unified field of experience." McLuhan, *Understanding Media*, 460–61. Yet again, of direct relevance to the Futurist ideas on interpenetration: "At the speed of light, everything affects everything." McLuhan, "Living at the Speed of Light," *Maclean's*, 7 January 1980, 32. It is instructive to read McLuhan as a latter-day Futurist—one can learn much about Futurism in that way, and a principal lesson concerns modernity's straining to overcome the limited human perspective and to attain a transcendental ("global") perspective.

38 Jules Romains, *La vie unanime* (Paris: Abbaye [de Créteil], 1908; Mercure de France, 1913). See also Rosalind Williams, "Jules Romains, *Unanimisme*, and Urban Systems," in *Literature and Technology*, ed. Mark L. Greenberg and Lance Schachterle (Bethlehem, PA: Lehigh University Press, 1992), which offers worthwhile commentary on Romains's *Unanimisme* as a poetry of the system of a new form of urban life that developed in the late nineteenth and early twentieth centuries and that depended on the new technologies of transportation and communication. (One thinks of Vertov's *Человек с киноаппаратом* [Chelovek s kinoapparatom], right down to the opening scenes in the movie theatre, which seem to suggest a similar point to that which Romains makes in "La foule au cinématographe"). Several of the passages from Romains's great work that I quote are cited in Williams's article, though I have translated them anew from the French.

39 Regarding Marinetti's claim to have considered calling the movement he founded Dinamismo, see *Guerra, sola igiene del mondo* (Milan: Edizioni Futuriste di Poesia, 1915), 5.

40 I am responsible for the translation from *La vie unanime*. I wish it were much better. The French original reads,

*Le présent vibre.*

En haut du boulevard le crépuscule humain
Se cristallise en arc électrique. Un bruit mince
Frétille. Le courant, qui s'acharne à passer
Et s'accroche aux buissons des molécules, saigne.

Mais, au fond des corps, les cellules
Sentent de merveilleux effluves onduler
Vers elles. [Electicity permeates the body and cosmos alike] L'arc, crépitant de fougue solaire.
Darde en chacune le désir d'être un héros.
Des rayons qu'on ne voit pas vibrent, clairons rauques.
…

L'esprit cède sa force à l'influx électrique.
La rue est résolue à jouir, tout à coup;
Au coin des carrefours il se caille des couples [dualities and polarities are tropes of the electrological image of the cosmos];
Les germes bougent. Des hommes vont s'attabler
Aux tavernes en petits groupes circulaires.
La foule rêve d'être un village au soleil. [Once again, a figure of speech evoking solar mysticism emerges: it is a fundamental trope of the electromagnetic age.]
(*La vie unanime*, 79–80)

41 Jules Romains, *La vie unanime*, 67.

42 The French original reads,

Il me semble qu'au fond de mes rues
Les passants courent du même sens,
Et, dénouant les carrefours neutres.
Redressent les boulevards tordus;
Pour que, de moins en moins divergentes.
Malgré les murs, malgré les charpentes.
Les innombrables forces confluent.
Et que brusquement l'élan total
Mette en marche toutes les maisons.
(*La vie unanime*, 67–68)

43 The French original reads,

Le moteur vit d'explosions obéissantes;
Les atomes des gaz se battent en chantant;
[The kinetic theory of gases, which, we shall see, is related to the theory of electromagnetism, shows that the phenomenon of Brownian movement is lawful—harmonic, one might say.]
Leurs groupes meurent et naissent. [Human groups behave analogously to clouds of gas.] Le métal tremble…
Les gens qui sont dans la voiture, coude à coude,
Baignés par la vitesse y perdent leur lourdeur [speed dematerializes].
Ils existent plus ardemment que tout à l'heure;…
Le long du trottoir froid, les passants se calfeutrent
Dans un terrier d'habits dont ils ferment les trous.
Mais ils ont vu courir la voiture farouche;
[A vehicle—presumably, given the first line, a motor vehicle is compared to an animal, suggesting, once again, that the machine is understood within a biocosmic framework—hardly the framework we ordinary use to understand the character and operations of machines.]
Ils se redressent tous, comme un gazon couché
Qu'on arrose.
(*La vie unanime*, 81–82)

44 The original French reads,

N'étant plus moi, je ne sens plus ce qui me touche;
Ma peau, c'est le trottoir de la rue et le ciel…

La roue de l'omnibus qui fait des étincelles,
Et la roue du soleil qu'embourbent les nuages

Donnent un rythme à ma pensée impersonnelle;
Je suis un tournoiement majestueux d'images.
(*La vie unanime*, 136–37)

45 The French original reads,

…je serai
L'homme qui sait voler de l'âme aux autres hommes,
Un carrefour joyeux des rythmes unanimes,
Un condenseur de l'énergie universelle;
[the condenser is an electromagnetic device]
…
Je veux être du moins
Dans le fouillis obscur des câbles et des fils
Le brin ténu de conscience, que le fluide

Traverse d'une émotion incandescente.
[The flow of consciousness/electricity—it is significant that their identity is presumed here—is compared to fluid flow, one of the images scientists used early in the electromagnetic age to interpret electricity; this flow can reverberate to incandescence, a surge of emotion.]
Et d'autres, çà et là, se mettront à briller;
(*La vie unanime*, 220–21)

46 The original French reads,

…ce chaud crepuscule

Où les yeux ne voient pas de formes séparées,
[The electrical universe, as we shall see, is one of interpenetration, which denies the separateness, the particularity, of objects.]
Où l'on ne pense à rien qui ne semble total.

Chaque chose en prolonge une autre, Le métal
Des rails, et les carreaux éblouis; les entrées

De maisons; les passants, les chevaux, les voitures
Se rejoignent entre eux et rejoigncnt mon corps;
Nous sommes indistincts: chacun de nous est mort;
Et la vie unanime est notre sépulture.
("L'unanime, je t'aime," from "L'individu," *La vie unanime*, 141)

47 Umberto Boccioni et al., "Futurist Painting: Technical Manifesto," in Rainey, 64–67 at 65.

48 Ibid., 67.

49 Paroptics (*paroptique*) is a term coined by Jules Romains for the capacity to see without using the eyes. Romains maintained that parts of the skin give evidence of a rudimentary form of vision and that the mucous linings of the nostrils are very sensitive to colours. Romains published *La vision extra-rétinienne et le sens paroptique: Recherches de psycho-physiologie expérimentale et de physiologie histologique* (to give its full title) under his given name, Louis Farigoule, apparently because he wanted to separate this work from his poetry (by way of insisting that the findings reported there were the results of hard-headed scientific study and a real contribution to perceptual psychology, and not a poet's fantasies). The first edition of this book was published by Paris's Éditions de la *Nouvelle revue française* in 1920; a second edition, brought out by Gallimard,

appeared the following year. An English translation, by C.K. Ogden (the author of *The Meaning of Meaning* [1923]), was published by G.K. Putnam in 1924 (under the title *Eyeless Sight: A Study of Extra-Retinal Vision and the Paroptic Sense*), and it still gives Louis Farigoule as the author.

Romains's paroptical interests are discussed in Martin, "Futurism, Unanimism, and Apollinaire," 258–68 at 261; and by Reino Virtanen, "Claude Bernard's Prophecies and the Historical Relation of Science to Literature," *Journal of the History of Ideas* 47, no. 2 (1986): 275–86 at 283–84.

50 For the quotation from "Futurist Painting: Technical Manifesto," see Rainey, 65. The original can be found in Marinetti, *I manifesti del futurismo* (Florence: Edizioni di *Lacerba,* 1914), 24. The passage reads, "Chi può credere ancora all'opacità dei corpi, mentre la nostra acuìta e moltiplicata sensibilità ci fa intuire le oscure manifestazioni dei fenomeni medianici? Perché si deve continuare a creare senza tener conto della nostra potenza visiva che può dare risultati analoghi a quelli dei raggi X?" For the quotation from Marinetti's "Fondazione e Manifesto del futurismo," see ibid., 50. I note that the mathematical conception of space is one of the hallmarks of the Newtonian paradigm, and that Marinetti is proclaiming that the way of seeing associated with that paradigm is passing. I will soon have much to say about the Futurist ideas on evolution.

51 Romains, "La foule au cinématographe," 118–20; reprinted as "The Crowd at the Cinematograph" in *French Film Theory and Criticism*, ed. Abel, 53–54.

52 Le Bon, *The Crowd*, 31.

53 Jules Romains's fascination with the cinema took another form, that of the film-script-as-literary work that I discussed in *DADA, Surrealism and the Cinematic Effect*. However, Romains's work in this form antedated the similar work produced by Philippe Soupault, Paul Eluard, Blaise Cendrars, Robert Desnos, and others: Romains published "Donogoo-Tonka ou les miracles de la science" in *Nouvelle revue française* 74 (November): 821–69; and 75 (December): 1016–63 in 1919, and it was published in book form by *Nouvelle revue française* in 1920. The Futurist *topos* of transformation of entities from one form to another—which I relate to the Futurists' conviction that reality is process—is a central theme of that work.

54 Leonid Andreev, in "Пис'мо о театр" (Pis'mo o teatr; Letter on Theatre), collected in *Полное собрание сочинений* (Polnoe sobranie sochineny; Complete Works), vol. 8 (St. Petersburg, 1913), 316. Translation cited from Richard Taylor, *The Politics of the Soviet Cinema, 1917–29* (Cambridge: Cambridge University Press, 1979), 14.

55 The tenth episode of Joyce's *Ulysses*—"Wandering Rocks"—was influenced by Romains's *Unanimisme*. That episode evokes, through the ordinariness of the incidents it depicts (e.g., a man standing in his doorway, watching a beggar, or a man picking up a child from school), a sense of dealing with real people in a real city. In this episode, the omniscient narrator of *Ulysses* embodies the collective intelligence, and the reappearance of characters featured in one of the episode's nineteen sections in another section suggests the common life in which all the characters participate.

56 Charles T. Semper, "Walt Whitman and His Philosophy," *Harvard Monthly Review* 5, no. 4 (January 1888): 149–65 at 162; and further, in the same spirit, "It is all divine and shouts for joy" (155); and further still, "It might be fancied at times that there was a design in the apparent formlessness, incongruity, commonplaceness which we at once single out as glaring defects" (159).

57 As it turns out, New England Transcendentalism's successor forms were relevant to this new spirit. The extent to which the Transcendentalists anticipated the new spirit's basic

mode of thought is remarkable: in Chapter 17 ("The Flight of Two Owls") of Nathaniel Hawthorne's (1804–1861) *The House of Seven Gables* (1851), Clifford remarks, "Then there is electricity, the demon, the angel, the mighty physical power, the all-pervading intelligence! . . . Is it a fact—or have I dreamt it—that, by means of electricity, the world of matter has become a great nerve, vibrating thousands of miles in a breathless point of time? Rather, the round globe is a vast head, a brain, instinct with intelligence! Or, shall we say, it is itself a thought, nothing but a thought, and no longer the substance which we deemed it!"

58 Jules Romains, "Statement on Whitman," in *Walt Whitman and the World*, ed. Gay Wilson Allen and Ed Folsom (Iowa City: University of Iowa Press, 1995), 266.

59 Walt Whitman, *Leaves of Grass* (1855–1900), ed. David S. Reynolds (New York: Oxford University Press, 2005), pts. 1 and 27. *Leaves of Grass* was first printed by James and Andrew Rome of Brooklyn; Whitman revised it continuously throughout his life. Subsequent writers took note of the theme of electricity in Whitman's writing. For example, in 1935, Michael Gold, the editor of the communist magazine *New Masses*, published the poem "Ode to Walt Whitman," which treated Whitman as an electro-technical author. *New Masses* 27 (5 November 1935): 21.

60 Marinetti, "The Founding and Manifesto of Futurism," in Rainey, 49–53 at 51–52.

61 Marinetti's claims to have developed an entirely new verse form, *parole in libertà*, are clearly an instance of the Oedipal anxiety of influence. Marinetti's poetic father was the French Symbolist poet Gustave Kahn (1859–1936). In 1899, Marinetti (then aged twenty-two) entered a poem, "Les vieux marins," in a poetry competition (for the *Samedis populaire* prize), which Gustave Kahn (and Catulle Mendès) adjudicated. Marinetti's entry won, and Marinetti went to Paris to hear his *maître symboliste* read his poem at one of the *samedis populaires* that Kahn organized for the Théâtre Sarah Bernhardt. While he was in Paris for this occasion, Marinetti established a good relationship with the French poet and the circle around him. Kahn mentioned Marinetti in one of his lists of capable young poets: "Aussi M. F. T. Marinetti, poète très personnel et coloriste très doué" (very personal poet and gifted colourist) (Gustave Kahn, *Symbolistes et décadents* [Paris: Vanier, 1902], 324).

Kahn claimed to be the inventor of *vers libre* and to have coined that term. That is an exaggeration. In his *Rapport sur le mouvement poétique français* (1902), Catulle Mendès listed the names of five or six writers who could lay claim to being the "originator[s]" of *vers libre*. He noted that *vers libre* (for which he had little admiration) had been advocated as early as 1880, when a now unjustly neglected Parnassian poet from Peru Nicanor della Rocca de Vergalo (1848–1919) published his *Poétique nouvelle* (Paris: Alphonse Lemerre, 1880). A Jewish poet from Poland, Marie (or Maria) Krysinska (1857–1908), has a plausible claim: she asserted that poems of hers printed in the years 1882 and 1883 (seven in *Le chat noir*, one in *La vie modern*, and one in *La libre revue*) could be considered *vers libre*. Concerning her assertion, Édouard Dujardin notes that Krysinska's free verses had first appeared as fragments of rhythmical prose and that these prose fragments were later rearranged and republished—in *Rythmes pittoresques* (Paris: Alphonse Lemerre, 1890)—in a form approximating typographically to *vers libres*. Dujardin was certainly closer to the truth than Kahn.

As for the origins of *vers libre* in prose, even Gustave Kahn asserted that his free verse, which led the way for all the other Symbolist innovations, had developed out of experiments in poetic prose—experiments in which he tried to interest Mallarmé, some time just before 1880. Kahn recognized the role that poetic prose had played,

and he highlighted the development of a particular type of prose poem from Aloysius Bertrand (1807–1841) to Baudelaire—he implied the latter's "Les bienfaits de la lune" (Blessings of the Moon, in *Le Spleen de Paris* [Paris Spleen, 1869]) brought the type to perfection. Prose, and prose poems, both Kahn and Dujardin understood, are like *vers libres* in forgoing the regular meter used by traditional poetry. Nonetheless, Kahn was not ready to admit a consequence of that fact—that poetic prose had given way to prose poems, and prose poems to *vers libre*, some time before he produced his first prose poems: Kahn's first *poèmes en prose* appeared in 1879–80, just before he was sent on compulsory military service to Algeria. When he returned to Paris in 1885, he assumed the directorship of *La Vogue*. The first of Kahn's *vers libres* to appear in print was in that review, in the 28 June 1886 issue.

The Symbolists generally accepted Kahn's claim that *Les palais nomades* was "le livre d'origine du vers libre." Édouard Dujardin, as we have noted, did not. Indeed, he argued that *La Vogue* itself had published *vers libre* before Kahn's early experiments. In issues 5 and 6 of the year 1866, as he pointed out, the review had published a number of poems from Arthur Rimbaud's (1854–1891) *Illuminations* (1873) and that publication confirmed the link between prose poems and *vers libre*: most of the poems in that issue are prose poems (a few, however, are more definitely metric), but one of them, "Marine" (printed in the sixth issue of *La Vogue*, published on 29 May of that year), M. Dujardin identified as "les premiers vers libres qui aient jamais été publiés."

Marinetti's Oedipal conflict with his Symbolist masters grew out of his desire to claim *vers libéré* as his own even while acknowledging his artistic progenitors. Indeed, the Oedipal *agon* reflected in "Noi rinneghiamo i nostri maestri simbolisti ultimi amanti della luna" was likely doubly overdetermined: in the battle for *vers libre*, Gustave Kahn found a comrade-in-arms in Jules Laforgue (1860–1887), an ardent student of Schopenhauer. Laforgue was an incomparably greater poet than Kahn. Kahn dedicated *Les palais nomads* (which appeared in April 1887) to Laforgue, who then lay terminally ill (he died on 20 August 1887). But the repressed returns (as the positively cathected grandfather who makes common cause with the son against the father is turned into a negative father figure, a figure who absorbs the displaced Oedipal resentment whose primary object is the father proper): Laforgue, though killed off (by tuberculosis), continued to haunt both Kahn and Kahn's follower/offspring/rival, Marinetti. Laforgue became the negative (Oedipal) father, and in the process Kahn was made into the good father.

The moon is a *topos* in Laforgue's poetry: he was one of the *ultimi amanti della luna*. Laforgue's *Les complaintes* (1885) included poems about the moon. His masterwork, *L'imitation de Notre-Dame la lune* (1885), which is dedicated to Gustave Kahn and "to the memory of little Salammbô, priestess of Tanit," contains twenty-two poems, among which are "Litanies des premiers quartiers de la lune," "Clair de lune," "Climat, faune et flore de la lune," "Dialogue avant le lever de la lune," "Lunes en détresse," "La lune est sterile," "Nobles et touchantes divagations sous la lune," and "Litanies des derniers quartiers de la lune", all of which have "lune" in their titles, as well as "Un mot au soleil pour commencer," "Au large," "Petits mystères," "Nuitamment," "États," "Stérilités," and "Jeux" (which begins, "Ah! la Lune, la Lune m'obsède," and "Avis, je vous prie"). Thus, every poem in the collection, except "Les linges, le cygnet," contains the word "lune." Furthermore, Pierrot, who is a lunar figure, has a key part in the work. It seems that the figure of Laforgue—the "ultimo amante della luna"—had absorbed Marinetti's Oedipal anxieties about being belated, of not winning the stakes of being the first to

develop *vers libéré* (that is, being the primary object of the mother's love / lunar love / feminine love); in this way, Marinetti concealed his negative feelings towards his true artistic father, Gustav Kahn.

It is instructive to read Marinetti's "La conquête des étoiles" as a text conveying the anxiety of influence, for in it Marinetti's long lines and long verses, at once lyrical and narrative, make use of a free prosody reminiscent of the poems of Verhaeren—or of Laforgue's last poems. But if Laforgue is the principal target among Marinetti's *maestri simbolisti*, the Symbolist circle includes Kahn as well. Marinetti would escape from that anxiety of influence by symbolically killing the fathers and declaring himself free of their influence. That is the task of "Noi rinneghiamo i nostri maestri simbolisti."

62 Brain notes that the following have written on Kahn's influence on the young Marinetti: Günter Berghaus, *The Genesis of Futurism: Marinetti's Early Career and Writings, 1899–1909* (Leeds: Society for Italian Studies, 1995); Marjorie Perloff, *The Futurist Moment: Avant-Garde, Avant-Guerre, and the Language of Rupture* (Chicago: University of Chicago Press, 1986); and Christine Poggi, *Inventing Futurism: The Art and Politics of Artificial Optimism* (Princeton: Princeton University Press, 2008), 13.

63 Robert Brain's paper takes up one of the few themes discussed less than exhaustively in Clive Scott, *Vers Libre: The Emergence of Free Verse in France 1886–1914* (Oxford: Clarendon Press, 1990). Scott notes the importance of the laboratory turn on 58–60.

64 Robert Brain, "Standards and Semiotics," in *Inscribing Science: Scientific Texts and the Materiality of Communications*, ed. Tim Lenoir (Stanford: Stanford University Press, 1997), 249–84. Endnote in passage cited.

65 Ernst Brücke, *Die physiologischen Grundlagen der neuhochdeutschen Verskunst* (Vienna: Carl Gerold's Sohn, 1871); and Paul Pierson, *Métrique naturelle du langage* (Paris: Vieweg, 1884).

66 On this topic, see Nélia Dias, *La mesure des sens: Les anthropologues et le corps humain au XIX^e siècle* (Paris: Aubier, 2004).

67 Robert Michael Brain, "Genealogy of 'ZANG TUMB TUMB': Experimental Phonetics, Vers Libre, and Modernist Sound Art" *Grey Room: Architecture, Art, Media, Politics* 43, no. 8 (April 2011): 90.

68 Caroline Tisdall and Angelo Bozzolla, *Futurism* (New York: Oxford University Press, 1978), 94.

69 For commentary on *sintesi teatrali*, see Mario Verdone, "La sintesi teatrale futurista," *Teatro contemporaneo*, vol. 1 (Rome: Lucarini, 1981); and Giovanni Lista, *La scène futuriste* (Paris: Centre National de la Recherche Scientifique, 1989). Both Verdone and Lista mention the influence of the nineteenth-century Symbolist author Gian Pietro Lucini (1867–1914). A short section of Lucini's *Il libro delle figurazioni ideali* (Book of Ideal Figurations) (Milan: Lib. edit. Galli di C. Chiesa e F. Guindani, 1894) presents the story of Romeo and Julie. Lucini presented the story almost as a script for a play and concentrated the entire drama within the scope of the episode of the balcony (see Verdone, 143–44; Lista, 186).

70 Marinetti, Settimelli, and Corra, "The Futurist Synthetic Theater," in Rainey, 205.

71 Ibid.

72 There may be a historical connection between film and these compressed scenes, these *atti* (acts) that are also *attimi* (moments). Films of the day were very short (typically they were "one-reelers," lasting three to five minutes) and presented within their brief compass accelerated actions and broad gestures (and sometimes variety theatre-like stunts). These were also attributes of the *sintesi teatrale*, which may have been influenced by early film.

73 A free-word construction (though somewhat onomatopoeic) spirals out from the centre of the page: "E se a spirale montano nuvole da qualche parte sono fosse rosse rosseeeeee rossissimeeee veri sacchi d'uova piene di sangue che cozzando eterne nei palpiti del vuoto piovono i germi della guerra eterna dovunque sono microbi e microbi a fornicare." Here is my attempt at a translation: "If the spiral mountain clouds are somewhere red rrreeeeddd mooost rrreeeeeddd real egg sacks filled with blood clash eternally in the onslaught of rain and empty the seeds of eternal war everywhere where microbes fornicate with microbes." The connection between electromagnetic and organic forms is evident.

74 Günter Berghaus, *Italian Futurist Theatre* (Oxford: Clarendon Press, 1998), 31.

75 Ezra Pound, "How to Read," in *Literary Essays of Ezra Pound*, ed. T.S. Eliot (London: Faber, 1960), 25. According to Eliot, it was first published in the Books section of the *New York Herald* in 1927 or 1928. Pound here proposes *phanopoeia* as one of three kinds of poiēsis (*melopoeia*, *phanopoeia*, and *logopoeia*) each involving a different manner by which "language is charged and energized."

76 Two exemplary arguments for Symbolism as an artistic revolution are these classic works: Edmund Wilson's (1895–1972) *Axel's Castle: A Study of the Imaginative Literature of 1870–1930* (New York: Scribner, 1931); and Roger Shattuck's (1923–2005) *The Banquet Years: The Origins of the Avant-Garde in France, 1885 to World War I* (London: Faber and Faber, 1958). The latter deals with a broader range of topics than just Symbolism, but reading it provides luminous insights into the avant-garde's origins in Symbolism.

77 Giacomo Balla's *Lampada ad arco*, though finished in 1911, was conceived sometime in 1909, before Futurist painting began as a movement; the contrast between its form and method and those of the works Balla produced over the next few years (consider *Dinamismo di un cane al guinzaglio*, 1912, and then *Linee andamentali + successioni dinamiche*, 1913) underscore my point here.

78 Boccioni et al., "Futurist Painting: Technical Manifesto," 64.

79 W.S. Di Piero points out that in 1903, Boccioni painted a landscape in the Macchiaioli style—I assume he means *Campagna romana (meriggio)* (Roman Countryside [Noon]). Di Piero's essay on the group, "Modern Instances: The Macchiaioli," in *Out of Eden* (Berkeley: University of California Press, 1991), 7–30, offers many suggestions about the relations between the assertively modern (and modernist) Macchiaioli group and the Futurists and is essential reading. More thoroughgoing historical commentary on the Macchiaioli can be found in Norma Broude, *The Macchiaioli: Italian Painters of the Nineteenth Century* (New Haven: Yale University Press, 1988); Albert Boime, *The Art of the Macchia and the Risorgimento: Representing Culture and Nationalism in Nineteenth-Century Italy* (Chicago: University of Chicago Press, 1993); and Katherine Hart, ed., *The Macchiaioli: Painters of Italian Life, 1850–1900* (exhibition catalogue) (Berkeley: University of California Press, 1982).

80 Ogden Rood, *Modern Chromatics with Applications to Art and Industry* (New York: D. Appleton and Company, 1879), 140.

81 Tisdall and Bozzolla, *Futurism*, 27.

82 Boccioni et al., "Futurist Painting: Technical Manifesto," 65.

83 The best (and most convenient) resource on Romolo Romani is Renato Barilli, *Romolo Romani* (Milan: Mazzotta, 1982), an exhibition catalogue for a show at Chiesa di S. Giulia, Brescia, Italy.

84 Ardengo Soffici, "Il Fascismo e l'arte," *Gerarchia* 9 (25 October 1922): 504; quoted in Laura Malvano Bechelloni, "Le mythe de la romanité et la politique de l'image dans l'Italie fasciste," *Vingtième siècle. Revue d'histoire* 78 (April–June 2003): 111–20 at 112.

85 The relation between the Milanese and Florentine Futurist groups was somewhat conflicted. Ardengo Soffici had a significant influence on the Florentine group. He studied at the Accademia (from 1897) in Florence and then at the Scuola Libera del Nudo (Free School of the Nude) before moving to Paris in 1900, where he worked for Symbolist journals and got to know Braque, Picasso, Gris, Apollinaire, and the Fauve André Derain (1880–1954)—artists and writers who would formulate Cubism's leading ideas. When he returned to Italy in 1907, to take up residence just outside Florence, he began writing for *La Voce*, producing a series of articles on modern art and artists. In 1911 he visited the Futurists' "Mostra d'arte libera" (Exhibition of Free Art), where Boccioni showed a piece then called *Il lavoro* (Work), now known as *La città che sale* (The City Rises, 1910), which holds together depictive elements (the chimneys of suburban buildings under construction are clearly rendered in the top part of the painting) and melted abstract forms (of men and horses in the mid-part) and mixes forms rendered in linear perspective with wave-like electromagnetic forms—those wave-like forms make *Il lavoro* one of the pioneering electromorphic paintings. Soffici wrote a blistering review of the show. On reading it, the Milanese Futurists dispatched Marinetti, Boccioni, and Carrà to Florence, where they met up with the journalist at the Caffè Giubbe Rosse and assaulted him (and others working at *La Voce*). In 1912, Soffici published a second article on Futurism, "Ancora del Futurismo" (Futurism Again), in which he reviewed their Parisian exhibition. This time, while deploring their publicity-seeking antics, he extolled the Futurists' commitment to the renewal of art. Severini was sent to Florence and, through negotiation, concluded what Boccioni dryly referred to as the "pace di Firenze" (Peace of Florence). In 1913, Soffici, together with Giovanni Papini, Aldo Palazeschi (1885–1974), and Italo Tavolato (1889–1963), quit *La Voce* to form *Lacerba*, a journal devoted exclusively to art and culture. There, on 15 April 1913, Soffici published "Teoria del movimento nella plastica futurista" (Theory of the Movement of Plastic Futurism). In it, he praised Futurism for its dialectical reconciliation of Impressionism and Cubism, which until then had seemed intractably opposed. Also, Soffici began painting in the Futurist style.

By 1914, the Florentine group had come to resent the dominance of the Milanese group, and the tensions lasted until just after the First World War.

Sources on Soffici include Mario Richter, *La formazione francese di Ardengo Soffici 1900–1914* (Milan: Vita e pensiero, 1969), which treats the effect that Soffici's years in Paris had on him (and so suggests much about the influence of Symbolism on Soffici's aesthetic and national ideals); Luigi Cavalla, *Soffici: Immagini e documenti (1879–1964)* (Florence: Vallecchi, 1986), generally considered the best source of Soffici's life and work; and Eraldo Bellini, *Studi su Ardengo Soffici* (Milan: Vita e pensiero, 1987).

86 "Il movimento di una figura non deve arrestarsi alle linee di contorno . . . ma per un'impulsione prodotta dall' intensità dei giuochi dei valori, dei sobbalzi e delle linee dell'opera, propagarsi nello spazio, spandersi all'infinito, a guisa di un'onda elettrica che sprigionandosi da una macchina ben costrutta, vola a reintegrarsi con la forza eterna dei mondi." Ardengo Soffici, "Il caso Medardo Rosso" (1909), in *Opere* (Florence: Vallecchi, 1959–68), vol. 1, 3.

Soffici and his friends longed to have a revolutionary impact. To that end, Soffici's group took part in the *Gran Serata Futurista* held at Florence's Teatro Verdi in December 1913, when it must have seemed that the world was on the cusp of a transformation. *Lacerba* reports that 5,000 people were in the audience, while the *Corriere della sera* reports 7,000. See Günter Berghaus, *Avant-Garde Performance: Live Events and*

*Electronic Technologies* (New York: Palgrave Macmillan, 2005), 34. Yet they remained committed to the aesthetic ideal of *toscanità*, an aesthetico-nationalist movement focused on Tuscany's natural beauty and peasant life. Soffici and his friends tried to have it both ways: to be at once rigorously vanguard and vigorously populist-nationalist. Soffici quickly put his Futurist involvements behind him and began to speak for the *Ritorno all'ordine* (Return to Order) and to paint rather tedious Tuscan landscapes. Soffici later became thoroughgoingly nationalist: he associated himself with the pro-ruralist *Strapaese* movement and remained loyal to Mussolini, following him even into the Republic of Salò.

But his ideas from the period of his avant-garde engagement continued to reverberate in the polemics around avant-garde art. Soffici the vanguardist was a champion of the Symbolist verse of Baudelaire and Rimbaud, and it was in the course of Soffici's discussions with his friend Giovanni Papini that the Futurist idea of dissolving the self, of eliminating the bourgeois idea of the fixed identity, was born: they spoke of "becoming unknown to ourselves" and of "plunging into the abyss" (that is, becoming one with nature through an act of higher consciousness). That sort of experience was widely discussed and sought by many.

87 Regarding the influence of Schopenhauer on the movement, the poet and art critic Gustav Kahn, in his "Résponse des symbolistes" (*L'événement*, 28 September 1886), praised the work of the scientist and colour theorist Charles Henry (1859–1926), whose *Cercle chromatique* (1888) was a great influence on the Symbolists, saying that both Henry's science and Symbolist art are "founded on the purely idealist philosophical principle that causes us to reject completely the reality of matter and admit the existence of the world only as representation." Henry actually did propose that the world we experience (cf. Schopenhauer's world as representation) is constituted by a fluxing interplay of colour-energies undergoing perpetual changes in *directions* (to use Henry's term). The Futurists, of course, were not so resolutely anti-materialist as the Symbolists. But they did come to consider what we think of as matter as congealed energy, and in that limited sense, their philosophy displays a nisus towards treating matter as a symbol of something beyond the objective. More importantly, as I try to show in this chapter, they evolved a metaphysics that sees matter as intelligent—as *geistig*.

The passage from Kahn can be found in *Nineteenth-Century Theories of Art*, ed. Joshua C. Taylor (Berkeley: University of California Press, 1989), 531.

88 Boccioni et al., "Futurist Painting: Technical Manifesto," 64–65.

89 On Bergson's relation to Cubism and Marey, see Marta Braun, *Picturing Time: The Work of Étienne-Jules Marey (1830–1904)* (Chicago: University of Chicago Press, 1992).

90 Carlo Carrà, *Tutti gli scritti* (Milan: Feltrinelli, 1978), 29. Quoted in translation in Rosa Trillo Clough, *Futurism: The Story of a Modern Art Movement: A New Appraisal* (New York: Greenwood Publishing, 1969), 91.

91 Boccioni et al., "Futurist Painting: Technical Manifesto," 66.

92 The proposition that history is not inherently conflictual—that the relationship of the future and present to the past is not necessarily eristic—is implicit in Bergson's idea of "psychic duration," which the Futurists took up. Bergson used that idea to propose that deep memory links past, present, and future in an inextricable continuity.

93 There were different motivations for such Simultaneist forms: artists sometimes contended that our sense that time passes is an illusion and that in the higher realm all events are contemporaneous; and they sometimes claimed that the speed with which events succeeded one another had made them "as if" contemporaneous (and that further

technological development would make them actually contemporaneous). There was no settled view on this matter, and we often find the same artist sometimes arguing one of these positions and sometimes the other.

94 This relational theory of existence is a foundational principle of Alfred North Whitehead's metaphysics. Following through on the logical implications the ideas of force and energy (understood in the light of the field theories of contemporary physics), Whitehead developed a metaphysics that takes what he called an actual occasion as the fundamental unit of reality: an actual occasion is a unit of process.

95 This is a peculiar status to accord the nude. Surely we use our nudity to make connections with others. Nonetheless, that *is* the status that Renaissance sculptors accorded the nude.

96 Like other Futurist manifestos, this near prose poem (first published in 1912) appears under variant titles, sometimes as "La scultura futurista" and sometimes as "Manifesto tecnico della scultura futurista." I use the former, for that is the title under which it appears in *I manifesti*, 75.

97 Umberto Boccioni, "Technical Manifesto of Futurist Sculpture," in Rainey, 113–19 at 114.

98 Ibid., 114–15. Emphases in original.

99 Joshua C. Taylor provides references (including to Boccioni's "Fondamento plastico della scultura e pittura futuriste") establishing that by 1911 several of the Futurists—including Carrà, Severini, Soffici, and probably Boccioni—had read some of Bergson's writings. See Joshua C. Taylor, *Futurism*, exhibition catalogue, Museum of Modern Art, New York (Garden City, NY: Doubleday and Company, 1961), 119n6; and Taylor, "The Futurist Goal, the Futurist Achievement," in *Major European Art Movements 1900–1945: A Critical Anthology*, ed. Patricia E. Kaplan and Susan Manso (New York: E.P. Dutton, 1977), 164–92 at 173.

100 As "cette espèce de sympathie intellectuelle" in Henri Bergson, *Œuvres*, vol. 3, 1395. Here I am citing a version of this text that appeared in 1903, in la *Revue de métaphysique et de morale*, because it highlights that Bergson means by *sympathy* something different than we commonly mean by it, something closer to *geistig*. A better-known version of the essay appears in Bergson's *La pensée et le mouvant* (1934), where Bergson writes, "Nous appelons ici intuition la *sympathie* par laquelle on se transporte à l'intérieur d'un objet pour coïncider avec ce qu'il a d'unique et par conséquent d'inexprimable." Bergson, *La pensée et le mouvant* (Paris: Presses Universitaires de France, 1985), 181; see also *Œuvres*, vol. 3, 1537; cf. 1421 and 1432. In the later version, sympathy—the mimetic capacity by which the mind is transported to the interior of an object, to coincide with what is particular in it—is no longer said to be a function of the intellect. The revised terminology suggests that its mimetic function has a spiritual rather than an intellectual nature, but the earlier expression makes clear that Bergson sometimes used the term *intellectuelle* as a descriptor of a higher faculty.

101 Ibid., 24.

102 Charles Baudelaire, "Notes nouvelles sur Edgar Allan Poe" (Introduction to Edgar Allan Poe), in *Nouvelles histoires extraordinaires*, trans. Baudelaire (Paris: A Quantin, 1884), i–xix at xvi.

103 Schopenhauer, too, advanced this thesis.

104 When Bergson writes of cinematographic time, he has in mind, first and foremost, a strip of film on which different moments in time are laid out spatially. But as Anson Rabinbach points in *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1990), 110, he also has in mind Marey's chro-

nophotographs, which also map temporal difference onto space. Rabinbach's chapter on É.-J. Marey deals with many of the same topics as the present volume: the "crisis of space-time perception" (113), the "crisis of all perceptual systems" (ibid.), and the "crisis of the real" (ibid.). Of special salience is his view of Bergson's skepticism, which he sees as going much further than "his contemporaries, such as Guyau or George Lechalas, by rooting the 'crisis of the real' within the scientific worldview" (ibid.). Rabinbach offers this insightful comment: "Bergson's view can be characterized as one polarity of classical modernist [I would say postmodern] criticism—the attempt to redeem the totality of experience at the expense of scientific rationalism. The opposite pole is represented by Marey, who identifies with the scientific project of decomposing the absolutes of space and time" (114).

105 Gino Severini, "Introduction" in *The Futurist Painter Severini.*

106 Umberto Boccioni, Carlo Carrà, Luigi Russolo, Giacomo Balla, and Gino Severini, "Gli espositori al pubblico," First published as "Les exposants au public" in *Les peintres futuristes italiens* (exhibition catalogue: Galerie Bernheim-Jeune, Paris), 5–24 February 1912, 1–14; then in English translation as "The Exhibitors to the Public" in an exhibition catalogue (published by the Sackville Gallery), *The Italian Futurist Painters*, 9–19. Collected as "Prefazione al catalogo delle esposizioni di Parigi, Londra, Berlino, Bruxelles, Monaco, Amburgo, Vienna, ecc," in Marinetti, *I Manifesti del futurismo*, 60–68; and in Maria Drudi Gambillo and Teresa Fiori, eds., *Archivi del futurismo* (Rome: De Luca Editore, vol. 1, 117–18); in *Les peintres futuristes italiens* (exhibition catalogue, Galerie Bernheim-Jeune, Paris), 5–24 February 1912, 1–14. In English: "The Exhibitors to the Public," in *Futurist Manifestos*, ed. Umbro Apollonio, 45–50; and in Rainey et al., *Futurism: An Anthology*, 105–9, citation at 107. Boccioni wrote the first draft of the text in October 1911 and then circulated it to Carrà, Russolo, Balla, and Severini.

107 Henri Bergson, *Matière et mémoire. Essai sur la relation du corps à l'esprit*, 14; English translation, *Matter and Memory*, by N.M. Paul and W.S. Palmer (New York: Zone Books, 1988), 24.

108 *Matière et mémoire*, 10; English translation, *Matter and Memory*, 17.

109 Ibid., 34.

110 Ibid., 65.

111 Ibid., 133.

112 Bergson might have argued that there is no such thing as pure perception, but the idea of pure perception was nonetheless influential. Subsequent artists (but not the Futurists) adopted the search for pure perception as their primary goal.

113 Ibid., 34.

114 Henri Bergson, *Introduction to Metaphysics* (1903), trans. T.E. Hulme (New York: Liberal Arts Press, 1955), 6.

115 Henri Bergson, *Creative Evolution* (1911), trans. Arthur Mitchell (New York: Modern Library, 1944), 194.

116 Ibid.

117 Ezra Pound, "Letter to James Joyce, dated 6 September 1915," in Ezra Pound, *Pound/Joyce: The Letters of Ezra Pound to James Joyce: With Pound's Essays on Joyce*, ed. Forrest Read (New York: New Directions, 1970), 43. The passage is cited in Edward Aiken, "The Cinema and Italian Futurist Painting," *Art Journal* 41, no. 4 (Winter 1981): 353–57 at 353.

118 Wyndham Lewis, "Note for Catalogue," in *Vorticist Exhibition* (exhibition catalogue, Doré Galleries, London, June 1915); reprinted in Walter Michel, *Wyndham Lewis:*

*Paintings and Drawings* (Berkeley: University of California Press, 1971), 432. Also in Aiken, "The Cinema and Italian Futurist Painting."

119 Aiken, 353.

120 The first comment appears in Roger Allard, "Remarks on Futurism and the Cinema," *Revue indépendante* 3 (August 1911): 134; the second in Allard, "Die Kennzeichen der Erneuerung in der Malerei," in *Der Blaue Reiter*, 2nd ed. (Munich: 1914), 35–40; the passage appears in English in Aiken, "The Cinema and Italian Futurist Painting," 353.

121 Robert Delaunay and Sonia Delaunay, *The New Art of Color: The Writings of Robert and Sonia Delaunay*, trans. Arthur A. Cohen and David Shapiro, ed. Cohen (New York: Viking Press, 1978), 78. The passages appear in Aiken, "The Cinema and Italian Futurist Painting," 353.

122 No date of death is given for Horace Barnett Samuel by either the Library of Congress name authority file or OCLC.

The phrase "strette reti di immagini o analogie" (upper-cased in the original) appears in the "Manifesto tecnico della letteratura futurista," in Marinetti, *I manifesti del futurismo*, 137. Marinetti contrasts these networks of images and analogies with "strette reti di metafore," which are unfortunately "too weighed down by the lead of logic" (troppo appesantite dal piombo della logica) (ibid., 94). This network form of construction became the basis of *parole in libertà*.

123 Horace B. Samuel, "The Future of Futurism," *Fortnightly Review* 99 (1913): 730; and *Living Age*, vol. 277 (1913): 744. A more readily available source for the passage than those Aiken gives is Samuel, *Modernities* (London: K. Paul, Trench, Trübner, 1913); the passage cited appears on page 220. The quotation appears in Aiken, "The Cinema and Italian Futurist Painting," 353.

Samuel had translated Nietzsche's *Zur Genealogie der Moral: Eine Streitschrift* (On the Genealogy of Morals: A Polemic, 1887) and Stendhal's *Le rouge et le noir* (The Red and the Black, 1830); his book *Modernities* (1913), which includes the essay "The Future of Futurism," from which the passage above is taken, provides an overview of the writings of Stendhal (Marie-Henri Beyle, 1783–1842), Frank Wedekind (1864–1918), Heinrich Heine (1797–1856), August Strindberg (1849–1912), Friedrich Nietzsche, and the British novelist Marie Corelli (1855–1924, an occultist, interested in reconciling Christian and heterodox beliefs, who enjoyed considerable popularity during the *fin-de-siècle* years). It also comments on the Conservative-reformist Benjamin Disraeli (1804–1881), Arthur Schnitzler (1862–1931), the Belgian Decadent Emile Verhaeren, and Marinetti, treating them as representatives of different sorts of modernities. The list of subjects gives evidence of an alert mind with a formidable ability to discern the contours of modernity's parts and to identify the pivotal functional elements of its structure.

124 I note, however, that the Futurists did sometimes succumb to the temptation of imagining ubiquitous technology / ubiquitous art. In 1915, F.T. Marinetti wrote a science-fiction piece depicting life in 2015. It seems he was prescient. He writes of "telefoni senza fili" (wireless telephones) and of men with the ability to write "in libri di nickel, il cui spessore non supera i tre centimetri…e contiene, nondimeno, centomila pagine" (in books made of nickel whose thickness is no greater than three centimeters…and contain no less than one hundred thousand pages), which sounds very close to our digital books on our portable memory devices. Both quotations are from "La guerra elettrica (Visione-ipotesi futurista)," in *Guerra, sola igiene del mondo*, reprinted in Marinetti, *Teoria e invenzione futurista* (Verona: Arnoldo Mondadori, 1968), 320. As

they do in Marshall McLuhan's writings, predictions about being connected to prosthetic memory devices allude to an envisioned capacity to overcome the vicissitudes of individual experience and the limitations of individual memory and attain thereby a transcendent viewpoint. This transcendence, I have been suggesting, is a basic theme of Futurist polemics, Futurist art, and Futurist theory.

125 Aiken, "The Cinema and Italian Futurist Painting," 353. Aiken scrupulously notes the sources of all these quotations.

126 Regarding Balla's interest in cinematic painting, Aiken points out that "As early as 1904 with the painting *The Worker's Day* (La giornata dell'operaio), Balla seems to have suggested his initial interest in the problem of motion picture and its relation to painting." He cites Marianne W. Martin, *Futurist Art and Theory 1900–1915* (Oxford: Clarendon Press, 1968), 74ff; and Gerald Silk, "Giacomo Balla's *The Worker's Day*," *Arts Magazine* 53, no. 5 (1979): 130–36 at 132.

A procataleptic note is in order. I have been arguing that the Cubism and Futurism programs for bringing forth new art forms were a response to the arrival of the cinema. I have suggested that many artists working in traditional media recognized a rival in the cinema and greeted it with some consternation. They felt that the cinema might be an art splendidly fitted for the early twentieth century, a time when industry had accelerated the pace of change and people had moved in great numbers to cities, there to experience the dynamism of urban life. At the same time, this valorization of the cinema elicited anxieties about the relevance of the traditional arts to the modern world: perhaps their static nature consigned traditional painting and sculpture—and indeed all traditional (contemplative) art—to a gallimaufry of outmoded forms.

But surely, someone might object, if Boccioni and Severini, who played such central roles in formulating the Futurist program for the visual arts, strongly objected to allying Futurism to the cinema, I must be mistaken. I really do not think that conclusion is warranted. An artist who, faced with this rival medium, set out to recast his or her medium (painting, sculpture, music, dance, poetry) to endow it with qualities of the cinema might understand what he or she was doing in one of two ways (though in practice I think that any artist in this situation would vacillate between the two positions, sometimes adopting one, sometimes the other, and sometimes some intermediate position): the artist might believe that in recasting painting (or whatever medium), one was capitulating to the cinema and creating a cinematic form of painting (that likely would not be better than its rival, the cinema, but at least would serve to keep painting vital); alternatively, the artist might believe that reformulating painting would allow it to surpass the cinema—to retain strengths it had, and that the cinema lacked, while acquiring most of the cinema's strengths.

I think there is good evidence for concluding that both Boccioni and Severini looked to the cinema to understand what an art that was appropriate to the age would be like. But they never lost faith that painting and sculpture had strengths the cinema would never possess.

127 Ardengo Soffici, "La pittura futurista," *Lacerba*, 15 December 1913; reprinted in *Archivi del Futurismo*, ed. Drudi and Fiori (Rome: De Luca, 1958), vol. 1, 175.

128 It seems to me that Wanda Strauven, in "Futurist Poetics and the Cinematic Imagination: Marinetti's Cinema Without Films," in *Futurism and the Technological Imagination*, ed. Günter Berghaus (Amsterdam and New York: Rodopi, 2009), 201–28, underestimates the distance that separates Marinetti's, Boccioni's, and the Futurists' general idea of what a machine is from the more ordinary understanding. Among the

signs of the underestimation is Strauven's drawing together tightly Marinetti's ideas of analogy (in his writing on *parole in libertà*) and Eisenstein's idea of montage. There are grounds for making this comparison (and indeed, I made the same connection in my account of *parole in libertà*). But this comparison needs to be handled carefully (and with qualification). Eisenstein's idea of montage, as the word (монтаж, montazh) suggests, is grounded in a mechanical conception of the artwork—he formulated his understanding of montage as part of an agonic enterprise directed at expelling the organic conception of the work of art from the nearly canonical status to which the Romantic tradition had elevated it. The Romantic/organic conception of a work of art rejects the notion that the value any element of an artwork has when independent of the whole is the same value that it has as part of the whole—nor, according to the Romantic/organic conception of unity, is the value that an element has when incorporated into one whole the same as the value it has when incorporated into a different composition. To express the matter in a different way, the value that any element has is changed when it is taken into a particular composition. In his early career, Eisenstein wanted to replace the organic conception of a work of art with a mechanical conception that views the making of a work of art as a process of assembling parts that are not internally changed when they enter into the whole that is the work of art. (His trip to Mexico changed his mind on many things, and he came to embrace the organic conception of the unity of a work of art, but accepting that resulted in his according montage a reduced importance.) The Futurist conception of artistic unity was not at all that of a mechanical unity—to the contrary, it was *radically* organic. Among other implications of the underestimation of the distance that separates the Futurist from the common understanding of the machine (evident in Stauven's essay) is that it obscures the electrological underpinnings of the Futurists' ideas about the fusion of human and machine: understanding the machine as *geistig* (spiritual) provides a more robust account of Futurist writings on how the human and machine merge.

129 It was the process of working out the implications of their process metaphysics that led the Futurists to embrace the transcendental/biocosmic/suprahuman viewpoint that readers generally find so abhorrent.

130 Umberto Boccioni, "La pittura futurista (conferenza tenuta a Roma nel 1911)," in Boccioni, *Altri inediti e apparati critici*, ed. Zeno Birolli (Milan: Feltrielli, 1972), 11. I have written on the connection that artists drew between thought-forms and electromagnetic waves transmitted through the aether in "The Artwork as an Aerial Computer Program: On Electricity, Archives, and Collage," *Parol* 27, no. 22 (2012): 284–301; and in "Harry Smith: Collecting Thought Forms and Programming the Aerial Computer," in *America Changed by Music*, ed. Ross Hair and Thomas Ruys Smith (London and New York: Routledge, 2017), 100–122.

131 Bruno Corra, "La musica cromatica e i film astratti" (Chromatic Music and Abstract Film); first published as "Musica cromatica" in Corra and Settimelli, *Il pastore, il gregge e la zampogna (divagazioni sul libro di Thovaz)* (Bologna: Libreria Beltrami, 1912) and reprinted in the same year as "Cinema astratto—Musica cromatica"; reprinted under the title just given in *Manifesti futuristi e scritti teorici di Arnaldo Ginna e Bruno Corra*, ed. Mario Verdone (Ravenna: Longo, 1984), 155–66. In English: "Abstract Cinema—Chromatic Music," in *Futurist Manifestos*, ed. Umbro Apollonio (New York: Viking Press, 1973). Here the term chromatic should be taken as intending *chroma*, not as referring to scales based on semitone steps.

132 Roger Griffin, *Modernism and Fascism: The Sense of a Beginning under Mussolini and Hitler* (London: Palgrave, 2007), 258.

133 He (Cesare Lombroso) wrote *Grafologia di Cesare Lombroso* (Milan: Hoepli, 1895).

134 Cesare Lombroso, *Ricerche sui fenomeni ipnotici e spiritici* (Turin: Unione tipografica editrice, 1909). In English: *After Death—What?: Spiritistic Phenomena and Their Interpretation*, trans. William Sloane Kennedy (Boston: Small, Maynard & Co., 1909). The first part discusses magnetism and argues that the human body exhibits polarity similar to that of magnets: if a magnet is placed near the cervix, half a centimeter from the skin, the subject's thoughts are affected. Placing one pole of a magnet near the skull can suppress hallucinations; placing both poles near the skull *produces* hallucinations.

135 See the entry for Cesare Lombroso in Theresa Cheung, *The Element Encyclopedia of the Psychic World: The Ultimate A–Z of Spirits, Mysteries, and the Paranormal* (New York: Harper Element, 2006).

136 That research on electricity was conducted in dissection rooms and hospital clinics is testimony to the currency of the belief that discoveries concerning electrical or electromagnetic phenomena have a bearing on physiology and neurology.

137 This question, which was a common one in the last decades of the eighteenth and the first decades of the nineteenth centuries, implies that at the time, electricity was viewed as a vital force intermediate between spiritual and physical being.

138 George Berkeley, quoted in G. Cantor, "The Theological Significance of Ethers," in G. Cantor and M. Hodge, *Conceptions of Ether: Studies in the History of Ether Theories, 1740–1900* (Cambridge: Cambridge University Press, 1981), 135–56 at 147.

139 John Cook, quoted in ibid., 137.

140 Patricia Fara, *An Entertainment for Angels: Electricity in the Enlightenment* (Cambridge: Icon Books, 2002), 116–17.

141 Alessandro Volta, "On the Electricity Excited by the Mere Contact of Conducting Substances of Different Kinds," *Philosophical Magazine* 7 (1800): 289–337 at 305 and 337.

142 Mary Shelley's (1797–1851) *Frankenstein; or, The Modern Prometheus* (1818) was inspired by scientists' experiments with electricity and by the feeling that electricity might be used to produce life—indeed, she intended the book to be a cautionary tale, counselling against the Faustian ambition that fuelled such hopes. Shelley likely learned about Galvani, Volta, and Aldini from Humphry Davy and William Nicholson (1753–1815), the era's top experts on electricity, who were friends of her father.

143 F.T. Marinetti, "Prime battaglie futuriste," in *Guerra, sola igiene del mondo*, in Marinetti, *Teoria e invenzione futurista*, ed. Luciano De Maria (Milan: A. Mondadori, 1968), 201–9 at 204.

144 On this, see Luciano Chessa, *Luigi Russolo, Futurist: Noise, Visual Arts, and the Occult* (Berkeley: University of California Press, 2012), esp. Ch. 11.

145 G. Franco Maffina, *Luigi Russolo e l'arte dei rumori; con tutti gli scritti musicali* (Turin: Martano, 1978), 175–76. My translation is based on the text printed in Maffina. A reader could compare it with the translation Chessa offers in *Noise, Visual Art, and the Occult*, 126–27.

146 Marinetti, *Teoria e invenzione futurista*, ed. Luciano De Maria (Verona: Arnoldo Mondadori, 1968), 209. Translation in Chessa, *Noise, Visual Arts, and the Occult*, 20.

147 Marinetti, *Teoria e invenzione futurista*, 125; Chessa, *Noise, Visual Arts, and the Occult*, 20.

148 Marinetti, *La grande Milano tradizionale e futurista: Una sensiblità italiana nata in Egitto* (Milan: Mondadori, 1969), 104. *La grande Milano tradizionale e futurista* and

*Una sensiblità italiana nata in Egitto* were written as separate monographs in 1943 and 1944, respectively; English translation in Chessa, *Noise, Visual Arts, and the Occult*, 20.

149 I commented above that being immersed in mud can be taken as allegory for the alchemical stage of finding the *materia prima*. Max Ernst used mud in just that way in Max Ernst, *Une semaine de bonté*, 5 vols. (Paris: Éditions Jeanne Bucher, 1934); reprinted, under the original French title, in a single volume, trans. Stanley Appelbaum (New York: Dover, 1976).

150 F.T. Marinetti, "Tattismo," in *Teoria e invenzione futurista*, 135–36. In English: "Tactilism," in Rainey, 264–69 at 265.

151 Ibid., 265.

152 Ibid.

153 Ibid.

154 Ibid., 266. Marinetti suggests that there was a precursor for the tactilist sensibility: the great Decadent writer Rachilde (*nom de plume* of Marguerite Vallette-Eymery, 1860–1953). He notes in particular Rachilde's *Jongleuse* (The Juggler, 1900, rev. 1925), and *Les hors nature: Mœurs contemporaines* (The Unnatural, 1897), a novel on the theme of incest. Nonetheless, Marinetti insisted, though other writers might have had presentiments of the tactilist sensibility, he was the true founder of Tactilism as an artistic/evolutionary-reformist program.

155 The importance of Rudolf Steiner's ideas in the shaping of this National Socialist policy should not be underestimated—in fact, our term "organic farming" is an adaptation of the Nazi term "organische Landwirtschaft," which itself was an adaptation of Steiner's term, "biodinamisches Landwirtschaft" (biodynamic farming—currently of such great interest to oenophiles).

156 Robert A. Pois writes on what he calls National Socialism's "Religion of Nature," which was a fusion of Neo-Romantic nationalistic nature mysticism and a species of biologism. He points out that in forging their religion of nature, the Nazi intelligentsia linked their movement to popular trends of their time. Pois, *National Socialism and the Religion of Nature* (London: Croom Helm, 1985), 10–11 and 39. He also points out that "even the core of the National Socialist religion of nature was not something utterly alien to Western / Central European cultural history in general, and that of Germany in particular. In part it was rooted in a general *malaise* that was a byproduct of material progress, a *malaise* that found articulation in 'the return to nature'" (ibid., 170).

157 The manifesto that includes this declaration first appeared as "Manifesto della radio" in *La gazzetta del popolo* (Turin, 22 September 1933), then in *Futurismo* (1 October 1933), and then as "La radia, manifesto futurista dell'ottobre 1933," in *Autori e scrittori* 6, no. 8 (August 1941): 5–10. Note that this wave technology has undergone a feminization in the later title. It is collected in *Manifesti, proclami, interventi e documenti teorici del futurismo, 1909–1944*, ed. Luciano Caruso (Florence: Coedizioni SPES-Salimbeni, 1980). In English: "The Radia: Futurist Manifesto" in Rainey, 292–95 at 292.

158 In "Prefazione all'edizione italiana," Chimelli's preface to his translation of Johann (Giovanni) Schomerus, *Il metodo di coltivazione biologico-dinamico in frutticoltura e in orticoltura* (Pergine: Arti grafiche Luigi Torgler, 1934), iii–xx; the passage quoted can be found on xvii.

159 Innocenza Cappa, "L'euritmia e Rodolfo Steiner," *La rivista illustrata del popolo d'Italia*, February 1930, 48–49. The article proclaims Steiner the "sacerdote ideale di una nuova fede nella vita, non deve essere un ignoto in questa nostra Italia" (ideal priest of a new faith in life, who should not be an unknown in our Italy). References to Steiner and

to Anthroposophy were not infrequent in Italian magazines and journals at the time. On this, see Enrico Pappacena, *Da Lucifero al Cristo: Itinerario spirituale d'un uomo 'rinato'* (San Casciano: Casa del Libro, 1933), 427.

160 Rinaldo Küfferle, "Colloquio con Steffen," in Roberto Farinacci's hardcore *Regime Fascista*, 12 December 1937: 5. In the autumn of 1938, Küfferle characterized himself as an Aryan Catholic Fascist; he also emphasized that Steiner was pure Aryan and submitted to the Ministry of Popular Culture a certificate of Steiner's Aryan character. See Küfferle, Letter to the Editor, *Regime Fascista*, 3 October 1938: 3; the letter itself is dated 30 September 1938.

161 Ibid.

162 In the case of Futurists, it seems almost proper to use gender-specific language here, even though they generally—though not always!—admitted that a new woman must emerge alongside the new man if the "new race" were to propagate itself into the more distant future.

163 The importance of the concept of evolution in the Futurist program for the arts influenced Marinetti's choice for his movement's name. Marinetti writes in "Contro l'amore e il parlamentarismo" (1915), "Noi siamo convinti che l'amore —sentimentalismo e lussuria— sia la cosa meno naturale del mondo. Non vi è di naturale e d'importante che il coito il quale ha per scopo *il futurismo della specie*" (We are convinced that love—sentimentalism and lust—is the least natural thing in the world. Nothing is more natural and important than coitus, the purpose of which is *the futurism of the species*). Marinetti, *Teoria e invenzione futurista*, 292–93; emphasis mine.

164 Arnaldo Ginna, "L'uomo futuro" in *Manifesti futuristi e scritti teorici di Arnaldo Ginna e Bruno Corra,* ed. Mario Verdone (Ravenna: Longo, 1984), 222.

165 "Non c'è bisogno di avere una mentalità futurista per seguire la via dell'evoluzione, che abbiamo visto essere una forza a cui nessuno può sottrarsi, ma occorre essere veramente futuristi se si vuol essere qualche cosa di più di una paglia che va alla deriva, trascinata da una invincibile corrente." In ibid., 222.

166 This is analogous to the idea raised by the Futurist-inspired Marshall McLuhan, when commenting on Edgar Allan Poe's "Descent into the Maelstrom"—that if "we keep our cool during the descent into the maelstrom, studying the process as it happens . . . we can get through" (as he put it during his *Playboy* interview with Eric Norden, published in *Playboy Magazine*, March 1969).

167 Ginna, "L'uomo futuro," 234.

168 "precise alchemist," in ibid, 217; "mystics of action," in ibid., 237; "the one I prefer," in Marinetti, *Teoria e invenzione futurista*, 583.

169 Arthur Rimbaud, William Butler Yeats, and Stefan Georg were all vatic poets who possessed a strong sense of having a significant historical role to play. This testifies to the importance of this conception among the Symbolists. (This feature of Symbolism was passed down to the Futurists.)

170 "the best novel possible"; in F.T. Marinetti, *Al di là del Comunismo* (Beyond Communism), in *Teoria e invenzione futurista*, 488.

171 Ibid., 488.

172 F.T. Marinetti, *Gli indomabili* (Milan: Edizioni Futuriste di *Poesia*, 1922). In English: "The Untamables," in *Marinetti: Selected Writing*s, ed. R.W. Flint (New York: Farrar, Straus and Giroux, 1972), 232.

173 See Benito Mussolini and Giovanni Gentile, *Fascism: Doctrines and Institution*s (Rome: Ardita, 1935).

174 Emilio Gentile, "La politica di Marinetti," *Storia contemporanea* 7, no. 3 (September 1974): 426.

175 Marinetti, *I manifesti del futurismo*: "La furente scopa della pazzia ci strappò a noi stessi e ci cacciò attraverso le vie, scoscese e profonde come letti di torrenti. Qua e là una lampada malata, dietro i vetri d'una finestra, c 'insegnava a disprezzare la fallace matematica dei nostri occhi perituri" (4). The translation can be found in "The Founding and Manifesto of Futurism" in Rainey, 49–54 at 49–50.

176 Marinetti, *I manifesti del futurismo*: "Ci avvicinammo alle tre belve sbuffanti, per palparne amorosamente i torridi petti. Io mi stesi sulla mia macchina come un cadavere nella bara, ma subito risuscitai sotto il volante, lama di ghigliottina che minacciava il mio stomaco" (4). Translation in Rainey, 49.

177 Marinetti, *I manifesti del futurismo*: "Io gridai:—II fiuto, il fiuto solo, basta alle belve! E noi, come giovani leoni, inseguivamo la Morte, dal pelame nero maculato di pallide croci, che correva via pel vasto cielo violaceo, vivo e palpitante" (4). Translation in Rainey, 50; "E noi" in the Italian ("And like young lions" in the English) begins a new paragraph in the original.

178 Marinetti, *I manifesti del futurismo*, 24.

179 Gordon J. Melton, ed., *Encyclopedia of Occultism and Parapsychology*, vol. 2 (Detroit: Gale Research, 1991), 1703.

180 Hippolyte Baraduc, *L'âme humaine, ses mouvements, ses lumières, et l'iconographie de l'invisible fluidique* (Paris: Georges Carré, 1896). In English: *The Human Soul: Its Movements, Its Lights, and the Iconography of the Fluidic Invisible* (Paris: G.A. Mann, 1913), 74.

181 Baraduc, *The Human Soul*, 20.

182 Hippolyte Baraduc, in a lecture given in Bar-le-Duc on 25 October 1896. Quoted in the *Annuaire général et international de photographie* (1897): 295. Quoted in Sabine Flach, "Thinking about/on Thinking: Observations on the Thought Photography of the Early Twentieth Century," *Configurations* 18, no. 3 (Fall 2010): 441–58 at 448–49.

183 Hippolyte Baraduc, *The Human Soul*, 44.

184 Ibid., 77; emphasis in original. Perhaps the most renowned thinker and experimenter who raised the possibility of thought-photography (and thought-cinematography) was Nikola Tesla. In 1893, he worked out the idea for a *Gedankenprojektor* (thought projector). He recalled forty years later, "I became convinced that a definite image formed in thought must by reflex action produce a corresponding image on the retina, which might be read by a suitable apparatus. This brought me to my system of television which I announced at the time…My idea was to employ an artificial retina receiving an object of the image seen, an optic nerve and another retina at the place of reproduction…both being fashioned somewhat like a checkerboard, with the optic nerve being a part of the earth." Reported by Carol Bird, "Tremendous New Power Soon To Be Unleashed," *Kansas City Journal-Post*, 10 September 1933; reprinted in T.E. Bearden, *The Solution to Tesla's Secrets and the Soviet Tesla Weapons*, pt. 2: *Reference Articles for Solutions to Tesla's Secrets*, compiled by John Ratzlaff (Greenville: Tesla Book Company, 1981), 101–2.

185 Baraduc, *The Human Soul*, 77–78.

186 Louis Darget, *Photographie de la pensée*, seems to have been a private collection. Articles in which Darget presented his thought photography include "Exposé des différentes méthodes pour l'obtention de photographies fluido-magnétiques et spirites: rayons V[iteaux]," *L'initiation* 84, no. 10 (1909): 1–21; and "Photographie des radiations psychiques" *Le spiritualisme moderne* 2 (20 January 1899): 18.

A fluidal photograph *Planète et satellite* (Planet and Satellite, 1896), produced by having a "Monsieur A." stare at an atlas of the heavens while a photographic plate was glued to his forehead, can be found in Veit Loers, ed., *Im Reich der Phantome. Fotografie des Unsichtbaren* (Ostfildern-Ruit: Hatje Cantz, 1997), 16.

On Darget, see Rolf H. Krauss, *Beyond Light and Shadow: The Role of Photography in Certain Paranormal Phenomena: An Historical Survey*, trans. Timothy Bell and John Gledhill (Munich: Nazraeli Press, 1995), 49–51; Clément Chéroux, "Photographs of Fluids: An Alphabet of Invisible Rays," in *The Perfect Medium: Photography and the Occult*, ed. Chéroux et al. (New Haven: Yale University Press, 2005), 114–38 at 116–22; and Alexandra Lembert, "'Thoughts Are Things': Magical Objects, Objective Magic, and Sax Rohmer's *The Dream Detective* (1920)," in *Magical Objects: Things and Beyond*, ed. Elmar Schenkel and Stefan Welz (Berlin: Galda + Wilch Verlag, 2007), 127–44 at 135–41.

187 A reproduction of the image can be found in Loers, ed., *Im Reich der Phantome*, 83.

188 Flach, "Thinking about/on Thinking," 453. For the quotation from Darget, she cites Charles Proth, *La photographie transcendentale: Les êtres et les radiations de l'espace* (Paris: Bibliothèque Nationale, 1911), 31.

189 Marinetti seems to have experienced fear of his *anima* (if I may borrow Jung's term)—for one thing, he seems to have been at once infatuated and terrified by infants' dependence on breast milk. Weininger's writings helped him rationalize his feeling that to be truly a man, one must be vigilant in struggling against the *anima*.

190 See Alberto Cavaglion, *Otto Weininger in Italia* (Rome: Carucci editore, 1982), 58ff.

191 One is obliged to note that they aligned themselves with a political movement that was racist and that their ideas on evolution and eugenics were downright sexist.

192 And he knew it—in "Against Academic Teachers" (1910), Marinetti wrote, "In our struggle against the professorial passion for the past, we violently reject Nietzsche's ideals and doctrines." In F.T. Marinetti, *Critical Writings: New Edition*, trans. Doug Thompson, ed. Günter Berghaus (New York: Farrar, Straus and Giroux, 2007), 81–84 at 81.

193 Ibid. Note the clear reference to evolution in the last sentence here. This confirms that although much of my discussion of the Futurists' ideas on evolution were from later periods in the movement's history, Marinetti's ideas on the new age and the new man were formed at least contemporaneously with the founding of the movement (if not earlier).

194 In 1988, Simona Cigliana published the article "Occultismo futurista" (Futurist Occult), *Il Ponte: Rivista mensile di politica e letteratura* (Florence) 44 (July–October 1988): 4–5, 195–211, which she later expanded into a book: *Futurismo esoterico: Contribuiti per una storia dell'irrazionalismo italiano tra Otto e Novecento* (Esoteric Futurism: Contributions to History of Italian Irrationalism in the Nineteenth and Twentieth Centuries) (Rome: La Fenice edizioni, 1997). Cigliana deals with a variety of Futurist writers, from Marinetti to the contributors to *L'Italia futurista*. Like the present work, Cigliana's article and book associate the hermetic thrust of Futurist literature with idealist notions taken up by many late-nineteenth- and early-twentieth-century thinkers. And through a method not unlike this work's (of analyzing lexical similarities between Futurist texts and esoteric texts), it relates Futurism's early idolatry of analogy, and its notions of *sintetismo intuitivo* and, ultimately, of *spiritualismo materialistico*, with magic, spiritualism (*spiritismo*), and Steiner's Anthroposophy. On the topic of analogy, synthesis, and Steiner's Anthroposophy, see *Futurismo esoterico*, 173–96. By revealing its connections to a backlash against positivism, Cigliana shows that the

esoteric strain in Futurism was part of the broader European *Zeitgeist*, which viewed science and occult teachings as complementary.

Note that there was an antecedent for Cigliana's article and monograph. Investigation into the esoteric aspects of Futurism began in 1970 with the publication of Germano Celant's brief article "Futurismo esoterico," *Il Verri* 15, nos. 33–34 (October 1970): 108–17; in English: "Futurism and the Occult," *Artforum* 19, no. 5 (January 1981): 36–42. In that article, Celant noted the complex turn-of-the-century cultural milieu in which Futurism was conceived and documented the intense interest that individuals such as Marinetti, Bragaglia, Ginna, Corra, and Boccioni showed for the activities and experiments of spiritual revivalists. Celant also drew attention to the "risks" of carrying out an esoteric reading of Futurism—risks arising from the Futurists' habit of disguising their sources of inspiration and exacerbated by the confounding, on the part of both Futurists and esotericists, of "scienza e spiritualismo, scienza e parascienza, scienza e parapsicologia [science and spiritualism, science and parascience, science and parapsychology]" (113).

195 Archivio Centrale dello Stato—Presidenza Consiglio dei Ministri (Rome). The passage referred to appears at 14/1/8147 (1937–39).

196 Ettore Martinoli, "Gli impulsi storici della nuova Europa e l'azione dell'ebraismo internazionale" *La Vita Italiana*, April 1943, 355–64. This article concluded with a discussion of the "struggle between Fascism and Jewry for the new Europe." While Fascism held the key to "purification from Jewish servitude," the strongest defence against Jewish corruption was "racism, which opposes itself to Judaism." Martinoli wrote,

> Racism has by now established itself in the center of the political, cultural, and ethical development of our century. With the achievement of Aryan racial consciousness, to an extent not seen before now, racism is erecting a barrier against Jewish domination, a barrier that is even more spiritual than political. Racism is also beginning to shape a continental European conscience, the only possible basis for an orderly and harmonious convergence of the peoples of Europe toward a unified civilization. (363)

197 The important Trieste branch of the Anthroposophical Society was made up mostly of Jews; in September 1938, it ceased its activities. It is not certain that Martinoli had a role in closing that branch.

198 Ettore Martinoli, *Liriche e canti* (Poems and Songs) (Trieste: Trani, 1940), 38. See also Martinoli, *Finlandia: Carme moderno* (Finlandia: A Modern Song) (Trieste: Trani, 1940), which includes similar hymns of praise to Mussolini.

199 See, for example, Alfredo Acito and Ettore Martinoli, "In tema di formulazione di una nuova sintesi spirituale," *Tempo di Mussolini*, January 1941, 1058–67.

200 There is a somewhat more recent sympathetic study of the School of Fascist Mysticism, by a follower of Evola, that presents Martinoli's role in the society in a variety of contexts. See Tomas Carini, *Niccolò Giani e la scuola di mistica fascista: 1930–1943* (Niccolò Giani and the School of Fascist Mysticism) (Milan: Mursia, 2009), 39, 124–26, 212, 225. The standard scholarly account is Daniele Marchesini, *La scuola dei gerarchi. Mistica fascista: Storia problemi, istituzioni* (The School of Hierarchs. Fascist Mysticism: History, Problems, Institions) (Milan: Feltrinelli, 1976).

201 Marchesini, *La scuola dei gerarchi*, 178. The title of Martinoli's presentation was "Valore e funzione della mistica nella dinamica della rivoluzione fascista." For thorough documentation of the February 1940 "Convegno nazionale di mistica fascista" in Milan, see

ibid., 164–87. Evola also gave a presentation, titled "Sul concetto di mistica fascista e sui rapporti con la dottrina della razza" (ibid., 183), which was reprinted in the March 1940 issue of the School's journal, *Dottrina Fascista*.

202 The January 1942 issue of *Dottrina Fascista* carried a twenty-two-page supplement, dated December 1941, titled "Atti della scuola di mistica fascista." The text emphasizes the school's ongoing work on "the racial element" and "the Jewish problem" (6) and lists many of its publications on race (12–13). See also the official report "Attività della Scuola di Mistica Fascista nell'anno XVIII" in Scuola di Mistica Fascista, *Dottrina Fascista* (January 1941): 226–48, which begins with Mussolini's ringing endorsement of the school and its work (226–27), an endorsement that emphasizes the crucial importance of "mysticism" and "the life of the spirit."

203 One example is Renzo Sertoli Salis, *Le leggi razziali italiane* (Milan: Scuola di Mistica Fascista, 1940). See also Arthos (pseud. Julius Evola), "Sul significato razziale della mistica fascista," *La Vita Italiana*, April 1940, 397–405; and Leoni Franzi, "Originalità del razzismo italiano," *Dottrina Fascista*, May 1939, 166–71.

204 Ettore Martinoli, *Funzione della mistica nella rivoluzione fascista* (Trieste: Trani, 1940).

205 Ibid., 13.

206 Aniceto del Massa, *Pagine esoteriche* (Esoteric Pages), ed. Angelo Iacovella (Trent: La Finestra, 2001), 44, 52, 75, 90–94. Cf. Michele Beraldo, "Il movimento antroposofico italiano durante il regime fascista," *Dimensioni e problemi della ricerca storia* 1 (2002): 151, who describes del Massa as a "sympathizer of Steiner."

207 Evola had close connections to Futurism. He considered himself to be a supreme painter, and this drew him close to the Futurist circle. Enrico Crispolti describes him as "praticamente allievo" (practically a student) of Giacomo Balla, and he regularly visited Balla's studio in the company of Prampolini, Depero, and the brothers Corradini; see Crispolti, "Giulio Evola," *La Medusa* 40, publication of the Studio d'Arte Contemporanea "La Medusa" in Rome, (November 1963: 1–6 at 2). When he began to paint at seventeen, he adopted a manner of Theosophical abstraction that was heavily influenced by Balla—he referred to himself in this period (1915–18) as an *astrattista futurista*, a Futurist abstractionist. In the next phase (1918–21), he turned to creating works in the manner of the Aleister Crowley circle, who mix abstract forms with astrological, cosmological, and esoteric signs. In this phase, Evola carried on a correspondence with the *Dadaisten* Tristan Tzara (1896–1963), Hans (Jean) Arp (1886–1966), and Christian Schad (1894–1982) and affiliated himself with that movement.

208 *Dallo yoga alla Rosacroce* was published in Rome in 1972 by Perseo. Massimo Scaligero was a pen name—his given name was Antonio Massimo Sgabelloni (also spelled Scabelloni).

The Anthroposophic Press, which publishes some of Scaligero's work in English translation, describes him as "a contemporary Italian spiritual master, who has drunk deep from Western and Eastern traditions. Equally at home by direct experience with Western philosophy and psychology, Western esotericism (Rosicrucianism, Templarism, and Anthroposophy) and Eastern meditative practice (Zen and Tibetan Buddhism), Scaligero created a body of work that will continue to influence spiritual seekers well into the new millennium" (Steiner Books catalogue, 2008).

Scaligero's principal works include *Avvento dell'uomo interiore: Lineamenti di una tecnica dell'esperienza sovrasensibile* (Advent of the Inner Man: Outline of a Technique for Attaining Supersensible Experience) (Florence: Sansoni, 1959); *La via della volontà solare* (The Way of Solar Will) (Naples: Tilopa, 1962); *Segreti dello spazio e del tempo*

(Secrets of Space and Time) (Rome: Tilopa, 1964); *Magia sacra: Una via per la reintegrazione dell'uomo* (Sacred Magic: A Means for Human Integration) (Rome: Tilopa, 1966); *La logica contro l'uomo: Il mito della scienza e la via del pensiero* (Logic against Humanity: The Myth of Science and the Way of Thought) (Rome: Tilopa, 1967); *Die Logik als Widersacher des Menschen: Der Mythos der Wissenschaft und der Weg des Denkens* (Logic as Humankind's Adversary: The Myth of Science and the Way of Thinking) (Stuttgart: Urachhaus, 1991); *Traktat über das lebende Denken: Ein Weg zur Überwindung der abendländischen Philosophien, des Yoga und des Zen* (Tractatus on Living Thought: A Way to Overcome Western Philosophies Through Yoga and Zen) (Stuttgart: Urachhaus, 1993); and *The Light: An Introduction to Creative Imagination* (Great Barrington: Lindisfarne Books, 2001).

209 See Fausto Belfiori, ed., *Massimo Scaligero: Il coraggio dell'impossibile* (Massimo Scaligero: The Courage of the Impossible) (Rome: Tilopa, 1982).

210 Scaligero himself insisted in his autobiography that he was never interested in (or involved in) politics and that he had tried to intervene against the racist campaign. His claims are completely incompatible with the historical record. Cf. Scaligero, *Dallo yoga alla Rosacroce*, 92–97. Even here, Scaligero maintained "the ethical validity of the positions I held" in the Fascist era (93) and stressed, "I still believe the same things about race that I believed back then" (96).

211 Massimo Scaligero, "La razza e lo spirito della Rivoluzione" (Race and the Spirit of Revolution), *La Vita Italiana*, May 1939: 601–5 at 602.

212 The only police file on Scaligero consists of a single page from the brief interregnum after the fall of Mussolini's first regime in mid-1943, produced just days before German troops occupied central and northern Italy. That document, an unsigned memorandum (from Rome, 6 September 1943), indicates that Scaligero continued his Fascist activities even after they were officially out of favour. The memorandum describes his "advanced Fascist sentiments," his racial publications, and his contacts with German officials, and says that he is still conducting "skillful propaganda on behalf of Fascism" (Archivio Centrale dello Stato, Polizia Politica, fascicolo personale, b. 1223, f. Scaligero Massimo).

213 Massimo Scaligero, "Omogeneità e continuità della razza italiana" (The Homogeneity and Continuity of the Italian Race), *La difesa della razza* (The Defence of the Race), 5 June 1939, 38–40; the quoted passages are on 38 and 40 (in the opening and closing paragraphs of the text).

214 In Rainey, 50.

215 Portions of "Uccidiamo il chiaro di luna!" were published in French in *Poesia* 5, nos. 7–9 (August–October 1909). It was also published as an independent leaflet in French and contemporaneously in Italian, under the title just cited. The piece appears in an English translation in Rainey, 54–61.

Claudia Salaris shows that the sea "costituisce la figura-cardine nella poetica marinettiana e la proiezione stessa dello scrittore, che ironizzando sull'omofonia tra il suo nome e il mare amava definirsi 'Marinetti nettamari delle alghe morte'" (constitutes the cardinal figure in Marrinetti's poetry and the projection of the author, who, through the homophony of his name and the sea, called himself "Marinetti, who cleans the sea of dead algae"). See Salaris, *Marinetti: Arte e vita futurista* (Rome: Editori Riuniti, 1997), 4. Marinetti's early (1904) Symbolist poem "Les babels du rêve" in *Destruction: Poèmes lyriques* (Paris: Librairie Leon Vanier, 1904), 35, associates the sea with destruction/ablution/purgation. For example, near the beginning it associates the sea with African witchcraft ("en l'Afrique sorcière"), which puts the unnamed protagonists

("nous") under "la garde sévère des prêtres noirs. / O silhouettes d'encre qui tachaient les soieries" (under the strict guard of black priests. / O silhouettes of ink staining silks), suggesting that Italian (European) *passitismo* will be destroyed by the ablutions of primitivist renewal and by being subjected to *negredo*. It also describes the sea as "écumante et sauvage" (foaming and wild) (38); alludes to its destructiveness and its power to dissolve identity by referring to it as a "ballerine orientale au ventre sursautant, dont les seins sont rougis par le sang des naufrages" (oriental dancer with a leaping stomach [the poem is an Orientalist work], whose breasts are reddened by the blood of all the shipwrecks) (37; cf., alchemists on *rubedo*); and offers a magical description of it: "ô Mer / comme une folle en des sursauts de rage, / tu agitais tes bras d'ivoire cliquetants d'amulettes, / tout en claquant des dents, galets sonores / … [ellipsis in original] cependant que la Nuit lentement conquérait la plage / comme une pieuvre colossale aux ventouses d'or" (o Sea / you'd shake your rattling amulets ivory arms, / while chattering teeth, sounding rollers / like mad outbursts of rage, / … / while the Night slowly conquering the beach / like a colossal octopus with golden suction cups) (38–39).

The alchemical interests of the young Symbolist poet Marinetti might be easy to assent to. But did he abandon those interests when he became the prophet of machine culture? I think that writings from time of "Fondazione e Manifesto del futurismo" to that "La guerra elettrica" show he did not.

216 Titus Burckhardt, *Alchemy: Science of the Cosmos—Science of the Soul* (Harmondsworth: Penguin Books, 1967), 183–89. The goal of this spiritualization is to recover the original purity and receptivity of the soul. This likely relates to the Futurists' interest in the revitalization of culture by returning it to its archaic ("black") condition.

217 F.T. Marinetti, *Mafarka the Futurist: An African Novel* (1910), trans. Carol Diethe and Steve Cox (London: Middlesex University Press, 1998), 23. One would have thought the reference to the juices extracted by the solar wheel might have been enough of a clue for scholars to recognize the alchemical strain in *Mafarka the Futurist*, but with very few exceptions, that seems not to have been the case.

218 Ibid., 153.

219 Alchemical accounts suggest that the transformation of baser metals into silver (and, after that, to gold) occurs through stages that include several phases of blue, from dark-blue to silvery-blue; the egg is such a common alchemical image that it has a name, the Alchemical Egg; it is akin to the Philosopher's Stone.

220 In the 1990s, Giovanni Lista discovered a film script, *Velocità*, that Marinetti wrote, probably somewhere between the end of 1917 and the middle of 1918. He remarks about it that "the themes of sun and light as fertilizing forces and generators of future can be better understood when referred to Marinetti's Egyptian childhood." See "Velocità" (1915–19?), in "Oltre l'autore 1," special issue of *Fotogenia* (1996), ed. Alberto Boschi and Giacomo Manzoli: 15–25. Michael Syrimis notes that images of light, sun, yellow, and gold (as well as date palms and huts) appear as well in Marinetti's *Il fascino dell'Egitto* (The Charm of Egypt) (Verona: A. Mondadori, 1933). See also Syrimis, *The Great Black Spider on Its Knock-Kneed Tripod: Reflections of Cinema in Early Twentieth-Century Italy* (Toronto: University of Toronto Press, 2012), 111.

221 The passage presenting she-Mafarka being penetrated by the he-sun appears in *Mafarka the Futurist*, 131.

222 Ibid., 146. It would be hard to imagine a more thorough amalgam of evolutionary and alchemical convictions than this misogynist statement.

223 The phrase "total music" appears in ibid., 205.

224 As regards the terra-cotta face, see ibid., 8

225 In Rainey, 49.

226 In ibid.: "like villages on holiday," 49; "Alone with the stokers," 49; "alone with drunkards," 49; "large double-decker trams," 49; "red-hot iron of joy," 50; "shipyards burning under violent electrical moons," 51.

The passage "Suddenly we jumped at the tremendous noise of the large double-decker trams which jolt along outside, shimmering with multicolored lights, like villages on holiday which the flooding Po suddenly strikes and uproots, dragging them all the way to the sea, over waterfalls and through gorges" is fascinatingly overdetermined. It describes the experience of being overwhelmed and swept away by an onrush of energy. The image of the flood has alchemical significance. Note, too, the suggestion that experience is synaesthetic: Marinetti juxtaposes references to the sound of a tram and to the lights on it (that likely entered into the room together).

227 Ibid., 50–51.

228 Ibid., 51.

229 Ibid., 52–53.

230 Ibid., 50.

231 Ibid.

232 Ibid., 51.

233 On this topic, see Claudio Fogu, "Futurist *Mediterraneità* between *Emporium* and *Imperium*," in *Modernism/modernity* 15, no. 1 (2007): 28–29. The reference to extracting the Futurist metal for the volcanic forge appears on page 29 of this article; Fogu cites Marinetti, *Teoria e invenzione*, 267, as the original source.

234 Marinetti quotes this passage in "Geometrical and Mechanical Splendor," in Rainey, 175–81 at 180; the cited passage appears there in italics and as part of a parenthetical remark.

235 Arnaldo Ginna, "Brevi note su Evola nel tempo futurista," in *Testimonianze su Evola*, 2nd ed., ed. Gianfranco de Turris (Rome: Edizioni Mediterranee, 1973), 135–37.

236 Jobbik's president is Gábor Vona (b. 1978). Vona's Steve Bannon is Tibor Imre Baranyi (b. 1967), who owns the Kvintesszencia publishing house, which in 2012 published a compilation of Evola's work. Vona himself wrote the introduction to that volume.

237 This cyclical view of history is expounded William Strauss and Neil Howe in *The Fourth Turning: What the Cycles of History Tell Us about America's Next Rendezvous with Destiny* (1997), a key influence on Donald J. Trump's former senior advisor Steve Bannon.

238 Renato Barilli, "The Birth and Evolution of the Contemporary Age," in *The Science of Culture and the Phenomenology of Styles*, trans. Corrado Federici (Montreal and Kingston: McGill–Queen's University Press, 2012), 84.

239 Ibid., 92.

240 Heinrich Wölfflin, *Principles of Art History: The Problem of the Development of Style in Later Art* (New York: Dover Publications, 1932). Only some aspects of Wölfflin's discussion of the transformations in visual form that occurred as Baroque art replaced Renaissance support this comparison. For example, Wölfflin shows that in this development, planar recession gives way to linear recession; Barilli sees electromagnetic art as returning to a form of composition that resembles planar recession, though in electromorphic art the planar compositions are almost completely flattened—in this case, a feature of the art of the earlier period characterizes electromorphic art. On the other hand, Wölfflin shows that the use of open or atectonic form (as opposed to closed

or tectonic form) and of relative (rather than absolute) clarity characterizes Baroque art; both are also features of art of the eletrological era—in this case, features of the art of the later period characterize electromorphic art. But here I am emphasizing electrological art's repudiation of linear composition. Furthermore, Wölfflin's formal taxonomy provides the terms in which Barilli thinks about the development of electromorphic art.

241 Barilli, *The Science of Culture*, 126.

242 Umberto Boccioni, "The Plastic Foundations of Futurist Sculpture and Painting" (1913), in Rainey, 139–42 at 140–41. In Italian: "Fondamento plastico della scultura e pittura futuriste," in *Gli scritti editi e inediti*, ed. Zeno Birolli (Milan: Feltrinelli, 1971), 39–44 at 40–42.

243 Ibid., 141 in the English translation, 42 in the Italian original.

244 One might feel entitled to consider this as giving voice to a narcissism of small differences, by exaggerating the differences between Boccioni's and the Symbolists' ideas about higher reality (which in the end are rather slight). If one is inclined to interpret this statement in that manner, he or she might consider how adamantly Boccioni must have believed that the Futurists fundamentally transformed the metaphysics of Symbolism by introducing into its vibratory metaphysics the concepts of force, power, and speed.

245 Boccioni, "La pittura futurista," 29.

246 Ezra Pound, the final four lines of Canto 74 in *Cantos* (New York: New Directions, 1970), 449. The historian of science Bruce J. Hunt does a splendid of job of relating lines of force and vortices in the aether to the analytic theory of heat in his "Lines of Force, Swirls of Ether," in *From Energy to Information: Representation in Science, Technology, Art, and Literature*, ed. Bruce Clark and Linda Dalrymple Henderson (Stanford: Stanford University Press, 2002), 99–113.

247 Ezra Pound, "Affirmations: Vorticism," *The New Age* 16, no. 11 (14 January 1915): 277–78 at 277; collected in *Ezra Pound and the Visual Arts*, ed. Harriet Zinnes (New York: New Directions, 1980), 7.

248 Pound alludes to Guido Cavalanti's *Philosophic Canzone*—the passages cited here are all translated in Canto 36: "mezzo oscura [luce] rade"—often given in the literature on Pound as "in the midst of darkness, [light] shines infrequently," though more accurate would be "within darkness, light is erased"; "risplende in sè perpetuale effecto"—shines in itself, a Perpetual Effect; "a lui si tiri"—draws to itself.

249 Ezra Pound, "Medievalism," a section of "Cavalcanti" (1931), in *Literary Essays of Ezra Pound* (London: Faber, 1960), 154–55. The background to Pound's theory of the vortex has hardly been recognized (but see Bruce Hunt and Antje Pfannkuchen). In 1858, Helmholtz published "Über Integrale der hydrodynamischen Gleichungen, welche den Wirbelbewegungen entsprechen" (On Integrals of Hydrodynamic Equations, Which Correspond to Vortex Motions) in *Journal für die reine und angewandte Mathematik* 55 (1858): 25–55. His work on fluid mechanics introduced the idea of vortex filaments, sheaves that bundle together many vortex lines (which are everywhere tangent to the vorticity vector). An important part of this work involved studying the behaviour of these filaments when they cross an infinitely small surface element of the fluid: he noted that these vortex filaments are conserved during the flow evolution, though they are usually stretched or distorted. He commented on the "remarkable analogy between vortex-motion of fluids and the electro-magnetic action of electric currents" and demonstrated that vortices exert forces on one another and that those forces take a form reminiscent of the magnetic forces between wires carrying electric current.

Helmholtz's paper set three friends to work on applying the great German physicist's findings on fluid flow to atomic theory and electromagnetic theory. One of these friends was James Clerk Maxwell, who described Helmholtz's interest as being concerned with "water twists"; another was William Thompson; the third was Peter Guthrie Tait (1831–1901), a Scottish mathematical physicist with whom Thompson wrote the *Treatise on Natural Philosophy*. Tait's was probably the truly pioneering work of investigating fluid vortices: He observed the following phenomena:

1. Vortex rings behave as independent solids.
2. In collision with one another, the vortex rings rebounded as if they were quivering elastic solids, like rings of rubber.
3. [Tait used smoke rings to illustrate the properties of vortices to his audience and] these smoke rings illustrated fascinating vibration modes about their circular form.
4. On each attempt to cut the smoke rings with a knife, the smoke rings would simply wriggle around the knife. The smoke rings were indivisible.

I have quoted these points from Samuel L. Lomonoco, "The Modern Legacies of Thompson's Atomic Vortex Theory in Classical Electrodynamics," *American Mathematical Society—Proceedings of Symposia in Applied Mathematics* 51 (1996): 145–66 at 146.

Thompson was in the audience when Tait gave the series of lectures expounding his work on knot theory and vortices. Thompson worked at the beginning of the age of modern atomic theory and was deeply engaged with its issues. He was intrigued by the permanence of these knots, so he asked himself whether atoms might be vortices in an aether that he (like most other scientists of his era) presumed pervades space. He became convinced that a vortex ring in a perfect fluid would possess perfect elasticity. The postmodern idea of infinite plasticity had found a scientific basis in this vorticial analysis of flow evolution.

Recall my contention that postmodern metaphysics considers matter to be congealed energy: we can now describe this more exactly: matter is the result of energy being whirled into semi-stable (knot) forms. This belief formed the basis of Pound's idea of the vortex, and it explains as well the deep meaning of the adage "every force evolves a form."

250 Reported in Andrew J. Norton and John Bolton, eds., *Dynamic Fields and Waves* (Boca Raton: CRC Press, 2000), 83.

251 Alfred North Whitehead, *The Concept of Nature* (Cambridge: Cambridge University Press, 1964), 146.

252 Alfred North Whitehead, *An Enquiry Concerning the Principles of Natural Knowledge*, 2nd ed. (1919) (New York: Dover Publications, 1982), 62.

253 Albert Einstein, "Maxwell's Influence on the Development of the Conception of Physical Reality," in *James Clerk Maxwell: A Commemorative Volume*, ed. J.J. Thomson (New York: Cambridge University Press, 1931), 67–73 at 71.

254 The Bergson quotation—"Il faut tenir compte de ce que percevoir finit par n'être plus qu'une occasion de se souvenir"—is from *Matière et mémoire* and appears in Bergson, *Œuvres*, vol. 3, 213. The phrase was quoted by Severini in his introduction to the catalogue for the exhibition of his paintings in London in April 1913, "Le analogie plastiche del dinamismo. Manifesto futurista" (1913–14); reprinted in *Archivi del Futurismo*, ed. Gambillo and Fiori, vol. 1, 113.

255 Boccioni et al., "La pittura futurista: Manifesto tecnico," in Marinetti, *I manifesti del futurismo*, 27–31, at 27. In English: in *Concepts of Modern Art*, ed. Richardson and

Stangos (Harmondsworth: Penguin Books, 1974), 99. I have used this translation, rather than the one in Apollonio, or in Rainey, because it highlights more effectively the point I am making.

256 Aiken, "The Cinema and Italian Futurist Painting." I should stress, lest there be any misunderstanding, that Aiken does not connect these two features of Futurist art to the persistence of vision, but that he does relate them to the cinema. I would justify connecting those features to the persistence of vision by pointing out that several Futurist manifestos reflect on the multiplication of images and generally relate this multipication to the psychophysiological process Roget examined.

The connection between the cinema and multiplied forms in these passages is sometimes difficult to grasp and, perhaps, seemingly far-fetched—but no more far-fetched than many other, more explicit linkages in Futurist manifestos. The core idea, I think, is that cinema provided a mechanical model that linked together repetition (the nearly exact duplication of forms), speed, life (what moves is alive, so the cinema shows that life can be multiplied), electricity, and the overcoming of space and time (the cinema proves that lives can be reborn across space and time). In "La pittura futurista: Manifesto tecnico," Boccioni and colleagues describe an art that is about to be born—an art we could well say possesses key qualities of the cinema—and in that description, the idea of multiplication is assigned a prominent role. I return to a passage I have already commented on, but this time to detect the allusions to the connection between electromorphism and the multiplication of forms:

> How is it possible still to see the human face as pink, now that our life, *redoubled by noctambulism,* has *multiplied our perceptions* as colorists? *The human face is yellow, red, green, blue, violet*. The pallor of a woman gazing in a jeweler's window is more iridescent than the *glistening prisms* of the jewels [prisms shatter/multiply forms] that fascinate her. [Could anyone read this without thinking of reverberations, a phenomenon arising from the propagation and reflections of waves?]
>
> The time has passed for our sensations in painting to be whispered. We will make them sing and shout on our canvases, which will sound forth deafening and triumphant flourishes [note the *topos* of synaesthesia, which interested thinkers of the era partly because both sound and light/colour are electromagmetic phenomena].
>
> Your eyes, accustomed to semidarkness, will soon open to more radiant vision of light [this light resembles that depicted in Balla's Divisionist canvas *Lampada ad arco*, Street Light; Balla put 1909 on the painting, but it was actually painted 1910–11]. The shadows that we shall paint will be more luminous than the highlights of our predecessors, and our pictures, next to those of the museums, will shine like blinding daylight compared with deepest night [painting will become truly iridescent, truly radiant, because of electricity]. (in Rainey, 66; emphases mine)

In "Noi rinneghiamo i nostri maestri simbolisti ultimi amanti della luna" (1911), Marinetti declares, "With us begins the reign of the man whose roots are cut, *the multiplied man who merges himself with iron, is fed by electricity*, and no longer understands anything except the sensual delight of danger and quotidian heroism" (ibid., 94; emphases mine). Of course, the figures that appear in films are fed by electricity, merged with iron (the cinematic apparatus, including the metal camera), and rarely understand anything except the sensual delight of danger and quotidian heroism.

Again, in "La guerra elettrica (Visione-ipotesi futurista)" (1911), we read, "We are creating the new aesthetics of speed. We have almost abolished the concept of space and notably diminished the concept of time—We are thus preparing *the ubiquity of*

*multiplied man*" (ibid., 99; emphasis mine). Here the multiplied man is the man (and here, this gender specificity reflects the views of the original Futurists) who has become fused with the machine and who can replicate himself mechanically. This multiplication is connected with the spiritual (occult) power of speed, which can abolish space and time; thus, it is associated with the cinema.

In Marinetti's "Risposta alle obiezioni" (supplement to "Manifesto tecnico della letteratura futurista") (May 1912), we read,

> **Every noun must have its double** [must be multiplied], which is to say, every noun must be immediately followed by another noun, with no conjunction between them, to which it is related by analogy. Example: man—torpedo boat, woman—bay, crowd—surf, piazza—funnel, door—faucet.
>
> Just as *aerial speed has multiplied our experience* of the world, perception by analogy is becoming more natural for man. It is imperative to suppress words such as *like*, *as*, *so*, and *similar to*. Better yet, to merge the object directly into the image which it evokes, foreshortening the image to a single essential word. (Rainey, 120; the bolded emphasis is Marinetti's and the italicized emphases are mine)

Perception by analogy is the essence of cinema: one image is juxtaposed to another, without any conjunction being necessary.

Luigi Russolo predicts the future human will have acquired the capacity to discern every individual vibratory frequency in the complex that constitutes a rich sound, and compares this with the augmented ability to see the different phases of movement the cinema captures in a shot—this ability will involve a multiplied sensibility that can grasp simultaneously many analogous forms, as the persistence of vision does. Futurist painters, he asserts, have begun to present the different phases that constitute a movement.

> We therefore invite young musicians of talent and audacity to listen continually and carefully to all noises in order to understand the *various rhythms* that go into their making, their principal tone, and their secondary ones [the frequencies—that is, periodic repetitions, which can be considered to be accelerated rhythms—that make up a tone are multiple]. Then, by comparing their various timbres with those of sounds, they'll be persuaded how much more numerous are the former than the latter. This will not only give us an understanding of noises, but also a taste and a passion for them. Our *multiplied* sensibility, having already been conquered by the eyes of the Futurists, will at last have Futurist ears. In this way the motors and the machines of our industrial cities will one day be able to be consciously attuned, so that every factory will be made into an intoxicating orchestra of noises. ("L'arte dei rumori" manifesto [March 1913], in Rainey, 137; emphases mine)

In a similar vein, "Distruzione della sintassi—Immaginazione senza fili—Parole in libertà" lauds "Man *multiplied* by the machine. New mechanical sense, a fusion of instinct with the output of a motor and forces that have been mastered; the life forms in the cinema are humans *multiplied* by the machine, and possess a new mechanical sense, and represent the fusion of instinct with the output of a motor" [emphases mine]. Moreover, the technique of *parole in libertà* promises to convert literature into a highly cinematic form, based on analogies: there Marinetti refers to "**Sums of vibrations—Knots of thought** [think of vortices]" and "**Movements in two, three, four, five different rhythms**" and "**telegraph poles that sustain the cable of intuitive wires**" (ibid., 147; emphases in original).

In a later manifesto, the "Manifesto della danza futurista" (Manifesto of Futurist Dance, July 1917), Marinetti states,

> We Futurists prefer Loie Fuller and the African American "cakewalk" (utilization of electric lights and mechanical movements).
>
> One must go beyond muscular possibilities and aim in the dance for that ideal multiplied body of the motor that we have so long dreamed of. Our gestures must imitate the movements of machines assiduously paying court to steering wheels, tires, pistons, and so preparing for the fusion of man with the machine, achieving the metallism of Futurist dance. (Rainey, 236)

The connection between the persistence of vision and the multiplication (repetition of images) also highlights an important error that is often made in discussions of Futurism. This use of repetition/multiplication is often attributed to the influence of Étienne-Jules Marey (1830–1904). However, the persistence of vision is not a factor in the multiplication of forms that we see in Marey's chronophotography: it is a phenomenon that involves presenting slightly different images, one after another, as happens with the zoetrope and the cinema, but not with chronophotography. (Marey certainly influenced Anton Guilo Bragaglia, but some Futurists expressed distain for his chronophotography.)

257 Umberto Boccioni, "Fondamento plastico della scultura e pittura futuriste," *Lacerba*, 15 March 1913. In English: "The Plastic Foundations of Futurist Sculpture and Painting," in Rainey, 142.

258 Carlo Carrà, "Piani plastici come espansione sferica nello spazio" (Plastic Planes as Spherical Expansion in Space), *Lacerba* 1, no. 6 (15 March 1913): 53–55; reprinted in *Archivi del futurismo*, vol. 1, ed. Gambillo and Fiori (Rome: De Luca, 1958), 145–47 at 146; quoted in Didier Ottinger, ed., *Futurism* (Milan: Centre Pompidou and 5 Continents Editions, 2008), 146. We will see that this declaration can be understood as an affirmation aligning Futurism with Maxwell's electromagnetic reality, not the Newtonian reality of the Cubists.

259 Although for the Romantics the inner being of an object was an immutable essence.

260 "il selvaggio, il bambino, il delinquente, il pazzo è il genio" as "gli ultimi resti dell'uomo originario e originale—dell'uomo vero." See *Archivi del Futurismo*, vol. 1, ed. Gambillo and Fiori (Rome: De Luca, 1958), 131.

261 For commentary on the works in the exhibitions in Paris and London, see C. Baumgarth, "Die Anfänge der futuristischen Malerei," in *Mitteilungen des Kunsthistorischen Institutes in Florenz* 11 (1964): 167–92. For comments on the press reception of the London show (and its relation to the trade in Futurist painting), see Barbara Pezzini, "The 1912 Futurist Exhibition at the Sackville Gallery, London," *Burlington Magazine* 155 (July 2013): 471–75.

262 Boccioni et al., "The Exhibitors to the Public," in Rainey, 106–7.

263 The spectator must reconcile the verticality of the major force-lines and the relative clarity of the figures in *Those Who Stay* with the diagonality of the major force-lines and the indistinctness of the figures in *Those Who Go* (Boccioni uses this indistinctness to suggest that these individuals had ephemeralized into pure activity)—this contrast indicates the difference between the feelings of the two groups.

264 Quoted in Tisdall and Bozzolla, *Futurism*, 43–44.

265 One could point out numerous parallels between Wassily Kandinsky's paintings of this period and those of the Futurists. A work to highlight when considering that topic

would be Kandinsky's *Improvisation 28 (zweite Fassung)* (Improvisation 28 [second version], 1912). That work is polarized (cf. magnetic poles) between the left and right sides of the painting: the forms on the left are in tumult, while on the right is a conflict-free zone whose spiritual bliss is suggested by an embracing couple and a church (*eros* and religion). Though the painting is nearly a work of pure abstraction, it contains forms that allude to the real world: for example, wave forms suggested by a boat and water waves but resembling *linee di forza* transport the eye from left to right, signifying the historical transformation to occur. Electromagnetic forces will take the world from tribulation to redemption.

266 Quoted in Tisdall and Bozzolla, *Futurism*, 44.

267 Max Kozloff, *Cubism/Futurism* (New York: Charterhouse, 1973), 151.

268 I think this comment supports my earlier claim that Strauven was off the mark when she compared Marinetti's ideas of analogy to Eisenstein's idea of montage.

269 "L'analogia non è altro che l'amore profondo che collega le cose distanti, apparentemente diverse ed ostili. Solo per mezzo di analogie vastissime uno stile orchestrale, ad un tempo policrono, polifonico, e polimorfo, può abbracciare la vita della materia…Quanto più le immagini contengono rapporti vasti, tanto più a lungo esse conservano la loro forza di stupefazione. Bisogna—dicono—risparmiare la meraviglia del lettore. Eh! via! Curiamoci, piuttosto, della fatale corrosione del tempo, che distrugge non solo il valore espressivo di un capolavoro, ma anche la sua forza di stupefazione." This is taken from the "Manifesto tecnico della letteratura futurista," which Marinetti wrote in collaboration with Pascoli, Guido Gozzano (1883–1916), Gian Pietro Lucini (1867–1914), and Aldo Palazzeschi (1885–1974). It was originally printed as "Manifeste technique de la littérature futuriste," on 11 May 1912, and then, in Italian, as the preface to *I poeti futuristi* (The Futurist Poets) (Milan: Edizioni di Poesia, 1912); it is included in Marinetti, *I manifesti del Futurismo*, 88–96 at 89–90. In English: in Rainey, 118–25 at 120–21.

270 Marinetti, "Distruzione della sintassi," 137. Marinetti's remarks here presage recent comparisons between the mind and the database and applications of database technology in artmaking.

271 "Per dare i movimenti successivi d'un oggetto bisogna dare la *catena delle analogie* che esso evoca, ognuna condensata, raccolta in una parola essenziale" ("Manifesto tecnico della letteratura futurista," 90; emphasis in original). In English: in Rainey, 121.

272 Marinetti, "Manifesto tecnico della letteratura futurista," 93.

273 See Marinetti, *Teoria e invenzione futurista*, 44.

274 Boccioni et al., "Futurist Painting: Technical Manifesto," 64–67.

275 Wanda Strauven, "Futurist Images for Your Ear: Or, How to Listen to Visual Poetry, Painting, and Silent Cinema," in "The Synaesthetic Turn," special issue of *New Review of Film and Television Studies* 7, no. 3 (2009): 275–92.

276 The era developed a remarkably lively interest in synaesthesia. This is understandable: an era that takes all sensation to be the results of electromagnetic vibration would be prone to believe (despite Helmholz's doctrine of specific nerve energy) in the possibility of cross-modal sensation.

277 Come abbiamo ammesso, e ammettiamo tuttora al senso ottico umano la conoscenza delle vibrazioni cromatiche da fonte luminosa, così deve essere accettabile il principio scientifico che dimostra come esistano nell'atmosfera e siano suscettibili al nostro senso ottico vibrazioni cromatiche originate da fonti sonore, forze entrambi di un valore influenzabile sull'atmosfera e quindi sui sensi umani…

[A]vendo parlato sempre di vibrazioni, e trattandosi di dinamismo atmosferico, le vibrazioni spostate da una forza non potranno avere per equivalente un colore, ma una moltitudine di colori, sapendo anche che l'atmosfera è composta di sette colori e che le vibrazioni sono una scomposizione di questa.

Concludendo dunque, non è assolutamente vero né possibile che un suono, un rumore, un gesto, una parola, un odore abbiamo per equivalente un colore, ma più col- ori, come non è vero che quanto più le vibrazioni atmosferiche sono violente, il colore di esse sia più intenso e quindi più visibile. (Enrico Prampolini, Palma Bucarelli, and Maurizio Calvesi, *Enrico Prampolini* [Rome: DeLuca, 1961], 33)

278 Umberto Boccioni, *Estetica e arte futuriste* (Milan: Balcono, 1946), 182–83. It seems that Boccioni coined the expression *pittura degli stati d'animo*, then sketched out the contours of a theory of such painting. Only after that (in 1911–12) did he produce his *stati d'animo* paintings and sculpture, including the three paintings just discussed: *Stati d'animo: Gli addii*; *Stati d'animo: Quelli che vanno*; and *Stati d'animo: Quelli che restano*.

279 The French original:

> Une foule d'intrus m'envahit et m'habite,
> Car j'ai perdu les clefs qui fermaient mon esprit.
> (Romains, *La vie unanime*, 131)

280 The French original:

> Je suis comme un morceau do sucre dans ta bouche,
> Ville gourmande. Mais je n'ai pas peur de toi.
> …quelle joie
> De fondre dans ton corps immense où l'on a chaud!
> (Ibid., 135)

281 Marinetti, "Fondazione e Manifesto del futurismo," 6; in English: in Rainey, 51. Bergson maintained that there are "deux manières profondément différentes de connaître une chose"; "De la première connaissance on dira qu'elle s'arrête au *relatif*; de la seconde, là où elle est possible, qu'elle atteint l'*absolu*." Bergson, "Introduction à la métaphysique," 1.

282 F.T. Marinetti, "La nuova religione-morale della *velocità*" (leaflet), May 1916. In Marinetti, *Teoria e invenzione futurista*, 130–37 at 133. In English: "The New Religion-Morality of Speed," in Rainey, 224–29 at 226.

283 Ibid.

284 McLuhan, *Understanding Media*, 5.

285 Ibid., 305.

286 McLuhan, "Living at the Speed of Light," 32.

287 Quoted in Derrick De Kerckhove and Christopher Dewdney, *The Skin of Culture: Investigating the New Electronic Reality* (London: Kogan Page, 1997), 205.

288 Michael A. Moos, "McLuhan's Language for Awareness under Electronic Conditions" in *Marshall McLuhan Essays—Media Research: Technology, Art, Communication (Essays by Marshall McLuhan)*, ed. Michael Moos (Amsterdam: Overseas Publishers Association, 1997), 140–66 at 159.

289 Ibid., 160.

290 Daniel-Henry Kahnweiler, *Der Weg zum Kubismus* (Munich: Delphin-Verlag, 1920), 53.

291 Bergson, *Matter and Memory*, 20.

292 Bergson, *La pensée et le mouvant*, 181; also *Œuvres*, 1537.

293 Bergson, *Introduction to Metaphysics*, 1.

294 Umberto Boccioni, *Pittura scultura futuriste (dinamismo plastico)* (Milan: Edizioni futuriste di *Poesia*, 1914). Reprint, Florence: Vallechi, 1977), 186. Collected in *Gli scritti editi e inediti*, 146. In English: as "Absolute Motion + Relative Motion = Dynamism," in Rainey, 187–94 at 188.

295 Ibid. Emphasis in original.

296 Boccioni, *Pittura scultura futuriste*, 118; *Gli scritti*, 122.

297 Cubism involves "un procedimento razionale che vive nella relatività non in un assoluto intuitivo." Ibid.

298 Boccioni, "Plastic Dynamism" (1913), in *Futurist Manifestos*, ed. Apollonio, 92–95 at 94. © 1970 Verlag M. Dumont Schauberg, Cologne, and © 1970 Gabriele Mazzotta editore, Milan. English translation © 1973 by Thames & Hudson Ltd., London. Reproduced by kind permission of Thames and Hudson. In Italian: "Dinamismo," Chapter 10, in Boccioni, *Pittura scultura futuriste (dinamismo plastico)*, in *Gli Scritti*, 149–53 at 151.

The Italian American experimental artist Aldo Tambellini (b. 1930), who was educated in Italy, would adopt and modify Boccioni's claim that the Futurists were "the primitives of a new and completely transformed sensitivity," by including the words "we are the primitives of a new era" in a painting (part of his *Manifestos* series) he did in 1962, which he titled with that same expression—the "we" referred to are likely the members (Ron Hahne, Elsa Tambellini, Don Snyder, Ben Morea, and, later, Jackie Cassen and Peter Martinez) of the Group Center, with which he was affiliated at the time. The people involved with Group Center engaged in intermedia explorations, combining poetry, photography, choreography, and filmmaking. Tambellini's own work brought together slide projections, film, performance, and music into actions he called "Electromedia."

299 Boccioni, *Pittura scultura futuriste*, 196–99; *Gli scritti*, 150–51. Emphases in original.

300 Letter from Boccioni to Nino Barbantini, 12 February 1912, in *Archivi del Futurismo*, vol. 2, ed. Maria Drudi Gambillo and Teresa Fiori (Rome: De Luca Editore), 40; *Gli scritti editi e inediti*, 346–47. I have introduced the emphasis. Chronologies ascribed this letter to September 1910, but as Christine Poggi astutely points out in *Inventing Futurism*, 296, it almost certainly was written early in 1911, since in it, Boccioni writes of his painting *Lavoro*, which he painted in 1911, being almost finished.

301 Boccioni, *Pittura scultura futuriste*, 181; *Gli scritti*, 145.

302 Note that this paragonal statement accords a higher value to the visual arts and a lower value to the literary arts. There are several reasons for this judgment on the part of Futurists, but the reason given here is that literature's proclivity towards narrative is greater, and when visual forms become anecdotal, they are basically imitating literature and are not being true to their own material natures.

303 U. Boccioni, "Moto assoluto e moto relativo," Chapter 9 of *Pittura scultura futuriste*, 182; *Gli scritti*, 145–46.

304 "vecchie emozioni statiche e nostalgiche." Boccioni, "Appunti per un diario," in *Altri Inediti*, 63. One thinks of Michelangelo Antonioni's famous introduction to *L'avventura* at the Cannes Film Festival of 1960.

305 "le violente emozioni del moto e della velocità" and "ispirare idee plastiche nuove." Boccioni, *Gli Scriti*, 89.

306 "primitivi di una nuova sensibilità completamente trasformata" (ibid., 132, 191, 423); "l'eterno rinnovamento della vita" and "l'energia sovrumana" (ibid., 89, and in *Pittura scultura futuriste*, 30).

307 Boccioni, *Gli scritti*, 344–45.

308 Ibid., 201.

309 Boccioni, *Pittura scultura futuriste*, 220; *Gli scritti*, 158.

310 McLuhan, *Understanding Media*, 141.

311 Marinetti, *I manifesti del futurismo*, 28.

312 Boccioni might have adopted this conviction from Charles Richet's metapsychic (parapsychological) study. Richet's best-known work, *Traité de métapsychique* (Paris: Felix Alcan, 1922), was still in the future when the Futurist painters wrote their technical manifesto. But Joseph Maxwell had issued early reports on work in the area of metapsychics in *Metapsychical Phenomena: Methods and Observations* (London: Duckworth, 1905), which appeared with a preface by Richet as the leading researcher in the field. (Moreover, between 1876 and 1882 Richet did extensive work at the laboratory of Étienne-Jules Marey and Marcelin Berthelin at the Collège de France, and Boccioni had certainly looked into Marey's *chronophotographie*.) However he came to know of it, Boccioni declared his interest in Richet's work in his *Estetica e arte futuriste* (Milan: Balcono, 1946), 190–91.

313 Marinetti, "La guerra elettrica (Visione-ipotesi futurista)," in Marinetti, *Teoria e invenzione futurista*, 321–22.

314 "With surprising ease, the scientists govern the docile masses of electrons. The earth which we already knew to be entirely composed of electrified particles, is regulated like an enormous Rumkorff coil." In "La guerra elettrica (Visione-ipotesi futurista)" in Marinetti, *Teoria e invenzione futurista*, 322.

315 Boccioni also wrote poetically of electricity as extending the power to dominate. In 1916 he composed a *sintesi teatrale* titled *Genio e cultura* (Genius and Culture). In it, Boccioni has an artist, who has worked himself up seeking ecstasy, exclaim to a critic,

> *(still painfully agitated, pacing, wringing his hands)* "Glory! Ah! Glory!
>
> *(Shaking his fists)* I'm strong! I'm young! I can face anything!…Oh divine electric light!…Sun…Electrify the crowds! Set them on fire! Dominate!…

Umberto Boccioni, "Genio e cultura" (1916), in *Teatro futurista sintetico*, ed. Guido Davico Bonino (Genoa: Il melangolo, 1993), 50. In English: "Genius and Culture," trans. Laura Wittman, in Rainey, 488.

I will have occasion to discuss the *sintesi teatrale* presently. For now, allow me to point out that the *sintesi teatrale* is a remarkably cinematic form, one that was conceived to convey the impact of a situation without lengthy description or explanation. Works of this sort eschew the traditional three-act drama—instead, they are brief, extremely compressed works that present a series of *attimi* (moments) conveying the essence of an event in a flash (as film does). With "Genio e cultura," this compressed (cinematic) form conveys the effect of electric lights on a magnetizable crowd. This is a cinematic phenomenon.

316 Marinetti, "La guerra elettrica (Visione-ipotesi futurista)," in *Teoria e invenzione futurista*, 321.

317 "bell'arancio da tanto tempo promesso alla nostra sete e finalmente conquistato!" (ibid., 321).

A reason for these fantasies about electricity's far-reaching effects is that scientists of the time believed—this belief developed out of research into radioactivity (which had revealed so-called "alpha rays" and "beta rays," streams of positively charged and negatively charged particles)—that the electron is the fundamental particle, the basis of all matter, as Gustave Le Bon announced in his bestselling *L'évolution de la*

*matière* (Paris: E. Flammarion, 1905). In a similar vein, as Sir Oliver Lodge asserted in 1904, "matter then appears to be composed of positive and negative electricity and nothing else." His "Electric Theory of Matter" (*Harper's Magazine*, August 1904, 387) also asserted that all matter ought to be radioactive, so nothing should be considered permanent. "Matter is *electrical* in its nature. The difference between one kind of *matter* and another lies in the physical and chemical properties of the atoms; but the difference between atoms is merely due to the electric groups of the atoms." G. Woodward Warder, *The Universe a Vast Electric Organism* (Kessinger Publishing, [1903] 1996), 46.

The atom, Le Bon suggested, was a condensation of energy; radiation was a process by which the atom dematerialized, shedding electrons (which he believed to be in a state intermediate between matter and energy) and returning their energy to the aether. A sense of his notions about radiation can be had from the subtitle of a later volume—*L'évolution de la matière: De l'énergie intra-atomique libérée par la dématérialisation de la matière dérivant la plupart des forces de l'univers* (The Evolution of Matter: Most of the Forces in the Universe Derive from Intra-atomic Energy Liberated by the Dematerialization of Matter) (Paris: Flammarion, 1920).

Thus, according to Lodge and Le Bon, atomic studies were leading scientists to understand the hidden (occult) nature of matter. Lodge was one among many scientists who swayed thinkers towards the idea that the universe is a vast electric organism, tending towards etherealization/dematerialization.

318 Marinetti, "La guerra elettrica (Visione-ipotesi futurista)," in *Teoria e invenzione futurista*, 320.

319 Ibid., 319.

320 In the early twentieth century, the term "electronic" was usually only used as the adjectival form of "electron." Nevertheless, Marinetti's application of the term "elettrico" often corresponds to the more modern definition of "electronic," as an adjective pertaining to mechanical devices regulated by electrons, or to what Renato Barilli calls technetronic devices.

321 Marinetti, "La guerra elettrica (Visione-ipotesi futurista)," in *Teoria e invenzione futurista*, 321–22.

Compare these multisensory pleasures centred on food with the proposals in Fillìa and Marinetti's "Manifesto della cucina futurista" for ways to realize the paradisiacal notions evident here: the ambience in which the meal is consumed would pleasure the senses in a synaesthetic unity: trumpets might sound while diners indulge themseves; diners would wear silk pajamas; perhaps they would be asked to stroke a piece of sandpaper while eating an olive; perfumes would be atomized into their faces and blown away with industrial fans after every course. Food would be served that would bring forth the accelerated human: in this context, formed and processed edible matter would take on new significance.

Spes-Salimbeni also issued, in 1932, F.T. Marinetti and Fillìa, *La cucina futurista*, a 267-page book, with many recipes, in which the manifesto appears on pages 5 and 6. The manifesto is also collected in Marinetti and Fillìa, *La cucina futurista* (1932) (Milan: Viennepierre, 2007), 27–30. In English: in Berghaus, *Futurism and the Technological Imagination*, 394–99.

322 "La libera intelligenza regna dovunque" and "soprappiù di godimento." Marinetti, *Teoria e invenzione futurista*, 322.

323 "I deboli e gl'infermi," and "triturati, sbriciolati, polverizzati dalle veementi ruote dell'intensa civiltà." Ibid., 324.

324 "chineranno i loro occhiali dai vetri di sali di piombo sul pericolo traforante e curativo del radium." Ibid., 324.

325 Boccioni, "La pittura futurista," in I. Schiaffini, *Umberto Boccioni. Stati d'animo. Teoria e pittura* (Milan: Silvana Editore, 2002), 160; it can also be found in *Altri inediti e apparati critici*, ed. Birolli, 13. I have introduced the emphasis into the translation.

326 "un corpo . . . appare . . . non come una realtà concreta, tangibile, ma piuttosto come un nucleo di vibrazioni luminose e iridate tendenti alla di fusione, e solo differenziate tra loro da una maggiore o minore intensità cromatica. Si vede che il principio del movimento è dato, nell'impressionismo, unicamente dalla deformazione dei corpi per via della luce ambiente." In "La pittura futurista," in Ardengo Soffici, *Cubismo e Futurismo* (Florence: Libreria della Voce, 1914), 65–66; see also Soffici, *Opera*, vol. 1 (Florence: Vallecchi, 1959–68), 336.

327 See Giovanni Lista, *Cinema e fotografia futurista* (Milan: Skira, 2001), 62. Bragaglia's "Futurist films" are often dismissed. However, when we learn that the self-consciously artificial theatricality of his films (he believed that anti-naturalism would become a common attribute of avant-garde film) was intended to produce a magical effect, we can experience them quite differently. His ideas on anti-theatricality in avant-garde art cinema can be found in his *Esplorazione del mimo* (Milan: Ceschina, 1930). These ideas lie at the heart of Prampolini's work on the set designs for Bragaglia's film, which, too, has often been discounted. Millicent Marcus, "Anton Giulio Bragaglia's *Thaïs*, or the Death of the Diva + the Rise of the Scenoplastica = The Birth of Futurist Cinema," *South Central Review* 13, nos. 2–3 (Summer–Fall 1996): 63–91; and Lucia Re, "Futurism, Film, and the Return of the Repressed: Learning from *Thaïs*," *MLN* 123 (2008): 125–50, have begun to redress the critical shortcomings around *Thaïs*.

328 Gabriel de Tarde, *Les lois de l'imitation: Étude sociologique* (Paris: Félix Alcan, 1890; Paris: Kimé, 1993). In English, *The Laws of Imitation*, trans. Elsie Clews Parsons from the 2nd French edition (1895) (Gloucester: P. Smith, 1903), 2–3.

329 de Tarde, *The Laws of Imitation*, 11.

330 Boccioni, *Pittura scultura futuriste (dinamismo plastico)*, 407.

331 F.T. Marinetti, "Poesia simultanea della luce tessuta" (Simultaneous Poetry of Woven Light). The title itself is highly significant. It was first published as a section of *Il poema non umano dei tecnicismi* (The Nonhuman Poem of Technologies) (Milan: Mondadori, 1940). In English: in Rainey, 473–76 at 475; punctuation conforms to the original.

332 These are the opening paragraphs of the manifesto, which went unpublished during Futurism's glory days. Severini had offered it to Marinetti in 1913, but Marinetti rejected it because, in his view, it did not have the form and attributes of a manifesto. Its first publication was in Maria Drudi Gambillo and Teresa Fiori, eds., *Archivi del futurismo.* The text appears in English translation as "Plastic Analogies of Dynamism: Futurist Manifesto," in Rainey, 165–69 at 165.

333 Arthur Edward Waite, Lewis Spence, and W.P. Swainson, *Three Famous Alchemists* (Philadelphia: David McKay Company, 193[?]; reprint edition Whitefish, MT: Kessinger Publishing, 1992), 155.

334 Severini, "Plastic Analogies of Dynamism: Futurist Manifesto," in Rainey, 165.

335 I will go on to show that the Futurists imagined the object being dissolved into an electromagnetic field. By raising the issue of emotional resonance, Severini is suggesting that these charged fields have emotional characteristics.

336 Ibid., 166.

337 Giacomo Balla, originally published in "Esposizione fu Balla e futurista" (exhibition catalogue for Sala d'arte A. Angelelli) (Rome: Studio per edizioni scelte, 1915). In English: "The Late Balla—Futurist Balla," in *Futurist Manifestos*, ed. Apollonio, 206. Balla's rejection of conjunctions is noteworthy.

338 The present-day philosopher Nicholas Rescher summarizes the fundamental principles of process philosophy:

1. Time and change are among the principal categories of metaphysical understanding.
2. Process is a principal category of ontological description.
3. Processes are more fundamental, or at any rate not less fundamental, than things for the purposes of ontological theory.
4. Several, if not all, of the major elements of the ontological repertoire (God, Nature as a whole, persons, material substances) are best understood in process terms.
5. Contingency, emergence, novelty, and creativity are among the fundamental categories of metaphysical understanding.

Rescher, *Process Philosophy: A Survey of Basic Issues* (Pittsburgh: University of Pittsburgh Press, 2000), 5–6. I recommend the whole of *Process Philosophy* as a guide to understanding Futurism's most radical implications.

339 Balla, "The Late Balla—Futurist Balla," 206.

340 See, for example, Boccioni et al., "Futurist Painting: Technical Manifesto," in Rainey, 64.

341 Marinetti, Settimelli, and Corra, "The Futurist Synthetic Theatre," in Rainey, 207. I have changed the manner of emphasis, from bold to upper case.

342 This information appears in Selena Daly, "From Symbolism to Futurism: *Poupées Électriques* and *Elettricità*," *Rivista di Studi Italiani* 27 (2010): 46–59 at 48–49. Her source is an unpublished letter in the Beinecke Library, Yale University.

343 The title is no doubt a sarcastic allusion to the famous *canzone* from Verdi's *Rigoletto* (1851).

344 I pointed out in the introduction that Nikola Tesla propounded a similar view.

345 This information, too, appears in Selena Daly, "From Symbolism to Futurism," 46–59, esp. 46. Daly's article is a valuable study of Marinetti's transition from Symbolism to Futurism (and while she does not make this claim—and may differ with my reading of the facts she offers—I take it as offering support to my claims that Futurism pursues Symbolism's spiritual goals by other means). She very carefully takes apart and refutes Günter Berghaus's assertion that "what is now called *Elettricità* was nothing but the second act of *La donna è mobile*, the Italian version of *Poupées électriques*" (see Berghaus, *Italian Futurist Theatre*, 188), by meticulously identifying the transformations that *Poupées Électriques* underwent (especially in its second act) in becoming the unusually long *sintesi teatrale*, *Elettricità*.

Marinetti expressed similar sentiments about the value of being jeered in the 1911 manifesto, "Manifesto dei drammaturghi futuristi" (Manifesto of Futurist Playwrights), which he initially issued in French under the title "Le plaisir d'être hué" (La voluttà d'esser fischiati; The Pleasure of Being Booed), and, indeed the "Manifesto dei drammaturghi futuristi" was printed as "La voluttà d'esser fischiati" in Marinetti's early collection of Futurist manifestos, *Teoria e invenzione futurista*, 310–13.

346 The original appeared as "Il teatro di varietà," *Daily Mail*, 21 November 1913, and was reprinted as "Il teatro di varietà," in *I manifesti del futurismo*, 158–66 at 158–59 (and as "Il teatro di varietà: Manifesto futurista" in Marinetti, *Teoria e invenzione futurista*).

In English: "The Variety Theatre," in Rainey, 159–60; I have conformed the manner of emphasis to that in *I manifesti del futurismo*. The first point, that contemporary humans are born from electricity, can serve as another example to show that ideas about electromagnetism were coming to dominate the age.

347 One episode of the Turco-Italian War (29 September 1911 to 18 October 1912), in the summer of 1912, saw Italy occupy twelve islands in the Aegean Sea that made up the Ottoman province of Rhodes (under Italian jurisdiction they became known as the Dodecanese). The Turkish navy retaliated, but was outgunned: their military technology was behind that of the Italians, who dropped the first ever aerial bomb during the conflict while the Turks distinguished themselves for being the first to shoot down an airplane with a rifle (they lacked anti-aircraft weapons).

348 The quotation from Marinetti is taken from "Il poeta futurista Aldo Palazzeschi," in Marinetti, *Teoria e invenzione futurista*, 54–56 at 55.

349 These quotations are from one of the most clamorous evenings at the Teatro Verdi in Florence (12 December 1913); the remarks are recorded in Tisdall and Bozzolla, *Futurism*, 92–93.

350 These *serate futuriste* had something of the character of street theatre, and they presaged a Futurist street theatre to come. In 1919, Mussolini, with the support of Marinetti and the poet Giuseppi Ungasetti, founded the Fasci di Combattimento in Milan.

In April of that year, against the wishes of Mussolini (who thought the action premature), Marinetti led Fascists, Futurists, and the Arditi against a mass Socialist Party demonstration. The Arditi was an elite black-shirted military corps whose soldiers in battle would sometimes charge the enemy, stripped to the waist, carrying a grenade in each hand and a dagger in their teeth. Marinetti waded in with fists flying, but he intervened to save a Socialist from being severely beaten by the Arditi. (To put the postwar situation in perspective, the Socialists had regularly been beaten, abused, and even killed by returning war veterans.) The Fascists and Futurists then proceeded to the offices of the Socialist Party paper *Avanti*, which they sacked and burned.

Marinetti stood as a Fascist candidate in the 1919 election.

351 Marinetti, "Il teatro di varietà," reprinted in *I manifesti del futurismo*, 160. In English: "The Variety Theatre," in Rainey, 160.

352 Marinetti, "Il teatro di varietà," 164; "The Variety Theatre," 163.

353 See Marinetti, "Distruzione della sintassi," 140.

354 Marinetti, "Geometrical and Mechanical Splendour," in Rainey, 175–80 at 176.

355 Marinetti, "Manifesto tecnico della letteratura futurista," in *I manifesti del Futurismo*, 88–103 at 92. In English: "Techical Manifesto of Futurist Literature," in Rainey, 119–25 at 122. This statement provides yet another indication that ideas about electromagnetism had formed the dominant image of reality's fundamental nature.

356 Re: "multiplied" (*moltiplicato*); the translated phrase appears in "Multiplied Man and the Reign of the Machine," in Rainey, 89–92 at 91. The original is in "L'uomo moltiplicato e il regno della macchina," first printed as "L'uomo moltiplicato e il regno della macchina," a pamphlet published in 1910, and thereafter included in *Le Futurisme* (1911); reprinted in Marinetti, *Teoria e invenzione futurista*, 253.

357 Re: "that filthy thing and filthy word" (*cosa e parola immonde*), the translated phrase appears in "The Variety Theatre," in Rainey, 162, and the original in "Il teatro di varietà: Manifesto futurista," in *Teoria e invenzione futurista*, 75.

358 Marinetti endorses working people's claims that "motors are truly mysterious . . . they have moods and unexpected whims; it seems they have a personality, a soul, will.

You have to caress them, treat them with respect, never mistreat or overwork them." Marinetti, "Multiplied Man and the Reign of the Machine," 90. The original reads,"I motori, dicono costoro, sono veramente misteriosi…Hanno dei capricci, delle bizzarrie inaspettate; sembra che abbiano una personalità, un'anima, una volontà." Marinetti, *Teoria e invenzione futurista*, 255–56.

359 I think the importance of the phrase "immensify his spirit" / "immensely enlarge his spirit" is nearly always overlooked—surely it means here to give the spirit greater compass, to allow the spirit to accomplish what formerly was done by the muscles.

360 Marinetti and Masnata, "The Radia: Futurist Manifesto," 292–95 at 292.

361 Commentators on this passage generally fail to take into account the special meanings the terms "life" and "life spirit" had at this time, in particular, for followers of Bergson (such as the Futurists).

362 "Manifesto dei drammaturghi futuristi" first appeared as an independent leaflet, dated 11 January 1911; it appeared, with some textual variants, in French, again in leaflet form, as "Manifeste des auteurs dramatiques futuristes," dated 22 April 1911. It was subsequently collected in *Le futurisme* (1911) as "Le plaisir d'être hué." In English, "The Pleasure of Being Booed," in Rainey, 96–98 at 97. In keeping with the provocative gestures of the *serate futuriste*, Marinetti and the other signatories of that manifesto assert,

> We Futurists teach authors contempt for the audience, and especially for first-night audiences, whose psychology we can synthesize as follows: rivalry of coiffures and feminine toilettes—vanity of the expensive seat, which transmutes itself into intellectual pride—boxes and orchestra seats occupied by rich and mature men whose brains are naturally contemptuous and whose digestions are very belabored, conditions incompatible with intellectual effort. (Ibid., 96)

363 "I fenomeni di volontà esteriorizzata che si manifestano continuamente nelle sedute spiritiche." Marinetti, "L'uomo moltiplicato e il regno della macchina," in *Teoria e invenzione futurista*, 297–301, at 297; "Multiplied Man and the Reign of the Machine," in Rainey, 89–92 at 91.

364 Ibid., 297. In English: in Rainey, 90.

365 Ibid., 297–98. In English: in Rainey, 90–91. The passage makes very evident the relations Marinetti draws among electricity, spiritualism, and alchemy (with its metaphor of flight to refer to the alchemical process of volatization).

366 Almost alone in acknowledging the role that theories of electromagnetism and the aether had in forming the Futurists' idea of *linee di forza* was the historian of science Bruce J. Hunt. See his "Lines of Force, Swirls of Ether," in Clark and Henderson, 99–113.

367 There is a sketch for the painting at the uptown Guggenheim Museum in New York City. Here I am commenting on the version at the same city's Museum of Modern Art.

Soon after Boccioni created this pioneering work, artists from other countries would adopt the Futurists' electromorphic forms. An interesting instance is the great German Expressionist Franz Marc (1880–1916). In 1913 he was still painting animals (consider *Stallungen* [Stables])—pictures of extraordinary formal and colouristic inventiveness, but pictures of animals all the same. One of the last pieces he produced before being killed in the Great War was *Zerbrochene Formen* (Broken Forms, 1914). The work is abstract, novel, and electromorphic (coiling force lines run throughout). It makes clear that Marc would have become one of the great electromorphic artists, were it not for his tragic death at the age of thirty-six.

368 *La città che sale* can usefully be compared with Pablo Picasso's *Guernica* (1937); the contrast between the shattered-object forms that appear in the latter and the fluid forms that appear in Boccioni's painting speaks volumes about Cubism's and Futurism's differing responses to the rise of the electromagnetic paradigm. Equally important is the differing senses of history implied in the two: Picasso's work is a protest against history's cruelty, while Boccioni's acknowledges that the march of history involves violence, which will purge all vestiges of the past.

369 Kozloff, *Cubism/Futurism*, 143–45.

370 There is an interesting dimension to Bergson's relation to the electrological paradigm. Anson Rabinbach points out that Bergson and É.-J. Marey were colleagues at the Collège de France in 1902 and that they worked together in a group investigating paranormal phenomena. "'The Groupe d'Études de Phénomènes Psychiques' met to 'explore that region situated at the intersection of psychology, biology, and physics, where we encounter forces not yet defined'" and "conducted what Bergson called 'rigorous experiments' using Marey's inscriptors to test certain well-known Parisian mediums." Rabinbach, *The Human Motor*, 111. Rabinbach does not go into what hypothesis concerning these "forces not yet defined" underlay these experiments, but Marta Braun does, in *Picturing Time* (279). She shows that the group conducted séances, studied the electric discharge of hysterics, and conducted scientific studies on telepathy and mental suggestion. Electricity, it was hypothesized, was in some way related to these "unknown forces."

371 Marinetti, "Manifesto tecnico della letteratura futurista," 91.

372 It is interesting that both camps—those who favour making art more like (present-day) vernacular forms of expression and those who favour making quotidian forms more like (present-day) poetry—claim that the importance of re-establishing a connection with the vital body is a central tenet in their advocacy.

373 For an excellent overview of the impact that ideas about energy and vibration had in art in this period, see Linda Dalrymple Henderson, "Vibratory Modernism: Boccioni, Kupka, and the Ether of Space," in *From Energy to Information: Representation in Science and Technology, Art, and Literature*, ed. Bruce Clarke and Linda Dalrymple Henderson (Stanford: Stanford University Press, 2002), 126–49. Also valuable are the essays in Anthony Enns and Shelley Trower, eds., *Vibratory Modernism* (Basingstoke: Palgrave Macmillan, 2013).

374 Giacomo Balla and Fortunato Depero, "Futurist Reconstruction of the Universe," first published 11 March 1915; the passage cited can be found in an English translation in Rainey, 209–12 at 209.

375 Blaise Cendrars, *Moravagine*, trans. Alan Brown (Garden City: Doubleday, 1970), 154.

376 Balla and Depero, "Futurist Reconstruction of the Universe," 212.

377 Irrationalism tends to produce a cult of action for action's sake. Action is deemed beautiful in itself, and action should be taken before reflection. Action is raw, primitive (in the sense of being first, "prius"), while deliberation is associated with the debilitating effects of culture. This distrust of intelligence is a hallmark of every form of Fascism, which attacks "degenerate intellectuals."

378 Marinetti, Settimelli, and Corra, "The Futurist Synthetic Theatre," in Rainey, 204–9 at 205; emphasis in original.

379 Marinetti declared that there can be no beauty except in struggle, that no work without an aggressive character can be a masterpiece. There is certainly something to this, for there was a signal change at the beginning of the twentieth century that allowed the purposeful hideousness of Picasso's *Guernica* to emerge, and Stein's *Tender Buttons*

(1914) to come forth as a near inanity far enough from genuine inanity to be another twentieth-century masterwork.

That said, one notes a clear difference between Marinetti's ZANG TUMB TUMB and the works by Picasso and Stein. The difference, surely, is that Picasso and Stein give an adequately large place to tender feelings, whereas Marinetti proposed that art can be nothing but violence, cruelty, and injustice. It is one thing for art to have demanded a place for negative feelings—and much of the greatest art of the twentieth century (a century that produced a prodigious amount of very great art) allowed for such feelings. It is quite another to afford no place whatsoever for sentimentality, for tenderness, or for contemplation. At least across the course of his work (if not in every canvas), Picasso allowed for tenderness, and Stein's work (perhaps because of its strong homoerotic drive) always mixes the two elements.

Boccioni, of course, was an anomalous Futurist: how could a man so obsessed with his mother that he could produce *Materia* (1912; changes made in 1913) not be sentimental? Balla and Depero were equally capable of tender sentiment.

380 Marinetti, Settimelli, and Corra, "The Futurist Synthetic Theater," in Rainey, 206. I have highlighted certain words by putting them in bold; other emphases are in the original.

381 This is not to say that verbal artworks (always) concern ideas. For it can be argued that what distinguishes poetic (literary/artistic) language from common language is that the ideational content is drained from the poetic text, and words returned to their material effectivity. On this view, the effort to create a literary work of art involves the struggle to empty a text of reference and to endow words with perlocutionary (or magic) powers.

382 Luigi Russolo, "The Art of Noise." First published as *L'arte dei rumori,* a four-page pamphlet, by Marinetti (Direzione del Movimento Futurista), in Milan, 11 March 1913. This became "L'arte dei rumori. Manifesto futurista," the first chapter of Russolo's, *L'arte dei rumori* (Milan: Edizioni Futuriste di *Poesia*, 1916), 9–17. It was reprinted in translation in Michael Kirby, *Futurist Performance. With an appendix of manifestos and playscripts*, trans. Victoria Nes Kirby (New York: E.P. Dutton, 1971); the passage cited appears on 168–69.

383 Marinetti, "The Variety Theatre," 160. The "Il teatro di varietà" appeared in 1913, just after the Second Balkan War (29 June 1913–10 August 1913). In that war, Bulgaria (an ally in the First Balkan War) took up arms against Serbia, largely out of dissatisfaction with the division of spoils during the earlier Balkan war (8 October 1912–30 May 1913). The war saw the defeat of Bulgaria (which lost territory).

The various figures referred to here were belligerents in the Second Balkan War. King Nicolas is presumably Nikol I. Mirkov Petrović-Njegoš (1841–1921) who was Prince of Montenegro (1860–1910) and king of that country from 1910 to 1918 (thus, during the Great War); he was also a poet. Enver Bey is a name-with-rank for the Ottoman Turk Enver-Pasha (1882–1922), a leader of the 1902 Young Turk Revolution and one of the perpetrators of the Armenian and Assyrian genocides; in his own time he was considered to be a hero. Dr. S. Baneff represented Bulgaria in negotiations related to these hostilities. Eleftherios Venizelos (1864–1936) was Prime Minister of Greece from 1910 to 1915, a liberal democrat.

384 Ibid., in Rainey, 160, 161, 162.

385 Enrico Prampolini, "Futurist Scenography," in *Futurist Performance*, ed. Michael Kirby, 204–5.

386 Mauro Montalti, "For a New Theatre: Electric-Vibrating-Luminous," first published in 1920. In English: in *Futurist Performance*, ed. Michael Kirby; the passage cited appears on pages 222–23.

387 *Vengono* was published in Marinetti, Settimelli, and Corra, *Teatro futurista sintetico*, 29–32.

388 Marinetti, "Velocità" (likely composed sometime between 1915 and 1919). In "Oltre l'autore 1," special issue of *Fotogenia* 2, ed. Alberto Boschi and Giacomo Manzoli (1996): 15–25. In English: "Speed," in idem., 143–7. See also Giovanni Lista, "Un inedito marinettiano: 'Velocità,' film futurista," in Alberto Boschi and Giacomo Manzoli, 6–14 (the Italian version of the article and play); in English: "An Unpublished Work by Marinetti: 'Speed,'" in Boschi and Manzoli, 139–42. Wanda Strauven has published a worthwhile piece on Marinetti's imagined involvement in filmmaking, "*Vita Futurista* e *Velocità*: Due film fatasma di F. T. Marinetti," in *Il racconto del film / Narrating Film*, ed. Alice Autolitano and Valentino Re (Udine: Forum, 2006), 371–79.

389 This emphasis on flowers, foliage, and vegetation (evident also in *Marfaka le futuriste* / *Marfaka il futurista*) is further evidence of the continuing influence of Symbolism on Marinetti's thought. But it also highlights the electrological character of Marinetti's art.

Renato Barilli identifies the use of phytomorphic "abstraction" as a characteristic tendency of contemporary (that is, post-1860) art. He also makes the brilliant connection between phytomorphic and electromorphic shapes.

> Contemporary art rediscovers its vocation for abstract forms (in the etymological sense of the term, whereby the essential is "drawn out" in stringy shapes onto the surface of the paper or the canvass). The contour lines of these "cut-outs" or *cloisons* are flowing and curvilinear in homage to the wave principle that underpins the technotronic era; they could also by seen as phytomorphs. In the last part of the [nineteenth] century, against the rigidity of machines, right angles and their derivatives, artists choose a more accessible and more familiar principle, that of *natura naturans* [nature naturing], as it appears in the growth of vegetation (plants, in Greek *tà phytà*). This is why we have to refer to a general phytomorphism typical of the forms produced in that period (which consistently relied on vegetation, springtime, and blossoming plants: *Ver Sacrum*, *Evergreen*, *Jungendstil*, etc.). In hindsight, we can say that even then they sensed the need for electromorphism, but it was realized through the mediation of nature, which is closer to the new sources of energy than were the forms of the industrial mechanical world. (Barilli, "The Birth and Evolution of the Contemporary Age," in *The Science of Culture and the Phenomenology of Styles*, 121–22)

Marinetti's writing draws together phytomorphic and electromorphic forms (*parole in libertà*).

390 Syrimis, *The Great Black Spider on Its Knock-Kneed Tripod*, 130.

391 Boccioni was the movement's principal theorist from 1909 until his death in 1916. His *Pittura scultura futuriste* figures among the movement's greatest theoretical contributions, if not its greatest.

392 The idea was in the air. Just slightly later than Balla, between 1920 and 1925, Achille Ricciardi built a coloured-light instrument for his *Teatro del colore* in Rome and carried out similar experiments.

393 This was not the only piece of mechanical chromatic music the Futurists produced: in 1928, more than a decade after *Fuochi d'artificio*, Enrico Prampolini mounted a performance, *Santa velocità* (Sacred Speed). This piece of chromatic music was performed using Russolo's *intonarumori*.

394 Enrico Prampolini, "The Magnetic Theatre and the Futurist Scenic Atmosphere," trans. Rosamond Gilder, in *Futurist Performance*, ed. Kirby, 86–87. Prampolini also declared the goal of his new theatre was "to overthrow the speculative field of theatrical theatre (*v.* Reinhardt-Tairov-Meyerhold) in order to give a new **spiritual** virginity to *scenic matter*" (bold emphasis mine, italics in original). The use of term "Magnetic Theatre" and the emphasis on the new theatre's pneumatic function suggest the influence of Spiritualist ideas, perhaps through Allan Kardec's (1804–1869) *spiritisme*.

395 It is notable that Russolo signed his letter of 11 March 1913 to Balilla Pratella (whom he salutes as "the greatest Futurist musician") as "Luigi Russolo, *Painter*." (That letter became the "L'arte dei rumori" manifesto.)

396 Russolo, "The Art of Noise," 166–67.

397 Edgar Varèse would present Russolo's last public concert in 1929 (during the vernissage for an exhibition of Futurist painting at Galleries 23 in Paris); Russolo carried the proposals from the "L'arte dei rumori" manifesto so far that he refused to acknowledge any distinction between pitched and unpitched sounds, and Varèse would follow suit in conceiving of music as nothing but organized noise and creating works like *Poème électronique* (1958).

398 The articles by Piet Mondrian appeared as "The Manifestation of Neo-Plasticism in Music and the Italian Futurist *Bruiteurs*" (Dutch original: "De 'Bruiteurs Futuristes Italiens' en 'Het' niewe in de muziek," *De Stijl* 4, no. 8 [August–September 1921]); and "Neo-Plasticism: Its Realization in Music and in Future Theatre" (Dutch original: "Het Neo-Plasticism [De Nieuwe Beelding] en zijn [hare] realiseering in de muziek," *De Stijl* 5, no. 1 [January 1922]: 1–7; no. 2 [February 1922]: 17–23). Both are in *The New Art—The New Life: The Collected Writings of Piet Mondrian*, trans. and ed. Martin S. James (New York: Da Capo Press, 1993), 148–55 and 156–63.

399 Luigi Russolo, "The Art of Noise," 167.

400 Ibid., 169.

401 Ibid., 167.

402 Ibid., 170.

403 Ibid., 171.

404 Ibid., 171–72.

405 To be sure, his notational system is less adventurous and forward-looking than it is sometimes made out to be.

406 Ibid., 173.

407 Ibid. This statement is actually point 3 in the list above.

408 Russolo's letter to Balilla Pratella is dated 11 March 1913; the famous first performance of *Весна священная* (Vesna svyashchennaya, The Rite of Spring), at Paris' Théâtre des Champs-Élysées, was on 29 May 1913. Charles Ives (1874–1954), in America, had been using polyrhythms (and polytonality) for some time, for example, in *Psalm 67* (ca. 1898–1902) and in the exquisite "The Housatonic at Stockbridge" section of *Three Places in New England (Orchestral Set No. 1)* (1911–14—the third section was composed in 1911). I must add that at this time Ives's work was unknown in Europe.

409 These stages are presented in translation in Chessa, *Luigi Russolo, Futurist*, 139.

410 Balilla Pratella, "La musica futurista: Manifesto tecnico" (four-page monograph) (Milan: Redazione di *Poesia*, 11 March 1911). In English: "Futurist Music: Technical Manifesto," in Rainey, 80–84 at 81. A second, revised Italian version was published in *Manifeste des musiciens futuristes* (Milan: Bureaux de *Poesia*), 11 May 1911; this was reprinted 19 March 1911 by Marinetti (Direction du Mouvement Futuriste). A version

dated 29 March 1911, attributed to Balilla Pratella and titled "La musica futurista. Manitesto tecnico," is collected in Marinetti, *I manifesti del futurismo*, 45–51. Other versions are collected in Pratella, *Francesco Balilla Pratella: Edizioni, scritti, manoscritti musicali e futuristi*, ed. Domenico Tampieri (Ravenna: Longo, 1995); in L. Scrivo, *Sintesi del futurismo*, 34–37; and in Viviana Birolli, ed., *Manifesti del futurismo* (Milan: Abscondita, 2007), 41–45.

411 Chessa, *Luigi Russolo, Futurist*, 139, 141–50.

412 Use of microtonal intervals and syncopation suggests that this Newtonian system was breaking down. This explains, I believe, the explosion of interest in the 1910s and 1920s in using quarter-tones (dividing an octave into twenty-four equal pitches). The following list provides just a few examples of composers who were seized by this interest: Charles Ives; the Mexican composer Julián Carrillo (1875–1965), who developed the notion of the "Sonido 13" (thirteenth sound); the Czech composer Alois Hába (1893–1973); the French-Russian composer Ivan Wyschnegradsky (1893–1979); and the American Mildred Couper (1887–1974), who composed pieces for two pianos tuned a quarter-tone apart (resulting in a palette of 176 tones). In the 1920s, both Wyschnegrasky and Carrillo began using even smaller divisions of the octave. And in 1931, the great Harry Patch (1901–1974) began composing the microtonal music that would have a powerful impact on American music beginning in the 1960s. Around 1928, the electrical engineer Léon Theremin (1896–1993), in a feat that exemplifies the technotronic age and its interest in "infinite" plasticity, began performing with an instrument he had invented, the theremin, which made it possible to pull out of the aether a continuous range of pitches—pitches of any frequency (not just notes on a scale, however fine the interval between them) (see next endnote for more on the theremin).

Of course, American vernacular music, which emerged at the meeting point of European and African traditions, was vigorously polyrhythmic. Ragtime music (popular from 1895 to 1918) arose out of the mixing of marching band music of the sort John Philip Sousa (1854–1932) wrote with polyrhythms coming from African music—Scott Joplin (1867/1868–1917) was a virtuoso at this. New Orleans Dixieland music (originating around 1910) was often polyrhythmic.

413 Luigi Russolo was deeply interested in acoustics and even built an audio laboratory to learn more about sound. Phenomena involving interactions of waveforms understandably interested artists and scientists at the beginning of electromagnetic epoch. In 1920, shortly after Russolo built his *intonarumori*, Léon Theremin constructed his first aetherphone (forerunner to the theremin). The turning point in his life came in 1917, when he saw Abram Fedorovich Ioffe defend his dissertation: Ioffe talked of electrons, the photo-electric effect, and magnetic fields, where other scientists spoke of abstract formulae. For Ioffe, magnetic fields and photo-electric effects were an objective reality that surrounds us every day. In 1919, Theremin joined Ioffe's laboratory.

Another instrument that produced a distinctive "postmodern" sound through the interaction of sound sources was the Ondes Martenot, invented in 1928 by Maurice Martenot (1898–1980) and used by Olivier Messaien (1908–1992) in his *Turangalîla-Symphonie* (1948) and *Trois petites liturgies de la présence divine* (1944), and his opera *Saint-François d'Assise* (1983).

414 Each of Russolo's *intonarumori* was constructed as a wooden parallelepiped sound box with a cardboard or metal speaker at its front. When a wooden or metal wheel inside the box spun, it caused a catgut or metal string to vibrate—the shape or diameter of the wheel varied according to the noise the particular *intonarumori* was intended to

produce. A drumhead at one end of the string transmitted those vibrations to the speaker, to generate sound. The performer turned a crank or pressed an electric button to cause the wheel to rotate. A lever at the top of the box could be manipulated to modify the tension of the string, allowing specific notes or glissandi to be played—by moving the lever, the performer could produce successive sounds at intervals of a tone, a semitone, or any frequency in between, over a range of more than an octave. The *intonarumori* thus demonstrated that sound, too, is plastic—this is another example of the postmodern age's interest in infinite plasticity.

415 The review in the *Times* (London) of a performance at the Coliseum on the afternoon of 15 June, titled *The Awakening of a Great City (Risveglio di uno Città)* and *A Meeting of Motorcars and Aeroplanes (Convegno d'Aeroplani e d'Automobili)*; cited in *Futurist Performance*, ed. Kirby, 38.

416 Kirby wrote this several years before Lista found a copy of Marinetti's script for *Velocità*. One can still, in some measure, credit Kirby's point: it is telling that Marinetti's script is literary in form and that Marinetti, when writing it, hadn't yet embraced the ideas for visual cinema outlined by Bruno Corra, Arnaldo Ginna, and Carlo Carrà and (what is even more startling) did not choose to extend Mauro Montalti's proposal for a new "electric-vibrating-luminous" theatre into cinema. Moreover, I agree with Lista that Marinetti likely wanted to produce *Velocità* through La Società Italiana Cines, Rome's largest production house at the time (whose pioneering technical head was Francesco Bragaglia, the father of Anton Giulio, Arturo, and Carlo Ludovico). Marinetti's film script is more commercial than his poems and plays—indeed, it is somewhat *passéiste*. Marinetti, we know, was keen to reach an audience, and when one reads the *Velocità* script, one comes to the distressing conclusion that Marinetti relaxed his standards in hopes of finding a place for his ideas in the cultural industries.

Of course, having commercial intentions wouldn't entail that Marinetti couldn't at the same time be engaged as a writer in a paragonal reflection on the cinema, reflecting on what an art of moving visual forms could be if it had not been co-opted by commercial considerations, and on how features of that ideal cinema could be transcoded to literature. Wanda Strauven has provided a nuanced reading in the complexities of Marinetti's views vis-à-vis the cinema. See her "Futurist Poetics and the Cinematic Imagination," 201–28.

417 Marinetti, "The Variety Theatre," in Rainey, 159.

418 Ibid. In Italian: "Il teatro di varietà: Manifesto futurista," in *Teoria e invenzione futurista*, 71; and "Il teatro di varietà" in *I manifesti del futurismo*, 158.

419 This edition of Marinetti's writings uses "Theater of Essential Brevity" to render *teatro futurista sintetico*, claiming that it better captures what the phrase came to mean among the Futurists and in Futurist writing. This translation helps me make the point I am trying to make here, and I have decided to use it. Nonetheless, readers must keep in mind that this is not a direct translation.

On 11 October 1921, Marinetti and Francesco Cangiullo published "Il teatro della sorpresa (Teatro sintetico, Fisicofollia Parole in libertà sceneggiate Declamazione dinamica e sinottica Teatro-giornale Teatro-galleria di quadri Discussioni improvvisate di strumenti musicali, ecc.)" (The Theatre of Surprises [Theater of Essential Brevity—Zany Physical Comedy—Words-in-Freedom on Stage—Dynamic and Multichanneled Recitation—News Theater—Gallery Theater—improvised conversations among different musical instruments, and so on]). It begins:

> We have brought glory to the *Variety Theater* and given it a new lease on life. In the *Theater of Essential Brevity* we have destroyed the overriding concerns with technique, verisimilitude, logical development, and step-by-step exposition.
>
> In this *Theater of Essential Brevity*, we have established a brand-new mix of the serious and the comic, of unreal as well as believable characters, the interweaving and coexistence of time and space, the drama of objects and discords, the visual, structured flow of images, shop windows of ideas and actions. If today there exists a young Italian theater with different combinations of serious, comic and grotesque, with fantastic characters in everyday settings, with a sense of the interpenetrating and coexistential nature of time and space, then it is thanks to our *Theater of Essential Brevity*. Today, we are compelling the theater to take yet another leap forward. (Marinetti, *Critical Writings*, 383–85 at 383)

The term that is translated as "interweaving" is *compenetrazione*: "Abbiamo nel Teatro Sintetico creato . . . le compenetrazioni e le simultaneità di tempo e di spazio" (In Synthetic Theatre we created . . . the interpenetration and simultaneity of time and space). Using "interweaving" to translate *compenetrazione* is an unusual feature of this edition of Marinetti's writing, but it does relate to the postmodern (electromagnetic) imaginary.

Marinetti claims that he recast the theatre into a structured flow of images—shop windows of ideas and actions—that interleave spaces and times, as well as space and time themselves, and that merge the serious with the comic, the real with the unreal. Note that the cinema does all this readily by virtue of characteristics that derive from its techniques of production. Marinetti's statement thus confirms that he was interested in reformulating the theatre so that it would take on attributes of the cinema.

The "Theatre of Surprises" manifesto was followed, substantially later, by "Dopo il teatro sintetico e il teatro a sorpresa, noi inventiamo il teatro antipsicologico astratto di puri elementi e il teatro tattile" (After the Synthetic Theatre and the Theatre of Surprise, We Invent the Antipsychological, Abstract Theatre of Pure Elements and Tactile Theatre, 1924). Thus this manifesto too reflects the effects the cinema, but by this time the Futurists were looking not to the American action comedy, but to the imaginary cinema envisioned by Gina Corra as their paragonal model.

420 Marinetti, Settimelli, and Corra, *Il teatro futurista sintetico*, in Marinetti, *Critical Writings*, 200–207 at 204–5.

421 Marinetti, Corra, et al., "Manifesto della cinematografia futurista." The Italian original is included in Marinetti, *Teoria e invenzione futurista*, 119–20. In English: "The Futurist Cinema," in Rainey, 230.

Regarding the time that passed between the founding of Futurism ("Fondazione e Manifesto del futurismo" appeared in 20 February 1909) and the appearance of "La cinematografia futurista" (11 September 1916), Aiken speculates (correctly in my view) that the Futurists' engagement with the cinema began in earnest only after Boccioni died and Severini drifted away from the movement—both were strongly committed to preventing Futurism from capitulating to the cinema (Aiken, "The Cinema and Italian Futurist Painting," 356). Balla, who informally assumed a leading position in the Futurist movement after Boccioni's death on 17 August 1916, was more favourably disposed to the cinema.

422 The original text reads "il mezzo di espressione più adatto alla plurisensibilità di un artista futurista." Marinetti, Corra, et al., "Manifesto della cinematografia futurista." In English: in Rainey, 230; emphasis in original.

423 Ibid.

424 An English translation appears, under the title "Theater, Cinema, and Futurism," in *The Ardis Anthology of Russian Futurism*, ed. Ellendea Proffer and Carl R. Proffer (Ann Arbor: Ardis, 1980), 181–83.

425 Ibid., 182.

426 These two pieces can be found in translation in *Framework* 18 (1982).

427 This poem was first published in *Кино-Фот. Журнал кинематографии и фотографии* (Kino-Fot. Zhurnal kinematografii i fotografii), ed. Aleksej Gan, no. 4, 5–12 October 1922. It was reprinted in *Театр и кино* (Teatr i kino, Theatre and cinema) 2: 425–26. The translation used here is taken from Taylor, *The Politics of the Soviet Cinema*, 39.

428 *Drama v Kabare Futuristov No. 13* appeared in November 1913 and was 431 meters long (roughly 21 minutes).

429 Jerry Heil provides a synopsis of the script in "Russian Futurism and the Cinema: Majakovskij's Film Work of 1913," *Russian Literature* (Amsterdam) 19 (1986): 175–92 at 178–79.

430 Arnaldo Ginna and Bruno Corra are pseudonyms: they were brothers, Arnaldo and Bruno Gianni Corradini, who went under a number of assumed names (most often the two just given). Those particular pseudonyms were coined by Giacomo Balla, and in a fashion characteristic of Futurism, were intended to highlight their dynamism: *ginnastica* and *corsa* are Italian words for gymnastics and running respectively.

431 Maria Giannini, the wife of Arnaldo Ginna, was a talented author in her own right, who produced fragmentary, dream-like prose-poetry that (like the work of some others in the Florentine group) had affinities with Surrealism in its quest for the absolute. In 1916–17, she directed Edizioni dell'*Italia futurista*, which was active from 1916 to 1918.

432 Marinetti, Corra, et al., "Manifesto della cinematografia futurista." In English: "The Futurist Cinema," in Rainey, 229.

Since the Futurists viewed their work as heralding a new future, *passéiste* was one of their favoured terms of opprobrium, and often applied to art and artists they believed would be consigned to the trash bin of history as the Industrial Age advanced.

433 Ibid.

434 Ibid.; emphasis in original.

435 Ibid.

436 Ibid.

437 Nevertheless, evidence of Boccioni's interest in photography can be seen in a "self-multiportrait" he made sometime between 1905 and 1907, when he was living in Venice. Such multiportraits were the stuff of fairground attractions at the time: itinerant photographers made them using mirrors placed at an angle behind the sitter. Boccioni was the first Futurist to explore his multiple identity in this way, more than a decade before other avant-garde artists (including Marcel Duchamp). Boccioni must have realized the form's potential to convey the impression of a *uomo moltiplicato e il regno della macchina* (multiplied man and the reign of the machine).

438 And, of course, individual Futurists held different views about the viability of photography as a Futurist medium.

439 Many of these works were executed by Arturo Bragaglia. Luciano Folgore reports that of the two brothers, Anton was the theorist and Arturo the executor. See Luciano Folgore, "Un 'ritratto futurista'" in *Anton Giulio Bragaglia*, ed. Mario Verdone (Rome: Bianco e Nero, 1965). In my opinion, the photodynamic images should at the very least be considered the work of Anton and Arturo jointly.

The story may be more complicated: *La Repubblica*'s "Spettacoli" section for 29 September 1987 reports that a third and youngest brother, Carlo Ludovico, also

staked a claim for sharing artistic responsibility for the photographs: "Dietro alle attività del suo più famoso fratello c'era spesso lui. 'Le fotodinamiche futuriste in realtà le abbiamo materialmente realizzate io e Arturo, poi Anton Giulio ne scrisse e ne teorizzò. Ma non ci ritenevamo espropriati perchè lui era comunque sempre il nostro grande ispiratore'" (He [Arturo] was actually behind the activities of his more famous brother. "We actually made the photodynamic [images], Arturo and I, then Anton Giulo would write and theorize about them. But we felt dispossessed [of our work] for he was always our greatest inspiration"). There is a remarkable consonance between Luciano Folgore's claim and Carlo Ludovico's.

440 Anton Giulio Bragaglia, *Fotodinamismo futurista* (Rome: Nalato, 1911; reprinted 1980). No complete translation of this work exists—some excerpts, translated by Caroline Tisdall, appeared in *Studio International* 190, no. 976 (July–August 1975): 12–16, and were reprinted in *Futurist Manifestos*, ed. Apollonio, 38–45. The most extensive translation, by Lawrence S. Rainey, appears in *Modernism/modernity* 15, no. 2 (April 2008): 363–79. A very good article on *fotodinamismo* is Sarah Carey, "From *fotodinamismo* to *fotomontaggio*: The Legacy of Futurism's Photography," *Carte Italiane* 2, no. 6 (2010): 221–37.

441 Quoted in Tisdall and Bozzollo, *Futurism*, 140.

442 Quoted in ibid., 137–38.

443 Anton Giulio Bragaglia, "Fotodinamica Futurista." In English: "Futurist Photodynamism," in *Futurist Manifestos*, ed. Apollonio; the passage cited appears on page 39.

444 Tisdall and Bozzolla, *Futurism*, 138.

445 Bragaglia, "Futurist Photodynamism," quoted in Tisdall and Bozzolla, *Futurism*, 138.

446 1916 was an important year for the Futurists' involvement with the cinema, for it was also the year that Marinetti, at last confronting the issues raised by the cinema's existence, wrote the "Manifesto della cinematografia futurista," which stimulated Arnaldo Ginna to make *Vita futurista*.

447 *Thaïs* and *Il perfido incanto* are often said to be variant titles for the same film. They are not: *Thaïs* was passed by the censor board on 22 January 1917, at a length of 1,446 meters; *Il perfido incanto* was approved by the censor board on 4 July 1917, at a length of 1,389 meters. The character, Thaïs Galizky (not Galitzky, as is commonly given), appears in both, which is a likely source for the confusion. *Il perfido incanto* may have been a sequel to *Thaïs*, a result of the latter's success.

448 Quoted in Tisdall and Bozzolo, *Futurism*, 145.

449 Antonella Bragaglia's characterization is cited in ibid., 145.

450 We might conjecture that the reciprocal fact is also true: the existence of the cinema—a medium that seemed destined to present the actions of consciousness as it operates in extreme states—was one of the factors that, together with their occult interests, helped shape the Futurists' ambitions to show states of the soul.

451 One might approach it from the opposite direction—as the product of a recognition that the Variety Theatre attempted to bring the theatre into the postmodern era by enriching it with devices drawn from (or based on) the cinema. Already in the "Variety Theatre" manifesto, Marinetti had declared, "The Variety Theatre is unique today in its use of the cinema, which enriches it with an incalculable number of visions and otherwise unrealizable spectacles." Perhaps Marinetti had concluded, in the three years that separated "Il teatro di varietà: Manifesto futurista" (29 September 1913) from "La cinematografia futurista" (11 September 1916), that, rather than enriching the theatre with the means of the cinema, one would be better off actually turning to the cinema.

452 Arnaldo Ginna and his brother Bruno Corra were more closely associated with the more Surrealistic Florentine Futurists (the *secondo futurismo fiorentino*, the second [renewed] Futurism, which developed after the Great War, in which the Florentine group had a significant role). Both were students of occult science, Theosophy, Asian philosophy, alchemy, and alternative medicine. Those occult interests are evident in Ginna's "L'uomo futuro." If Ginna's and Corra's writings on abstract film seem marginalized works in the Futurist canon, perhaps that is because the Milanese and the Florentine Futurists were never on equal terms. I would not take their lack of impact as evidence of a relative indifference on the Futurists' part towards the cinema itself.

453 Corra, "Abstract Cinema—Chromatic Music," in *Futurist Manifestos*, ed. Apollonio, 66. The Tyndall referred to is the Irish physicist John Tyndall (1820–1893). His early work concerned dimagnetism (dimagnetic materials produce a magnetic field in opposition to an externally applied magnetic field), infrared radiation (electromagetic radiation with wavelengths longer than those of visible light), radiant energy, heat absorption, and the differential scattering of light waves of different colours (which accounts for why we see the sky as blue).

454 Carlo Carrà, "The Painting of Sounds, Noises, and Smells," in Rainey, 155–59 at 156.

455 Mauro Montalti, "Per un nuovo teatro 'elettro—vibro—luminoso,'" *Roma futurista: Giornale del partito politico futurista* 3, no. 53 (4 January 1920): 2. In English: "For a New Theatre: Electric-Vibrating-Luminous," in *Futurist Performance*, ed. Kirby, 222; emphasis in original.

456 Arnaldo and Bruno Corradini (a.k.a. Arnaldo Ginna and Bruno Corra), "A. B. C. Metodo," first published as "A.B.C." (Ravenna: Tipo-Lido Ravegnana, 1910); collected as "A. B. C. Metodo" in *Manifesti futuristi e scritti teorici di Arnaldo Ginna e Bruno Corra*, ed. Mario Verdone (Ravenna: Longo, 1984), 49–79 at 64.

457 Both quotations can be found in Arnaldo Ginna, "Pittura del'avvenire" (1905) in *Manifesti futuristi e scritti teorici di Arnaldo Ginna e Bruno Corra*, 203. Of course, as we know (despite Mario Verdone's assent to Ginna's claim—see his introduction to *Manifesti futuristi e scritti*, 12), Ginna was not the first painter to create pure, abstract paintings: the first were produced by Mr. Prince, Miss Macfarlane, and Mr. John Varley and appear in the book I have mentioned as the source of Ginna's ideas on painting feelings, viz., Annie Besant and Charles Leadbeater's *Thought-Forms* (London: Theosophical Publishing House, 1901). The paintings in that volume are *pittura occulta*, made up of constructed forms that are *astratti, irreali, e occulti*. (Reproductions of the images can be found at http://www.fulltable.com/VTS/c/cbk/tf/tf.htm. Some have a remarkable resemblance to abstracts that the great Canadian painter and pioneering abstractionist Lawren Harris produced late in his career, from 1934 to 1970. This should not be surprising: Harris was a devoted Theosophist.)

458 That the painting is titled *Nevrastenia* (Neurasthenia) lends support to a thesis of this book, that an electromagnetic conception of reality would lead to an art offering representations not of defined, bounded objects, but of flows. Neurasthenia, it might be recalled, was understood as the result of overloading the electrical system that operates human beings—the painting suggests those flows and the emotional lassitude they induce.

459 Ginna, *Manifesti futuristi e scritti teorici*, 106.

460 Ginna, "Pittura dell'avvenire," 202.

461 Bruno Corra, A. Ginanni, Remo Chiti, Settimelli, Mario Carli, and Nerino Nannetti, "La scienza futurista (antitedesca, avventurosa, capricciosa, sicurezzofoba, ebbra d'ignoto)," *L'Italia futurista* 1, no. 2 (15 June 1916): 1. (*L'Italia futurista* was the central organ of the Florentine Futurists.) "La scienza futurista" was reprinted in Ginna,

*Manifesti futuristi e scritti teorici*, 205–9 at 208. It is also reprinted in PierLuigi Albini, *Manifesti futuristi: Scienza, machine, natura* (2003), 32–34 at http://venezian.altervista.org/Ebook/Manifesti_futuristi_scienza_macchine_natura.pdf.

462 There was some ambiguity around the dating of the films. Corra states that they were made "between last June and October," leaving some doubt as to whether this was June to October 1911 or June to October 1912. Giannalberto Bendazzi has proved conclusively that it must have been 1911. See his "The Italians Who Invented the Drawn-On Film Technique," *Animation Journal* 3–4 (Spring 1996): 69–84, and online at http://www.giannalbertobendazzi.com/Content/resources/pdf/Animation-Essays/Ginna_and_Corra_1996.pdf. Bendazzi acutely points out the significance of this early date:

> The most important ramifications to arise from our study of Corra's text come from the dating of the films of Ginna and Corra. We now know that an abstract cinema was born at almost the same time as abstract painting, since Wassily Kandinsky's first experiments with abstracting landscapes began in his watercolors around 1910. Therefore, we must overturn what has been considered common knowledge, viz., that abstract cinema began (around 1921, the date of Walther Ruttmann's *Lichtspiel: Opus I*) as an imitation and derivation of abstract painting—that Painting, the "higher" form of Art, had opened the way and inspired the "lower" art of cinema. In fact, abstract cinema was born from its own roots independent of painting. (73)

463 The Turin literary critic Enrico Thovez's (1869–1925) *Il pastore, il gregge e la zampogna* (Naples: Riccardo Ricciardi Editore, 1910) proposed the ideal of pure lyricism, which he understood essentially in the manner of Vladimir Solovyov (Влади́мир Соловьёв; Vladímir Solov'jov, 1853–1900), as the immediate expression of a pure love that is akin to delight in the world's beauty (though infused with lofty moral ideals). Thovez's work was ruthless in exposing what he felt was the backwardness of Italian culture (really, only Dante and Leopardi were completely spared his condemnation), and he was especially appalled by its tendency towards Arcadian academicism. He also rejected the distinction between a poetry of form and a poetry of content, thus making it possible to stake moral claims for lyrical expression. Thovez wrote forcefully, so this statement of his views on Italian literature provoked outrage.

464 It is likely that these films (as, essentially, experiments) had no titles and that the titles I am using were assigned retrospectively, by people writing about the Corradini brothers.

The painting *Una corda di colore* is based on is likely *Riposo all' ombra* (Resting in the Shade, 1892), an image of girl lying in the shade. Readers who are familiar with Segantini's *oeuvre* must be asking why these pioneers of postmodern art would interest themselves in that painter. "His colours" might come close to answering the question, but it's not exactly right. Another piece to help solve the puzzle is that as a thinker and in his lifestyle, the alpine artist was more progressive than one might imagine. In his early career, he was associated with the *Scapagliature* (The Dishevelled), who adopted the position that so many in the avant-garde did, of advocating that life itself should be transformed into a form of art. He was also associated with the Milanese *Arte nuova* furniture maker and architect Carlo Bugatti (1856–1940) and the Buddhist-influenced Divisionist landscape painter Emilio Lononi (1859–1932). He later embraced both the Symbolist philosophy and the Symbolist manner and, under the influence of an art dealer devoted to Symbolism, began to separate his colours into contrasting complementaries and to paint in the Divisionist manner. He also began studying the works of Gabriele D'Annunzio, the death-haunted Symbolist poet and playwright Maurice Maeterlinck (1862–1949), and the great artist-scientist (and

student of phytomorphism and of love as interpersonal magnetic attraction), Johann Wolfgang von Goethe (1749–1832).

465 Cited in G. Bendazzi, *Cartoon: Il cinema d'animazione 1888–1988* (Venice: Marsilio Editori, 1988), 19.

466 This interest in flowers is not accidental, but suggests the deep affinity of postmodern art for phytomorphism.

467 Carlo Carrà, "The Painting of Sounds, Noises and Smells," in Rainey, 156, where "the wireless imagination" starts a new paragraph; In Italian original: "La pittura dei suoni, rumori e odori," in *Archivi del futurismo*, 73–76 at 74.

468 Ibid. In Rainey et al., eds., 155; in *Archivi del futurismo*, 73.

469 Ibid. In Rainey et al., eds., 156; in *Archivi del futurismo*, 74.

470 Ibid. In Rainey et al., eds., 156–57; in *Archivi del futurismo*, 74.

471 Ibid. In Rainey et al., eds., 157; in *Archivi del futurismo*, 74.

472 Quoted in Gustav Kahn, "Seurat," *L'art moderne* 11, no. 14 (5 April 1891): 107–10; in English: *Seurat in Perspective*, ed. Normal Broude (Englewood Cliffs: Prentice-Hall, 1978), 20–26.

473 Ibid. In Rainey et al., eds., 157–58; in *Archivi del futurismo*, 74–75.

474 Ibid. In Rainey et al., eds., 158; in *Archivi del futurismo*, 75.

475 Charles Olson, a poet and theorist deeply influenced by A.N. Whitehead's electrological theories, offers a definition of a poem and a description of a poem's manner of operation that bears startling similarity to Carrà's ideas:

> A poem is energy transferred from where the poet got it (he will have some several causations), by way of the poem itself to, all the way over to, the reader. Okay. Then the poem itself must, at all points, be a high energy-construct and, at all points, an energy-discharge. So: how is the poet to accomplish same energy, how is he, what is the process by which a poet gets in, at all points energy at least the equivalent of the energy which propelled him in the first place, yet an energy which is peculiar to verse alone. (Olson, "Projective Verse," in *Collected Prose*, ed. Donald Allen and Benjamin Friedlander [Berkeley: University of California Press, 1997], 239–49 at 240)

A sign of how advanced the Futurists were in developing an electrological theory of art is that Olson states that these ideas are "just now" (1950) beginning to be examined. The Futurists had been working with those ideas forty years earlier.

476 Carrà, "The Painting of Sounds, Noises and Smells," in Rainey, 158; in Italian original: "La pittura dei suoni, rumori e odori," in *Archivi del futurismo*, 75.

477 Ibid., 158 in Rainey, 75 in *Archivi*.

478 *Il funerale dell'anarchico Galli*, based on the conflict between police and demonstrators, was painted from 1910 to 1912. In the autumn of 1911, Marinetti had taken the Futurists to Paris, where they saw Cubist paintings in the flesh. Carrà responded as though to a revelation, and reworked the canvas to produce a work in which harshly hatched reds and blacks converge towards the painting's centre (such centralizing devices, with outward-developing echoes, can be considered examples of electromorphic art's technotronic features), drawing the spectator into the centre of the painting. Such forms really do impress an arabesque of force-lines on the spectator's soul.

These ideas would lead Carrà towards a fundamental cinematic principle, viz., collage construction. In 1914 he would go even further, in painting another great work, *Manifestazione interventista* (Interventionist Demonstration), which combined Marinetti's *parole in libertà* with (the proto-Surrealist, proto-Cubist) Apollinaire's ideograms. That work is a paradigmatic instance of postmodern electromagnetic form, with energies radiating from a centralized pole.

479 Carrà, "The Painting of Sounds, Noises and Smells," 158–59; in Italian, *Archivi*, 75–76.

480 Corra, "Abstract Cinema—Chromatic Music," in *Futurist Manifestos*, ed. Apollonio, 66.

481 Ibid., 67. Note that the comment relating *notturni* to violet and *mattinate* to green connects colour to solar patterns. It should also be pointed out that the Corradini brothers were not the only Theosophically-inclined artists to create a device based on ideas of parallels between colour and music. In fact, interest in so-called colour organs was fairly common in Theosophical circles (see Elder, *Harmony and Dissent: Film and Avant-Garde Art Movements in the Early Twentieth Century* [Waterloo: Wilfrid Laurier University Press, 2008], 44–81).

482 Boccioni, "La pittura futurista," in *Altri inediti e apparati critici*, 11. Here Boccioni makes a connection, common in these times, that relates thought-forms (feelings, projected as colours onto the astral plane) to electromagnetic phenomena capable of affecting a soul through induction.

One might take the passage as confirming that Boccioni's resistance to the cinema was motivated by his belief that the cinema is simply a device for mechanically producing reproductions. But it can also be read as calling for an art that would be like a cinema whose deeper possibilities (those recognized by the Corradini brothers) had been realized. The latter construal seems to me more faithful to the text.

483 Corra, "Abstract Cinema—Chromatic Music," 67.

484 It is perhaps worth pointing out that much work has been done in the last decade showing how common colour was even in the early years of cinema. Readers who haven't seen the colour restorations of Georges Méliès's films have missed something wonderful.

485 Ibid.

486 Ibid., 68. Re: "gradual and uniform sequence of chromatic themes"—this suggests that Corra (unlike Carrà) believed the analogy to music demanded that the importance of harmony be acknowledged; "cataclysm of incomprehensible colors" suggests that the colours were not clearly distinguished from one another—unlike music, there was no specific vibratory frequency or range of vibratory frequencies that could be identified as $red_2$ or $blue_2$, while in music there is a frequency we recognize as $C_2$ and another we recognize $D_2$; and without articulated parts, there can be no harmony.

487 Ibid. Re: "decided to consider the film to be coloured as divided into bars"—the conception of such a division provides for articulating a flow into distinct parts (see endnote 486); the "space between four perforations" represents the height of a 35mm film frame; "for one complete rotation of the switch," that is, for one complete frame.

488 Ibid.

489 Ibid. Re: "a white canvas soaked in glycerin"—this soaking was probably done in the hope that the colours would bleed together; "a tinfoil surface" was probably used in the hope the colours might merge in being reflected; "very fine gauze penetrable by the light rays"—a fine screen would diffuse the light into clouds of colour "chromatic music" (and Corra probably chose chromatic music as his term for a medium that shapes coloured light to emphasize the analogy to music, in which the continuum of possible pitches is divided, on a harmonic principle, into a dozen set pitches); "serves us adequately" could be read as an assertion on Corra's part that the Corradini brothers could not achieve the desired effect by projecting pure coloured light onto a screen; in fact, the passage suggests they were experimenting with an immersive atmospheric effect, with light being bounced off white canvas on the walls of the hall, white paint over the whole room, and people sitting in the audience in white suits.

The Theosophical composer Alexander Scriabin, who shared the Corradinis' and Carrà's belief that synaesthesia produced metaphysical revelations, had the performers of his *Прометей: Поэма огня* (Prometej: Pojema ognja; Prometheus: A Poem of Fire,

1911), a symphony-with-light-show, wear white—and he hoped that the audience would, too. He did so for the same reason that the Corradini brothers imagined their audiences wearing white: so that their bodies would pull invisible colours out of the aether. That cinematic effect would make visible the creative universal (a.k.a. universal dynamism).

490 Ibid., 69.

491 Ibid., 69. Re. "fills the whole screen" and the preceding two sentences—the remarks just made, and those to come, clearly describe the articulation of definite colours (see endnotes 486 and 487); "an example of a linear, as well as chromatic, theme"—line and chroma relate in visual art as melody and harmony do in music; "the solar spectrum"—note the solar allusion, and the correspondence suggested between the colours composing the solar spectrum and the tones in a (non-chromatic) musical scale; "the seven colors of the solar spectrum" are red, orange, yellow, green, blue, indigo, and violet; "columns and lines, interpenetrating, deforming, etc." suggests the interpenetration of force fields.

492 This was also the phase during which Giacomo Balla published his "Manifesto futurista del vestito da uomo." That manifesto was first published in Milan by the Direction du mouvement futuriste (F.T. Marinetti), as a four-page booklet, "Le vêtement masculin futuriste." It was rewritten in September 1914 by Marinetti with the new title "Il vestito antineutrale" (11 September 1914), also published by Marinetti as a four-page monograph. An earlier draft, slightly different in content and likely penned at the end of 1913, was translated and reprinted as "Futurist Manifesto of Men's Clothing 1913," in *Futurist Manifestos*, ed. Apollonio, 132–34; "Il vestito antineutrale" appears in an English translation as "The Anti-Neutrality Suit," in Emily Braun, "Futurist Fashion: Three Manifestoes" *Art Journal* 54, no. 1 (Spring 1995): 34–41 at 39.

493 Balla and Depero, "Futurist Reconstruction of the Universe" (leaflet) (11 March 1915). In English: in Rainey, 209–10.

494 Corra, "Abstract Cinema—Chromatic Music," 69–70. The Italian titles for the two films are *L'arcobeleno* and *La danza*.

495 The Dadaists' version of individualism suggested that by getting in touch with the deepest levels of the self, where one is most completely individuated, one reaches a point where one can easily go beyond the deep self and make contact with cosmic forces (as it is the cosmos that shapes the unique attributes of each individual being). Furthermore, Raoul Hausmann, as well as many other twentieth-century artists and the philosopher Arthur Schopenhauer, often identified this life-force with ultimate reality, in which all that is, is united in a single organism (a biocosmic reality, we might say). Among the Dadaists, Hausmann certainly adopted the view that reality is a biocosmic form akin to energy. On this topic, one might consult Timothy O. Benton, *Raoul Hausmann and Berlin Dada* (Ann Arbor: UMI Research Press, 1987), 8–9. The Merz-Dada artist Kurt Schwitters expressed something similar: "If you can see the essence of a work of art then it appears to you…as a unity…as a thing that grows out of itself…and which does not differ in essence from other…entities in Nature." Schwitters, "Art and the Times," originally in *Ray* (1927), quoted in John Elderfield, *Kurt Schwitters* (London: Thames and Hudson, 1985), 137. This hope of having the form of an artwork arise out of the dynamics of a biocosmic reality was not restricted to the *Dadaisten*: an important strain in European Constructivism was committed to transcending individual self-expression and to giving the processes of artistic creation over to the Universal.

496 Marinetti, *I manifesti del futurismo*, 92–93. In English: in Rainey, 122–23; I have changed the manner of emphasis to conform to Marinetti's original publication. The Italian for the passage I highlighted (it is not highlighted in the original) reads, "Il

cinematografo ci offre la danza di un oggetto che si divide e si ricompone senza intervento umano. Ci offre anche lo slancio a ritroso di un nuotatore i cui piedi escono dal mare e rimbalzano violentemente sul trampolino. Ci offre infine la corsa d'un uomo a 200 chilometri all'ora. Sono altrettanti movimenti della materia, fuor dalle leggi dell'intelligenza, e quindi di una essenza più significativa."

497 Ibid., 123.

498 The work bears comparison with Guido Severini's *Mare = Battaglia* (1914), an extraordinary painting that connects water-waves, aetheric messages (suggested by the incorporation of COMPENETRAZIONE), and tumultuous—or more exactly swirling (vortical)—change, all in a work of visual poetry (*parole in libertà*) whose use of language is punning, playful, and plurisemic, much in the way that newspaper headlines sometimes are. Furthermore, in *Mare = Battaglia*, fake headlines seem to be drawn down from the vortex to become thought-forms (or to merge into a document of consciousness, rather as they enter the text of *Ulysses*'s "Aeolus" section, which similarly straddles the objective and subjective realms, or, more accurately, belongs to a domain in which there is no distinction between the subjective and the objective). "Aeolus" climaxes with the "Vision of the Plums," a high-angle view of a city, laid out in circles—like an expanding electromagnetic field.

499 Linda Landis, "Futurists at War," in *The Futurist Imagination*, ed. Anne Coffin Hanson (exhibition catalogue, Yale University Art Gallery, New Haven, 13 April–26 June 1983), 60–75.

500 In English: in Rainey, 147.

501 In English: "Futurist Cinema," in Rainey, 231.

502 Ibid., 231.

503 Ibid., 230. I have introduced the underlining, to highlight the claim that the Futurists actually concluded that the cinema is the *ottima arte*, at least for the Futurist sensibility, and that the cinema could serve as a model for reshaping the other arts. All other emphases are in the original.

504 *Natura naturas* became simply another expression for the nexûs of all electromagnetic fields. The idea that thought-forms can be projected into the aether, where they persist, had an incredible influence in the first half of the twentieth century, and continued to influence artists right into the twentieth century's last decade.

505 Renato Barilli, "The Birth and Evolution of the Contemporary Age," in *The Science of Culture and the Phenomenology of Styles*, 124.

506 Hans-Robert Jauss, "1912: Threshold to an Epoch. Apollinaire's 'Zone' and *Lundi Rue Christine*," trans. Roger Blood. *Yale French Studies* 74 (Phantom Proxies: Symbolism and the Rhetoric of History): 39–66. Most of the passages Jauss quotes come from *Méditations esthétiques: Les peinture cubists* (Jauss gives their exact sources).

507 Alfred North Whitehead, *Science and the Modern World* (Cambridge: Cambridge University Press, 1926), 69.

508 Alfred North Whitehead, *Process and Reality: An Essay in Cosmology* (1929), corrected edition, ed. David Ray Griffin and Donald W. Sherburne (New York: Free Press, 1978), 21.

509 Marinetti, "Let's Murder the Moonlight!," in Rainey, 54–61 at 59.

510 Leo Steinberg, "The Eye Is Part of the Mind," *Partisan Review* 20, no. 2 (1953): 194–212. Reprinted in Steinberg, *Other Criteria: Confrontations with Twentieth-Century Art* (New York: Oxford University Press, 1988), 289–306 at 304.

511 Ibid.

512 Ibid.

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# INDEX


Abbaye de Créteil (art group), 339–41n157
*L'ABC du cinéma* (Cendrars), 343–44n181
Absolute, 91–92, 480–81. *See also* God
absolute space, relative *vs.*, 103–14
abstraction: in cinema, 238–40, 423, 553, 556–57, 637n462, 637–38n464; in Cubism, 108, 178–79, 187, 199–200; in dance, 242–43; modernism's preference for, 38, 42–43; representation in Cubism *vs.*, 178–79, 187, 199–200; as scientific, 580–81
abstract painting, beginning of, 555, 636n457
"The Aesthetic Hypothesis" (Bell), 36, 37–38
aesthetics: of abstract art, 43; aesthetic attitude, 74–75, 126n90; aesthetic experience, 37–39, 44–46, 120–21n6, 503; "boo-hurray" theory, 73–74; distancing in, 39–40; emotion and, 36, 38, 421; of Futurism, 421; ideas of, 82–83, 127n104; judgments on, 70–78; Kant on, 72–82, 126n90; modernist theory of, 38–44, 73; relational aesthetics, 120–21n6. *See also* beauty
aesthetic *vs.* rational ideas, 82–83, 127n104
aether, theories of, 427–29
*L'aficionado (Le torero)* (Picasso), 108
African American art, influence of, 273–75
African culture: influence of, 269, 273–74, 350–51n247. *See also* "primitivism"
African sculpture, 162, 272–73
Aiken, Edward, on Futurism, 420, 422

alchemy: allegories of, 434, 604n149; in Evola, 457–58; fusing sexes in, 452–54; in Marinetti, 451–56, 610–11n215; radiation compared to, 586n26; of Russolo's art of noises, 431–32, 533–34, 536–37; Section d'or and, 339–41n157; stages of, 452–56, 611n219
*Alcools*. *See* "Zone" (Apollinaire poem)
Aldini, Giovanni, electrical experiments of, 431
Alhazan, 64. *See also* Haytham, Ibn al-
*American Nervousness* (Beard), 116
"Analogie plastiche del dinamismo" (Severini), 500–502, 623n332
Analytic Cubism: heroic phase of, 172–73; lack of intuition in, 485–86, 488; Léger's rejection of, 214; transition to synthetic, 172–76, 180, 213–14; two-stage process of, 186–87; typographical signs in, 177, 226–27. *See also* Synthetic Cubism
Antheil, George: background of, 292–96; collaborators, 294, 296, 365nn315–16, 366–67n325; *Cyclops*, 298–300, 301, 367–68n328; on endocrinology, 365n314; on harmony, 307–8, 309–10, 369–70n351; influences, 292–93, 301, 362–63nn303–4, 363–64n307; interest in timing, 297–98, 304–6, 365–66n320, 368–69n337; patents of, 296, 312; Pound on, 296–98, 302–4, 306–7, 312, 315–16; "Treatise on Harmony," 307–8; use of repetition, 362–63n304; works of, 295–96, 307–8, 364n311. *See also Ballet Mécanique* (Antheil concert); *Ballet mécanique* (Léger/D. Murphy film)
*Antheil and The Treatise on Harmony* (Pound), 308, 315, 316–18
anthropocentrism: challenges to, 197, 320–21, 392, 568–69, 568–75. *See also* biocentricity
anthroposophy, 438, 448–50
anti-foundationalism, and critique of Purism, 232–33
Apollinaire, Guillaume: "L'anti-tradition futuriste," 141, 322n4; on cinema, 119–20n3, 146; on fourth dimension, 104, 105–6, 114, 133n156-57; on imitation *vs.* creation, 114, 318–19; innovations of, 167–68; *Les mamelles de Tirésias*, 452; *Les peintres cubistes*, 49; relationship with Picasso, 329n54; "Zone" (poem), 141–46, 168–69, 321n3, 574–75
"À propos de l'élément mécanique" (Léger), 232–33
*L'arcobaleno* (Corra/Ginna film), 567–68
Arendt, Hannah, 60, 124n55
art: cinema as, 23–24, 36, 119–20n3, 150, 261, 579; emotions provoked by, 36, 38, 421; Fiedler's defence of visual art, 88–89; forms of, 328n53; ideal forms in, 64, 125n69–70; impact of space-time on, 107; modernist view of, 17–18, 38; of noises, 431–32, 528–38, 615–17n256; *ottima arte*, 23–24, 261, 423, 573, 579–80; relation to reality, 38, 56, 87–88, 128–29n111; representation in, 38, 40–43; saltimbanques in, 329n54; spirituality and, 57; synthetic visual art, 272; as vivifying life, 515–16. *See also specific art forms*
Artaud, Antonin, "Alchemical Theatre," 586n26
*arte-azione*. *See serata futurista*

"L'arte dei rumori" manifesto (Russolo), 520, 528–36, 615–17n256
artisanal classes, rise of, 53, 123n39
artists: interest in the occult, 46, 131n139; leadership role of, 5
art of noises, 431–32, 528–38, 615–17n256. *See also* music
astral vision, higher dimensionality of, 50, 122n32

*Babel and Babylon* (Hansen), 245
Bacon, Francis, 53, 54, 56
Balla, Giacomo: on cinema, 422, 601n126; *Compenetrazione iridescente No. 1* (painting), 502; dramas of objects, 527–28; dynamism of, 502–4; *Fuochi d'artificio* (light show), 527–28; "Manifesto futurista del vestito da uomo," 640n492; noise instruments of, 530; "Ricostruzione futurista dell'universo" (manifesto), 516–18, 567; *Rumoristica plastica* BALTRR (painting), 531
ballet: diversity in, 268–70; *Within the Quota* (Léger/G. Murphy), 266–67. *See also* dance
*Ballet Mécanique* (Antheil concert): instruments used in, 291, 310, 370n354, 370–72n356, 372–74n358; intention of, 298, 366n324; performances of, 301, 313–15, 368n332; reaction to, 314–15
*Ballet mécanique* (Léger/D. Murphy film): actor-objects in, 207, 215–17, 267–68, 335n113, 338n135; Antheil's work on, 300–301, 310–18, 344n183, 356–58n285; choreography of, 306; collaborators on, 267–68, 285–91, 296, 356–58n285, 359–60n292, 360n294; Cubist aspects of, 28, 189; diversity in, 189, 268; financing of, 235, 285, 288; humans as objects in, 206–8, 217, 228; influences on, 238–39; music in, 305–10, 310–13, 315–16, 367–68n328, 370–72n356, 372–74n358; as machine art event, 310–13, 335n113, 356–58n285, 367–68n328, 370–71n356; nonactors in, 339n151; purpose of, 342–43n175; repetition in, 305, 362–63n304; rhythm in, 236–38, 267–68, 290, 304–5, 309; screening of, 313–14; shot analysis, 318; Surrealist aspects, 278, 353n267; synchronizing music with, 313, 356–58n285, 365–66n320, 367–68n328; use of montage in, 218–19; versions of, 281–82, 354n282-83, 355–56n284; "woman climbing stairs" scene, 216–17, 267–68
Ballet russes, diversity in, 268–69
ballets, mechanical. *See* mechanical ballets
Baraduc, Hippolyte, 443–44
Barilli, Renato, 4, 30n2, 459–60, 574, 612–13n240
Barney, Natalie, 287, 361n298
Barry, Iris, 355–56n284
Baudelaire, Charles, 90, 415
Beard, George, *American Nervousness*, 116–17
beauty: and cognition, 73; experience of, 74–75, 79–80, 126n90; types of, 72. *See also* aesthetics
Bell, Clive, "The Aesthetic Hypothesis," 36, 37–38
Bendazzi, Giannalberto, 637n462
Benjamin, Walter, 90, 245
Benn, Gottfried, 155
Bergson, Henri: on cinema, 416–18; on comedy in visual art, 206; influence on Cubism, 190–99; influence on Futurism, 408–10, 412–13,

414–19, 471, 474–75, 484, 597n92; on intuition, 102, 414–15, 417, 419, 474–75, 598n100; philosophy of, 127–28n109, 418, 471, 484–85; *Le rire*, 474; on time, 84, 147, 195, 416–19, 484, 598–99n104; view of reality, 9, 83–84, 190, 480
Besant, Annie, *Thought-Forms*, 444, 552, 555
biocentricity: of cinema, 568–69, 571–74; Dadaists on, 640n495; Marinetti on, 569–71, 572–73; urgency of achieving, 18. *See also* anthropocentrism
biocosmic art, role of machine in, 422
biodynamism, 435–38, 604n155
biomechanics, 248–49, 251, 257–59. *See also* human body
Black sculpture. *See* African sculpture
Blake, William: as electromagnetic artist, 459; *Europe, a Prophecy*, 11–12, 31n13; *The First Book of Urizen*, 12
Bloch, Ernst, 292, 362n303, 363n305
Boccioni, Umberto: anti-cinema stance of, 633n421, 639n482; *La città che sale* (painting), 514–15, 627n368; on dynamism, 485–89; on electricity, 621n315; "Gli espositori al pubblico," 417–18; on future of painting, 385–86, 423; on intuition, 485–90, 491–92; on motion in art, 484–85, 563–64; on photography, 545, 634n437; "La pittura futurista: Manifesto tecnico," 395–96, 408–11, 476–77, 493, 584n19, 615–17n256; *Pittura scultura futuriste*, 473, 485, 487–88, 491–92, 499–500; plasticity and, 461–62, 467–68, 499–500; on reality, 395–96, 463, 496; on sculpture, 412–13; "La scultura futurista," 412–13; spiritualism of, 627n370; on spirituality, 490–91; on states of mind, 471–73, 474, 479, 619n278; *Stati d'animo* (triptych), 471, 473, 474, 493, 617n263, 619n278; *La strada entra nella casa* (painting), 469–70, 477; on synaesthesia, 563–64
body, human. *See* human body
body-madness. *See* fisicofollia
Bogdanov, Aleksandr, *Proletkult*, 256
Bok, Mary Louise Curtis, 292, 363n305
"boo-hurray" theory of value, 73–74
Boyle, Robert, 58, 60–62, 125n63, 428
Bragaglia, Anton Guilo: films of, 550–51, 623n327, 635n447; "Fotodinamica Futurista," 547–48; *Il mio cadavere* (film), 551; *Il perfido incanto* (film), 551; photodynamism of, 545–49, 550
Bragaglia, Arturo, 545–46, 634–35n439
Bragaglia, Carlo Ludovico, 546, 634–35n439
Brain, Robert Michael, 400–401
Braque, Georges: *Broc et violon*, 170–71; *Clarinette et bouteille de rhum sur une cheminée*, 179–80; collage of, 178–80; contrasted with Picasso, 164, 166–67, 170–71, 173–75; Cubism of, 108–9; *faux-bois* technique, 185; *Le Grand nu*, 164; heroic period of, 172; interest in pictorial space, 173; *Maisons à l'Estaque*, 105, 149, 164, 324n27; *Le portugais*, 180; *trompe-l'oeil* of, 208; typographical signs in art of, 177; *Le verre d'absinthe*, 174
Brecht, Bertolt, 244–45
*Broc et violon* (Braque), 170–71
Brücke, Ernst, 115, 135n162
Bullough, Edward, 39–40
Burliuk, David, 541–42, 543
*Buste de femme* (Picasso), 166

Cage, John, 306
Calinescu, Matei, 331n82
*camera obscura*, 158, 326n39
Canudo, Ricciotto, 119–20n3, 350–51n247
Carrà, Carlo: *Il funerale dell'anarchico Galli* (painting), 562, 638n478; on Futurism *vs.* Cubism, 470; on infinite plasticity, 409; *Manifestazione interventista* (collage), 571–72, 641n498; "Manifesto dei pittori futuristi," 385–86; "La pittura dei suoni, rumori e odori," 553, 558–59, 560–62; on synaesthesic art, 557–59, 560–62
Carter, Huntly, 253–54
Cavendish, Henry, 425, 426–27
Celant, Germano, 607–8n194
Cendrars, Blaise: *L'ABC du cinéma*, 343–44n181; on cinema, 279–80, 281, 343–44n181, 353n269; collaborators of, 275–76; *La fin du monde filmée par l'Ange N.D.* (novel), 278–79, 353n269; *Moravagine*, 276–78, 516–17; mythic interests of, 276–79; poetry of, 280–81
Cézanne, Paul: influence of, 159, 160, 161, 188, 202–3; nude males in works of, 205, 334n108; on painting, 159–60; *passage*, 162–67, 326n45; process of, 162–63; rejection of Optical Realism, 158
Chaplin, Charlie, *The Rink*, 350–51n247
*chiaroscuro*, 173, 224–25
Chimelli, Luciano, 435–36
chromatic music, 564–65, 566, 639n486
chromatic piano, 563, 564
chronophotography, 547–48
Cigliana, Simona, 607–8n194
cinema: abstraction in, 238–40, 556–57, 637n462, 637–38n464; actor-objects in, 207, 215–17, 267–68, 335n113, 338n135, 552; artistic value of, 23–24, 36, 119–20n3, 150, 261, 579; biocentricity of, 197, 568–69; Cendrars on, 279–80, 281, 353n269; close-ups in, 216, 222; collective experience of, 243–46, 346n199, 392, 396–98; colour in, 564–68, 639n484, 639–40n489; dance in, 250, 265–66; dynamism of, 140–41, 222–23, 469, 615–17n256; early cinema, 23–24, 35–36, 119n1; Eisenstein on, 326n38, 336–37n124, 344n182, 601–2n128; as electromagnetic, 13–15, 20–23, 113–14, 578–79, 615–17n256; influence of, 27, 70, 189, 223, 261, 368–69n337; Léger on, 222–23, 234–35, 235–36, 270–73, 337nn126, 342–43n175, 344n182; as machine art, 298–99; modes of, 284–85, 358n287; montage in, 224, 279, 336–37n124, 601–2n128; music in, 310–18, 356–58n285; optical devices used in, 283; as *ottima arte*, 23–24, 261, 423, 573, 579–80; photodynamism and, 547; rhythm in, 236–38, 250–51, 267–68; Romains on, 396–97; synaesthesia in, 552–68, 637n462, 637–38n464; theatre and, 402–3, 518–28, 594n72; as threatening, 601n126; as transforming art, 503; variety theatre and, 538–39, 551, 635n451. *See also* film; Futurist cinema
*ciné-pupitre*, 356–88n285
*Cité de Paris* (Delaunay painting), 191
*La città che sale* (Boccioni painting), 514–15, 627n368
*Clarinette et bouteille de rhum sur une cheminée* (Braque), 179–80
*Clarinette* (Picasso), 175–76

*cloisonniste* technique, 163, 326n47
Coburn, Alvin Langdon, 283, 286, 288, 359n291
cognition: and beauty, 73; consciousness as, 5, 56–57; of Cubist paintings, 181–82; spiritual experiences and, 57, 124n48; and spirituality, 57; traditional view of, 6–7
cognitive judgments, 73
collage, 176–83, 183–87, 224, 339n154
collective experience: at Bauhaus, 244; of cinema, 243–46, 346n199, 392, 396–98; Le Bon and Romains on, 391–92; loss of self in, 143–44, 246, 476, 479, 511; sharing ideas in, 245, 346–47n203. *See also Unanimisme*; universal relations
colour piano. *See* chromatic piano
colours: in cinema, 564–68, 639n484, 639–40n489; liberation of, 205, 334n109; music of, 553; in Synthetic Cubism, 185–86
*compenetrazione*: in literature, 570; in painting, 460, 477; in variety theatre, 632–33n419. *See also interpenetrazione*
*Compenetrazione iridescente No. 1* (Balla), 502
*Compotier avec fruits, violon et verre* (Picasso), 188
conceptual realism. *See* new realism
*La conquête des étoiles* (Marinetti poem), 390
consciousness: as cognition, 5, 56–57; digital art as imitating, 497; as electromagnetic, 143; immediacy of, 49, 69, 122n25; impact of technology on, 146, 386–87; modern view of, 6
constructive realism. *See* new realism
Constructivism, 68–69, 238–39, 261
*Contra Venezia passatista* (manifesto), 388
Corra, Bruno: abstract cinema of, 556–57, 564–68, 630–40n489, 637n462, 637–38n464; L'arcobaleno (film), 567–68; background, 552; on chromatic music, 553, 562–65, 566, 639n486; *La danza* (film), 567–68; *Metodo*, 554–55; "La musica cromatica e i film astratti," 553, 556, 562–63, 565–68; "Il pastore, il gregge e la zampogna," 556–57; pseudonym of, 634n430
Corradini brothers. *See* Corra, Bruno; Ginna, Arnaldo
cosmos. *See* universe
Crary, Jonathan, on the senses, 86
*La Création du monde* (Milhaud/Léger ballet), 265, 271–72, 275
crisis of vision, 87–88, 155–62, 575–76
Crookes, William, 12–13, 549, 578
Crouch, Stanley, on African culture, 273
Cubism: basic themes in, 85–89, 89–103, 103–14, 114–19; as challenging anthropocentrism, 320–21; cinema and, 23–24, 27, 28, 186, 223; cognition of, 181–82; diversity in, 188–89, 270; first Cubist painting, 105; fourth dimension in, 49, 103–4, 122n28, 172, 328n53; Futurism *vs.*, 319–20, 405–6, 411–12, 487–88, 580–81; Impressionism *vs.*, 112, 133n154, 157; infinite plasticity in, 273–75; influences, 147–48, 159, 163, 190–99, 273–75, 331n79; metaphysics of, 576; musical forms in, 330n64; on perception, 110–12, 155–62; poetry, 144–45; representation in, 148, 153, 170–72, 174, 175–76, 318–19; simultaneity in, 104, 130n132, 163–66, 320, 412; space-time and, 103–8, 132n147; spatial form

in, 227–28; spiritualism of, 105, 131n139; techniques of, 163–64, 171, 176–83, 188–89, 326n47; on technology, 574; transitional phase of, 108–9, 172–76, 180
Cubism, Analytic. *See* Analytic Cubism
Cubism, Synthetic. *See* Synthetic Cubism
*Cyclops* (Antheil opera), 298–300, 301, 367–68n328

DADA, influence on *Ballet mécanique*, 238–39
*DADA, Surrealism, and the Cinematic Effect* (Elder), 14, 23–24, 27, 46, 62
dance: abstraction in, 242–43; based on myth, 272–73; human as machine in, 252; of machinery, 253–54; mechanization of, 265–66; montage and, 250. *See also* ballet
D'Annunzio, Gabriele, 382, 440, 583–84n12
*Danse macabre* (D. Murphy film), 266, 283–85
*La danza* (Corra/Ginna film), 567–68
Darget, Louis, *Photographie de la pensée*, 445, 606–7n186
Darwin, Charles, 8
Dedalus, Stephen, *Ulysses*, 69
Delacommune, Charles, 311, 313, 356–88n285, 370–72n356
Delaunay, Robert: *Cité de Paris* (painting), 191; influences of, 341n158; "Light," 191–93, 332n84; and Orphism, 575; view of perception, 192–93
Deleuze, Gilles, *Le pli*, 195–96
Del Massa, Aniceto, 449, 450
de Maré, Rolf, 266, 269
*Democrazia futurista: Dinamismo politico* (Marinetti), 441
*Les demoiselles d'Avignon* (Picasso), 105, 148, 149, 161–62, 163–64
Depero, Fortunato, "Ricostruzione futurista dell'universo," 516–18, 567
Descartes, René, 427–28
de Tarde, Gabriel, 498–99
Dickens, Charles, 274–75
Dilthey, Wilhelm, 99–100
dimensions, higher. *See* higher dimensions
*Discours de métaphysique* (Leibniz), 196
distancing, importance to aesthetics of, 39–41
"Distruzione della sintassi" (Marinetti et al.), 386–87, 615–17n256
diversity, in art, 188–89, 268–70
Divisionism, 218, 404–5, 514, 559. *See also* Impressionism
divisionism, dynamic, of Léger, 215, 218–19
Doull, James, 92–93, 100–101
Drake, Stilman, on Galileo, 53–54
drama of objects, 523–24, 527–28, 552. *See also* theatre
Duchamp, Marcel: *À propos de jeune soeur*, 331n78; collaborators of, 361n300
*Du cubisme* (Gleizes/Metzinger), 104, 131n134, 148, 150, 190–91
Dujardin, Édouard, 592–94n61
dynamic divisionism, of Léger, 215, 218–19
dynamism: in ballet, 266; Boccioni on, 485–90; of fourth dimension, 487; of Futurism, 380–81, 413–16, 469–76, 476–77, 479, 513–18; manifestos on, 500–501, 516–17, 623n332; of shapes, 560; universal dynamism, 408–10, 415, 477, 479, 503–4, 546–47. *See also* infinite plasticity

Eddington, Arthur, *The Nature of the Physical World*, 324–25n30
"Edison's Wonderful Vitascope," 20

*The Educated Imagination* (Frye), 148–49, 324n23
Einstein, Albert: as challenging Newtonian physics, 62; theory of relativity, 103, 112–13, 132n146, 257; *Zur Elekrodynamik bewegter Körper*, 105, 107, 132n144
Einstein, Carl, on "Negerplastik," 272
*Einstein, Picasso* (Miller), 52, 123n35
Eisenstein, Sergei, on cinema, 326n38, 336–37n124, 344n182, 601–2n128
electric fish, studies of, 425–27
electricity: as matter, 621–22n317; speed of, 482–83; spirituality of, 427, 603n137
electromagnetic art: cinema as, 13–15, 20–23, 113–14; phytomorphism in, 557, 638n466; visual forms in, 459–62, 612–13n240; of Whitman, 399, 592n59
electromagnetic cosmology: energy fields in, 10–11, 407–8, 464–66; of Futurism, 18–19, 403, 407–8, 467, 554–55, 574–75; shift to, 4–5, 8–9, 577. *See also* Newtonian cosmology
electromagnetic energy: consciousness as, 143; effect on nerves, 86–87; light as, 463–64; occultism and, 25, 554–56; thoughts as, 463, 577; ubiquity of, 466–67, 577. *See also* energy; force
electromagnetic force, 464–65, 554–55
electromorphism, 465–66, 615–17n256, 626n367, 629n389
Eliade, Mircea, 89
Emerson, Ralph Waldo, 156
empiricism, 12, 32n15, 61, 64–65, 125–26n72. *See also* science
energy: in art, 561, 638n475; ontological reality of, 10–11, 13. *See also* electromagnetic energy; force
*The Enneads* (Plotinus), 63–64
"espositori al pubblico, Gli" (Boccioni et al.), 417–18
eternity, unreality of, 194–95
ethical order (*Sittlichkeit*), 92
Euclidean geometry: challenges to, 51, 113–14. *See also* geometry
eugenics, poetic, 447. *See also* New Man
*Europe, a Prophecy* (Blake), 11–12
Evola, Julius, 449, 457–58, 609n207
Exter, Alexandra, 247–48
"The Eye Is Part of the Mind" (Steinberg), 580–81

facts: producing, 51–54, 58–62. *See also* knowledge
*La famille de saltimbanques* (Picasso), 329n54
Faraday, Michael, 463, 464
Fara, Patricia, 429
Fascism: events leading to, 376–78; Futurism and, 388, 406–7; mysticism of, 449; philosophy of, 448–51; racism of, 448–51, 608n196; rise of, 378–79. *See also* Mussolini, Benito
Faure, Élie, 36, 120n4, 342n167
*faux-bois* technique, 185
*Femme aux poires* (Picasso), 166
*Femme nue au bord de la mer* (Picasso), 164–65
Ferdinandov, Boris, on metro-rhythm, 249
Fiedler, Conrad, 87–89
Field, J.V., 55
film: painting on, 556–57, 564–68, 637n462, 637–38n464; paradoxical nature of, 198; as prosthetic for the senses, 154, 156–57; rhythm in, 236–38, 250–51, 267–68; soundtrack inventions, 370–72n356; spirituality of, 198. *See also* cinema

*La fin du monde filmée par l'Ange N.D.* (Cendrars novel), 278–79, 353n269
*Finnegans Wake* (Joyce), 320, 585n22, 586n26
*The First Book of Urizen* (Blake), 12
fisicofollia, 510, 512, 520–21
Flach, Sabine, 325n34
Florensky, Pavel, 257–58
Florentine Futurists, 402, 406–7, 596n85
force: electromagnetic, 464–65, 554–55; lines of (*line di forza*), 463–64, 472–73, 486, 513–15, 617n263, 617–18n265; notionality of, 10. *See also* energy; *linee di forza*
Foregger, Nikolaï, 248–49, 251–52, 348n217. *See also* Mastfor (studio)
"Fotodinamica Futurista" (A.G. Bragaglia), 547
Fotoplayer, 311, 357–58n285, 367n328; Antheil's use of, 310, 370–72n356
fourth dimension. *See* higher dimensions
Frank, Joseph, *Spatial Form in Modern Literature*, 328n53
free verse, 400–401, 592–94n61
Freud, Sigmund, 117–18, 134n161, 135n162, 136n171
*fröliche Wissenschaft, Die* (Nietzsche), 90, 129n114
Fry, Edward, 106
Frye, Northrop, *The Educated Imagination*, 148–49, 324n23
Fry, Roger, 41–42
Fuller, Loïe, *Ballet de lumière*, 265, 350n238
Fülöp-Miller, René, 252, 253, 258–60
*Il funerale dell'anarchico Galli* (painting by Carrà), 562, 638n478
*Fuochi d'artificio* (Balla), 527–28
"The Future of Futurism" (Samuel), 600n123
Futurism: on alchemy, 451–56, 610–11n215; on analogy, 475, 499–501, 506, 515, 573–74; basic themes in, 85–89, 89–103, 103–14, 114–19; biocentricity of, 568–75; cinematic nature of, 419–23, 469, 475; Cubism *vs.*, 319–20, 405–6, 411–12, 487–88, 580–81; dynamism of, 380–81, 413–16, 469–76, 476–77, 479, 513–18; electromagnetic cosmology of, 18–19, 403, 407–8, 467, 554–55, 574–75; Fascism and, 389, 406–7, 448; Impressionism *vs.*, 416, 468–69; influence of Bergson on, 408–10, 412–13, 414–19, 471, 474–75, 484, 597n92; influence of Symbolism on, 404–5, 411, 415, 476–77, 559, 585–86n24; intuition in, 485–86, 487–90; on literature, 489, 620n302; as machine art, 423, 601–2n128; on matter, 412–13, 569, 597n87; metaphysics of, 423, 488–89, 503, 554–55, 576, 624n338; New Man of, 433–35, 438–40, 445, 447–48, 496–97, 511–12; occultism of, 424–25, 432, 433–35, 554–55; origin of, 375–76, 378; on perception, 468–76; on photography, 545–46; on plasticity, 406, 412–13, 467, 473–74; publicity stunts, 388–89; Romani as predecessor, 406; on speed, 380, 385, 435, 481–82, 549; synaesthesia and, 478–79, 479–80, 553–54, 556–68; verse forms of, 400–402; on violence, 378, 384, 385, 387, 513, 627n379; on women, 381–82, 445–46, 583nn7–8, 607n189
Futurist cinema: of Hylea group, 541, 543; lack of, 538–39, 543–44; painting on film, 556–57, 564–68, 637n462, 637–38n464; works, 541, 543, 637n462, 637–38n464, 639–40n489; writings on, 386–87,

417, 539–41, 543–45, 547, 553. *See also* cinema
Futurist evening. *See serata futurista*
Futurist exhibitions, 471
Futurist groups, conflicts between, 596n85
Futurist manifestos: against *passéisme*, 388; bombast of, 387, 389; on cinema, 539–41, 543–45, 547, 553; on clothing, 640n492; on cooking, 583n8, 622n321; on dance, 615–17n256; on dynamism, 500–501, 516–17, 623n332; on electric theatre, 553–54; founding manifesto, 379–80, 381–82, 383–85, 399, 439, 582–83n4; on intuition, 400; on joy, 516–18, 567; on language, 441; on literature, 400, 475–76, 569–72; on mathematics, 113, 133n155; on noise, 615–17n256; non-Italian, 141, 247, 322n4, 540; on occult, 433, 556; on painting, 385–87, 395–96, 408–11, 469, 615–17n256; on *parole in libertà*, 146–47, 433; on photodynamism, 547; on politics, 441; on radio, 432–33, 437, 512, 604n157; on speed, 481–82; on *teatro sintetico*, 539, 632–33n419; on technology, 386–87, 615–17n256; on theatre, 382, 384, 402–3, 504–5, 512, 632–33n419; on variety theatre, 382, 506–7, 510, 518–21, 538–39, 628n383, 635n451
Futurists, Florentine, 402, 406–7, 596n85
"Futurist Stage," 522
Futurist theatre: cinema's influence on, 402, 403, 594n72. *See also sintesi teatrale*; synthetic Futurist theatre

Galilei, Galileo, 53–54, 55–56, 66, 124n46, 126n75
Galvani, Luigi, 8, 424–25, 429–30
Gance, Abel, *La roue*, 207, 222–23, 235, 275–76
Gastev, Alexei, 258–61
Gastevizing, 261–63
geometric forms, in cinema, 237, 238–40
geometry: challenges to Euclidean, 51, 113–14; *n*-dimensional, 51–52, 62–63, 123n34, 125n64; of space-time, 103
*Geschichte des Materialismus* (Lange), 96–97
Gibbons, Tom H., 122n28, 131n139, 132n147
Giedion, Sigfried, *Space, Time, and Architecture*, 103–7, 130n130
Ginanni, Maria, 544, 634n431
Ginna, Arnaldo: abstract works of, 555, 556–57, 564–68, 630–40n489, 637n462, 637–38n464; *L'arcobaleno* (film), 567–68; background, 552; chromatic music of, 563–65, 566; *La danza* (film), 567–68; *Metodo*, 554–55; *Nevrastenia* (painting), 555; pseudonym of, 634n430; "L'uomo futuro," 438–39; *Vita futurista* (film), 551–52
Gleizes, Albert: on Cubism, 49; Cubist works of, 189; *Du cubisme*, 104, 131n134, 148, 150, 190–91
God, 92, 195, 196. *See also* Absolute
Golding, John, 172
*Grafa enarmonica per gli intonarumori futuristi* (Russolo), 532, 535
*Le grand nu* (Braque), 164
Grant, George, 92, 93, 101–2
Greenberg, Clement, on Léger, 208, 212–13
Gris, Juan, 187, 331n75
"Großstädte und das Geistesleben, Die" (Simmel), 115, 134nn159–60, 140
"La guerra elettrica" (Marinetti), 493–96
Gunning, Tom, publications of, 119n1

Hamann, Johann Georg, 99
Hansen, Miriam, *Babel and Babylon*, 245
harmony, 302–10, 307–8, 309–10, 369–70n351
*Harmony and Dissent* (Elder), 14, 23–24, 45–46, 86
Hausmann, Raoul: on Leibnizian metaphysics, 195–96; "Manifeste de PRÉsentisme," 194–95, 196–97, 332n86, 333n88, 333n93; philosophy of, 195–96, 333n92–93, 640n495
Haytham, Ibn al-, 108, 132n148, 326n39. *See also* Alhazan
Hegel, G.W.F., 8, 30, 64, 90, 91–93, 101–2
Heidegger, Martin, 60, 101, 124n55
Helmholtz, Hermann, 86, 115, 613–14n249
Henderson, Douglas, 371n356, 372n358, 373n358
Henderson, Linda Dalrymple, 132n147; (with Bruce Clarke), *From Energy to Information: Representation in Science and Technology, Art, and Literature*, 349n225, 613n246

Henry, Michel, 65–68, 111
Hertz, Heinrich, 466
higher dimensions: and astral sight, 50, 122n32; in Cubism, 49, 103–4, 122n28, 172, 328n53; in Futurism, 487–88; in geometry, 51–52, 62–63, 123n34, 125n64; in music, 297–98, 366n324; as spiritual, 105–6
higher noesis, 46, 47
higher realism: Cubist quest for, 103, 176. *See also* new realism
Hinton, Charles Howard (also C. Howard), 50
Hitler, Adolf, 379
Hobbes, Thomas, 58, 59–62
Hoffmanthal, Hugo von, 240–41
*Homme au violon* (Picasso), 176
homologies, 107, 458–68
Honneger, Arthur, 269, 350–51n247
human body: in Léger's work, 228–35; as machine, 228, 258–64. *See also* biomechanics
human, new, 101, 232, 262, 447–48
Husserl, Edmund, *Die Krisis der europäischen Wissenschaften*, 65–66
Huygens, Christian, 428
Hylea (Futurist group), 540–43

imagination, reason and, 62–63
imagination, productive, 83
"Immaginazione senza fili" (Marinetti), 146
Impressionism: challenges to, 147–48; contrasted with Cubism, 112, 133n154, 157; influence on Léger, 219–20, 221; light in, 413. *See also* Divisionism
infinite plasticity: in art and culture, 273–75, 406, 473–74. *See also* dynamism
*L'inhumaine* (L'Herbier film), 295, 364n310
*The Innocent Eye* (Shattuck), 167–68
instantaneity, 167–70
instruments, musical. *See* musical instruments
*interpenetrazione*: in abstract art, 503; Cubist lack of, 487; description of, 484; in Futurism, 405, 487–88, 492–93; importance of intuition to, 485–90. *See also compenetrazione*
interrelation. *See interpenetrazione*
*intonarumori*, 537, 631–32n414
intuition: Bergson on, 102, 414–15, 417, 419, 474–75, 598n100; Futurism on, 400, 470; intellect *vs.*, 84
irrationalism, 95–102

Jacobi, Friedrich Heinrich, 99
James, William, on time, 48
Jaques-Dalcroze, Émile, 250, 347–48n214
Jarry, Alfred, 390, 505, 585–86n24
Jauss, Hans-Robert, 142–45, 574–75
*Jazz Style in Kansas City and the Southwest* (Russell), 273–74
Jeanneret-Gris, Charles-Édouard, 229–30
*Jeune fille à la mandoline* (Picasso), 175
Jouffret, Esprit, influence on Picasso, 52, 123n34
Joyce, James: Cubist aspects of, 167; *Finnegans Wake*, 320, 585n22, 586n26; Futurist aspects of, 585n22; *Stephen Hero*, 328n53; *Ulysses*, 70, 298, 350n242, 591n55; work with Antheil, 301
Juba, infinite plasticity of, 274–75
judgment, aesthetic, 70–78, 73

Kahn, Gustave, 400, 592–94n61
Kahnweiler, Daniel-Henry, 108, 177, 483
Kamensky, Vasily, 541, 542
Kandinsky, Wassily, 617–18n265
Kant, Immanuel, 6, 70–85, 94–95
Kepler, Johannes, 64
Kern, Stephen, 227
Kiesler, Frederick, 281–82, 354n281–82
Kirby, Michael, 538
knowledge: as affecting perception, 112; consensus and, 61–62; morality of, 97–98; non-objective, 66–67; non-rational, 57; reality of, 59
Koyré, Alexandre, 53, 123n40
Kozloff, Max, 181, 514
Kracauer, Siegfried, 245–46, 346–47n203
Kramer, Hilton, 162
*Krisis der europäischen Wissenschaften, Die*, Husserl, Edmund, 65–66
Kuleshov, Lev, 250, 251

Laforgue, Jules, 592–94n61
Lamarr, Hedy, 296, 365nn315–16
Lange, F.A., *Geschichte des Materialismus*, 96–97
language: attempts to mechanize, 260; as disconnected from reality, 97, 98, 130n125, 240–41, 345n191, 345n198; Fry's taxonomy of, 148–49; objects as, 277–78; role of perception in, 87. *See also* typographical signs; words
Lawder, Standish, 218
Leadbeater, C.W., 50, 444, 552, 555
*Leaves of Grass* (Whitman), 399, 592n59
*Lebensphilosophie*, 26–27, 195–96
*Lebensreform*, 437
Le Bon, Gustave: *L'évolution de la matière*, 621–22n317; *Psychologie des foules*, 391–92, 397, 587n30
Le Corbusier, 229–30
Lee, Anna, 250, 347–48n214
Léger, Fernand: abstraction in art of, 199–200; all-over forms of, 209, 210–11; "À propos de l'élément mécanique," 232–33; background of, 150–51; on capitalism, 233, 235; cinematic interest of, 222–24, 234–35, 235–36, 270–73, 337n126, 344n182; collaboration with Cendrars, 275–76; collaboration with D. Murphy, 267–68, 282, 285–91, 359–60n292, 360n294; collaboration with G. Murphy, 266; colour in works of, 205, 224–26, 334n109; criticism of Delaunay, 203, 334n104; Cubism and, 28, 199–200, 202–6; disc series of, 224,

225–26, 235; evolution of, 219–20; influences, 217–18, 272–73; mechanical period, 219–20, 225–27, 229; new realism of, 200–201, 211–12, 219–20, 336n121; objectifying humans, 206–8, 217, 220, 228; plastically organized intensity of, 207, 221; Purism of, 228–29, 232–35; in Section d'or, 339–41n157; theory of contrasts of, 213–19; typographical signs in art of, 226–27, 353n268. *See also Ballet mécanique* (Léger/D. Murphy film)
Léger, Fernand, works of: *La création du monde* (ballet), 265, 271–72, 275; *L'escalier*, 188; *La femme en bleu*, 213; *Les plongeurs*, 199, 333n95; *La noce*, 191; *Les nus dans la forêt*, 203–5, 213; *Le pont*, 202, 334n102; *Le typographe*, 226; *La ville*, 218–19, 221, 225, 235; *Within the Quota* (ballet), 266–67
Lehrman, Paul, *Ballet mécanique* and, 365–66n320, 370–72n356
Leibniz, Gottfried Wilhelm: *Discours de métaphysique*, 196; metaphysics of, 195–96
Leonardo da Vinci, 54, 123n45
Lessing, Gotthold Ephraim, 328n53
letters. *See* words
*Leviathan and the Air-Pump* (Shapin and Schaffer), 58–62, 63
L'Herbier, Marcel: on cinema, 207, 335n115; *L'inhumaine* (film), 295, 364n310
light: as electromagnetic, 404–5, 463–64; Impressionist interest in, 413; as intelligence, 577–78; in mechanical ballets, 265, 350n238; as related to electricity, 11, 21–22, 31n10; Tesla on, 11, 33n25; theatre of, 527–28; as used in cinema, 13–14, 23
"Light" (Delaunay), 191–93, 332n84
*linee di forza*, 463–64, 472–73, 486, 513–15, 617n263, 617–18n265
literary forms, inspired by cinema, 70
literature, modernism in, 167–68
Lobachevski, Nikolai, 51
Lodge, Oliver, 12–13, 621–22n317
Lombroso, Cesare, occultism of, 424, 603n134
Luchishkin, Sergey, on *Tragedija AOU*, 263–64
luminescence. *See* light

Macchiaioli group, relations with Futurists, 404, 595n79
machine art: cinema, 298–99, 367–68n328; dance, 252–54; Futurism as, 423, 601–2n128; mechanical ballets, 238–43, 246–47, 264–66; music, 311, 312; theatre, 345n281; *Ballet mécanique* as machine art event, 310–13, 335n113, 356–58n285, 367–68n328, 370–71n356
machines: beauty of, 231; fusing with humans, 511–13; rhythm of, 262; as spiritual, 379–80, 452, 497, 512, 625–26n358. *See also* technology
Magnetic Theatre, 528, 630n394
*Maisons à l'Estaque* (Braque), 105, 149, 164, 324n27
*Ma jolie (Femme à la guitare)* (Picasso), 179, 180–81
*Les mamelles de Tirésias* (Apollinaire), 452
*Manifestazione interventista* (collage by Carrà), 571–72, 641n498
"Manifeste de PRÉsentisme" (Hausmann), 194–95, 196–97, 332n86, 333n88, 333n93
"Manifesto dei drammaturghi futuristi" (Marinetti et al.), 512, 626n362
"Manifesto dei pittori futuristi" (Carrà), 386

"Manifesto della cinematografia futurista" (Marinetti et al.), 539–40, 543–45, 572–73, 633n421
"Il manifesto della cucina futurista" (Marinetti), 583n8, 622n321
"Manifesto della danza futurista" (Marinetti), 615–17n256
"Manifesto della declamazione dinamica e sinottica" (Marinetti), 433
"Manifesto del teatro futurista sintetico" (Marinetti/Settimelli/Corra), 402, 403, 519–20
"Manifesto tecnico della letteratura futurista" (Marinetti et al.), 400, 475–76, 569–72
Man Ray, 285–88, 288–91, 360n294, 361n300
Marc, Franz, 626n367
Marey, Étienne-Jules, chronophotography of, 547–48
Marinetti, Filippo Tommaso: alchemy in, 451–53, 610–11n215; on analogy, 475; on artist's leadership role, 5, 30n4; background of, 389–91, 592–94n61; on biocentricity, 569–71, 572–73; on crowds, 399–400; on D'Annunzio, 382, 440, 583–84n12; electromagnetic spirituality of, 432–33, 481–82, 493–96; on *fisicofollia*, 510, 512, 520–21; interest in life sciences, 447; on Italian art, 383–84; on language, 441; on modern life, 146, 323–24n14; on New Man, 433, 439–40, 447–48, 511–13; plays of, 403, 523–24; *Poesia* magazine, 385–86, 391; poetry of, 390, 456, 500, 592–94n61, 627–28n379; science fiction of, 600–601n124; support for photodynamism, 545, 547; Symbolism and, 382–83, 385, 390, 400–401, 475–76, 582–83n4; on technology, 386–87; on theatre, 384, 504–7; verse form of, 400–402, 592–94n61; on violence, 513, 627n379; on women, 583nn7–8
Marinetti, Filippo Tommaso, works of, 403; *La conquête des étoiles* (poem), 390, 592–94n61; *Democrazia futurista: Dinamismo politico*, 441; "Distruzione della sintassi," 386–87, 615–17n256; *Fondazione e Manifesto del futurismo*, 379–85, 399, 439, 442, 582–83n4; "La guerra elettrica" (fiction), 493–96; "Immaginazione senza fili," 146; *Mafarka il Futurista* (novel), 452–54; "Manifesto dei drammaturghi futuristi," 512, 626n362; "Manifesto della cinematografia futurista," 539–40, 543–45, 572–73, 633n421; "Il manifesto della cucina futurista," 583n8, 622n321; "Manifesto della danza futurista," 615–17n256; "Manifesto della declamazione dinamica e sinottica," 433; "Manifesto del teatro futurista sintetico," 402, 403, 519–20; "Manifesto tecnico della letteratura futurista," 400, 475–76, 569–72; *La nuova religione-morale della velocità*, 481–82; "Poesia simultanea della luce tessuta," 500; *Poupées électriques* (play), 505–6; "La radia," 437, 512, 604n157; "Risposta alle obiezioni," 146–47, 615–17n256; *Le Roi Bombance* (play), 505; *Tattilismo*, 433–35, 604n154; *Il teatro della sopresa*, 632–33n419; "Il teatro di varietà: Manifesto futurista," 382, 506–7, 510, 518–19, 520–21, 538–39; "Il teatro futurista sintetico," 384, 504–5, 523; "Uccidiamo il chiaro di luna!," 580; *Velocità* (script), 524–27, 629n389, 632n416; *Vengono: Dramma*

*d'oggetti* (play), 403; *ZANG TUMB TUMB* (poem), 456, 627–28n379
Martinoli, Ettore, 448–50, 608n196
Mastfor (Foregger's Workshop), 248–49, 252–54. *See also* Foregger, Nikolaï
Matisse, Henri, 160–61, 162
matters of fact, reality of, 58–59, 60; and consensus, 61–62
Maxwell, James Clerk, 31n10, 463–64
Mayakovsky, Vladimir, 540–43
Mazza, Armando, 391, 586–87n28
McLuhan, Marshall: on art's function, 5, 30n3; on collectivism, 299, 392–93, 587–88n37; on individualism paradox, 25–26; as late Futurist, 392–93, 587–88n37; on nerves, 118–19; on perception, 192–93; on science, 54; on simultaneity, 130n132, 320; on spatial form, 227–28; *Understanding Media*, 482, 492
mechanical art. *See* machine art
mechanical ballets, 238–43, 246–47, 264–66. *See also Ballet mécanique* (Léger/D. Murphy film)
mechanical period, of Léger, 219–20, 225–27, 229
mechanical sounds. *See Noise Orchestra* (Foregger)
*Das mechanische Ballett* (Schmidt-Teltscher), 238–40
Méliès, Georges, 523, 639n484
Merleau-Ponty, Maurice, on perception, 102–3
metaphysics: of Cubism, 576; of Futurism, 488–89, 503, 554–55, 576, 624n338; of Leibniz, 195–96; modern *vs.* pre-, 152; of Plato, 414
*Méthode de radiographie humaine* (Baraduc), 443
*Metodo* (Ginna/Corra), 554–55
Metzinger, Jean, *Du cubisme*, 104, 131n134, 148, 150, 190–91
Milhaud, Daris, *La création du monde* (ballet), 265, 271–72, 275
Miller, George I., *Einstein, Picasso*, 52, 123n35
Minkowski, Hermann, on space-time, 103, 107, 130n130, 132n146, 319
*Il mio cadavere* (A.G. Bragaglia film), 551
Möbius, Paul Julius, 117, 135–36n167
modernism: aesthetic theory of, 38–44, 73; on concordance, 40–41; influence of urban life on, 141, 321nn1–2; in literature, 167–68; modernist art, 17–18, 36, 38, 42–43, 47–48; on narrative, 48–49, 69–70, 126n79; on phenomenology, 49; postmodernism *vs.*, 15–17; start of, 458
Moholy-Nagy, 327n51
montage, in cinema, 224–26
Montalti, Mauro: electric theatre, 522–23, 553–54; "Per un nuovo teatro elettro-vibro-luminoso," 553–54
Moos, Michael A., 483
*Moravagine* (Cendrars novel), 276–77
More, Henry, 122n28
Moritz, William, 282, 288–90, 353n267, 354n281
Müller, Johannes, 86
Murphy, Dudley: *Danse macabre*, 266, 283–85; *The Soul of the Cypress* (film), 282–83; visual symphonies of, 282–83; work on *Ballet mécanique*, 267–68, 282, 285–86, 288–91, 356–88n285, 359–60n292; work with Man Ray, 285–88, 360n294
Murphy, Gerald, *Within the Quota* (ballet), 266
music: in cinema, 310–18, 356–58n285; of colours, 553, 564–65, 566, 639n486; fourth dimension in, 297–98, 366n324; harmony, 302–10,

309–10, 369–70n351; historical development of, 531; microtones in, 631n421; noise *vs.*, 534–35. *See also* art of noises
"La musica cromatica e i film astratti" (Corra), 553, 556, 562–63, 565–68
musical forms, in Cubism, 330n64
musical instruments, postmodern, 537, 631–32nn412–14
Mussolini, Benito, 378–79, 436, 438. *See also* Fascism
mysticism: Fascist, 449; solar, 396, 451, 453. *See also* spirituality
mythology: dance based on, 272–73; remaking in modern world, 142–43, 145

narrative: Cubist rejection of, 227; modernist view of, 48–49, 69–70, 126n79
nature, modern view of, 5, 7–8, 24–25
*Nature morte à la chaise canné* (Picasso), 184, 331n74
nature religion, of Third Reich, 604n156
"Negerplastik." *See* African sculpture
*Nerven* (Reinert film), 116
nerves: effect of electromagnetic energy on, 86–87; effect of *sintesi teatrale* on, 539; experiments involving, 115, 134n161; weakness of, 114–19, 135nn163–64
neurasthenia: Beard on, 116–17; in painting, 555, 636n458; period of interest in, 115–16; supposed causes of, 117–18, 136–37n171, 137n173; treatment of women with, 136n168
*Nevrastenia* (Ginna painting), 555
new human, 101, 232, 262, 447–48, 511–13. *See also* human body; New Man
New Man: of Fascism, 438–40, 448; of Futurism, 433–35, 438–40, 445–46, 447–48, 496–97; of Third Reich, 437. *See also* new human
new realism: Léger on, 200–201, 211–12, 219–20, 336n121. *See also* higher realism
Newtonian cosmology: challenges to, 13, 51, 62, 576; importance of material world in, 52–53; shift from, 4, 6, 11–12. *See also* electromagnetic cosmology
Newton, Isaac, 427, 428–29
new vision, 139–51
Nietzsche, Friedrich: *Die fröliche Wissenschaft*, 90, 129n114; "On the Genealogy of Morals," 96, 383, 584n14, 600n123; "On Truth and Lie in an Extra-Moral Sense," 130n123; *The Will to Power*, 97; on knowledge, 97–98; on modern life, 90, 96, 129n114; on will, 95–96, 129n121
Nikritin, Solomon, 255–58, 263–64
noesis, 46, 47
*Noise Orchestra* (Foregger), 252–53
noises, art of, 431–32, 528–38, 615–17n256
non-Cubism. *See* quasi-Cubism
non-European cultural forms. *See* "primitivism"
noumenal realm, Schopenhauer on, 93–94, 96
nouns. *See* language
*La nuova religione-morale della velocità* (Marinetti), 481–82
*Les nus dans la forêt* (Léger), 203–5, 213

objectivity, 65–67
objects: in cinema, 207, 215–17, 267–68, 335n113, 338n135, 552; drama of, 523–24, 527–28, 552; language as, 277–78; unifying with subject, 470–73

occultism: artistic interest in, 46, 131n139; electromagnetism and, 25, 198–99, 554–56; as response to modernity, 424; spirit photography, 443, 549. *See also* spiritualism
Olson, Charles, 209
optical devices, use in cinema of, 283, 286, 359n291
optical experience. *See* senses; visual experience
Optical Realism, 148, 157–58
Ornstein, Leo, 292, 362n303
Orphic painting, 575
Osborne, Harold, 42
Ozenfant, Amédée, 229–30

painting: on film, 556–57, 564–68, 637n462, 637–38n464; first abstract paintings, 555, 636n457; as a Futurist synthetic art, 385–400; ideal forms in, 64, 125n69–70; manifestos on, 385–87, 395–96, 408–11, 469, 615–17n256; Medieval view of, 159; monocular perspective in, 108; orphic painting, 575; spatial form in, 227–28
paper rolls, Antheil's use of, 297, 312–13, 365–66n320, 370–72n356, 372–74n358
*papier collé*, 178–83, 183. *See also* collage
*parole in libertà*, 400–402
paroptical vision, 396, 590–91n49
Parrhasius, Zeuxis and, 88, 128–29n111
*passage* technique, 163–64, 171, 188, 191
"Il pastore, il gregge e la zampogna" (Corra/Settimelli), 556–57
*Paysage, Horta de Ebro* (Picasso), 105
perception: art's role in shaping, 89; cinema as vivifying, 222–23; effect of understanding on, 158; Futurist theory of, 468–76, 570–71; reality of, 67–68, 178, 319, 330n68; role in language, 87; as unfolding over time, 162, 326n45. *See also* senses; visual experience
*Il perfido incanto* (A.G. Bragaglia film), 551
"Per un nuovo teatro elettro-vibro-luminoso" (Montalti), 553–54
phenomenology, modernism and, 49
philosophy: of Bergson, 127–28n109, 418, 471, 484–85; of Fascism, 448–51; of Futurism, 511–12, 518; of Hausmann, 195–96, 333n92–93, 640n495; Nietzschean, 101–2; pre-Socratic, 151–52
photodynamism, 545–49
photography: chronophotography, 547–48; Futurists on, 545; paradoxical nature of, 198; as prosthetic for the senses, 154–55, 156–57; of spirits, 443–44, 549; spirituality of, 198; of thoughts, 33n26, 155, 443, 445, 606–7n186
phytomorphism, 465–66, 557, 629n389, 638n466
pianola, 295, 300, 301, 305, 309, 311, 312, 313, 314, 335n113, 357n285, 363n307, 366n324, 367n328, 370–72n356, 372n358. *See also* player piano; Pleyel
Picabia, Francis, 361n300
Picasso, Pablo: Boccioni on, 485–86; Braque compared to, 164–67, 170–71, 173–75; collage of, 177–82; constant relearning of, 149, 324n26; influences, 52, 160, 161–62; misogyny of, 30n1; on reality, 18, 52, 63, 108, 125–26n72; relationship with Apollinaire, 329n54; simultaneity of, 163–64; techniques, 179–81, 184–86, 185, 188; transitional phase of, 172–76

Picasso, Pablo, works of: *L'aficionado (Le torero)*, 108; *Buste de femme*, 166; *Compotier avec fruits, violon et verre*, 188; *Les demoiselles d'Avignon*, 105, 148, 149, 161–62, 163–64; *La famille de saltimbanques*, 329n54; *Femme aux poires*, 166; *Femme nue au bord de la mer*, 164–65; *Guernica*, 627n368; *Homme au violon*, 176; *Jeune fille à la mandoline*, 175; *Ma jolie (Femme à la guitare)*, 179, 180–81; *Nature morte à la chaise canné*, 184, 331n74; *Paysage, Horta de Ebro*, 105; *Pipes, tasse, cafetière et carafon*, 179; *points de capiton*, 175–76, 177, 330n64; *Portrait d'Ambroise Vollard*, 171, 329n60; *Portrait de Daniel-Henry Kahnweiler*, 173–74; *Le verre d'absinthe*, 275
pictorial space, 173, 180, 182, 186
"La pittura dei suoni, rumori e odori" (Carrà), 553, 558–59, 560–62
"La pittura futurista: Manifesto tecnico" (Boccioni et al.), 395–96, 408–11, 476–77, 493, 584n19, 615–17n256
*Pittura scultura futuriste* (Boccioni), 473, 485, 487–88, 491–92, 499–500
plastically organized intensity, of Léger, 207, 221
plasticity, infinite: in art and culture, 273–75, 406, 473–74. *See also* dynamism
Plato, 56, 63, 64, 194–95, 414
player piano, 296, 299, 300, 301, 310, 311, 335n113, 357n285, 363n307, 365n315, 365–66n320, 367n328, 370n354, 370–72n356, 372–74n358. *See also* player piano rolls, Antheil's use of
player piano rolls, Antheil's use of, 297, 312–13, 365–66n320, 370–72n356, 372–74n358
Pleyel (Pleyel et Cie., French piano-manufacturing firm), 312, 313, 357n285, 363–64n307, 370–72n356, 372–74n358
*Le pli* (Deleuze), 195–96
Pliny the Elder, story of Zeuxis and Parrhasius, 128–29n111
*Les plongeurs* (Léger), 199, 333n95
Plotinus, *The Enneads*, 63–64
"Poesia simultanea della luce tessuta" (Marinetti), 500
poetry: of Apollinaire, 141–46, 321n3, 574–75; of Cendrars, 280–81; Cubist methods in, 183; forms of, 400–401, 403, 595n75; machine-aided, 280–81; of Marinetti, 390, 456, 500, 592–94n61, 627–28n379; of Pound, 464; simultaneity in, 168–70; on urban life, 141–46
Poincaré, Henri, *La science et l'hypothèse*, 51
pointillism. *See* Divisionism
*points de capiton*, in Cubism, 175–76, 177, 330n64
Pollock, Jackson, 208–10
*Le pont* (Léger), 202, 334n102
Porter, Cole, 266, 350n240
*Portrait d'Ambroise Vollard* (Picasso), 171, 329n60
*Portrait de Daniel-Henry Kahnweiler* (Picasso), 173–74
Posner, Bruce, 313, 355n284
postmodern era, musical instruments of, 631–32nn412–14
postmodernism: modernism *vs.* (differing periodization by philosophers and art historians), 15–17; start of, 458–59; view of nature, 25, 98
Pound, Ezra: on Antheil's music, 296–98, 302–4, 306–7, 312, 315–16; *Antheil and The Treatise on Harmony*, 308, 315, 316–18; on electromag-

netic forces, 464–65; on Futurism, 368n336; invention of vortoscope, 283, 286, 288, 359n291; involvement with *Ballet mécanique*, 286–88, 289–91, 344n184, 359–60n292, 372–74n358; optical devices and, 283, 286, 359n291, 360n294; poetic forms of, 403, 595n75; poetry of, 464; relationship with Antheil, 294, 296–310; on rhythm, 306–7; on urban life, 69–70; vortex theory, 613–14n249
*Poupées électriques* (Marinetti play), 505–6
Prampolini, Enrico, 479, 522, 528, 551, 630n394
Pratella, Francesco Balilla, 531, 534
pre-Socratic philosophers, 151–52, 325n31
Previati, Gaetana, 404
Priestly, Joseph, *The History and Present State of Electricity*, 425
"primitivism," 15, 49, 271, 351n250. *See also* African culture; traditional societies
primordial experience, 65–70, 407, 470, 479, 489–90
Princet, Maurice, 51–52, 122n32
process, reality as, 9–10, 18, 46, 624n338
productive imagination, 83
"Prof. Roentgen's Great X-Rays," 20
Projectionism: other names for, 349n222; principles of, 255–56; Projection Theatre, 258, 263–64
psychicones, 444
*Psychologie des foules* (Le Bon), 391–92, 397, 587n30
*pulchritudo adhaerens vs. pulchritudo vago*, 72
punched paper rolls, Antheil's use of, 297, 312–13, 365–66n320, 370–72n356, 372–74n358
Purism, 228–35; on beauty, 231–32; of Léger, 228–29, 232–35; principles of, 229–34
Puteaux Group of Orphists, 339–41n157
Pythagoreans, beliefs of, 230

quasi-Cubism, Léger and, 202–6

Rabinbach, Anson, 135n163
racism, of Fascism, 448–51, 608n196
"La radia" (Marinetti/Masnata), 437, 512, 604n157
radio, as exemplar of new age, 12–13, 578
radio waves, prediction of existence of, 31n10
Raphael, *La trasfigurazione*, 41–42
rationalism *vs.* empiricism, 65, 125–26n72
rational *vs.* aesthetic ideas, 82–83, 127n104
Raynal, Maurice, 49–50
Read, Herbert, 108
realism: in collage, 176–78; Cubist quest for higher realism, 103, 176; Léger on new realism, 200–201, 211–12, 219–20; Léger on pictorial realism, 214. *See also* representation
realism, optical. *See* Optical Realism
reality: dynamic view of, 91, 190, 476, 513–18; as electromagnetic, 491; language as disconnected from, 97, 98, 130n125, 240–41, 345n191, 345n198; of perception, 6, 67–68, 178, 319, 330n68; as process, 9–10, 18, 46, 624n338; relation to art, 38, 56, 87–88, 128–29n111; scientific view of, 324–25n30; senses as disconnected from, 34n27, 59–61, 85–89, 129n112, 151–55, 324–25nn30–31; of time, 84–85,

89–103; as understood through intuition, 84; unknowability of, 96–97; as vibration, 553–56
reason: Futurism on, 400; imagination and, 62–63; Le Bon's view of, 587n35; science setting standards for, 152–53; principle of sufficient reason, 94; as used to perceive reality, 6, 63–64, 575–76
Red'ko, Kliment, *Declaration on Electroorganism*, 255–56
Reghini, Arturo, 449–50
Reinert, Robert, *Nerven* (film), 116
relational aesthetics, 120–21n6
relations, universal, 476–79
relative space, absolute *vs.*, 103–14
relativity, theory of, 103, 112–13, 132n146, 257
Renaissance: on nude in art, 412, 598n95; on science, 54, 123n42
repetition, literal, 28, 268, 305, 318, 362n303, 363n304, 369n338
representation: abstraction in Cubism *vs.*, 178–79, 187, 199–200; in art, 38, 40–43; liberation from, 153; *points de capiton* and, 175–76, 177, 330n64; structure in Cubism *vs.*, 170–72, 175–76, 181, 330n64; in theatre, 509–10. *See also* realism
rhythm: Antheil on, 306–7; in *Ballet mécanique*, 236–38, 267–68, 290, 304–5; in cinema, 236–38, 250–51, 267–68; Ferdinandov on, 249; in film, 236–38, 250–51, 267–68; Pound on, 306–7
Richardson, John, 104, 131n135, 131n138
"Ricostruzione futurista dell'universo" (Balla/Depero), 516–18, 567
Riemann, Bernhard, 51
*Le rire* (Bergson), 474
"Risposta alle obiezioni" (Marinetti), 146–47, 615–17n256
Rivière, Jacques, 147–48
Robbin, Tony, *Shadows of Reality*, 123n34
*Le Roi Bombance* (Marinetti play), 505
rolls, player piano, Antheil's use of, 297, 312–13, 365–66n320, 370–72n356, 372–74n358
Romains, Jules: on cinema, 396–97; compared to Futurists, 395–96; compared to Le Bon, 587n30; *Unanimisme* of, 391, 392–93, 591n55; *La vie unanime*, 393–95, 480, 588n38, 588–89n40, 589n43, 590nn45–46; on Whitman, 399
Romani, Romolo, 406
Romantics: on art, 601–2n128; on intuition, 415; Jena Romantics, 83; on nature, 8; Romantic science, 24–25
Röntgen, Wilhelm, 20–21
Rood, Ogden, 405
Rosenberg, Alfred, 457
Rosenfeld, Paul, *Port of New York*, 362n303
Rosso, Medardo, as Symbolist, 405
*La roue* (film by Gance), 207, 222–23, 235, 275–76
Rudge, Olga, 294
*rumore musicale*. *See* art of noises
Russell, Ross, *Jazz Style in Kansas City and the Southwest*, 273–74
Russolo, Luigi: "L'arte dei rumori" manifesto, 520, 528–33, 615–17n256, 630n397; art of noises, 431–32, 615–17n256; *Grafa enarmonica per gli intonarumori futuristi*, 532, 535; "Manifesto dei pittori futuristi," 385–86; noise concerts of, 530, 537–38; occultism of, 533–34; "La pittura futurista: Manifesto tecnico," 395–96, 408–11, 476–77, 493, 584n19, 615–17n256; studies of sound, 631n413

Saint-Saëns, Camille, 283–84
Salisbury, Robert Gascoyne-Cecil, 197–98
Salon Cubists, 190, 191, 332n83
saltimbanques, in art, 329n54
Samuel, Horace B.: "The Future of Futurism," 600n123; on Futurism, 420–21
Satie, Erik, 368–69n337
Scaligero, Massimo, 450–51, 609–10n208, 610n210, 610n212
Schaffer, Simon, *Leviathan and the Air-Pump*, 58–63
Schapiro, Meyer, 104, 106, 109, 111–12
Schillinger, Joseph, 347n210
Schlemmer, Oskar, dances of, 241–43, 246, 345n192, 345n194
Schmidt, Kurt, *Das mechanische Ballett*, 238–40
School of Fascist Mysticism, 449
Schopenhauer, Arthur, 18, 83, 93–95, 127–28n109, 480–81
Schuré, Édouard, 339–41n157
science: experimentation and, 61; objectivity of, 66–67; on reality, 324–25n30; Romantic science, 24–25; as setting standards for reason, 152–53; theory and, 53. *See also* empiricism
*La science et l'hypothèse* (Poincaré), 51
Scriabin, Alexander, 639–40n489
"La scultura futurista" (Boccioni), 412–13
Section d'or (art group), 339–41n157
Segantini, Giovanni, 557, 637–38n464
self, collective. *See* collective experience
Sellars, Wilfrid, 324–25n30
Semper, Charles T., 398–99
senses: augmenting of, 154–55, 475–76; as disconnected from reality, 34n27, 59–61, 85–89, 129n112, 151–55, 324–25nn30–31; as outmoded, 442; prosthetics for, 154–55, 156–57, 493; as separate from reason, 63–64; technology's affect on, 26. *See also* perception; visual experience
*serata futurista* (Futurist evening), 504–5, 507–11, 518–24, 596–97n86, 626n362. *See also* theatre; variety theatre
Serpieri, Arrigo, 436–37
Sérusier, Paul, 339–41n157
Settimelli, Emilio, 384, 403
Seurat, Georges, 559–60
Severini, Gino: "Analogie plastiche del dinamismo," 500–502, 623n332; anti-cinema stance of, 633n421; on cinema, 417, 633n421; on speed, 380
*Shadows of Reality* (Robbin), 123n34
Shaftesbury, Anthony Ashley Cooper, 71
Shapin, Steven, *Leviathan and the Air-Pump*, 58–63
Shattuck, Roger, *The Innocent Eye*, 167–68
Shelley, Mary, 603n142
Sherry, Vincent, 316–17
Simmel, Georg: "Die Großstädte und das Geistesleben," 115, 134nn159–60, 140; on urban life, 70, 126n80
simultaneity: in art, 104, 130n132, 165, 191, 327n51, 597–98n93; in Futurism, 480, 483–84, 504–5; understanding of, 168–70
*sintesi teatrale*, 402–3, 523–24, 539, 621n315. *See also* theatre; variety theatre
*Sittlichkeit* (ethical order), 92
*Skating Rink* (ballet), 269, 350–51n247
Soffici, Ardengo, 407, 411, 422–23, 498, 596–97nn85–86
solar mysticism, 396, 451, 453

sonic art. *See* art of noises
*The Soul of the Cypress* (D. Murphy film), 282–83
space, absolute *vs.* relative, 103–14
space, pictorial, 173, 180, 182, 186
space-time (idea of Hermann Minkowski), influence on Cubism, 103–8, 132nn146–47
*Space, Time, and Architecture* (Giedion), 103–7, 130n130
*Spatial Form in Modern Literature* (Frank), 328n53
special theory of relativity, 103, 112–13, 132n146, 257
spirit photography, 443–44, 549
spiritualism, 198–99, 431–33, 549–60. *See also* occultism
spirituality: of electricity, 427, 603n137; as form of cognition, 57, 124n48; of fourth dimension, 105–6; of Futurist art, 489–91; of machines, 379–80, 398–99, 452, 497, 512, 625–26n358; of matter, 569; of modern media, 198. *See also* mysticism
*Stati d'animo* (Boccioni triptych), 471, 473, 474, 493, 617n263, 619n278
Steffen, Albert, 438
Steinberg, Leo, 165, 580–81
Steiner, Rudolf, 435–36, 438, 604n155, 604–5n159
Stein, Gertrude, 179
Stein, Leo, 52
*La strada entra nella casa* (Boccioni painting), 469–70, 477–78
Strauven, Wanda, 478, 601–2n128
Stravinsky, Igor, 292–93, 363–64n307
structure *vs.* representation in Cubism, 170–72, 175–76, 181, 330n64
Stuckenschmidt, Hans Heinz, 239–40
sufficient reason, principle of, 94
Surrealism, Apollinaire on, 114
Swedish ballet, diversity in, 269–70
Symbolism: influence on Futurism, 400, 404–5, 407, 559, 585–86n24, 595n76; language of, 382–83, 516–17; Marinetti and, 382–83, 385, 390, 400–401, 475–76, 582–83n4; Neo-Platonic nature of, 415; view of matter, 597n87
symphonies, visual, 282–83
synaesthesia: in cinema, 552–68, 637n462, 637–38n464; in Divisionism, 559; in Futurist art, 478–79, 553–54, 556–68; Futurists on, 479–80, 554, 557–62, 563–64; as primordial, 479
Synchronisme cinématique, 356–88n285. *See also* Delacommune, Charles; Synchro-Ciné
Synchro-Ciné, 313, 356–88n285, 366n320
synthetic ballet, 268–70
Synthetic Cubism, 183–89; diversity in, 188–89, 270; Léger and, 199–200; transition to, 108–9, 172–76, 180; use of collage in, 183–86; use of depth in, 185, 187; use of exposed canvas in, 188, 331n78. *See also* Analytic Cubism
synthetic Futurist theatre, 402–3, 523–24, 539, 621n315
synthetic Russian theatre, 247–52
synthetic visual art, 272
Syrimis, Michael, 526–27

Tairov, Aleksandr, 247–48
Tait, Peter Guthrie, 613–14n249
Tambellini, Aldo, 620n298
*Il teatro della sopresa* (Marinetti/Cangiullo), 632–33n419
"Il teatro di varietà: Manifesto futurista" (Marinetti), 382, 506–7, 510, 518–19, 520–21, 538–39
"Il teatro futurista sintetico" (Marinetti/Settimelli), 384, 504–5, 523

*teatro sintetico*. *See* synthetic Futurist theatre
technological determinism, unviability of, 4
technology: changes caused by, 140–41; impact on consciousness, 146, 386–87; as part of urban life, 139–40; as spiritual, 379–80, 398–99, 497. *See also* machines
temporal economy, 259–61
Tesla, Nikola: investigation of X-rays by, 21, 32n23-24; on electricity and magnetism, 10, 22; on light, 11, 33n25; on nature of universe, 19; on photographing thoughts, 33n26, 606n184
text. *See* language; typographical signs; words
*Thaïs* (A.G. Bragaglia film), 550–51
theatre: Apollinaire on, 146; electric theatre, 522–23, 553–54; inspired by cinema, 518–24; of light, 527–28; manifestos on, 382, 384, 402–3, 504–5, 512, 632–33n419; of objects, 523–24, 527–28, 552; *serate futuriste*, 504–5, 507–11, 518–24, 596–97n86, 626n362; *sintesi teatrale*, 402–3, 523–24, 539, 621n315; synthetic Futurist theatre, 402–3, 523–24, 539, 621n315; synthetic Russian theatre, 247–52. *See also* variety theatre
theory of relativity, 103, 112–13, 132n146, 257
Theremin, Léon, 631nn412–13
thought-forms: in art of noises, 533, 535; Boccioni on, 563–64, 639n482; description of, 552
*Thought-Forms* (Besant/Leadbeater), 444, 552, 555
thoughts: as electromagnetic, 463; energies of, 445; interaction with matter, 536–37; photographing, 33n26, 155, 443, 445
Thovez, Enrico, 637n463
*The Three Graces*, as subject for painters, 165, 327n48-49
time: Cubism and, 147, 182–83; ecstatic experience of, 194; efficient use of, 259–61; Judaeo-Christian view of, 89–90, 91, 331n82; reality of, 84–85, 89–103; subjective experience of, 190–91; types of, 331n82; in urban life, 90, 129n114
time-space (George Antheil's compositional principle), 298, 304–6, 306, 368–69n337; in *Ballet mécanique*, 306, 312; description of, 305–6; in music, 316–17
time-space (scientific concept); Meyer Schapiro on, 111–12
timing, Antheil's interest in, 297–98, 304–6, 365–66n320, 368–69n337
torpedo ray, studies of, 425–27
traditional societies, 6–7, 89. *See also* African culture; "primitivism"
*Tragedija AOU*, 263–64
Transcendentalism, 398–99, 591–92n57
transhistoricism, of Purism, 232
*La trasfigurazione* (Raphael), 41–42
"Treatise on Harmony" (Antheil), 307–8, 309–10, 369–70n351
*trompe-l'oeil*, 208
Turkin, Valentin, 250
Tyndall, John, 636n453
typographical signs: in Cubist art, 177, 226–27. *See also* language; words

*Ulysses* (Dedalus), 69
*Ulysses* (Joyce), 70, 298–99, 350n242, 591n55
*Unanimisme*, 191, 391–92, 398. *See also* collective experience; universal relations

underdistancing, effect on aesthetic appreciation, 39–41
*Understanding Media* (McLuhan), 482, 492
universal dynamism, 408–10, 415, 477, 479, 503–4, 546–47
universal relations, 476–79. *See also* collective experience; *Unanimisme*
universe: as alive, 19; as created by will, 95; energy of, 13; human place in, 17, 320–21; mathematics and, 126n75; rationality of, 93. *See also* world
urban life: cinematic quality of, 69–70, 126n80, 140–41, 146; displacing rural, 140; influence on modernist art, 141, 321nn1–2; intensity of, 516; poetry about, 141–46; sensory overload of, 115, 226–27, 253; technology as part of, 139–40; time in, 90, 129n114

Varèse, Edgar, 530, 630n397
variety theatre: in cinema, 538–39, 551, 635n451; influence on Futurists, 506–7, 511; manifestos on, 506–7, 510, 518–21, 538–39, 632–33n419, 635n451. *See also* theatre
*vasi comunicanti, I* (Marinetti play), 403
Vattimo, Gianni, 122n25
Vendryes, Joseph, 237, 344n185
*Vengono: Dramma d'oggetti* (Marinetti play), 523
Verhaeren, Emile, 391, 586–87n28
*Le verre d'absinthe* (Braque), 174
*Le verre d'absinthe* (Picasso), 275
*vers libre*, 400–401, 592–94n61
Vertov, Dziga: *Kino-Eye*, 154; *We: Variant of a Manifesto*, 261–63
Vico, Giambattista, 68
*La ville* (Léger), 218–19, 221, 225, 235
vision, astral, 50
vision, crisis of, 87–88, 155–62, 575–76
vision, new, 139–51
vision, paroptical, Romains on, 396, 590–91n49
vision, persistence of, 469, 615–17n256
visual art. *See* art
visual experience, 47, 87–88, 129n112, 158. *See also* perception; senses
visual symphonies, 282–83
*Vita Futurista* (film by Ginna), 543
*La Voce* (journal), influence of, 406–7
Volkonsky, Serge, 250–51, 347–48n214
Volta, Alessandro, 430–31
Vorticism: basis of, 613–14n249; descriptions of, 296–97, 317; Futurism *vs.*, 419–20; and harmony, 302–10; Vorticist music, 303–4; vortoscope, 283, 286, 288, 359n291
vortograph, 268, 287, 288, 291, 359n291, 361n298
vortoscope, 283, 286, 288, 359n291, 360n294; use of in *Ballet mécanique*, 288, 359n291, 360n294, 361n298

Walsh, John, 425
*We: Variant of a Manifesto* (Vertov), 261–63
Weininger, Otto, *Sex and Character*, 445–46
Whitehead, Alfred North, 6, 9–10, 11, 466–67, 576
Whitman, Walt: *Leaves of Grass*, 399, 592n59; mysticism of, 398
will: amorality of, 98–99, 100–101; as creating the world, 94–95
*Within the Quota* (Léger/G. Murphy ballet), 266–67
Wittgenstein, Ludwig, 60, 124n52, 446
Wölfflin, Heinrich, 130n130, 459–60

Wolkonsky. *See* Volkonsky, Serge
words: in Cubist painting, 179–80, 183–84; as disconnected from reality, 97. *See also* language; typographical signs
world: as created by will, 94; images of, 324–25n30. *See also* universe

X-rays: discovery of, 21, 32n23-24; early beliefs about, 443–44; link with cinema, 20–21; as prosthetic for the senses, 154–55, 156–57, 493; spirituality of, 494

Yeats, W.B., 366–67n325
Yutkevich, Sergei, 251, 348n216

*ZANG TUMB TUMB* (Marinetti poem, also referred to as *Zang Tumb Tuuum*), 456, 627–28n379
Zeuxis and Parrhasius, 88, 128–29n111
Zilsel, Edgar, 54–55
"Zone" (Apollinaire poem), 141–46, 321n3, 574–75
*Zur Elekrodynamik bewegter Körper* (Einstein), 105, 107, 132n144

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