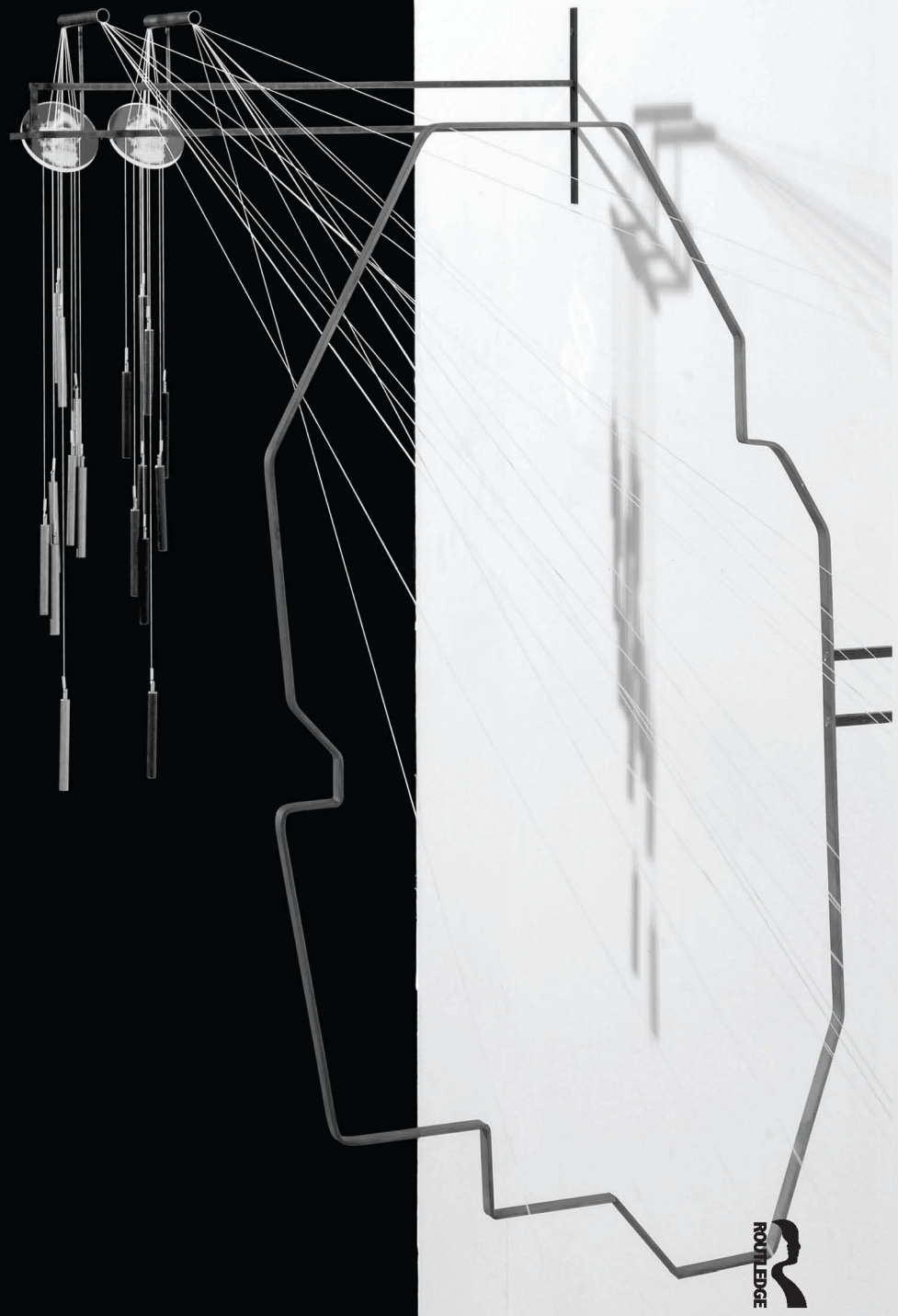
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Marcel Duchamp and the Architecture of Desire

PENELOPE HARALAMBIDOU



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Penelope Haralambidou

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INTRODUCTION

1.1 INTRODUCING MARCEL DUCHAMP

How does an architect write about an artist? In May 1937 an innovative visual essay, part of a series entitled Design-Correlation, was published in the American monthly magazine *Architectural Record*.[1] The essay by the Austrian-American architect Frederick Kiesler was a close analysis of a seminal work by French artist Marcel Duchamp entitled *The Bride Stripped Bare by Her Bachelors, Even (La mariée mise à nu par ses célibataires, même),* 1915–23.[2] Composed on two large glass panes arranged vertically on a frame and using materials such as lead foil, fuse wire, and dust, the work is better known as the *Large Glass*. It combines meticulously plotted drawings in perspective, as well as forms deriving from chance operations and is accompanied by a set of notes that allude to an allegorical amorous exchange between a 'Bride' and her 'Bachelors' (fig. 1.1).[3]

Kiesler's essay is possibly the first introduction of Duchamp's complex work to an architecture audience.[4] In a letter to Kiesler, Duchamp's reaction was jubilant:

> How you have surprised me! It was a great pleasure to read your article in the 5 extracts of the *Architectural Record*— firstly the wit of the article, then your interpretation and the way you present your ideas! Thank you for being prepared to look at the glass with such attention and for clarifying points that so few people know about.[5]

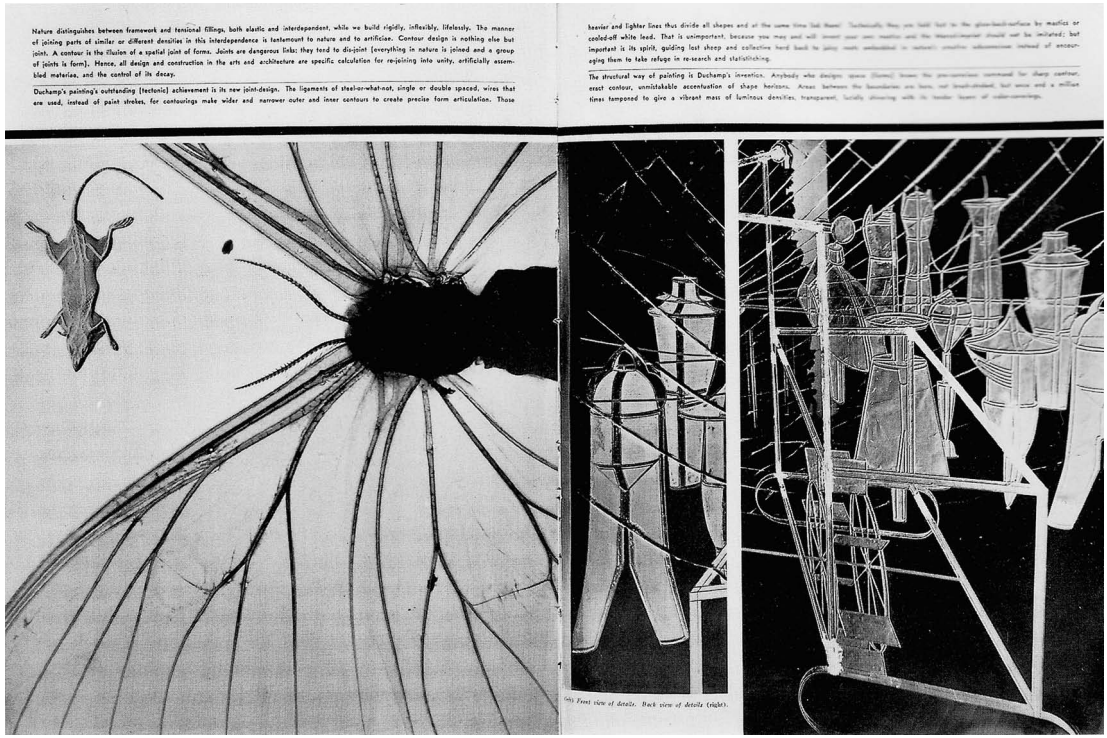
Although he always welcomed interpretations of his work by others, Duchamp is particularly taken by the *esprit* (lively intelligence, wit) of Kiesler's essay, his original interpretation and innovative visual presentation. But what were the points that Kiesler was able to clarify that so few people know about, and how was he able to do so?

Disappointed with previous photographic representations of the *Large Glass*, which show the work intact before its infamous accidental shattering in transit, Kiesler commissioned American photographer Berenice Abbott to take new photographs after Duchamp's 'restoration' in 1936.[6] Abbott's photographs depict the *Large Glass* from the front, but also at an angle and from the back and reveal its visceral texture, absent from earlier photographs. Although these images are the focal point of the essay, Kiesler does not present them conventionally, but cuts, collages and juxtaposes them with images depicting traditional stained glass construction details, a photogram of a leaf, and X-ray images of a bat and mouse. By presenting the photographs this way and employing typography and drawing, Kiesler's primary mode of interpreting the *Large Glass* is pictorial.[7] In his photographic juxtapositions the jagged strokes of the cracks on the *Large Glass* join with the lines of the radiographs and the seams of the stained glass patterns to form an original (re-)drawing of Duchamp's artwork (fig. 1.2).

Appearing at the margins and separated by lines, the text compliments the images in the form of extended captions. In awe of Duchamp's work, Kiesler calls the *Large Glass* a 'masterpiece of the first quarter of twentieth-century painting' but his primary aim is to establish its significance as architecture: 'Architecture is control of space. An Easel-painting is illusion of Space-Reality. Duchamp's Glass is the first x-ray painting of space'; and later: the *Large Glass* 'is architecture, sculpture, and painting in ONE'.[8] Focusing primarily on



1.1 Marcel Duchamp, *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)*, 1915–23. Philadelphia Museum of Art. Bequest of Katherine S. Dreier. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.



1.2 Frederick Kiesler, page spread from 'Design-Correlation: Marcel Duchamp's *Large Glass*', published in *Architectural Record*.

its use of glass, the only material that at once expresses surface and space – which he sees as an enclosure that at the same time divides and links – he advocates its 'structural' innovations as an 'outstanding (tectonic) achievement'.[9] He then embarks on a description of 'architectural' details, linking the work to both medieval technologies of stained glass and to cutting-edge radiography, a connection assisted by his forensic arrangement of Abbott's photographs.

Kiesler warns his architect readers: 'Those who think only in "practical" meanings: dollars and cents, brick and mortar, jobs and publicity – would do well to turn to the very last page of this section.'[10] He concludes the essay by connecting his interpretation of the *Large Glass* to contemporary technological innovations in architecture and the construction industry, perhaps as an attempt to comply with pressure from the magazine publishers; Kiesler's pseudo-technological musings, in this and previous essays in his Design-Correlation series, were not always to the taste of the greater part of the magazine's readership.[11] The final page presents a second reworking of the *Large Glass* through photographic collage, borrowing images from research into glass technologies, including the use of metal framed glass as partition by German-American architect Mies Van der Rohe; drawings

on translucent glass; testing on bullet-proof glass; a woman looking through a circular hole in transparent plastic; and directly below a group of five men in suits standing on sheets of glass to test their resistance. Deriving from unrelated sources and aimed at a dry architectural audience, the collage portrays visual themes strongly associated with the *Large Glass*: framing and drawing on glass, shooting and breakage of panes of glass, and a 'Bride' figure above with 'Bachelors' below. Unexpectedly and perhaps unintentionally, the last page is another faithful 'architectural' portrayal of Duchamp's work.

Duchamp's genuine pleasure with the essay points to an approval of Kiesler's reading of the *Large Glass* as an architectural construction. Seeking to produce a work that is 'not of art', Duchamp might have welcomed Kiesler's review of the *Large Glass* as a work 'of architecture' instead.[12] Widely overlooked, Duchamp's interest in architecture exists not only in his construction of the blueprint of desire underpinning the *Large Glass*, but also in his many artworks replicating architectural fragments, such as doors, windows and mantelpieces, as well as his groundbreaking, unconventional exhibition designs. So the wit, original interpretation and satisfying visual presentation that Duchamp appreciated in the essay might be connected with Kiesler's approach to the *Large Glass* as architecture. I argue that Kiesler's architectural interpretation was able to grasp a novel dimension of the *Large Glass*, which genuinely surprised and delighted Duchamp.

In an unpublished dissertation, 'Critiquing Absolutism: Marcel Duchamp's *Étant donnés* and the Psychology of Perception', American scholar Linda Landis points out a striking detail that distinguishes Kiesler's analysis from perhaps every other interpretation: his 'complete failure to mention the Bride and the Bachelors'.[13] Kiesler addresses this omission in his essay:

> We look at it not to interpret the bio-plastic exposition of the upper half of the picture or of the mechanomanic lower part; such physio and psychoanalysis will be readily found here and there, now and later—but I bring to the technicians of design-realization the teaching of its techniques.[14]

Kiesler chooses not to address the allegorical subtext of the amorous exchange between the Bride and the Bachelors and presents instead an alternative allegory:

> To create such an X-ray painting of space, materiae [sic] and psychic, one needs as a lens (a) oneself, well focused and dusted off, (b) the subconscious as camera obscura, (c) a super-consciousness as sensitizer, and (d) the clash of this trinity to illuminate the scene.[15]

Describing the creative act as a photographic camera, Kiesler infers that the image on the *Large Glass* is a snapshot of the creative mind in action. Duchamp also insinuates this allegorical interpretation – albeit couched in poetic and cryptic language – in his notes for the *Large Glass*, to which Kiesler did not have access prior to composing his essay.[16] At a further allegorical level, Kiesler's terminology clearly alludes to the id, ego and superego, the three elements of Sigmund Freud's structural model of the psyche.[17] So in Kiesler's analysis of the *Large Glass* the ego is 'a lens (a) oneself, well focused and dusted off',

the id is '(b) the subconscious as camera obscura' and the superego is '(c) a super-consciousness as sensitizer'. Blending the allegory of photographic processes with psychoanalytic theory, Kiesler proposes Duchamp's work as an 'architecture of desire'. I suggest that when Duchamp declares in his jubilant letter that Kiesler clarifies 'points that so few people know about' he refers to this particular passage.[18]

Related to the *Large Glass* and its photographic camera imagery, this description is also a fitting narrative for the viewer's experience in front of Duchamp's other major piece, *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage …* (*Given: 1. The Waterfall, 2. The Illuminating Gas …*), 1946–66, or *Given* (fig. 1.3).[19]

Closely connected with the themes governing the *Large Glass*, *Given* is a three-dimensional assemblage, a diorama permanently installed in a room at the Philadelphia Museum of Art. Hidden behind a wooden door and portraying a brightly lit and explicitly pornographic scene, the diorama is visually accessed through two peepholes. In the experience of *Given,* the eyes of the viewer are the lens(es) 'well focused and dusted off', fixing the image and making it clear; the door and the sight beyond forms an inverted 'camera obscura' making pictures of light in the subconscious; and the intellect, like the 'super-consciousness', is where the image will be imprinted in memory. The switch turning the bright light on in the diorama is triggered automatically when the visitor enters the gallery, bringing together the trinity of the door, eyes and intellect – or id, ego and superego – to create 'an X-ray painting of space, materiae [sic] and psychic'.[20]

Kiesler's analysis of the *Large Glass* in 1937 uncannily anticipates the arrival of *Given* nearly ten years before Duchamp began work on the assemblage in 1946.[21] Not only was Kiesler seemingly able to read Duchamp's mind after just studying the *Large Glass* visually, but he also predicted the essence of a closely linked, later work that would preoccupy Duchamp for twenty years, only completed long after the two friends inexplicably cut off contact with one another.

In a short paper he presented at the Convention of the American Federation of Arts in Houston in 1957 entitled 'The Creative Act', Duchamp has described the artist as 'a mediumistic being who, from the labyrinth beyond time and space, seeks his way out to a clearing'. He asserts that the 'creative act is not performed by the artist alone' and that the spectator adds a contribution through 'the phenomenon of transmutation'.[22] As a spectator, and critic, Kiesler does not simply study the *Large Glass* from a distance, but he architecturally redesigns it. Although one could argue that there is evidence of a clear affinity between Kiesler and Duchamp's patterns of thinking, I believe that Kiesler's act of redrawing the architecture of the *Large Glass*, and entering the process of recreating it, leads to a profound comprehension of its syntax. The 'architectural' reading allows the 'architectural' meaning to emerge. Consequently, Kiesler not only adds his contribution to the creative act through the 'phenomenon of transmutation' as a spectator, but in addition, by using design he is able to take on the role of the creator, the 'mediumistic being'. Critical analysis through architectural redrawing of the original work becomes performed empathy. Kiesler's empathetic engagement with the Large



1.3 Marcel Duchamp, *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage … (Given: 1. The Waterfall, 2. The Illuminating Gas …)*, 1946–66. Philadelphia Museum of Art. Gift of the Cassandra Foundation. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

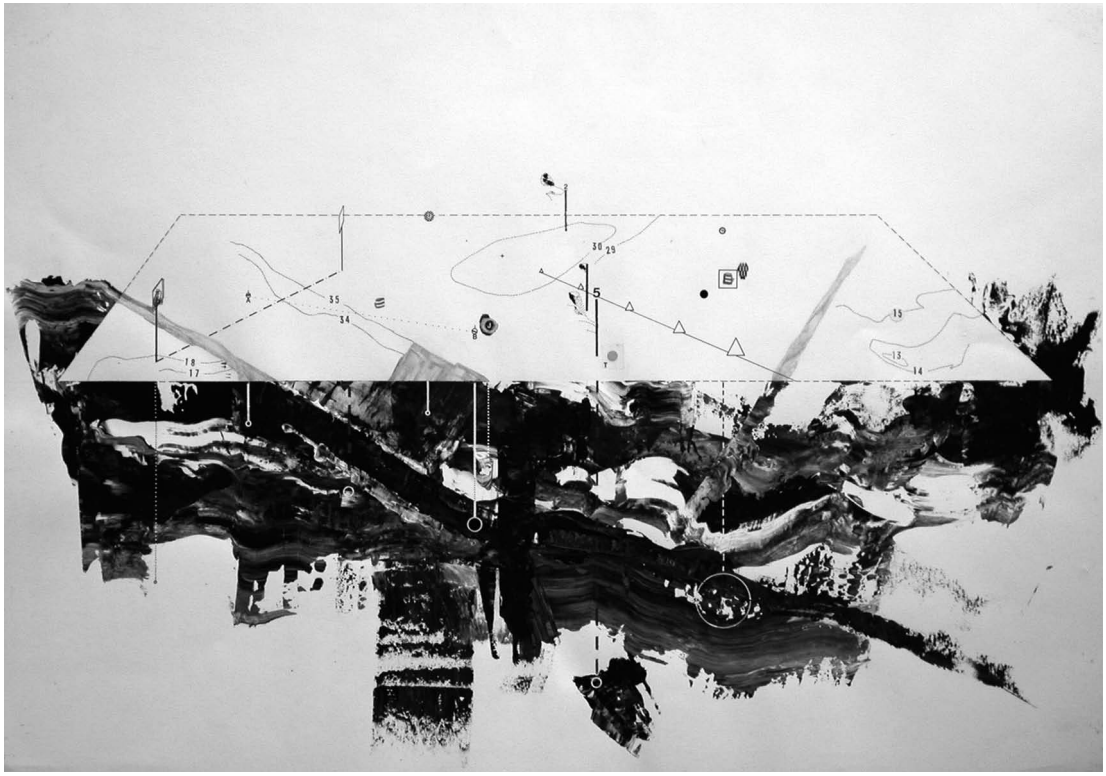
Glass offers insights that expand its themes of allegory, visuality and desire in ways that the original author was possibly not yet aware of.

Marcel Duchamp and the Architecture of Desire is my 'architectural' analysis of Duchamp's ideas and work, focusing on an in-depth investigation of Given, which similarly to Kiesler, uses drawing extensively as a research methodology. The book is structured around the themes of desire, allegory and visuality, which for Duchamp are interchangeable: the allegory of the *mise en scène* in his two major works can be interpreted both as the staging of an unfulfilled erotic desire and the exploration of an expanded visuality. Equally, desire is not just related to eroticism but can refer to a search for a missing dimension in vision or the elusive meaning in allegory. Using drawings and models alongside textual analysis to study his work, *Marcel Duchamp and the Architecture of Desire* attempts to define and endorse a practice positioned between art and architecture – but also between theory and making – that predates and includes Duchamp (fig. 1.4).

As we have seen, evidence of Duchamp's interest in architecture exists in his work. Yet, the architecture that his work assimilates is not only found in the normative architectural profession. As I will show in this book, Duchamp was fascinated by the 'architecture of desire', reconstructing the imagination through drawing and testing the boundaries between reality and its aesthetic and philosophical possibilities.

Since Kiesler's introduction in the *Architectural Record*, other architects, architectural historians and critics have found connections between Duchamp's work and architecture. For instance, the British architect, critic and historian Kenneth Frampton compares the *Large Glass* to the *Maison de Verre* designed by French architect Pierre Chareau in 1928–32, while architectural historians Alberto Pérez-Gómez and Louise Pelletier include the *Large Glass* in their analysis of the history of architectural representation.[23] French architect Bernard Tschumi defines both the *Large Glass* and *Given* as architectures of pleasure, while Diller + Scofidio, similarly to Kiesler, critically redesign the *Large Glass*, this time as a stage set for *A Delay in Glass, or The Rotary Notary and His Hot Plate*, a theatre play commissioned by the Philadelphia Museum of Art for the Duchamp Centennial in 1987.[24] While previous architectural analyses by architects are, for the most part, brief references to the *Large Glass*, my primary focus is *Given*, which I see as directly linked to the *Large Glass*, perhaps as a second rendition of the same 'programme' found in his notes. In *Marcel Duchamp and the Architecture of Desire* I perform a meticulous and systematic dissection of Duchamp's final enigmatic assemblage.

Inspired by Kiesler and others, such as Swedish art critic and writer Ulf Linde and British artist Richard Hamilton, who have engaged with Duchamp's work through making, drawing and reconstruction, my analysis is largely underpinned by practice-led experimentation.[25] I employ architectural design – speculative drawing and model-making, as well as photography, collage, digital animation and film – as an investigative tool. The chapters in this book are interwoven with detailed presentations of my probing architectural projects, proposing a research methodology deriving from architectural design principles, able to reach new interpretations of Duchamp's work. (fig. 1.5). Conversely, I also recognize an

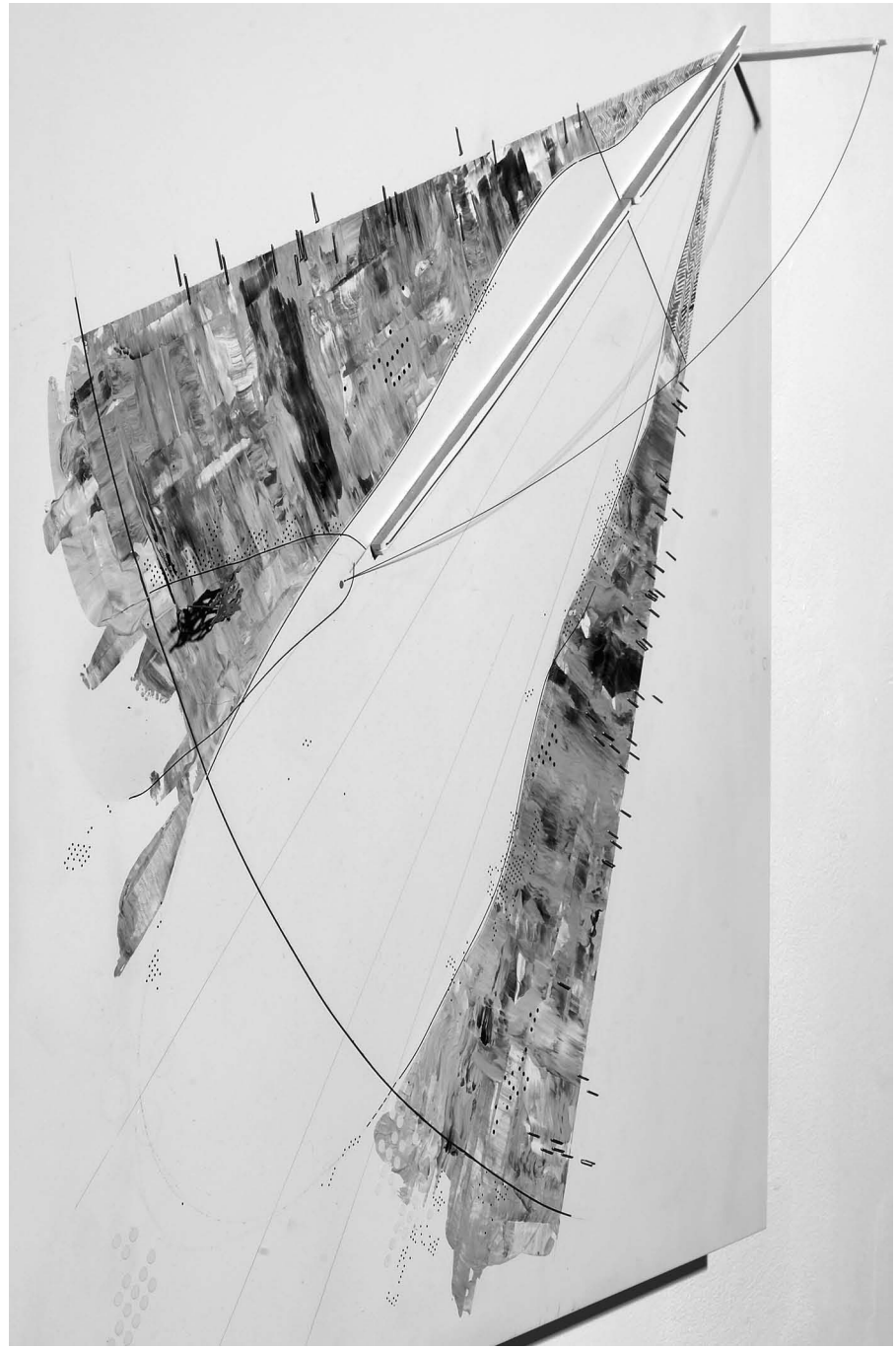


1.4 *Illuminated Scribism*, plate 19, 1997. Drawing by the author.

analytical, often philosophical and scientific – if not pseudo-scientific – inclination in Duchamp's artistic practice, and propose his example as a viable paradigm of research methodology in architecture and other visual practices. Finally, I identify Duchamp's architectural influences and trace his legacy in architectural design and research. Although deriving from an architectural design perspective, this analysis is not solely intended for an architectural design audience, but provides original insights that add to, and perhaps challenge, other art historical understandings of his work.

1.2 ARCHITECTURE OF DESIRE

Duchamp often uses the term 'eroticism', which as French linguist and art historian Marc Décimo admits is 'a vague notion that Duchamp never defined'. In his introduction to the edited anthology *Marcel Duchamp and Eroticism*, Décimo suggests Duchamp›s undefined eroticism is possibly 'dynamic thought that adapts and creates' or 'the very instant when the "click" takes place, the rendezvous, the moment when our vision changes and approaches what is there, before our eyes, in a new way'.[26]



1.5 *The Fall*, 2004. Mixed media drawing by the author. Photograph Andy Keate, 2009.

> Duchamp's work provides an opportunity to focus on the infinitely erotic-dynamic functioning of thought, on its physiology; which consists in appreciating, through the intervention of the eye, what lies beyond the screen of memory and prejudice and being filled with wonder by the much more meaningful shadowy side, illuminated by the seduction of a revealed truth. If only we take the trouble to look.[27]

American art historian Craig Adcock admits that Duchamp's use of eroticism and *double-entendres* has added to the notoriety of his works and their impact on twentieth-century art.[28] In his interviews with French art critic Pierre Cabanne, Duchamp often states the importance of eroticism: everyone understands it without speaking of it which means that it is possible to address issues through eroticism that often remain hidden.[29] However, in 'Duchamp's Eroticism: A Mathematical Analysis' Adcock poignantly observes that Duchamp's eroticism can be linked with his interest in ideas concerning four-dimensional geometry and more specifically the work of mathematician Esprit Pascal Jouffret. He compares the new geometrical principles, including the notions of reversal and expansion, with examples of Duchamp's works, for instance his gender reversals in Rrose Sélavy and *L.H.O.O.Q.*, the topological rotations of his 'readymades' and what he calls his 'geometrical' nudes in the *Large Glass* and *Given*.[30] Adcock argues that, beyond its role in seducing the viewer, eroticism informed by mathematics and geometry becomes a method for philosophical and scientific pursuit. He concludes:

> The eroticism … is first funny and then ironic and then epistemic. Duchamp's bizarre erotic games are intermeshed with other systems of thought, with mathematics and epistemology, and at those levels they are profound.[31]

In 'Surreal House', 2010, an exhibition bringing together a selection of works from art and architecture under the theme of Surrealism, two works by Duchamp featured as an introduction at the gallery entrance, marking his influence on the exhibition theme: the link between architecture and desire. In her introductory text to the exhibition catalogue, curator Jane Alison points out: 'We can say with some certainty … that eroticism and architecture were the mainstays of Duchamp's decidedly non-retinal practice.'[32] However, eroticism in Duchamp's work is also connected with an architecture of looking, and both the *Large Glass* and *Given* are 'Bachelor' machines for looking at the coveted image of an unattainable 'Bride'.[33] Duchamp arranges the constituent parts of these optical machines to form complex spatial constructs. Moreover, he uses architectural drawing conventions to describe the lower part of the *Large Glass* – plotting the Bachelors' domain from a plan and a section – and directly using architectural elements – the door and wall in *Given*.

In his article entitled 'Architecture and Its Double' for the special *Architectural Design* issue on 'Surrealism and Architecture' assembled by Czech architectural theorist Dalibor Vesely in 1978, French architect Bernard Tschumi discusses Duchamp's *Given* as a 'space of desire'. He observes Duchamp's 'antiretinal' choice of 'mechanical drawing' for the *Large Glass,* while he sees *Given* as the culmination of Duchamp's fascination with erotic machines. Describing the relationship of the viewer with Duchamp's new assemblage, he refers to a space



1.6 *Illuminated Scribism*, plate 12, 1997. Drawing by the author.

'of tension, of empathy, of *desire*'. For Tschumi the implicit, allegorical erotic content in the *Large Glass* becomes explicit in *Given,* but at the same time the nude figure is just a signifier of any erotic exchange between object and viewer, or even between idea and object.

In *Built upon Love: Architectural Longing after Ethics and Aesthetics,* 2006, Alberto Pérez Gómez uncovers the relationship between love and architecture. He divides love into *eros,* relating to erotic desire, seduction and poetics; and *philia*, relating to friendship and ethics. Speaking of his *Polyphilo or The Dark Forest Revisited,* 1992, he asserts that 'to the primary reality of embodied consciousness, architecture speaks in the medium of the erotic, as poetic image'.[34] Discussing Duchamp's *Given* as part of the architectural poetic image in modernity, alongside work by architects Jean-Jacques Lequeu and Kiesler, he suggests that the space between the observer and the nude 'is tense and unbridgeable and yet … it is a space of participation'.[35] In the *Large Glass* and *Given*, 'the space of participation is activated through *eros*'.

Thus the term 'architecture of desire' in the title refers to *Given*, the primary focus and subject matter of this book, which, in harmony with the

views presented above, I too perceive as a space pointing to the erotic potential in architecture. As we will see, there is evidence that the model for the nude figure in *Given* was Duchamp's lover, Brazilian sculptress Maria Martins. *Given,* therefore, is literally the structure Duchamp designed and physically constructed to house Martin's coveted image on the verge of losing her: the architecture of his desire.

1.2.1 DRAWING

Beyond simply signifying *Given*, however, by using the term 'architecture of desire' I also refer to architecture's relationship to drawing. Drawing in architecture is in anticipation of the thing it describes: the construction of the building. This missing object is often seen as a source of desire in design. I suggest, however, that desire exists in architectural drawing beyond the anticipation of the physical presence of the building. Training in architectural design promotes the development of a sophisticated spatial imagination capable of grasping complex three-dimensional configurations intellectually. The consummation of this intense imagination, however, is disproportionate. Unlike art, where the drawing is single, and an art object in itself – therefore, offering the potential for immediate pleasure – in architecture the object referred to by the drawing is 'delayed'. The pleasure derives from a combination of information from several different drawings – for instance the plan in combination to the section – leading to a slow blossoming of the designed structure in the mind. Architectural design, therefore, involves a suspension of pleasure that produces desire.

In *Architecture's Desire: Reading the Late Avant-garde*, American architectural historian and theorist K. Michael Hays examines architecture as a way of 'negotiating the real' and as a 'socially symbolic production whose primary task is the construction of concepts and subject positions rather than the making of things'.[36] He discusses Tschumi's *Advertisements for Architecture*, 1975–76, a series of postcard-sized montages of disparate images accompanied by text as a 'notational device to "trigger" the desire for architecture'. According to Hays, Tschumi attempts to establish an architectural notation that 'is not secondary to some building it denotes (as are conventional architectural drawings)' but still contains 'a gap – a desire that must be performed by each reader of these works'.[37] In one of his *Advertisements for Architecture* Tschumi discusses another type of desire deriving from architectural drawing:

> Ropes and rules. The most excessive passion always involves a set of rules. Look at it this way: The game of architecture is an intricate play with rules that you may break or accept. These rules, like so many knots that cannot be untied, have the erotic significance of bondage: the more numerous and sophisticated the restraints, the greater the pleasure.

So for Tschumi, architecture and architectural drawing involves an appreciation of the pleasure of rules, geometry and order, compounded by a compulsive desire for their 'irrational' excess and dissolution.[38] He suggests that 'the ultimate pleasure of architecture lies in the most forbidden parts of the architectural act; where limits are perverted and prohibitions *transgressed*'. [39] He stresses, however, that this not a purely nihilistic or subversive stance – 'we are not dealing with destruction here, but with excess, differences, and left-overs' – but a creative

position to secure the preservation of the 'erotic capacity of architecture'.[40]

This love of rules, combined with a compulsive desire to break or exceed them, is not a characteristic of all architectural drawings; it is, however, a trait that links all the work presented in this book. Architectural drawing, irreversibly disengaged from building and employed for seduction, construction of allegorical narratives or for interrogating the limits of visual representation, is paradigmatic of Duchamp's artistic pursuit, my empathetic review of his work in search of hidden dimensions, as well as my selection of his influences and legacy in architecture.

Duchamp's work is exemplary of the paradox of constructing rules combined with a desire to break them. His oeuvre includes meticulous and precise compositions, such as the *Large Glass* and *Given*, as well as audacious and ironical attacks.[41] These attacks seek to contest not only the underlying syntax of accepted norms in the production of art – as in his readymades for instance – but also challenge the foundation of his own allegorical compositions through chance operations.

My research also originated as an attack aimed at perspective construction and a need to transgress the underlying syntax of architectural representation. Frustrated by the fact that even in its contemporary digital phase architectural drawing relies on orthographic projection and a Cartesian understanding of homogeneous space, I sought to unravel its foundation. This Cartesian schema is closely connected to the 'invention' of perspective construction during the Renaissance, which in turn derives from a monocular understanding of vision. French philosopher Jean-François Lyotard in his *Les transformateurs Duchamp* (Duchamp's Trans/formers), 1977, sees *Given* as an incarnation – a fleshing out on an architectural scale – of the system of Renaissance perspective, while at the same time 'maliciously at work to lay bare that system's hidden assumptions'.[42] Inspired by Lyotard's analysis – including his expounding sketch of *Given*'s interior – my research examines Duchamp's work as an inversion or expansion of the rules of linear perspective in search of an alternative understanding of visual space.[43]

Drawing on Duchamp's term 'blossoming', which describes the Bride's desire, but, as we will see, can also be linked to Duchamp's fascination with non-Euclidean geometries and stereoscopy, I call my analysis of *Given* 'The Blossoming of Perspective'. Stereoscopy, a popular illusory technique infamously linked to pornography, transgresses perspective by isolating and revealing binocular depth and allowing an image to 'blossom' in space. My analysis of *Given* identifies stereoscopy as its central and intentional theme, influencing its intellectual content and guiding its manufacturing process. Consequently, I read Duchamp's inversion or expansion of perspective in *Given* as a physically constructed stereoscopic drawing, attempting to unlock the erotic potential of architectural representation: a 'blossoming of perspective'.

Finally, transgression and excess of architectural drawing conventions links all the practitioners I present in the conclusion as an attempt to formulate Duchamp's influences and legacy in architectural design. Jean-François Niceron exceeds perspective through anamorphosis, Jean-Jacques Lequeu transgresses the boundaries of decency in architectural representation through excessive

eroticism, while Kiesler denounces drawing on a flat plane and builds the model of the endless house as an extension of the body. Conversely, Michael Webb devises drawing techniques to picture the imperceptible nature of memory and Nat Chard constructs meticulous drawing machines that violate their own structure in their mission to capture indeterminacy. Entirely atypical, they all exceed the primary role of architectural drawing as geometric instructions to build and employ it as an investigatory tool in a sometimes refreshingly indulgent, philosophical pursuit.

In *Marcel Duchamp and the Architecture of Desire* architectural drawing is both the subject matter and the method. Although 'written', most concepts and discoveries in this book originated as drawings: large ambitious final drawings; three-dimensional drawings and models; collages; animated drawings; stereoscopic drawings; sketches in loose pages and sketchbooks that I keep safe; perishable sketches now lost; but also ephemeral drawing-like ideas forming in the mind which are difficult to fully translate into either physical drawings or words. Furthermore, I use drawing as a method not only of developing new ideas but also of closely 'reading' other drawings.

1.2.2 FIGURAL THEORY

'This book is a defense of the eye,' writes Lyotard in the introduction to his complex work *Discours, Figure*, 1971.[44] Lyotard defends the eye by establishing the notion of the 'figure', which he links to phenomenology, images/drawings and the experience of seeing. He originally places figure in opposition to discourse, which he associates with structuralism, written text and the experience of reading. For Lyotard, discourse implies the domination of text over image, conceptual representation over unmediated perception and rationality over the 'other' of reason. In contrast, figure embraces rhetorical tropes such as allegory, and implies notions of configuration, shape and image – yet without the clarity and transparency that conventionally accompanies those terms. Later in the same book, Lyotard deconstructs this opposition by conceiving of figure and discourse in negotiation with one another, and showing how they can be mutually implicated in creative thinking. He describes desire's complicity with the 'figural' and sees this as a violating force, which works to interrupt established structures in both the visual and the discursive realm.

Influenced by Lyotard's ideas, my use of architectural design acquires the violating force of the figural and through allegory, drawing and making I aim to challenge architecture's established syntax of representation codes. These codes are shaped by our understanding of vision as a cultural construct whose structure transforms historically, influenced by socio-economical parameters and technological developments. A critical understanding of the shifting paradigms in representation of space due to the emergence of new technologies is paramount. Research through the analytical and compositional process of architectural design leads to the discovery of ideas, often unavailable to other types of enquiry, and capable of forming novel epistemological models. Following Lyotard's example, therefore, *Marcel Duchamp and the Architecture of Desire* is also unashamedly a 'defense of the eye', that critically probes the role of the visual in defining conceptual models of creative knowledge in architecture.

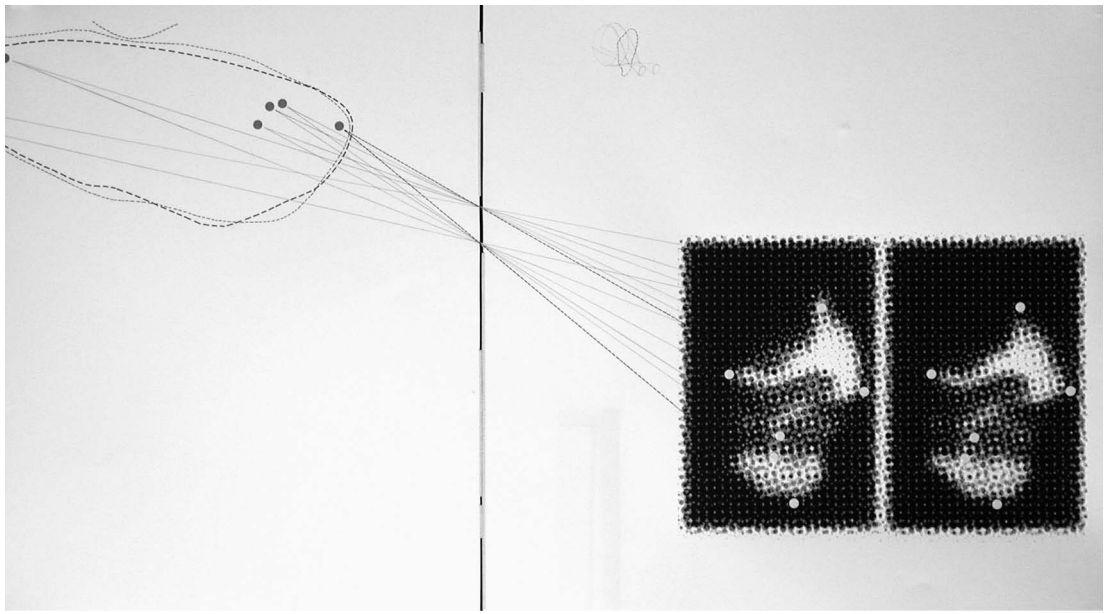


1.7 'The Blossoming of Perspective', exhibition view, DomoBaal Gallery, 2007. Photograph Andy Keate, 2007.

Architectural drawing as a research method can also be applied to investigate themes from other disciplines, such as art, film, music, science or politics. In my research, architectural design is disconnected from building; it assumes the disruptive and creative role of Lyotard's figure, and, in combination with discourse, becomes a vehicle for critical enquiry. Breaking the dichotomy between theory and praxis and blurring the distinction between two fields of architectural endeavour – drawing and theoretical writing – my research explores the potential of architectural design as 'Figural Theory'.

In 'Empathetic Blossomings: The "Drawings" of Penelope Haralambidou', British artist Brigid McLeer discusses my investigatory drawings studying the structure of Duchamp's *Given* (fig. 1.7).[45] For McLeer my work challenges 'the principles of objectivity, dispassionate observation and remote criticism' by proposing a method of engagement through 'empathetic' drawing.[46] She mentions that in our discussion I call them 'thinking drawings' and recognizes in them 'an architect's love of the trouble of drawn space' and the expression of 'empathy with an artist also in love with troubling space and fixity'. Design research therefore becomes:

> ... a process requiring empathy and love more than criticism. Love first: the deep recognition of an open invitation



1.8 *Illuminated Scribism*, plate 11, 1997. Drawing by the author.

> to commune, then empathy: taking place in the place of, and with, the other, despite not fully understanding. Then blossoming.[47]

1.3 BOOK STRUCTURE

In *Marcel Duchamp and the Architecture of Desire* the interplay between the presentation of visual material and the textual analysis is integral to the construction of the argument. My in-depth architectural analysis of Duchamp's *Given* forms the central focus of the book, where the design-led research – through drawings, sketches, photographs, models and films – interweaves with the textual analysis. Another main focus is my attempt to contextualize and historically position Duchamp's work in architecture, by presenting a selection of work by 'architects' who have either influenced his ideas, or who can be seen as carrying his legacy in architectural design. My selection of their drawings aims to identify a territory of exploration in architecture that, similarly to Duchamp, seeks to redefine architectural thinking through a challenging of the syntax of architectural notation. Finally, I position my use of allegory, visuality and desire by exploring these themes separately. Each theme is analysed by bringing together two interrelated components: a theoretical grounding and the detailed exposition of a drawing defining an alternative practice at the boundaries between art and architecture.

After Chapter 1, this introduction, Chapter 2, 'Allegory: *The Fall*' examines allegory in Duchamp and architectural design. The first part of Chapter 2, describes my design of an allegorical architectural

project, *The Fall*, which acts as the hypothesis of the research. Duchamp's two major works draw the allegorical narrative of the amorous exchange between the Bachelors and the Bride. He described his *Large Glass* as an 'allegorical appearance', and his work often addresses the viewer as an enigma – a subgenre of literary allegory – that is open to interpretation. Additionally, Duchamp has famously suggested that the artist also conceives the work as an enigma.[48] Based on an examination of Duchamp's allegorical work, and by using theory from literary allegory, the second part of the chapter, 'Allegorical Traits', defines the role of allegory in architectural design. Although allegory exists in the experience of built architecture, Chapter 2 explores how allegory, narrative and enigma can be employed as creative tools in architectural drawing to grasp and represent aesthetic and philosophical ideas of space.

Chapter 3, 'The Blossoming of Perspective: An Architectural Analysis of *Given*' is a detailed investigation of Duchamp's enigmatic final assemblage. By challenging Lyotard's linking of the work to linear perspective and suggesting an association with the nineteenth-century technique of stereoscopy, the chapter puts forward an original interpretation of *Given*'s method of fabrication and significance. I define *Given* as a built allegory of the abstract diagram of perspective construction and dissect its structure by studying six significant components in comparison to their perspectival equivalents: 'Squared Linoleum', seen as the embodiment of the Cartesian grid; 'Wooden Door', carrying the two peepholes instead of the single apex of the visual pyramid; 'Gas Lamp', an incarnation of the vanishing point or the focus of the geometric 'light'; 'Brick Wall', the physical equivalent of the picture plane; 'Found Twigs', a complex form that linear perspective is unable to render; and finally 'Cast Nude', the material projective alternative to a form composed from an orthographic plan, section and elevation.

I suggest *Given* is the culmination of Duchamp's search for a representational system beyond perspective, inspired by his fascination with four-dimensional geometry and stereoscopy. My methodical interrogation of the different components of Duchamp's seminal piece aims to expose the omissions and simplifications in the establishment of perspective construction, which still influences architectural drawing and guides architectural imagination today. By linking *Given* to stereoscopy, my objective is to demarcate an expanded notion of space – a 'blossomed' perspective – pointing to an alternative representation technique in architecture.

Chapter 4, 'Visuality: *The Act of Looking*' looks at Duchamp's obsession with the visual. Often erroneously interpreted as anti-visual, the term 'antiretinal' refers to Duchamp's opposition to the simplification of vision. His lifelong preoccupation with optics attests to his interest in visuality as an underlying structure of thought and creativity, and his debt to the Renaissance perspectivists has been analysed by the French art historian Jean Clair amongst others. Although fascinated by logic and precise mathematical thinking, Duchamp was also happy to challenge and mock that same logic. Furthermore, as art historians Craig Adcock, Linda Darlymple Henderson and more recently Herbert Molderings have suggested, Duchamp's interest in non-Euclidean geometries and the fourth dimension was linked to his search for an alternative system for

representing and organizing space. The first part of Chapter 4, 'Geometry of Vision' traces Duchamp's debt to perspective as a tribute and as an ironic subversion, and analyses the influence of theories of non-Euclidean geometries, the fourth dimension, and stereoscopy on Duchamp's conception of an expanded spatial schema based on desire. The second part, '*The Act of Looking*', presents my full-scale redrawing of *Given* in an installation by the same title.

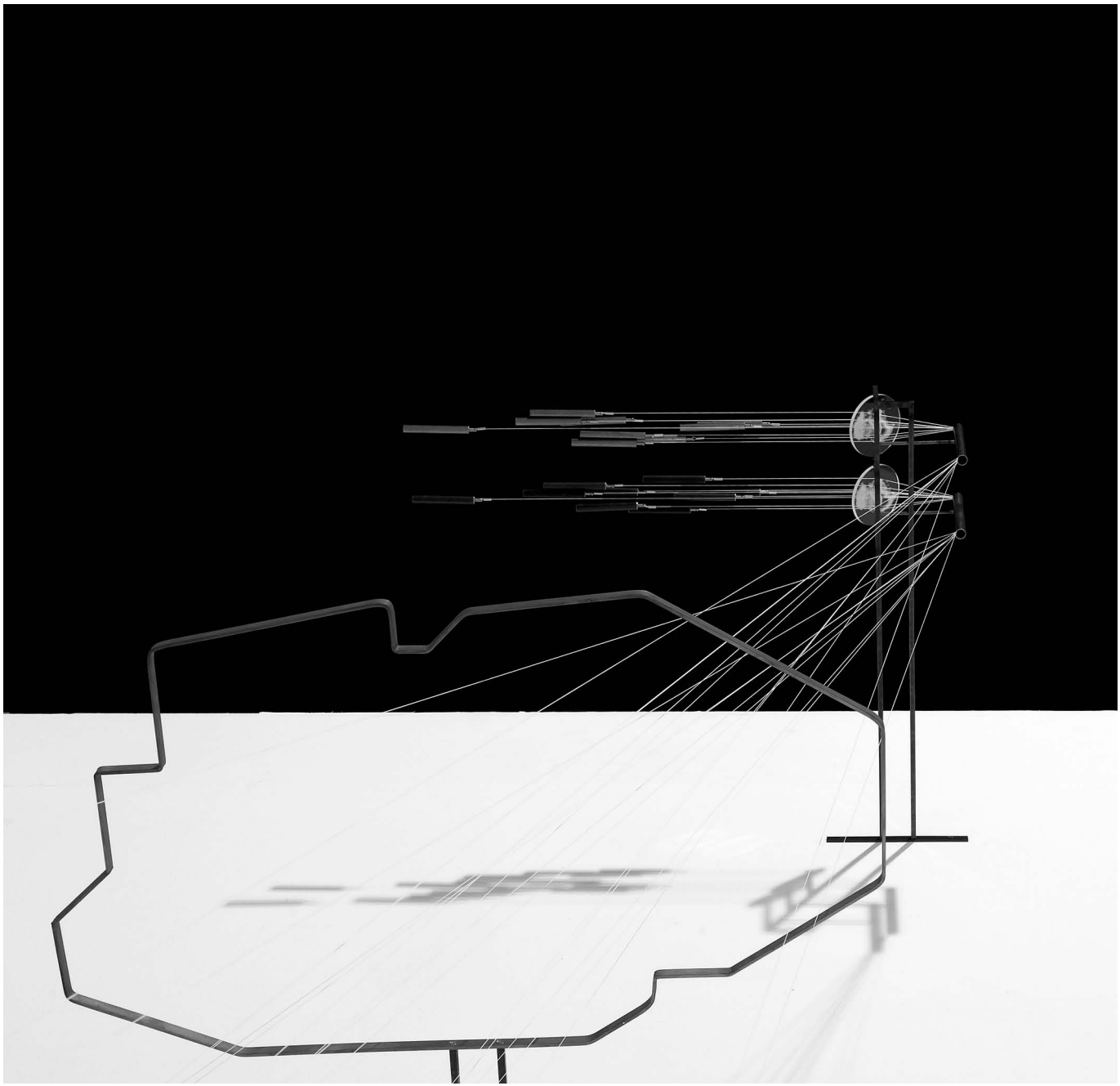
As a counterpoint to the intellectual interrogation of *Given* in the other chapters, Chapter 5, 'Desire: *Female Nude Drawing*', demonstrates an engagement with the artwork on a personal, embodied level. It attempts to convey my gendered position in regard to its architectural staging of desire and how a visceral engagement with art can open up different layers of meaning. No figures accompany the text in this chapter, but it contains a drawing in words.

Finally in Chapter 6, 'Defrocked Cartesians: Duchamp's Influences and Legacy', I assume the role of a curator, selecting drawings by 'architects' and 'philosophers' whose work I see as directly or indirectly connected with Duchamp's. I coined the term 'defrocked Cartesians' from a comment Duchamp made in an interview, referring to his 'Cartesian' fascination with ruled drawing and perspective, and calling himself *défroqué* (defrocked) to describe his simultaneous desire to exceed the limitations of these representation techniques through irony. The chapter is in the guise of an exhibition catalogue, where I introduce the rationale behind my decision to associate each work with Duchamp in a short text, thus giving priority to the 'reading' of the selected drawings.

1.9 *The Act of Looking*, 2007. Installation by the author. Photograph Andy Keate, 2009.

The length and structure of the chapters in *Marcel Duchamp and the Architecture of Desire* vary considerably. To use an example from architectural design, the book structure is equivalent to the concept of *Raumplan*; the term is linked to Austrian architect Adolf Loos's use of internal distribution of spaces, according to which every room in a building is designed at the necessary height, breaking the rigid vertical separation in single-height floors.[49] Each chapter in the book, like a room in a building, has the necessary length and internal configuration to discuss and portray the ideas explored, therefore, avoiding a forced homogeneity.

Perhaps unavoidably, given my background in architectural design, I have also understood the different parts of the book as spaces or rooms belonging to an edifice, in terms of their significance, subject matter, or position in the structure. For instance, after the front garden and porch of Chapter 1, this introduction, signifying the entry point of the research, Chapter 2, 'Allegory: *The Fall*', can be understood as an antechamber or a vestibule. Chapter 3, 'The Blossoming of Perspective: An Architectural Analysis of *Given*' is the central part of the book, the core of this allegorical construction. It is subdivided into six sections named after selected elements composing *Given*: 'Squared Linoleum', 'Wooden Door', 'Brick Wall', 'Gas Lamp', 'Found Twigs' and 'Cast Nude'. The sections constitute stops on a topological journey through the piece and act as cabinets of curiosities, or 'mnemotectonic loci' displaying ideas related to the different parts of the assemblage.[50] In Chapter 4, 'Visuality: *The Act of Looking*', I dissect vision and visual representation techniques as in a laboratory. The shortest chapter,



Chapter 5, 'Desire: *Female Nude Drawing*', where I engage with *Given* from an autobiographical point of view as a female architectural designer and writer and a mother, is a withdrawing room.[51] Finally the concluding Chapter 6, 'Defrocked Cartesians: Duchamp's Influences and Legacy' differs significantly from the rest of the chapters as the primacy of the visual material takes over. This part of the book is therefore similar to a picture gallery.

To put it simply, I would not have been able to 'write' this book if I was not trained as an architect – if its ideas were not drawings before developing into words. Through architectural design, allegory, drawing and making, and an excruciatingly slow process of translating the practice-led research into text, I write about Duchamp in a book that claims it should be read like a building.

Notes

1 Kiesler, 'Design-Correlation, Marcel Duchamp's *Large Glass*', 53–60. Under the series title Design-Correlation and during the late 1930s, Kiesler was a regular contributor of essays to the journal.

2 The *Large Glass* is permanently installed at the Philadelphia Museum of Art, http://www.philamuseum.org/collections/permanent/54149.html [accessed: 20 March 2013].

3 Breton, 'Phare de La Mariée'. Reprinted in Lebel, *Marcel Duchamp*.

4 The themes of the essays introduce technological innovations. Kiesler's technique for his series combines photographic images and drawing with text and typography inventing a language of describing his architectural philosophy of Design-Correlation; his ideas and mode of delivery stand out from everything else in the magazine.

5 My translation of the French: 'Quelle surprise vous m'avez faite! J'ai eu très grand plaisir à lire votre article da[ns] le 5 extraits de l'Architectural Record sur le verre – d'abord l'esprit de l'article, puis votre interprétation et la présentation des vos idées! Je vous remercie d'avoir bien voulu regarder le verre avec une telle attention et d'avoir fixé des points que peu de gens connaissent.' Autograph letter from Duchamp to Kiesler, 25 June 1937, Paris. See Duchamp, *Affectt | Marcel*, 214.

6 The *Large Glass* was shattered in 1931, during transit between New York and West Reading Connecticut after its first presentation to the public at the Brooklyn Museum in 1926. The damage was not discovered, however, until a few years later, when the boxes it was packed in were opened. Duchamp travelled to the States specifically for the purpose of 'restoring' it and spent more than two months doing so in the summer of 1936 at the house of the piece's owner, American artist and art patron Katherine Dreier.

7 Kiesler's style is reminiscent of collages by László Moholy-Nagy, photographic experiments by American artist and photographer Man Ray and photo essays by Hungarian photographer André Kertész.

8 Kiesler, 'Design-Correlation', 53–54.

9 Kiesler, 'Design-Correlation', 56.

10 Kiesler, 'Design-Correlation', 55.

11 For instance in a letter to Duchamp, Katherine Dreier suggests that Kiesler might have lost his job with the magazine as a result of the cost involved in hiring Berenice Abbott to take the photographs for this particular article.

12 In one of his notes Duchamp asks: 'Can works be made which are not "of art"?' See Duchamp, *A l'infinitif (In the Infinitive)*, 1.

13 Landis, 'Critiquing Absolutism', 102.

14 Kiesler, 'Design-Correlation', 54–55.

15 Kiesler, 'Design-Correlation', 54.

16 This explains Duchamp's 'surprise' and immediate offer to provide him with a full set of notes in the same letter.

17 Freud discussed the structural model in his essay 'Beyond the Pleasure Principle', 1920, which he formalized and elaborated upon three years later in his 'The Ego and the Id', 1923.

18 Kiesler, 'Design-Correlation', 54.

19 *Given* is permanently installed at the Philadelphia Museum of Art, http://www.philamuseum.org/collections/permanent/65633.html [accessed: 20 March 2013]. For an analysis of the *Large Glass* as a camera, see Clair, *Duchamp et la photographie*.

20 Kiesler, 'Design-Correlation', 54.

21 Kiesler's analysis also predates his own research on the *Vision Machine* at Columbia University, which shares similar concerns with the *Large Glass* and *Given*. See Chapter 6.

22 Duchamp, 'The Creative Act', 140.

23 See Vellay and Frampton, *Pierre Chareau*, 245, and Pérez-Gómez and Pelletier, *Architectural Representation and the Perspective Hinge*, 371–73.

24 Tschumi, 'Architecture and Its Double', Diller + Scofidio, 'A Delay in Glass', and 'A Delay in Glass: Architectural Performance from a Work by Marcel Duchamp'.

25 Both artists and writers have produced replicas of the *Large Glass*: Linde in 1961 and Hamilton in 1965–66. The replicas are part of the permanent collections of the Moderna Museet in Stockholm and Tate Modern in London, respectively.

26 Décimo, 'Preliminaries' in Décimo, *Marcel Duchamp and Eroticism*, 2. The book is the result of a colloquium that took place in December 2005 at the University of Orléans and the Musée des Beaux-Arts in Orléans, France, in relation to an exhibition entitled 'Marcel Duchamp Rrose Sélavy' (28 November 2005–29 January 2006).

27 Décimo, 'Preliminaries', 2.

28 Adcock, 'Duchamp's Eroticism', 149.

29 Adcock, 'Duchamp's Eroticism', 149.

30 Duchamp's readymades are ordinary manufactured objects that the artist selected and modified, as an antidote to what he called 'retinal art'.

31 Adcock, 'Duchamp's Eroticism', 165.

32 Alison, 'The Surreal House', in Alison, *The Surreal House*, 26.

33 For more on Duchamp, architecture and desire, see Haralambidou, 'On the Architecture of Looking', an interview by Victoria Watson, filmed by Mobile Studio, where I discuss the devices that structure our experience of Duchamp's *Given*. The film was presented at 'The Fractured Body: The House as Body', an evening event organized and curated by Mobile Studio as part of *The Surreal House* exhibition at Barbican Art Gallery, 2010. http://www.youtube.com/theMobileStudio#p/u/1/XWF0fpbOEfo [accessed: 20 March 2013].

34 Pérez-Gómez, *Built upon Love*, 101.

35 Pérez-Gómez, *Built upon Love*, 103–4.

36 Hays, *Architecture's Desire*, 1.

37 Hays, *Architecture's Desire*, 145.

38 Tschumi, 'The Pleasure of Architecture', 178.

39 Tschumi, 'The Pleasure of Architecture', 180.

40 Tschumi, 'The Pleasure of Architecture', 180.

41 Molly Nesbit touches upon the significance of Duchamp's training in mechanical drawing in Nesbit, *Their Common Sense*.

42 Krauss, *Optical Unconscious*, 113.

43 See figure 6.14, Chapter 6.

44 Quoted in Jay, *Downcast Eyes*, 565. In the French edition the passage reads: '*Ce livre-ci est une défense de l'œil*', Jean-François Lyotard, *Discours, Figure*, Paris: Klincksieck, 1971, 11. In their translation Antony Hudek and Mary Lydon present the same passage as: 'this book takes the side of the eye', see Lyotard, *Discourse, Figure*.

45 McLeer, 'Empathetic Blossomings'. This invited catalogue essay responds to my solo exhibition 'The Blossoming of Perspective' at DomoBaal gallery, 2007, see Haralambidou, *The Blossoming of Perspective*.

46 McLeer, 'Empathetic Blossomings', 21.

47 McLeer, 'Empathetic Blossomings', 21.

48 He suggested this in his essay 'The Creative Act'.

49 Loos does not actually directly refer to the term *Raumplan*, or the resolution of the plan in space, in his own writing. The term was introduced by Loos's student, Czech-Austrian architect Heinrich Kulka to describe Loos's new 'elaborate' conception of space.

50 Mnemotectonic loci are rooms in an imaginary edifice used by orators practising the ancient technique of the art of memory for memorizing a text. See, Chapter 2, Section 2.2.7 'Allegory and the Art of Memory'.

51 A withdrawing room in a large sixteenth to early eighteenth-century English house, was a room to which one could 'withdraw' for more privacy. Later, it became known as the drawing room, where the ladies of a dinner party would withdraw after dinner.

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ALLEGORY: THE FALL

After convincing the world that he had abandoned art for chess, Duchamp worked on a major final piece in complete secrecy for twenty years. Just before his death in 1968, Duchamp arranged for the piece to be permanently installed at the Philadelphia Museum of Art, but when this was unveiled to the public a year later, he was not there to offer any clues to its significance and meaning.[1] Standing in front of an old weathered door in a darkened, empty room, the viewer engages through two peepholes with a concealed pornographic scene: a recumbent, faceless, female nude, holding a gas lamp and submerged in twigs in the open landscape bathed in light, where a waterfall silently glitters (see fig. 1.3). Defying traditional definitions of painting or sculpture Duchamp's enigmatic final work is an assemblage of elements, a carefully constructed diorama, with an equally enigmatic title: *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage …* (*Given: 1. The Waterfall, 2. The Illuminating Gas …*), or *Given*.

The title derives from an earlier note by Duchamp referring to the *Large Glass*:

> Preface
>
> Given 1 the waterfall
>
> 2 the illuminating gas
>
> Determine the setting for an instant Pause (or allegorical appearance), of a succession of a set of phenomena seeming to necessitate each other according to laws, in order to isolate, the sign of accordance between this Pause (open to all countless eccentricities), on one hand, and a choice of possibilities legitimised by these laws (and also causing them), on the other.[2]

By assigning this title to *Given*, Duchamp may have implied that this is his second attempt to determine the setting for an 'instant Pause' or 'allegorical appearance'. If *Given* is the staging of an allegory – in the sense suggested by the Greek roots *allos*, other, and *agoria*, speaking – it is a pornographic image that says one thing and means another. Furthermore, the title reads as a mathematical problem or a riddle inviting interpretation by the viewer and the uncanny atmosphere and stillness of the nude body resemble a crime scene under forensic examination. Whether an allegory, mathematical problem or detective mystery, Duchamp's piece confronts the viewer with an enigma. What is the hidden meaning behind the allegorical setting of *Given*? The following part of the book is a response to Duchamp's call for the interpretation of *Given*. Research is primarily conducted through drawing and *The Fall*: the design of an imaginary building, an allegory itself, which aims to critically analyse Duchamp's own allegorical work (fig. 2.1).

The Fall allegorically encapsulated my research hypothesis, a set of ideas, which, although complete and intuitively convincing within the allegorical structure, I accepted as an unresolved enigma that I felt compelled to decipher. The ensuing investigation through text and drawing aimed to interpret, verify and expand the intuitive links established by the allegory. Duchamp's term 'blossoming' came to suggest an expansion of the Cartesian understanding of space, and led to a study of stereoscopy and binocular vision – the overlooked 'other' eye – pointing to an alternative visual schema.

I suggest that the importance of the allegorical architectural project, and the construction of the design enigma, is paramount within the boundaries of a research project in visual practices, as a method of grasping meaning beyond analytical discourse.



This is especially valuable in research focusing on representation and drawing, which is for art and architecture what language is to literature. The difficulty of interrogating the foundation of visual thinking directly can be resolved by working through a figurative parable or an allegorical narrative. Additionally, I recognize the same strategy in Duchamp. His arrangement of both the *Large Glass* and *Given* as narratives of an erotic exchange allows him to explore the underlying structure of visual perception and representation through the allegorical structure.

In this chapter, I discuss the process that led me to use allegory as a research method and the role of this particular allegorical architectural project in my study of *Given*, followed by my attempt to formulate a theoretical background supporting the use of allegory in architectural research.

2.1 THE FALL

2.1.1 HOUSE OF MONA LISA

The focus of this research project is an architectural analysis of *Given*. However, Duchamp's final enigmatic assemblage was not the starting point of the research. Rather, the origin of my preoccupation with the piece was an unexpected intuitive association – if not an accident – as it is often the case during the design process. At the time, I was interested in architectural representation and its influence in the conception of spatial ideas. The point of departure was what I perceived as an antiquated rigidity in architectural drawing: even in its recent digital phase, it remains dependent primarily on orthographic or parallel projection, which is closely connected by the Renaissance invention of linear perspective construction.

The Fall was an entry to an international architectural ideas competition.[3] Its development within the boundaries of a competition was an experiment in which I tested a hypothesis, as in the laboratory, where results can be expected, but accidents or unexpected results might point in directions not previously considered. I entrusted the result of the project to a basis of intuitive cues, and a simple set of allegorical juxtapositions in the narrative led to the construction of my hypothesis.

The competition, organized by the Japanese magazine *Shinkenchiku-sha*, was entitled 'House of Mona Lisa'. According to the competition brief:

> The Mona Lisa is shrouded in a veil of mysteries. Who is the model? Why is she smiling? Why is her hair undone? What is the landscape in the background? Why is the left hand unfinished? Was it perhaps a self-portrait? These mysteries are part of the work's fascination.[4]

Entrants were invited to design a house in accordance with their own interpretation of the *Mona Lisa*, their own solution to the mystery. My decision to respond to this competition brief was guided by Leonardo da Vinci's role in developing the Renaissance technique of perspective construction. Although virtually devoid of architectural features, I saw both the *Mona Lisa* – the painting – and Mona Lisa – the female figure – as metaphors for perspective. Consequently, I hoped that using my entry to the competition to design a house for her, might allow me to address my uneasiness with the representation technique. My entry to the competition was, therefore, an experiment aimed at questioning perspective construction,

2.1 *The Fall*, 2004. Mixed media drawing by the author. Photograph Andy Keate, 2007.

albeit not directly but through the construction of an allegorical building: the house of Mona Lisa. As preparation for my design, I started looking at Leonardo's painting afresh.

2.1.2 FIRST SKETCHES

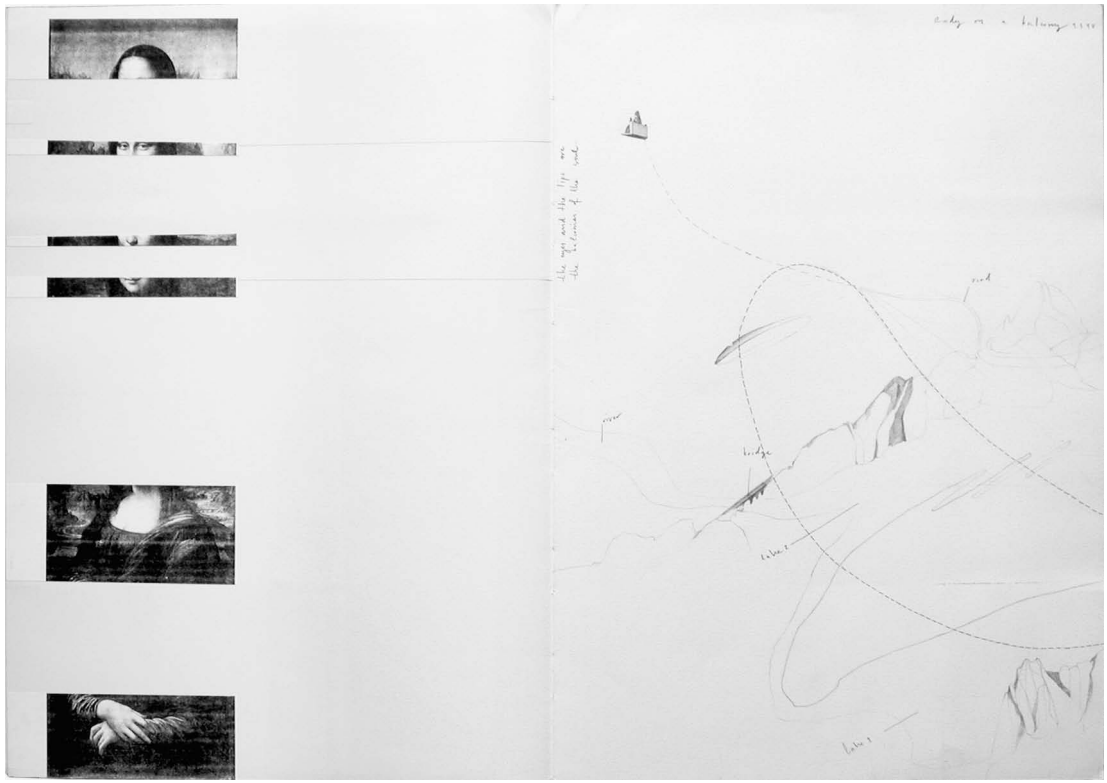
Although a set of drawings and a model formed the submission to the architectural ideas competition, representations more accurately describing *The Fall* exist in the form of my sketches and notes in the pages of the project's sketchbook, by the same title. There, ideas and thoughts contradict each other, are repeated, or left unfinished, and despite some unavoidable post-rationalization the sketchbook reflects the fragmentary nature of the design process. However, the sketchbook is not just a representation of the project but its first site and the medium through which it developed. Its pages reveal the true nature of *The Fall*, not as a finished design proposition but as a research method, where the investigation is conducted through the allegory of the fall.

In one of my first sketches/collages I sliced a copy of the *Mona Lisa*, as an attempt to counteract my inability to see the image as a whole because of my overexposure to it (fig. 2.2). The fact that this image is so widely reproduced does not enhance its precise recollection. Instead, it seems to erase it. Most people recognize the portrait at a glimpse but few can describe it in detail: the balcony, the landscape and the detailing of the dress are areas usually forgotten. I hoped that slicing the portrait in strips might reveal aspects of it to which I had not previously paid attention. The slicing also attempted to neutralize the uncanny effect of the woman's facial expression, though I found that cutting the image horizontally did not successfully fragment the face: the disengaged mouth and floating eyes still carry their mysterious allure.

Art historian Martin Kemp refers to the portrait as 'Portrait of a Lady on a Balcony' (the '*Mona Lisa*').[5] The presence of the balcony in the picture is subdued and sometimes overlooked.[6] However, this alternative title, suggesting that the figure is on the balcony of a high building, probably a tower overlooking the vast rugged landscape, clarified the picture's spatial setting and inspired my next sketch on the other half of the spread.

This sketch imagines the view from a different viewpoint in the space depicted in the portrait, where we see the lady on the balcony from the back. In the painting there is no information about the building to which the balcony belongs, or the topography in which it is sited. So from this 'other' point of view in my drawing the balcony appears to float in mid-air. I also drew the landscape below, identifying a river, mountains, a bridge, two lakes and an oval shape in dotted line hovering above.

In the painting the landscape is 'interrupted' by the head of Mona Lisa in the foreground. In my sketch, however, the landscape is continuous, bridging the two parts visible on either side of the head in the portrait and adding new elements, revealing how imagination tends to link the two banks of visual information. Spatial continuity in everyday experience confirms that even if something is concealed it may still be there. The landscape behind Mona Lisa, though, is a pictorial representation of a partly imaginary place. Her presence might disturb its continuity in ways different from normal spatial experience, which naturally connects the remaining visible parts on either side of such an interruption.



2.2 *The Fall Sketchbook*, double spread with the *Mona Lisa* spliced and first topographical sketch, 1998.

The female figure casts a contour of invisibility over the depicted scenery. Her head throws a huge shadow of visual ignorance; a dotted line marks this outline in the sketch, allowing the possibility that the region concealed behind Mona Lisa's head might be a void. I decided that this potential void, the mysterious hidden part of the landscape, was an appropriate site for her house.

2.1.3 GEOLOGICAL NARRATIVE

According to Martin Kemp, the project for altering the course of the river Arno with a canal, and the consequent flooding of the Valdichiana, led Leonardo to draw many maps of the region between the Tyrrhenian Sea and the Apennines.[7] These studies revealed for Leonardo not only the current geology of the area but also the dramatic processes in the distant past which had caused it. In the *Mona Lisa* the landscape captures the geological narrative of millennia.

On the horizon vast volumes of rock disappear in a dense haze, probably caused by a storm. On the right border, a large white shape can be seen either as an obscured rock or as an iceberg. A river, formed by the accumulation of water from rain and the melting of ice, runs through the valley and erodes



2.3 *The Fall Sketchbook*, two sides of the background collage, 1998.

the rocks causing them to break, fall, block the flow and create a lake. The river continues to flow, forming a waterfall in the rugged landscape. Human presence is manifested on the right by a bridge which connects the two banks of a river, and on the left by a road that traverses the valley. The painting can be read as a geological history that starts at the horizon in the far background of the picture and ends with Mona Lisa's face in the foreground: a perspective through time.

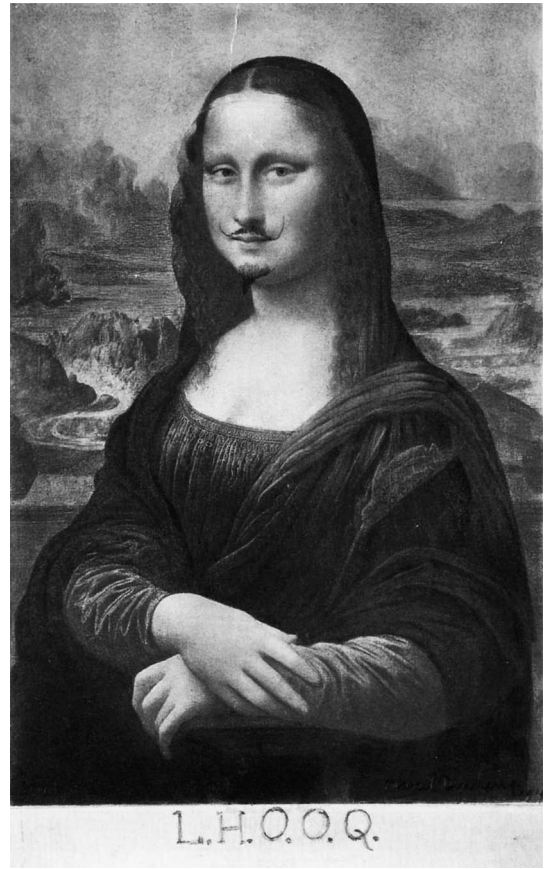
Kemp maintains that Mona Lisa is enlivened by the ebb and the flow of her inner spirit, expressed by not only her face but also the landscape, which portrays the earth as a living, changing organism, 'incessantly subject to the cycles of evaporation, precipitation, erosion and accretion'.[8]

In another collage, I enlarged the two parts of the landscape on either side of the figure, omitting the head (fig. 2.3). The absence of the head disrupting the expectation for continuous pictorial information on either side reveals the inconsistency of the landscape. Psychoanalyst Darian Leader finds this split landscape more mysterious than the smile: 'the immediate effect is that of a discontinuity in the visual field, as if beyond the lady is a crack, a faultline in visual space.'[9]

2.1.4 L.H.O.O.Q.

A manipulation of the collective memory image of Mona Lisa appeared in 1919, the 400th anniversary of Leonardo's death. Duchamp added a beard and moustache to a postcard reproduction of the portrait and gave this rectified readymade the title *L.H.O.O.Q.* (fig. 2.4). The title is a double pun: pronounced as a word, it sounds in English like 'look' and calls attention to something not previously observed; the second and more commonly known interpretation is the letter-by-letter reading of the acronym in French, which produces the phrase *'elle a chaud au cul'* (something like 'she has the hots').[10] In this work Mona Lisa's secret loses its sublime character and acquires sexual undertones. However, Duchamp's main target was perhaps not the *Mona Lisa*, but painting in general, of which Leonardo's portrait operates as a symbol.[11]

The year that Duchamp pencilled the sacrilegious additions to the Mona Lisa postcard, he had just returned from Buenos Aires to Paris, where he re-encountered Francis Picabia, and through him met the Dada group. As a consequence, *L.H.O.O.Q.* was reproduced extensively in the group's publications.[12] His previous work in Buenos Aires was related to the *Bride Stripped Bare by Her Bachelors, Even* … or the *Large Glass*. The third study in glass, the one for the Oculist Witnesses, *To Be Looked at (from the Other Side of the Glass) with One Eye, Close to, for Almost an Hour*, 1918 was executed there, as was his *Handmade Stereopticon Slide*, 1918–19. Both of these works mark his growing interest in optical phenomena and the illusion of depth, while his parallel development of the desire machine in the *Glass* links *L.H.O.O.Q.* with the concept of the Bride.[13]



2.4 Marcel Duchamp, *L.H.O.O.Q.*, 1919. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

Comparing the hand-coloured reproduction of the *Mona Lisa* in *L.H.O.O.Q.* with *Given* presented a series of uncanny similarities: the same composition, a central figure surrounded by an 'organic element' in a rocky landscape with a strong presence of water in the form of a lake and waterfall; the same melancholy and sense of unresolved mystery. There was even a matching colour balance: browns and blues contradicting the paleness of the flesh. Although at the time a connection between the two works seemed nonsensical, the similarities between

the two images inaugurated my interest in *Given*, which I started investigating further.

Art historian Janis Mink's description of the figure in *Given* also notes the atmospheric similarities of the two works:

> Although she is obviously a woman, she has been strangely de-sexed and somehow abused, without a bruise on her. In the background a watery landscape atmospherically reminiscent of that of the Mona Lisa suggests a distant and deserted corner of the earth—a source, but not a pure or unequivocal one.[14]

Having established the first intuitive connection between *L.H.O.O.Q.* and *Given*, I embarked on a study of several different versions of the readymade, which revealed further links between the two works. As we have seen, the first appearance of *L.H.O.O.Q.* in 1919 was in the middle of the work for the *Glass*. This timing acquired a particular significance, because it links the *Large Glass* with *Given* at an early stage, even before Duchamp's claim that it was 'definitively unfinished' in 1923.[15] Much later, and while Duchamp was secretly at work on *Given*, in 1955 he added a moustache and goatee on another reproduction of the *Mona Lisa*: this time on a tea towel. The work was inscribed to Man Ray's wife Juliet, and was entitled *L'envers de la peinture*.[16] *L'envers* means the reverse or the wrong side: inside out or wrong side for clothes, back for paper, reverse for a medallion, underside for a leaf and the inside for an animal's skin. Art historian Arturo Schwarz finds another double entendre here: 'the reverse or the wrong side of painting'.[17] Another use of the word is *quand on connaît l'envers du tableau* – when you know what is going on underneath it all, when you know the other side of the picture. The title of this version of *L.H.O.O.Q.*, a clue for the project, is an indication by Duchamp of the nature of the final piece that he was secretly developing.

What is at the back, at the opposite side of the flat plane of the *Mona Lisa* picture? A turning of the hinged picture plane might reveal a hidden expanded spatiality or the unexpected trace of a secret. As we will see in greater detail later, Duchamp was at the time fascinated by the work of French mathematician Esprit Pascal Jouffret, according to whom rotation around a plane or a space projects a volume into the fourth dimension.[18] Duchamp thus conceives a work of art as the inverse of classical painting, turns it inside out and thus projects its subject into the fourth dimension. This reversal simultaneously reveals all the optical attributes that painting based on linear perspective might suppress. So through *L.H.O.O.Q.*, I started seeing *Given* as Duchamp's consistent reversal of the *Mona Lisa*.

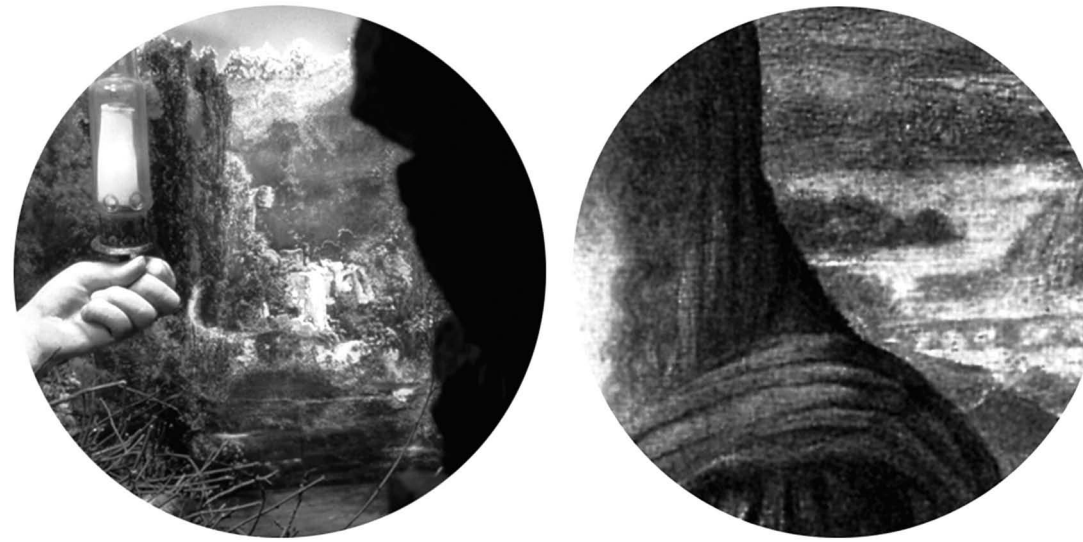
Finally in 1965, when the work on *Given* was near an end, there was more news on the *L.H.O.O.Q.* front: *L.H.O.O.Q. rasée* (shaved *L.H.O.O.Q.*), an invitation card for the exhibition 'Not Seen and/or Less Seen of/by Marcel Duchamp-Rrose Sélavy 1904–64'. The reproduction of the *Mona Lisa* on a playing card loses the moustache and beard and appears shaved. This 'rectified' readymade was also the final appearance of *L.H.O.O.Q.* French art historian Jean Clair describes *L.H.O.O.Q. rasée* as 'putting things back as they were'.[19] Or perhaps, an insolent allusion to the secret work on *Given*, and the nude's lack of pubic hair. It indicates that *Given* is approaching completion and that the challenge of the image of Mona Lisa can now be transferred to the nude in the assemblage.[20] As art historian Hellmut Wohl has suggested:

> By virtue of the five letters he placed under the image, the Mona Lisa also became an allusion to the Bride in the *Large Glass*, who through the Draft Pistons in her Cinematic Blossoming issues commands to the Bachelors to commence her stripping. Like the rectified Mona Lisa, *elle a chaud au cul* (*L.H.O.O.Q.*). In the unassisted readymade of 1965 the Mona Lisa is once more a woman, and with her new title Duchamp has created a new thought for her: she announces the Bride of *Étant donnés*, desirous, in a landscape setting, and *rasée*.[21]

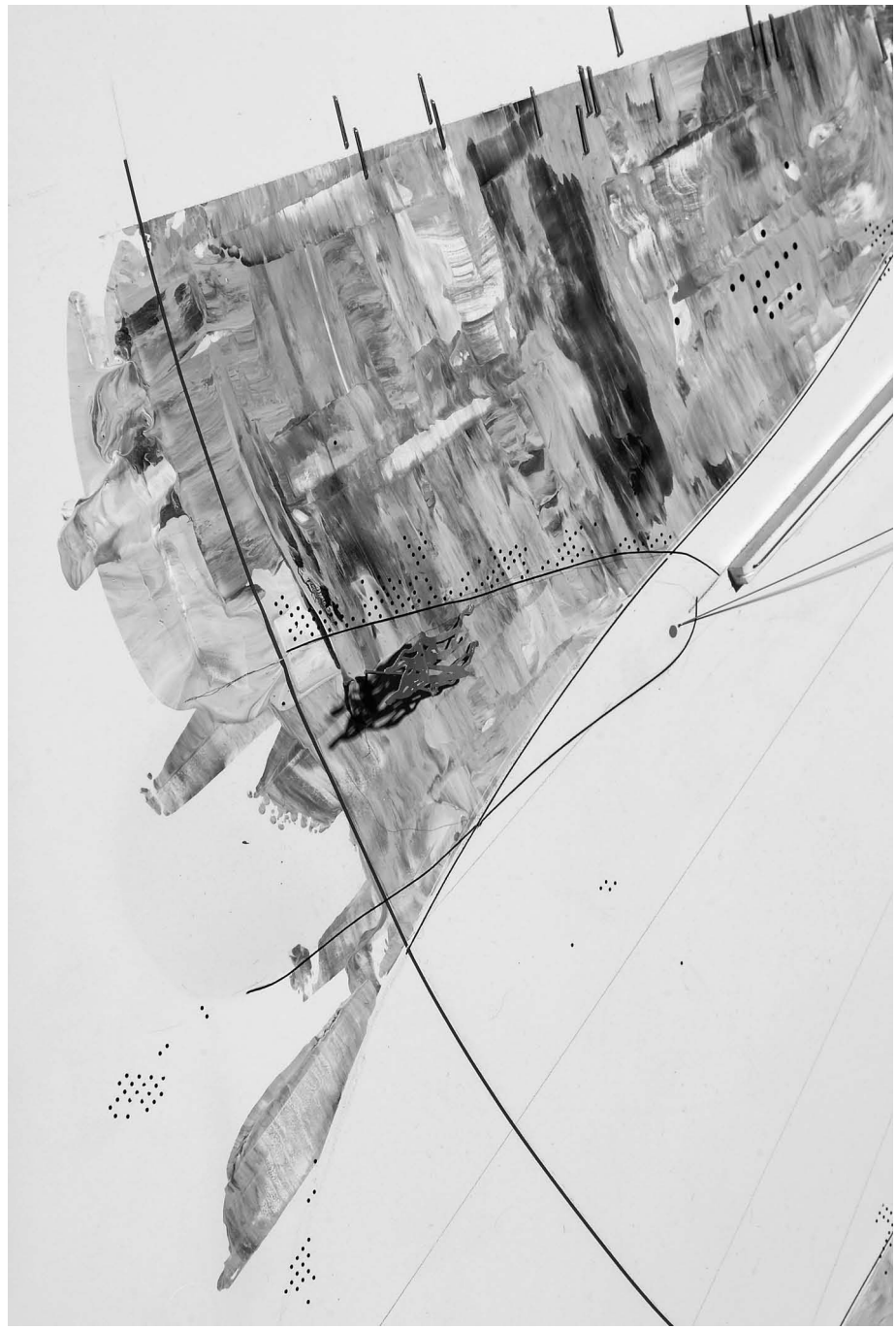
2.1.5 THE WATERFALL

The Waterfall and the Illuminating Gas are significant elements in the *Large Glass*; they constitute the animating forces behind the flow of the narrative but remain invisible. In *Given,* Duchamp treats the illuminated gas and the waterfall of the title figuratively. They appear as a handheld lamp and a water feature, part of the landscape in the background, respectively.[22] On the right of the nude, far back and in between the trees, a stream falls into a silent lake. One attribute that cannot be shown in a photograph is Duchamp's optical trick for depicting its flow. Hidden in a rotating biscuit box mechanism, a flickering light creates the illusion of water reflecting the sun. This serene blinking in the 'distance' adds duration and movement to the stillness of the assemblage.

The presence of water in motion is reminiscent of the landscape behind Mona Lisa. By closely examining the landscape in the portrait I discovered another sighting of the waterfall. What is accomplished through a trick in the assemblage is rendered pictorially in the painting in the form of a cascade of water appearing on the right of the head and beyond the bridge. The two sightings of the waterfall, depicted in two different works of art, were no longer distinct. The idea that they are two separate views of a single waterfall in the same landscape started developing in my mind (figs. 2.5, 2.6).



2.5 Comparison between the two 'sightings' of the waterfall, 2010. Digital drawing by the author.



2.6 *The Fall*, detail of the waterfall, 2004. Mixed media drawing by the author. Photograph Andy Keate, 2009.

The similarities of atmosphere and light between the assemblage and the portrait were now justified: I concluded that they both depict the same 'place' from different viewpoints. Mona Lisa and the nude occupy the same 'distant and deserted corner of the earth'.[23] As a further consequence, the possibility of the two female figures sharing the same identity arose:

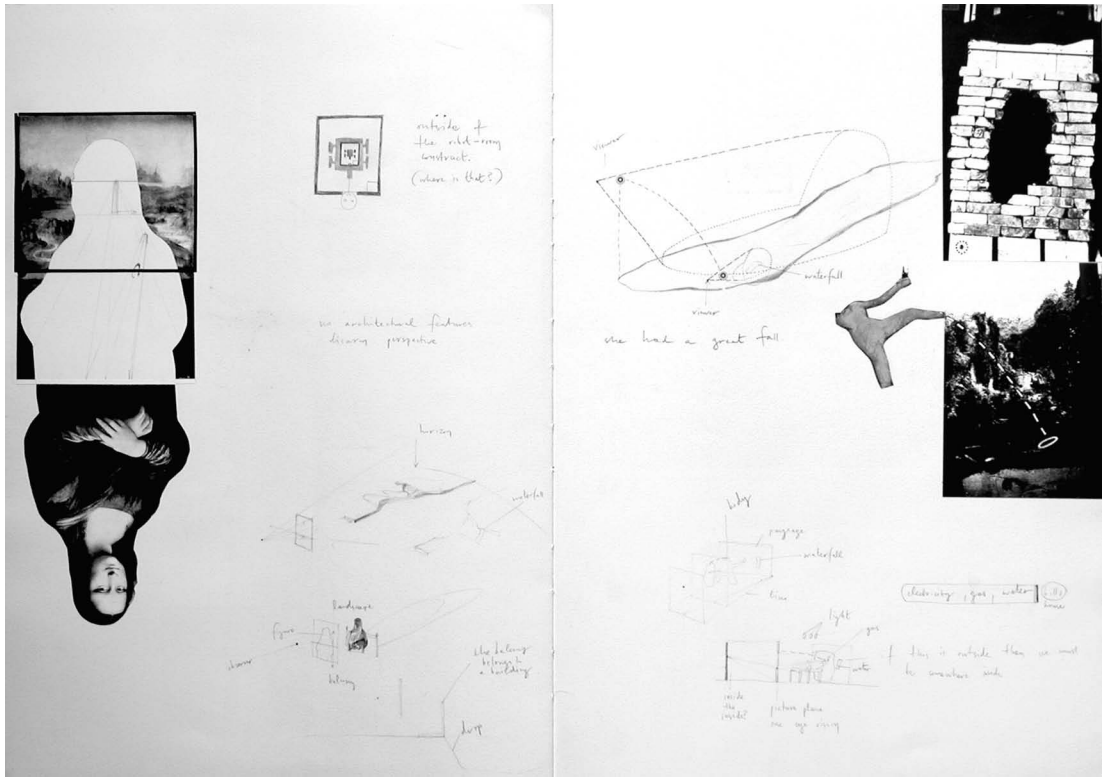
> 'She had a great fall'[24]

2.1.6 GIVEN: THE CORRIDOR, THE TOWER AND THE FALL …

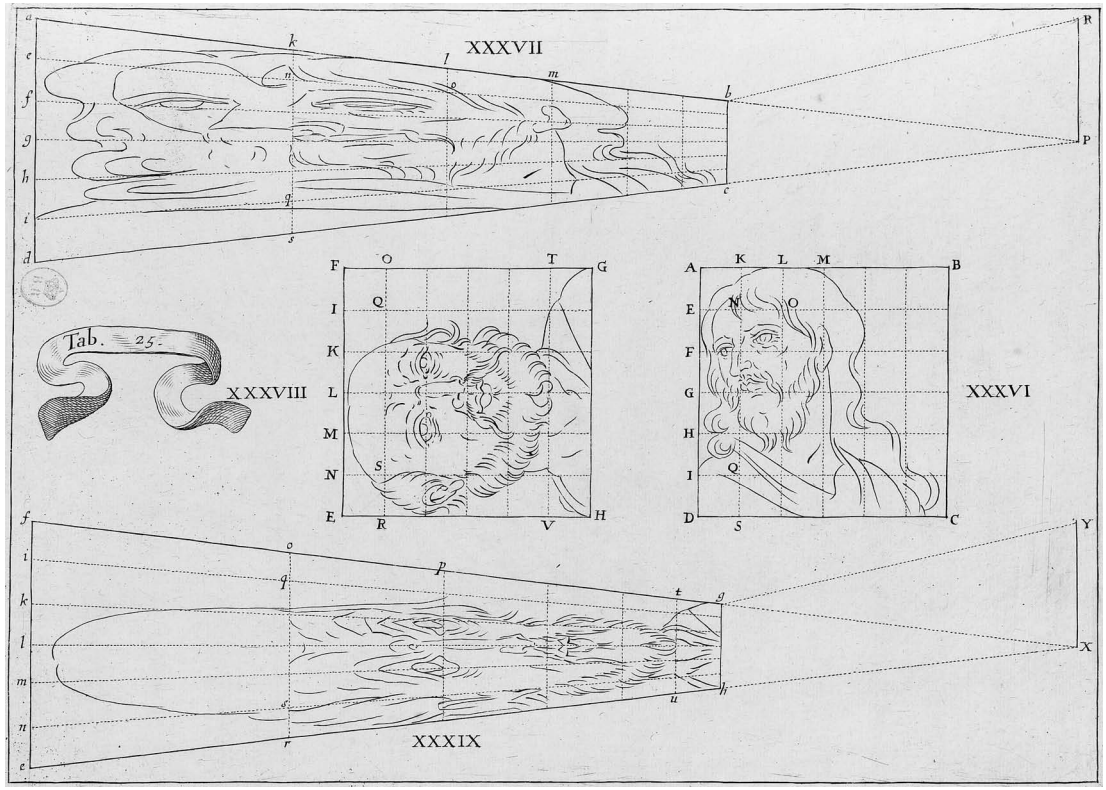
One of the mysteries of Leonardo's portrait is the identity of the sitter. A similar secrecy veils the identity of the female nude in *Given*.[25] In my proposal for the competition the two enigmatic figures merge, condemned to share the same lost identity.

Lady on a Balcony, a less well known title for the *Mona Lisa*, suggests that the female figure sits on the balcony of what might be a tower overlooking a mysterious landscape. In *Given*, the female nude observed through the door of a back yard lies submerged in a similar landscape.

The two locations converge at the waterfall on the right side of both images. What we see is the same landscape from two different viewpoints; the change of position, which also causes the undressing of the woman, results from her fall from



2.7 *The Fall Sketchbook*, the shadow behind Mona Lisa, first sketch of *The Fall*, and collage with the nude in Given, 1998.



2.8 Jean-François Niceron, perspectival anamorphosis of heads, from *Thaumaturgus opticus*, 1646.

the balcony to the back yard (fig. 2.7).

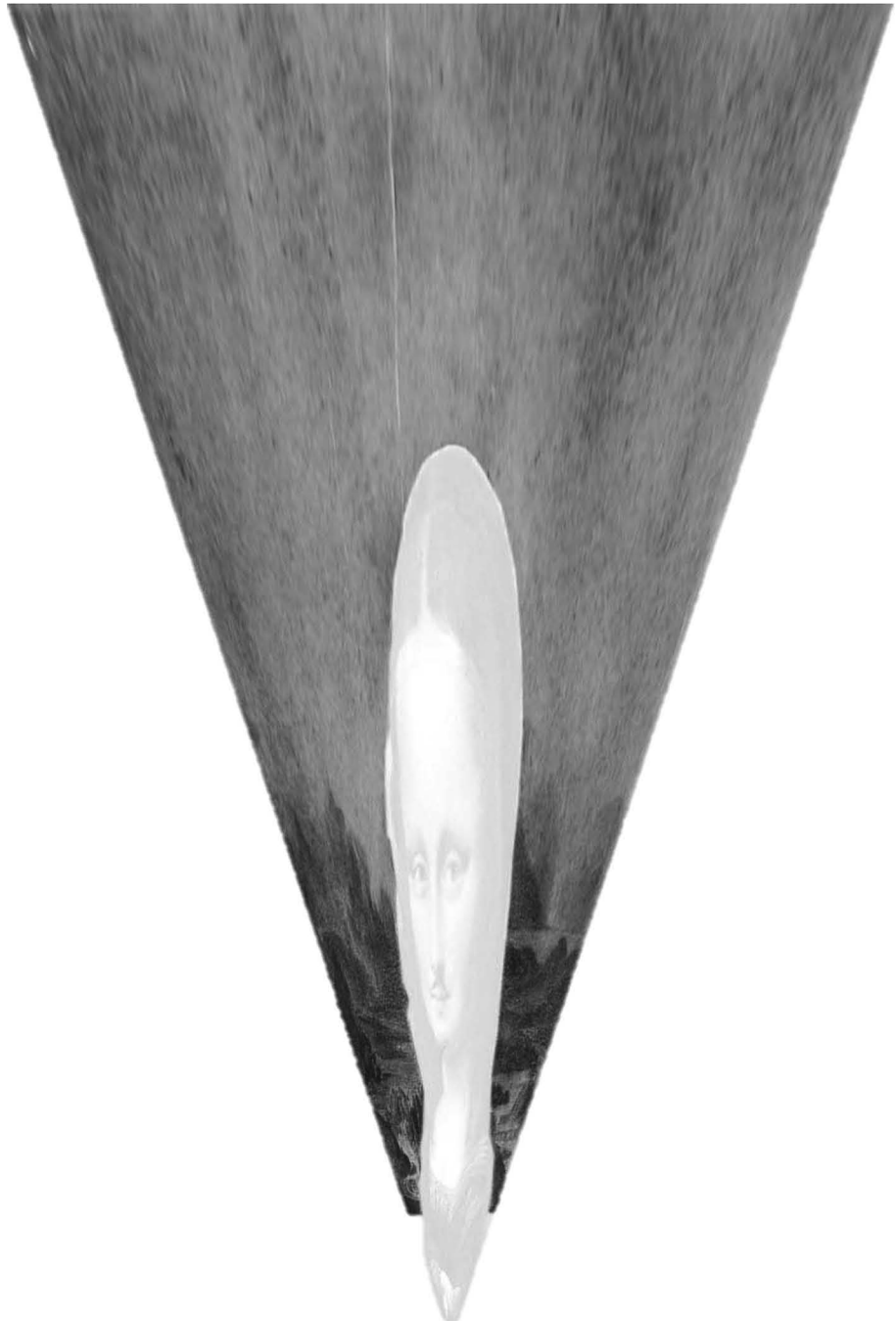
Furthermore, Duchamp in his note for the *Large Glass* describes the desire of the Bride:

> The last state of this nude bride before the orgasm which may (might) bring about her fall graphically, the need to express, in a completely different way from the rest of the painting, this blossoming.[26]

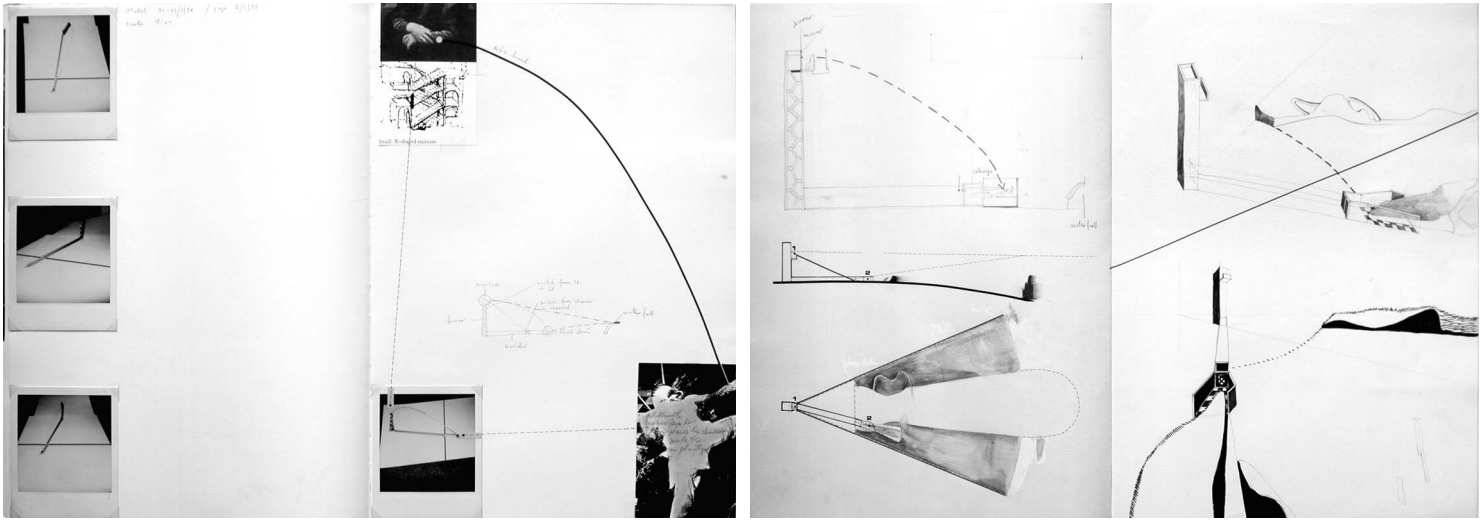
The Bride's fall is therefore connected with the apogee of her desire, which causes her fall and the need to represent her 'blossoming' differently. Therefore, I began to see the nude figure in Duchamp's assemblage as a 'fallen' Mona Lisa.

Given became at the same time a three-dimensional expansion of the portrait and its other side, *l'envers de la peinture*. This reversal of the painting unfolds in space and time. It introduces the springboard and the gravity for the fall of the Bride below the horizon. It is an extrusion of the 'infra-thin' threshold between two-dimensional representation and the realm of three dimensions.[27]

The project's architectural structure occupies the void hidden behind the head in the portrait, the anamorphic visual shadow of Mona Lisa (figs 2.8–2.11).



2.9 *Void*, 2000. Digital drawing by the author.



2.10 *The Fall Sketchbook*, collage with polaroid photographs of first model and collage, 1998.

2.11 *The Fall Sketchbook*, sketches presenting different views of *The Fall*, 1998.

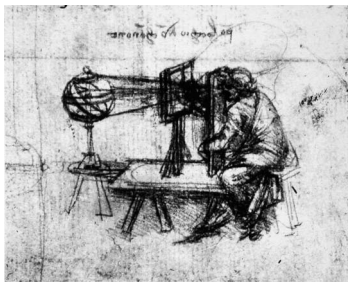
It consists of a tower supporting the balcony, which joins to a long corridor traversing the void and leading to the view from the back yard. After the fall, the female figure travels through the corridor and climbs the staircase in the tower to assume the original position, only to fall into the landscape again in a repeated cycle of uninhibited falling and following a long structured path back. *The Fall* is the design of a composite building, a house for the female protagonist, comprising the linear architecture framing her pedestrian journey, the pictorial garden of the cut-out landscape, and the sinuous trajectory of her fall (see figs. 2.1, 2.24).

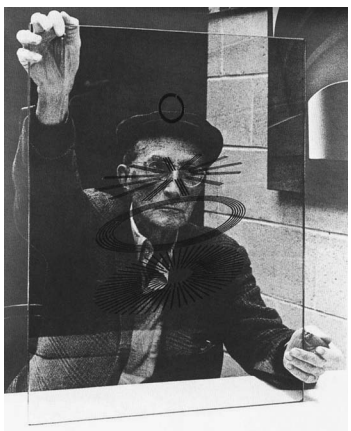
2.1.7 SPATIAL THEORY

In *L.H.O.O.Q.*, Duchamp's sacrilegious addition of a moustache to the Mona Lisa has been seen as an attack on Leonardo. The two artists, however, have a lot in common and art historian Theodore Reff, as well as Clair, amongst others, have identified similarities between their work and methods.[28] Both artists saw art primarily as a record of intellectual processes, documented their observations and ideas in notes, and left unfinished masterpieces.

During the design process of my project, the allegorical narrative of the fall and the blossoming of Mona Lisa into Duchamp's nude slowly became an examination of the representational systems these two works of art might signify. Mona Lisa and her dominating position over the landscape, combined with her controlling gaze towards the viewer, came to stand for perspective construction. Leonardo was one of the most unwavering supporters of the newly invented technique and assisted its evolution as both a dedicated practitioner and a theoretician. The nude, on the other hand, came to signify the opposite: Duchamp's 'defrocked' construction of vision, which as a result from the fall blossoms into extra dimensions.[29]

Nevertheless, neither the *Mona Lisa* nor *Given* resemble a geometrical configuration, or linear arrangement. Conversely, I saw them





2.12 Leonardo da Vinci, draughtsman drawing a sphere with the help of a transparent plane, c. 1510.

2.13 Richard Hamilton, poster for Duchamp's retrospective at the Tate Gallery, 1966. © R. Hamilton. All Rights Reserved, DACS 2013.

as representations of geometry in the sense of a spatial order, a system of observing and intellectualizing space. Each geometry is mainly evident at a pictorial, allegorical level, as much in the general configuration as in the details. In the *Mona Lisa*, perspective construction is represented by the withdrawal of the landscape, in the way the figure crosses her hands and locks the viewer in her dominant gaze. In the case of *Given* the alternative geometry is pictorially translated in the closeness of the landscape, the provocative pose of the naked figure, the glow of her skin and the absence of her gaze.

According to Clair the theory of the fourth dimension plays the same role for Duchamp as the theory of the pyramid of visual rays for Leonardo. As with Leonardo, the act of looking, ruled by the intellect, assumes the etymological sense of the term 'theory' for Duchamp (figs. 2.12, 2.13).[30] From the moment when phenomena become observable, the act of looking becomes speculation about not the phenomena themselves but the rules that govern them. So the work of art is not an inconsistent retinal illusion or a deceptive rendering of an image but the exposure of a concrete set of relationships between the phenomena or the appearances of the phenomena.[31]

In an interview, Duchamp admits to American art critic Francis Roberts that he proposed to 'strain the laws of physics', to reveal them as unstable.[32] Asked if his experiments in mechanical drawing were based on physical laws like Leonardo's, he answers:

> My approach to the machine was completely ironic. I made only the hood. It was a symbolic way of explaining. What was really beneath the hood, how it really worked, did not interest me. I had my own system quite tight as a system, but not organised logically. My landscapes begin where da Vinci's end.[33]

The Fall, my project aimed at interpreting Duchamp's allegorical work, is also an allegory, and this chapter will seek to explain its function as a research method by looking at how it shares allegorical traits found in literature and art.

2.2 ALLEGORICAL TRAITS

2.2.1 LITERARY ALLEGORY AND ARCHITECTURE

The allegorical impulse is a mode of the human intellect linked to the origins of language and representation as the introduction of the 'other', *allos*. Allegory is a structure of thought where meaning is not grasped directly but through metaphor, that often takes the guise of narrative and story telling. American literary critic Joel Fineman in 'The Structure of Allegorical Desire' asserts that this other-discourse of allegory accompanies 'the loss of being that comes from re-presenting oneself in language ..., makes the psyche a critical allegory of itself, and ... justifies psychoanalysis as the allegory of that allegory'.[34]

John MacQueen, in his book *Allegory*, provides a historical overview of literary allegory, recognizing its origins as philosophic and theological, and closely associated with narrative in the form of myths.[35] Furthermore, MacQueen recognizes Plato as the founder of several aspects of the allegorical tradition; often his dialogues include allegorical narratives, 'which serve to image truths beyond the reach of the discursive intellect'.[36] Allegorical

parables populate the Old and New Testament and allegory flourished as the prevalent literary mode during the Middle Ages. In her book *Castles of the Mind: A Study of Medieval Architectural Allegory*, author Christiania Whitehead studies the potential offered by architecture for allegorical representation and analyses how writers in the Middle Ages turned to the trope of the textual building, or 'scriptural architecture', to describe different themes from ecclesiastical truths to romantic love.[37] Furthermore, Dante Alighieri, author of perhaps the most famous medieval allegory, the *Divine Comedy*, offers the first theory of literary allegory.

The next significant definition of allegory after Dante arrives in the twentieth century with Walter Benjamin's analysis of Baroque allegory, conceiving of it as a literary theory and 'casting it in cultural and ontological terms'.[38] Indeed in Benjamin's analysis, allegory is primarily an experience of the world as no longer permanent, but fragmentary and enigmatic: 'transforming things into signs is both what allegory does – its technique – and what it is about – its content.'[39]

Departing from this short account of its historical place in literature, my aim is to explore the role of allegory in architectural research. Although allegory exists in the design and experience of built architecture – for instance, Emile Mâle has shown how a medieval church is a historical allegory written in stone, glass and wood – here I focus at imaginary projects using architectural drawing to express something 'other' than the construction of a building.[40]

Recent examples of projects that can be seen as allegorical include: a series of collaborative projects by Rem Koolhaas and OMA, whose pseudo-historical narratives add a fictional dimension to his critical historical analysis in *Delirious New York: A Retroactive Manifesto for Manhattan*, 1978; *Temple Island: A Study*, 1987, a project by ex-Archigram member Michael Webb, featuring poetic drawings critically investigating geometry and representation as the substructure of a fleeting childhood recollection; *Appliance House*, 1990, a project by Ben Nicholson that contemplates domesticity and the collector, and offers a re-evaluation of architectural drawing through collage; and *Actions of Architecture: Architects and Creative Users*, 2003, by Jonathan Hill, who uses design to challenge architectural institutions.[41]

Although chronologically close and clearly using allegory to structure and represent spatial ideas, these examples are not directly connected. While the authors are most likely aware of each other's work, they do not form a collective. Their critical use of drawing is fuelled by an individual desire for allegory, which for Fineman 'is implicit in the idea of structure itself and explicit in criticism'; this critical tendency defines and separates these projects from other 'paper architecture' examples.[42] An in-depth historical tracing of the origins of the allegorical project is beyond the scope of my investigation here. However, most of the examples above favour narrative as a vehicle for grasping and developing spatial ideas, a tendency originating at schools of architecture, such as the Architectural Association, Cooper Union and most recently the Bartlett, revealing allegorical design as a practice thriving within architectural education.[43]

Angus Fletcher, in *Allegory: The Theory of a Symbolic Mode*, performs an examination of the

literary trope of allegory and identifies its different characteristics. Influenced by his analysis and in search of a theoretical background for the role allegory in design research, I look for, and identify, similar allegorical traits in both Duchamp's work and my allegorical interpretation of it. These are: duplicity of meaning which invites interpretation, use of figurative elements to denote structural relationships, reciprocity between visual and verbal, similarity to a battle – an opposition between two forces – or a journey, and being unfinished.

2.2.2 DOUBLE MEANING

By saying one thing and implying another, in all allegories there is doubleness, or perhaps duplicity of meaning. But the link between what is articulated and its interpretation, as well as the intentions of the author, vary. We find an intentional single secondary meaning in most Christian and Medieval parables; ambiguity in Baroque allegories; intentionally diverse multiple meanings when a work invites an open-ended interpretation from the receiver; and a concealed meaning to be deciphered through a series of logical steps in an enigma or riddle. Finally, critical interpretation unearths meanings often not intended by the author.

Duchamp approved all interpretations of his work and was reluctant to give any of his own, describing the artist as a:

> … mediumistic being who, from the labyrinth beyond time and space, seeks his way out to a clearing … All his decisions in the artistic execution of the work rest with pure intuition and cannot be translated into a self-analysis, spoken or written, or even thought out.[44]

The work succeeds if it triggers many interpretations, because it is not the artist alone who performs the creative act: the viewers make their own contribution. Clearly, however, he sees the work as something presented as a riddle or an enigma not only to the viewer but also the author. For Duchamp the work of art is an allegory in its reception and interpretation, but also in its inception and creation.

My allegory of *The Fall* uses architectural drawing to analyse *Given* and carries out a critical interpretation of Duchamp's work: a form of art theory performed through architectural design. However, on another level, the main intention of the research is to challenge the underlying syntax of architectural representation and to propose a reconsideration of accepted norms. So the problem set by the allegorical project is: if *Given* is an inverted incarnation of the *Mona Lisa*, which represents the principles of perspective construction, then what are the attributes of the alternative perspective suggested by the nude? And if monocular perspective is still influencing contemporary architectural drawing, how may the rules of this 'other' expanded and inverted perspective affect the syntax of architectural representation?

The Fall allegorically encapsulated a set of ideas, which, although complete and intuitively convincing within the allegorical structure, were accepted by me, the author, as an enigma. I used the ensuing textual and drawing research to interpret, verify and expand the intuitive links established by the project.

2.2.3 FIGURATIVE GEOMETRY

Writing from a literary theory perspective, Fletcher describes allegory as 'figurative geometry'. Allegorical narrative operates as a mathematical

equation or geometric principle, which uses personages, everyday or sublime objects and sites rather than abstract numbers and letters, in order to signify structural relationships. In this pure 'structurality' of allegory exists a paradoxical contradiction. However particular its figurative elements are, the allegory remains abstract, as if allegorical themes are emptied of their content by the structure that governs them.[45]

We have seen how the female figure, transforming from the fully dressed smiling lady on a balcony to the unhindered recumbent nude in the bush, personified the allegorical hypothesis of the research: the geometrical transformation of the female figure into a form of extra dimensions caused by her fall. Furthermore, the diagram of the tower, the corridor and the trajectory of the fall in the landscape, the simple elements constituting the figurative geometry of *The Fall*, was a reoccurring symbol, drawn repeatedly, even compulsively, throughout the study (fig. 2.14).

Appearances of this underlying structure in the form of a diagram for a building exist in my numerous sketches, the model featuring in the competition submission and a subsequent hybrid between a drawing and a model, also entitled *The Fall*, which I constructed much later. The diagram came to allegorically represent the theme, the transformation of perspective into its blossomed other, but also, more significantly, the research methodology itself. The curved line of the fall, an unhindered connection between the top of the tower and the bush in the landscape, stands for the intuitive link between the two works established through the allegorical design project, while the slow and measured return through the corridor to the top the tower represents the subsequent interpretative textual analysis supporting it.

2.2.4 BATTLE AND PROGRESS

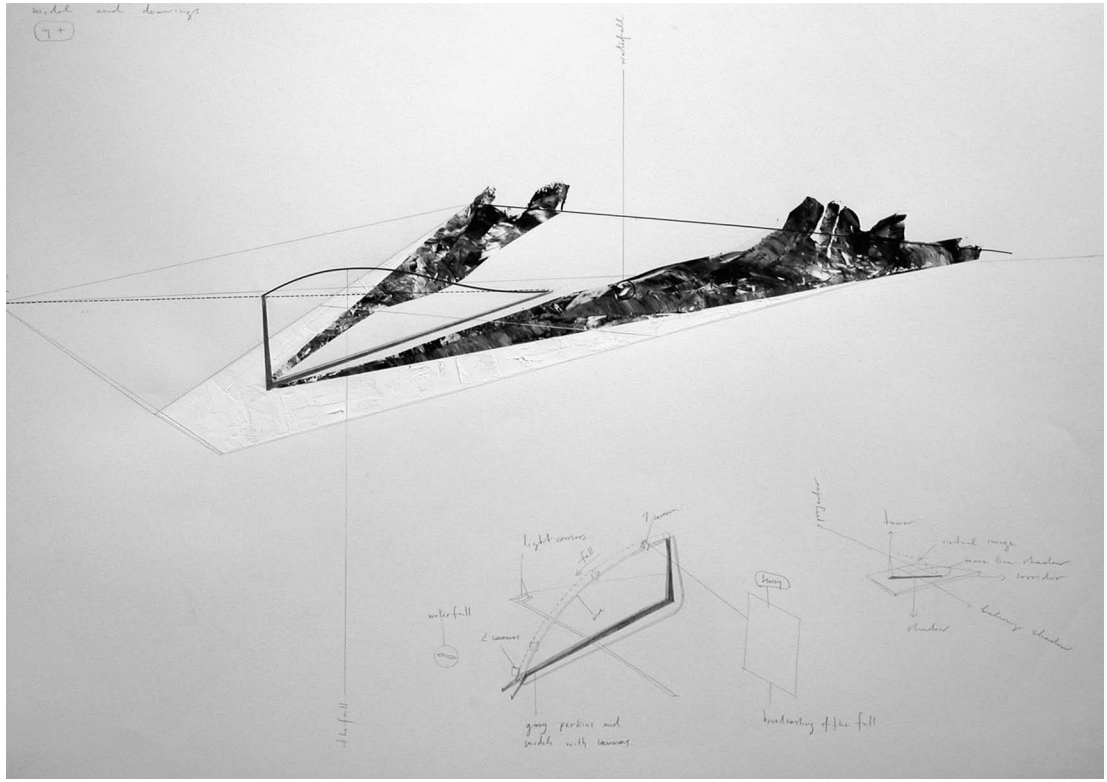
Fletcher defines two broad categories of allegorical narratives: what he calls 'battle', an opposition between two forces, and 'progress', a description of a sequence of events that often takes the form of a journey.[46] Most allegorical architectural projects can be seen to belong to either one or both of these seemingly simplistic categories, and *The Fall* is no exception.

The figurative structure of *The Fall* embodies a set of binary oppositions and therefore can be seen as a 'battle' between the Mona Lisa and her reversal in the nude. The project stages this dialectical interaction between the linear order of perspective, Mona Lisa, and its equivocal 'other', nude, which in the beginning is only metaphorically defined. The allegorical 'battle' functions as a research method leading to a gradual understanding of *Given* as a precise drawing, and revealing the representational potential of stereoscopy as an expanded alternative to perspective.

Additionally, the project stages a journey: the female figure's traversing of the landscape first by falling and then by walking back to the top of the tower (fig. 2.15). In one of my early notes, 'progress' around the imaginary spatial configuration of *The Fall* is also seen as the 'scriptural architecture' of the research:

> Start by looking at the picture, running information on a surface, go behind the picture, fall down in the landscape, study the assemblage, picking up clues placed scattered in time, turn and look towards the door, and build the link back to the top. The text describes a spatial understanding: the architecture is the text and the text is the architecture.[47]

Furthermore, the research was conceived as a battle

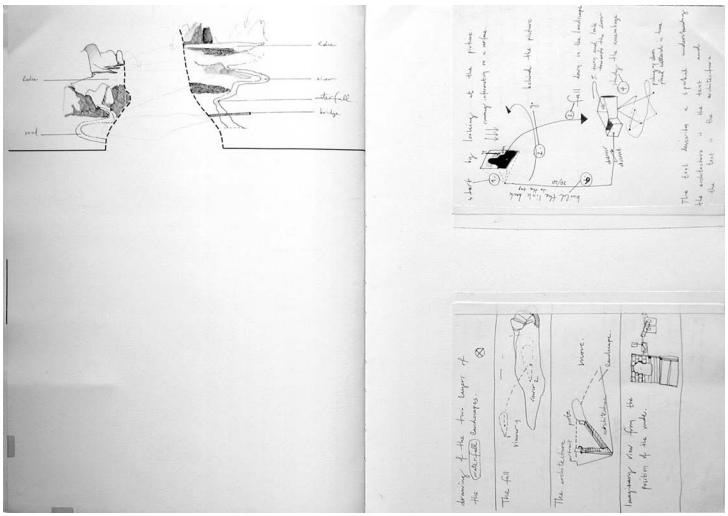


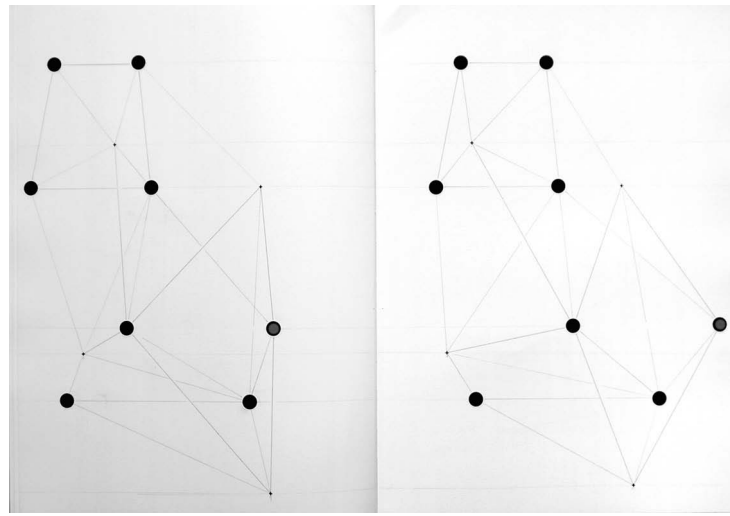
2.14 *Illuminated Scribism*, plate 16, 1997. Drawing by the author.

between perspective construction – cast in the role of the necessary villain – and its suppressed other, which at the beginning of the research was desired and implicit but fundamentally unknown. According to French mathematician Henri Poincaré:

> If I may be permitted a crude comparison, let us represent the future elements of our combinations as something resembling Epicurus's hooked atoms. When the mind is in complete repose these atoms are immovable; they are, so to speak, attached to the wall. This complete repose may continue indefinitely without the atoms meeting, and, consequently, without the possibility of the formation of any combination. On the other hand, during a period of apparent repose, but of unconscious work, some of them are detached from the wall and set in motion. They plough through space in all directions, like a swarm of gnats, for instance, or, if you prefer a more learned comparison, like the gaseous molecules in the kinetic theory of gases. Their mutual collisions may then produce new combinations.[48]

The value of this Cartesian understanding and perspective as a system for mathematically depicting space is undeniable. Its role has been paramount, not only in pictorial representations but also in defining scientific space, developing new





technologies and sanctioning rational intellectual space. Orthographic projection is associated with the conception of space as a precise homogenous continuum bounded by flat planes, similar to the 'walls' in Poincaré's metaphor of intellectual processes.

However, the Renaissance schema is founded on a crude geometric model of vision: the monocular visual pyramid. Within the perspectival system the body of visual space is cut by invisible yet potent two-dimensional intersections. Static images of objects notionally rest on these surfaces, as if on transparent walls. This calculated flattening of the visual object coincides with a rationalization of intellectual space.

Given the complexity of contemporary spatial phenomena, progress in the psychology of vision, and the computational power of recent imaging technologies, my investigation began to focus on aspects of the visual that have been forgotten due to the overpowering simplicity of perspective. One alternative understanding of vision is binocular disparity, a visual schema best conceptualized as a gas or a fluid in motion. In the binocular field the observed object is released from the flat monocular plane back into deep space, dispersed into a swarm of points. This gaseous conception of visual space designates not the opposite of rational space but an expanded rational space. Through this allegorical battle between perspective and its other, my research thus seeks a projection system able to describe a spatial schema closer to the intellectual space of Poincaré's gaseous collisions (fig. 2.16).

Poincaré asserts that the combination and complementary role of both manners of thinking – walls and gas – leads to discovery in mathematics, and I began to see perspective construction not as the villain any more, but as complementary to this potential alternative projective system. The word 'blossoming' denotes an interlinking between

2.15 *The Fall Sketchbook*, notes on the journey around *The Fall*, 1998.

2.16 *The Fall Sketchbook*, stereoscopic drawing on sketchbook spread, 1998. When fused the drawing blossoms in front of the sketchbook surface and the dots float in space tethered by the lines.

the two representation systems – the passing from the flat plane of the wall into a dispersal of colliding particles.[49]

2.2.5 VISUAL AND VERBAL

Literary critic Craig Owens notes a reciprocity between the visual and verbal in allegory: words are often treated as purely visual phenomena, while visual images are offered as a script to be deciphered: 'In allegory the image is a hieroglyph; an allegory is a rebus – writing composed of concrete images'.[50] Many architectural projects that can be described as allegorical exist in book form, where drawing and text complement each other in the production of meaning.

My research has been conceived as a hybrid between a text and an architectural project. Poincaré's qualitative metaphor for thought processes, seen as a space constructed by flat walls dissolving into a gas of particles, can be assigned to these two different operative tools (figs. 2.17, 2.18).

In an elementary analogy the flat rigid walls in Poincaré's metaphor stand for design, where the intersecting planes of orthographic projection organize space with a rational precision. A text can open up unpredictable collisions and connections and can be thought of as gaseous. On the other hand, design can also assist the release of the particles of the gaseous thinking, causing collisions. Intuitive spatial thought processes, emerging while developing an architectural project, are often more volatile than the processes involved in arranging an academic text.

The operational mode of my research is an interplay between these two spatial analogies of thought processes, a hybrid between the design of a text and the narrative of a project, both of which oscillate between being a 'gas' and a 'structure'.

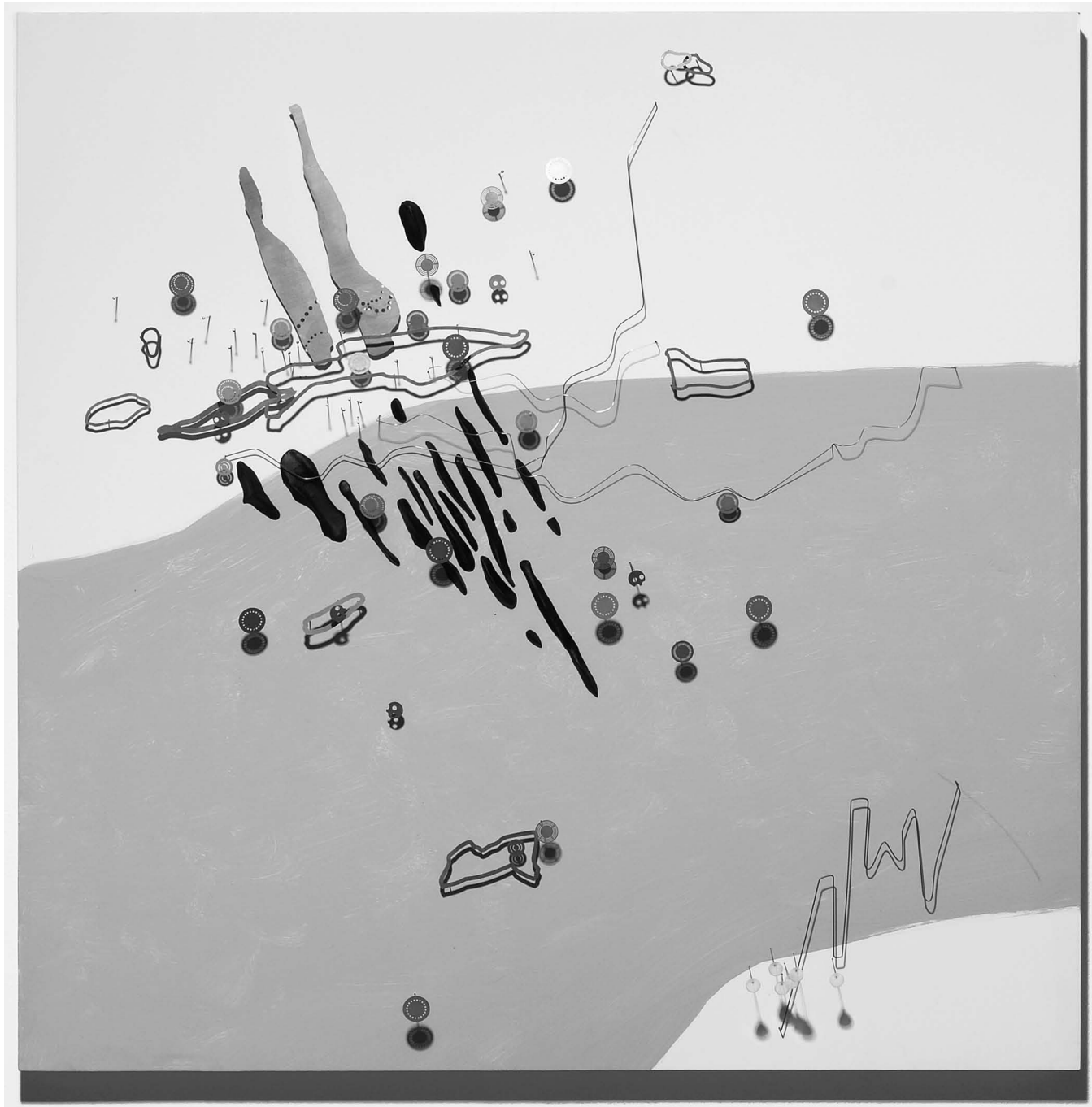
The design part of this research is not a separate element which the text accompanies, describes, explains or reacts to, but a drawing-based technique that organizes, tests and structures the research itself. This drawing technique I call 'illuminated scribism', a term deriving from Richard Hamilton's interpretation of a note in Duchamp's White Box, 1966: 'an "*illuminatoresque Scribism*" bonds image and word – each shedding light upon and adorning the other.'[51] Hamilton suggests the term is similar to 'pictorial nominalism' and that the fabricated word 'illuminatoresque' means 'illuminated', as in 'illuminated manuscript'.[52]

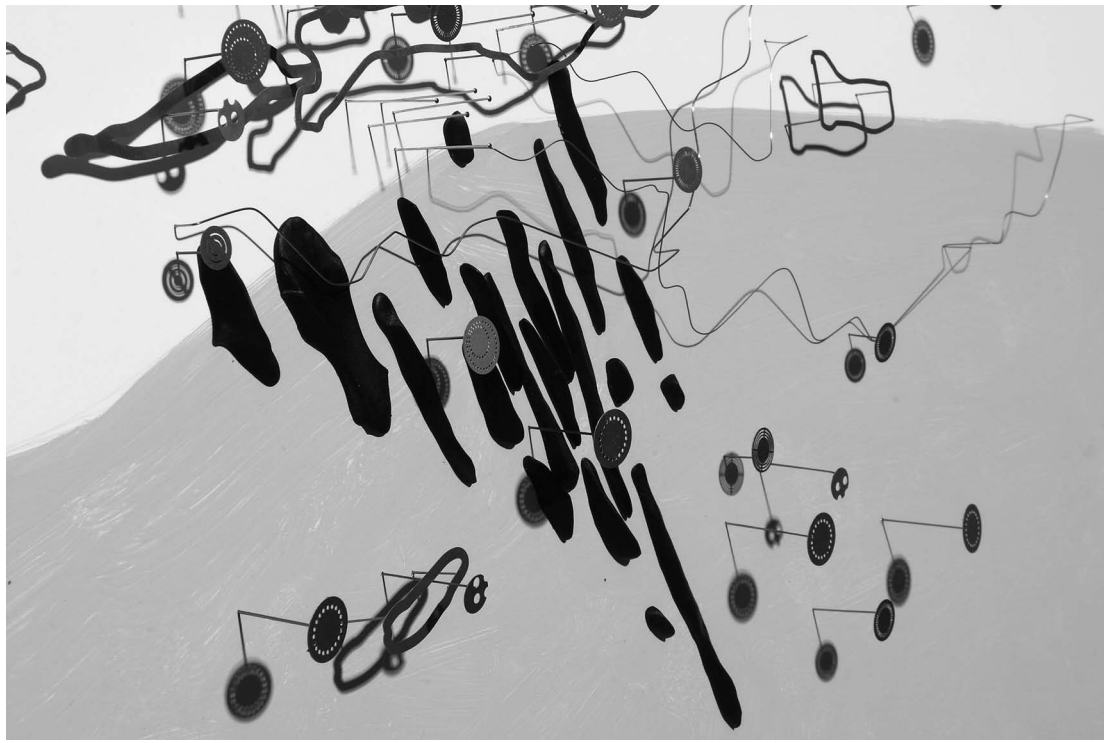
Although unavoidably guided by aesthetic intentions, my design technique was primarily a research method: a combination of pages with sketches, diagrams, notes, experimental 'motion pictures' (digital films), and 'deep drawings' (stereoscopic images) (fig. 2.19). The pages with sketches, diagrams and notes display the beginnings of an idea, while the act of keeping the sketchbook is also what generates the idea, demonstrating a design technique for structuring the research.

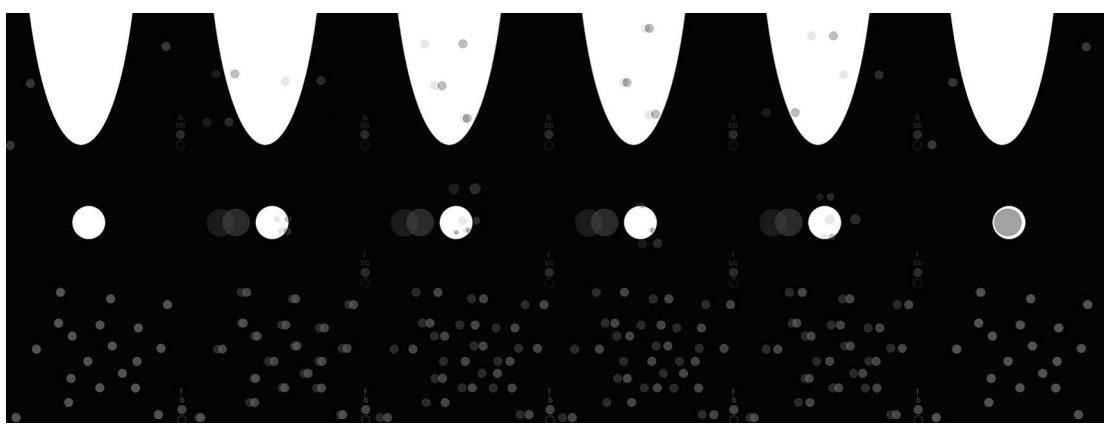
The stereoscopic images and films are discrete aesthetic entities but also play a role similar to that of an experiment in scientific research. Their production was based on predetermined hypotheses, experimentation, trial and error, and interpretation of accidents.

2.2.6 UNFINISHED

Characteristically, many allegories are left unfinished. For instance, Edmund Spenser's, *The Faerie Queene*, 1590, Franz Kafka's, *The Trial*, 1925, and *The Castle*, 1926, and even Duchamp's







2.17 *Undressing*, frontal view, 2007. Mixed media drawing by the author. Photograph Andy Keate, 2009.

2.18 *Undressing*, detail, 2007. Mixed media drawing by the author. Photograph Andy Keate, 2009.

2.19 *Three Anaglyphic Films*, selection of stills, 1999. Digital animations and arrangement by the author.

definitively unfinished *Large Glass*, are examples of incomplete allegories.[53] According to Fletcher, the unfinished form and fragmented nature of these works needs to be understood in dynamic terms: 'all analogies are incomplete, and incompletable, and allegory simply records this analogical relation in a dramatic or narrative form.'[54] Furthermore, in his famous essay 'The Allegorical Impulse: Toward a Theory of Postmodernism', American art theorist Craig Owens sees allegory as 'consistently attracted to the fragmentary, the imperfect, the incomplete'.[55]

Allegorical architectural projects are by definition unfinished, since they are never built. However, physical construction of the ideas in the drawings and texts is not the intention of the author, who deliberately sites her project in the realm of the imagination. Often, however, the fragmentary, unfinished and incomplete trait of allegory colours the drawing technique itself.

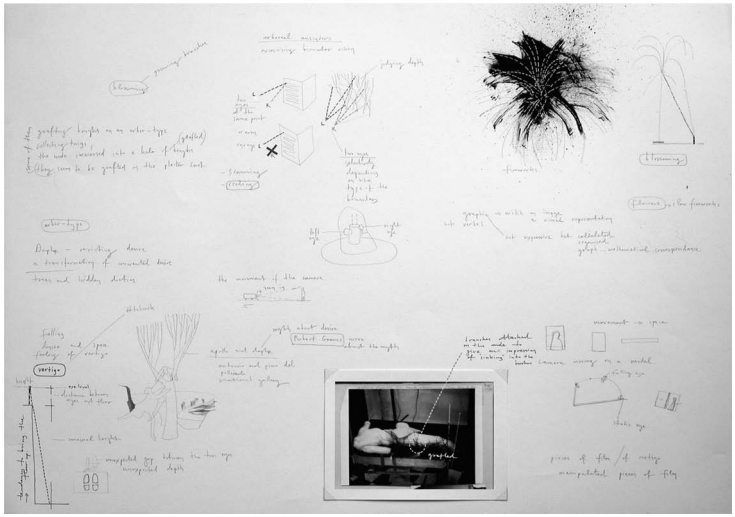
The drawing practices of Leonardo and Duchamp inspired and influenced my sketching and noting technique. According to Theodore Reff, the most fundamental affinity between the two artists is the conviction that art is primarily the record of an intellectual process rather than a visual experience:

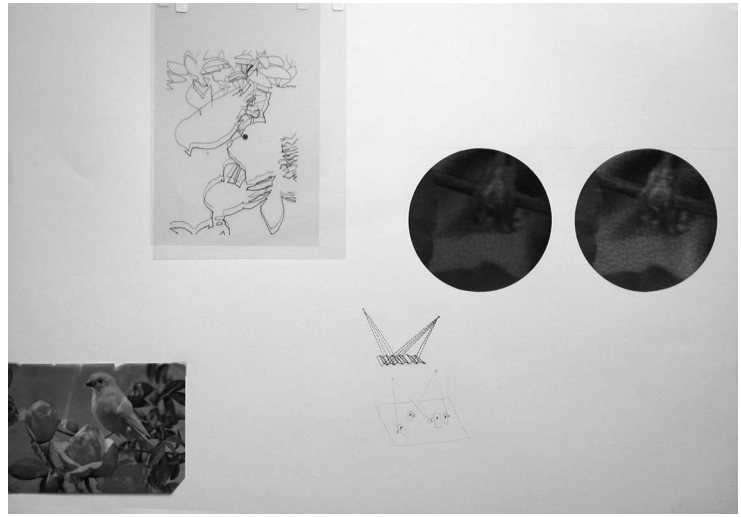
> Leonardo's famous remark, 'art is a mental thing,' can be set beside Duchamp's intention to 'put painting once again at the service of the mind.' In their drawings with extensive annotations a—sheet of Leonardo's geometrical diagrams and allegorical sketches, for instance, or Duchamp's *Boxing Match*, a study for the *Large Glass*—this conviction expresses itself in works of art that look more like an engineer's plans or the diagrams of a scientist.[56]

Both Leonardo and Duchamp were interested 'in formulating their ideas rather than producing finished paintings [and] as a result, their studies became ends in themselves and could be appreciated as such'.[57] Although Leonardo's plan to collect and publish his notes remained unrealized during his lifetime, the notes circulated amongst his students after his death, contributing to his acclaim. Around the turn of the twentieth century, the publication of numerous editions of his manuscripts, notes and drawings made them accessible to a wider public. Reff suggests that Duchamp's decision to publish his own notes in facsimile was perhaps influenced by the example of Leonardo, whose notebooks were treasured as revelations of an extraordinary mind at work, despite their lack of obvious aesthetic interest. Duchamp's publications are not bound but collections of loose-leaf reproductions of the original notes. The first box of notes appeared in 1914, followed by the so-called *Green Box* in 1934 and finally the *White Box* (or *A l'infinitif*) in 1966.[58] Duchamp reproduced the exact appearance of the original notes by devising a system of metal plates guiding the tearing of each piece of paper. The ability to rearrange the loose notes breaks the linearity of the narrative:

> What the facsimiles present, above all else, is the evidence of a prolonged meditation on art—a conscious probing of the limits of aesthetic creation. They convey the doubts, the rethinks and double takes, the flat bewilderment and the moments of assurance; the pauses and reaffirmations are there, the winces, private sniggers and nervous ticks.[59]

My sketches and notes give an account of the progress of my research or display relevant





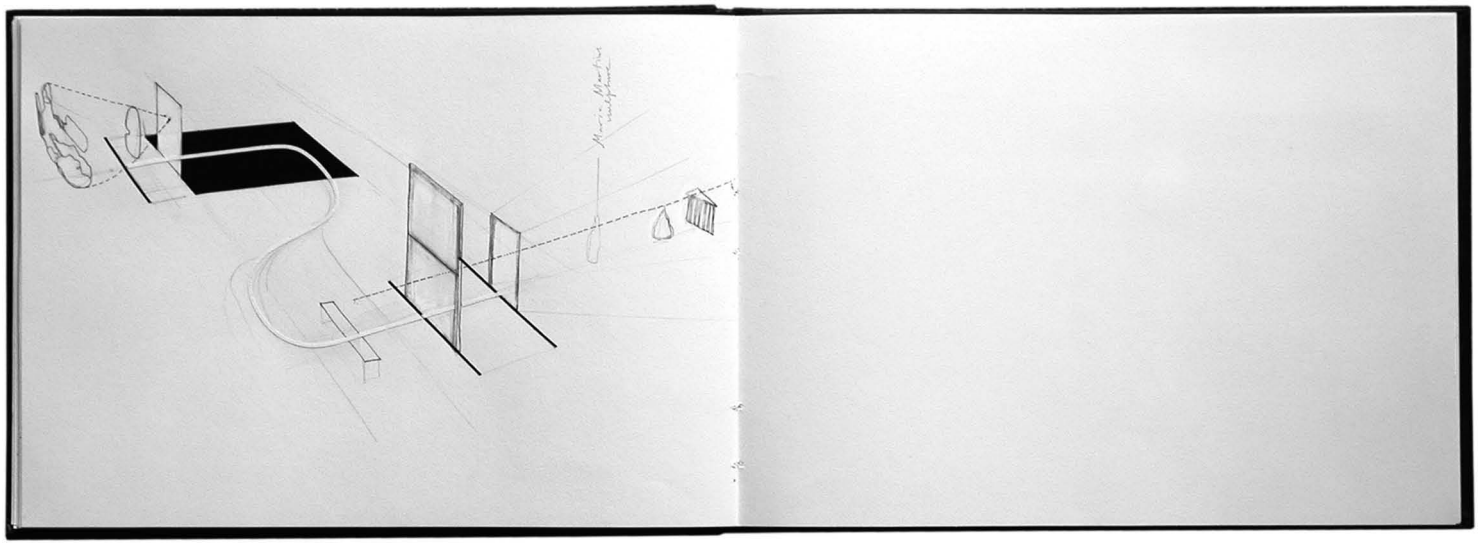
2.20 *Illuminated Scribism*, plate 20, 1999. Notes and sketches relating to the concept of 'blossoming'. Drawing by the author.

2.21 *Illuminated Scribism*, plate 31, 2000. Dissecting a lenticular 3D card. Drawing by the author.

observations and readings: the configurations are markings of nodes and paths in the development of ideas. They appear in two forms: either on the pages of a sketchbook, which are closer to diaries or records, or in loose leaves of two different sizes (figs. 2.20, 2.21).

The Fall Sketchbook describes the origin and development of the main project and contains drawings and ideas relating to *The Fall*, the project submitted to the Mona Lisa competition, which depicts an imaginary building; the project is a metaphor, using the language of architectural design to speculate on spatial representation and to structure the argument of the research. Some ideas and thoughts contradict each other and some are repeated as the sketchbook reflects the non-linear design process, but follows a more or less chronological progression due to its bound continuity, although there are some breaks – for instance, pages from other sketchbooks are attached, parts are erased or covered, and pages are revisited later. *The Fall Sketchbook* not only contains a representation of the project but is also its first 'site' and the medium through which it developed. Finally, the project is seen not as a finished design proposition but as a research method, and the investigation is conducted through the allegory of the fall. Further sketchbooks relating to this research include *Philadelphia Sketchbook*, which I took on my visits to the Philadelphia Museum of Art in 2000, and again nine years later in 2009, and the sketchbook I worked on while preparing the exhibition at the DomoBaal Gallery in 2007, amongst others (fig. 2.22).

Some notes on the free pages have dates and follow the progress of the research chronologically, similarly to *The Fall Sketchbook*. Their singularity, though, gives the practice of keeping notes the status of drawing. Duchamp's loose notes, and their



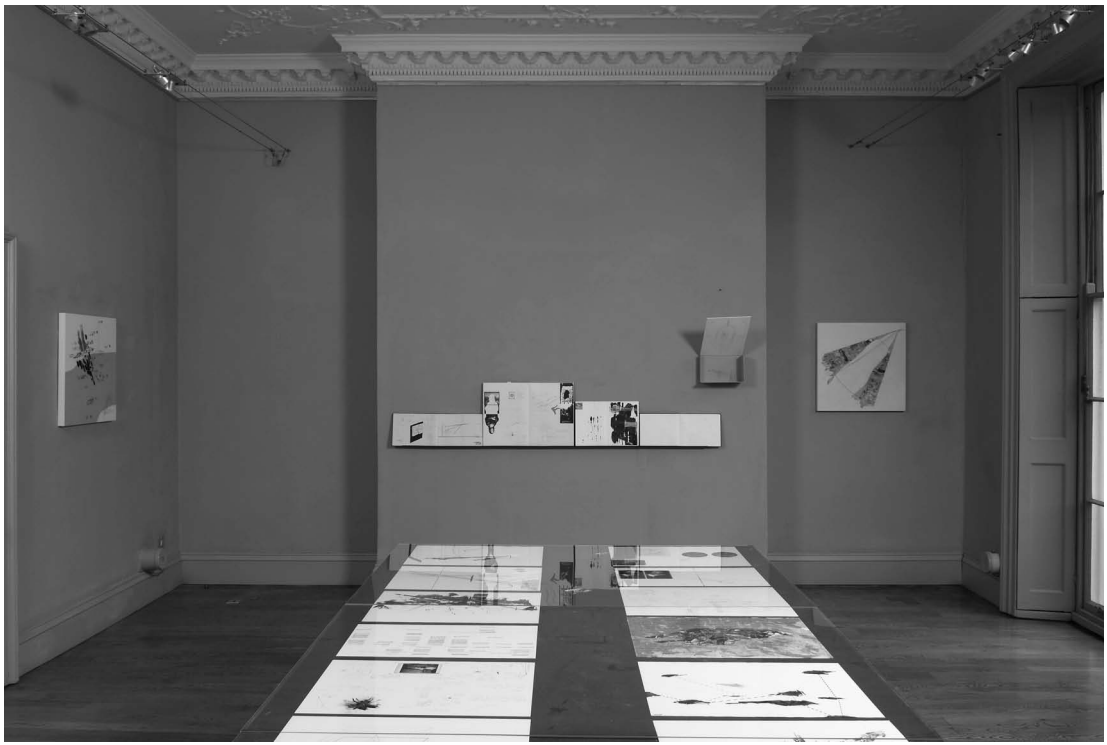
2.22 Arrangement of the *Large Glass* and *Given* in the Duchamp galleries at Philadelphia Museum of Art, *Philadelphia Sketchbook*, 2000.

ability to be rearranged in ways that might offer different insights, influenced this type of drawing. Even when a page is mainly a constellation of words connected by lines it is a 'written drawing' rather than just text, and the configuration refers to the structure of the research, the design of both written and drawn parts. Often, the inquiring mode of the notes recedes, they contain no written material, and the pages resemble pictures. Such a page displays a single idea and the composition does not only describe the thought process but derives from aesthetic concerns; such drawings also appear in the sketchbooks and often take over both facing pages. Therefore the notes, sketches and diagrams shape constellations of ideas, which shift between writing and drawing, verbal and pictorial, analytical and synthetic (fig. 2.23).

The type of drawing appearing in my sketchbooks and loose pages is not a final, measured technical drawing but reflects the generative development of ideas (fig. 2.22). It is also the main tool and method for generating ideas. The paper is not a final 'display terminal', but a surface upon which emerge concepts and connections not previously registered or perhaps even conceived. Despite a general initial intention, exactly what would appear on the paper was seldom known. This lack of predetermined rules governing what is revealed was never, however, a subconscious surfacing in the surrealist sense. An aesthetic preoccupation and an alignment with the allegorical theme always indicated what was relevant, guiding my decisions.

2.2.7 ALLEGORY AND THE ART OF MEMORY

In *Vision Machine*, Paul Virilio describes the role and function of the 'art of memory' an ancient mnemotectonic technique:



2.23 'The Blossoming of Perspective', exhibition view showing the drawings comprising *Illuminated Scribism* displayed on tables and a selection of sketchbooks displayed on the wall, DomoBaal Gallery, 2007. Photograph Andy Keate, 2007.

The ancient memory theorists believed you could consolidate natural memory with the right training. They invented a *topographical system*, the Method of Loci, an imagery-mnemonics which consisted of selecting a sequence of places, locations, that could easily be ordered in time and space. For example, you might imagine wandering through the house, choosing as loci various tables, a chair seen through a doorway, a windowsill, a mark on a wall. Next, the material to be remembered is coded into discreet images and each of the images is inserted in the appropriate order into the various loci. To memorise a speech, you transform the main points into concrete images and mentally 'place' each of the points in order at each successive locus. When it is time to deliver the speech, all you have to do is recall the parts of the house in order.[60]

This technique translates an oral text into a system of images. The poet or orator practising the technique transforms words into persons or objects, sentences into rooms and the whole text into a building, binding together the separate parts of the narration spatially. Imaginary architecture thus links ideas that might otherwise float disconnected and lose their meaning or dissolve into oblivion.

Creating composites of familiar simple elements solved the problem of visualizing abstract meanings. Ancient mythology did this by organizing concepts through narrative, explaining the origin of the universe and the human virtues and vices by personifying phenomena and concepts. The

art of memory was practised before the invention of typography, when writing was the privilege of a few. When typography replaced oral transfer of knowledge, the ephemeral, aural and pictorial mental symbols transformed into widespread and permanent, printed images of words.

Italian literary scholar Lina Bolzoni follows the history of the technique in the Middle Ages, its reshaping in the 'image and likeness of the new Christian doctrine', and the change of assignment from rhetoric to ethics: 'Man is held to be weak, and he does not succeed in understanding and remembering abstract concepts; metaphor, allegory, and the memory image can be used to counter this weakness; they give appreciable form, a mask of flesh to those abstract truths that otherwise he would fail to grasp fully and thereby jeopardise his eternal salvation.' Thus 'mnemonic techniques do not always serve merely to remember texts already produced, but can contribute to producing memorable texts, that is, texts capable of being easily remembered'.[61]

The Fall operates like a memory locus: a mental image, borrowed from the language of architectural design, which organizes in space elements signifying clusters of ideas. But here the role played by architectural design is reversed: no previous verbal space is to be codified into architecture. Instead, the space of the project suggests the paths of the text. My aim was the construction of a methodology for enquiry, as well as a structure for the display of the results of this enquiry (fig. 2.24).

The next chapter, entitled 'The Blossoming of Perspective', is a close analysis of the constituent elements composing *Given* in search of its coded meaning, which I interpret as an inferred, alternative spatial schema beyond perspective construction. Similarly to the orators' memorizing practices, the text is arranged spatially, metaphorically attached onto the organizing architecture of the piece. As in the 'art of memory', *Given* is a *tableau vivant* or 'allegorical appearance' whose components act like mnemotectonic loci: their spatial arrangement bears a coded account of the geometry of desire, a blossoming of perspective.

2.24 *The Fall*, side view, 2004. Mixed media drawing by the author. Photograph Andy Keate, 2009.

Notes

1 For an in depth analysis of *Given* see Taylor, *Marcel Duchamp: Étant donnés*.

2 Duchamp, *Duchamp du signe*, 43–44. My translation of the French. I will discuss the significance of this title later in Chapter 3, Section 3.7 'Given ...'.

3 Shinkenchiku-sha, *Eighth SxL*, n. pag. Submission was in March 1998 and the results were published in Shinkenchiku-sha, 'House of Mona Lisa'. My project received an Honourable Mention.

4 Shinkenchiku-sha, *Eighth SxL*, n. pag.

5 Kemp, *Leonardo da Vinci*, 264.

6 Slender columns framed Mona Lisa before the painting was cut to its present size. Bramly, *Mona Lisa*, 14.

7 Pedretti, *Leonardo Architect*, 263.

8 Kemp, *Leonardo da Vinci*, 235.

9 Leader, *Stealing the Mona Lisa*, 78.

10 Reff, 'Duchamp & Leonardo', 90.

11 Cameron, 'Given', 18. See also Reff, 'Duchamp & Leonardo', 90.

12 In a special issue of the magazine *391*, in December 1919, *L.H.O.O.Q.* appears under the title *Tableau dada par Marcel Duchamp*. The additions to the picture were drawn from memory by Francis Picabia, who gave her a more pointed moustache and forgot altogether the beard.

13 See Chapter 3, Section 3.2.4 'Things to be Looked at with Two Eyes'.

14 Mink, *Marcel Duchamp: Art as Anti-Art*, 86.

15 Duchamp's decision to claim the work 'definitively unfinished' in 1923 was 'prophetic', as it anticipates the shattering of the *Large Glass* while in transit following an exhibition at the Brooklyn Museum in 1926–27. Duchamp fixed the work ten years later, to its current appearance.



16 Schwarz, *Complete Works*, 804.

17 Schwarz, *Complete Works*, 804.

18 Adcock links several works by Duchamp to the theories around the fourth dimension in mathematics. See Adcock, 'Duchamp's Eroticism', 149. Also see Jouffret, *Traité élementaire*.

19 Clair, *Marcel Duchamp*, 136.

20 For a detailed analysis of all instances of *L.H.O.O.Q.* see Naumann, *The Art of Making Art*, 10–15.

21 Wohl, 'Duchamp's Etchings', 171.

22 See Banz, *Marcel Duchamp and the Forestay Waterfall*.

23 Mink, *Marcel Duchamp*, 86.

24 From a note in *The Fall Sketchbook*.

25 The model for the nude was Maria Martins, Duchamp's mistress at the time of its conception. However, for some parts, for instance the right lower arm and hand, the model is thought to be Duchamp's wife Teeny Matisse-Duchamp.

26 Duchamp, *Bride Stripped Bare*, n. pag.

27 Infra-thin (*inframince*) is a term invented by Duchamp and used to describe nearly imperceptible transitions or material transformations and the passage from two to three dimensions. See Duchamp, *Notes* and Clair, *Duchamp et la photographie*, 94.

28 See Clair, *Marcel Duchamp*, 83–93 and Reff, 'Duchamp & Leonardo'.

29 See Chapter 3, Section 3.4.3 'Duchamp's Veil', where Duchamp is quoted characterizing himself as an unfrocked/defrocked (*defroqué*) Cartesian. I used 'defrock' here metaphorically, linking the usual meaning – deprive of professional status – with de-frocking in the sense of undressing Mona Lisa.

30 'Theory' comes from the Greek *theoria*, which has the same root as the word *thea* (view). *Theoro*, means 'I think' or 'I believe' while *epitheoro* means 'I inspect, review, survey'.

31 Clair, *Marcel Duchamp*, 155.

32 Roberts, 'I Propose', 63.

33 Roberts, 'I Propose', 63.

34 Fineman, 'The Structure of Allegorical Desire', 47.

35 MacQueen, *Allegory*. Examples from the classical world of Greece and Rome include the myth of Demeter and Persephone, an allegorical explanation of sowing and harvesting corn, and inevitably of human mortality, and Orpheus, an allegory of the redemptive powers of the human soul.

36 Examples include a passage from *Phaedrus*, where the soul is compared to a charioteer driving two steeds, the spiritual and the sensual element in man, and a series of allegories in different styles on the subject of love from the *Symposium*. See MacQueen, *Allegory*, 7.

37 Whitehead, *Castles of the Mind*.

38 Cowan, 'Walter Benjamin's Theory of Allegory', 110.

39 Cowan, 'Walter Benjamin's Theory of Allegory', 110.

40 Emile Mâle, *The Gothic Image: Religious Art in France of the Thirteenth Century*, trans. Dora Nussey, London and Glasgow: Collins, 1961. Quoted in McQueen, *Allegory*, 40.

41 I revisit these projects in Chapter 6.

42 Fineman, 'The Structure of Allegorical Desire', 26.

43 Koolhaas, Nicholson and Hill have studied at the AA, while Webb's connection to the school is through his fellow Archigram members, for instance Peter Cook, who taught there. Hill is teaching at the Bartlett, which was reinvented by Cook in the 1990s, where both Nicholson and Webb are frequent lecturers and also act as external examiners.

44 Duchamp, 'The Creative Act', 138.

45 Fineman, 'The Structure of Allegorical Desire', 51–2.

46 Homer's two poems reflect these two literary modes: 'Iliad' is the narration of a battle and 'Odyssey' recounts a series of adventures linked by a journey.

47 Note from the *The Fall Sketchbook*.

48 Poincaré, *Science and Method*, 61.

49 The term 'blossoming' is used by Duchamp in the notes accompanying the *Large Glass*; it relates to the Bride and describes her fall, her undressing, the expansion of her desire and her passing to a higher dimension. I further discuss of the concept of blossoming in Chapters 3 and 4.

50 Owens, 'The Allegorical Impulse', 74.

51 Richard Hamilton, 'An Unknown Object of Four Dimensions', in Duchamp, *A l'infinitif*.

52 Hamilton, Maharaj and Nixon, 'Agendas'.

53 Although the claim on Kafka's novels as allegory is often contested, many critics discuss them in allegorical terms, including Fletcher and Cowan, who states that 'if new chapters in the history of allegory are to be written, the inquiry ought to start with two German-language Jewish writers: Kafka, of whom Benjamin once commented that his work was like 'the rumor about the true things (a sort of theological whispered intelligence dealing with matters discredited and obsolete)' – and Benjamin himself'. See Fletcher, *Allegory*, 14–15, and Cowan, 'Walter Benjamin's Theory of Allegory', 122.

54 Fletcher, *Allegory*, 174.

55 Owens, 'The Allegorical Impulse', 70.

56 Reff, 'Duchamp & Leonardo', 85.

57 Reff, 'Duchamp & Leonardo', 91.

58 Duchamp, *A l'infinitif*.

59 Hamilton, 'Green Book'.

60 Virilio, *Vision Machine*, 3.

61 Bolzoni, 'Play of Images', 20.

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THE BLOSSOMING OF PERSPECTIVE: AN ARCHITECTURAL ANALYSIS OF GIVEN

American art critic John Canaday's article in the *New York Times*, published a few days after *Given* was revealed to the public, summarizes the work's impact (fig. 3.1):

> This mixture of camp, high style, prophetically opportunistic sexual exhibitionism, surrealism, cynical wit and horseplay is pure Duchamp.

A few years earlier, in 1966, just after *Given* was finished, Duchamp inscribed the title, the dates and his signature on the right arm of the female nude, and prepared a notebook of instructions, a manual for taking it apart and reassembling it (fig. 3.2).

This manual was essential for its installation at the Philadelphia Museum. Following the terms of the agreement whereby *Given* was offered to the museum, no photographs of the backstage construction or the notebook of the instructions were to be published for at least fifteen years. Only in 1987 did the museum release a reproduction of Duchamp's *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage* (fig. 3.3).[1]

The original notebook is a ring-bound folder of plastic sleeves. It consists of fifteen general, hand-written descriptions of operations, accompanied by black and white photographs. Duchamp recorded every detail thoroughly: the photographs are covered with explanatory inscriptions, marks and numbers, and there are diagrams, plans, elevations, sketches and a folded cardboard model. Anne d'Harnoncourt, Director of the Philadelphia Museum at the time, mentions in her short introduction to the notebook how 'without Duchamp there to offer guidance for the format of this publication, it seemed best to settle for the most straightforward color reproduction, in actual size'.[2] The publication is not just a photographic copy of the contents of the plastic sleeves but of the folder as a whole, with its ring binder: a flattened version of Duchamp's original notebook. This accurate reproduction conveys faithfully every detail: folded page additions, tape attachments and changes of pen. The only element that substantially eludes accurate reproduction is the folded scale model of the assemblage inserted in the first plastic sleeve. According to d'Harnoncourt, this three-dimensional object can only be studied by turning it in one's hands. To make up for this discrepancy, three photographs of the model shown in plan, front and rear view are included to give a sense of how it works and to show the texts written on each side (fig. 3.4). These pictures of the paper model reveal the perspectival setting of *Given*. Marked on the lower view is the triangular projection of the visual pyramid. The correspondence between the shape of the model and the projected field of vision suggested to me that the assemblage might be designed as a three-dimensional visual space.

Founded on a detailed study of the manual, this chapter is an unravelling of Duchamp's constructed architecture of desire in *Given*. As we have seen my investigation follows French philosopher Jean-François Lyotard's view of the diorama as an incarnation of the abstract diagram of perspective construction (fig. 3.4).[3]

The sections in this chapter are each named after a significant element composing *Given* in comparison with its perspectival equivalent: 'Squared linoleum', seen as the embodiment of the Cartesian grid; 'Wooden door', carrying the two

New York Times

MONDAY, JULY 7, 1969

Philadelphia Museum Shows Final Duchamp Work

By JOHN CANADAY

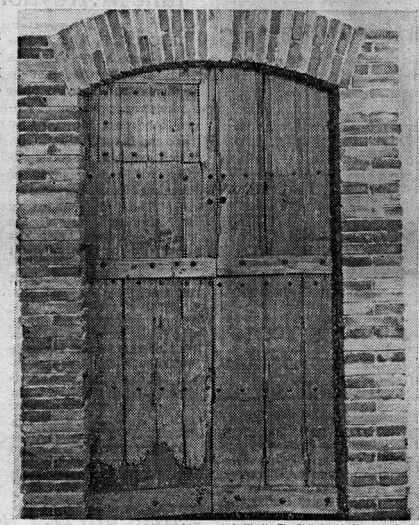
WELL, well well. What shall we say about the latest, and without much question the final, work by the late Marcel Duchamp? Left to the Philadelphia Museum of Art with the stipulation that it not be photographed for 15 years, and so arranged that it can be seen by only one person at a time, it is posthumous verification of Duchamp's status as the trickiest, cleverest, and most seductive personality on the fringes of art that he established as part of true art. Its provocative title, "Etant Donnés: 1, la chute d'eau; 2, le gaz d'éclairage," can be translated, in parody of a mathematical problem, "Given: a water fall and illuminating gas," with the possibility of some puns or close associations with the word "donnés." It was done between 1946 and 1966, when Duchamp was supposed to have abandoned creative endeavors in painting or sculpture (this is both) (or neither) and goes on exhibition today as a permanent installation in Philadelphia's museum.

To describe it:

You enter a small room in which treadles in your path activate the lights and devices of the concoction. You go up to a couple of weathered barn (or shed) doors, which are enclosed in a brick arch ("Duchamp himself chose the bricks," we are proudly told) in the center of which (the center of the doors) are two peepholes at average eye level.

Just beyond the door your eyes encounter a brick wall in which a hole has been punched. Your pleasure as a voyeur is doubled by this peering through a double obstacle. Voyeurism is no fun unless it's secret.

Well, this business you are now looking at, is it a *nature morte* or a *tableau vivant*? Actually it is like a still life executed in three dimensions from a living picture that might have been included in "Oh! Calcutta!" There is no question as to exactly what the focal center of the composition is. You are confronted with a life-size female nude figure, apparently covered with skin or a skin-like substance tinted with what looks a lot like pancake makeup. She is lying spread-eagled, seen feet first, and holding in one hand an old-fashioned gas lamp with a six-inch cylindrical asbestos flame guard, glowing at the tip. Rather flabby as to physique, although young, the nude lies upon a bed, or sort of eagle's nest, of twigs and dead leaves, backed up by a painted scene of a lake and wooded hillside a tinted photograph actually, including a waterfall that has been animated with some kind of illuminated twisted glass device to look as if it is really water falling, like in an old-time Belasco backdrop.



A. L. Wyatt—The Philadelphia Museum of Art

Through two peepholes in these doors, one person at a time can view Marcel Duchamp's "Etant Donnés: 1, la chute d'eau; 2, le gaz d'éclairage." The holes are in the center of the doors at average level of adult human eye.

This mixture of camp, high style, prophetically opportunistic sexual exhibitionism, surrealism, cynical wit and horseplay is pure Duchamp. Duchamp can never be dismissed, but on the other hand he should never be taken with total seriousness except in the context of a concept of modern art that accepts effete exhaustion as a residual intellectual game.

But for the first time, this cleverest of 20th-century masters looks a bit retardataire. Edward Kienholz, as the major specific example, has gone so far beyond the spent and sterile slickness of this final Duchamp work that he makes Duchamp look like Bouguereau.

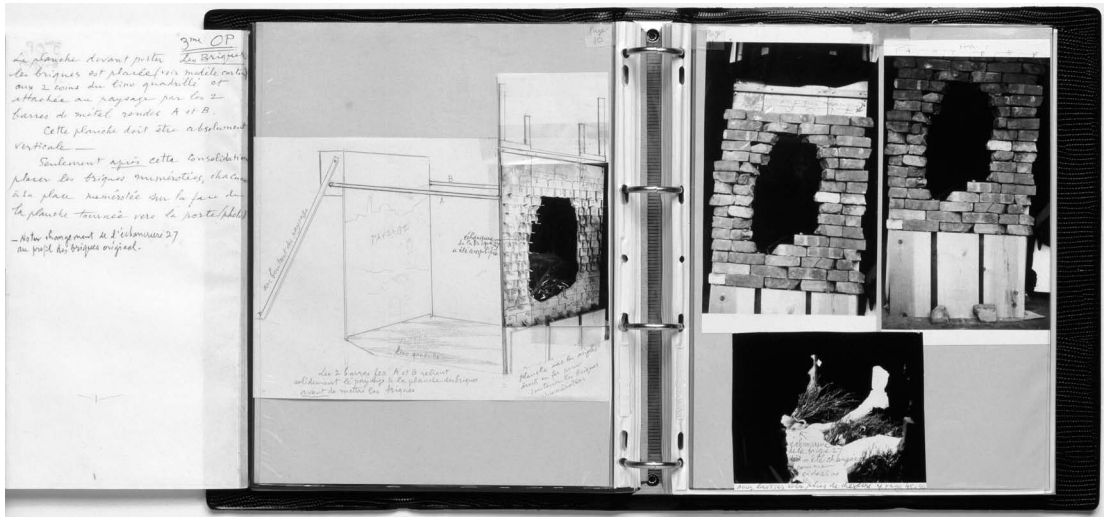
As for the restriction against photography, it is explained by Duchamp's having tried, but failed, to photograph the work successfully. This is absurd. If the thing were an environment, then still photography might not cope with it. But you are held so rigidly to a single view (try as you may, you cannot twist your eyes to see beyond the peepholes in one direction or another) that your vision is as static as that of a camera's lens. This is the one completely photographable three-dimensional work that I can think of.

The Philadelphia Museum's current Bulletin is given over to a scholarly analysis of this latest acquisition by Anne d'Harnoncourt and Walter Hopps. I have not yet faced reading it, frankly. But the work belongs exactly where it is, with the bulk of Duchamp's work in the Arensberg collection. The new Duchamp is the unexpected addition to a legacy that everyone thought was final, the legacy of an entrancing personality who has been, along with Picasso and Matisse, one of the trio of most powerful influences on 20th-Century art but who, unlike his two peers, has exerted an influence primarily destructive—unless you want to say that the recognition of art as a parasitic appendage, an amusement, a vaudeville performance, is constructive in its flat admission that art has lost all connection with anything but the fluff of life.

This was Duchamp's own territory, and only by such recognition can he be thought of as a serious artist. The trouble is that he is too often thought of with the kind of exaggerated reverence that makes his art nonsensical. Philadelphia's new treasure is an entertaining invention that has arrived a bit late to make a sensation. A swell Duchamp it is. But a major addition to 20th-century art it is not. The impression is just a bit as if we had discovered the tomb of another Pharaoh. Very interesting, but nothing new.

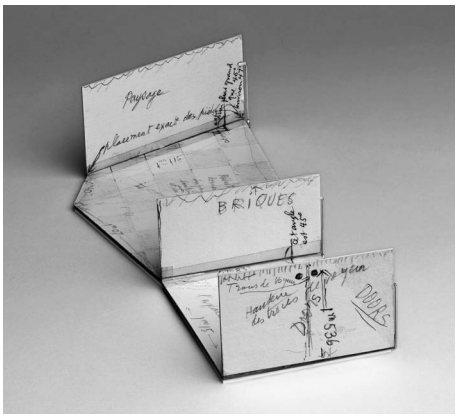
3.1 John Canaday, 'Philadelphia Museum Shows Final Duchamp Work', *New York Times*, 7 July 1969.

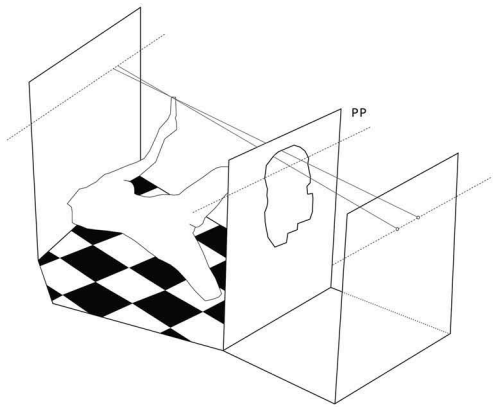


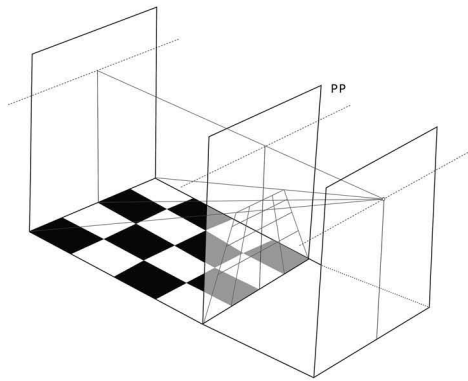


3.2 Denise Browne Hare, figure seen from back with title, date and Duchamp's signature inscribed on right arm, 1968. Philadelphia Museum of Art, Archives.

3.3 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.







peepholes instead of the single apex of the visual pyramid; 'Gas lamp', an incarnation of the vanishing point or the focus of the geometric 'light'; 'Brick wall', the physical equivalent of the perspectival concept of the intersection; 'Found twigs', their complexity revealed in binocular viewing; and 'Cast nude', the material projective alternative to a form composed from an orthographic plan, section and elevation.

The sections analyse the constituent elements of *Given*, starting with a study of the squared linoleum piece, which organizes the whole arrangement; positioning the linoleum is also the first operation in the *Manual*. However, my subsequent description does not follow Duchamp's sequence: in the *Manual* the door is described in the fifth operation, the lamp in the thirteenth, the wall in the fourth, the twigs in the ninth, tenth and fourteenth, and the nude in the eleventh. The sequence of my sections follows the process of setting up a perspective drawing: establishing the underlying grid and marking the positions of the objects to be depicted, 'Squared linoleum'; setting up the point of view, 'Wooden door' and the vanishing point, 'Gas lamp'; positioning the picture plane, 'Brick wall'; and plotting the forms of the drawn objects 'Found twigs' and 'Cast nude'. The analysis resembles an allegorical spatial journey through the arrangement of the assemblage, with all the constituent elements resembling mnemotectonic loci as in the ancient technique of the 'Art of Memory' we discussed earlier.[4]

This systematic interrogation of the different components has a twofold aim: to expose the omissions and simplifications in the establishment of perspective construction, and to define an expanded version of a theoretical spatial model that might meet extra representational requirements, synthesizing a 'blossomed' perspective.

The final section, '*Given …*', revisits the enigmatic title of *Given*, which I presented in Chapter 2, and endeavours to provide an answer to Duchamp's allegorical riddle, or perhaps a solution to his algebraic formula.[5]

3.4 Marcel Duchamp, folded model, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.5 Comparison between diagram of perspective construction and layout of *Given*. Drawn by the author, 2007.





3.6 Detail from *The Healing of the Cripples*, Monreale Cathedral, c. 1170.

3.7 Master Bertram of Minden, *The Division of the Waters*, altar of St. Peter's, Hamburg, 1383.

3.1 SQUARED LINOLEUM

3.1.1 CHEQUERBOARD

Before the invention of the principles of correct perspective construction during the Renaissance, it was difficult to depict a chequerboard floor pattern in a painting. Without a single vanishing point, constant distortion was impossible and squares in the middle of the composition tended to seem either too large or too small. Such representations show a striking inability to foreshorten a tiled floor correctly and include geometrical inconsistencies. In *Perspective as Symbolic Form*, German art historian Erwin Panofsky shows how, in Antiquity and above all in the Middle Ages, awkward discrepancies deriving from the lack of a single vanishing point were often concealed by an escutcheon, decoration, bit of drapery or some other 'perspectival fig leaf' (figs. 3.6, 3.7).[6]

Nevertheless, this geometric problem of depicting architectural tiling patterns in painting may have gradually drawn attention to the fact that optically all parallel lines meet at one point and that the apparent size of square tiles diminish in regular intervals. In nature, objects also appear to diminish according to their distance from the eye, but it is harder to decipher the rules governing this diminution because of the lack of parallel straight lines, which occur mainly in architecture. Observation of architecture's linearity, therefore, may have first drawn attention to and later revealed and confirmed an important principle of perspectival distortion: that all parallel lines converge to a single vanishing point.

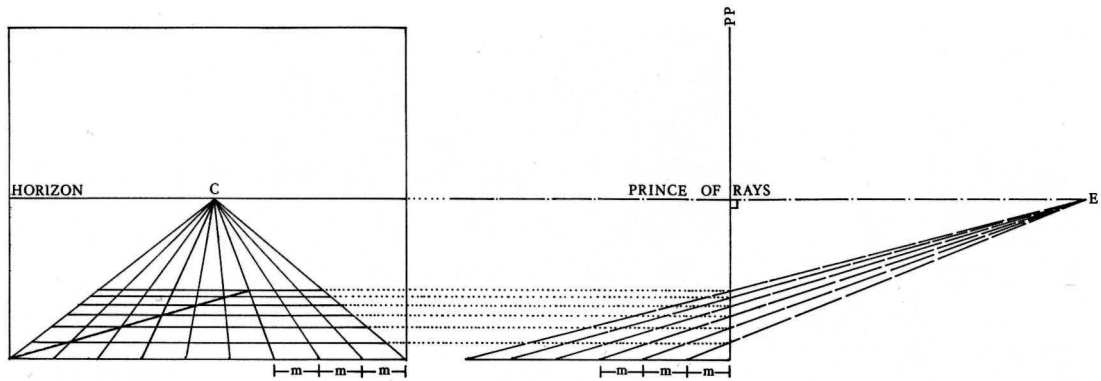
The representation of a tiled floor was subsequently adapted as an important aid for perspective construction. It became the horizontal grid according to which all artefacts, natural objects and bodies, were positioned on the picture plane. Single vanishing-point construction distorts all widths, depths and heights in constant proportion, so defining precisely the apparent size of any object in relation to its actual size and its distance from the eye. The geometric diagram of the foreshortened grid in Leon Battista Alberti's practical perspective method can thus be seen as a tessellated pavement that has lost its materiality (fig. 3.8).

According to British architect and architectural historian Robin Evans:

> What could be easier than to turn a grid into a pavement? What could be easier than to allow the line that Alberti called 'the prince of rays,' coursing from the eye of the beholder to the centric point, to career on through the pictorial space as an axis of symmetry or to open up an avenue in its path, since this focus-cum-vista was already intimated in the preparatory construction?[7]

Panofsky goes further, recognizing a progression in the status and role of the chequerboard tile pattern, from a two-dimensional motif in Byzantine mosaics into an index of spatial values. It runs under the depicted bodies, organizing their position in the picture, and calculates depth accurately as a number of floor squares (figs. 3.9).

In the constitution of this three-dimensional grid, Panofsky sees the foundations of the Cartesian system and claims that this same pattern of tiles represents the first example of a coordinate system, 'for it illustrates the modern "systematic space" in an artistically concrete sphere, well before it



3.8 Diagram of Alberti's perspective construction, from Robin Evans, *Projective Cast*, 1995.

has been postulated by abstract mathematical thought' (fig. 3.10).[8]

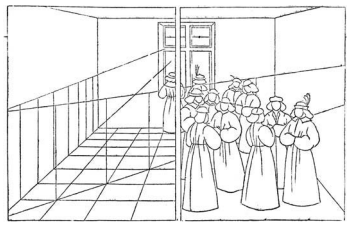
3.1.2 GRID

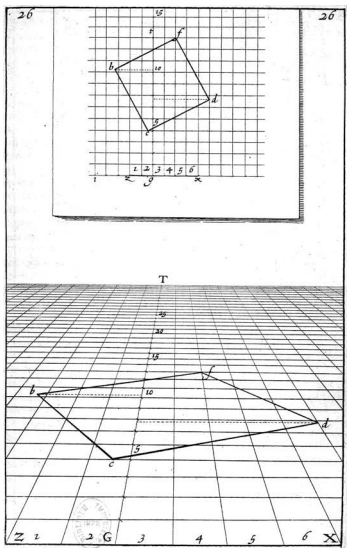
In his essay 'Scopic Regimes of Modernity', American intellectual historian Martin Jay finds it difficult to deny that the modern era has been dominated by the visual.[9] Nevertheless, the precise nature of this visual culture is not readily apparent. Is there one unified 'scopic regime', or several, perhaps competing, ones? For Jay, modern vision is a contested terrain, characterized by several visual subcultures.

Admitting the crudity of his characterization, he describes three distinct visual models. The first, normally claimed to be dominant, is identified with Renaissance notions of perspective in the visual arts and Cartesian ideas of subjective rationality in philosophy. This 'Cartesian perspectivalism', often assumed to be the modern scopic regime *par excellence*, achieved this reigning role because it was thought to best express the 'natural' experience of sight validated by the scientific worldview.

The prestige of Cartesian perspectivalism in Italy overshadows Jay's second model, flourishing in the seventeenth-century Low Countries, which rejects the privileged constitutive role of the subject and describes a world of objects whose existence is indifferent to the beholder's position. This 'art of describing' renders the surface, texture, colour and light of the depicted objects, unlike Cartesian perspectivalism, which emphasizes their correct form and position. Furthermore, where the Albertian window entirely contains the constructed scene, the frame of the Flemish pictures seems arbitrary.

Jay's third model is a permanent, if often repressed, visual possibility throughout the modern period. This is best identified with the Baroque: 'painterly, recessional, soft-focused, multiple and open', lacking the monocular homogeneous geometry of the Cartesian tradition or the material solidity and legible surfaces of the Flemish art of describing.[10] The Baroque fascination with opacity and ambiguity – the 'indecipherability of the reality it depicts' and the tactile or haptic quality of its





3.9 Jean Pèlerin Viator, illustration from *De Artificiali Perspectiva*, 1505.

3.10 Abraham Bosse, plate 26, from *Manière universelle de M. Desargues, pour pratiquer la perspective par petit-pied, comme le géométral, ensemble les places et proportions des fortes et foibles touches, teintes ou couleurs*, 1648.

visual experience – diverges from the oculacentrism of its Cartesian equivalent.

Cartesian perspectivalism implies constructing a system of objects based on a horizontal grid. Before their three-dimensional blossoming they must be drawn in plan and section, so they and the space around them have to be created from the start. A notional three-dimensional grid, deriving from an extrusion of the horizontal plane, occupies the whole space of the picture as an invisible infrastructure and parts of it are often rendered as a pictorial architectural space (figs. 3.11a, 3.11b).

In Cartesian perspectivalism, although perspective construction derives from an observation – and perhaps survey – of existing architecture, it often depicts imaginary buildings, designed specifically as a stage set framing the pictorial subject matter.

On the other hand, the art of describing uses a vertical grid, in the form of either Alberti's veil or the camera obscura, and presupposes the 'correctness' of Cartesian construction. It accepts the existence of the intersecting projection plane and performs a monocular tracing of the view.[11] The painter does not measure nor plot geometrically the apparent shape of objects but copies them as contours and textures directly. This grid coincides with the picture plane (figs. 3.12a, 3.12b).

The built environment, internal or external, depicted in these scenes – although often still invented – is occasionally a true representation of contemporary architecture and existing buildings.

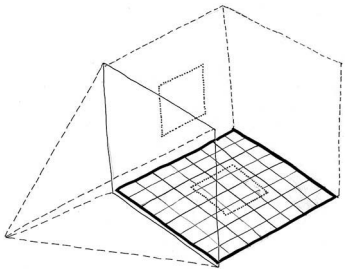
The grid during the Baroque period is perhaps the result of the confidence deriving from the two other models. This confidence leads to questioning and playfulness.[12] The grid is distorted and, through an inversion of the rules of perspective, it results in anamorphosis, a technique appreciated for its 'magical' illusionistic results (figs. 3.13a, 3.13b).

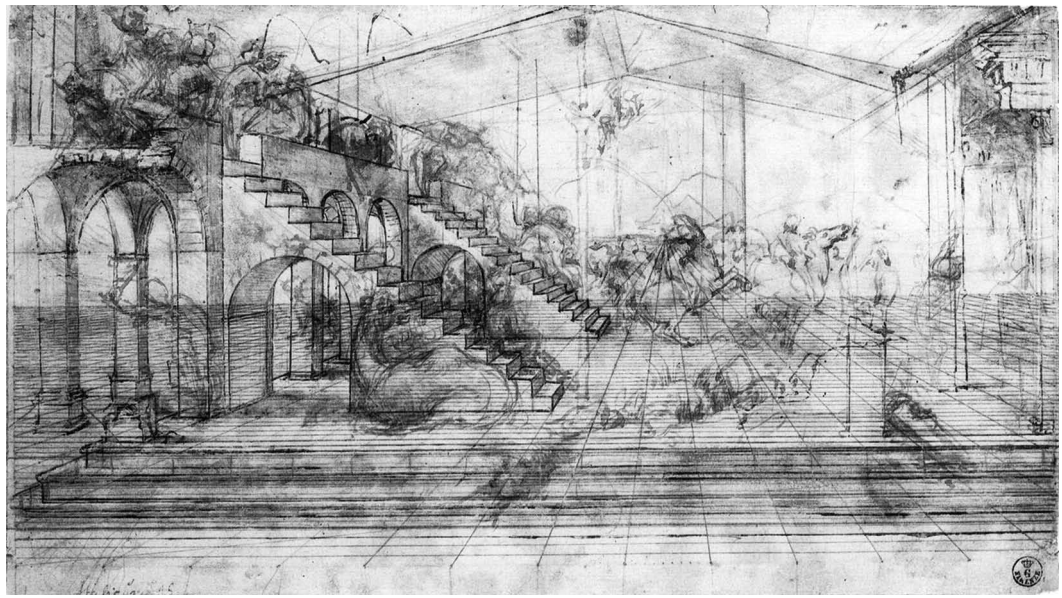
Beyond the search for 'wonder', though, the projective geometry governing anamorphic representations had a further pragmatic use. It facilitated the correct plotting of perspective views on increasingly complex architectural surfaces, such as domes and alcoves, which had to be painted distorted on the ceilings so as to be seen correctly from below.

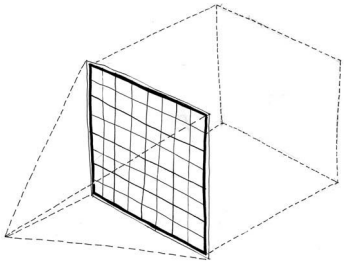
Therefore Jay's three different scopic regimes suggest three different types of organizing grid: the Cartesian perspectivalism grid is horizontal, the grid in the art of describing is vertical, and the Baroque grid is 'distorted'.

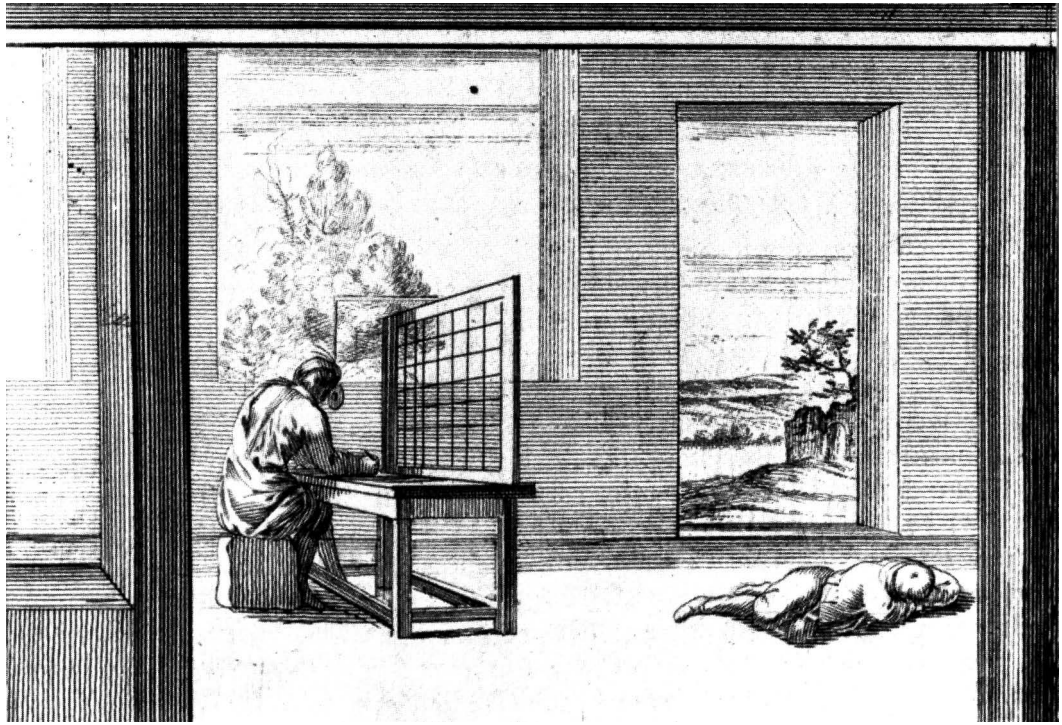
American art critic and theorist Rosalind Krauss believes the grid is emblematic of the Modernist ambition within the visual arts and that perspective studies are not really early instances of grids: 'perspective was, after all, the science of the real, not the mode of withdrawal from it.'[13] The Modernist preoccupation with the grid, however, can be linked with the invention and development of the perspectival system. Since the early Renaissance the grid has been the infrastructure of spatiality, the medium through which space is conceived and operated on (fig. 3.14). The Modernist abstract grid can be seen as the gradual isolation of the perceptual screen from the real world and its exposure as the underlying matrix of vision.

In Duchamp's *Given* all three types of grid are present but cladestine. Squared linoleum flooring, the Cartesian grid organizing the horizontal dimensions, is concealed from the viewer and only revealed in the photographs of Duchamp's *Manual*.







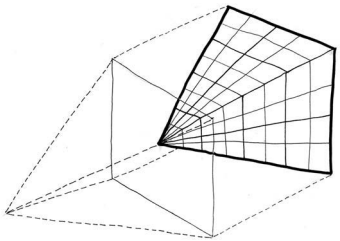


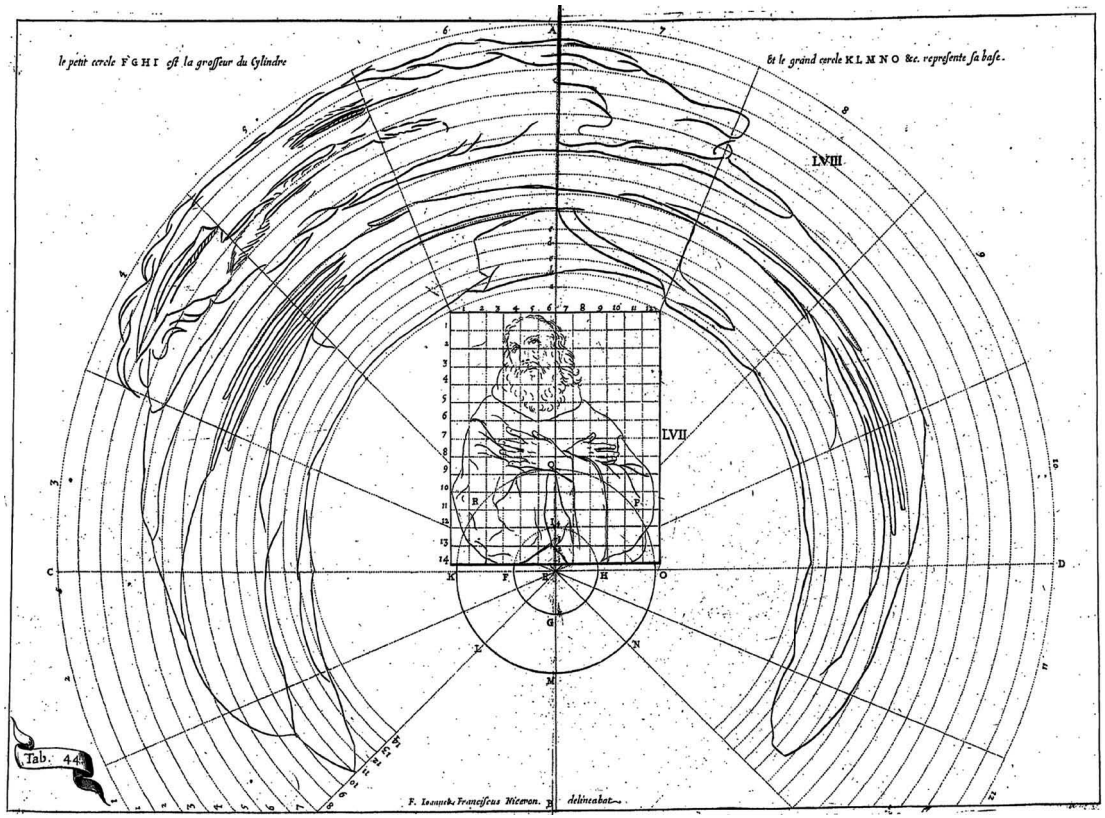
3.11a Horizontal grid. Sketch by the author, 2002.

3.11b Leonardo da Vinci, perspective study for the *Adoration of the Magi*, Uffizi, Florence, c. 1481–85.

3.12a Vertical grid. Sketch by the author, 2002.

3.12b Jean Du Breuil, the use of a vertical grid as perspective device, from *La perspective pratique*, 1642.





3.13a Distorted grid. Sketch by the author, 2002.

3.13b Jean-François Niceron, cylindrical anamorphosis of St. Francis of Paola, from *Thaumaturgus opticus*, 1646.

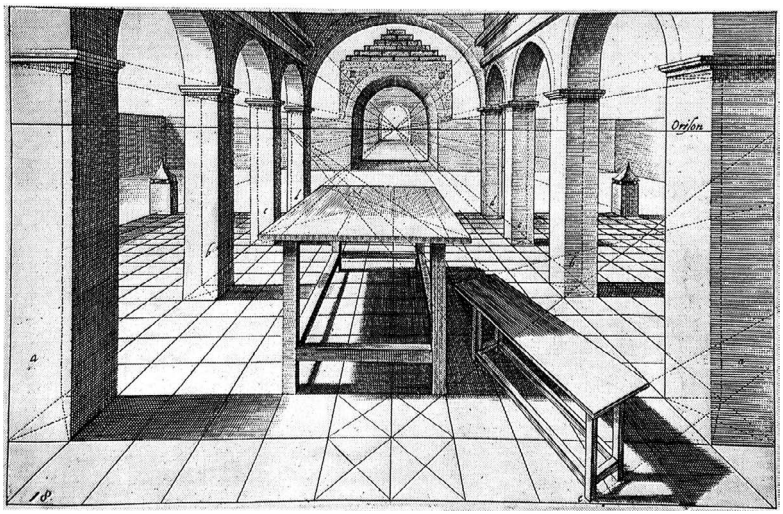
As we will explore in greater detail later on, both a vertical grid organizing the picture plane in the form of the brick wall, and a three-dimensional grid defining the anamorphically distorted nude figure, underlie the design of the assemblage.[14] Duchamp's attitude, though, seems opposed to the Modernist extraction of the grid from matter. He gives the grid back to matter in the form of the lino, the brick wall and the cast of the body in parchment. Moreover, he operates on it not only intellectually and visually but manually – by cutting, building and stereoscopically 'touching'.

3.1.3 LINOLEUM

The linoleum organizing the setting-up of *Given* is equivalent to the horizontal grid used in perspective. According to Lyotard:

> The black and white squared lino placed on the ground of the scene is entirely invisible, as the squaring must be that serves to set up the perspective in Alberti and the others.[15]

A first step in constructing a perspective view is to set up a horizontal grid on which the positions and relative sizes of the constituent elements





3.14 Jan Vredeman de Vries, engraving, from *Perspective*, 1604–05.

3.15 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

can be decided. In the final image, the grid is not necessarily visible and, if it is, it takes the form of a patterned floor. In the *Manual*, the placement of this horizontal grid is also the first operation in setting up the assemblage:

> Following the 1/10 card model for the positioning of the landscape, the bricks and the door: 1 place the squared linoleum and adhere to the floor (horizontal), 2 place the second (smaller) lino and adhere directly next to the first.[16]

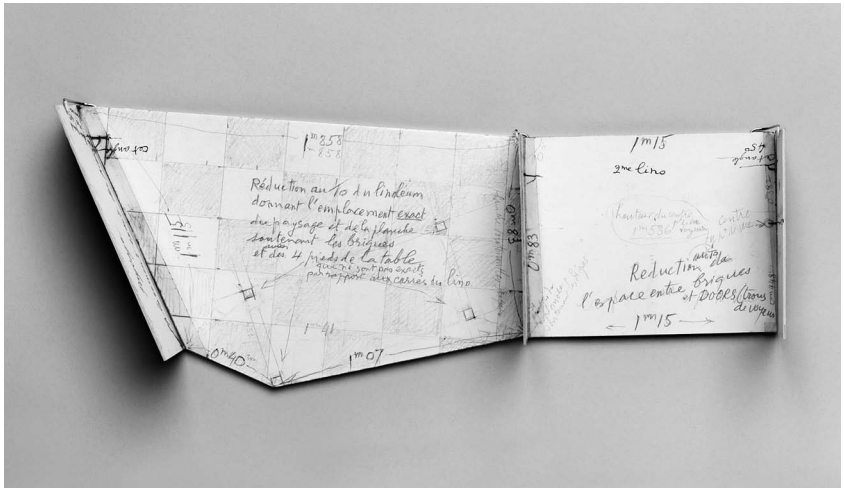
The linoleum operates as a template for positioning the table on which the nude lies (fig. 3.15).

The *Manual* frequently refers to the linoleum as it carries markings for the positioning of several other elements, and Duchamp stresses that they should be placed 'exactly' on the designated areas. The *Manual's* paper model repeats at a smaller scale the markings and the peculiar shape of the linoleum, which seems to follow accurately the *ichni*, the planar projected shapes, of the two visual pyramids whose apices are the holes in the door. Therefore it does not only give the footings of the vertical elements but coincides with the plan, the horizontal trace of the region of visibility (fig. 3.16).

Duchamp drew markings on the plastic surface and cut four square holes for the positions of the legs of the table (fig. 3.17).

The legs resemble projectors, lines leaving the registration ground and lifting the reference plane to a higher level. Indeed, in early perspective treatises, drawings presenting the projection of a rectangular or square shape, instead of being abstract, often feature tables, chairs and podiums (fig. 3.18). Each leg geometrically represents a vertical transfer, the equivalent of a vertical line, onto another projective plane, here the top of a low table.

In *Given*, on this elevated horizontal plane of the table top and with a seemingly chaotic but elaborate system of supports, Duchamp establishes the three





3.16 Marcel Duchamp, folded model, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.17 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

points of impact registering the inclination of the cast nude. This construction with pieces of wood and planks closely resembles the graphic setting-up of perspective with pen and paper (figs. 3.19, 3.20).

Furthermore, to facilitate the reassembly of the work, Duchamp has added outlines and numbers in white paint straight on the table. Although Duchamp's underlying structure for supporting the nude looks like a messy piece of furniture it is actually a physical incarnation of a projective drawing practice in space.

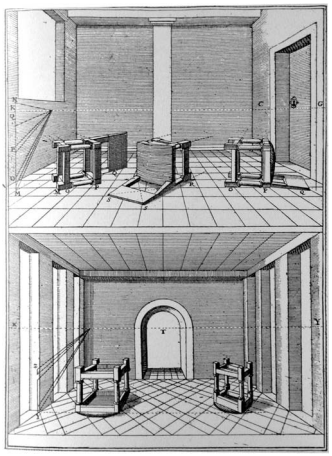
3.2 WOODEN DOOR

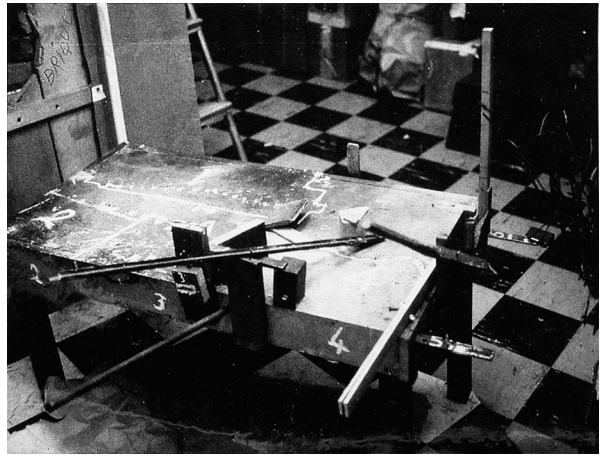
3.2.1 PHYSICAL LIMIT

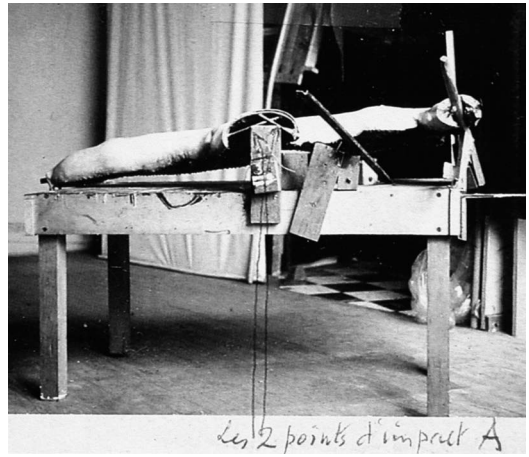
A wooden door in a dim room in the Philadelphia Museum of Art is the first interface through which *Given* is perceived (fig. 3.21).

A door can signify spatial ambiguity, and its hinged rotation, and function as a threshold between one territory and another, always fascinated Duchamp. A few of his pieces, representing doors or windows, play with reversals: interior/exterior, transparency/opacity, back/front, looking through/passing through (fig. 3.22).[17] The door in the Philadelphia Museum has a similar ambiguous spatiality. Is the door an obstacle obscuring the view, or the interface through which the view is constructed?

Pictures in a museum are like windows to a represented space beyond, and visitors contemplate them from a distance: 'Please do not touch'. In *Given*, the door stands in the place of the picture, suggesting the existence of a space beyond, but is also a barrier hiding the view and controlling the passage to that space. Yet the door, an architectural element that invites touch, reduces the contemplative distance between viewer and exhibit; it invites the visitor's touch. On closer inspection its weathered appearance and lack of handle







3.18 Jean Du Breuil, demonstration of foreshortened objects in perspectival interior, from *La perspective pratique*, 1642.

3.19 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.20 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.21 Marcel Duchamp, *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage … (Given: 1. The Waterfall, 2. The Illuminating Gas …)*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

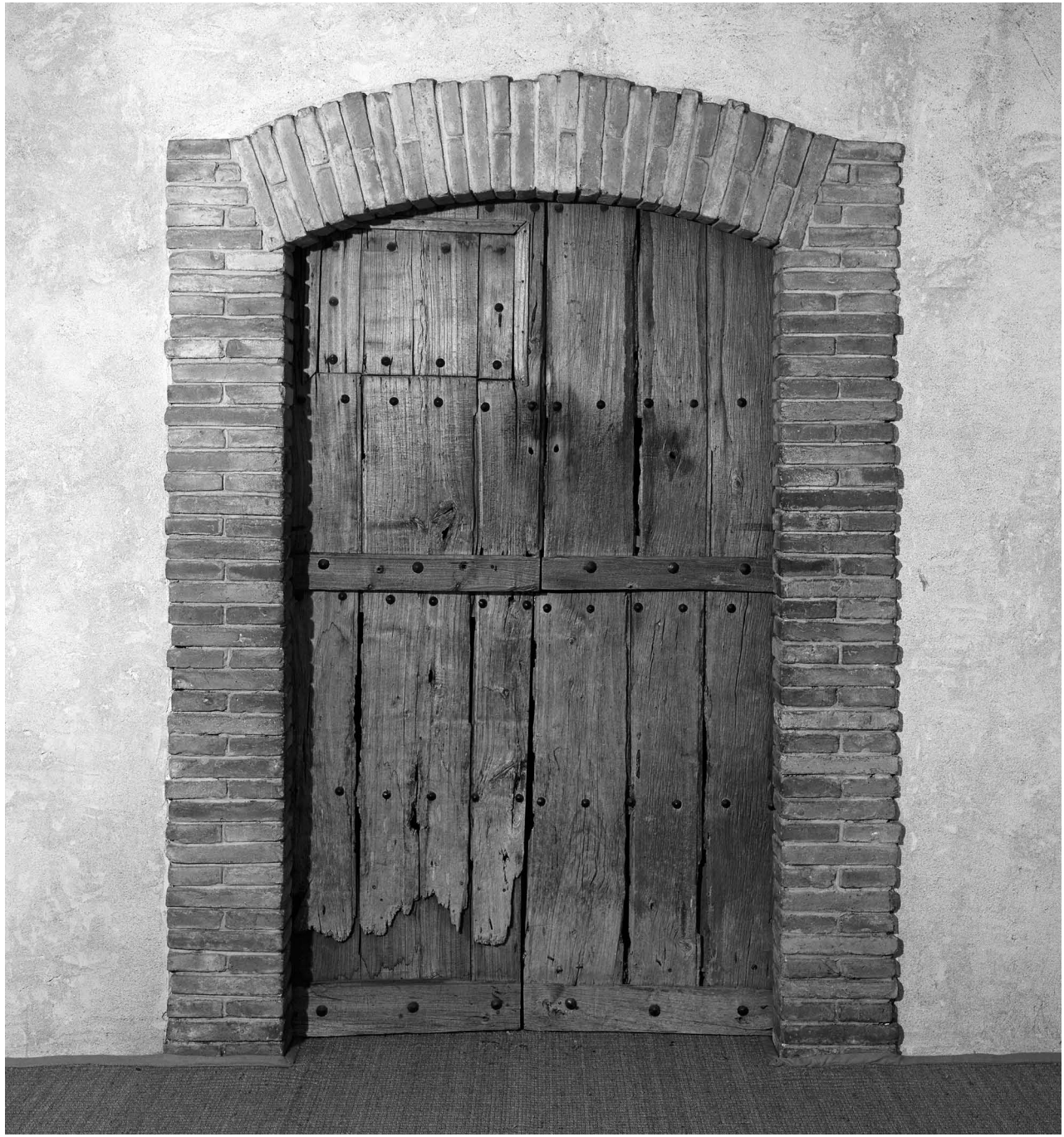
eliminate the possibility of physically crossing this boundary. Yet proximity and contact with the door and its peepholes reveal a view to, an up to that point hidden, illusory space that has been projected further in (fig. 3.23).

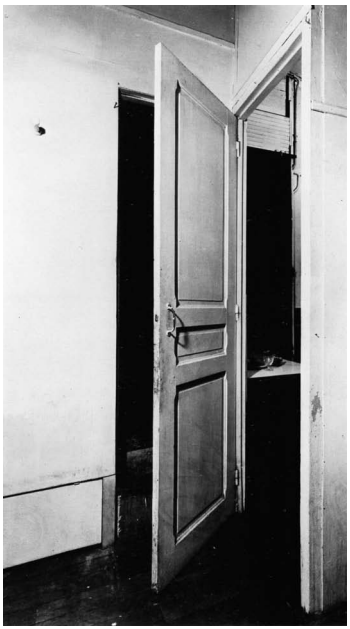
Before reaching the door, the viewers are as if 'blind', oblivious of the subsequent expansion of the visual field; to see through it they need to touch the door. However, what they will perceive beyond the door is a purely optical space and clearly beyond touch. The boundary of the door is thus both a tactile terminal and a visual portal projecting the gaze into the high visuality of the scene.

Each peephole, like the stylus in a perspective apparatus, requires a firm position for the 'eye' (fig. 3.24). By not allowing any wandering around the scene, the design certifies the view as a 'paused' optical space.[18] Any sense of three dimensions is registered only visually from a single position and not by an additive spatial exploration. Therefore the door emphasizes binocular depth. This configuration is similar to a stereoscope, where an illusory visual space is also paused. American art historian and critic Craig Adcock states that:

> Duchamp's tableau represents only a portion of what could be necessary for a three-dimensional stereoscopic image of a four-dimensional "Bride." Most critical, there is no place for viewers to station their points of view. With their eyes fixed at the peepholes, they do not have an extra-dimensional point of view as would be required for a genuine four-dimensional perception. From their position in three-dimensional space, they are in a situation analogous to seeing a stereopticon slide from inside the slide.[19]

Adcock notes that Duchamp is concerned with the difference between the tactile exploration of the eye around a three-dimensional object, and vision from a fixed point as in linear perspective. He observes that in *Given* the viewer's eyes are not permitted to wander, but remain fixed by the peepholes.









3.22 Marcel Duchamp, *Door: 11, rue Larrey*, 1927. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.23 View of the nude's hand holding a gas lamp as seen through the left peephole. Photograph by the author, 2000.

3.24 Albrecht Dürer, artist using a stylus and glass plate in portraiture, from *Underweysung der Messung*, Nuremberg, 1525.

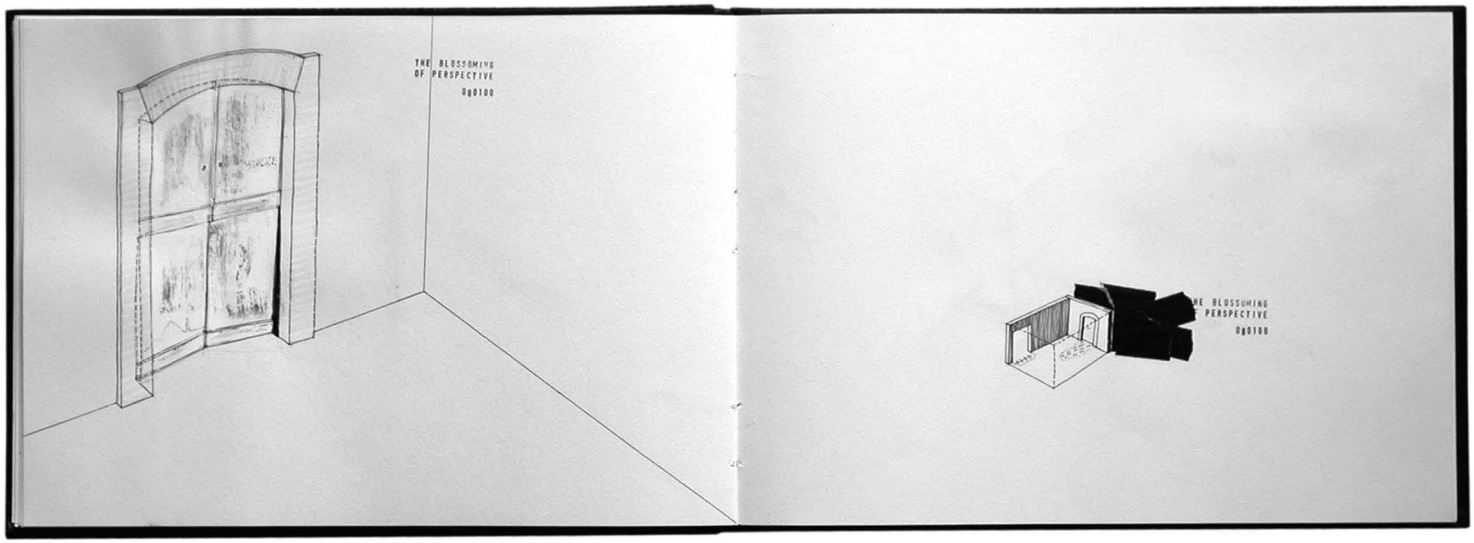
However, the assemblage is not a two but a three-dimensional perspective, and the eyes, although fixed at the plane of the door, can wander in depth, as in stereoscopy.

3.2.2 INFRA-THIN LAYER

Photographs of the door, showing a worn and unwelcoming surface, fail to convey the tactile nuances of the physical experience. An imaginary approach stumbles on this flat boundary. When encountered in real life in the gallery, the door subtly welcomes the viewer and takes account of his or her body.[20] The two lower panels are at a slight angle, creating a shallow alcove for one's feet, allowing close contact of the upper body with the door (fig. 3.25).

Another feature, invisible in photographs, is that the join between the two upper panels is grooved, creating a narrow nook for the nose, so that the door fits like a mask (fig. 3.26).[21]

The repeated touch of viewers' faces on the door has left the distinctive smell of skin oil, mixed with that of wood – reminiscent of the smell of the wooden icons in Orthodox churches, continually kissed by worshippers for centuries. This frequent pressing of faces in Philadelphia has also left a visible trace on *Given*'s door: the vague outline of an accumulated composite portrait. The collective voyeuristic act of looking through the peepholes constructs an apparition of a face looking back at the viewer as he or she approaches the door (fig. 3.27).



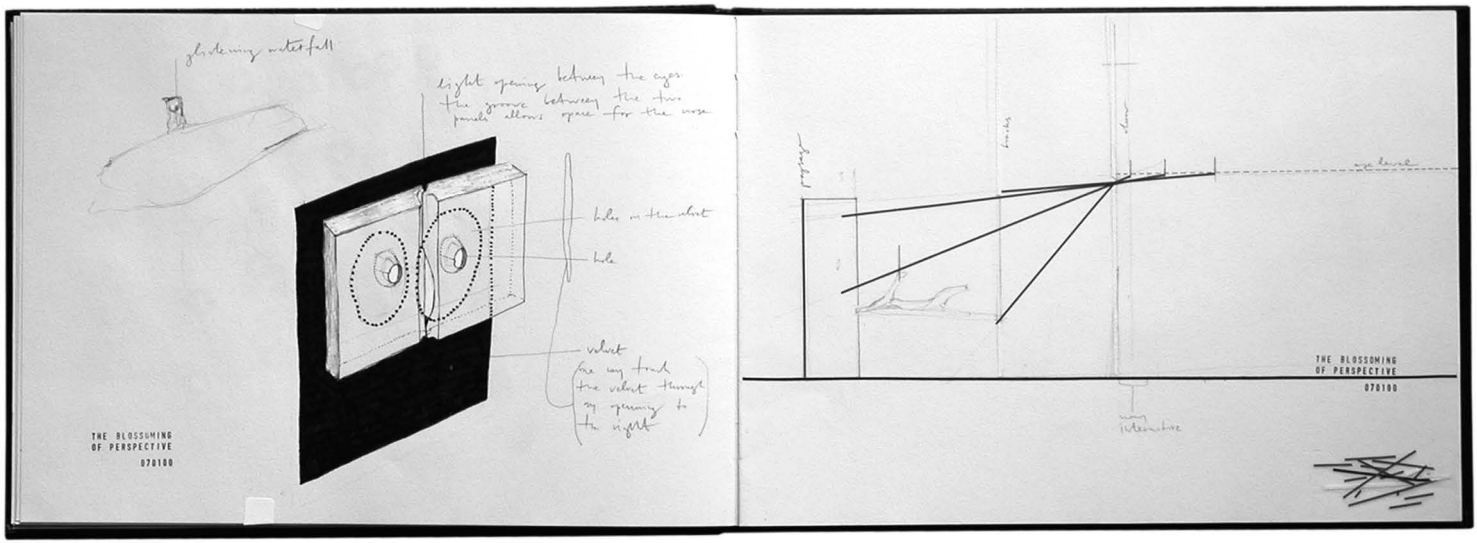
3.25 Spread from *Philadelphia Sketchbook*, 2000. The sketch on the left shows the tilted bottom panels of the door creating a recess for the feet. Drawing by the author.

The result is a subtle sense of occupancy, an 'infra-thin' region between the door and the viewer embodying the passage from two to three dimensions. Infra-thin (*inframince*) is a term invented by Duchamp and used to describe nearly imperceptible transitions or material transformations and the passage from two to three dimensions.[22] The low-relief modelling of the door's front surface is like a convex mould in the shape of the human body. Unlike the abstract monocular viewing point in perspective construction, here we have a 'humane door' with two peepholes that brings to the surface the binocular corporeality of vision (figs. 3.28, 3.29). Krauss notes:

> To be discovered at the keyhole is, thus, to be discovered as a body; it is to thicken the situation given to consciousness to include the hither space of the door, and to make the viewing body an object for consciousness.[23]

3.2.3 SINGLE EYE

During the Renaissance, linear perspective, *perspectiva artificialis*, was found to correspond with essential attributes of the visual, *perspectiva naturalis*. However, the simplicity and clarity of linear perspective was only possible by eliminating, contradicting or confusing elements in corporeal vision. An issue whose importance is overlooked when vision is identified with the representation technique is that perspective's mathematical structure is based on monocular observation. In the treatises and the diagrams of the perspectivists, the observer always looks with a single eye, left or right, never both (fig. 3.30). The 'eye' in perspective construction coincides with the apex of the visual pyramid, and occasionally is illustrated on its own, disconnected from the human body. The 'other' eye and thus binocular vision have been ostracized from the perspectival scopic regime.



3.26 Spread from *Philadelphia Sketchbook*, 2000. The sketch on the left shows a close-up detail of the peepholes and the groove that allows space for the nose, making the door feel like a mask. On the right a section shows the horizontal positioning of the nude. Drawing by the author.

A clear demonstration of this deliberate occlusion of one eye appears in the texts of Sébastien Le Clerc, an ardent Cartesian, who claimed that clear and distinct vision of an object could only be monocular (fig. 3.31).[24]

In the case of an object observed by two eyes through a glass plate the 'animal spirits crowding' along the two optical nerves transmit two images of the object to the brain. According to Le Clerc, one eye must be closed so as not to see double. He concludes: 'the rules of perspective are truly founded on a single viewpoint.'[25] For Le Clerc, the glass plate operates as the plane on which an erroneous apparition of two images emerges, a primitive and unfortunate occurrence, which can be corrected by closing one eye. However, the presence of the glass is initially what causes the problem: introducing the picture plane as an intersection of the visual field requires closing one eye.

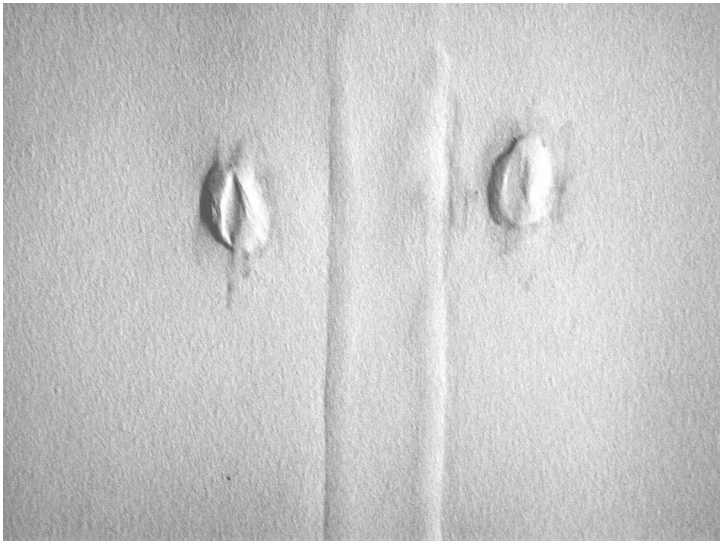
The perspectivists favoured the ability of the single eye to render clear outlines over the apparent complexity and confusion of the binocular field. The single vanishing point of perspective construction created a mathematically measurable spatiality: a homogenous and systematic space.[26]

Leonardo, one of the most dedicated students of perspective, was aware of the effects of binocular vision and one of the few who did not immediately dismiss it as an irrelevant nuisance. He tested different conditions (fig. 3.32):

> Let the eyes be *a* and *b*, looking at an object *c*, with the converging central axes of the eyes as *ac* and *bc*, which converge on the object at the point *o*. The other axes, lateral to the central one, see the space *gd* behind the object, and the eye *a* sees all the space *fd*, and the eye *b* sees all the space *ge*. Hence the two eyes see behind the object and all the space *fe*. On this account, this object acts as if transparent, by



3.27 Closer view of the trace left from visitors pressing their faces onto *Given*'s door, forming a 'collective portrait' around the peepholes. Photograph by the author, 2000.





3.28 Impression of peepholes on a page of the *Philadelphia Sketchbook*, 2000.

3.29 Enhanced stereoscopic close-up of the two peepholes. Stereo-photograph by the author, 2000.

3.30 Selected details from perspective demonstration plates focusing on single eye observation. Collage by the author, 2001.

> the definition of transparency, according to which nothing behind it is concealed. This cannot happen with someone who looks at an object with one eye, if the object is bigger than the eye.[27]

Monocular vision renders distinct the boundaries of objects whereas in binocular vision only distant objects retain clear outlines because their images on the two retinas are nearly the same. The difference between the two retinal impressions in the observation of near objects offers the sensation of depth. Intense concentration at any point in the visual field, though, tends to break the singularity of the image, and the two retinal impressions appear simultaneously, creating confusion.[28] The painter, therefore, faces the dilemma of choosing one of the two slightly different perspective images. Leonardo asserts:

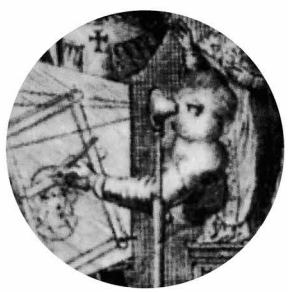
> It is impossible that a picture copying outlines, shade, light and colour with the highest perfection can appear to possess the same relief that appears in an object in nature, unless this natural object is looked at over the long distance and with a single eye.[29]

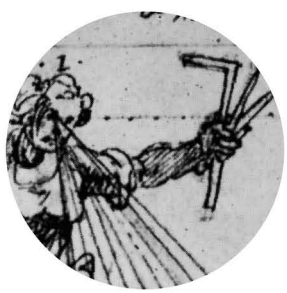
Although rupture and apparent confusion can hinder concentration, the sensation of three-dimensional relief that derives from binocular observation is of a persistent single image, so a mechanism regulating what each eye sees must be in operation. By understanding this mechanism a painter has the option of faithfully representing the binocular 'eyeballing' of areas seen by the left eye and others seen by the right. The resulting painting is therefore a composite image; although rendered on a flat surface, it will be a merging of information derived from both eyes. Such a painting can guide the retrieval of binocular relief and thus is closer to

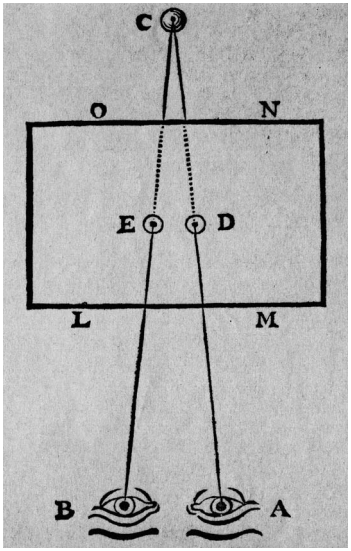


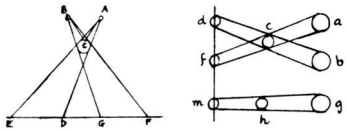












3.31 Sébastien Le Clerc, looking at a sphere through a plate of glass, from *Discours touchant le point de veuë, dans lequel il est prouvé que les choses qu'on voit distinctement ne sont veuës que d'un œil*, Paris, 1679.

3.32 Leonardo da Vinci, binocular vision of an object and comparison between binocular and monocular vision, from *Leonardo on Painting*, 1989.

natural vision than if the painter was to close one eye. This important difference between photography – or photorealist painting – and painting from life is often disregarded. A painting from life retains cues from the painter's binocular viewing of the subject and unlike the static flatness of the photograph has the potential of 'blossoming' again in full binocular depth in the viewer's mind.

3.2.4 THINGS TO BE LOOKED AT WITH TWO EYES

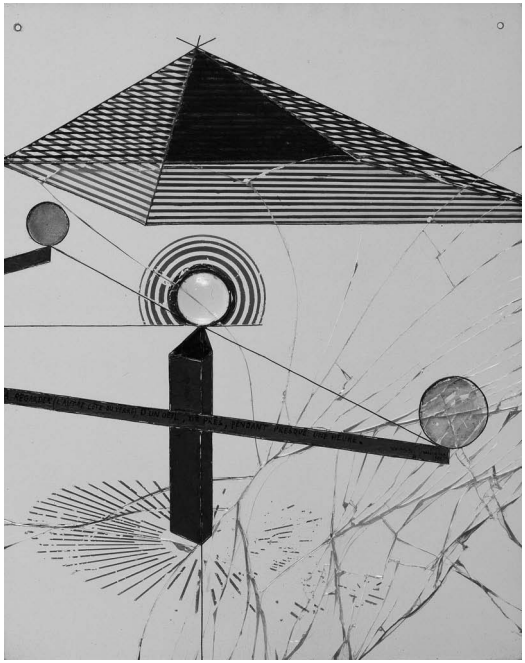
French art historian Jean Clair investigates the influence that photography had on Duchamp's work in *Duchamp et la photographie: Essai d'analyse d'un primat technique sur le développement d'une oeuvre*, 1977. He convincingly argues that Duchamp's first major piece, the *Large Glass*, is a 'delay in glass', (*retard en verre*): an incarnation of the photographic process in terms of not only construction technique but also subject matter (see fig. 1.1). More specifically, in a chapter entitled 'Opticeries', Clair traces Duchamp's fascination with stereoscopy.[30] According to Clair, the single point of view, as invented during the Renaissance, 'reduces the depth of the real world to the illusion of a flat surface … a monstrous, artificial, and, finally, a mythic vision, with something of Cyclops and the Medusa in its nature, flattening the world and turning it into stone'.[31] He suggests that three centuries later Duchamp offers a new reflection on the problems of vision in perspective, monocular or flat, and binocular or in relief. In his notes, Duchamp suggests making:

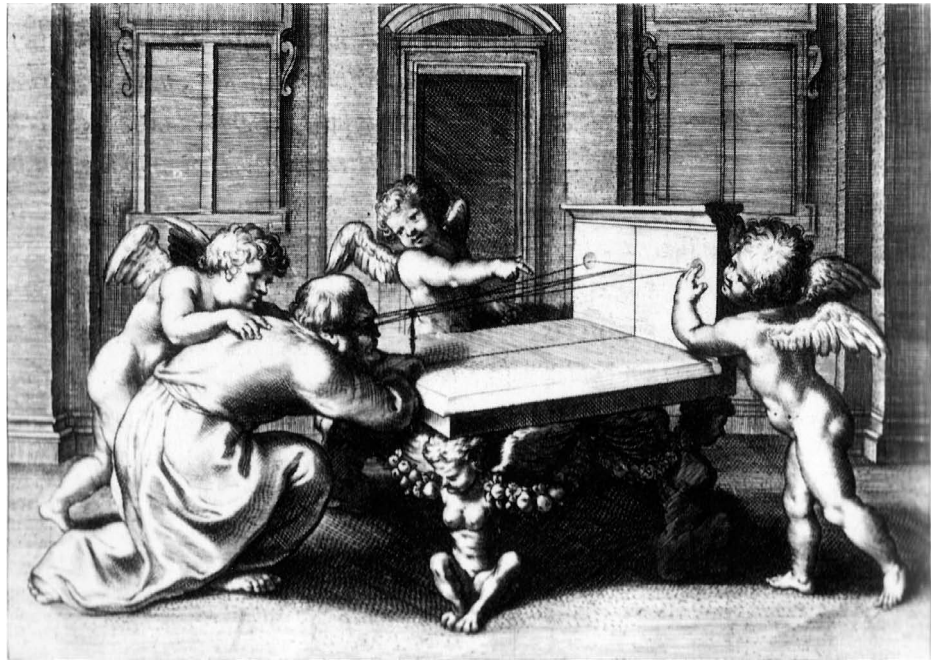
> A thing to be looked at with one eye
> – – – – – with the left eye
> – – – – – – – right – – –,
> One could base a whole series of *things to be looked at with a single eye* (left or right).[32]

The evolution of Duchamp's exploration into the art of seeing can be traced through analysis of a series of works, each of which demands to be viewed in a precisely determined manner. A piece clearly part of a series of works by Duchamp that favour a particular manner of viewing is *To Be Looked at (from the Other Side of the Glass) with One Eye, Close to, for Almost an Hour*, 1918 (fig. 3.33).

The work, which he completed while in Buenos Aires, is a study of a detail in the *Large Glass*. *To Be Looked at …* refers to photography, featuring an integrated lens that inverts the view beyond. Furthermore, as Clair has suggested, Duchamp's use of glass as the surface of the picture was inspired by photographic plates on glass, but also perhaps by the fact that early stereoscopic slides were glass-mounted. Guided by the obvious title and his analysis of the *Large Glass* as photography, Clair insists that Duchamp's *To Be Looked at …* belongs to the category of things to be seen with one eye. Indeed, the gallery label text accompanying the piece suggests that viewers should look with one eye through the central lens Duchamp mounted between two panes of glass: 'Peering through the convex lens "for almost an hour" is supposed to have a hallucinatory effect, as the view is dwarfed, flipped, and otherwise distorted.'[33]

However, I would like to argue that in contrast to the title, the piece depicts a geometrical configuration that bears similarities to a diagram describing binocular vision – a diagram of looking at a sphere with two eyes.[34] The similarities are obvious when Duchamp's piece is compared to Peter Paul Rubens's





3.33 Marcel Duchamp, *To Be Looked at (from the Other Side of the Glass) with One Eye, Close to, for Almost an Hour*, 1918. © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

3.34 Peter Paul Rubens, demonstration of the horopter, from François d'Aguilon, *Opticorum Libri Sex philosophis juxta ac mathematicis utiles*, Antwerp, 1613.

engraving of angels demonstrating the workings of binocular vision in a physical model(fig. 3.34).[35]

In the engraving a man observes a small sphere balanced on a pointed stand, while rays starting from his eyes cross to join with representations of the two retinal images on a flat vertical plane, which are also connected by a thin straight line. This diagram is at the same time a close approximation of the operation of stereoscopic vision. If the man was able to fix the circle on the left with his right eye and the circle on the right with his left eye, he would have a visual sensation of the sphere in its correct position in space, even when the sphere is not there. Similarly to Rubens's engraving, the central lens in *To Be Looked at* ... balances on a pointed baton, and is flanked by two flat representations of itself, two circles, at the end of two rods connected by a thin straight line. The convex lens, protruding out from the plane of the glass as a three-dimensional relief, potentially represents the stereo view of a sphere derived from successfully merging the two complementary circles on either side.

Although rendered differently and with some of the elements eventually omitted, this part of the composition suggests that perhaps the *Large Glass* as a whole is also an allegorical study of the abstract diagram of binocular vision and stereoscopic viewing. Here the circles are missing, but we see the extensions of the rods crossing over the chocolate grinder – a tactile equivalent of the crossing of binocular rays – reminiscent of Denis Diderot's and René Descartes' illustrations of a blind man holding



3.35 René Descartes, blind man using crossed sticks, from *La Dioptrique*, 1637.

a device of intersecting sticks (fig. 3.35).[36]

Undoubtedly, *To Be Looked at …* and the *Large Glass* refer materially to photography, but through the allegorical setting of the Bachelor machine Duchamp may have also aimed to expose the complex architecture of stereoscopic vision (fig. 3.36).

A further proof of Duchamp's interest in stereoscopy as an intellectual and material theme while developing the *Large Glass* is *Handmade Stereopticon Slide*, 1918–19. Duchamp constructed the slide by drawing in pencil two slightly different views of a diamond-shaped geometrical figure on a double photograph of a seascape. Italian scholar and art historian Arturo Schwarz remarks that observed through a stereoscopic viewer the slide gives a striking three-dimensional effect (fig. 3.37).[37]

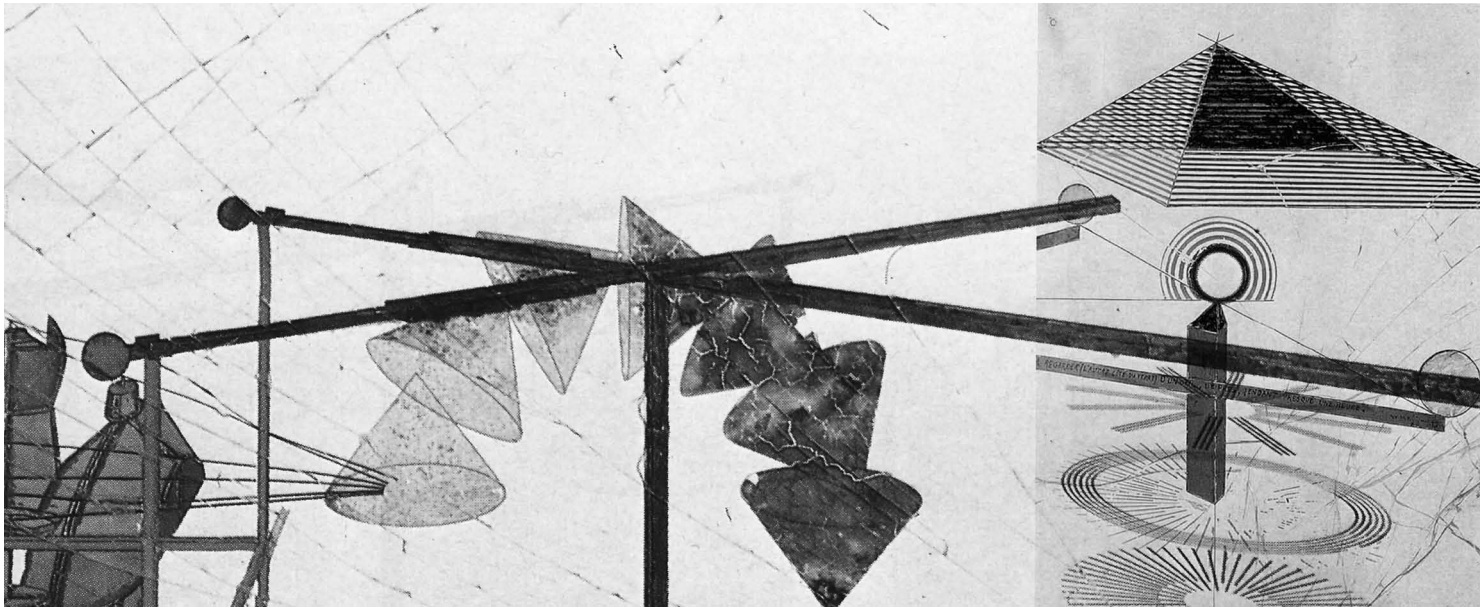
In *Handmade Stereopticon Slide* the image of the seascape is photographic, but not necessarily stereoscopic. Duchamp may have copied the same view of the sea and the horizon for the left and right slide, as stereoscopic images of distant views tend to be similar anyway. His plotting of the prism in perspective from a different viewpoint for each side allows the shape to 'blossom' in space. Furthermore, as Clair observes, the drawn figure resembles the monocular visual pyramid found in treatises of perspective, here rotated and hovering vertically in space:

> Rules of perspective used in monocular vision to reduce the three-dimensional world to a two-dimensional surface are employed here, in binocular vision, *backwards*, so that a flat geometric figure produces a virtual image with the effect of an illusory volume.[38]

Combining photography with drawing, Duchamp designs the simple architecture of the monocular field as a three-dimensional form blossoming out of the surface of the paper. Therefore, *To Be Looked at …* is a work to be viewed with one eye that describes the diagram of binocular vision, which is looking with two eyes, and *Handmade Stereopticon Slide* is a work to be viewed with two eyes that describes the abstract diagram of single-eye, or monocular vision. While testing visual perception though a sophisticated process of making and drawing, Duchamp is clearly equally interested in the intellectual structures that facilitate and construct perception.

Referencing photography and perhaps stereoscopy, the drawing technique organizing the architecture of the *Large Glass* was perspective construction, combined with a poetic verbal description in loose notes. But in *Given* the visceral impact of the pornographic subject matter, its blatant presentation and dazzling light effects, mask the underlying geometric architecture organizing the scene. However, several clues point to the stereoscope, a nineteenth-century invention (fig. 3.38).

As we will see in greater detail later, the stereoscope is a device for viewing a pair of stereoscopic images – photographs or drawings – representing the slightly different perspective views formed on the two eyes. The device fuses the two separate images into a single illusory view offering an extra visual sensation of depth. Several details in *Given* reference the stereoscope: the two peepholes on the door; the tinted landscape in the background similar to hand-painted early stereoscopic slides; and perhaps

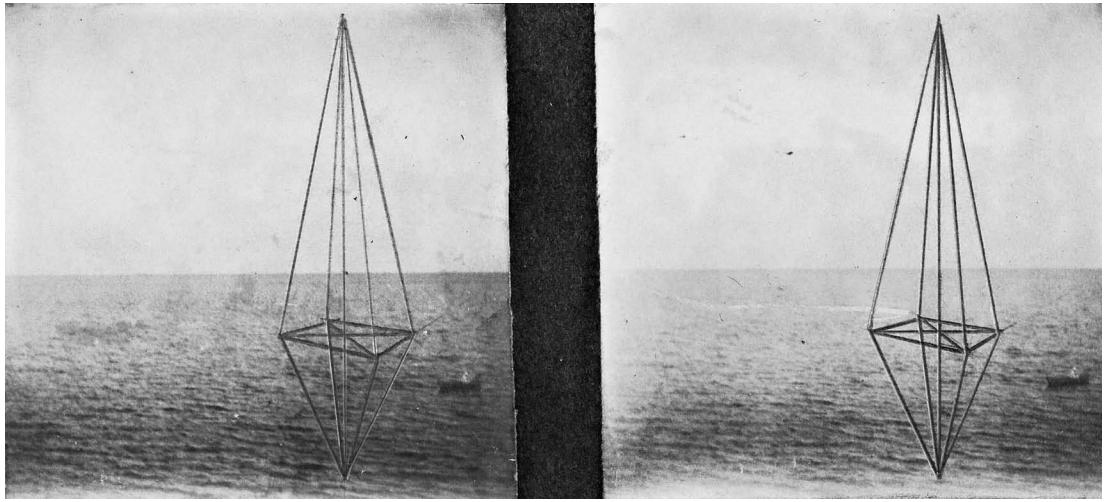


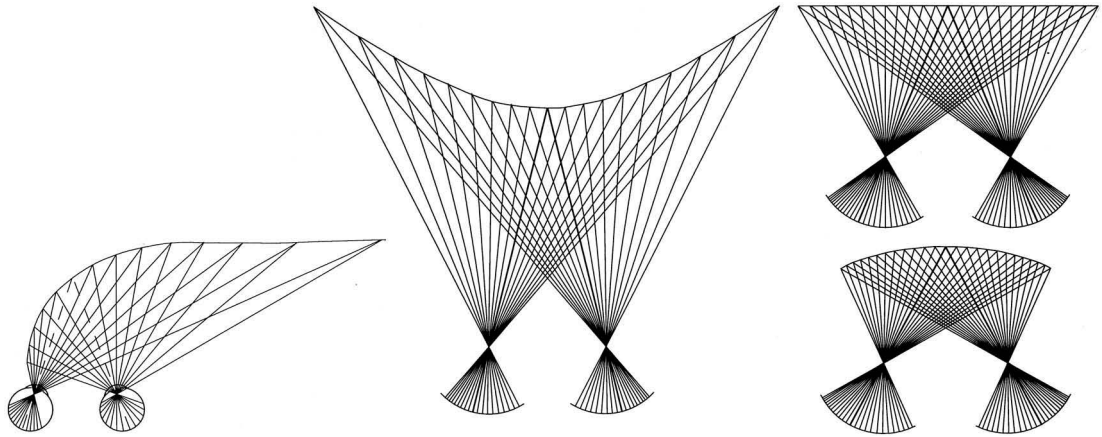
3.36 Superimposition of Duchamp's *To Be Looked at …* on the *Large Glass*. Digital collage by the author, 2011.

even the pornographic subject matter with which stereoscopy notoriously became synonymous – all point to an interpretation of *Given* as a staging of stereoscopy in three dimensions. *Given*'s layout, although resembling and referencing the stereoscope, does not require special glasses in order to be perceived, but still evokes a visual tangibility that cannot be expressed in a single photographic image. The gaze travels through the deep space of the scene, visually touching all the different elements in spatial gradients and leaving the viewer with a sensation of 'constructing' its depth by looking at it.

As we will see later in this book, I speculate that Duchamp may have used stereoscopy as a creative technique to construct the three-dimensional cast of the nude out of a photographic process. In contrast to the common view that the nude is composed of fragments physically cast from a female body, I have suggested that Duchamp may instead have used stereo-photogrammetry to record a real woman in the same pose, and then, at least partly, plot the form of the nude figure mathematically from the resulting photographs. Similarly to the iconography of the *Large Glass*, therefore, *Given* can be seen as a 'machine' using projective geometry to represent desire with precision.

Going back to Duchamp's exploration into the art of seeing through works that demand to be viewed in a precisely determined manner, it is clear that the two peepholes on the door of *Given* suggest that the scene is made as 'a thing to be looked at' with two eyes. Is *Given*, Duchamp's culmination of research into stereoscopy and binocular vision?





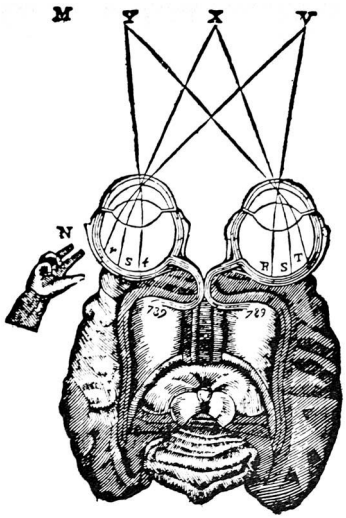
3.37 Marcel Duchamp, *Handmade Stereopticon Slide*, pencil on gelatine silver prints mounted on black-paper-surfaced board, c. 1918–19. The Museum of Modern Art, New York. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

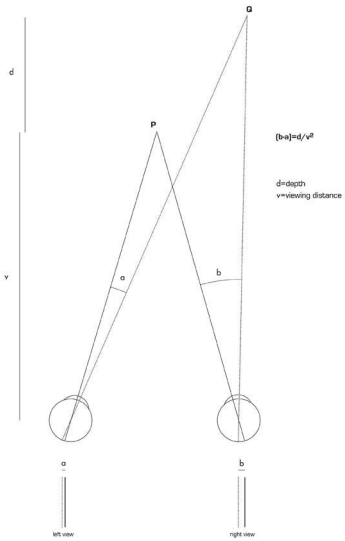
3.38 Different diagrams of the horopter, from Howard and Rogers, *Binocular Vision and Stereopsis*, 1995. By permission of Oxford University Press, USA.

3.2.5 BINOCULAR DISPARITY

Perspective construction offered a formula for systematically diminishing the sizes of represented objects within the visual field. This formula can be applied relatively successfully to the retinal view of each eye individually. The binocular visual field is composed of a fusion of these two disparate images into a single view, offering an impression of binocular depth. Although the computational system in the human brain that matches corresponding regions from each eye is complex, it is also governed by rules.

Research in the psychology of vision has only recently started to define the dimensions of binocular vision.[39]





3.39 René Descartes, diagram of a section through the eyes, from *La Dioptrique*, 1637.

3.40 Calculating binocular disparity. Diagram by the author, 2003.

For some purposes the eye can be thought of as a camera, with the cornea and lens acting together to focus light onto a mosaic of retinal receptors.[40] The pattern of the excitation of the retinal perceptors is a 'picture', curved around the back of an eyeball. Although curved, the image is essentially two-dimensional, and the question of how human beings recover depth and form a three-dimensional vision from this has dominated the psychology of perception (fig 3.39).

Philosopher George Berkeley and the empiricists assumed that the third dimension must be perceived by associating visual 'cues' with the position of objects felt by touch. These cues, although related to the eye's function, were also perceived as tactile: calculation of the different angles of inclination of the eyes, different degrees of blurring in the image, and the different degrees of strain in the muscle around the lens. Most recent research, however, has concluded that these physiological cues are minor sources of depth retrieval. Instead, a significant visual faculty for calculating relative distance derives from the overlapping fields of binocular vision. All animals with overlapping visual fields gain stereoscopic information by comparing the images obtained by the two eyes. Objects at different distances appear closer or further apart to each eye, reflecting the horizontal disparity between the two views.

Disparity is measured in degrees of visual angle and is proportional to depth divided by the square of the viewing distance (fig. 3.40). It increases with depth but decreases rapidly with increasing viewing distance. Proximity of the observer to the object dramatically extends the divergence between the images at the two eyes. Thus the value of stereoscopic vision is greatest near the observer, while distant objects render disparities too small to be detected.[41]

Binocular vision is a comparatively new field of study in psychology. Not much is known about how the images from the two eyes are fused so imperceptibly to form a uniform field. Experiments with random-dot stereograms isolate the contributions of binocular vision to recovering three-dimensional form and demonstrate that binocular matching and the creation of a depth map is independent from pictorial information.

The following question, however, is still being researched: if pictorial cues are not necessary for matching the two separate images, how does the brain determine which feature in the left eye is the appropriate match for a given feature in the right eye and what happens with occlusions, the areas seen by one eye only?

Psychologists Ken Nakayama and Shinsuke Shimojo recognize Leonardo's unique observation of occluding contours.[42] As a tribute to his early insights, they group under his name phenomena that are close to them: those linked to rivalry, depth, subjective contours and motion – all related to occlusive conditions. They make a clear distinction between 'Wheatstone Stereopsis' – referring to Charles Wheatstone, English scientist and inventor of the Victorian era and inventor of the 'stereoscope' – which deals with the geometry of the visual field in the case of points visible from both eyes, and 'Da Vinci Stereopsis', which deals with areas within the visual field which are only seen by one eye, usually because the view of an object is blocked by another object in front of it.[43] 'Wheatstone Stereopsis' is the traditional view of stereopsis as a system

of matching similar patterns on the two retinas. The alternative 'Da Vinci Stereopsis' recognizes the importance of the ruptures, the 'mistakes' between the two patterns, as the basis of the structure of depth.

As we will see in the next section, Wheatstone's invention of the stereoscope not only employs binocular vision to create an illusory effect of depth, but also becomes a device for isolating and studying this overlooked visual faculty.

3.2.6 SOLID VISION

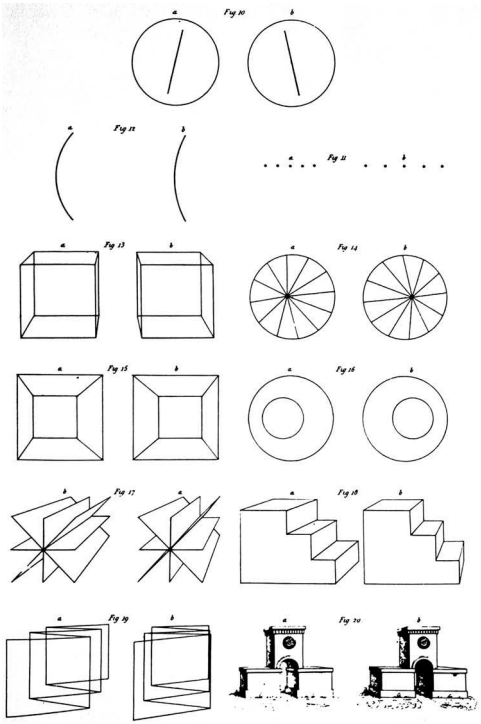
For art historian Jonathan Crary, the most significant form of visual imagery in the nineteenth century, apart from photography, was that of the stereoscope. That in binocular vision a different image forms on each retina had been a familiar phenomenon since Antiquity. For the first time, though, early nineteenth-century researchers were preoccupied with the rules governing the apparent singularity of the visual field.[44]

Although its origins are disputed, Wheatstone is often attributed with the invention of stereoscopy. His first observations, during the research that led to the invention of the first stereoscopic device, were based on the difference between the perception of close and distant objects.[45] He noted that when observing distant objects the two visual rays are nearly parallel and the fused image from both eyes is 'precisely the same as when the image is seen by one eye only'. On the other hand 'this similarity no longer exists when the object is placed so near the eyes that to view it the optic axes must converge. Under these conditions, a different perspective projection is seen by each eye, and these perspectives are more dissimilar as the convergence of the optic axes becomes greater'.[46]

This simple observation formed the foundation of Wheatstone's discovery. 'What would be the visual effect of simultaneously presenting to each eye instead of the object, its projection on to a plane surface as it appears to that eye?'[47] To test this he drew the apparent perspective images of an object as seen by each eye separately and then tried to fuse them. (fig. 3.41) He found that as 'these modes of vision are forced and unnatural, eyes unaccustomed to such experiments require some artificial assistance'. Using a box and two cardboard tubes he visually combined the two images and saw a figure of three dimensions 'bold in relief'.

The instrument that helped verify his theory has two mirrors placed back to back at 90 degrees to one another, on each side of which images slot into vertical frames. Observers place their nose where the mirrors join to see the two images simultaneously and get the three-dimensional effect (fig. 3.42). He called the instrument a 'stereoscope' from the Greek words *stereos* (solid) and *scopein* (to look). The name reflects the peculiar relation between stereoscopic vision and touch and the stereoscope's attribute of evoking tactile qualities like firmness, hardness and steadiness entirely through looking at pictures of objects.

According to Crary this apparatus 'made clear the atopic nature of the perceived stereoscopic image and the disjunction between experience and its cause'. The images were spatially separated from each other, held in slots on either side of the observer. The illusory and fabricated nature of this experience, therefore, remained bare in comparison to later versions of the device, where the two images are placed concealed within a box. This spectre of





3.41 Charles Wheatstone, stereograms, 1838.

3.42 Reflecting stereoscope originally used by Charles Wheatstone. © Science Museum/ Science and Society Picture Gallery.

relief was clearly a subjective event created by the observer: 'the observer coupled with the apparatus was the agent of synthesis or fusion'.[48]

Therefore the illusion of 'visual solidity' results from merging the information given by two disparate images placed apart. According to Crary, the perceptual inconsistency that Wheatstone's apparatus expresses explicitly represents the rupture signified by stereopsis. He asserts that the stereoscope signals the loss of the single point of view which defined the relationship between an observer and the object of vision for several centuries: 'the relation of observer to image is no longer to an object quantified in relation to a position in space, but rather to two dissimilar images whose position simulates the anatomical structure of the observer's body.'[49]

Wheatstone had several instruments made and used in physics laboratories and his drawings were widely reproduced. These images were mainly of hand-drawn simple geometric figures but no artist was able to render accurately both stereoscopic images of a complex object (fig. 3.42).

The stereoscope would have sunk into oblivion, being limited to flat-sided geometric figures, had it not been for the subsequent but nearly contemporary invention of photography. The early process, yielding permanent the images of the



3.43 A group of stereoscopic viewers based on David Brewster's model, 1850–69. © National Media Museum/Science & Society Picture Library.

camera obscura, was commercialized under the name 'daguerreotype' after its inventor Jacques-Louis-Mandé Daguerre.

In 1849 Scottish physicist and mathematician David Brewster described a simplified, more compact and practical version of the stereoscope: two adjacent half lenses, joined at their narrowest point and set in a pyramidal box (fig. 3.43).

The two images were now mounted on the same support, a single surface of paper or glass, and placed together inside the box in front of the lenses. Light coming in from an opening on the side would illuminate the paper prints, or, in the case of prints on tissue paper mounted on glass, a translucent backing allowed viewing against the light for added effect. This new apparatus created a private engagement between the observer and the secret luminous spectacle in the box, a miniature equivalent of the experience of viewing *Given*.



3.44 Anonymous, *Nude with Veils*, c. 1850.

3.2.7 FILE BB/3

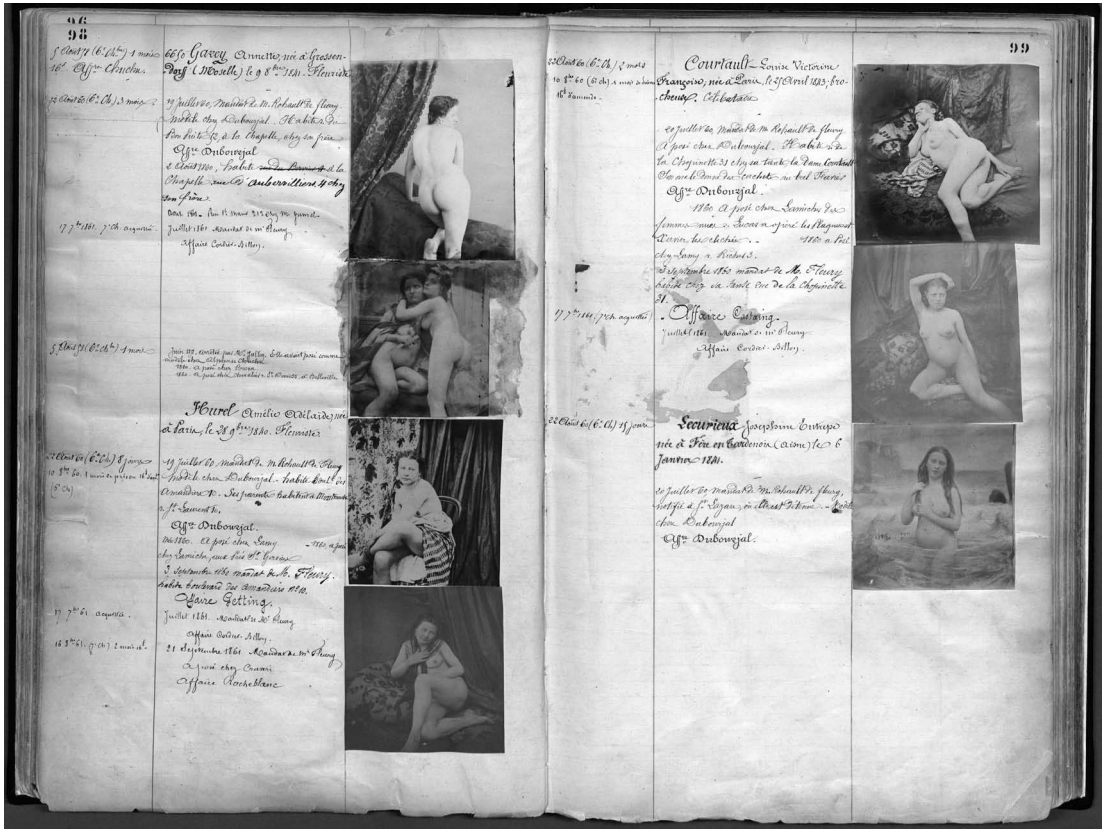
Unsurprisingly, like any other novel visual technology, the stereoscope created a flourishing underground industry: producing and circulating three-dimensional erotic and pornographic daguerreotype images. The spectator was drawn into an apparently intimate proximity to the object, a sense of being within the image (fig. 3.44).

The erotic tone of the following contemporary description, of a stereoscopic portrait of a woman dressed for a dance, although entirely 'innocent' gives an idea of the excitement felt by purchasers of explicit or suggestive pornographic pictures produced for the stereoscope:

> Stretch out your hand and touch her silky dress … And what about that lace whose transparent folds provide a glimpse of her rounded arm, does it not seem as if you are about to crush it beneath your fingers? And can you not see the daylight passing between the pearls of her necklace and the delicate skin of her neck? And what about the shadow of her lashes over her clear blue eyes, and the faint smile hovering about her lips? And can you not see the blood moving beneath her downy cheeks, the force which brings her soft translucent skin to life?[50]

The extend of this lucrative industry is evident in police reports of offences against public morals were kept in the archives of the Paris police headquarters under shelf mark BB/3: 303 numbered hand-written sheets dated between 1855 and 1868, the 'golden age' of the stereoscope (fig. 3.45).[51]

The album contains around a hundred photographs, selected from confiscated prints next



3.45 File BB/3, pages 98 and 99, 1855–68. © Préfecture de Police, Paris.

to which appear the names of offenders: respectable merchants, colourists, travelling salesmen, and about 100 female and 20 male models. Although it was illegal to make, pose for, reproduce, colour or circulate lewd photographs, no law forbade possession of the banned images. Stereoscopic images were expensive so they were mainly bought by a wealthy minority; once purchased, they entered the private domain and were no longer illegal. The images in file BB/3 are single photographs but most are one half of a stereoscopic pair, cropped to allow space for written information. This severing suggests a form of censorship, albeit likely unintentional: each stereoscopic pair is unable to blossom into three dimensions, depriving the image of its potential erotically charged stereoscopic impact.

The large scale of this illicit output of erotic images and the publicity it received in newspapers damaged the reputation of the stereoscope. Countless artistic prints, genre scenes and topographical views were produced for it but never succeeded in redeeming its reputation. *Given*

also created intense public reaction ranging from 'rejoicing to revulsion' when it was first unveiled.[52] Although it was recognized as a major work, many condemned it as bordering on pornography and saw it as sensationalism rather than art. Clearly related to Duchamp's preoccupation with the visual and eroticism, I believe that his presentation of a pornographic subject matter is also an allusion, a clandestine hint to the viewer, of the link to stereoscopy and the type of images it became infamous for.

3.2.8 OBSCENE IMMATERIALITY

The original immense popularity of the stereoscope declined, giving way to the extraordinary development of its rival: photography. Clair suggests that the reason was a desire to take possession of the world through the physical permanence of images:

> The tourist 'shoots' places, sights or monuments, not because he loves these things and wants to remember them. Rather, he tends to appropriate them symbolically through the 'taking' of photos. Ultimately, the camera pressed over one open eye, while the other remains closed, becomes a patch blinding vision; it is that which *prevents* one from seeing.[53]

The grasp on things offered by the photograph transforms it into a form of currency. For Clair, the role of the photograph as a material object in the economy of vision, 'in the relationship of one's desire for things and persons in the external world', is equivalent to that of the bank cheque and the promissory note in the capitalist economy. The stereoscopic image, on the other hand, does not permit symbolic exchange because it has no material reality. Unlike the material document on paper, stereoscopy 'as virtual image, an immaterial imitation, a totally transparent, all-too-perfect delusion of reality, … does not permit one to trade the substance for the shadow'. Clair believes it was this virtuality of the stereoscopic image, which Duchamp found seductive:

> To Duchamp, who was repelled by the physicality, the odorous corporeality, of painting, by its excessive grounding in the sensory world, the stereoscopic image showed the way to a purely ideal configuration, the intelligible result of synthesis certainly closer to the brain – and to the workings of a *cosa mentale* – than to the retinal effect.[54]

Conversely, for Crary the visual tangibility, which the stereoscope offers 'hovers uneasily at the limits of acceptable verisimilitude'.[55] The stereoscopic object 'enters' the viewer's mental construct of the view obtrusively, shattering the sterile barrier between observer and object that linear perspective establishes. Crary suggests that the illusory penetration of the object that the stereoscope creates was inherently 'obscene, in the most literal sense', which also perhaps explains its entanglement with pornography.

This obscene immateriality of stereoscopic imagery suits Duchamp's requirements for a precise visual representation of the erotic undressing of the Bride.

3.2.9 GIVEN THE STEREOSCOPE

For art historian Dalia Judovitz, the scene inside *Given* is hyperreal and stages eroticism as too obvious a spectacle.[56] The viewer is mystified by the explicitness of *Given*, its hypervisibility. But is not



3.46 Pierre Lefort, stereoscopic coloured view seen lit from the front and from the back, *Concert on the Champs-Elysées*, c. 1859–60.

this hypervisibility an attribute of the stereoscope? Like Adcock, Clair, Krauss and others, Judovitz notes the similarities between the set-up of *Given* and that of the stereoscope.[57] Here we will look into this resemblance between *Given* and the stereoscope as a deliberate imitation that uses the hyperreal presentation of eroticism as an allusion. Duchamp may have reproduced in a sculptural, corporeal manner the ethereal effect of the stereoscopic image to construct a rhetorical opposition to monocular vision. Therefore the pictorial treatment of *Given* represents the 'fall' of perspective into a lush visceral equivalent. We have considered *Given* as a blossoming of perspective. Its similarity to the stereoscope makes this blossoming stereoscopic.

Clearly the main feature connecting *Given* with stereoscopic imagery is the two holes in the door; I will now analyse other pictorial similarities between Duchamp's assemblage and the stereoscope in more detail: illusion of light and colour; fragmented space; looking into; undressing; and apparent tangibility.

3.2.9.1 ILLUSION OF LIGHT AND COLOUR

Some of the first stereoscopic images were translucent, which allowed for additional enchanting light effects. Backed with thin, hand-painted paper and mounted between two glass plates, these stereoscopic 'slides' allowed double viewing: lit from the front, as a simple black and white print, or backlit, when the full impact of the coloured image would be visible (fig. 3.46).[58]

Colouring became an art in itself as the added tints brought to life the black and white images. Cut-outs and pinholes on the surface of the print created glowing spots simulating shine or lustre on reflective surfaces for an even more dramatic result. By holding the stereoscope against the light, the viewer would be impressed by not only illusory depth but by saturated colours, a convincing depiction of shine, and a hyperreal light that seemed to illuminate the scene from within.

This treatment of stereoscopic prints is similar to the design of the landscape in *Given*. The photographs illustrating the second operation in the *Manual* present the landscape as a collage of hand-painted photographs mounted on translucent *verre dépoli* (frosted glass) (fig. 3.47).[59]

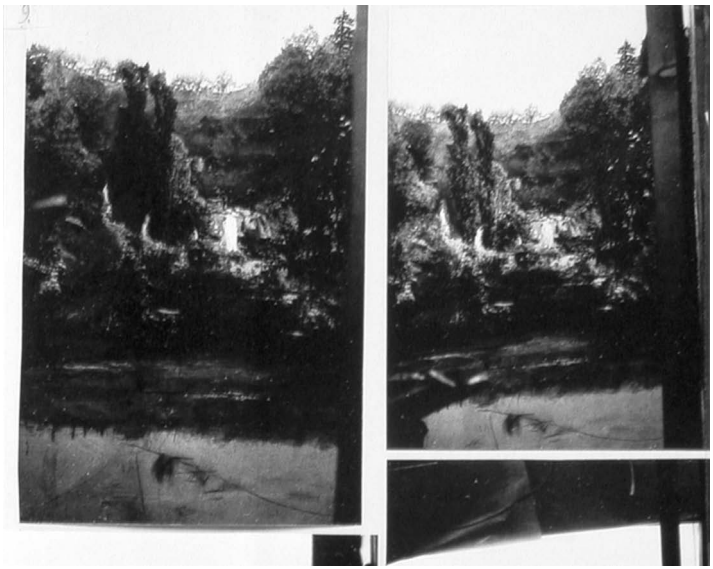
A fluorescent tube illuminates the surface from the back, creating the bright blue of the sky by 'reflection and transparency'.[60] Moreover, the red, brown and green hues, which Duchamp added to the black and white photographic collage of the landscape, match the saturated colour scheme of early hand-coloured stereoscopic prints.[61]

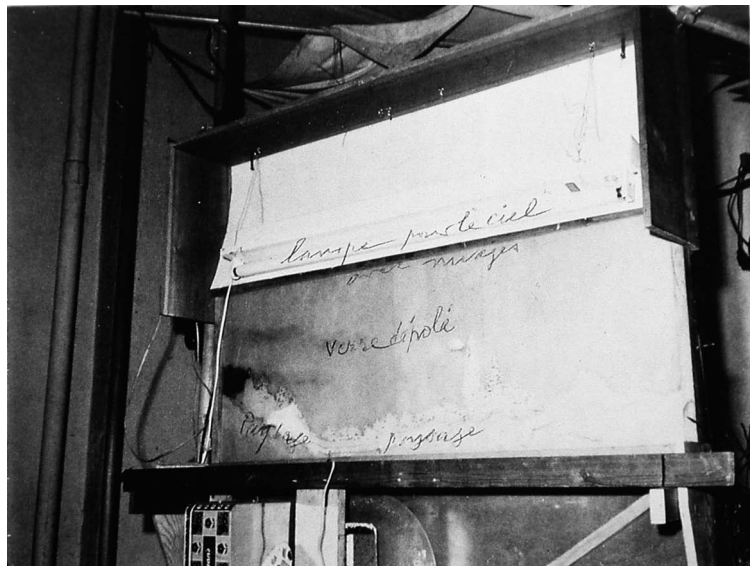
In the arrangement of this luminous landscape, the *Manual* describes the ingenious mechanism of the waterfall for which Duchamp may have found inspiration in the depiction of reflective light in stereoscopic images. In *Given*, a perforated aluminium disk on a motor rotates between the image of the waterfall at the front and the light source hidden in a biscuit box at the back, creating an effect of reflective light on falling water (fig. 3.48).

The principle of representing shine is the same as in the early stereoscopic slide; instead of two different 'shimmering' spots Duchamp contrives a 'flow' of spots, the only element in *Given* depicting movement.

3.2.9.2 FRAGMENTED SPACE

Crary notes that stereoscopic relief or depth has





3.47 Marcel Duchamp, backlit waterfall, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.48 Marcel Duchamp, the waterfall mechanism seen from the back, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

no unifying logic or order. Unlike the homogenous and metric space suggested by perspective, the stereoscope discloses a 'fundamentally disunified and aggregate field of disjunct elements'.[62] There is never a 'full apprehension of the three-dimensionality of the entire field', only a 'localized experience of separate areas'. When looking at a photograph or a painting the eyes scan the image without changing the angle of convergence, 'thus endowing the experience with an optical unity'.[63]

Crary compares the stereoscopic space with what Gilles Deleuze and Felix Guattari call a 'Riemann' non-Euclidean space: 'each vicinity … is like a shred of Euclidean space but the linkage between one vicinity and the next is not defined'. Riemann space is a heterogeneous space, 'a collection of pieces that are juxtaposed but not attached to each other'.[64]

> The reading or scanning of a stereo image … is an accumulation of differences in the degree of optical convergence, thereby producing a perceptual effect of a patchwork of different intensities of relief within a single image. Our eyes follow a choppy and erratic path into its depth: it is an assemblage of local zones of three-dimensionality, zones imbued with hallucinatory clarity, but which when taken together never coalesce into a homogeneous field.[65]

Given is an assembled space bringing together elements that have shifting dimensions, origin and significance. Mixing real objects with their representations or illusions, Duchamp creates a heterogeneous visual field: the door, from Spain; the bricks collected from a nearby construction site; the flat background, a black and white photographic collage enlarged and hand-tinted; the twigs,



3.49 *Le Déshabillé au stéréoscope*, published by La Nouvelle Librairie Artistique, Paris, 1906.

collected by Duchamp and his wife Teeny on their walks in a park; the gas lamp, an appropriated object, nostalgic and belonging to a different time, the only manufactured object in the assemblage; the flow of the waterfall, an optical illusion and the only moving element; the ambiguous form of the nude, either a cast or a projected geometry.

3.2.9.3 LOOKING INTO

In 'Photography's Discursive Spaces' a chapter in *The Originality of the Avant-Garde and Other Modernist Myths,* 1997, Krauss discusses stereoscopy and asserts that stereographic space is perspectival space raised to a higher power.[66] The experience of deep recession is insistent and inescapable. The viewer's ambient space is marked out by the engagement with the optical instrument, which heightens the experience of being drawn into the illusory space.

> The apparatus of the stereoscope mechanically focuses all attention on the matter at hand and precludes the visual meandering experienced in the museum gallery as one's eyes wander from picture to picture and to surrounding space. Instead the refocusing of attention can occur only within the spectator's channel of vision constructed by the optical machine.[67]

Looking into a stereoscope locks the viewers within the visual space, disconnecting them from the actual space they occupy. In the same way, *Given* transports the viewer into an illusory space. According to British art critic and curator David Sylvester:

> Duchamp's primary motive for having the peepholes, he told his wife, was to ensure that the work should have only one spectator at a time: he hated the thought of a work of art being viewed simultaneously by a mass of people, felt it degraded the experience of looking at it.[68]

Sylvester adds that Duchamp felt this especially when in 1963 crowds of visitors gathered at the Metropolitan Museum of Art showing the *Mona Lisa*, 'the very icon which he had virtually made his own'. In his attempt to create a reversal of the *Mona Lisa*, Duchamp makes the visual appreciation of the female figure in Given an exclusive experience.

3.2.9.4 UNDRESSING

After the Second Empire, stereoscopic prints were not sold secretly anymore and a few specialist magazines like *Stéréo-Nu (Stereoscopic Nude)* and *Le Déshabillé au stéréoscope (Undressing in the Stereoscope)* provided their readers with stereoscopic cards (fig. 3.49).

The development of the technique of the anaglyph meant a continuing circulation of images of nudes in magazines, like *Nus académiques dans la nature (Academic Nudes in Nature)* and books which could be viewed with gelatine glasses.[69] The anaglyph is a stereoscopic viewing technique that involves encoding the images of the stereoscopic pair in chromatically opposite colours – typically red and cyan. The two images are printed, or projected, superimposed and the stereoscopic effect is achieved by using gelatine red and green, or blue, glasses. The anaglyphic and stereoscopic presentation of women in different stages of undress connects stereoscopy with the process of stripping. In other words, stereoscopy provided a visual language for stripping and the revelation of naked female flesh. In his notes for the *Large Glass*,

Duchamp asserts that the stripping of the Bride coincides with her blossoming:

> Develop graphically
> … 1st the blossoming into the stripping by the bachelors.
> 2nd the blossoming. into the imaginative stripping by the Bride-desiring.
> 3rd From the 2 graphic developments obtained find their conciliation. Which should be the "blossoming" without causal distinction …
> The last state of this nude bride before the orgasm which may (might) bring about her fall graphically, the need to express, in a completely different way from the rest of the painting, this blossoming.[70]

So the final blossoming, which might cause the fall of the Bride, is the conciliation between the two versions of stripping-blossoming: one by the Bachelors and another by the Bride herself imagining. Duchamp makes a note to himself that this third blossoming needs to be expressed graphically in a completely different way. I suggest that in *Given*, Duchamp has chosen stereoscopy, the contemporary popular visual language for striptease, for this special 'graphic representation' of the stripping-blossoming.

3.2.9.5 APPARENT TANGIBILITY

The stereoscopic image appears multi-layered: a steep gradient of different planes stretch away from foreground into depth; to view this space involves scanning the stereoscopic field of the image in a way different from looking at a painting. Krauss suggests that the viewer moves visually through the stereoscopic tunnel, seemingly focusing and refocusing the eyes, from inspecting the nearest ground to attending to an object in the middle distance and then into the farthest plane. She explains that the eye is not actually refocusing, but that this sensation is due to the readjustment and coordination of the two eyeballs from point to point as vision moves over the surface.

Krauss notes that these micro-muscular efforts are the kinaesthetic counterpart of the optical illusion of the stereoscope: an enactment, on a reduced scale, of the imagined physical exploration of the deep channel of space before the viewer: 'the actual readjustment of the eyes from plane to plane within the stereoscopic field is the representation by one part of the body of what another part of the body (the feet) would do in passing through real space.'[71] Speaking of the stereoscope, American physician and poet Oliver Wendell Holmes describes the mind feeling its way 'into the very depths of the picture'.[72]

In contrast to the effect of a single photograph the stereoscope induces an apparent tangibility; its images evoke not only visual but tactile and kinaesthetic memories. German physician Hermann von Helmholtz asserts:

> When I have seen for the first time buildings, cities, or landscapes with which I was familiar from stereoscopic pictures, they have often seemed familiar to me; but I have never experienced this impression after seeing any number of ordinary pictures because these so imperfectly represent the real effect upon the senses.[73]

The stereoscope, a bridge between vision and touch, conjures up a messy subjective space of desire and personal memories. The sensation of being part of the image creates the charge but is

also an intrusion within the space of the imagery. Not conforming with the aesthetic value of a viewer separated from the perspective view through a picture plane as established during the Renaissance, the stereoscopic view lurks at the boundaries of the aesthetically acceptable.

The stereoscopic staging of *Given* evokes a visual tangibility that cannot be expressed in a single photographic image. The gaze travels in the deep space of the scene, visually touching all the different elements in spatial gradients. The viewer is left with a sensation of 'weaving' the spatiality of *Given* by looking at it (fig. 3.50).

3.2.10 LEFT EYE

Published photographs of *Given*'s interior are monoscopic, so cannot communicate its full three-dimensional depth. Existing, published images of the artwork, while they may differ slightly from one another, are always taken from the peephole for the right eye. The main distinguishing feature is the lock of blond hair, which appears only in the right-eye image. To the left eye, the other eye, the hair is invisible. As in the BB/3 file, the view is unintentionally censored, deprived of its potential impact, and would be better communicated by a stereoscopic image. Therefore during my visit to the Philadelphia Museum of Art I tried to acquire one.

The *Manual* refers to sliding panels in the upper part of the door, which could permit the use of a stereoscopic camera. According to art historian and curator Michael R. Taylor, who was Curator of Modern Art at the Philadelphia Museum of Art from 1997 to 2011, it is impossible to open these panels, as there are strict restrictions on visiting the space beyond the door. But photography is permitted everywhere in the museum, including at the door's peepholes. So, hoping to capture the assemblage in full stereoscopic blossom, I took monoscopic photos through each peephole. Later I scanned, printed and positioned the two images next to each other to form a stereoscopic pair, entitled *Stereoscopic Pair of* Given, 2000, which can be easily fused either freely or in a stereoscope, offering the 'extra' missing dimension to the existing single photographic representation (fig. 3.51).

Inspired by Wheatstone, I constructed *Stereoscope*, 2007, a wall-mounted stereoscopic viewer, which I designed to display *Stereoscopic Pair of* Given. Taken from the two peepholes, two photographs of the scene beyond the door in *Given* are placed opposite each other, on either side of a two-faceted mirror in the middle. Viewers position their eyes in front of the mirrors between the two images placed perpendicular to the wall (fig. 3.52).

Observed in my *Stereoscope* the two images merge and blossom, revealing the full three-dimensional impact of the scene. The stereoscopic staging of *Given* evokes a visual tangibility that cannot be expressed in a single photographic image. The gaze travels in the deep space of the scene, visually touching all the different elements in spatial gradients. The mental fusing of the two slightly different views weaves an expanded stereoscopic veil.

3.2.11 DOM PERIGNON BOX

Until recently, it was not known that Duchamp himself made a large number of stereoscopic images of the assemblage in the 1960s (fig. 3.53).



3.50 *Illuminated Scribism*, plate 39, 2002.
Drawing by the author.



3.51 *Stereoscopic Pair of* Given, stereo-photograph, 2000.

These images, stored in a Cuvée Dom Perignon champagne box, were shown for the first time at an exhibition celebrating the fortieth anniversary of *Given*'s public unveiling at the Philadelphia Museum of Art in 2009.[74] Writing in the exhibition catalogue, Taylor suggests that the pairs of slides reflect the artist's lifelong interest in stereoscopy, 'while undoubtedly also referencing the vogue for stereoscopic images of splayed female nudes and other forms of erotica in nineteenth-century France'.[75] Furthermore, the existence of this material certifies Duchamp's awareness of the limitations of representing the work faithfully in a single photograph. As I will argue later, however, the stereoscopic representation of *Given* may have not been just an afterthought for Duchamp, but a theme sparking its inception and guiding its construction.

3.2.12 INVERTED CAMERA OBSCURA

In *Given*, the door with its two peepholes resembles a stereoscopic device constructing the three-dimensional view. Furthermore, it performs similarly to another optical apparatus, the camera



3.52 *Stereoscope*, wall-mounted steel support, photographs, front surface mirror, 2007. Photograph Andy Keate, 2007.

obscura, predecessor of the photographic camera. Similarities between the arrangement of *Given* and that of the camera obscura support an interpretation of Duchamp's assemblage as an incarnation of the basic principles of perspective (fig. 3.54).

The camera obscura embodies and demonstrates the optical phenomenon which perspective construction translates into a graphic technique. The single apex of the pyramid is the hole or lens through which the two-dimensional appearance of the external world is projected onto a flat plane in the dark interior. Architectural researcher and historian Philip Steadman describes the camera obscura:

> If a small hole is made in the wall of a darkened room, an image of the scene outside can be formed by light rays passing through the hole. The image may appear on a wall opposite the hole, or can be observed on a sheet of paper or other screen placed in front of the hole. The hole can be in a door, say, or in a solid wooden window shutter.[76]

Clair notes a similarity between *Given* and the camera obscura but:

> In *Étant donnés* everything takes place as if the device were working in reverse: the beholder is thrust back to the other side of the two circumscribed spaces outside the brick wall and outside the door, as if into a darkness of an

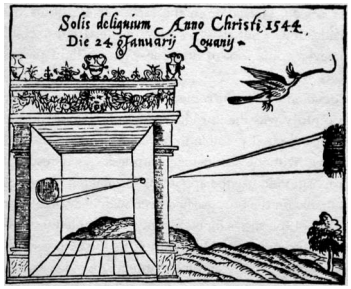


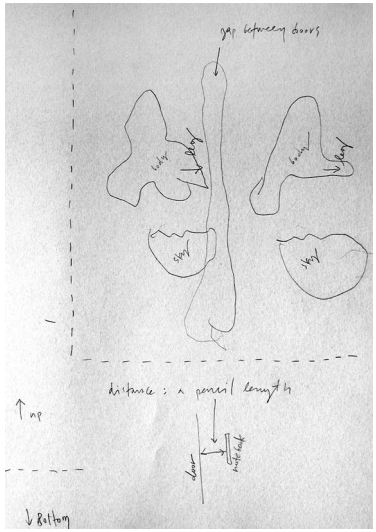
3.53 Marcel Duchamp, *Cuvée Dom Perignon Box*, 1968. Box containing stereoscopic slides of *Given*. Philadelphia Museum of Art, Archives. Gift of Jacqueline, Paul and Peter Matisse in memory of their mother, Alexina Duchamp © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

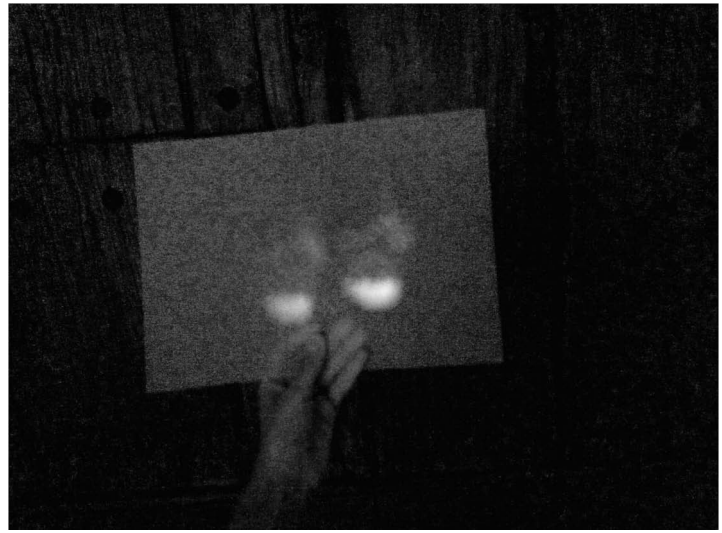
> outer world. Conversely, the real, bright, visible world, with the trees, the water and the woman, is entirely contained inside the box. While the classical camera obscura was an instrument which articulated the three-dimensional and the two-dimensional, by the intermediary of a monocular opening, it appears – this is a pure hypothesis – as if *Étant donnés* might be an instrument capable of projecting a three-dimensional image, a perfect simulacrum of our world, through a dark room and a twin peephole, outside in a mysterious expanse.[77]

Clair concludes his essay with a reference to a legend in which the Persian poet Roudaki dedicated a poem to a woman so beautiful that her image passed through a pinhole in a curtain and was depicted on the opposite wall; the image was inverted so that Allah could contemplate it properly from the skies.[78]

In *Given*, the intense light of the interior projects through the peepholes and the crack between the two panels. By placing on the plane of the door a sheet of paper, three clear-cut brightly lit shapes become visible: two eyes and long nose. However, if the paper is removed from the plane of the door and held at an appropriate distance, the light patterns corresponding to the two peepholes focus into the double inverted idol of the nude in the landscape. A rough trace of the outlines of the main shapes, pink







3.54 Gemma Frisius, eclipse of the sun observed in camera obscura, from *De radio astronomico et geometrico*, 1545.

3.55 Yeoryia Manolopoulou, sketch tracing the coloured light pools projected from the door of *Given*, 2001.

3.56 *Writing with Light*, 2009. Light on paper. Photograph by the author, 2009.

for the flesh and blue for the sky, reveals the door's ability to draw the image of *Given* in light (fig. 3.55).

So *Given* is a double camera obscura in reverse: not a dark chamber into which images of the outside world are projected, but a hidden, intensely lit and three-dimensional view that projects a pair of images outwards (fig. 3.56).

While standing in front of the door and just before visual contact with the scene the peepholes cast those luminous images on the face of the voyeur. Conversely, when the viewer is not there, the dimly lit entrance space in front of *Given* is occupied by the imperceptible interweaving of the two projections, which redraw the naked body in light. Duchamp's vision machine is constantly 'looking', its door incessantly drawing out the deep space of the interior independently of an observer (fig. 3.57).

Unassisted, the two images are blurred, but placing two simple magnifying lenses in front of both holes focuses the views in sharp detail. If these two detailed images of light were captured on a photosensitive surface they would form a stereoscopic pair from which the geometry of the assemblage could be measured. Consequently, the arrangement of *Given* not only provides a hidden spectacle, but is a drawing machine, drawing in light the pair of images from which it can be recreated in three dimensions, even in the absence of a camera. More significantly, Duchamp's door exposes the role of photography – from the Greek φως (*phos*) 'light' and γραφή (*graphé*) 'drawing' – in the construction of imagination and vision, while at the same time confounding the old discord between emission and intromission theories. Duchamp famously stated that the creative act is not performed by the artist alone, and stressed the role of the spectator in completing the work of art. In *Given*, the spectator provides the lenses – eyes – and the photosensitive



3.57 *L.H.O.O.Q.* facing the door of *Given* with inverted projections of the view around her eyes. Collage by the author, 2002.

substrate, photographic film or paper – retinas – completing this staging of photography by imprinting a deep image of Duchamp's constructed daydream into the viewer's mind.[79]

3.3 GAS LAMP

3.3.1 LUMEN AND LUX

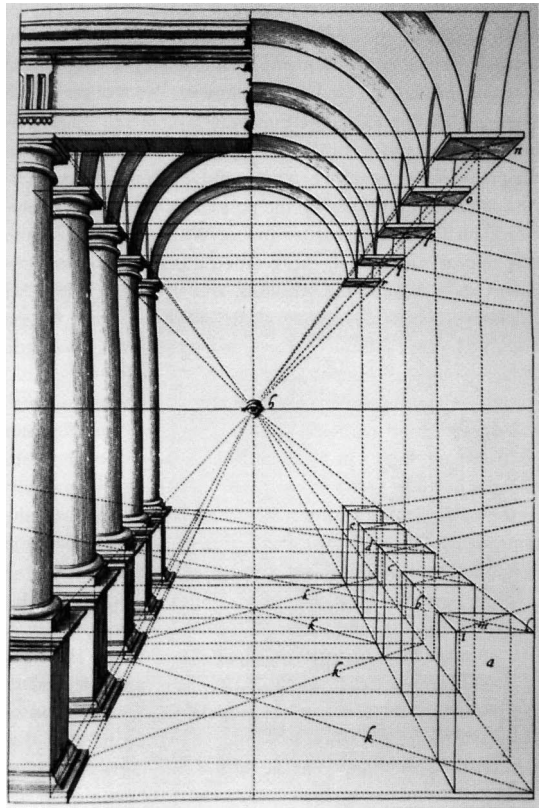
One view of the origin of Renaissance perspective construction, and its consequent influence in the development of architectural drawing, is that it grew from the medieval fascination with the metaphysical implications of light.[80] In classical Antiquity and the Middle Ages, a mathematical theory of vision existed – *perspectiva*, for Latin writers and οπτική for Greek – which was not necessarily connected with a mathematical theory of representation. The purpose of this perspective had been limited to expressing in geometric theorems the relations between the real quantities found in objects and the apparent quantities these form in the visual image. It was perceived as a science of sight. Based on this science, Renaissance theorists developed a new method for constructing pictures. The distinction was reflected in their names: the older one concerning vision was *perspectiva naturalis*; the one connected with representing this visual experience on a flat plane, the precursor of modern perspective construction, *perspectiva artificialis*.[81]

Jay discerns an ambiguity in the way sight was understood in Greek philosophy.[82] On one hand vision was conceived as 'pure sight', with the inner eye of the mind perceiving perfect and immobile forms, 'the ideas'. On the other hand the immediate experience of the two eyes of the body was considered impure: Plato in particular often expressed reservations about the reliability of the two eyes of normal perception and insisted that we see through and not with them.[83]

This ambiguity had its equivalent in the way light was subsequently conceptualized in Western thought. Light conceived of as a single ray in the form of a perfect geometric line was called *lumen*, the essence of illumination. *Lumen* existed whether perceived by the eye or not. The concept of *lumen* originated in Greek optics and the study of straight lines in reflection and refraction. It also coincided with Euclid's definition of the straight line in geometry: a line is reduced to a point when seen end on, an attribute also of a light ray. Euclidean geometry, although primarily applied to physical things, for example in land surveys, also translated into theorems, the attributes of the purely visual.

The other conception of light *lux*, emphasized the experience of normal human sight through colour and shadow, not form and outline, and was later connected with the metaphysics of light of Christian Neo-Platonism. According to Proclus, space was nothing other than the 'finest light'. Through the conception of light as lux, space was thus 'transformed into a homogenous and homogenising fluid, immeasurable and indeed dimensionless'.[84] Although, deprived of solidity and rationality this submersion into a liquid light led to the conception of the world as a continuum.

By combining *lumen*'s linearity and *lux*'s spatial continuity, Renaissance theorists developed a mathematical process, which allowed a perspective to be constructed with a compass and a ruler: the picture was defined as a cross-section of a visual pyramid, whose apex is the eye and its base the object (fig. 3.58).



3.58 Hendrik Hondius, eye as the vanishing point delineating space, from *Instruction en la science de perspective*, 1625.

According to the *costruzione legittima*, the construction of this cross-section required two preparatory drawings: the elevation or *orthographia* and the ground plan or *ichnographia* of the whole system.[85] These two diagrams gave the coordinates of points in space, and each is then connected with the point representing the eye. Thus the two vertical diagrams are fused into a central projection system:

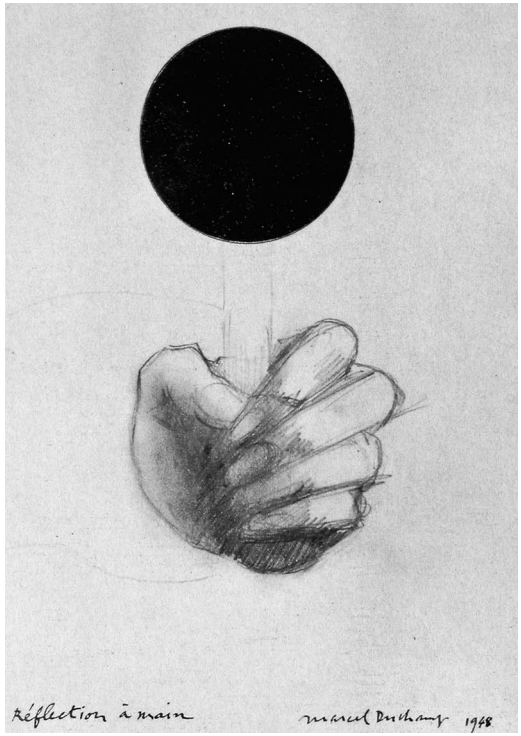
> In architectural projection space is nothing other than pictures of light. Images drawn as if transmitted to a surface by light are pushed around and explored within the surface by simulacra of light that have been flattened into a comb of drafted lines.[86]

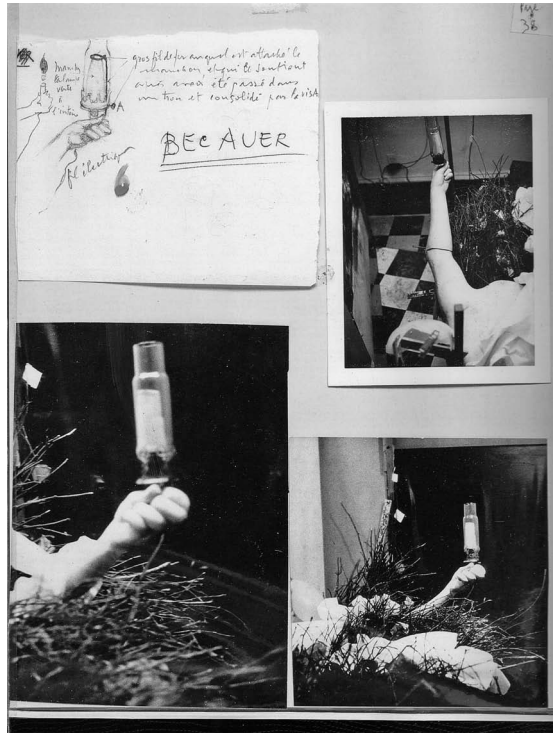
3.3.2 TACTILE VISION

According to Panofsky, psychophysiological space is a complex space where the tactile sense plays as important a role as vision. The cooperation of vision and touch ascribes to objects a definite size and form. Consequently, we do not always notice the distortions these sizes and forms suffer on the retina, as haptic experience has a tendency to stabilize size within our consciousness.[87]

Size stability and the axiom that two parallel lines never converge inform the basic rules of Euclidean geometry, which is perceived as a purely mental construction, remote from practical application. For Evans this conceptual quality of geometry led some mathematicians to propose that it should be reclassified as a humanity or as an art, since it seems to be guided by an aesthetic sense.[88] The concern with ratios and equalities of lines, areas and angles, however, originates from experience of measuring the tactile world through tasks like modelling artefacts, laying out buildings and surveying land. Moreover, the haptic size of solid objects remains constant, and parallel edges do not converge in our lived experience. Euclidean geometry, thus, is an ideal mental construction, but one influenced by a primarily tactile understanding of the world.

Conversely, optical images of solid objects are elastic. Vision is ephemeral compared to touch because every movement of the observer's head renders a different view of an object. Unlike the constant haptic size of an object, the image it creates on the retina when placed near the eye is bigger than the image it creates when placed further





3.59 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage.* Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

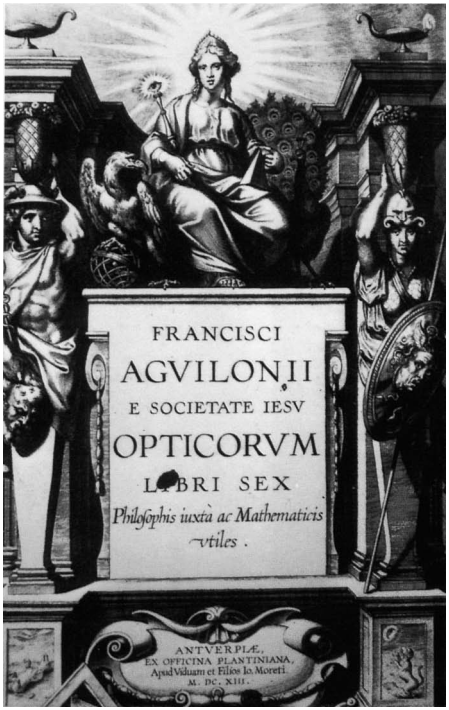
3.60 Marcel Duchamp, *Réflection à main (Hand Reflection)*, 1948. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

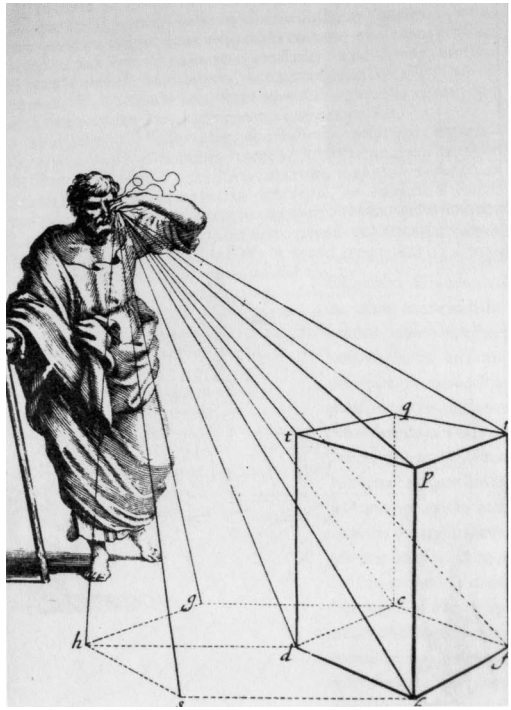
away. In vision, moreover, parallel lines converge at a single vanishing point.[89]

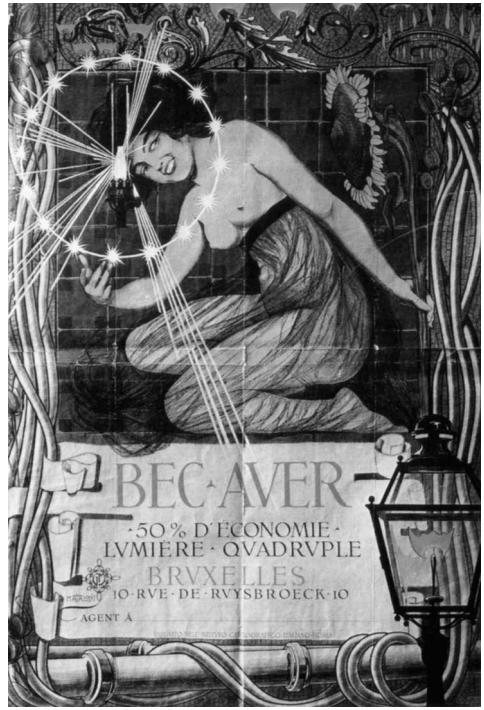
The achievement of perspective was to bridge the gap between vision and touch by conferring the stability of the tactile world onto the visual and creating a different type of geometry: projective geometry. Through perspectival understanding, subjective vision became objective, measurable and reliable. Evans asserts:

> Metrical geometry is a geometry of touch (haptic) because congruity of figures is assessed by whether they feel the same when put together, while projective geometry is a geometry of vision (optic) because congruity is assessed by whether they look the same from a given standpoint.[90]

Helmholtz marks the differences between the perceptual input from the senses: the 'eye's rapid, far-reaching power' enables an overview of spatial relationships and, although touch can also distinguish relations of space and has priority in judging resistance, volume and weight, it only refers to matter within reach.[91] However, he reports, the sense of touch is sufficient to develop complete conceptions of space, as experiments upon those born blind have proved; sight is not necessary for their formation. According to Helmholtz, tactility continually controls and corrects notions







3.61 Abraham Bosse, light or visual rays collected to the eye, from *Manière universelle de Mr. Desargues*, 1648.

3.62 Peter Paul Rubens, eye held as a sceptre in the title page, from François d'Aguilon, *Opticorum libri sex*, 1613.

3.63 G.M. Mataloni, *Bec-Auer Gas Mantles*, poster, 1895.

of spatial location deriving from the eye because impressions of touch are accepted as the most decisive.[92] He sees the two senses as having the same task but different means of accomplishing it: each sense can 'happily make up for each other's deficiencies'. He concludes: 'touch is a trustworthy and experienced servant but enjoys only a limited range, while sight rivals the boldest flights of fancy in penetrating to illimitable distances.'[93]

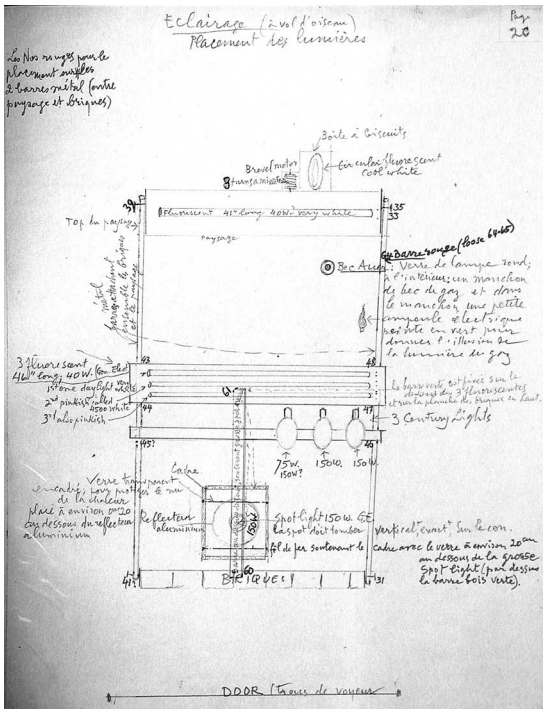
It is clear, therefore, that concepts deriving from tactility influence the understanding of visual stimuli, making it impossible to study vision independently: perhaps we see as much through touch as we do through vision.

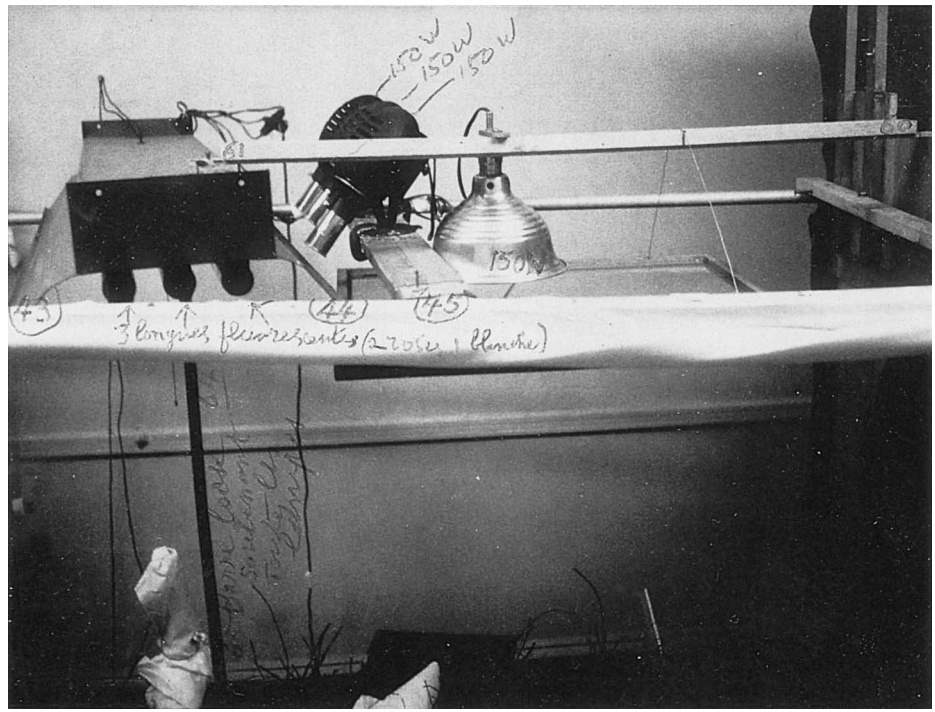
3.3.3 HAND-HELD EYE

An enigmatic attribute of the scene in *Given* is that the faceless, seemingly passive, nude grasps a gas lamp with her left hand and points it towards the viewer (fig. 3.59).

In one of his boxes Duchamp included a sketch, *Réflection à main (Hand Reflection)*, 1948, in which a similar hand grasps instead a mirror, suggesting that in the early stages of the development of the piece, he may have planned to use a mirror instead of a lamp (fig. 3.60).[94]

If the nude in *Given* was holding a mirror this would reflect the viewer's gaze. Furthermore, the lamp as a physical object incarnates the point where





3.64 Marcel Duchamp, 'Eclairage (à vol d'oiseau): Placement des lumières', from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.65 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

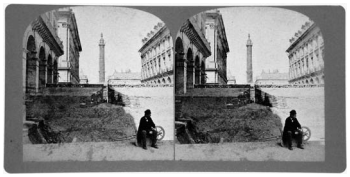
the mirror image of the single observing eye lies: the 'other' eye, projected within the realm of the image. The gas lamp, thus, can be read as a vanishing point, a projected eye. Although this hand-held eye is the centre of the scene, it is not a removed abstract point in space towards which all lines gravitate, as in perspective, but takes the form of an everyday object, a lamp, notionally illuminating the scene. Many perspective treatises represent the all-perceiving eye as a hand-held sceptre radiating light rays (fig. 3.61).

The gas lamp as a hand-held eye metaphorically signifies vision's invaluable support from tactility. Although faceless, the nude returns the viewer's gaze by grasping in her fist and holding up this 'eye'.

3.3.4 BEC AUER

The gas lamp also symbolizes the role of light in forming spatial concepts.[95] Reading the lamp as a geometric vanishing point accords with the concept of light as *lumen*, illumination as perfect linear form, similar to the model of the geometric ray, whether perceived by the human eye or not, and representing a scientific understanding of light (fig. 3.62).

This connection is supported by the pictorial representation of the *bec Auer* (Welsbach burner, or gas mantle) in late nineteenth-century advertisements: a sometimes half-naked woman holds up a lamp, the pole of concentric lines representing rays. This popular image exemplifies





3.66 Anonymous, *The Paris Commune*, stereoscopic photograph, 1871.

3.67 Attributed to Ferrier and Soulier, *The Place du Châtelet*, between 1858 and 1870.

the conception of light as geometric ray and connects this hand-held lamp with the vanishing point, where all lines meet. The point of visual gravity, the optical magnet that attracts all visual beams, is here an everyday object portrayed as radiating linear rays instead (fig. 3.63).

Furthermore, the effect of the lamp, the blinding light it apparently throws on the scene, is related to the conception of light as *lux*, which emphasizes the qualitative experience of light, ecstatic dazzlement by the blinding divine light and the collapse of perception into pure sensation. The scene is immersed in an engulfing light that dazzles the senses. Although symbolically centred on the lamp, the source of this breathtaking light is illusory. The *Manual* shows that the effect is achieved through an elaborate array of lamps of different intensity and hue (figs. 3.64, 3.65).

Finally, a hand-held lamp questions the conception of light as immaterial and intangible. The light in *Given* is not a Euclidean abstraction cut by planes and lines but a dense, sensual fluid overwhelming the viewer with its palpating tangibility and depth. In combination with the explicit pornographic subject matter, the intensity of the light is blinding.

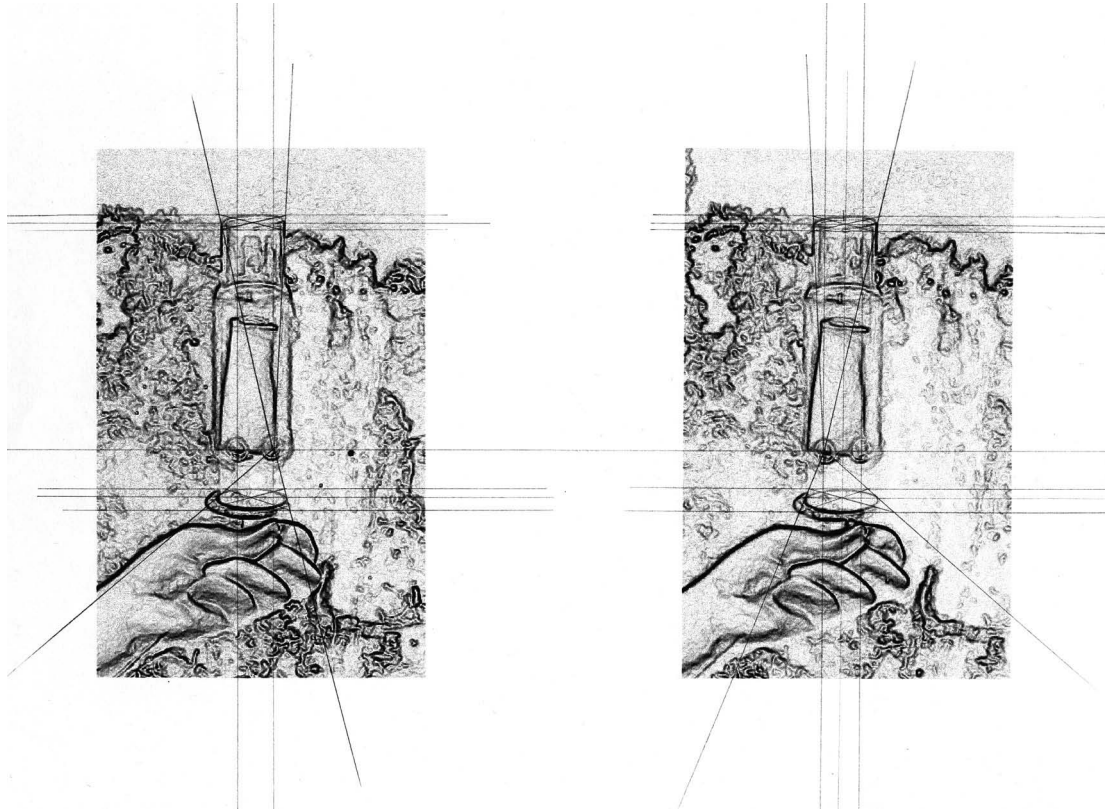
3.3.5 VANISHING POINTS

Krauss notes the persistence of a perspectivally organized depth in stereoscopic views, often heightened or acknowledged by a vertical marker in the fore- or middle ground that works to centre stereoscopic space, 'forming a representation within the visual field of the eyes' convergence at a vanishing point'.[96] Many early stereoscopic images are organized around such a centre, like a bare tree trunk in nature, or a column in an urban setting (figs. 3.66, 3.67).

Stereoscopic views by definition have no single vanishing point because they result from fusing two retinal images, and the optical experience is of not a constant recession in depth but a layered fragmentation. Nevertheless, a distinct vertical element in the fore- or middle ground is a recognizable marker that assists the process of fusion and locks the two disparate images into a single visual field. After matching the two images of this central feature, the rest of the image gradually blossoms stereoscopically. The gas lamp plays a similar role in fusing the *Stereoscopic Pair of* Given, derived from the monoscopic photographs taken through each peephole: its most pronounced central element is the lamp's vertical rounded stylus, which the nude points towards the viewer. After the optical fusion of the lamp is established, the rest of the view locks into place, and blossoms.

Moreover, the only visible man-made object in the assemblage, the lamp, can be divided into geometrically recognizable shapes and, therefore, is the sole carrier of perceptible perspectival distortion, which can be used to define the centre of perspective for each of the two views (fig. 3.68).

Close examination of images of the lamp reveals two small spherical protrusions in the upper glass tube, like eyes looking back at the viewer. Their convex glass surfaces reflect a double image of the view towards the door: a minuscule stereoscopic pair, a returning glance of the nude towards the viewer, were it possible for her to see through the hand-held lamp. So the nude in *Given* is holding in her left hand the redoubled vanishing point, revealing tactility's grasp on vision and contrasting



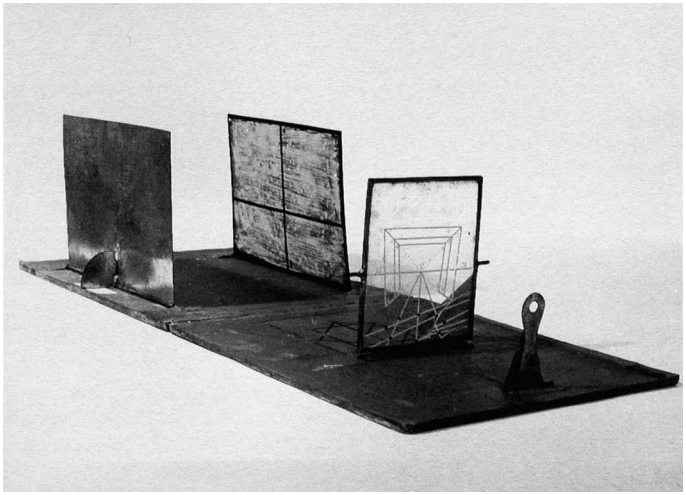
3.68 *Handheld Eyes*, pencil on print, 2002. Drawing by the author.

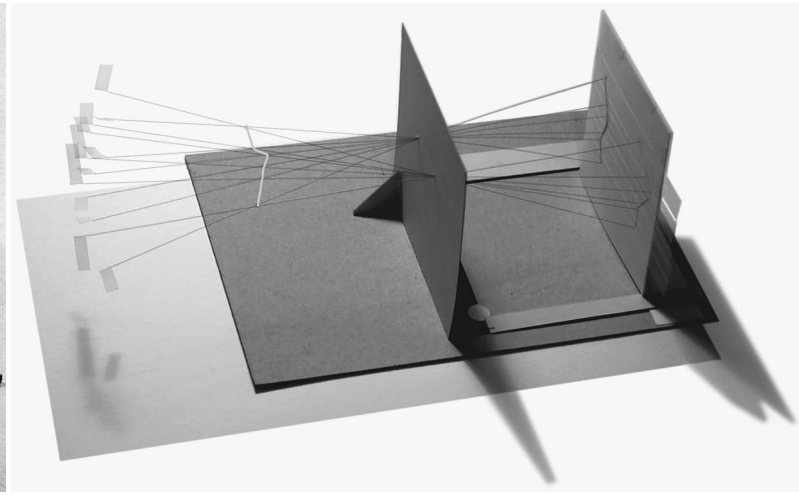
its traditional status as a theoretical reflection of the point of view, which is positioned at a mathematically unattainable horizon.[97]

3.3.6 FOLDING MODEL OF STEREOVISION

The perspective system owes a great part of its success to the simplicity of the geometric diagram that describes vision: the visual pyramid. Inspired by John Wood's perspectival flip-up book models and the three-dimensional models of mathematical principles in the Museum Poincaré in Paris, my *Folding Model of Stereovision*, 2007, attempts to describe in a physical object the underlying geometry of binocular vision (fig. 3.69).[98]

The model consists of a walnut base on which two hinged planes can fold up and be held vertical. The back plane holds a template representing two stereoscopic images of an abstract figure etched on nickel silver, where two wires, representing visual rays, glide. The wires pass through two holes on the next plane and intersect in front of it, with a bead marking the point of intersection. The gliding movement of the rays changes the bead's location in space and 'draws' a





3.69 John Wood, perspective demonstration model using glass and metal flaps, from *Six Lectures on the Principle and Practice of Perspective as Applicable to Drawing from Nature: Accompanied with a Mechanical Apparatus*, 1804.

3.70 Sketch model representing stereoscopic vision, 2003. Paper model by the author.

notional three-dimensional figure. In an early, paper version of the model, I traced the movement of the bead in space through photography. Connecting the positions of the bead with a continuous line marks its trajectory (fig. 3.70).

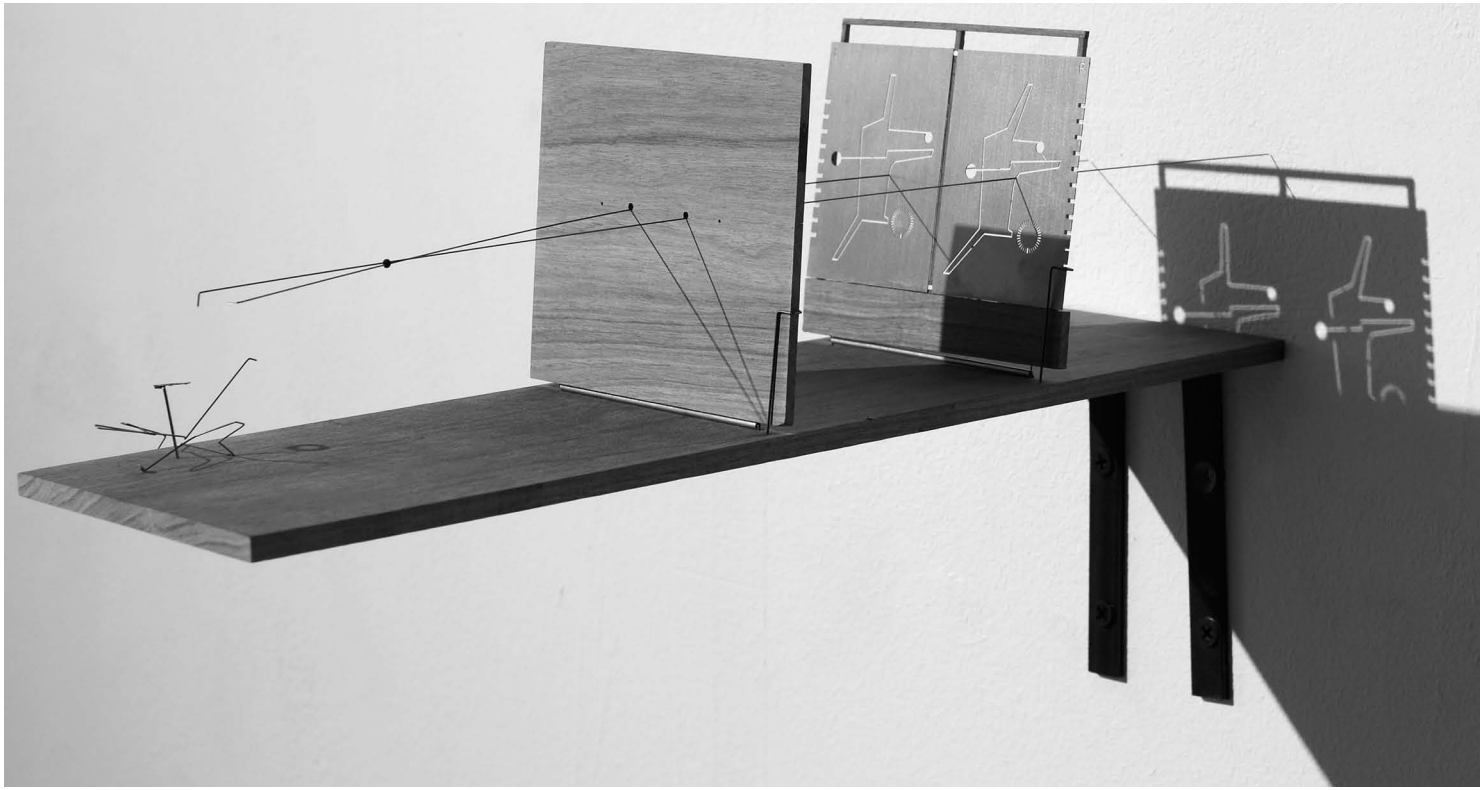
Folding Model of Stereovision is an interpretation, and exposition, of stereoscopic vision in a physical object that you can hold and manipulate in your hands. The plane holding the template stands for the flat images at two retinas, the holes on the second plane are the equivalent of the eyes or lenses, and the three-dimensional abstract figure is the resulting spatial form moulded in the mind. In the later version, the trajectory of this stereoscopic 'looking' performed by the model acquires matter (fig. 3.71).

Solidified and positioned on the walnut base under the bead – as if it has just dropped – is the three-dimensional figure that this particular template generates. In contrast to the single-eye perspective view, the two eyes turn the frozen singularity of the distant vanishing point into a dynamic field of intersections that visually 'touch' and mentally mould the binocular view in three dimensions.

3.4 BRICK WALL

3.4.1 INTERSECTING PLANE

The notional flat plane intersecting the visual pyramid is central to perspective construction and was a conceptual innovation in the Renaissance. Panofsky suggests its 'invention' was delayed because in previous spatial schemas it remained 'unthinkable or unimaginable'.[99] More specifically, he maintains that in ancient Greece the flat picture plane was inconceivable because, through observation of the sky and the movement of celestial bodies, the intersecting surface of vision



3.71 *Folding Model of Stereovision*, 2007. Walnut, piano wire, aluminium tubing and acid etching in nickel silver model by the author.

was understood as spherical. The precise visual corrections in Greek temples reveal a particular sensitivity to the effects of a curvilinear visual system, which contradicts the concept of a flat projection plane.

But, what could have caused this imaginative leap leading to the invention of the flat intersecting picture plane during the Renaissance, an invention whose importance would fashion visual technologies through to the present day? Normal binocular observation also penetrates the singular intersecting plane, and as we will see later, suggests a different understanding of the visual field as a gas, or a dynamic fluid. If the picture plane is connected to monocular observation, as we have seen in Section 3.2, 'Wooden Door', then its conception might originate in tasks requiring the use of a single eye or convergence of the two eyes on a single surface. In Italy a significant practice using monocular observation during the Renaissance was the survey of ancient ruins, developed by a new interest in the culture of Antiquity and Roman architecture. Contemporary survey instruments operated through monocular readings and the

configuration of measuring devices and the geometry used for calculations seem directly related to perspective (fig. 3.72).

Filippo Brunelleschi, according to his biographer, Antonio Manetti, surveyed numerous ancient buildings.[100] Furthermore, art historian Martin Kemp suggests that the architect's knowledge and practice of surveying provided him with the technical skills for composing the perspectival projections of the Florence Baptistery and Palazzo dei Signori, which led to the 'discovery' of perspective construction.[101] The techniques for surveying lengths, breadths and heights of physically inaccessible buildings were based on triangulation, estimating distances visually on a vertical and horizontal rod. In the form of a cross, the simple instrument for surveying architecture, constituted a notional vertical surface between the surveyor and the building, and its readings could only be taken by monocular observation (fig. 3.73).

This intersecting notional surface gave birth to the picture plane and the mathematics for visually gauging the dimensions of built form led to a geometric science of vision. Perspective construction, therefore, came to describe not vision in general, but a specific way of observing architecture through measuring devices (fig. 3.74).

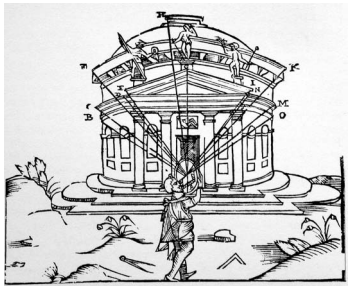
Following Brunelleschi's invention Alberti formalized the theory and geometric principles of perspective construction. In 'The Cutting Surface: On Perspective as a Section, its Relationship to Writing, and its Role in Understanding Space', architect and architectural theorist Gordana Fontana-Giusti links his definition of this intersecting surface with the practice of reading and writing:

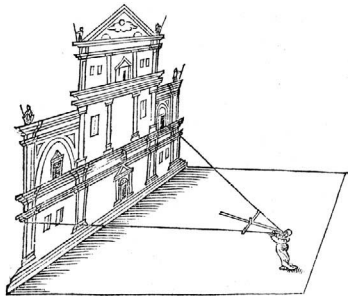
> The intersection is described as a surface/veil, which enables a particular visual aspect of the object to be noted. Above all it is characterised by the process of transcription, which allows the form, number, size and disposition of elements to be recorded and disseminated in a universal manner. The operation of this surface is analogous to that of a page, which also allows for the transcription, disposition and regulation of the elements presented upon it. In this way we can see that Alberti's almost unconscious drive for introducing the concept of the intersecting surface must have been indebted to his experience of reading from, and writing on, the page.[102]

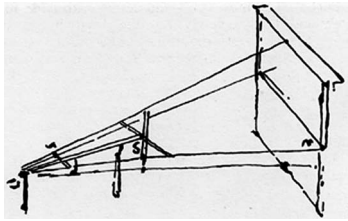
In reading, the two rays connecting the eyes with words remain locked at the point of contact with the surface of the page. Consequently the page operates as a mediating intersection, between reading and imagining, simplifying the optical diving-in space that occurs in normal binocular observation. Thus according to Giusti, Alberti's ability to imagine through the surface of the page was a skill that led him to the graphic formalization of the rules of perspective construction, and to the conception of the picture plane as a surface where visual scanning deposits its trace, and through which space is graphically imagined.

3.4.2 ALBERTI'S VEIL

Alberti describes 'a veil loosely woven of fine thread, dyed whatever colour you please, divided up by thicker threads into as many parallel square sections as you like, and stretched on a frame', the device 'whose usage I was the first to discover' and 'which among my friends I call the intersection'.[103] The artist positions this translucent grid between his single eye and the object to be depicted, 'so that the visual pyramid passes through the loose weave







3.72 Cosimo Bartoli, astrolabe used for measuring a building, from *Del Modo di misurare*, 1589.

3.73 Gemma Frisius, the radio astronomico, an instrument based on Leonardo da Vinci's bacolo of Euclid, used to measure the width of a facade, from *De radio astronomico et geometrico*, 1545.

3.74 Leonardo da Vinci, sketch of a 'bacolo of Euclid'.

of the veil', and transcribes the apparent shape of the object on a horizontal drawing divided into similar squares (fig. 3.75).[104]

Other practitioners used the perspectivist veil, including Leonardo da Vinci, who substituted the netting with a glass pane. Alberti's veil and Leonardo's glass were perspective devices for surveying vision and the first physical embodiments of the picture plane.

As we have seen, the presence of a glass plate or grid intersecting the visual field requires the artist's monocular observation.[105] Consequently, the picture plane is not an innocent interface but affects the resulting representation because it demands a single observing eye. Perspective construction merged the surface of representation with the geometric intersection of the visual pyramid and turned the previously opaque plane of the picture into a transparent 'window'.

American art historian Joseph Masheck in 'Alberti's "Window": Art-Historiographic Notes on an Antimodernist Misprision' argues that 'Alberti's all too famous Renaissance idea of a painted image as windowlike does not simply apply to the (overall) surface of a painting'.[106] Masheck insists that in the original text Alberti draws a rectangle, which he then metaphorically calls a window. Alberti's window coincides with the base of the visual pyramid, but the view he proceeds to draw does not derive from observation; it is entirely constructed mathematically and may, or may not, correspond to a real view. Not merely meant for looking through, then, this metaphorical window is the matrix through which space is projected and/or imagined. Moreover, the view is constructed through the correct plotting in perspective of a 'pavement'.[107] As we have seen, the pavement is a notional horizontal grid regulating the relative positions of pictorial elements, and often corresponds to a depicted tiled floor.[108] It is clear that the architectural metaphors of the window and the pavement show perspective's debt to the observation of architecture and therefore unavoidably also favour architecture as the primary subject matter organizing the perspective view.

Metaphorical or not, this perspectival window is not entirely open but covered by a surface, either notional or diaphanously present as a measuring device, made of strings or glass; it is an invisible plane upon which the image of the view beyond is transferred (fig. 3.76).

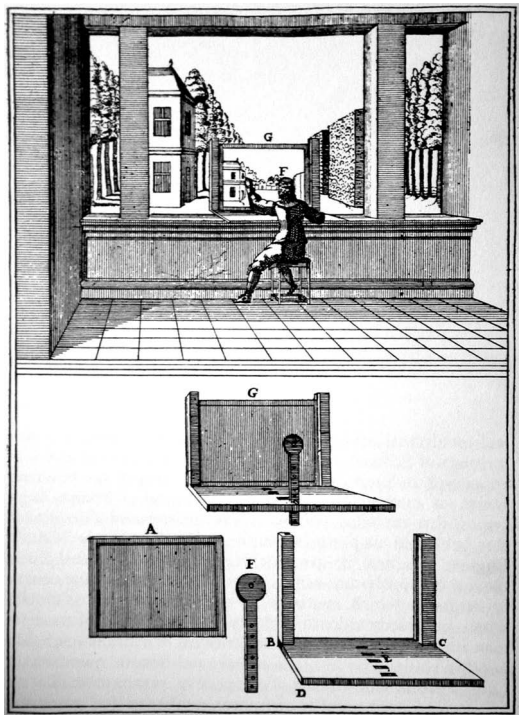
Even when physically absent, an 'assumed' reference net organizes the transparency. In other words, the view through the perspective window is not bare but 'dressed' in a loosely woven veil regulating its transcription. The veil is always present, blocking the draught of visual exchange and creating a distance between subject and object, allowing no binocular visual contact.

3.4.3 DUCHAMP'S VEIL

Marcel Duchamp, an artist with a special interest in stereoscopy, and an ambivalent attitude towards perspective, offers a transgression of the perspectivist picture plane. Although widely perceived as antiretinal – a term we will revisit later – in a seemingly contradictory manner Duchamp was fascinated by Cartesianism:

> It is true that I really was very much of a Cartesian, if you could use the word *defroqué* which means defrocked Cartesian, because I was very pleased by the so-called pleasure of using Cartesianism as a form of thinking. Logic



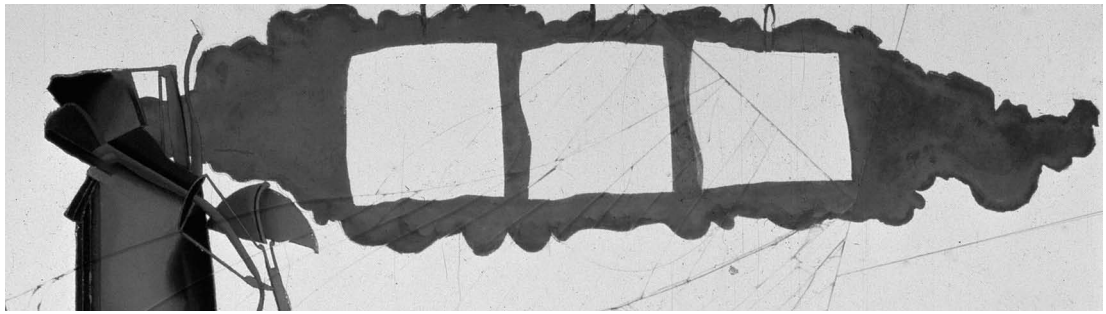




3.75 Albrecht Dürer, draughtsman using a net to draw a nude figure in foreshortening, from *Underweysung der Messung*, 1538.

3.76 Jean Du Breuil, drawing frame in front of window, from *La Perspective pratique*, 1642.

3.77 Marcel Duchamp, *Fresh Widow*, 1920. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.



3.78 Marcel Duchamp, *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)*, detail, 1915–23. Philadelphia Museum of Art. Bequest of Katherine S. Dreier. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

> and very close mathematical thinking, yet I was also very pleased by the idea of getting away from it.[109]

Duchamp was therefore a Cartesian with a twist: attracted by the cerebral accuracy of perspective, he was tempted to question or subvert it. More specifically, his work celebrates and challenges the concept of the intersecting plane, as a veil and open window. For instance, in *Fresh Widow*, 1920, a scale model of a French window is closed, creating a visually impermeable boundary, the panes being of leather, which Duchamp insisted should be polished every day like shoes (fig. 3.77).

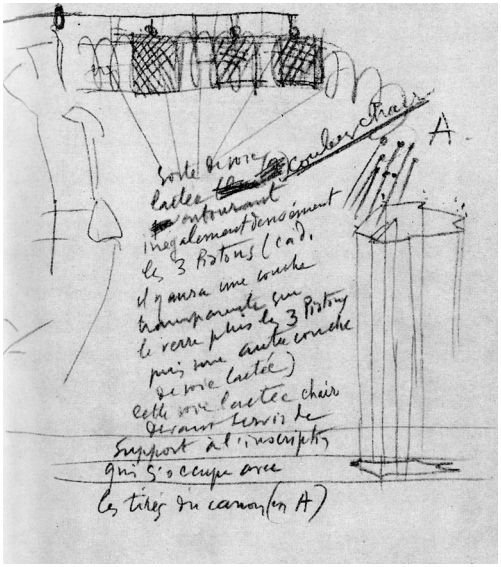
The French word *voile*, which means both veil as a female garment, and also net or netting, becomes a metaphor with alternating meanings in Duchamp's work. It links different works by him, indicates communication or exchange of information, and persistently merges both meanings. Moreover, the veil relates to the visual and its syntax, which he repeatedly studied through several of his pieces, but most notably two works sharing the same set of ideas expressed in his notes. The *Large Glass* and *Given* are two versions of the same theme, or two renderings of the same programme.[110] Both works stage the desirous gaze and analyse the act of looking where the veil can be conceived as an interface between Duchamp's allegorical personages: the Bride and her desire-filled Bachelors. Through this interface, she communicates her nudity, her bare skin. However, the desire Duchamp stages in both his major pieces is not just erotic or sexual desire, but also a desire to see beyond the cultural construct of vision.

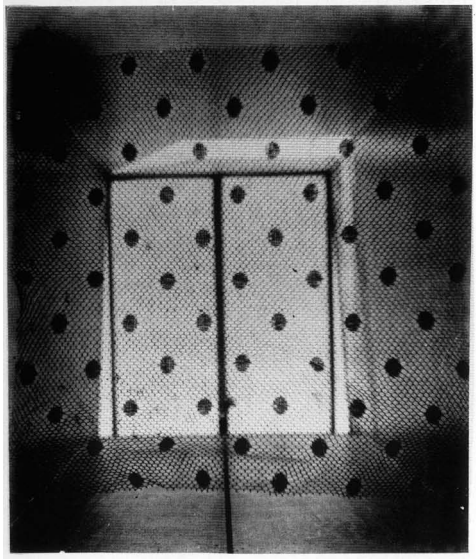
3.4.4 DRAFT PISTONS AND MILKY WAY

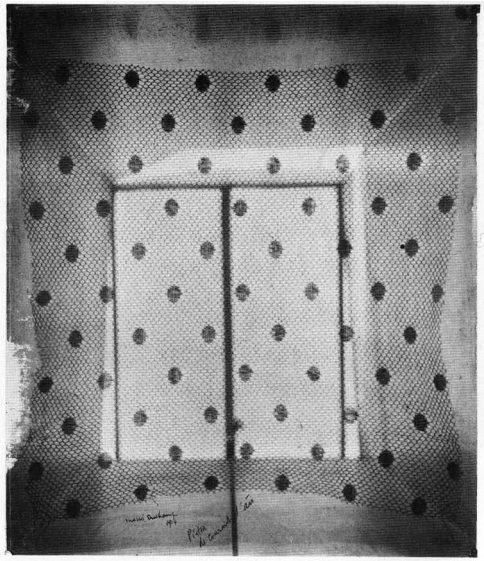
The *Large Glass* is unmistakably an embodiment of the picture plane, a transparent section taken out of the continuum, a poetic rendition of Leonardo's perspective glass, and a metaphorical window placed in front of a real window in its permanent position at the Philadelphia Museum of Art (fig. 3.78).

Here, though, I focus on a detail bridging the two sliding meanings of voile: the picture plane as both transparent static grid and ethereal fabric. In the top right-hand corner of the *Large Glass*, we can see what appear to be three irregular rectangular shapes set against the nebulous ground of a fleshy pink cloud: the Draft Pistons (fig. 3.79).

To make the Draft Pistons, Duchamp hung a







3.79 Marcel Duchamp, *Milky Way*, note from the *Green Box*, 1915. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.80 Marcel Duchamp, *Draft Pistons*, two of the three photographs determining the outlines encircled by the *Milky Way* – the third one is presumed lost, 1914. Philadelphia Museum of Art. Gift of Mme Marcel Duchamp. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

square piece of netting patterned with dots in front an open window and, as the air penetrated the room, the cloth was 'accepted and rejected by the draft', assuming different shapes as it moved in the air current. He photographed these configurations to give a 'conventional representation' of the three pistons (fig. 3.80).

According to Duchamp's notes, the pistons work as a triple grid, or composite cipher, which transfers and directs the Bride's commandments. The configurations of the grid fluttering in the wind propose a fluid alternative to the picture plane. The same net that the perspectivist stretches over a frame, Duchamp allows to reconfigure and undulate in the wind like a flimsy female garment. The need for precision, nevertheless, remains high. Alberti's veil is a two-dimensional surface suitable for capturing the images of solid and static objects. British artist Richard Hamilton, who reconstructed the *Large Glass* in 1965–66, maintains that since spots were distributed at regular intervals on the net, the photographs record not only the contour, but the topology of the entire surface. By surveying wind through the pauses of the fluctuating net Duchamp is ironically 'measuring' the performance of a fluid. The frozen pauses, the photographs of the topological shifting of the net, form an interface of communication between the Bride and the Bachelors. However, this cipher is not verbal; it represents the effect of their desire-filled visual exchange and consists of the revelation of the Bride's 'vibrating' nudity.

The undulating veil is a survey tool revealing the invisible body of the wind in motion, registering the complex geometry of fluid dynamics. The three nets are encircled 'unevenly, densely' by the Milky Way, the nebula-like shape on the top part of the *Large*

Glass, which Duchamp also calls the cinematic blossoming:

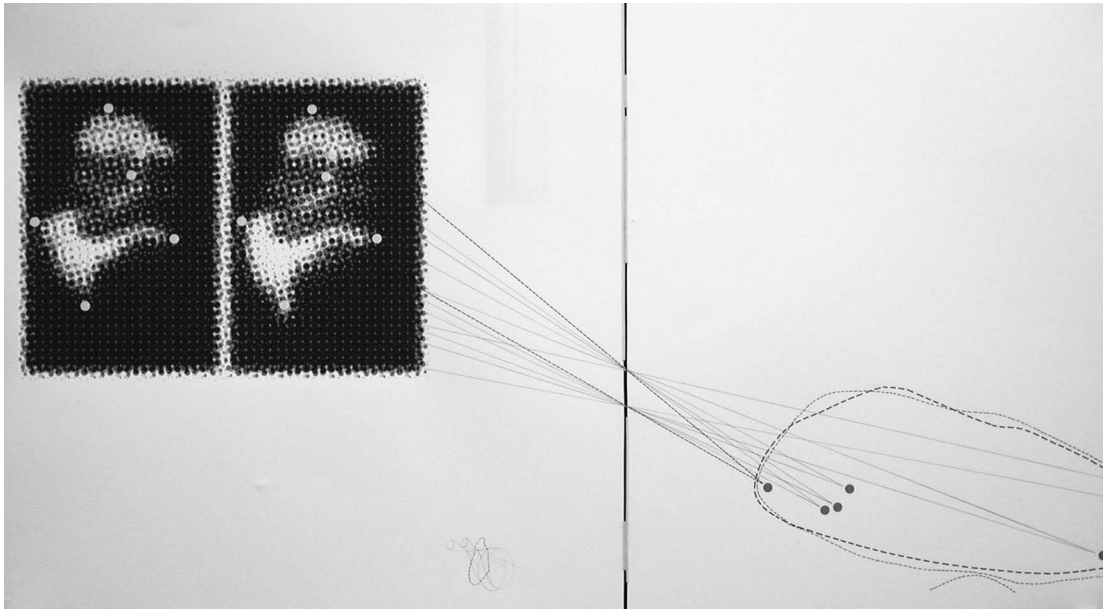
> Grafting itself on the arbor-type – the cinematic blossoming (controlled by the electrical stripping) this cinematic blossoming is the most important part of the painting. (graphically as a surface) It is, in general, the halo of the Bride, the sum total of her splendid vibrations ...[111]

The Milky Way's resemblance to a cloud or a gas was possibly influenced by Duchamp's readings of the French mathematician Henri Poincaré.[112] Poincaré compares the constitution of the Milky Way with the behaviour of gases as innumerable molecules animated by great velocities: 'in the eyes of a giant, to whom our Suns were what our atoms are to us, the Milky Way would only look like a bubble of gas.'[113] Furthermore, Swedish art critic Ulf Linde, who constructed a replica of the *Large Glass* in 1961, remarks that the French for Milky Way, *voie lactée*, sounds like *voile acté* (enacted veil).[114] Such word play would be characteristic of Duchamp.

The Milky Way's position at the upper right corner of the *Large Glass*, above the skeletal Bride, the *Pendu femelle*, resembles a long vesture fluttering in the wind. Its irregular shape is painted in a flesh colour. According to Hamilton, 'the hue of the blossoming is flesh, rich, sumptuous, Renoiresque: the rose pinks and pale peach, tinged with emerald green, of the classic female nude'.[115] Does the skin tone of this garment, this veil of the Bride, denote her epidermis? Perhaps the Milky Way represents the skin lifted from her desired body like an *écorché*, a term referring to an anatomical representation of the body where the skin is removed so as to display the musculature or the structure of bones.[116] In an *écorché*, the figure often appears holding her own skin as a garment, or veil, she has just removed, thus exposing an extreme version of nudity. Is the Milky Way a flowing garment woven by the observation of her nudity, the image of her pink skin composed of innumerable tiny glimpses, like Poincare's gaseous particles 'animated by great velocities'? The Draft Pistons and Milky Way is Duchamp's attempt to illustrate the complex geometry of the desire-filled gaze. Exposed by a veil fluctuating in the wind, the Bachelors' desiring gaze is a gas cast in the mould of the Bride's fluid nudity.

3.4.5 BLOSSOMING

The word 'blossoming' appears repeatedly in Duchamp's notes for the *Large Glass*. Paul Matisse describes the difficulties in interpreting the several meanings of the original word in French, *épanouissement*, which he believes is one of the most evocative words in the text. Beyond the English association with the flowering of plants and the growing up of girls, in French there is an implicit sexual element, but it can equally describe the development of a football club or the shock wave of an explosion.[117] In several notes, Duchamp describes the Bride's blossoming as vertical or horizontal, which for Matisse signifies an entirely new level of meaning. French mathematician Esprit Jouffret in his *Elementary Treatise on the Geometry of Four Dimensions*, 1903, described normal geometric elements as being the beginning of an *épanouissement* into dimensional fields of higher orders.[118] Duchamp's great interest in Jouffret's writings relates the Bride's *épanouissement* to a dimensional expansion, as a result of being stripped bare by her Bachelors even. In Duchamp's work,



3.81 *Illuminated Scribism*, plate 11, 2002. Drawn by the author.

the word blossoming signifies a transformation, a change in state: the passage from virgin to Bride or from three to four dimensions, the undressing of the Bride, and the explosion of desire, horizontally for the Bride and vertically for the Bachelors. Blossoming can also be linked to Duchamp's lifelong interest in stereoscopy: a spatial representation technique, isolating and revealing binocular depth and allowing an image to 'blossom' in space.

The notion of blossoming is analogous to the process of 'fusing' the two flat images of a stereoscopic pair into a virtual three-dimensional volume. The visual sensation can be described as an expansion from the plane of a single image into deep space, similar to the expansion of the petals from the centre of the bud. So, stereoscopy also entails an *épanouissement*, a blossoming of the monocular picture plane, in the mind (fig. 3.81).

Blossoming is a vivid phenomenological effect combining intellectual and affective attributes that single photography is unable to convey. Duchamp's architecture of desire blossoms into stereoscopy.

3.4.6 FRACTURE

In contrast to the transparency of the *Large Glass*, *Given* is a piece hidden behind closed doors. The abstract flat representation of the Bride captured within the infra-thin surface of the *Large Glass* is fully fleshed out in *Given*, as a three-dimensional cast within the deep space of a brightly lit diorama. The two peepholes assert the viewer is looking with both eyes, making the optical experience similar to looking into the illusory space of a stereoscope.

Lyotard was granted permission to study *Given* and Duchamp's *Manual of Instructions* before its publication.[119] According to Krauss he presents *Given* as a spatial equivalent of linear perspective which manages at the same time to expose its hidden assumptions.[120] All the geometric, abstract principles of perspective construction acquire volume and materiality (see fig. 3.5). Lyotard finds in *Given* the incarnation of the picture plane:

> The plane of this perspectivist picture remains virtual: there is no glass nor any support in the breach in the wall on which the plane projections of the 3-dim[ensional] nude would really be inscribed. There, of course, is where Dürer's gate would be installed, as Jean Clair suggests [...] What's left is that the window pane is not there.[121]

Alberti's architectural metaphor of an open window professedly allows the unmediated view through perfect transparency. Neither an abstract notional surface nor a light transparent interface between the viewer and the nude, the picture plane in *Given* is a heavy brick wall, a physical, built boundary. The visitor engages with the view through the peepholes and behind the wall through a large hole. Yet this hole is not a window, a rectangular opening establishing the boundaries of the projection, but has a jagged outline as if a violent collision has fractured the picture plane. Krauss asserts:

> The role of the picture surface that slices through the visual pyramid of classical perspective is played, for example, by a brick wall, with the possibility of seeing-through that is normally a function of pictorial illusion now a matter of literally breaking down the barrier to produce a ragged opening.[122]

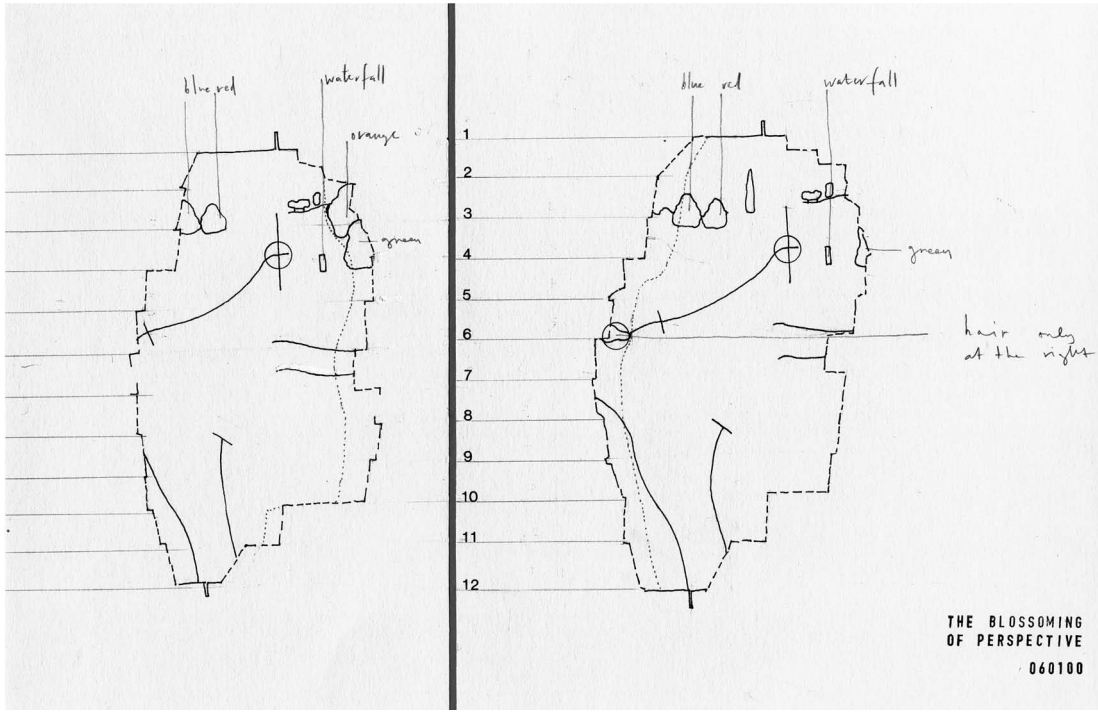
In *Given* the picture plane is a rupture unveiling the space of desire.

3.4.7 MASONRY GRID

The first entry in my Philadelphia sketchbook is a drawing of the two views through the peepholes, intended to capture the relative positions of the elements, register the horizontal shift of boundaries, and define the occluded sections of the image for each eye (fig. 3.82).

Because the elements are presented without accurate perspective distortion, this diagram is a sort of double elevation. The wall as an ordered structure of rectangular units, the bricks, was used graphically to square up the double elevation of the view and locate the elements as seen by the left and right eye. Thus a notional extension of the joints between the bricks weaves the invisible threads of the Bride's veil spanning the fracture. The two images originate from monocular observation but can be fused to give an impression of depth when viewed in a stereoscope. If so, the flat lines of each drawing blossom into three dimensions.

It is unclear whether Duchamp used the wall as a grid, diaphanously organizing the construction of the view, in fabricating the piece. His *Manual of Instructions* makes no reference to this but reveals another detail. The bricks are not bonded with mortar as in a conventional wall but suspended with metal brackets from a wooden vertical plane on which the position of each brick is numbered. The laying becomes irregular around the hole as the bricks shaping the opening slide along the horizontal, and some are carefully chiselled to create an intentionally profiled outline. According to Duchamp's notes in the *Manual of Instructions*,



3.82 Stereoscopic sketch of the breach and the view beyond through the two peepholes in *Given*. Drawn by the author, 2000.

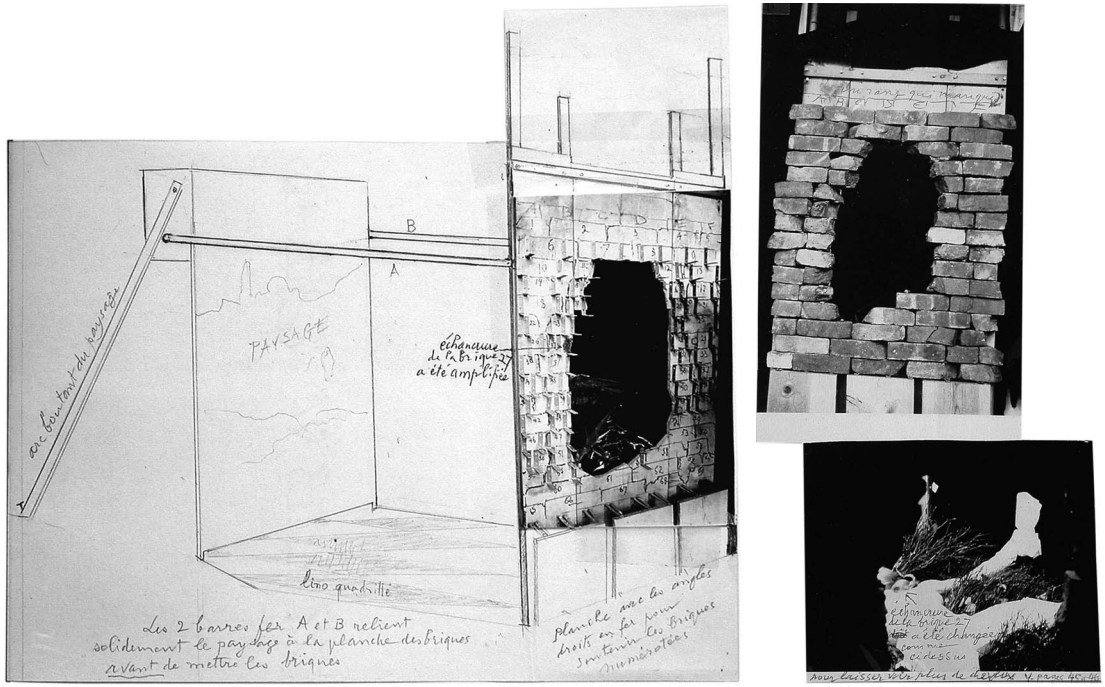
for instance, the indentation of brick number 27 has been amplified to change the original profile and reveal a curl of blond hair by the nude's shoulder on the left.[123] This peculiar construction was certainly due to the need to dismantle and rebuild the assemblage, but also suggests that the bricks were used to precisely control the outline of the hole, and therefore, the visible parts of the view (figs. 3.83, 3.84).

3.4.8 MERGING THE TWO VEILS

Albrecht Dürer's woodcut of the artist painting a reclining woman shows both veils: the garment scantily covering her body and the perspective device between her and the artist.

As we have seen, Duchamp's work often confuses the distinction between the two appearances of the veil: if the veil is closer to the Bride, it becomes a malleable fluid surface touching the body, partially revealing its immeasurable geometry; closer to the Bachelors, it becomes a rigid apparatus hiding the true dimensions of the view. Undressing is a lifting of a veil; its removal reveals the blossomed topology of desire but it is not always clear if this is an undressing of the Bride as a body, or an unveiling of her view.

In *Given*, the function of the picture plane as a theoretical intersecting barrier between the viewer and the object is damaged. The look does not stop on the notional surface of the wall but leaks through the hole and into the deep space behind. The fracture creates a draught that sucks in the



gaze, which visually touches the naked body. Unlike Dürer's woodcut, in *Given* both veils are seemingly absent: the body is naked and the grid is unravelled. However, the two veils have not disappeared but have instead fused into a new stereoscopic veil.[124] In representational terms, to merge the two veils is to weave an alternative visual field, which lies between the Bachelors and the Bride and locks them in an exchange of desire. Therefore, in *Given* the blossomed nudity of the Bride is still dressed in a new veil woven by the Bachelors' binocular gaze, looking from the peepholes and visually touching her skin; her bare appearance, a full unveiling of the object of desire, is perhaps beyond perception, visual or other.

3.83 Marcel Duchamp, drawing and collage showing the numbered positions of the bricks, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.84 Marcel Duchamp, note referring to the indentation of brick number 27, from *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.4.9 DOOR FOR GRADIVA AND FAMILY PORTRAIT

Another earlier piece by Duchamp studying and questioning the status of the picture plane is his door for André Breton's gallery, Gradiva, in Paris, 1937 (fig. 3.85).

The door was made out of frosted glass on which Duchamp incised the silhouette of a couple of lovers.[125] In his introductory text, Breton reveals that the heroine of a novel by Wilhelm Jensen, inspired the gallery's name. The novel was influential in surrealist circles, mainly through Sigmund Freud's *Delusion and Dream in W. Jensen's Gradiva*, and the figure of Gradiva became an important surrealist literary trope and visual motif.[126]





3.85 Unknown photographer, view of André Breton's Gradiva gallery entrance, 1937.

3.86 Marcel Duchamp, *Family Portrait (1899)*, 1964. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

British art historian Briony Fer notes that the symbolic figure of Gradiva condensed many surrealist concerns: release of the unconscious, metaphor and metamorphosis, notions of the avant-garde and the female figure as the artist's muse.[127] According to Breton, Gradiva is 'she who advances' and sees 'the beauty of tomorrow – still hidden from most people', a metaphor for advanced art. More significantly in regards to *Given*, for Paul Eluard, Gradiva is 'the woman whose glance pierces walls'.[128]

The underlying theme of Jensen's story – desire for an impossible ideal female figure – shares similarities with Duchamp's concept of the Bride. Her apparition, the unattainable physical object of desire materializes in a sculptural relief, similar to the cast nude in Duchamp's dream-like fantasy in *Given*. In both cases, unfulfilled desire solidifies in an inanimate substitute, and if the Bride is Duchamp's Gradiva, her now absent glance has pierced the wall.

The design of the door for Gradiva is a transgression of the picture plane. Duchamp's cut-out outline suggests that the two figures of the lovers, instead of being flatly captured in the surface of the glass, have broken away and been released. In a reversal of projection, they escape the realm of ideal

two-dimensional representation and are freed back into three dimensions. The projector lines no longer transfer the image of the couple towards the glass; instead, the glass incision carries the trace of the liberation of the image into deep space. The breach in the door for Gradiva is an outline of two lovers embracing, but the seemingly accidental outline of the broken wall inside *Given* has always been seen as unintentional. Could this breach, deriving from a piercing look, or an abrupt detachment of the image of the Bride pushing her naked body through, be not a random shape, but a carefully sculpted, calculated silhouette?

A later related piece, *Family Portrait*, 1964, now lost, is a montage of a photograph of his family that Duchamp prepared for the exhibition catalogue for 'Not Seen and/or Less Seen of/by Marcel Duchamp/ Rrose Sélavy 1904–1964' (fig. 3.86).

Schwarz suggests that the original photograph was cut in an irregular shape and mounted on a black lightweight card.[129] Rather than being 'irregular', however, the shape resembles the outline of the head and shoulders of a figure. The reproduction is not clear but the cardboard looks like a top layer with a hole as in the door for Gradiva, making *Family Portrait* a similar manipulation of the surface of the picture plane. If the shape suggests a silhouette, who is the figure that has been released back into the space of the image?

In the photograph Duchamp appears as a young child, central in a pyramidal composition between his mother, father and sisters, looking straight at the photographer. The curved boundary of the perforated picture plane creates an uncanny effect: like an inverted cast shadow, not obscuring but rather illuminating the scene out of an amorphous darkness, it hints at an invisible presence. The glance of this enigmatic invisible observer cuts out the view, while his or her identity and position remain ambiguous. Duchamp is perhaps setting a trap: we, as the observers of this *Family Portrait*, are caught looking at the young boy looking back at himself.

3.4.10 OCCUPYING A DAYDREAM

As we have seen, Duchamp clarifies in his notes for the *Large Glass* that not only the Bachelors' lust but also the Bride's imagined apparition of herself naked sets in motion the mechanism of desire.[130] *Given* is arranged like *Family Portrait* in that the shape of the breach resembles the outline of the family view, hinting at the presence of an invisible observer. Although the nude's face is concealed, denying visual contact with the viewer, she seems to watch from an unidentifiable position, bringing to the surface the viewer's voyeuristic guilt.

According to this interpretation, the viewer of *Given* is caught inside the Bride's daydream, trapped in her inverted shadow and her imagined vision of her nakedness. The female figure is staging her imaginary undressing, watching herself lying nude in a bed of twigs and holding a gas lamp, through the eyes of the viewer. This staging locks the double presence of the Bride within a reflected fantasy. Her inverted shadow pierces the wall, like the piercing look of Gradiva, and her desiring gaze 'casts' her naked figure through the broken surface. The viewer is in the middle of this duplicate glance, as if looked at from behind. A similar experience is expressed by Belgian art theorist Thierry de Duve:

> My impression when I went to see *Étant donnés* the first time was, of course, that I was caught in the act but also

> (it's very subjective, you can't explain this) that it was the Bride's gaze that went around the corner and caught me from behind. This is a strange topology, but the fact that her head is turned away and hidden behind the wall is what made me feel that way. She doesn't stare back … and yet the piece is not a simple defacing of woman, that is, a representation of a woman as a sheer object of desire that cannot respond.[131]

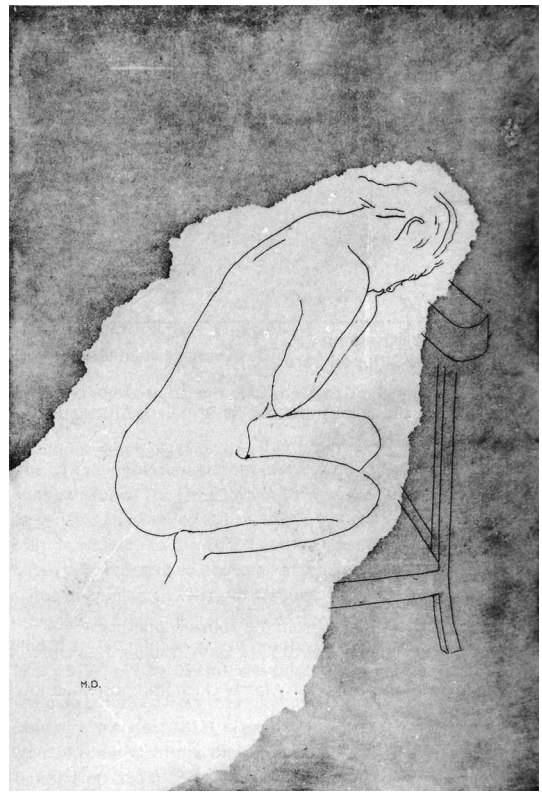
The irregular fracture of the wall breaks the relationship between observer and object organized by the perspectival picture plane, introduces ghostly apparitions and improbable shadows, and blows a visual 'draught' through the space of the image.

3.4.11 INSIDE THE VEIL

Veils indicate a woman's status, or mark important occasions of initiation: veils adorn the communicant, the bride and the widow. As well as hiding they also partly reveal the body only to increase the intensity of the projected desiring imagination. A soft translucent veil is a malleable, changing configuration around the body or face like a fluid: not a rigid frame but an envelope in continuous flux.

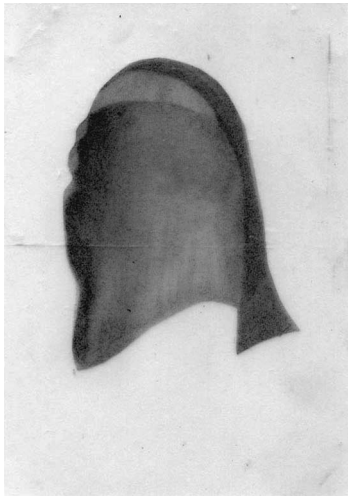
The amorphous shape of the Milky Way on the *Large Glass* reappears as an uneven outline in one of Duchamp's later etchings, *The Bride Stripped Bare …*, 1968, showing a naked young girl kneeling on a prayer bench 'in a cloud-like uneven veil' (fig. 3.87).[132]

The source was possibly an advertisement, and on the lower part of the study Duchamp wrote '*Encore une mariée/mise à nu*', ('Another bride stripped bare'). 'The Bride has finally been stripped bare here,' he also remarked to Schwarz who had no idea about the existence of *Given* at the time.[133]



3.87 Marcel Duchamp, *The Bride Stripped Bare …*, 1968. © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

The girl is encircled by a transparent veil, which instead of hiding reveals and frames her nudity. According to Judovitz, it is not clear whether this aureole surrounding the girl denotes a shape in the foreground or in the background; whether its silhouette is a doorway or screen through which we see, or whether the nude is a cut-out. '*Le nu est à l'interieur du voile de la Mariée*', ('The nude is in the interior of the Bride's veil'), Duchamp wrote at the top of the pencil study. The inscription refers to the interior of the veil, suggesting that the shape is not a flat surface but a cavity, a concave space (fig. 3.88).



3.88 The cavity of her veil, 1998. Drawing by the author.

Similarly the nude occupies a cavity beyond the opening on the brick wall in *Given*. Perhaps the ragged shape of the opening is the outline of the Bride's veil. Art historian Hellmut Wohl writes:

> In shape as well as in meaning, the veil in the form of an aureole is the reincarnation of the Cinematic Blossoming in the *Glass*, about which Duchamp wrote that it 'expresses the moment of stripping.' In the etching, as in *Étant donnés* that which was invisible in the *Glass* has been made explicit. But the veil/aureole in the etching is also an allusion to *Étant donnés*, for its shape is repeated in the opening in the brick wall that frames the Bride holding a gas lamp, not turning away from us and closed in upon herself as in the etching, but displaying her sex with unchecked factual candor.[134]

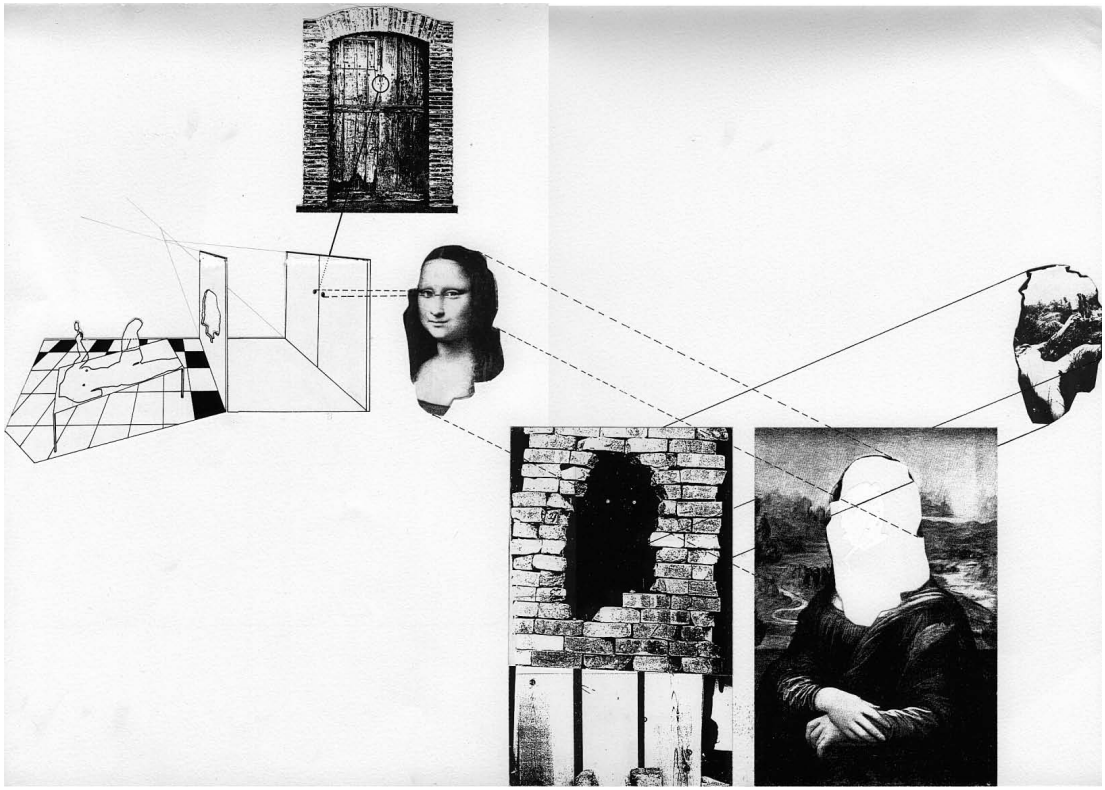
Going back to the original linking of *L.H.O.O.Q.* and *Given* in the allegorical architectural project of *The Fall*, if the Bride is Mona Lisa, then her apparition of herself nude appears in the space behind the outline of her veil: the nude is in the interior of Mona Lisa's veil (fig. 3.89).

3.4.12 EDGES

My allegorical identification of the breach as an outline of the Bride/Mona Lisa veil, inspired the following test aimed to reveal the different types of hidden ruptures that exist in the binocular visual field. Mona Lisa's veiled head conceals part of the landscape in Leonardo's portrait, while in *Given* a hole in the shape of her veil reveals the scene.[135] To construct a simple sketch model, I cut a shape similar to the veil/breach out of a piece of black card. I then placed the positive and the negative pieces separately on a stage made of two vertical gridded planes forming a floor and a background and photographed the two set-ups with a stereoscopic camera. Viewed in a stereoscope each stereoscopic pair offers a vivid three-dimensional effect.

The first pair is the equivalent of the *Mona Lisa* arrangement: the card piece is the silhouette of the veiled figure and the gridded vertical surface represents the landscape beyond. The second pair is closer to the staging of *Given*: a perforated surface, possibly outlining a figure, through which a landscape is visible. Compared to the view from a single point in the middle, the fused stereoscopic view reveals a larger part of the background in both cases. The amount of visible background depends on the size of the object and its distance from the eyes and background. The view in the stereoscope gives the illusion of one coherent image, but in the zones around the edges, each eye sees a different portion of the background. By superimposing the images it was easy to identify the areas seen by each eye. In both cases, the vertical edges of the 'veil' create zones of occlusion for each eye like cracks in the homogeneity of the single view (figs. 3.90a,b,c). As the diagram shows, these occlusions are reversed: in the *Mona Lisa* the view behind the left boundary is seen by the left eye only and in *Given* by the right (fig. 3.91). The double veil of the Bride differs from the clarity of the monocular perspectival veil; it is a reversible veil with fluctuating edges that denote ambiguity.

This experiment exposes *Given* as the reverse, *l'envers*, of the *Mona Lisa* in stereoscopic terms. The flat surface of the painting has been turned inside out, like a glove, into the deep space of the diorama (fig. 3.92).



3.89 Comparison between the shape of Mona Lisa's veil and the outline of the wall's breach, 1998. Detail of sketch in *The Fall Sketchbook*.

3.5 FOUND TWIGS

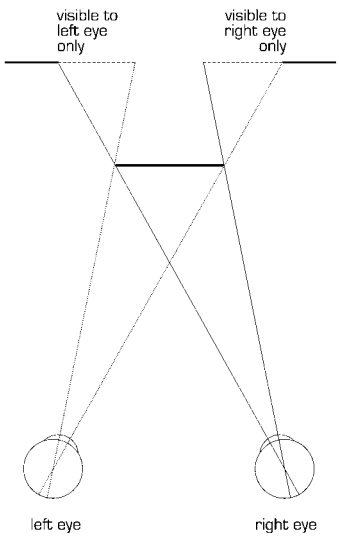
3.5.1 ARBOR-TYPE

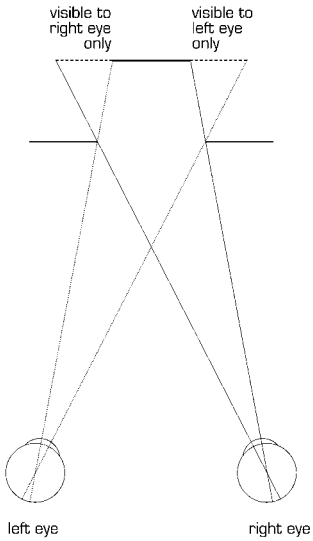
The nude in *Given* lies on a bed of twigs: real branches which Duchamp and Teeny, his wife, gathered near Teeny's house in New Jersey.[136] The complex interweaving of these branches has been read as a metaphor for hair and female complexity. Judovitz, for instance, sees the twigs as missing or misplaced pubic hair:

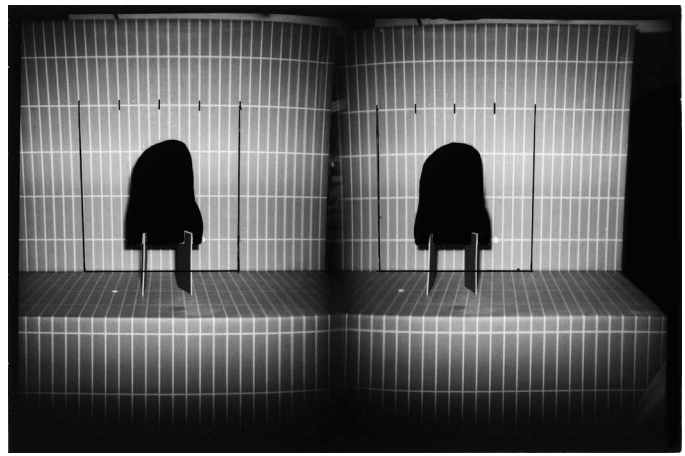
> Instead of veiling the female sex in *Given*, Duchamp displaces the veil, so that it surrounds the nude copiously as the field of twigs in which the figure appears to be embedded.[137]

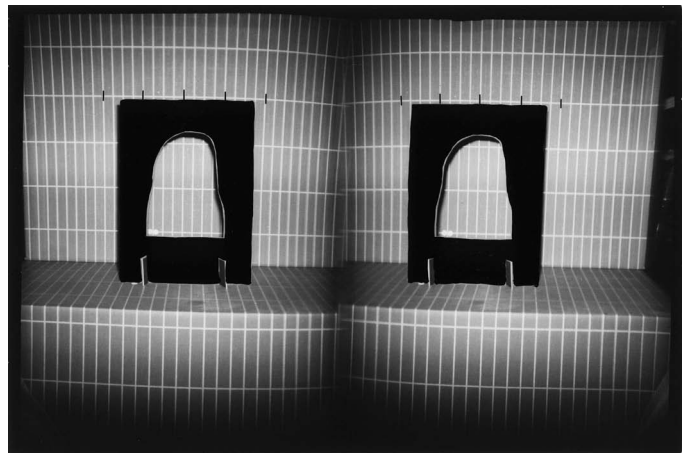
Stereoscopy manual illustrations often depict dense configurations of trees, grass and twigs, as these complex forms from nature are one of the favourite subject matters of stereoscopic representation (fig. 3.93). Is the complexity of the twigs emerging from, and surrounding, the nude body an allusion to an allegorical, physical manifestation of the blossoming of the Bride's desire in stereoscopy? (fig. 3.94)

Psychologists Barton Anderson and Bela Julesz explain the role stereopsis plays in natural vision, and the significance of the environmental context











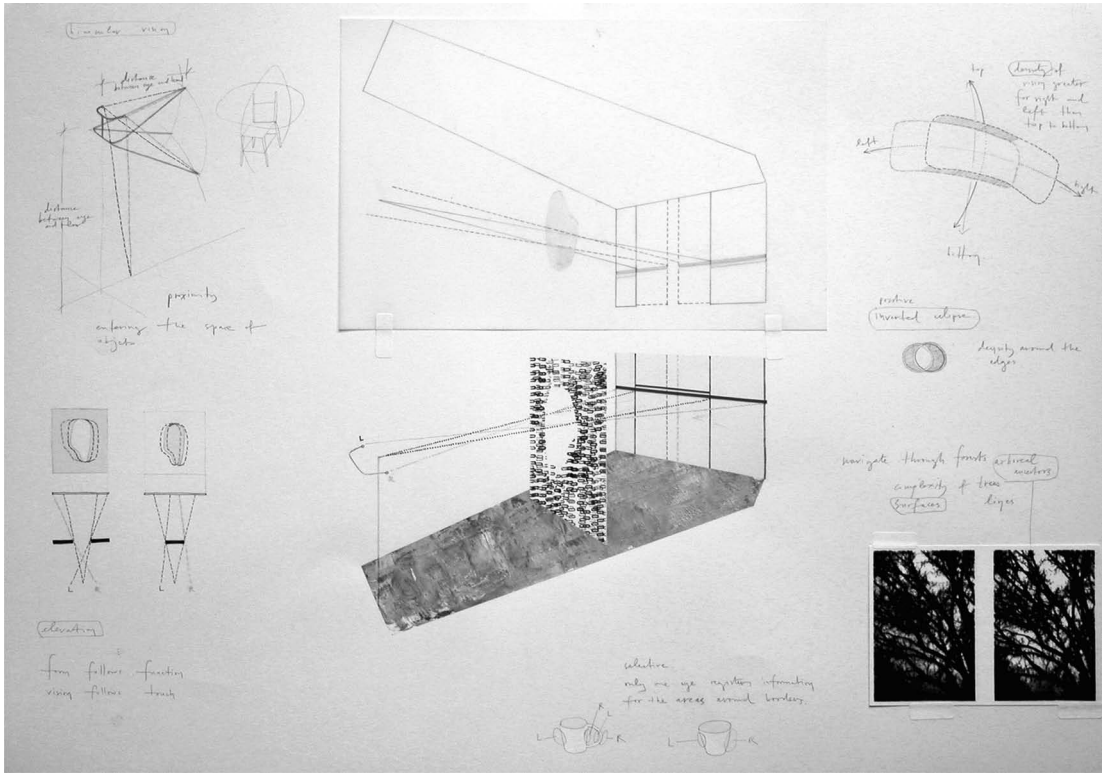


3.90a Stereoscopic veil: *Mona Lisa*. Stereophotograph by the author, 2002.

3.90b Stereoscopic veil: *Given*. Stereophotograph by the author, 2002.

3.90c Stereoscopic veil: Comparison between the two arrangements. Digital collage by the author, 2002.

3.91 Diagram of the two arrangements in the stereoscopic veil test, 2003. Diagram by the author.

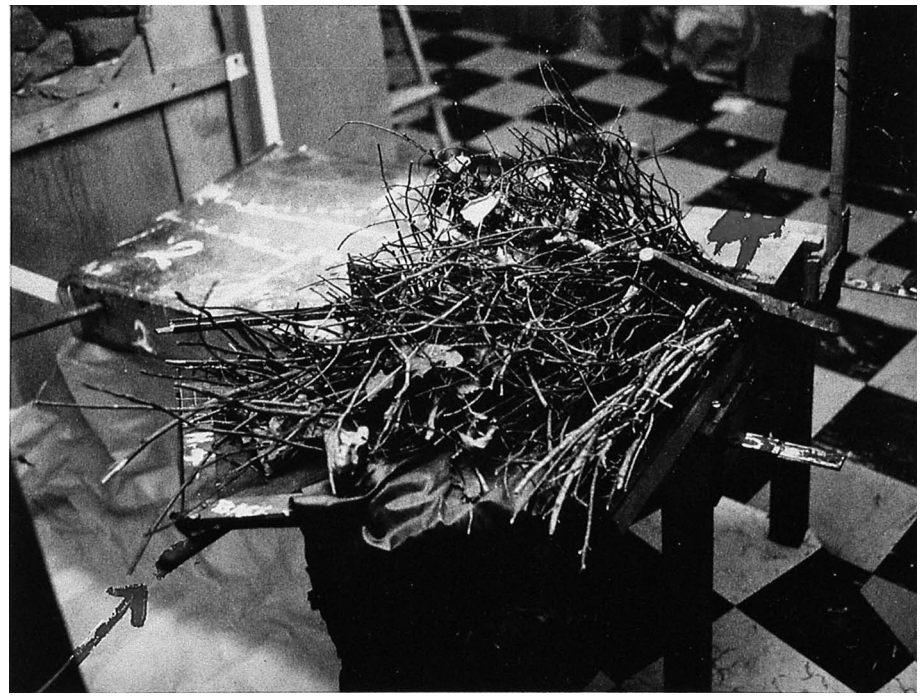


3.92 *Illuminated Scribism*, plate 21, 1999. Binocular vision and perception of right and left boundaries. The main diagram in the middle compares monocular and binocular visibility in the spatial arrangement of *Given*. The superimposed diagram shows the reverse arrangement of the *Mona Lisa*. Drawing/collage by the author.

in which it evolved.[138] One of the most critical tasks our arboreal ancestors were confronted with was to resolve the three-dimensional structure of their habitat. This required accurate segmentation and recovery of the geometric structure of branches and leaves, which in some illumination conditions is daunting. In a single image, the lack of contrast makes it impossible to specify which branch is in front of which other or how one branch is curved in depth (fig. 3.95). When the two images are fused stereoscopically, however, the tree blossoms in three dimensions and the eyes can travel in space through its branches.

Duchamp's notes in the *Green Box* illuminate the significance of the twigs: 'this blossoming should be the refined development of the arbor-type. It is born, as boughs on this arbor-type'.[139] *Arbor* in Latin means tree, a word close to the French for tree, *arbre*. The Bride, in other words, is tree-like. In the *Large Glass*, the viewer is called upon to imagine the blossoming as part of the function of the Bride-Bachelor Machine, whereas in *Given* the blossoming has already occurred and, under the strongest light, the 'arbor-type' of the Bride is in full bloom; it blossoms by growing branches, opening up into three dimensions to be perceived in a binocular way like a tree:





3.93 Nikolai Adamovich Valyus, anaglyphic view of a forest, from *Stereoscopy*, 1966.

3.94 Marcel Duchamp, positioning of the twigs, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

> This cinematic blossoming which expresses the moment of the stripping, should be grafted on to an arbor-type of the Bride … by giving birth to the arbor-type, find within this arbor-type the transmission of the desire to the blossoming into stripping voluntarily imagined by the Bride desiring.[140]

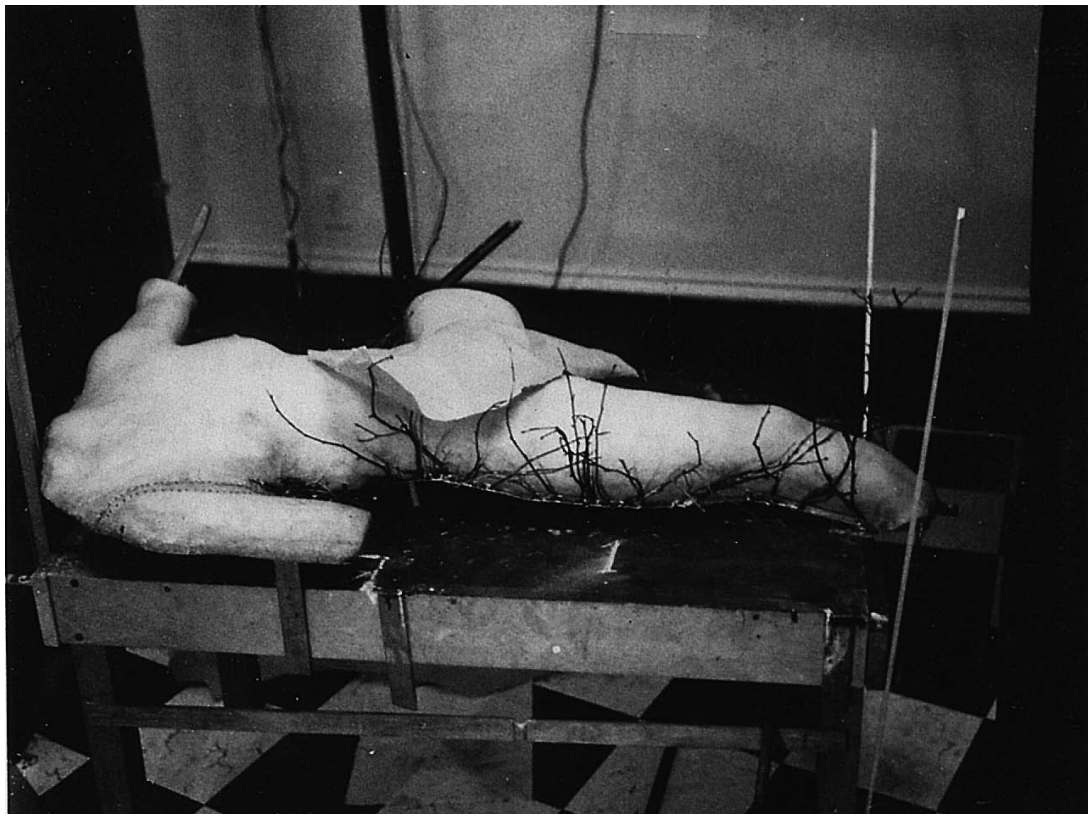
A photograph in the *Manual* shows that Duchamp has 'grafted' some of the twigs on the nude cast, attaching them on three aluminium bands that follow the curves of the body (fig. 3.96).

What seems in the assemblage to be a nude in a bush, Duchamp has constructed as a body growing branches like a tree. The Bride is a tree-like machine with a goal: to make desire relating to her visible, if not tangible. The blossomed tree-like Bride echoes the Greek myth of Apollo and Daphne as portrayed by Antonio Pollaiuolo, c. 1470–1480.[141] In her desperate attempt to escape Apollo's amorous pursuit, Daphne begs her father to transform her into a tree. As in *Given*, unfulfilled desire solidifies into branches that grow out of the female body.

Duchamp defines two different kinds of desire: the desire of the Bachelors and that of the Bride imagining herself naked.

> Grafting itself on the arbor-type – the cinematic blossoming (controlled by the electrical stripping) this cinematic blossoming is the most important part of the painting. (graphically as a surface) It is, in general, the halo of the Bride, the sum total of her splendid vibrations: graphically,





3.95 Unknown, *And the Palm Tree nodded to the Mirror in the Jungle*, stereoscopic print of foliage, c. 1900.

3.96 Marcel Duchamp, twigs grafted on the nude, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

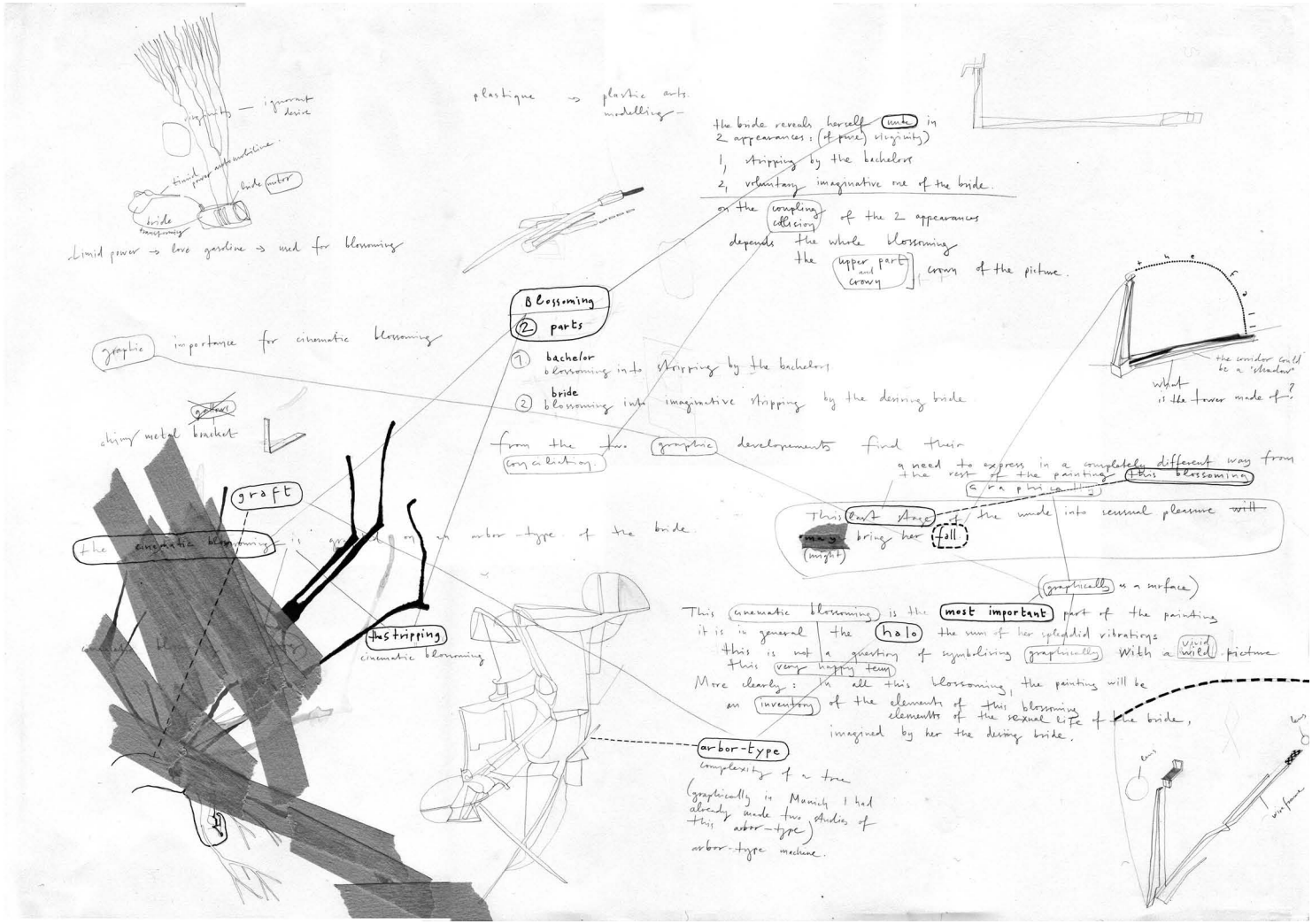
> there is no question of symbolising by a grandiose painting this happy goal – the Bride's desire; only more clearly, in all this blossoming, the painting will be an inventory of the elements of this blossoming, elements of the sexual life imagined by her the bride-desiring.[142]

The twigs are a consequence of her undressing and sprout around her as a solidification of desire framing her naked body like a halo. This extra dimension of the aura of her desire, visible in the complexity of the twigs stereoscopically expanding from the body outwards, makes any representation of *Given* in a single photograph inadequate.

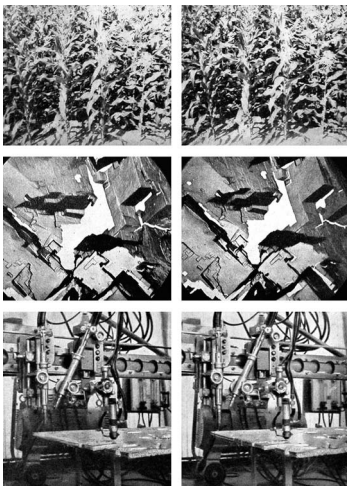
The concept of blossoming can describe the transition from the two single images of a tree to a fused stereoscopic view, which gives an impression of expansion. The stereoscopic view reveals how the twigs curve in depth, a complexity better deciphered through binocular vision (fig. 3.97).

3.5.2 COMPLEXITY

According to Helmholtz the impression of solidity or depth is perceived with one eye and communicated by painters by moulding light and shadow and



3.97 *Illuminated Scribism*, plate 29, 1998. Study of the *Green Box* notes referring to 'blossoming'. Drawing by the author.



3.98 Nikolai Adamovich Valyus, stereoscopic images of complex forms: foliage, machinery, crystals and rock faces, from *Stereoscopy*, 1966.

using perspective.[143] He continues:

> The first man who clearly defined the aspects for which it is impossible for any picture to represent actual objects was the great master of painting, Leonardo da Vinci … He pointed out in his *Trattato della pittura* that the separate views of the outer world presented by our eyes are not precisely the same. Each eye sees in its retinal image a perspective view of the objects which lie before it, but inasmuch as it occupies somewhat different position in space from the other, its point of view, and so its whole perspective image, is different.[144]

Helmholtz notes that representation of solid forms by drawings created through perspective construction is most successful with objects of 'regular, symmetrical shape, such as buildings, machines, and implements of various kinds'. The knowledge that most of these are bounded either by planes which meet at a right angle or by spherical and cylindrical surfaces is 'sufficient to supply what the drawing does not directly show'. Conversely, objects of unknown and irregular shape, like rough blocks of rock or ice or masses of foliage, baffle the skill of the most gifted artist. Even their representation in what Helmholtz considers the 'most complete, perfect manner possible', a photograph, often shows nothing but a confused mass of black and white. The perspective and shading may be absolutely correct but the total impression remains confused, 'yet when we have these objects in reality before our eyes, a single glance is enough for us to recognise their form'.[145]

For Helmholtz the clearest proof that binocular sight constitutes the most important cause of perceiving the third dimension is the stereoscope: the solid shape of the object represented in the stereoscopic slide offers the same 'complete evidence of the senses' as when the real object is looked at. The illusion produced by the stereoscope is most striking when other means of recognizing the form of an object fail. He offers examples of diagrams of crystals and the representation of irregular objects, 'especially when they are transparent and the shadows do not fall as we are accustomed to see them in opaque objects'.[146] Thus glaciers in stereoscopic photographs often appear to the unassisted eye an incomprehensible chaos of black and white, but seen through a stereoscope 'the clear transparent ice, with its fissures and polished surfaces, stands out as if it were real'.

Consequently, Helmholtz distinguishes objects that can be deciphered through perspectival rendering from those that benefit from stereoscopic representation. In other words, like Duchamp, he distinguishes between things to be looked at with one eye and things to be looked at with two; the latter are entities of complex form like crystals, foliage, rock faces and complex machinery (fig. 3.98).[147]

3.5.3 CINEMATIC BLOSSOMING

Optical traversal of the stereoscopic field includes the dimension of time. Krauss compares the phenomenology of the stereoscope with the 'optical transportation' of a cinema audience. Both use an image to isolate the viewer from the surroundings; the pleasure derives from an appearance of reality whose effect cannot be tested because physical movement through the scene is denied, an effect heightened by 'temporal dilation'.[148] Stereoscopic viewing involves an unfolding of the image before one's eyes, which Duchamp calls a 'cinematic blossoming'. Mental

merging of the two retinal images creates a 'space' in which the gaze can wander.

Descriptions of stereoscopic viewing indicate that fusion of the two images takes place over time and might not be secure. The rapid shifting between the two images composing illusory depth is similar to the fast sequence of frames in cinema composing illusory movement. For Brewster mere combination or superimposition of the two pictures does not offer three-dimensional relief. Instead, this effect of visual depth is given by 'the play of the optic axes in uniting, in rapid succession, similar points of the two images' which 'correspond to different distances from the observer'.[149]

According to Helmholtz the solidity of an object is perceived by the accumulative movement of the eyes through the stereoscopic image. This wandering from point to point weaves together the spatiality of the object and the scene over time. However, experiments show that the illusion of stereoscopic depth is also produced instantly, when a spark illuminates the stereoscopic pair.[150]

In the cinema, scenes of flowers blossoming, the unfolding of petals from a centre or fireworks ('fire-flower' in Japanese) exploding from a core, often metaphorically represent the erotic act. This may be connected to the visual experience involved in intimate proximity. Closeness to a body or a face renders its binocular value deeper, so the visual effect of approaching a lover is also one of expansion in depth: their coveted image blossoms in desire.

Cinematic Blossoming, 1999, is an experiment in stop frame animation, recording the blossoming of a flower in stereoscopy. With my stereoscopic camera I took consecutive images of a flower in a pot during its flowering season from the same point of view. The pictures were subsequently animated to create a stereoscopic 'motion picture' that can be viewed with a stereoscope in three dimensions (fig. 3.99).

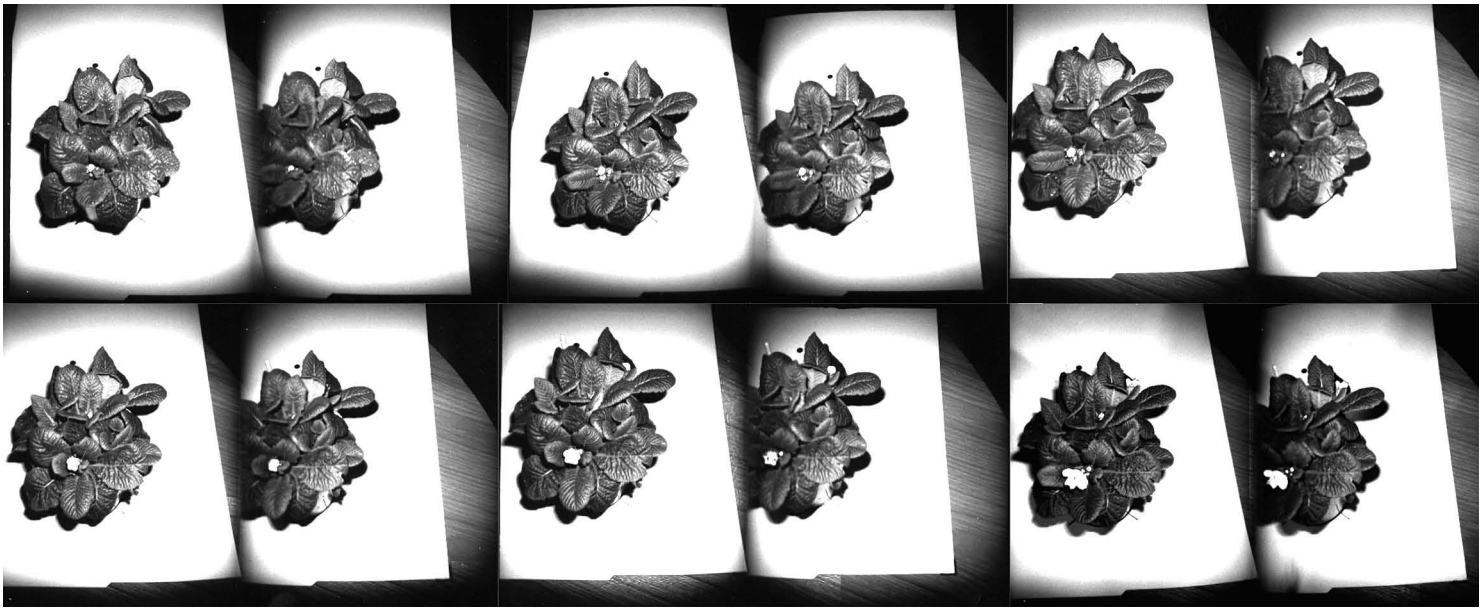
Fusing two moving images in a stereoscopic pair to give the illusion of contour entails a sensation matching the description of stereoscopic blossoming: suddenly a flat image unfolds or explodes, rendering a virtual volume. *Cinematic Blossoming* describes a double blossoming: the natural unfolding of the petals during the flowering season and the volumetric opening up of the bud in stereoscopy.

3.5.4 GRAFTED ON TWIGS

My early stereoscopic studies, *Constellations*, 1999, make use of graphic insertions in stereoscopic photographs. The simple added elements seek to test the possibilities of 'occupying' the expanded vista of each stereo-photograph.[151] Although flat on the level of the photographic surface, each element engages with the illusory depth of the scene, creating a dreamlike result: an uncanny visual architecture (fig. 3.100).

A more complex drawing within stereoscopic space is *The Blossoming of Perspective*, 2006.[152] Inspired by Duchamp's *Handmade Stereopticon Slide* and stereographer H. Vuibert's hovering ethereal shapes, it illustrates a geometric figure grafted on a stereoscopic photograph of a tree.[153] When the image is stereoscopically merged, the geometric figure 'blossoms' in three dimensions held by the tips of the branches (fig. 3.101).

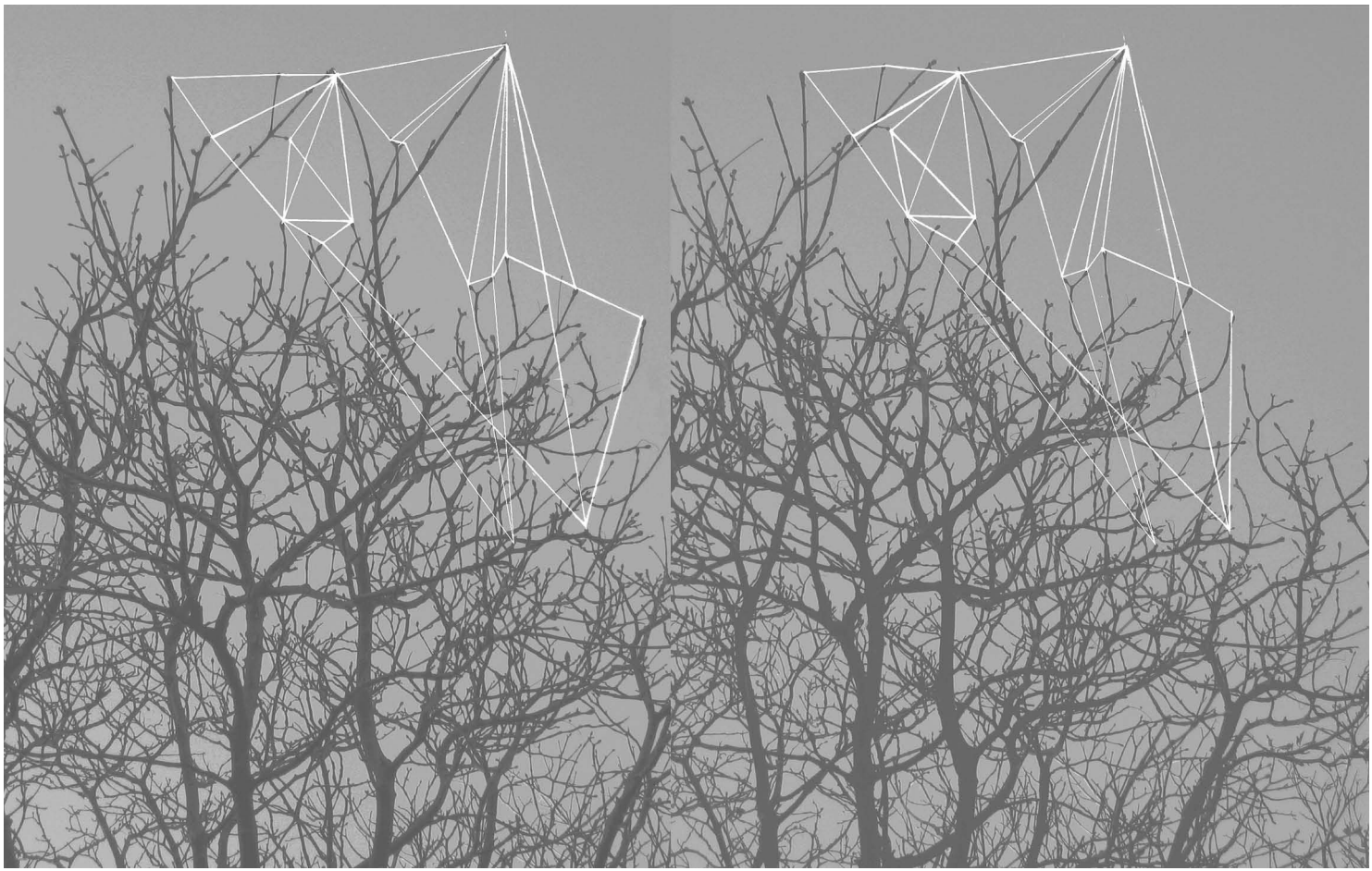
The spatial geometry of the tree, as recorded by stereo-photography, provides a three-dimensional 'site' on which the geometric figure is plotted, exposing the potential synergy between photography and architectural drawing.





3.99 *Cinematic Blossoming*, 1999. Stereoscopic stop-frame animation by the author.

3.100 *Constellations*, 1999. Graphic insertions on stereoscopic prints by the author.



3.101 *The Blossoming of Perspective*, 2007. Composite drawing by the author. The drawing was used as the cover for the catalogue of my show of the same name at DomoBaal gallery in 2007.

3.6 CAST NUDE

3.6.1 SCULPTURE AND PAINTING

For Leonardo the importance of perspective construction as a science becomes clear in his treatise *On Painting*.[154] His condemnation of painting without rules, on one hand, and of the manual practice of sculpture, on the other, reflects the true status of this new representational schema as an intellectual grasping of space. He consequently sees painting that is structured by perspective as a *cosa mentale*:

> Those who are in love with practice without science are like the sailor who boards a ship without rudder and compass, who is never certain where he is going. Practice must always be built on sound theory, of which perspective is the signpost and gateway, and without perspective nothing can be done well in the matter of painting. The painter who copies by practice and judgement of eye, without rules, is like a mirror which imitates within itself all the things placed before it without any understanding of them.[155]

He compares the difficulty of sculpting with that of painting:

> Sculpture is not a science but a very mechanical art, because it causes its executant sweat and bodily fatigue. A sculptor only need know the simple measurements of the limbs and the nature of movement and postures. With this knowledge he can complete his works, demonstrating to the eye whatever it is, and not inherently giving any other cause for admiration in the spectator, unlike painting, which on a flat surface uses the power of its science to display the greatest landscapes with their distant horizons. There is no comparison between the innate talent, skill and learning within painting and within sculpture, inasmuch as spatial definition in sculpture arises from the nature of the medium and not from the artifice of the maker.[156]

Leonardo criticizes both the purely visual and the purely tactile. Neither mindless visual imitation nor pure tactile duplication provide the intellectual and scientific idea of an object or express the depth of one's experience of it; the technique that bridges the visual with the tactile through geometric projection becomes therefore a highly respected expertise, a science. Moreover, this understanding shapes a new type of spatial thinking that greatly affects not only other visual practices like architecture but other sciences, mathematics and philosophy. He continues:

> The sculptor is not able to achieve diversity using the different types of colours … The perspective used by sculptors [in reliefs] never appears correct, whereas the painter can make a distance of one hundred miles appear in his work. Aerial perspective is absent from the sculptor's work. They cannot depict transparent bodies, nor can they represent luminous sources, nor reflected rays, nor shiny bodies such as mirrors and similar lustrous things, nor mists, nor dreary weather.[157]

A new visual assessment of phenomena took over from medieval tactile or verbal appraisal in the creation of 'ideas'. Perspective construction was pursued as a correct representation of vision but was primarily a mathematical abstraction, only partially explaining visual functions. The monocular decisiveness of perspective created nevertheless a powerful visual theory, which clarified and organized vision through a geometric system. Consequently,

perspective construction moulded vision as much as vision inspired perspective.

It is difficult to define *Given* as either sculpture or painting because, although a physical construction, it accentuates some of the atmospheric, colour and light conditions that Leonardo appreciates in painting. Moreover, it portrays pictorially an expanse far beyond the crammed physical boundaries of the gallery room it occupies. Finally, although clearly three-dimensional, it allows no movement around it, focusing its scrutiny from a single position as if it were a painted perspective. As it is difficult to define as a sculpture or a painting, I analyse *Given* as a drawing; aware of Duchamp's fascination with projective processes, I study his drawing of the architecture of desire as an incarnation – an expansion or reversal – of central projection.

3.6.2 BUILDINGS AND BODIES

Through Renaissance perspective construction, space was for the first time represented consistently and lost the floating quality of previous two-dimensional depictions. The new system allowed depicted architecture to act as a disguised structural background, an underlying spatial grid determining the correct relationships of objects in depth. So perspective construction became synonymous with architecture, which organized the placement of the portrayed human figures like puppets suspended within pictorial depth by invisible strings, the projection lines (fig. 3.102).

Depicting the human figure played a subordinate role in most treatises on perspective and was either 'passed over in silence or summarily dealt with by a reference to those mechanical devices which assure approximate correctness without a claim to mathematical exactitude'.[158] For most Renaissance artists the depiction of bodies belonged to a system beyond perspective, which was only used to calculate their general positioning. Armours and uniforms divide figures into simpler geometric forms and thus render them easier to represent geometrically, but linear perspective seemed inadequate for depicting the naked body, a plastic fluid form that moves, bends, rotates and stretches, defying reduction to a system of surfaces or perfect solids.

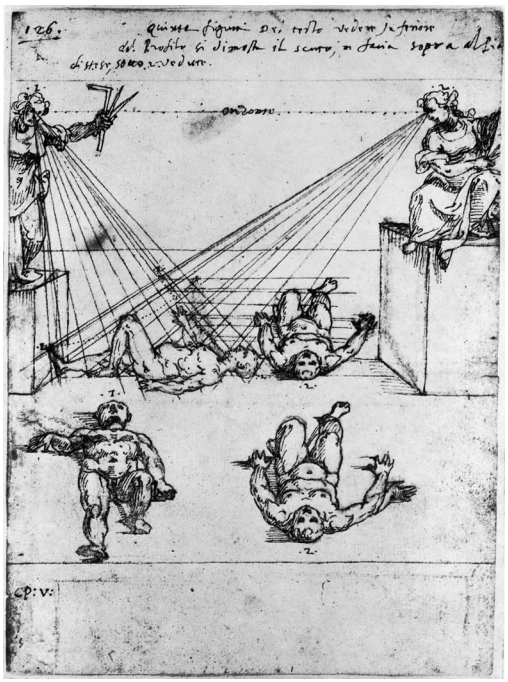
The depiction of the naked human body was mainly studied in other ways: anatomical dissection which exposed internal organs and the bone and muscular structure supporting the skin (fig. 3.103); the theory of proportions, a dynamic system that interconnected the dimensions of the body like a flexible network (fig. 3.104); and life drawing and sketching, a visual training in the observation of the human form.

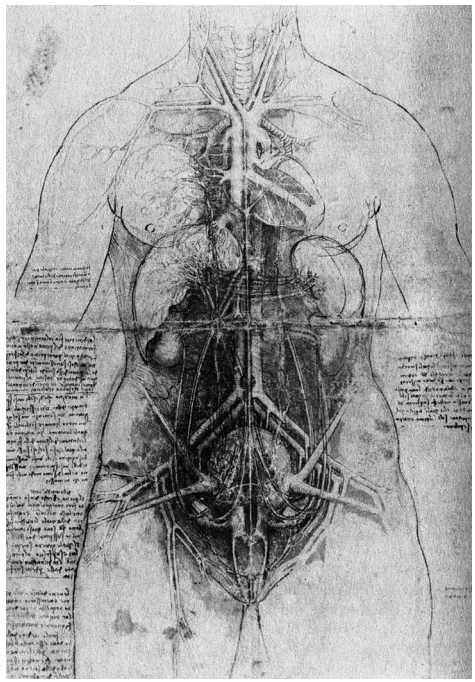
But as Evans notes:

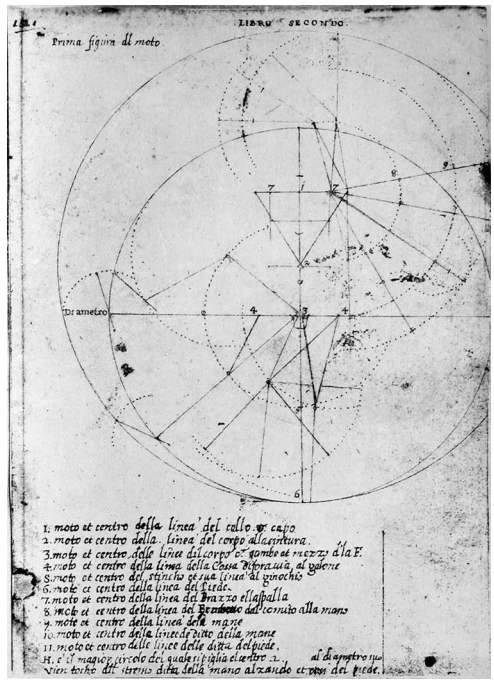
> Human figures are recalcitrant to direct survey by Alberti's linear perspective, but that did not prevent occasional attempts to render them surveyable. Alberti himself spoke of the body as an assembly of faceted planes, which, by implication, could be recorded with the same precision as pavements.[159]

Only a few overconscientious theorists had the patience to apply perspective construction to human figures. Amongst these was Piero della Francesca. Evans continues:

> Painters like Botticelli and Raphael found a different type of liberty in Alberti's central perspective. Architecture







3.102 Unknown artist, bodies in space, from *Codex Huygens*, fol. 126, c. 1570.

3.103 Leonardo da Vinci, *Anatomical Drawing of a Woman*, c. 1508.

3.104 Unknown artist, diagram of proportions, from *Codex Huygens*, fol. 12, c. 1570.

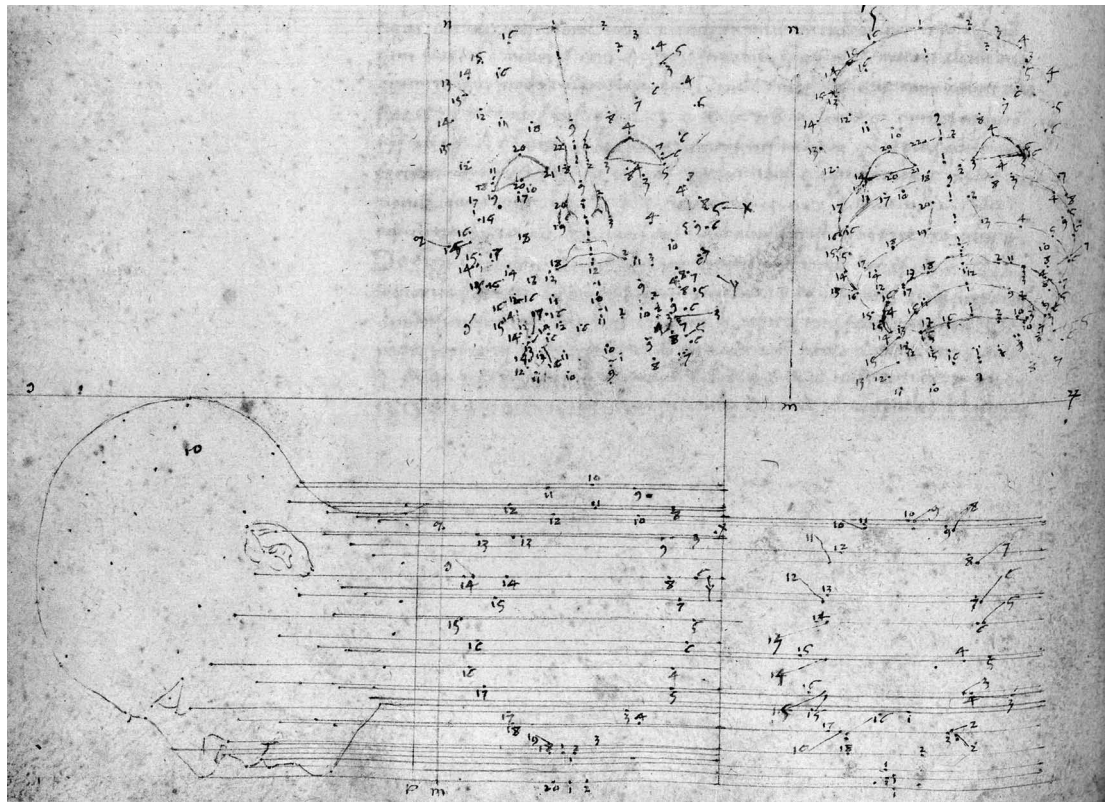
> (plotted) is marshalled by the system of projection, while figures (intuited) move freely in its measured space. In Piero's art people and things seem to be more alike. Such an effect would be the natural consequence for using the Other Method for both figures and objects, as happens in *De prospectiva pingendi*.[160]

Piero's 'Other Method' depends on orthographic projection and the dissolution of surfaces into constellations of dots; he refers to objects drawn that way as 'put in true form' (fig. 3.105).

According to Evans, the perspective result was achieved entirely by orthographic means, just like architecture: 'Piero's other method makes pictures of light paths between points in exactly the same way that architects make pictures of buildings.'[161]

My animation, *Proving*, 2001, tests Evans's hypothesis that the five heads in Piero della Francesca's *Proving of the True Cross* derive from the same template. The animation presents them in a continuous succession, like a single head turning. Parts of the transition were successful but changes in hair and headdress made it difficult to conceive this as a single head. An unexpected side-effect was the sudden appearance of volume: the ordered succession of these perspective views gave the impression of a three-dimensional figure blossoming out from the flat background (figs. 3.106, 3.107).

Dürer also insists that exact perspective construction of human figures is only possible on

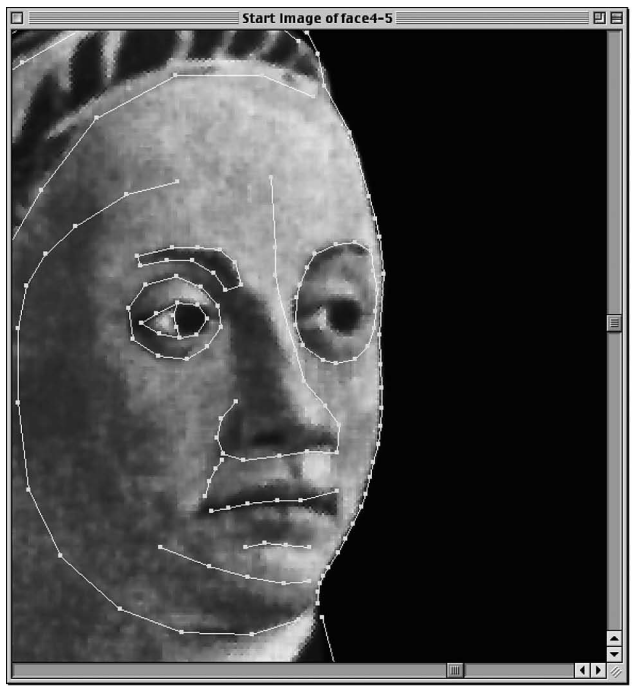


3.105 Piero della Francesca, constellation of points describing the form of a tilted head, *De prospectiva pingendi*, c. 1470–80.

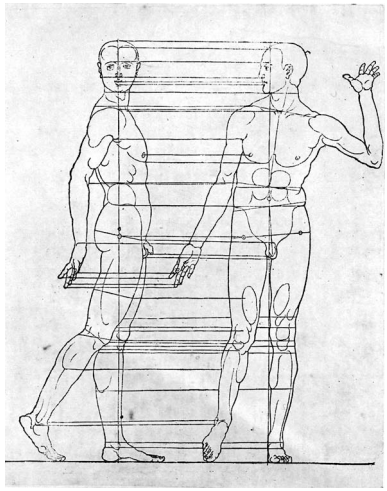
the basis of diagrams obtained by parallel projection: 'for if one wants eventually to use the posed figure for a foreshortened and lifelike picture, it is necessary to have such (diagrams) from which one can evolve it.'[162] According to Michelangelo, though, Dürer's articulation of theory fails to describe the essence of human form: '[he] treats only of the measure and kind of bodies, to which a certain rule cannot be given, forming the figures as stiff as stakes; and what matters more, he says not one word concerning human acts and gestures' (fig. 3.108).[163]

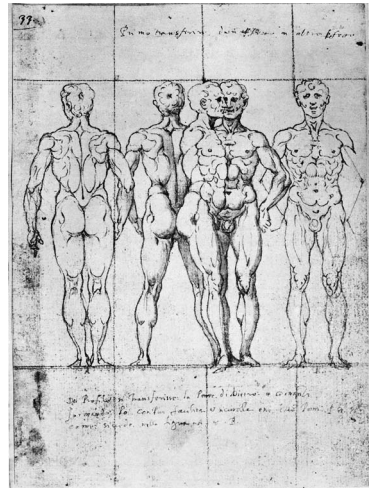
The author of the *Codex Huygens* teaches a method of transforming the profile elevation of a human figure into a front or rear elevation.[164] The three elevations are not detached from one another but directly juxtaposed and interlocked. The profile elevation establishes the vertical dimensions and mirrors outer and inner contours. Therefore the front and rear elevation 'unfold' from the profile elevation, creating what Panofsky calls a 'Siamese triplets effect' (fig. 3.109).[165] This method resembles Raphael's definition of the correct set of orthographic drawings for depicting buildings (fig. 3.110). During the Renaissance the newly developed

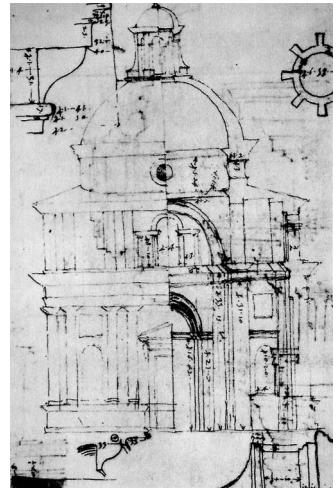



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3.106 *Proving*, 2001. Digital animation by the author.

3.107 *Proving*, 2001. Screenshots of the network of points guiding the transformation of the head while using the software *Morph*. Digital animation by the author.

3.108 Albrecht Dürer, constructing the human body, from *Vier Bücher von menschlicher Proportion*, 1528.

3.109 Unknown artist, Siamese triplets effect, from *Codex Huygens*, fol. 33, c. 1570.

3.110 Giovanni Sallustio Peruzzi, drawing of Sant' Eligio, c. 1560–65.

understanding of space through orthographic projection, employed for the design of buildings, was seeping into the depiction of the human body, turning it into soft architecture.

In the Middle Ages the work of art was a symbol, a single abstracted template whose simplicity conveyed the dimensionless whole. However, after the new understanding that perspective affords, this single template changes into a system consisting of two or three orthographic projection drawings perpendicular to each other, describing space as a ruled three-dimensional continuum. Given the appropriate set of templates, space can be reconstructed as an image: a plan, elevation and section are not only necessary to construct a new building, but become the necessary blueprint for the correct construction of pictorial space.

The newly established 'scientific' practice of painting proved the assumed correctness of perspective construction in the representation of the visual. Additionally, it generated the idea that all objects can be rendered correctly from any point of view if their orthographic projection templates are defined; like a genetic code for visual entities these may have also begun to be perceived as pre-existing the objects and including information for their physical formation. This was legitimate for architecture, where plans and sections preceded buildings, and described their construction. Natural forms and bodies, though, posed a problem. Constructing the form of a human body from a plan and section might seem unnatural and forced, but Leonardo tended to believe it was possible in sculpture:

> The sculptor says that he cannot make one figure without making an infinite number, on account of the infinite number of contours possessed by any continuous quantity. It may be replied that the infinite contours of such figure can be reduced to two half figures, that is, one half from the middle

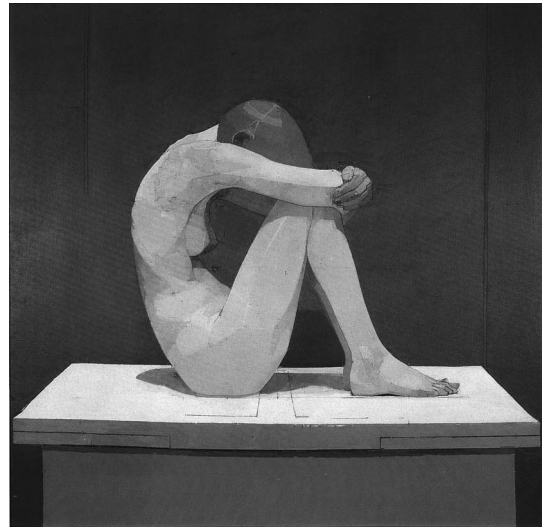
> backwards and one half from the middle forwards, which, if correctly proportioned, will combine to make a figure in the round. These half figures, exhibiting the due relief in all their parts, will embody in themselves without additional assistance all the infinite figures which the sculptor claims he must make.[166]

In the *Large Glass*, perspective construction successfully represents the domain of the Bachelors because they are reduced into uniforms and separated into recognizable geometrical forms; their images and positions are rendered from a plan and section (see fig. 4.1). The stripping, the revelation of the Bride's nudity in the upper part, transports her into the fourth dimension. Orthographic or central projection is inadequate to represent nudity so she is not precisely projected but graphically codified; the need to represent her sublime four-dimensionality mathematically was not satisfactorily met (see fig. 4.15). Here we will study the nude cast in *Given* as a second attempt to precisely project the geometrical complexity of the naked Bride.

3.6.3 FROM TWO REGULAR HORIZONTAL POSITIONS FROM THE EYE

British painter Euan Uglow's depiction of the form of a female body is close to both Piero's renderings of the human form and Duchamp's nude. According to Martin Golding, Uglow's work:

> Takes the most sensual and immediately interesting object, the human body, and puts it out of reach of time and desire; it takes the most purely rational concept of which mankind is capable, mathematical order, and makes it a delight to the senses.[167]



3.111 Euan Uglow, *Summer Picture*, 1971–72. Private collection. With kind permission from Marlborough Fine Art.

What works is 'right' not 'like', Uglow insisted.[168] Correctness is not a matter of representing the appearance faithfully but of the whole image becoming harmonious and readable. So he arranges his poses to convey the image he has in mind. This contradiction between appearances and idea finds an extreme in *Summer Picture*, 1972, and is manifest in both the nude figure and the simple stage framing her (fig. 3.111). Uglow had to wait 45 minutes in every hour for the model to relax her back into the 'unnatural' pose, matching his idea of the perfect curve of her back. He also built the table (on which the nude sits) wider at the back because he found the observed perspective too 'violent'.[169]

His 'correction' of the physical form of the table makes it appear closer to the ideal, the 'right' one. The tactile idea of the solid shape of the table, as a rectangle with parallel sides, is more resilient than the trapezoid that foreshortening renders visually.

The natural binocular perception of the table from the position of the painter would also be less violent. The table is therefore physically cut into an inverted trapezoid to look straighter, to fit into the mould of the right image: the perceptual residue of the table in the mind, which is both visual and tactile.

According to Golding, Uglow's most single-minded investigation is the *Nude, from Twelve Regular Vertical Positions from the Eye*, 1967. Making this painting involved building an apparatus, a throne-like structure of variable height, which allowed Uglow to view the model from twelve different levels. For Golding:

> [Although] the whole enterprise might be described as an experiment in a rigidly literal monocular vision, the upshot is in effect a conceit, which gives the model a majestic presence which reverberates. The arrow-headed interventions – the gaps occasioned by the apparatus – become her properties; armed with which she remains separate and whole, unaffected by the lesions the analytic vision opens. The scrutiny of that analytic eye, with its deliberate separation of the familiar whole into unfamiliar parts, creates an image which is barbarically strange, like something by Ingres.[170]

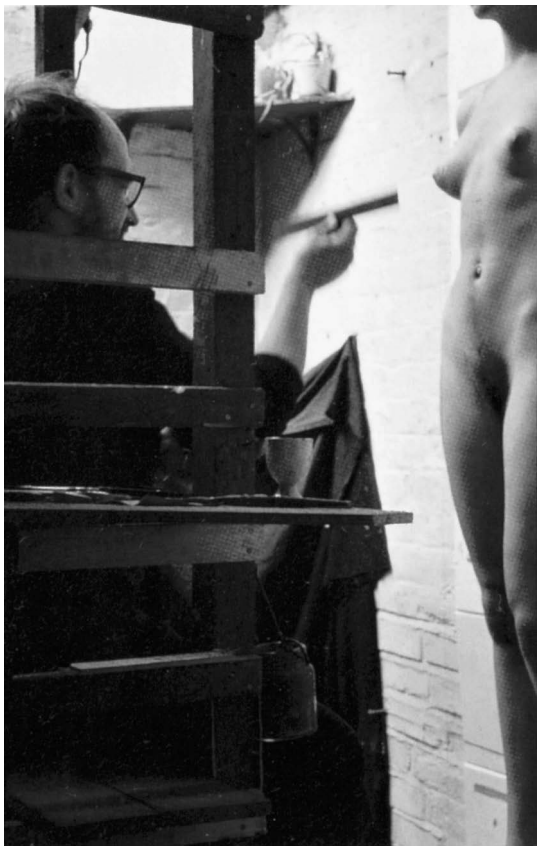
Uglow's representation of the nude differs from the normal visual perception of it: he splits the view into twelve segments which correspond to his changing position on a vertical axis. By 'dissecting' vision the resulting painting, a two-dimensional image, becomes a composite drawing offering precise geometric information about the spatiality of the nude (figs. 3.112 and 3.113).

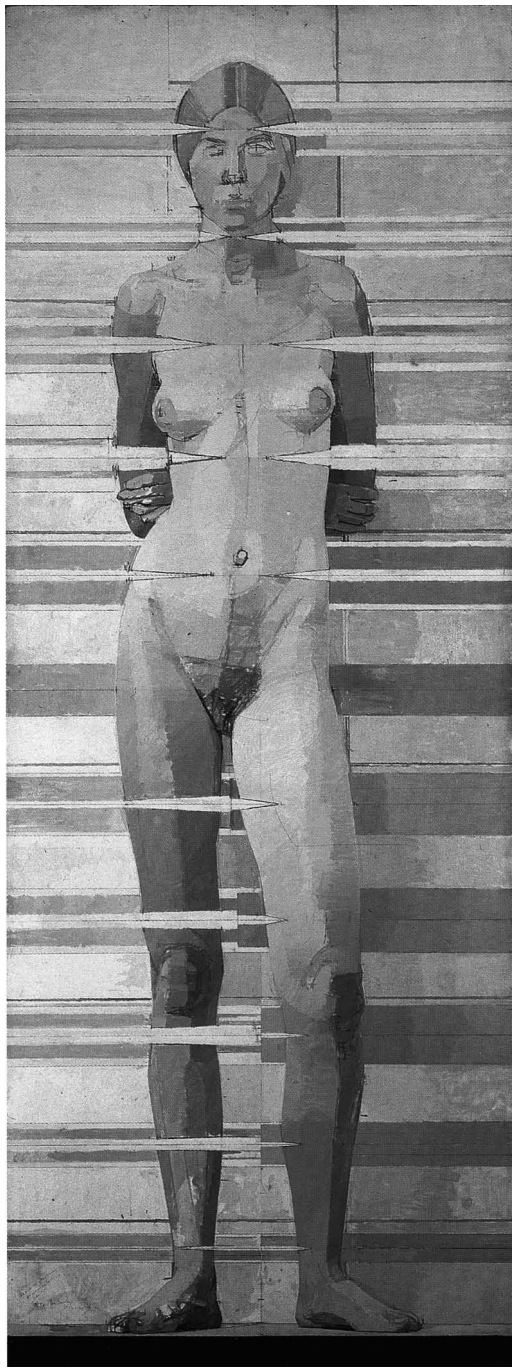
Uglow asserted that one should be able to figure out the form just by studying the dagger-shaped triangles that separate the painted areas. Indeed, the shape of these triangles describes depth and accurately renders the three-dimensional volume of the nude in two dimensions similarly to an architectural drawing.

Uglow's gaze measures the body as the vertical movement of his single eye, on the relocating contraption, scans its form. The picture describes the contours of the figure, but also the painter's presence as a body looking from regulated positions in space like a surveying tool. The machine reduces the distortions of one-point perspective by placing the eye nearer to each segment and attempts to grasp the fleeting purity of a body as it exists theoretically, without these distortions. Consequently, the view is closer to a tactile than a visual evaluation. His depiction pins down the nude like a captured butterfly, but bestows on her the blossoming of volume.

The gap between vision and touch is brought to the surface. The scanning eye seeks an extra dimension to bridge between the visual and the tactile. There is a tense relationship between the eye, the hand and the nude, as the stretched arm sets up the distance from the picture plane, and the hand holding the eye beam is close to the nude but never touching. Visual rays penetrate and immobilize the nude inside the box of the canvas. The monocular gaze of the painter is sharp: the resulting daggers pin down her escaping three-dimensionality.

As we will see, Poincaré suggests that the consistency of the laws according to which different perspectives of the same body taken from different points of view succeed each other inspires the idea of geometric space.[171] Duchamp's *Nude Descending a Staircase*, 1912, is an aggregate of superimposed images of a body in motion observed from a static

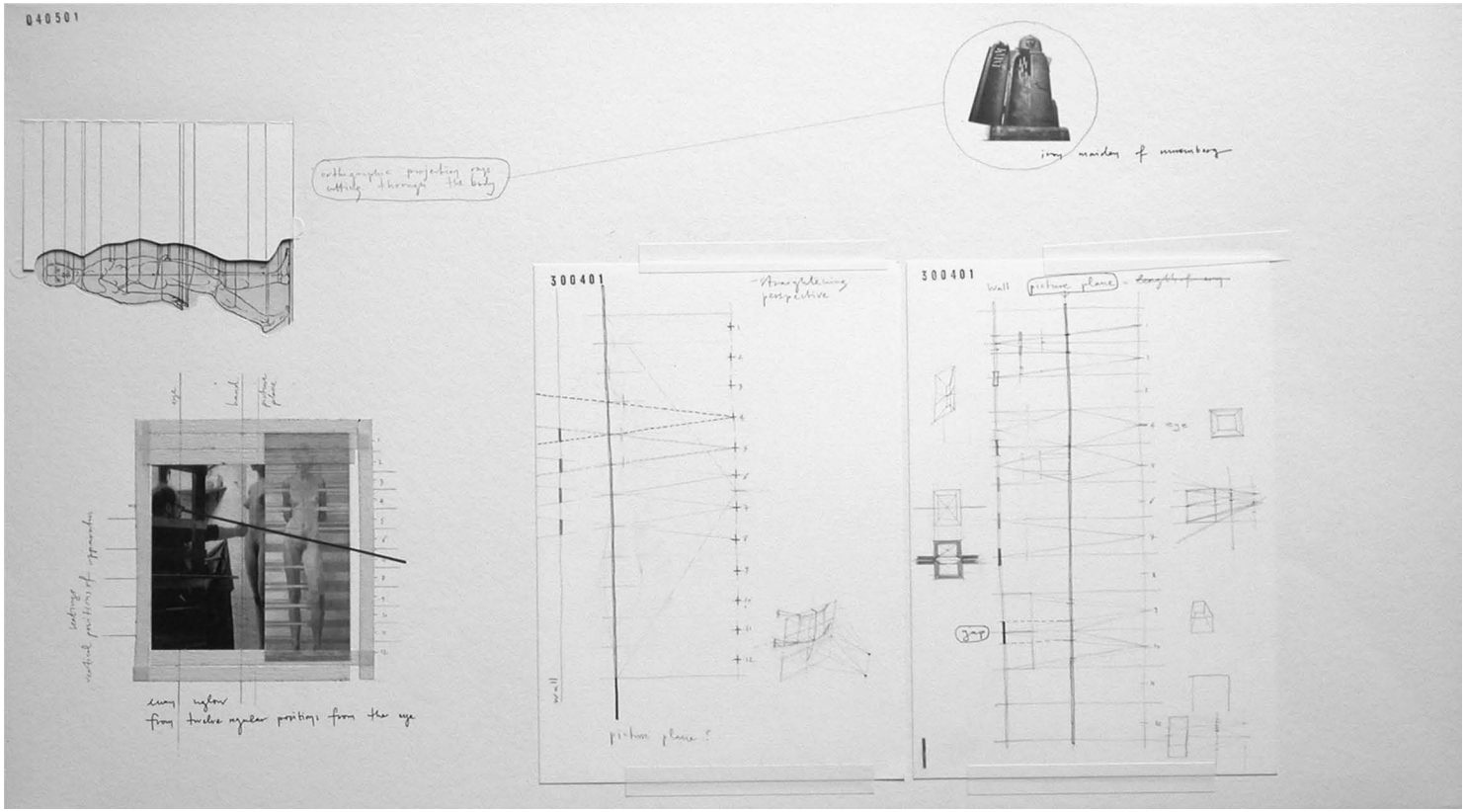




position. The images of the nude succeed each other according to the intervals defined by the staircase. *Nude, from Twelve Regular Positions from the Eye* is also a composite image, an aggregate of twelve different views of the nude that succeed each other according to the intervals defined by the painter's viewing armature. Here the nude is static and the painter's eye descends and relocates itself in twelve steps. Both works use an ordered succession of images to describe in a composite coded picture the geometric spatiality of the naked body (fig. 3.114).

3.112 Uglow on his repositioning device surveying the model for *Nude, from Twelve Regular Vertical Positions from the Eye*, 1967. Uglow archive. With kind permission from Marlborough Fine Art.

3.113 Euan Uglow, *Nude, from Twelve Regular Vertical Positions from the Eye*, 1967. University of Liverpool Art Gallery and Collections. With kind permission from Marlborough Fine Art.

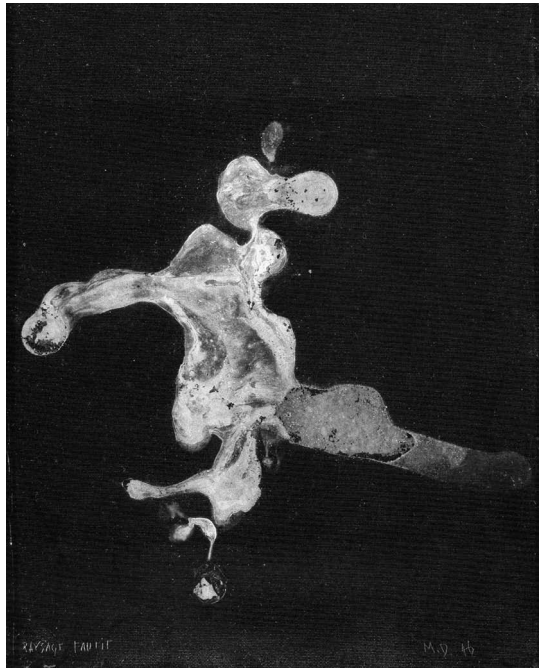


3.114 *Illuminated Scribism*, plate 24, 2002. Study of Uglow's, *Nude, from Twelve Regular Vertical Positions from the Eye*. Drawing by the author.

In binocular vision, space derives from the ordered 'succession' of just two images. Duchamp's final nude in *Given*, whose image is the mental composite of the succession of the two views from the peepholes, is therefore a precisely described nude 'from two regular horizontal positions from the eye'.

3.6.4 NOTRE DAME DES DÉSIRS

Duchamp suggests the start date of his final secret project in the inscription on the invisible arm of the dummy: *Étant donnés, 1° la chute d'eau, 2° le gaz d'éclairage …, 1946–1966* (see fig. 3.2). Also in 1946, Duchamp offered one of his *Boîtes-en-valise* to the Brazilian sculptor Maria Martins, known as Maria. Each box includes reproductions of Duchamp's works and an original new piece; Martins' was a 'surpassingly strange drawing on celluloid backed with black satin: an abstract, flowing, amoeba-like shape that resembled nothing else in his entire oeuvre'.[172] Its title is *Paysage fautif (Faulty Landscape)*, 1946, and in 1989, chemical analysis disclosed that the drawing medium was seminal fluid (fig. 3.115).[173]





3.115 Marcel Duchamp, *Paysage fautif*, 1946. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.116 Maria Martins in *Vogue*, 1944.

The desire fuelling the conception and execution of *Given*, in contrast to the abstract idealized absence of the Bride in the *Large Glass*, had a tangible focus: Martins, Duchamp's secret lover (fig. 3.116). Tomkins places their first encounter as early as 1943; soon after, Duchamp embarked on his last major work, *Given*, which would occupy him for the next twenty years.

According to Tomkins, Duchamp discovered he had fallen deeply in love with Martins on the verge of losing her. After nine years in Washington, in 1948, her husband was named Brazil's ambassador to France. Although Duchamp only met her a few times after that, they wrote to each other for four years. Martins' daughter Nora Lobo in *The Secret of Marcel Duchamp* remembers:

> Marcel was a very independent person, … a very separate person, he was a bit of a spectator in a sense. He … [n]ever had really wanted to live a life together with somebody. But he definitely wanted mother to leave everything and rent a studio in front of his down on Fourteenth Street and go on creating while he watched. And this was definitely an idea, he dreamt of that and he wrote about that.[174]

Martins refused; instead, Duchamp made the studio his secret room, where he constructed his desire-filled fantasy. Martins role in the conception and construction of *Given* was central: according to her daughter, Martins would have been 'indignant that



3.117 Maria (Martins, Maria), *The Impossible III*, 1946. Digital image, The Museum of Modern Art, New York/Scala, Florence. © DACS, London 2013.

an artist as important as Duchamp was not working on anything much' and might have urged him to reconsider his abandonment of art for chess and encouraged him to begin just such an ambitious project;[175] moreover, she was the inspiration for this second appearance of the Bride, and their passion was its driving force. Absence pushed her desired image to an unreachable domain and her unattainability transformed her into the perfect 'Bride' (fig. 3.117).

Duchamp's letters to her allude to the work's progress. Only he and she knew about it, and in one letter he refers to the nude as '*N.D. [Notre Dame] des désirs*'.[176] In 1947 he gave her a pencil drawing, the first relating to *Given*, for which Tomkins believes she was the model as well as for all subsequent studies. He also suggests that even before her departure, Maria had become a 'physical presence' in his work: the model of the final, life-size three-dimensional nude in *Given*.[177]

Given is therefore an elaborate and painstaking substitution of Duchamp's lover by the dummy of her missing body, a daydream coming to life and a structured diorama fleshing out his recollection of her coveted tangibility. Moreover, Duchamp in reproducing Martins' body tries to arrest the

fleeting architecture of his desire and present it with mathematical exactitude.

According to Lobo, Duchamp's attitude changed after his affair with Martins:

> Marcel was … a bit of a voyeur. He liked to stay outside the picture and look in. Look in, like the *Étant donnés* where you look in – perhaps that's part of it. To participate was very difficult. I think my mother broke through, I think that Maria broke through this … invisible glass wall of his.[178]

The following section analyses Duchamp's preparatory studies for the construction of *Given*, in search of clues clarifying his working methods.

3.6.5 PREPARATORY STUDIES

Duchamp made a series of preparatory studies in relation to the construction of the nude figure in *Given*. The dating of these studies is inconclusive, not only because some of them were only dated posthumously, but also because Duchamp's dates often reflect when he offered them as gifts and not when he constructed them.

3.6.5.1 FIRST SKETCH

A preliminary pencil sketch of 1947 is inscribed on the lower left: *Étant donnés: Maria, la chute d'eau et le gaz d'eclairage (Given: Maria, the Waterfall, and the Illuminating Gas)* (fig. 3.118).[179]

This is the first indication that the model for the nude in *Given* is Martins. The body in the sketch, though seen from a different point of view, has the same posture as in *Given*, but seems flat and angular. All studies in this first period of the nude's development lack the apparent curvatures of the body in *Given*. Moreover, the similarity of the sketch's title to the introductory note in the *Green Box* is the first sign of a connection between *Given* and the *Large Glass*.[180]

In this preliminary stage there is an added third 'given': Maria, the name of the desired nude. So, the title would be: Given a female naked body, the waterfall and the illuminating gas…. Or, perhaps more accurately: Given three forms, which are difficult to describe through perspective construction with precision.

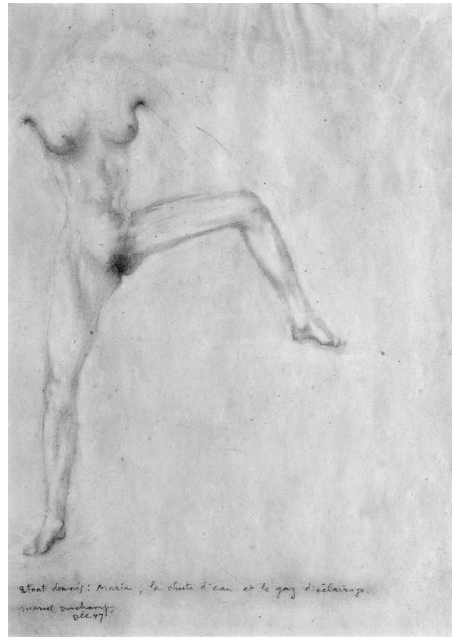
3.6.5.2 COLLAGE

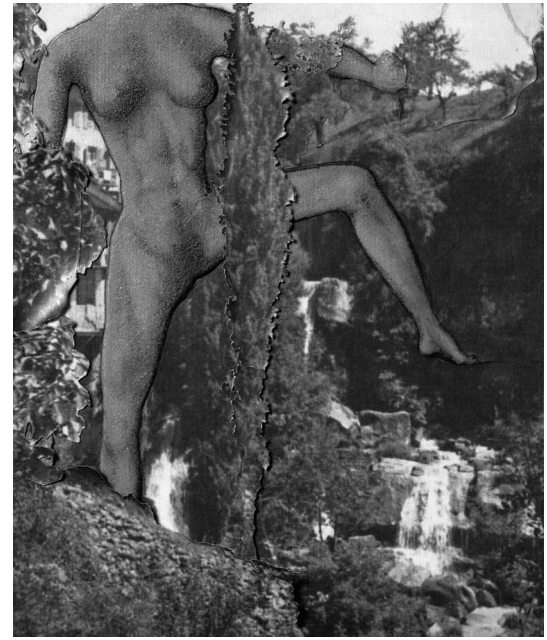
Another untitled piece also dating from 1947 is an untitled photographic collage (fig. 3.119).[181]

The collage introduces the landscape behind the nude figure, where some of the elements in the final piece are already present. The background is a composite of black and white photographic prints with the same view of the waterfall; in *Given* a similar image is enlarged, tinted and backlit to form the landscape. The left hand is clutched in a fist as if holding something, but the lamp is absent. Added layers of foliage embed the body in the landscape and obscure her right forearm and the lower part of her left leg, while the head is cut off by the added top layer of the image's border. The body is consequently 'severed' just as the nude in *Given* is cut off by the boundary of the breach. The figure, of a yellowish translucent wax, is a shallow relief attenuated by the illusionistic treatment of shadows. All the elements which will compose *Given* appear in this collage flat and layered, before their final blossoming in the assemblage.

3.6.5.3 RELIEF

Another important preparatory work offering clues





3.118 Marcel Duchamp, *Étant donnés: Maria, la chute d'eau et le gaz d'éclairage*, 1946. Moderna Museet, Stockholm. Gift, 1985, dedicated to Ulf Linde from Tomas Fischer. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.119 Marcel Duchamp, *Untitled*, photocollage landscape study for *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*, c. 1946. Private collection. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

regarding Duchamp's methods is a relief, of painted leather over plaster, mounted on velvet (fig. 3.120).[182]

Inscribed in French on the back is:

> This lady belongs to Maria Martins/with all my love/Marcel Duchamp 1948–49/ – to illuminate: from the top right with a diffused light to avoid strong shadows./In case of restoration or re-framing avoid touching the woman since her skin is tinted with lead pencil in the shadows – this lead pencil is not fixed and it could not be fixed (even light fixative washes away and causes the pencil to disappear).[183]

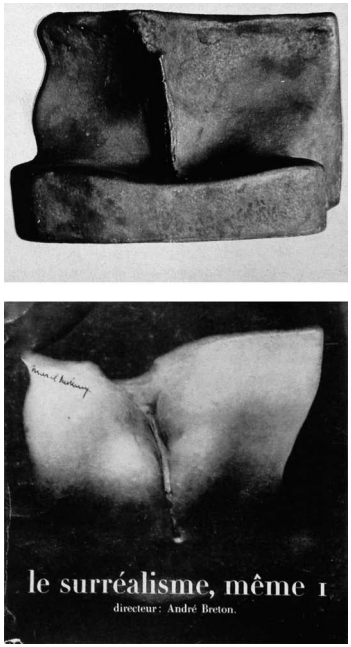
The first public appearance of the relief was in the 1966 Duchamp retrospective in London. At that time no one knew of *Given*'s existence, so it was unconsciously apt that the exhibition, organized by Richard Hamilton, was entitled 'The Almost Complete Works of Marcel Duchamp'. Martins, requested by Hamilton to lend the important 1911 painting of a coffee mill, offered something else by Duchamp, as well. It was the relief, which arrived late, when the show was being hung, without any further explanation from Martins. Duchamp, not previously notified, saw it hanging shortly before the opening, when he came to view the installation. According to Hamilton, he demanded its source, and, although clearly dismayed, offered no information and did not ask for it to be removed from the show.[184]

The nude appears in the same position in plan as the one it eventually occupies in *Given*, but is viewed frontally and not at an angle as through the peepholes. So a clear layout of the entire assemblage existed probably from this early stage.[185]

Presented in relief, this smaller nude is



3.120 Marcel Duchamp, Study for *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*, c. 1946–48. Gelatin silver print by unknown photographer, 1950. Moderna Museet, Stockholm. Gift, 1985, dedicated to Ulf Linde from Tomas Fischer. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.



3.121 Marcel Duchamp, hand-coloured *découpage* of *Feuille de vigne femelle*, 1966 and cover for *Le Surréalisme, même*, no. 1, 1956. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

accompanied by lighting instructions. Significantly, detailed lighting instructions are an important aspect of Duchamp's *Manual* for *Given*. The precise illumination instructions for the relief prefiguring *Given* suggest that the apparent form of the nude might depend on light source position and orientation. Like in the previous two sketches, the figure appears distorted, although the pose is the same. Duchamp mentioned to Schwarz that the figure in the relief was that of the Bride in the *Large Glass*, finally unclothed and treated in '*trompe l'oeil* fashion'.[186] This might suggest that the piece is not supposed to be seen from the front but tilted, lit and viewed from an angle, as in *Given*.

Duchamp's interest in manipulating the apparent form of an object by special lighting is manifest in another related work: a photograph of the *Female Fig Leaf*, 1950, taken for Breton's magazine *Le Surrealisme, même*, 1956, following Duchamp's instructions.[187] The object was lit to appear 'inside out and upside down' and Duchamp retouched the photograph, accentuating its contours and enhancing the reverse appearance of a convex form (fig. 3.121).[188] This control over illumination and viewing point transform the apparent spatiality of the object. Duchamp uses *Female Fig Leaf* as an optical mould for casting its own inverted illusory volume.

Clair detects a reciprocity: the process is identical to the placement of the elements on the *Large Glass*, where an accurate drawing of the figure in plan, as in the *Stoppages*, is rendered in perspective, suggesting an illusory space beyond the surface of the glass.[189]

A field of spots, like shallow pinhead indentations, on an orthogonal grid appears to cover the whole 'skin' of the nude in the relief. In relation to these dotted imprints, Schwarz mentions the late-medieval torture machine, the 'Iron Maiden of Nuremberg', a body-shaped coffin lined with spikes: 'Duchamp explained to me that in order to obtain the spots on the "skin" … he had placed it in a coffinlike case similarly lined with sharp points.'[190] Schwarz, perhaps misunderstanding Duchamp, suggests that he first sculpted or moulded the relief and then placed it in a box with spikes on a grid to obtain these indentations.[191] Nevertheless, as we will see this remark by Schwarz is significant because it corroborates the argument that the process was the reverse: the coffin-like case with points is the mould in which the skin was formed, and the marks on the skin are traces of a sort of matrix used for determining the three-dimensional shape. The marks are not thus traces of torture, as Schwarz suggests, but soft touches of the structure defining the apparent volume of the figure.

I suggest that this study in relief is a small-scale test of the technique that Duchamp was planning to use in the three-dimensional rendering of the *Given* nude, which I will describe later.

3.6.5.4 PERFORATED

d'Harnoncourt and Walter Hopps in *Étant donnés, 1° la chute d'eau, 2° le gaz d'éclairage: Reflections on a new work by Marcel Duchamp,* 1987, admit that little information has emerged about the origin of Duchamp's ideas for the piece, or the progress of its execution over two decades.[192] One of the 'few odd bits of visual evidence' connected by the construction of the nude is (fig. 3.122):

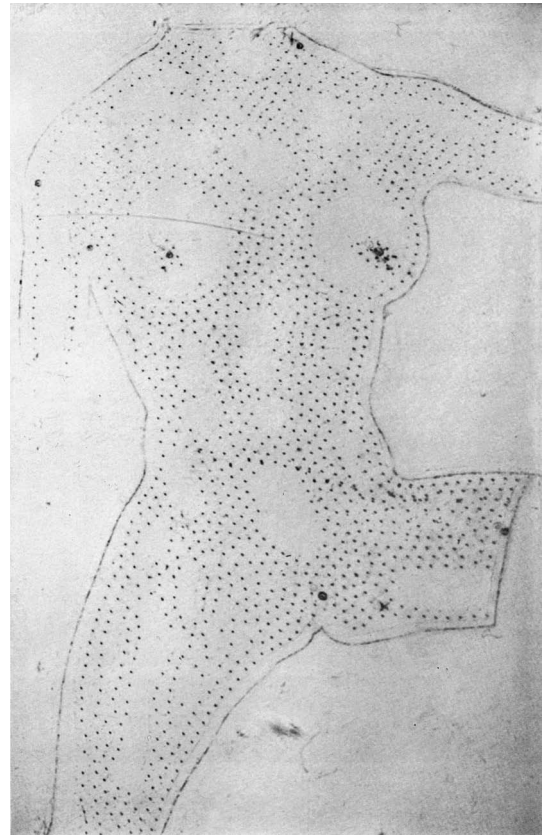
> A sheet of transparent plexiglass [Perspex] on which the outline of the nude figure is lightly traced in white gouache

> and through which small holes are drilled to conform with the contours of the figure, somewhat like a geodetic survey map. This rather mysterious object is not a work in itself but rather a working tool, apparently used by Duchamp in some stage of the evolution of the figure, possibly to transfer its outline and contour from one substance to another.[193]

We have referred to the nude in *Given* as a cast, but the word is not used in its traditional meaning – an object made by shaping plaster in a mould, made from perhaps a human model, Martins for example – because this seems not to accord with Duchamp's preoccupations. His concept of a mould as 'apparition' describes intellectual and projective rather than physical processes.[194] The fabrication may have been guided by a determination to capture the Bride's image with precision but the obviousness of a physical cast could not successfully describe the impossibility of desire.

If the nude is not a traditionally defined cast it might be a sculpture. However, one could assume that, like Leonardo, who valued the intellectual processes involved in perspective projection above the physical fatigue and the direct transfer involved in sculpture, Duchamp was also interested in art as a *cosa mentale* and in projection as the 'artifice of the maker', a way of not only depicting but also conceptualizing space.

Moreover, his *Manual* shows the nude from different points of view, revealing a peculiarly distorted figure and suggesting it was constructed to be seen from only one position (fig. 3.123). From the two peepholes the nude appears as a full three-dimensional volume, an effect not retained in other views where the figure looks flat, implying a projective process in its creation.



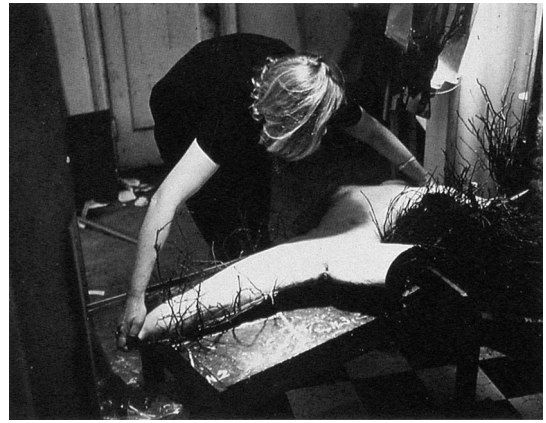
3.122 Marcel Duchamp, preparatory study for the figure in *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*, c. 1950. Private collection. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

The Perspex sheet resembles the methods employed by the Renaissance perspectivists. As we have seen, Piero stored the coordinates of a human head as a field of points in templates he could then project from different points of view and in different positions.[195] The set of templates he called the 'pure form' of a head was thus the coded form which allowed the correct rendering of all possible views in two-dimensional perspective (see fig. 3.105). Moreover, the Perspex sheet is reminiscent of the Dürer woodcut that shows two men drawing a lute by

painstakingly defining through touch, point by point, its two-dimensional trace on a panel (see fig. 4.26). The Perspex sheet is also perforated with a field of dots following the curves of the figure which perhaps describe the three-dimensional form of the nude in *Given*. This makes the sheet a 'pure form' of the nude before projection in a three-dimensional view.

We have seen the indentations on the earlier scaled relief of *The Illuminating Gas and the Waterfall* as a trace of the method Duchamp followed to determine depths and cast the shape of the nude. The affinity between the grid of marks and the pattern of perforated holes on the Perspex sheet suggests that the two works shared a similar process. On the Perspex, the grid loses the orthogonal delineation and follows the contours of the nude, which, according to d'Harnoncourt, is 'somewhat like a geodetic contour map'. Indeed, topographical maps describe surfaces as constellations of points, organized in contour lines for simplicity (fig. 3.124).

Thus the Perspex sheet may be a tangible full-scale map for constructing the *Given* nude. If it is constructed with the aid of a sort of 'geodetic contour map', then perhaps the process Duchamp followed to record and measure the contours of the human model is the one used to measure the contours of a landscape. Geodetic contour maps are usually the outcome of stereo-photogrammetry, which uses a stereoscopic pair of aerial photographs of the terrain. With a complex system of viewing and measuring the technique offers the x, y, z coordinates of points defining the contour of the landscape. Stereo-photogrammetry is based solely on optical measurements with minimal physical contact. Duchamp's possible use of stereo-photogrammetry to survey the model and construct the nude would make it not a physical but a visual mathematical cast plotted in space (fig. 3.125).

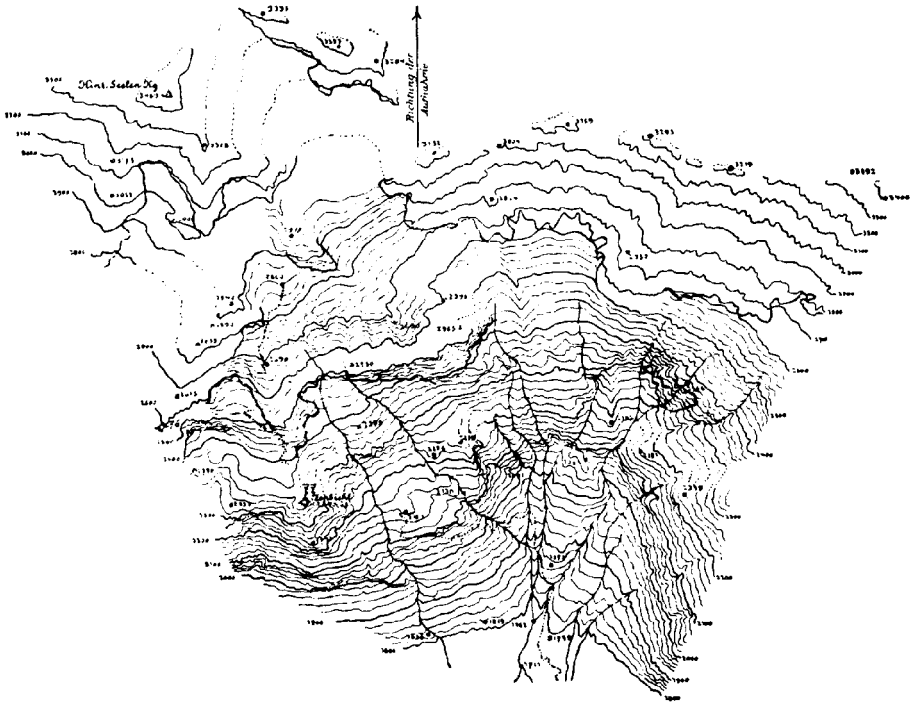


3.123 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.6.5.5 SKINS

One of the most engaging revelations during the 2009 exhibition celebrating the fortieth anniversary of the unveiling of *Given* at the Philadelphia Museum of Art was the presentation of two previously unknown studies for moulding the parchment skin that forms the epidermis of the nude. The two fragments consist of a headless female upper torso with the stubs of both arms and a female lower torso. Melissa S. Meighan provides a detailed description of the two parchment studies in her technical essay in the exhibition catalogue.[196] The two pieces are evidently part of a trial and error process in Duchamp's attempts to shape the parchment (figs. 3.126, 3.127).

Possibly, one or both of these are part of what he mentions as a 'more or less definitive test' in his 12 October 1948 letter to Martins. Nevertheless, the test was not definitive enough as Duchamp continued





3.124 One of the first plots of contour lines representing a recorded landscape and produced on the stereo-autograph by von Orel-Zeiss, 1911.

3.125 Contour lines connecting the pattern of perforations on the Perspex sheet, 2002. Drawing by the author.

struggling with the forming process in the years to come.

Although dating from the late 1940s, and not treated with utmost care – at least the lower torso skin has been used as a testing surface, with obvious traces of paint, graphite, wax and resin – both fragments still hold their shape surprisingly well. Visually enigmatic and compellingly beautiful, their texture and shape resemble large dried leaves or flowers; or perhaps a shell resulting from the nude's 'ecdysis', the moulting of her epidermis. The newly revealed existence of the two fragments supports the conjecture that Duchamp may have wished for the Bride to be represented as a free-standing, moulded skin.

Significantly, similarly to the earlier relief study and in contrast to the final mould, the surface of these test parchments is speckled with a field of small rounded convex indentations. Unlike the earlier relief, however, the pattern is not an orthogonal grid, but closely matches the constellation of perforations found on the Perspex sheet, suggesting that perhaps this was employed in the process of moulding them. If so, how?

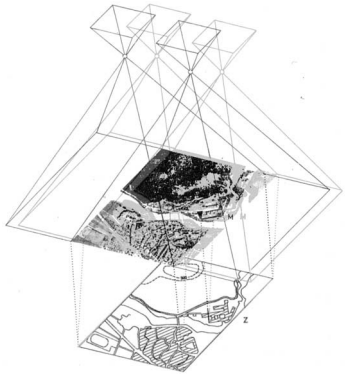
3.6.6 REMOTE SENSING

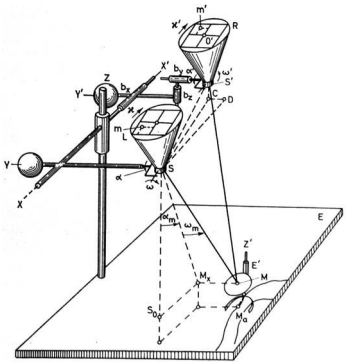
Normal binocular vision is subjective: rendering of depth relates to distance between the eyes, acuity of vision in each eye, level of concentration, degree of coordination between the eyes and other physical and psychological factors. Nevertheless, this does



3.126 Marcel Duchamp, *Untitled (Skin for Upper Torso of the Étant donnés Figure)*, c. 1948–49. Philadelphia Museum of Art. Gift of Mme Marcel Duchamp. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

3.127 Marcel Duchamp, *Untitled (Skin for Lower Torso of the Étant donnés Figure)*, c. 1948–49. Philadelphia Museum of Art. Gift of Mme Marcel Duchamp. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.





3.128 Anaglyphic drawing demonstrating the principle of stereo-plotting.

3.129 Nikolai Adamovich Valyus, diagram of intersection in a double projector, from *Stereoscopy*, 1966.

not preclude accordance between subjective binocular depth and measurable depth. Furthermore, an observing apparatus, not a human subject but a 'binocular' instrument – for instance a stereoscopic camera – with known internal geometry, can offer precise measurements of depth.

Due to the illusory character of stereoscopic images, the stereoscope is perceived as a trick, a deceptive apparition of reality. In 1866 Austrian physicist and philosopher Ernst Mach noted that one application of the stereoscope, 'which is quite obvious but has not been used', is to estimate or even measure spatial quantities.[197] Indeed since the later invention of stereo-photogrammetry stereoscopic photographs have been used for the precise survey and three-dimensional determination of physical forms in many scientific disciplines. The measurements, which derive from optical sources through geometric calculations, require no physical contact with the object.

Stereo-photogrammetric methods determine the spatial relationships between objects and provide a complete geometric picture of the relief of the photographed area. The method consists of taking photographs from at least two viewpoints separated by a known distance, the 'base'. If the internal geometry of the recording apparatus, the camera, is known, the pictorial differences between the two images of the stereoscopic pair operate as a set of drawings providing precise measurements of volumetric relationships in the depicted scene. The relief of a locality may be determined by measuring the geometric relationships of a projected virtual model of the object (fig. 3.128).[198]

If two projectors replace the cameras that photographed the object in the original positions relative to it and project the two negatives, the rays that pass through the corresponding points of the object reconstitute its virtual geometric form. The essential feature of this process is that it produces such a stereoscopic substitute and makes measurements upon it, instead of the real object (fig. 3.129).[199]

Because stereo-photogrammetry accurately measures objects without touching them, the technique is also known as 'remote sensing'.[200]

3.6.7 STEREO-PLOTTER

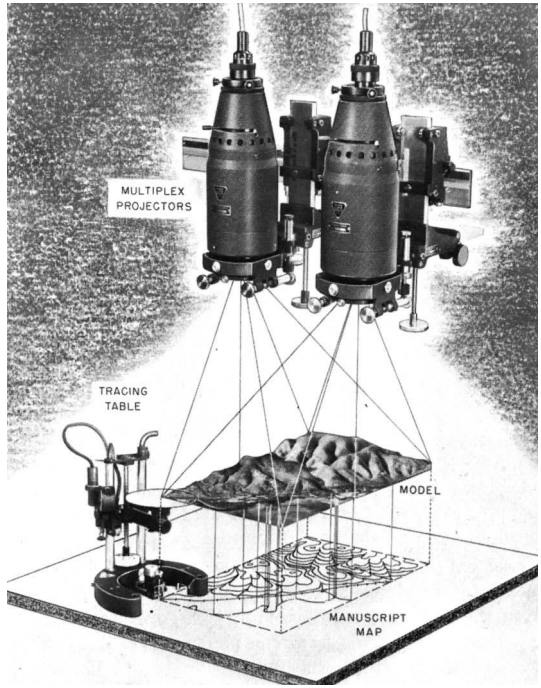
One of the original machines developed to turn the pictorial qualities of stereo-photography into precise measurements of volume is the stereo-plotter: an analogue stereo-photogrammetric instrument using a pair of anaglyphic images to establish a virtual model, identify points in space and give their three-dimensional coordinates (fig. 3.130).

The method converts the recording procedure. Two projectors, with the same geometric properties as the camera used, project negatives of the stereoscopic pair. Their positions are then rotated into exactly the same relationship towards each other at the moment of exposure. The projected light rays from both photographs intersect with each other, forming a three-dimensional optical model viewed through a stereoscope. These machines require a human operator to register the spatiality of the observed virtual object and measure depth.[201] The instrument is equipped with a 'floating mark' which can travel within the space of the virtual model and is navigated by both hands through levers. The mark is the fused three-dimensional image of two dots, one on each photograph. It can move left–right (x), up–down (y) and inwards–outwards (z). The measuring process consists of positioning

the three-dimensional mark on the surface of the virtual model. The visual sensation of placing the mark in contact with the surface can be compared to the certainty of touching. A set of coordinates x, y, z for each point in space is automatically readable on the instrument and the movements of the mark mechanically link to a drawing device, which provides a 'corrected' two-dimensional map, also known as an 'orthophoto'. The greater the number of points identified in that way, the more accurate the map of the object. Trainee operators are advised to define surfaces with as many spots as possible and avoid the easier contour-line procedure which cuts the model into slices. The instruments merge the two views and operate in a stereoscopically deep space, but the outcome, the map, is orthographic:

> The function of all three-dimensional photogrammetric plotters can be reduced to this basic operation: reconstruction of a model by means of the merger of two perspectives, and subsequent measurement and presentation of the model in a projection orthogonal to the projection plane.[202]

Stereo-photogrammetry, although using the geometry of binocular vision, aims to correct perspectival distortions and binocular ambiguities, and results in orthographic representation. The technology witnessed a rapid development, both in terms of machinery and the mathematical calculations involved, during World War II, as it was employed to record and analyse enemy terrain remotely. Was Duchamp's method in constructing the nude inspired by the function of the stereo-plotter, and is the Perspex sheet the result of his use of the device for plotting the nude's topography?

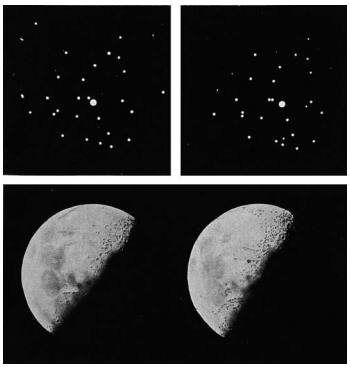


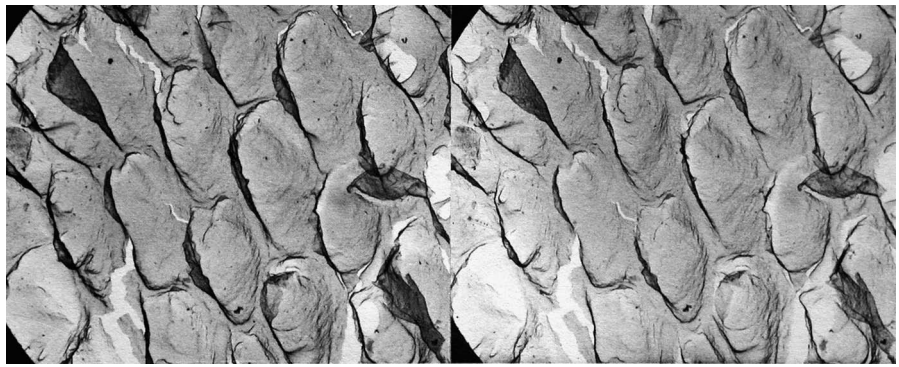
3.130 Double projector with virtual model of landscape and plotter.

3.6.8 PICTURING SCIENCE AND LUST

According to Russian stereographer Nikolai Adamovich Valyus, a representation of any three-dimensional event becomes clearer when presented stereoscopically than in a single photograph.[203] The immediacy of the cognition of the spatial arrangement replaces the need for computational calculations or the study of separate projections on perpendicular planes. Consequently, stereoscopy is used in many branches of science and engineering, including astronomy and microbiology.

Stereo-photogrammetry and the spatial understanding that it offers also relates to Duchampian concepts. For instance, stereoscopic methods enable the study of forms of higher





3.131 Nikolai Adamovich Valyus, artificially produced stereogram of the 25 stars nearest to the sun and stereoscopic photograph of the surface of the moon, from *Stereoscopy*, 1966.

3.132 Boyde and Ross, transmission electron micrograph stereoscopic pair, 1975. From Atkinson, *Developments in Close Range Photogrammetry*, 1980.

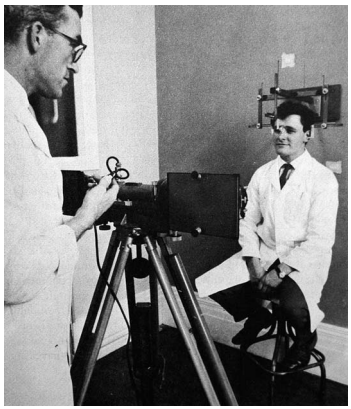
complexity in motion: aerodynamic processes and fluid movements of gases and liquids, combustion processes, explosions, cloud movements and the formation of waves and eddies in streams.[204] Water and gas, the two elements that, although they fuel the desire machine in the *Large Glass*, are absent because Duchamp was unable to represent them in perspective, when represented stereoscopically reveal information about their complex spatiality. The stereoscopic image offers an accurate spatial map, an 'instant Pause', of fluids in motion.[205] Stereoscopy is also a visualization technique in astronomy (figs. 3.131, 3.132).[206] The resulting images, stereoscopic maps rather than photographic representations, look convincingly descriptive of Duchamp's concept of the Milky Way.

The advantages of stereo-photogrammetry in measuring the human body – lack of contact, ability to capture the dynamic surface of the skin, rapidity of recording, and the ability to measure later in the absence of the subject – are all reasons, for preferring stereo-photogrammetry to a more intrusive method in medicine, and show why the technique interested Duchamp (fig. 3.133).[207]

Finally, Duchamp might have also been aware of the use in sculpture of stereo-photogrammetric machines for modelling objects, faces and bodies. Early devices are equipped with a marker that coincides with the virtual model produced by two photographs of the object (figs. 3.134, 3.135).

The marker moves in three dimensions, visually 'touching' the image of the object. A piece of material is placed where the stereoscopic model is viewed and an appropriate tool for cutting the material replaces the marker. Moving the tool along the surface removes a layer of material and the relief created by this repeated stroke coincides with that of the original object.[208]

So stereoscopic photography is both a medium linked to pornography and a precise measuring system, mainly applied in aerial stereo-photography of landscape topography. Duchamp's depiction of the Bride in *Given* is not a vertical image as in a portrait but a reclined horizontal surface of the relief of a body seen from above like a landscape. Picturing science and lust, stereo-photography is for Duchamp the ideal method for accurately depicting and measuring desire in the form of a four-dimensional nude Bride.



3.133 MacGregor and Newton, patient photographed with a stereoscopic camera to measure facial volume changes following the loss of teeth, 1971. From Atkinson, *Developments in Close Range Photogrammetry*, 1980.

3.6.9 ANAGLYPHIC CHIMNEY

Duchamp's very last work was, perhaps inevitably, a stereoscopic/anaglyphic sketch, which was to be included in the French translation of Schwarz's *Complete Works of Marcel Duchamp* (fig. 3.136).

However, his sudden death in October 1968 cancelled its publication. In an earlier letter to Schwarz, Duchamp describes the work:

> I have thought of making an anaglyph (red and green) apropos of a Spanish chimney of which I have made a sketch in three dimensions for the mason who is executing it in our new summer home. This handmade anaglyph should produce a three-dimensional effect when viewed through a pair of spectacles with red and green filters.[209]

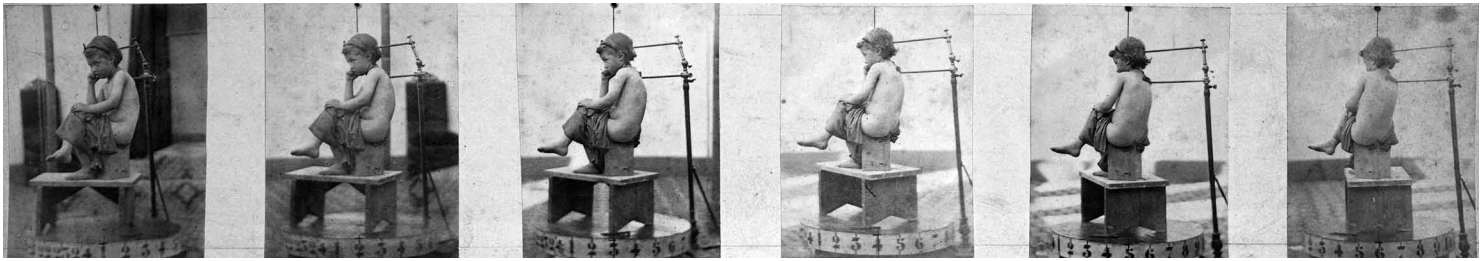
Duchamp's anaglyphic drawings of the chimney were informed by the geometric figures in Vuibert's *Les Anaglyphes Géométriques*, 1912, which Duchamp was consulting at the time.[210] (fig. 3.137).

Vuibert describes the figures that attracted Duchamp's attention as 'hovering in space like a model at the same time material and ideal'.[211] A related photograph by Man Ray was discovered much later, and was included in an exhibition focusing on the collaboration between the two men, 'Marcel Duchamp/Man Ray: 50 Years of Alchemy' in 2000. The photograph entitled *Le Dernier Oeuvre de Duchamp/Cheminée Anaglyphe*, 1968, shows an attempted physical construction in wire of the geometric shape described in the anaglyphic drawing (fig. 3.138).

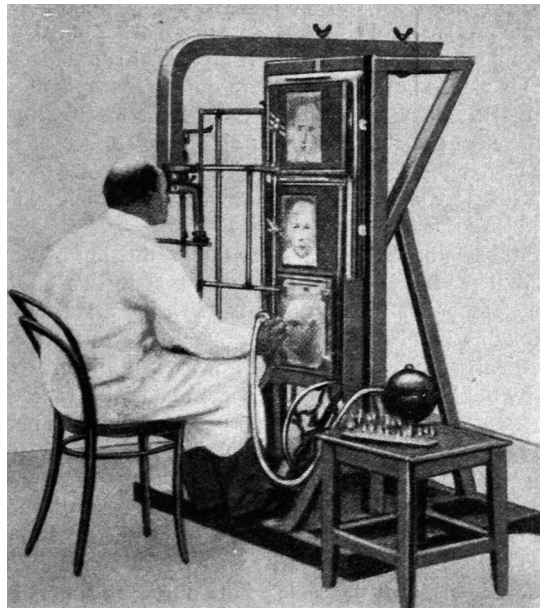
In her essay in the exhibition catalogue, 'Marcel Duchamp, Man Ray and the Desiring Machine', Chrissie Iles sees *Anaglyphic Chimney* as another collaborative work between the two friends and believes that it demonstrates the 'tension between material form and conceptual thinking':

> These delicate, ghostly volumetric drawings appear almost like an x-ray image, or shadow, of the chimney. Both the photographic rendering of the chimney and its stereoscopic graphic equivalent complicate the definition of original and copy, and reiterate the problem of optical perception in relation to three-dimensional form that had preoccupied Duchamp all his life.[212]

Duchamp's suggestion that the sketch was drawn 'for the mason' certifies that, although ethereal and ideal, he aimed for the form to materialize in space. The volumetric sketch, a design aid for Duchamp to visualize the simple geometry, could perhaps have operated as a three-dimensional blueprint for the mason constructing the chimney. Although thought never to have been completed, the chimney was discovered in 2008 in Cadaqués, Spain, in a house that Duchamp had rented when he became too frail to climb the stairs of his own residence.[213] The exact relationship between the stereoscopic blueprint and the process followed to construct it can only be speculated on. Similarly to a previous stereoscopy-related collaboration with Man Ray – *Anaglyphic Film*, 1920 – Duchamp may have projected the two complementary images of the 'ideal' chimney, the red and green drawings, onto its physical prospect location at the corner of the room: a chimney in mixed reality.[214] The wireframe model would then be a first physical marking of the 'delicate, ghostly volumetric drawings'. The existence of the built chimney, an architectural structure, suggests that Duchamp might have taken stereoscopy a step further – not just for recording an existing form or



creating an illusion of depth – but as a creative tool, to conceive, project and construct the design of a new three-dimensional form in space.



3.134 François Willème, study for photosculpture, sitting youth, c. 1865. Courtesy of George Eastman House, International Museum of Photography and Film.

3.135 Nikolai Adamovich Valyus, production of a sculpture from a stereoscopic model, from *Stereoscopy*, 1966.

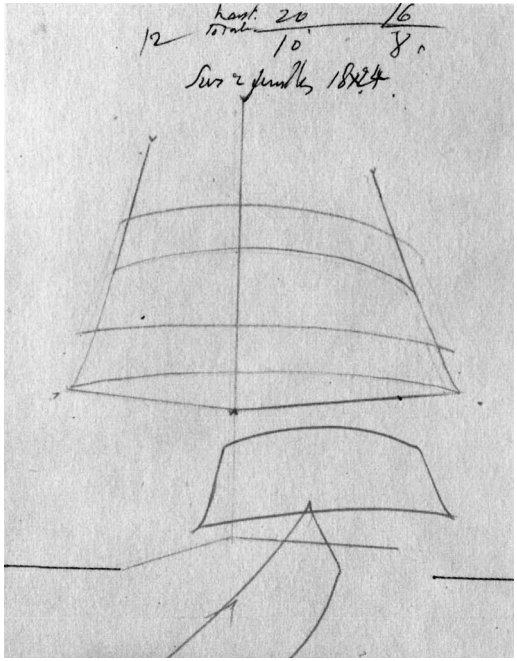
3.6.10 APPEARANCE AND APPARITION

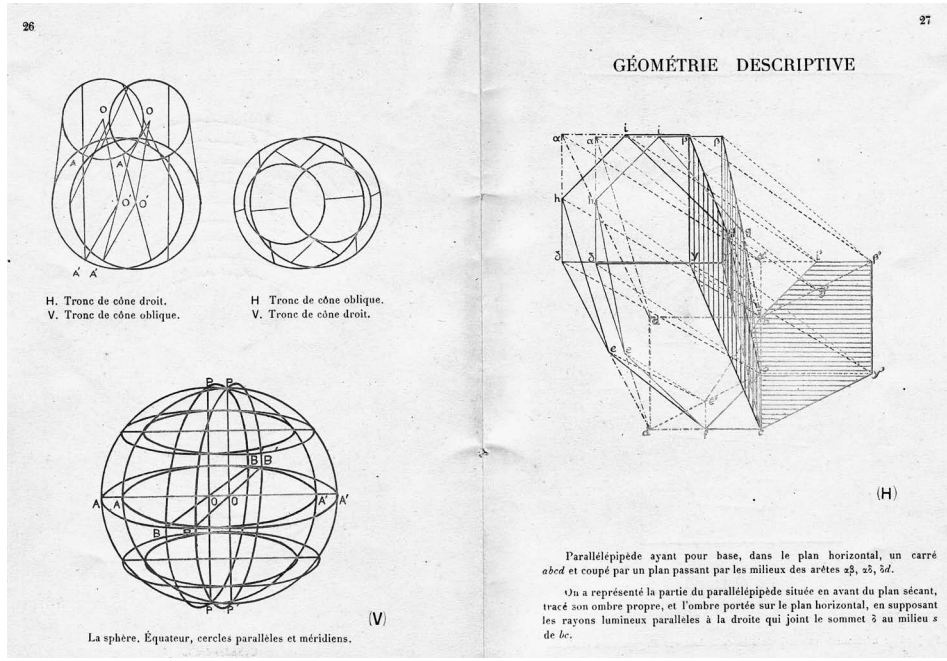
Duchamp's notes in the *White Box* refer to visual casting through the notions of appearance and apparition:

> Appearance and Apparition
> of a chocolate object for example
>
> The appearance of this object will be the sum of the usual sensory evidence enabling one to have an ordinary perception of that object (see psychology manuals)?
>
> Its apparition is the mould of it.[215]

The apparition or mould for a chocolate object is a drawing of sorts, which gives the guidelines for the appearance of the chocolate object. This mould is not itself an object. Duchamp suggests that each apparition has two parts: one concerning shape, the other concerning colour. The first type of apparition he compares to engineering drawing or orthographic projection. The relationship between drawing and the designed object is similar to that between apparition and appearance.

The second part of an apparition relates to colour. For Duchamp there are two different types of colour: native and active. The two types of colour relate differently to light: the native colour is a constant internal luminous source, but the active colour changes depending on exterior lighting. Native colour, 'chocolate phosphorescence' or an internal luminous source, controls the active colour,





the appearance of the chocolate, in different lighting. Duchamp concludes: 'there is one native chocolate colour which serves to determine all chocolates'.

The concept of appearance and apparition can be seen as a description of the relationship between the mental image of an object and the visual perception of it. Apparition is the image of an object stored in our memory that we use to recognize the appearance of the same object in reality. We need an abstract mould in order to construct the perception of a real object. Perception, the appearance, depends on and presupposes the existence of an apparition, a mental template.[216]

The apparition is an abstraction, but it can also be seen as more inclusive, comprising all possible appearances. The abstract symbol of a table contains all possible views of the same table in perspective, and the table retains its proper dimensions in our minds even if its appearance shifts in size. Here the apparition coincides with the 'idea'. The apparition, which is not only visual but tactile, can be more powerful than the appearance; it can conceal or distort appearances.

This reading relates to *Given*, and the shape and lighting of the nude:

> Given *The object*, considered in its physical appearance (colour, mass, form.) Define graphically i.e. by means of pictorial conventions) the mould of the object.[217]

The first sentence resembles the title of *Given*. It means 'given the appearance, define the apparition'.

3.136 Marcel Duchamp, *Cheminée anaglyphe (Anaglyphic Chimney)*, anaglyphic drawing, blue and red coloured pencil on cardboard, 1968. Collection Arturo Schwarz. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

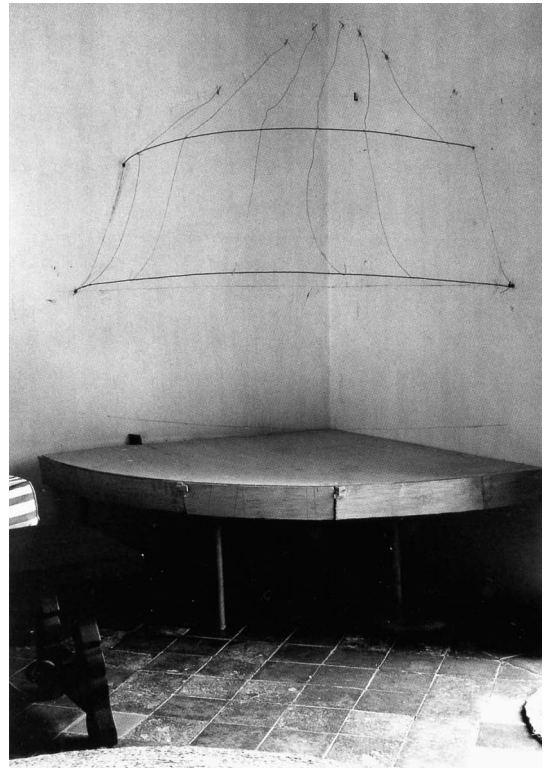
3.137 H. Vuibert, truncated cone and other anaglyphic geometric shapes, from *Les Anaglyphes Géométriques*, 1915.

The passage can be read as the task that the artist sets for himself. Given an object, a female nude, observed in its physical appearance, define, through pictorial conventions, the mould or the drawing of this nude. Duchamp stages the appearance of the nude by carefully shaping and lighting the 'drawing' of its apparition.

3.6.11 VISUAL CAST

My analysis of Duchamp's process, when constructing the nude cast, derives from a close study of the material in the *Manual of Instructions*, Duchamp's preparatory studies, his letters to Martins and the new research by Taylor and technical essays by Meighan, Andrew Lins, Beth A. Price, Ken Sutherland, Scott Homolka and Elena Torok, in *Marcel Duchamp: Étant donnés*.[218] My visit to the Philadelphia Museum of Art in September 2009 to attend the exhibition and symposium organized to celebrate the fortieth anniversary of the unveiling of the assemblage, allowed direct observation of many related artefacts – especially the parchment skin studies – whose existence I was not aware of. In the catalogue Lins, Meighan and Taylor present previously unpublished material offering new insight into Duchamp's methods but there is still no conclusive explanation of his techniques. My analysis is, therefore, also largely based on conjecture. Significantly, however, my research is informed by an applied 'empathy' through architectural drawing and making, which I employ not only to grasp, but also to think through ideas about, Duchamp's motivations, concepts and methods.[219]

Not clearly fitting the categories of painting or sculpture, and informed by my own drawing practice, I also see the nude figure as a spatial



3.138 Man Ray, *Le Dernier Oeuvre de Duchamp/Cheminée Anaglyphe*, 1968. Private collection. © Man Ray Trust/ADAGP, Paris and DACS, London 2013.

'drawing', whose plotting may consist of the following three stages: recording, measuring and casting or printing.

3.6.11.1 RECORDING

The first step in constructing the nude was to record the three-dimensional topography of the model, who may have been Martins. The 'extra-rapid exposure' of her image may even have taken place before 1946, the official start date of the piece. To create an accurate spatial facsimile of his lover, Duchamp would prefer an instant photographic method to a physical casting from her body, as previously suggested by other

scholars, which he would perhaps, like Leonardo, find hideously corporeal, preferring spatial definition to arise from the 'artifice of the maker' and not the 'nature of the medium'.[220]

While the model was lying in the right pose, two cameras, or a stereoscopic camera, would take two photographs. The position of the camera(s) could be either from above, similarly to recording landscapes, or from a position relative to the voyeur's peepholes in *Given*. If the latter was true, the resulting stereoscopic pair of the model, would present her in the same pose and from the same point of view as in *Given*, when observed through a stereoscope.

The interrelated information stored in the two views would form the pictorial blueprint for reconstructing the nude. The stereoscopic pair, considered as a two-dimensional template that includes coded information for the blossoming of an appearance of the nude in three dimensions, convincingly fits Duchamp's definition of 'apparition' as a drawing of sorts, or an immaterial mould.[221] However, this appearance would not be confounded within the apparatus of the stereoscope, or remain in the realm of illusory expansion. Through an elaborate projective process, the nude would jump from the domain of the visual into tactile physicality.

3.6.11.2 MEASURING

The machine that Duchamp might have employed in constructing the nude is the stereo-plotter: an early analogue stereo-photogrammetric instrument using a pair of stereo images to establish a virtual model, identify points in space and give their three-dimensional coordinates. Duchamp would have been able to measure the images deriving from the recording in a stereo-plotter after 1946, because stereo-plotters were developed and mass-produced during World War II for remotely surveying enemy terrain.

Duchamp may have either given the images to be measured by a trained operator in a laboratory, used the machine himself or staged his own version of the arrangement. Two projectors with the same geometric properties and position of the cameras that Duchamp used to record Martins would project the images of the stereoscopic pair by occupying the position of the voyeur behind the door, imitating the moment of exposure. The light rays from the two images would intersect, forming a three-dimensional optical 'model' of the naked body which could be viewed stereoscopically. Looking at the three-dimensional virtual nude and using the floating measuring mark, the operator would measure the surface of the skin point by point.

If this conjecture is correct, then the pattern of the dots on the Perspex sheet is the orthographic map, the orthophoto, that Duchamp derived from the process of stereo-photogrammetrically processing the image of the naked body. These points constitute a field of optical touches or caresses and are the coordinates of desire.

3.6.11.3 CASTING

Duchamp may have transferred the orthographic map of points into a field of drilled holes on the Perspex sheet. The number ascribed to z, offers a depth value for each point, so the flat map can be 'raised' to a relief. To create a physical three-dimensional model, Duchamp may have cut pieces of metal rod fitting the diameter of the holes, or used long nails, at a length equal to z for each hole.[222] The tips of the points of this forest of rods

would define the surface of the nude's skin and all the visual touches performed in the stereo-plotter would materialize as physical points in space. A continuous surface would be necessary to connect the points, a soft stretched membrane like the parchment Duchamp used. The indentations from the tips of the rods on this constructed skin would be lovingly smoothed out.

A 'contour gauge' is a tool for recording the cross-sectional profile of a surface. Contour gauges consist of a set of steel pins, which are set tightly in a frame and able to move independently perpendicularly to it. When pressed against a surface – usually architectural moulding – the pins conform to the profile. The gauge can then be used to draw the profile or to transfer it onto another material.

I would like to suggest that Duchamp may have used this forest of rods as a volumetric rather than linear contour gauge. His initial aim was to form the skin of the nude as a single continuous surface by using as a mould this terrain of points. He thought of stretching and pressing over it a soft, malleable membrane that turns hard and keeps its shape when dry: the parchment. In his letters we find, I believe, clear allusions to his attempts to mould the parchment directly onto this field of 'nails' by devising some kind of press:

> The skin is in the press until tomorrow morning.
>
> I am returning tomorrow and will go back to my dry skin under its steel rods – only you can understand this sentence.
>
> Tomorrow and the following days I will be putting my skin under the nails and will make a test, which will be more or less definitive ...[223]

Duchamp, thus, may have aimed to create the replica of the figure, not from physically casting the actual body of his lover, but from moulding the three-dimensional surface of her skin from an entirely visual source. Duchamp admired the Renaissance perspectivists, who captured and mathematically rendered perspective distortion, measuring, controlling and taming it by hand and arresting its, up until then, fleeting character. As we have seen, stereo-photogrammetry measures the ungraspable binocular depth and uses it to survey landscapes, fluids and bodies. Inspired by perspective Duchamp may have used stereo-photogrammetry, which renders tangible the human facility of deciphering visual depth, to mould this purely optical sensation in real space.

As a gift from vision to touch, the optical cast of the nude lies between tactility and vision: it is a fleshing-out of a gaze in three dimensions and a perspective that can be touched. It derives not from physical measuring but mathematical manipulation of data captured in a snapshot. Apart from being an expression of desire, the cast accords with Duchamp's preoccupation with the mathematical, cerebral element in vision.

So, Duchamp may have used stereo-photogrammetry to measure and reproduce the topography of Martins, her haunting mental image. Using the precise blueprint of her dimensions, Duchamp enters the domain of his sexual fantasy and plots with mathematical precision the coveted body of his lost lover, which can no longer be touched or consumed in a sexual relationship.

3.6.12 EXPOSURE

Inspired by the principles of the analogue

stereo-plotter, in *Exposure*, 2001, I used the *Stereoscopic Pair of* Given to create a virtual anaglyphic model of its internal view.[224] I digitally manipulated the two photographs to accentuate the outlines of the forms and assigned monochrome tints of red for the left and green for the right eye. I then got the resulting images transferred onto slides and projected them from two slide-projectors placed next to each other, so as to render a full-scale view of the interior.[225] I matched the red and green images on the figure of the waterfall, as this is one of the furthest most points in the assemblage. Apart from the partial clarity of the waterfall, the two superimposed images on the wall created an initially indecipherable pattern of red and green lines. But by entering the space of the image and holding upright a sheet of paper like an individual small screen, I could perform haptically what the eyes do automatically: merge the corresponding points of the two separate views to understand relationships in space. By moving the paper backwards and forwards, and walking in this ethereal architecture of light I could determine the exact point of convergence between red and green local shapes, and thus occupy physically the virtual space of the interior. The gas lamp, the tips of the branches, the background, the edge of the breach in the wall, and parts of the nude's skin could all be 'touched' in this way. As if passing through the door, and walking inside the luminous three-dimensional drawing of *Given*, I was able to visually 'touch' not only the nude, but the whole illusory space of the assemblage. Although physically absent, and visually coded in a complex overlapping of lines, the interior architecture of *Given* was there, exposed (fig. 3.139).

3.6.13 SURVEY

To test my conjecture regarding Duchamp's measuring method of the nude figure's form in *Given*, in 2002 I decided to follow a similar process using the equivalent contemporary technology at the Geomatics Group, part of the Department of Civil, Environmental & Geomatic Engineering, at University College London. As the basis of my stereo-photogrammetric experiment, I used the two monoscopic photographs of *Given*, which I took through each peephole. Consequently, *Stereoscopic Pair of* Given was the equivalent of the first part of Duchamp's process, the recording, which had already taken place in Philadelphia. The aim was to geometrically define the surface of a figure, so it seemed appropriate to use the volumetric information stored in the stereoscopic pair of the view behind the door in *Given* and measure the same form as the one Duchamp surveyed: the surface of the skin of the nude.

The process I used for viewing and measuring stereoscopic data was similar to existing techniques that Duchamp may have used in the 1940s, with the sole difference of digital technology substituting the early analogue process, reducing time and effort.[226] The two images were scanned and input into software to create a stereoscopic virtual model of the scene, which I viewed with LCD shutter glasses working in conjunction with a special display monitor.[227] To set up the digital model, and obtain accurate volumetric information, I entered details of the internal geometry of the recording apparatus – my camera type and lens – and the external dimensions of the recorded scene, as found on the folded paper model in Duchamp's *Manual*. The equivalent of the analogue, floating marker is a



3.139 *Exposure*, 2001. Anaglyphic representation of *Given*. Digital drawing by the author.

cursor controlled by a special mouse with an extra thumb-operated wheel, which, in addition to normal planar movement, controls diving in stereoscopic depth (fig. 3.140).

By moving in three dimensions the cursor can be placed confidently in different locations within the virtual model with a certainty of touch. Values x, y, and z for the position of the cursor appear at the bottom of the screen. Clicking a mouse button leaves a red cross mark with registered coordinates on the virtual model (fig. 3.141).

The aim was to describe the surface of the skin with as many marks as possible, to reduce errors. The sensation of moving the cursor in space is of an optical finger 'touching' the surface; if it is too high or too low there is a sense of being above or under the surface. However, defining the exact point of intersection needs practice because the tactile resistance of a physical material object is absent. Touching the virtual model is like touching smoke or light. The resulting three-dimensional field of points, *Gas*, 2002, describes the spatial form of the nude but is devoid of pictorial information (fig. 3.142).

Like floating gas particles in the shape of the nude, the measured points are an unveiled, undressed geometry of vision.

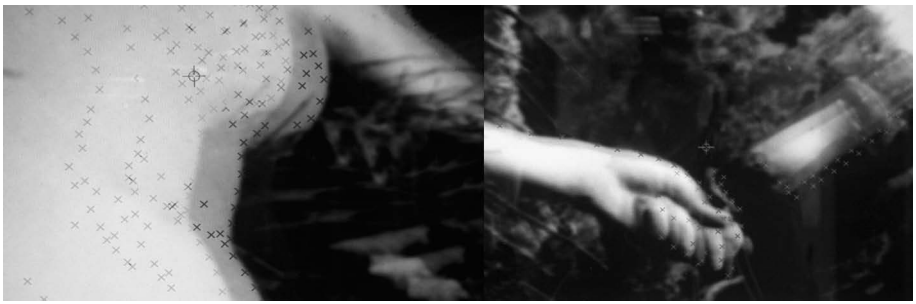
3.6.14 LANDSCAPE

Landscape, 2007, is a three-dimensional drawing portraying the undressed geometry of vision, deriving from my stereo-photogrammetric survey of the nude in *Given*. On a white board, I used the field of points I collected in my previous survey experiment, *Gas*, to construct a three-dimensional terrain of the figure with pins. The height of the pins is not accurate, but approximate, attempting to describe the surface of the nude as a topography. Two acid-etched, nickel silver discs carry the images of the stereopair of the view, one for each peephole. Taut silver threads represent visual rays starting at the peepholes. They 'look' at two locations in the constructed landscape of the figure: the tip of the gas lamp and her right shoulder, marked with small pieces of red tape, like flags (figs. 3.143, 3.144).

3.6.15 PARCHMENT

A technical study of the materials and methods that Duchamp used to create the female figure in *Given* was undertaken as a component of the Philadelphia Museum of Art's celebration of the fortieth anniversary of its opening. In contrast to earlier descriptions suggesting that the material used for the nude figure was pigskin or leather, this analytical study identified it as parchment or vellum. In his letters to Martins, Duchamp often refers to the word *peau* in French which, conveniently, or perhaps confusingly, can mean both skin and leather. Parchment, a thin membrane made of animal hide, and used as a surface for writing and drawing, is distinct from leather because the hide is limed but not tanned. The lack of tanning makes it extremely reactive to changes in relative humidity and it is not waterproof; when wet it becomes pliable and because it consists mainly of collagen, a natural glue, it can keep its dried shape well whether stretched flat or formed over a template. Vellum is a finer quality, semi-translucent parchment usually made from calf.

When dried flat, vellum has the appearance of a crisp sheet of paper with a white translucency. Humidity, however, immediately affects its appearance and causes it to curl. If submerged in





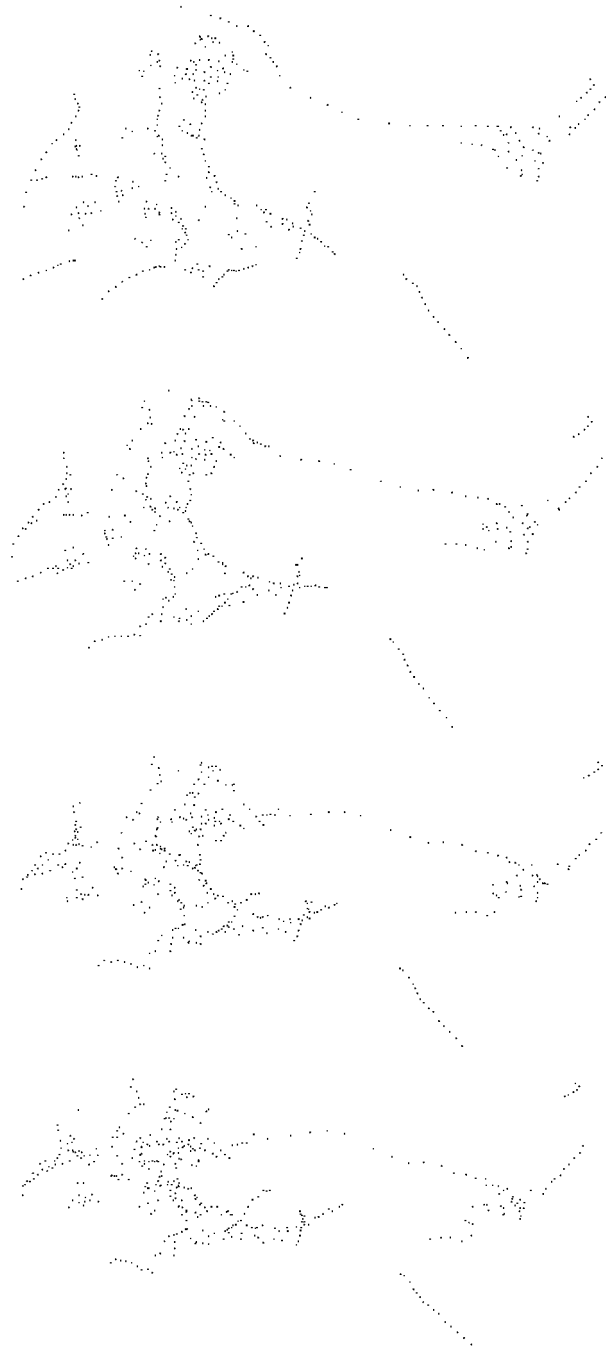
water it undergoes a dramatic transformation into a soft, malleable membrane with a tacky elasticity. Parchment and vellum were traditionally used for writing but also for drawing and painting. When water in paint media touches the parchment's surface the collagen melts slightly, forming a raised bed for the paint. This changeability, as well as an uncanny feeling of touching wet skin, makes the material feel alive.

La Bella Principessa (The Beautiful Princess), c. 1490, is a portrait of a young lady in coloured chalks and ink on vellum, which is attributed to Leonardo.[228] It is the sole known work on vellum by Leonardo, and the attribution has been a matter of contention, with one gallery director privately condemning it as a 'screaming 20th-century fake'.[229] By applying pink paint on both sides of the skin of his nude, Duchamp may have aimed to offer his own version of a drawing, or painting, on vellum, as a response to Leonardo's effort.

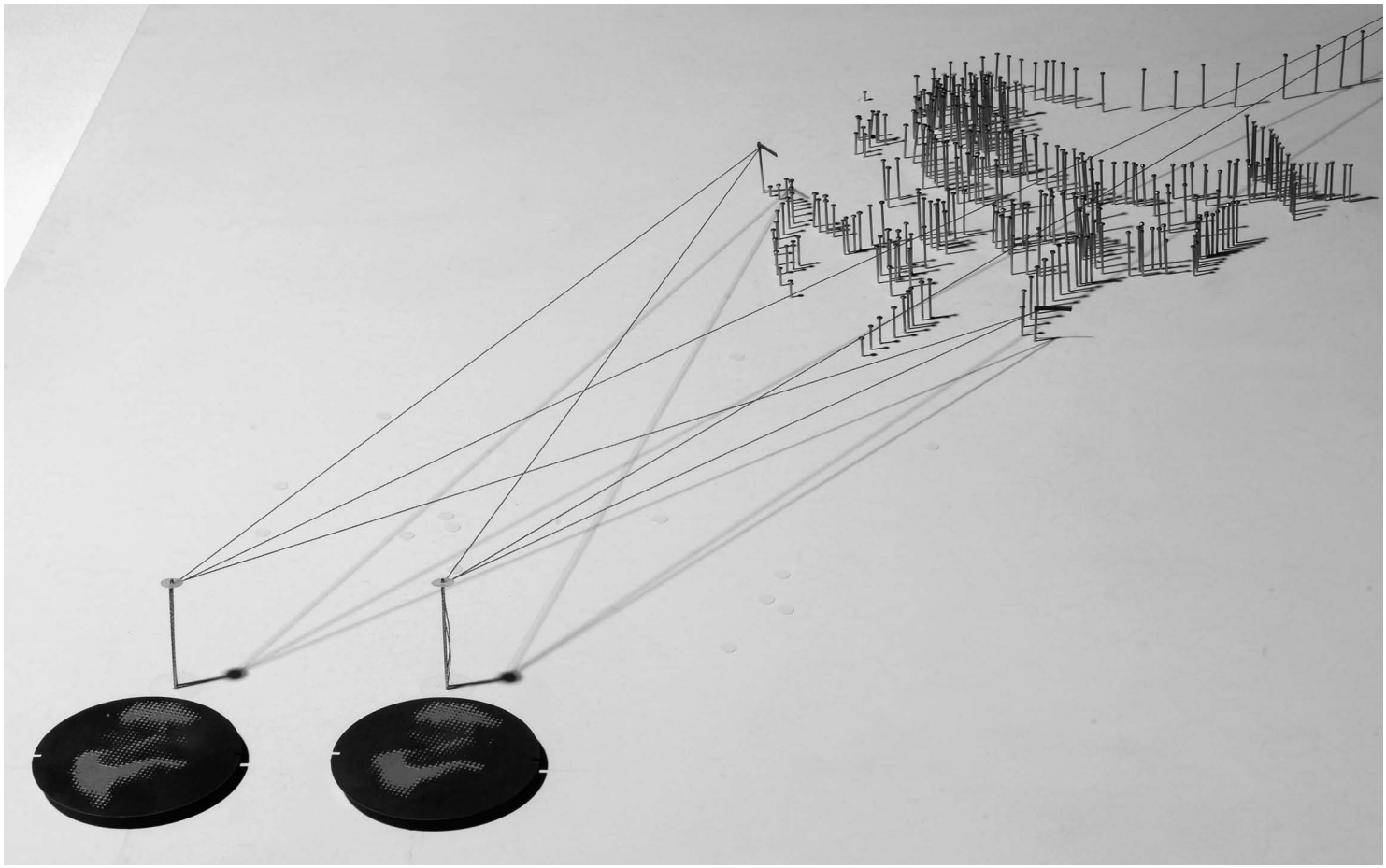
Duchamp's decision to use parchment for the nude in *Given* is thought to be a result of his exposure to its use in bookbinding through Mary Reynolds. Reynolds, Duchamp's long-time companion, with whom he was still romantically involved when he met Martins in 1943, studied bookbinding under Pierre Legrain in the late 1920s.[230] Using different types of leather, including vellum, Reynolds designed and produced many celebrated bookbinding projects, some of them in collaboration with Duchamp, such as Alfred Jarry's, *Ubu Roi, Exploits and Opinions of Doctor Faustroll, Pataphysician* and Giorgio de Chirico's *Hebdomeros*.[231] But while bookbinding techniques seem to directly inform the nude figure in Duchamp's small test relief *Le gaz d'eclairage et la chute d'eau*, which is set in velvet and resembles an embellished book cover, in the final nude he was trying something different.

3.140 Red cross-shaped marks positioned on the stereoscopic 'skin' of the nude. Photographs by the author, 2002.

3.141 During the survey with glasses, screen and special mouse. Photograph by the author, 2002.



3.142 *Gas*, 2002. Three-dimensional field of points describing the spatial form of the nude, tilted in space.



3.143 *Landscape*, 2004. Mixed media drawing by the author. Photograph Andy Keate, 2007.

3.144 *Landscape*, side view, 2004. Photograph Andy Keate, 2007.

3.6.16 THREE-DIMENSIONAL PRINTING

Just before Duchamp started working on Given, he was involved in a series of graphic design projects using halftone separation. Halftone is a reprographic technique for printing images that simulates continuous tone through the use of dots of varying size in a grid pattern.[232] One of these projects was the cover design for André Breton's *Young Cherry Trees Secured Against Hares*, 1946, which features Breton's head added to the statue of Liberty holding a torch (fig. 3.145).

A vertical, halftone grid of differently sized dots renders the shape of the statue's drapery. As we have seen a similar vertical grid of dots embellishes the surface of the nude figure in *The Illuminating Gas and the Waterfall*, which one could say is also draped in a 'printed' epidermis. Significantly, though, in the relief the dots do not vary in size but in elevation, defining the surface of the skin in three rather than two dimensions.

As we have seen in his reproduction of the *Large Glass*, now housed at Tate Modern, London, Richard Hamilton painted the surface of the Milky Way in 'rose pink' and 'pale peach, tinged with emerald green', the colours of the classic nude in accordance to Duchamp's original.[233] Duchamp's rendering of this nebulous surface which crowns the domain of the Bride in flesh tones perhaps indicates that he meant it as her skin. A skin that has been lifted, revealing the structure of bones and tendons similarly to an *écorché*. The cloud-like perimeter of the epidermis frames the irregular shapes of the Draft Pistons, the outlines of a square piece of mesh that Duchamp photographed undulating in the wind. The photographs that Duchamp used to trace the Draft Piston outlines for the *Large Glass* show thin netting marked with dark spots on a diagonal grid, the type of fabric used for millinery veils.[234]

> I wanted to register the changes in the surface of that square, and use in my Glass *the curves of the lines distorted by the wind*. So I used a gauze which has natural straight lines. When at rest, the gauze was perfectly square – like a chessboard – and the lines perfectly straight – as is the case in graph paper. I took the pictures when the gauze was moving in the draft to obtain the required distortion of the mesh.

As we have seen, the netting is also analogous to Alberti's veil. Consequently, the Draft Pistons might suggest details, or three different states of the same detail, of the curved geometry of the skin, an enlarged small fragment of this emancipated and now amorously fluctuating mathematical membrane.

Similarly, stereoscopic images often render the sensation of a world made of 'infra-thin' surfaces devoid of volume or substance. The restrictive frontality of the image infers that this very thin skin of the world is hollow. If the viewer were to move around and look at the scene from the back there would be no substance behind.[235] This sensation is exemplified by a phenomenon called pseudo-stereoscopy, where, by flipping the two images of a stereoscopic pair, the illusory impression of a concave form turns convex. The shifting of the two images from left to right results in a 'visual draft' sucking the infra-thin pictorial surface in or out, similarly to a fluctuating fabric in the wind.

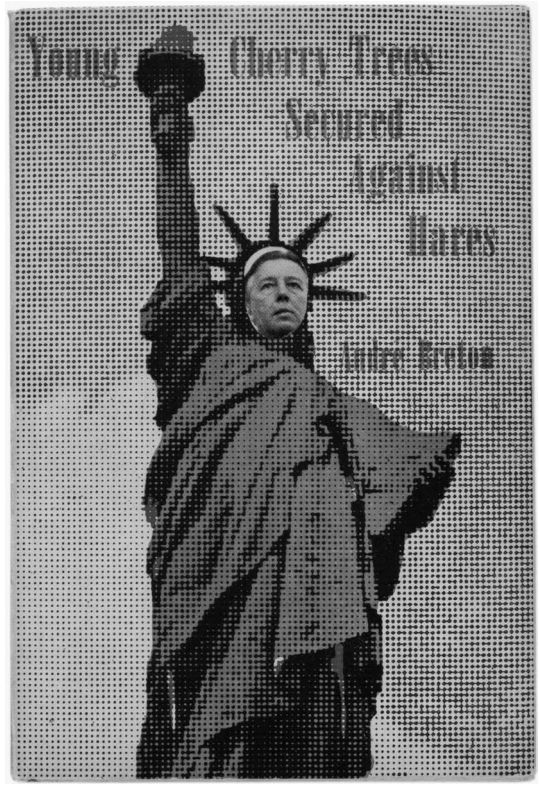
In her description of the leather study, Meighan suggests that the significance of the 'regular, almost grid-like distribution of small, circular, convex

depressions' is unclear.[236] I would like to suggest that these indentations are part of Duchamp's attempts to three-dimensionally print his lover's coveted form based on pre-recorded mathematical information stored in a photographic mould of Martins' physical body. His process is a three-dimensional equivalent of Piero della Francesca's graphic perspectival storing of forms in fields of points. The test parchments are a testament of Duchamp's attempts to cast the shape of his lover in three dimensions, but were for some reason aborted. In constructing the nude figure in *Given*, was Duchamp experimenting with an early form of 3D printing?

In accordance with the flayed figure in the *Large Glass* and the hollow vessel optical impression of forms in stereoscopy, I would like to suggest that in *Given*, Duchamp aimed to recreate the Bride as a geometrically defined membrane, a free-standing skin. The visual image of the lover's skin is released from her body, claiming presence as an independent object of desire. This intention might not have been there at the outset of the work's inception; the first sketches and studies do not support this hypothesis. But, in one of his early letters to Martins, Duchamp refers to their secret project as 'my skin' or 'our "skin"':

> I am returning tomorrow and will go back to my dry skin under its steel rods – only you can understand this sentence.
>
> … I still harbor a grudge against Barr for talking to his wife about our "skin."[237]

Furthermore, according to Paul Matisse, 'for about a year the shell-like leather sculpture was free-floating … [Duchamp] had to construct a new armature for this newly painted form. He made it up out of steel and wire glued together with "Liquid Solder" and "Plastic Steel"'.[238] From what I understand from Meighan's descriptions and the photographic evidence in her technical essay, the nude figure in *Given* is not supported on a plaster cast, but is still just a free-standing skin – reinforced by grey putty – braced on the armature described by Matisse. As evident in his letters, Duchamp, after abandoning his attempts to shape the figure solely on a field of points, embarked on making a plastilene figure, which he then cast in plaster. He clearly describes this efforts in shaping this, which for me contradicts previous suggestions that he directly cast Martins'



3.145 Marcel Duchamp, cover design for André Breton's *Young Cherry Trees Secured Against Hares*, New York: View Editions, 1946. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

body. Instead, I would like to suggest that he used plastilene to fill and cover his forest of nails – the volumetric field of points describing her skin through stereo-photogrammetry – carefully smoothing the outer surface. Most likely the resulting plaster cast appears in an enigmatic photograph showing an eerie, 'undressed' white version of the nude in *Given*, known as the 'lost plaster'.

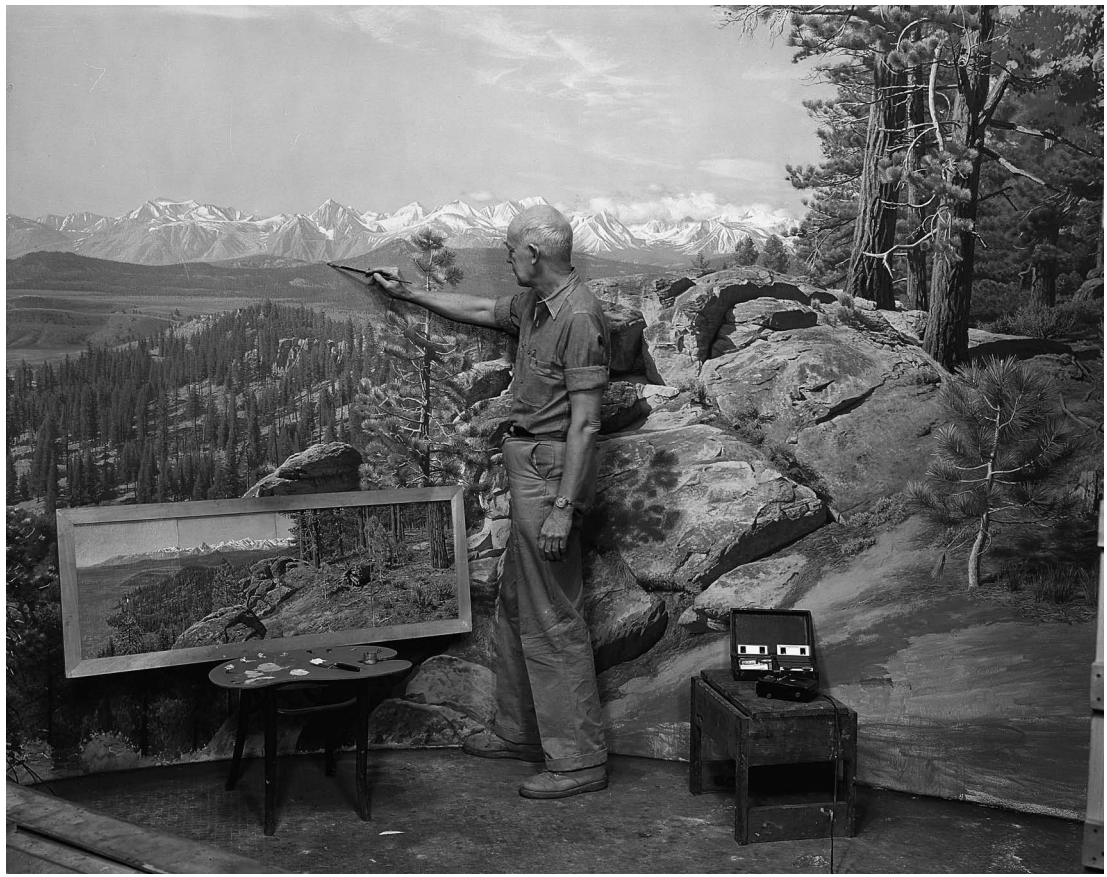
3.6.17 DIORAMA

Given has often been compared to a diorama, a three-dimensional full-size model of a landscape scene sometimes enclosed in a glass showcase for a museum for the purposes of education or entertainment. The original diorama, from the Greek *di-* 'through' and *orama* 'that which is seen, a sight', was a popular entertainment invented by Louis-Jacques-Mandé Daguerre in Paris in 1822. Daguerre's diorama was a theatrical experience of a landscape painting housed in a specialized building with a rotating audience section. Through mechanical interventions and special lighting the represented scenes would change their appearance dramatically in phantasmagorical manner. Although using elaborate lighting and retaining the feature of the waterfall as the closest reminder of Daguerre's invention, *Given*'s composition is closer to the modern diorama as seen in most major natural history museums.

Carl Akeley, a naturalist, sculptor and taxidermist, is credited with creating the first modern habitat diorama for Milwaukee Public Museum in 1890. Akeley, who was later responsible for the design of the popular animal habitat dioramas at the American Museum of Natural History in New York, is also considered the father of modern taxidermy. According to Mark Alvey, 'Akeley's approach (which he refined over the years) was to first model a lifelike form of the animal's body in clay, make a mold of the sculpture, create a lightweight cloth and papier-mâché cast from the mold, and then stretch the skin over the cast.'[239] The description of this process seems disturbingly similar to the process Duchamp followed in forming and mounting the skin for the figure in his desire-driven diorama.

In 1942, the year that Duchamp arrived in New York, and four years before the start of his secret work in *Given*, the Hall of North American Mammals opened at the American Museum of Natural History in the same city. Responsible for the landscape backdrops in these dioramas, which are considered masterpieces, was James Perry Wilson, an architect turned diorama landscape painter. According to British architect and researcher Nat Chard, Wilson 'brought the rigour of architectural perspective to diorama projection'.[240] Remarkable was Wilson's ability to draw the eye effortlessly from the specimens in the foreground to the painted background portraying a vista stretching endlessly beyond the horizon. His constructions are celebrated not only as revered diorama backdrops but works of art that redefine landscape painting (fig. 3.146).

However, beyond careful colour matching and attention to detail, Wilson's technique was founded on a geometrical underpinning of the act of looking, evident in his use of stereo-photography, as well as an elaborate projection system for transferring his preliminary *plein air* studies to the curved background wall of the diorama.[241] A possible visit to the museum by Duchamp may have inspired his decision to stage his second rendering of the Bride



3.146 James Perry Wilson painting background for Western Pine Forest Group, Forestry Hall, 1956. Note Wilson's stereo-viewer and slides resting on the side table on the right. Photograph Robert E. Logan. Research Library, American Museum of Natural History, New York.

as a diorama of a lost lover's natural habitat.

Photographs of the exhibition preparation in the Research Library of the New York museum picture some of the supporting clay and plaster sculptures of the 'undressed' animals, which bear an uncanny resemblance to the photographed figure of Duchamp's lost plaster. They are smooth, opal-white and, by being stripped of their feathers or mane, they reveal an otherworldly nakedness similar to the eerie and 'ravishingly beautiful appearance' of the lost plaster without its epidermis.[242] As Duchamp writes to Martins, 'In any case this plaster cast was only made with a view to the skin that will go on it and that changes the whole conception.'

Connecting the nude in *Given* with the preparation of a figure for diorama display is disturbing because taxidermy involves the removal and reapplication of the hide of a dead animal.[243] However, Duchamp's methods and use of materials bear an uncanny resemblance to diorama design

and taxidermy techniques.[244] These include: use of stereo-photogrammetry in recording the habitat but also perhaps the preparation of the animals, illusory presentation of the landscape, constructing an 'undressed' full-scale plastilene, taking a mould of this in plaster, and preparing a lightweight cast from the mould on which the skin will be mounted (fig. 3.147).

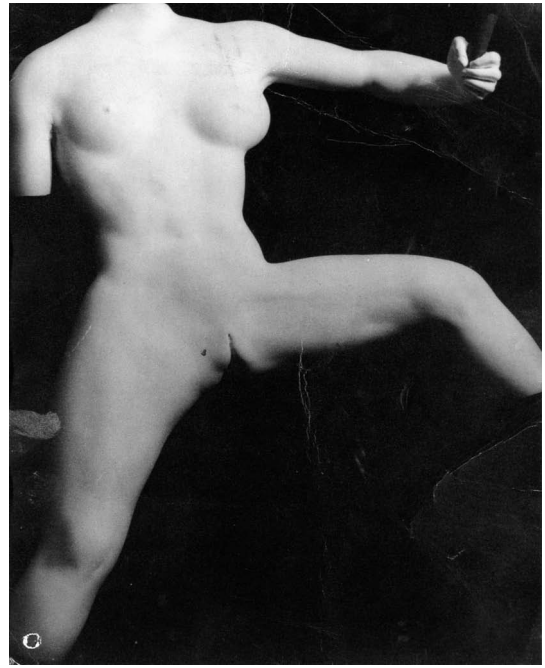
Finally, Duchamp's use of parchment to represent the nude makes this comparison plausible (fig. 3.148). As we have seen, parchment is processed animal skin, but also a surface used like paper for drawing and also painting on attributes that must have appealed to Duchamp, who aimed to compose *Given* as a new type of representation: a cross between sculpture and painting.

In a curious twist, dioramas were also a popular subject for stereo-photography and a lot of early examples survive as stereoscopic images (fig. 3.149). Both stereoscopy and the diorama stage an illusory vista of nature in three-dimensions, a frozen moment in time or an 'instant Pause', to remember Duchamp's terminology, for study and entertainment. The stereoscope creates illusory dioramas, frozen moments of natural scenes. A frozen moment of a frozen moment *mise en abyme*.

3.7 GIVEN …

Having analysed in detail all constituent elements of *Given*, we now return to the title, which as we have seen recalls an earlier note by Duchamp referring to the *Large Glass* (fig. 3.150).

The note exists in two versions on either side of a piece of paper and reads as a mathematical problem. On one side:



3.147 Marcel Duchamp, plaster study for the figure in *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*, 1949. Gelatine silver print. Private collection. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

Preface

Given 1. the waterfall
2. the illuminating gas

We will determine the conditions for an instant Pause (or allegorical appearance), of a succession of a set of phenomena seeming to necessitate each other according to laws, in order to isolate, the sign of accordance between this Pause (open to all countless eccentricities), on one hand, and a choice of possibilities legitimized by these laws (and also causing them), on the other.[245]

And on the other side:

Foreword

Given [in the dark] 1. the waterfall
2. the illuminating gas, in the dark,

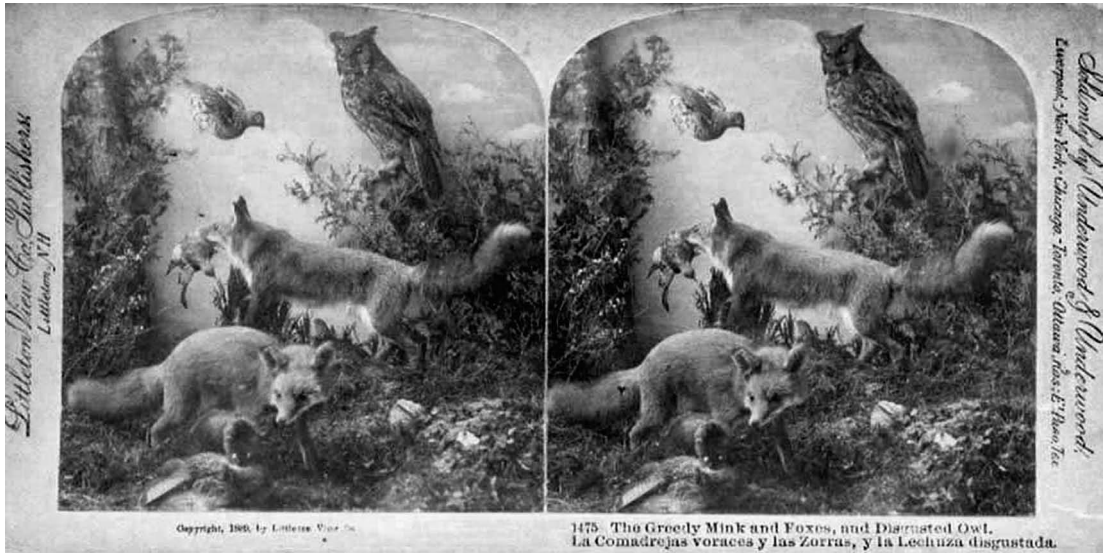


3.148 Mr Clark fitting animal skin on clay model of Indian Lion, 1930. Photograph M.D Burch. Research Library, American Museum of Natural History, New York.

> One will determine the conditions for the extra-fast exposure (=allegorical appearance, allegorical Reproduction), of several collisions [assaults] seeming to strictly succeed each other following laws, in order to isolate, the sign of accordance between this extra-fast exposure (open to all countless eccentricities), on one hand, and a choice of possibilities legitimised by these laws on the other.[246]

Richard Hamilton includes both versions in the introductory part of his typographic version of the *Green Box*.[247] Both present the work as a task Duchamp sets himself, and perhaps a question to the viewer. We have analysed *Given* as a riddle or mathematical problem: given the appearance, define the 'apparition'; given the image, define the underlying structural system; or given the drawing, define the drawing technique. We have followed an investigatory journey, collecting clues and piecing together the rules for Duchamp's representation technique in *Given*.

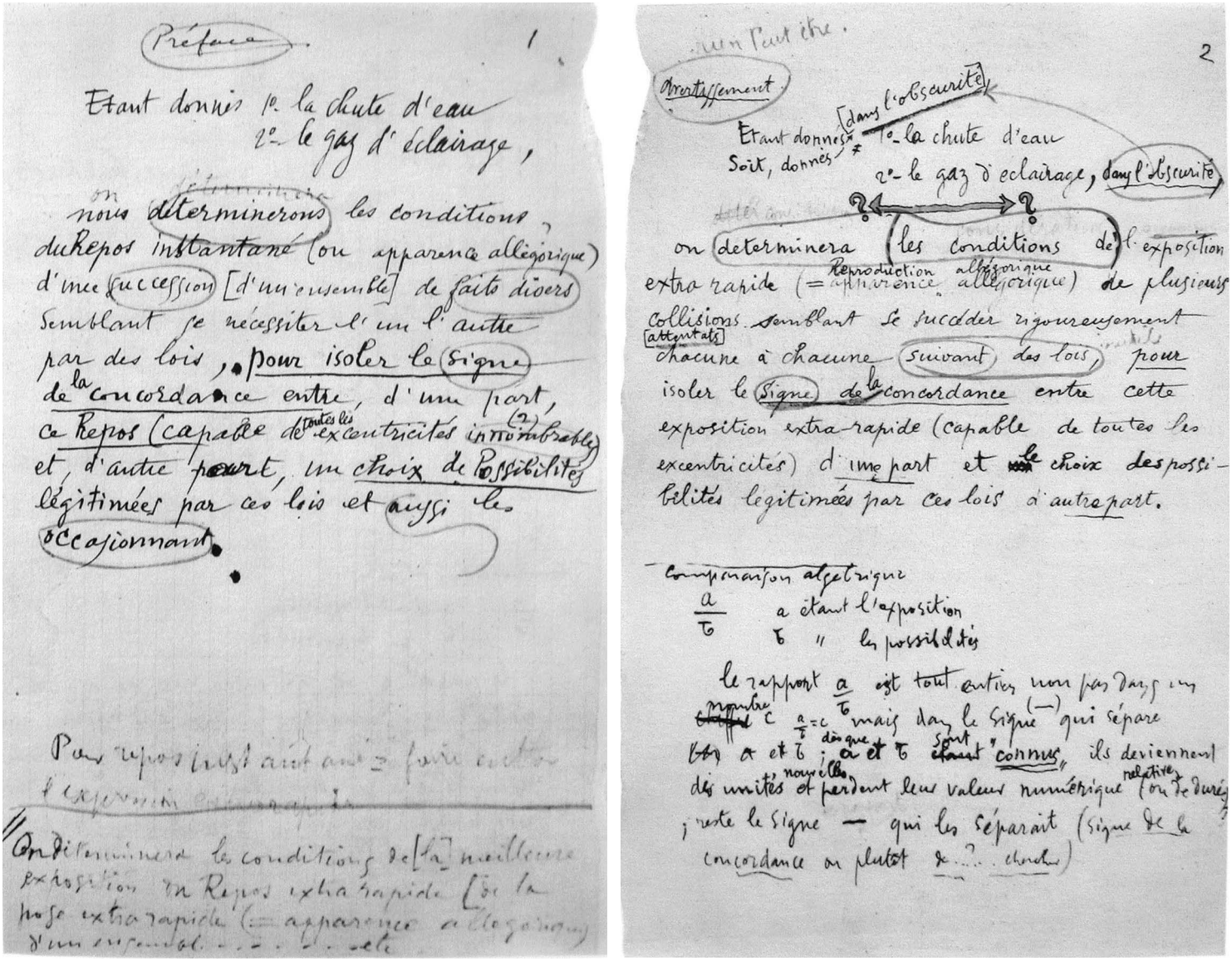
Poincaré argued that the consistency of the laws governing how perspective images of solid objects succeed each other inspires the idea of Euclidean geometric space, and that if there were no solids in nature there would be no geometry. According to Poincaré, solids transform visually only by change of



3.149 Unknown artist, *The Greedy Mink and Foxes, and Disgusted Owl*, stereoscopic view of diorama, c. 1900.

position whereas fluids transform also by change of state. The first sentence of Duchamp's title defines two givens: water and gas (fluids and thus characteristic of a change of state). Although complex, the changes characterizing fluids are 'a succession of a set of phenomena seeming to necessitate each other according to laws', which are different from the ones characterizing solids, but can nonetheless be defined. Duchamp attempts to define the geometry of desire through recasting the image of his lost lover, which lies in the domain between solids and fluids. Close observation and study of the behaviour of water and gas, thus, might inspire this geometry of extra dimensions, appropriate for measuring and representing the female nude.

Because of the visual complexity of the changes of state characterizing fluids, Duchamp wants to determine the conditions for an 'instant Pause' or an 'extra-fast exposure' of their three-dimensional flow. He uses photographic terminology, *exposition* (display but also 'exposure') and *instantané* ('instant' as an adjective, and as a noun 'snapshot'), but, insisted that this snapshot is not exactly a picture, and suggested that 'delay' should be used instead.[248] Stereo-photogrammetry is used in engineering to enable the study of forms of higher complexity in motion, such as fluid movements of liquids and gases, by isolating three-dimensional snapshots of their behaviour. So the terms 'instant Pause' and 'extra-fast exposure' might relate to stereoscopy, not a picture but a three-dimensional view. The allegorical scene inside *Given* is recognized as the physical construction of this three-dimensional Pause, a built stereoscopic image or frozen binocular field featuring impressions of water, gas and the surface of the skin of a female nude.



3.150 Marcel Duchamp, facsimile note from the *Green Box*, recto and verso, 1934. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

Duchamp constructed the Pause manually, a process that took him twenty years, and therefore a delay, 'to isolate the sign of accordance' between this and a choice of different possible appearances. The accordance of the laws governing the visual behaviour of fluids, their 'collisions seeming to strictly succeed each other', could be seen as analogous to Poincaré's consistency of the laws governing the observation of solid objects which inspires Euclidean geometry. Duchamp perhaps suggests that the isolation of the sign of accordance between the Pause, the constructed view, and 'a choice of possibilities legitimised by these laws' will define another geometry, another understanding of space.

In *Given*, water and gas are represented by light, and the scene is observed from a strictly determined binocular position. Falling water apparently sparkles, reflecting the sun, and the illuminating gas apparently manifests itself as a green gas flame; observing how light reveals these forms by taking the appearance of a fluid might offer an alternative intuition of space. Consequently, Duchamp's task would read: 'given light behaviour observed on the waterfall and the illuminating gas, we shall determine a visual system that is similar to a fluid'. Light, vision and space lose their Cartesian rigidity and become fluid.

However, the depiction of the fluids in the diorama of *Given* is only through visual tricks: the 'gas' is an electric bulb painted green and the 'waterfall' gives the impression of flickering light by the rotation of a perforated disk. Duchamp in a final ironical subversion locks the result of his staged mathematical problem within the realm of illusions.

Notes

1 Duchamp, *Manual*.

2 d'Harnoncourt, introduction sleeve in Duchamp, *Manual*.

3 The results of Lyotard's study of *Given* appear in his *Duchamp's TRANS/formers*.

4 See Chapter 2, Section 2.2.7 'Allegory and the Art of Memory'.

5 See Chapter 2.

6 Panofsky, *Perspective*, 40.

7 Evans, *Projective Cast*, 136.

8 Panofsky, *Perspective*, 58.

9 Jay, 'Scopic Regimes', 3.

10 Jay, 'Scopic Regimes', 16.

11 Techniques that involve monocular tracing in painting derive from Alberti's veil and Dürer's glass. An important development was the camera obscura, where the painter's single eye becomes the aperture or the lens. Extensive studies of the role of the camera obscura in Western painting are Hockney, *Secret Knowledge* and Steadman, *Vermeer's Camera*.

12 This development derives from the need to render images on complex architectural surfaces. Painting figures on the curved surface of a dome demanded a complex projection method if well-proportioned forms were to be perceived from floor level. Not just playfulness but the need to project with precision on a three-dimensional surface led to the creation of 'irregular' projections.

13 Krauss, *Originality of the Avant-Garde*, 10.

14 I analyze the horizontal grid in this Section 3.1 'Squared Linoleum', the vertical grid in Section 3.4 'Brick Wall' and the distorted grid in Section 3.6 'Cast Nude'.

15 Lyotard, *Duchamp's TRANS/formers*, 176.

16 Duchamp, *Manual*, my translation of the French.

17 For example, in 1927 he installed in his studio *Door: 11 rue Larrey*, a single door that closed off either the bathroom or the bedroom so was always both open and closed.

18 'Pause' is a term used by Duchamp to describe the *Large Glass*, see Chapter 2 and Section 3.7 'Given …'.

19 Adcock, 'Duchamp's Way', 330.

20 I kept a record of my visit to the museum in sketches in *Philadelphia Sketchbook*.

21 The oval holes are conical, opening up towards the scene. Behind the panel of the door and the holes is a velvet curtain. The curtain can be touched through a third hole on the right panel. However, nothing can be seen through that opening, although as the mark around it

reveals, many viewers try, because looking through this point of view would most likely reveal the nude's face. A further crack on the right edge of the panel allows a thin strip of light through. A sketch recording these details is found in my *Philadelphia Sketchbook*.

22 See Duchamp, *Notes* and Clair, *Duchamp et la photographie*, 94.

23 Krauss, *Optical Unconscious*, 112.

24 Sébastien Le Clerc, *Discours touchant le point de veuë, dans lequel il est prouvé que les choses qu'on voit distinctement ne sont veuës que d'un œil* (*Touching on the viewpoint where it is proved that the things one sees distinctly are seen only with one eye*) in Clair, 'Classical Perspectivists', 46.

25 Clair, 'Classical Perspectivists', 46.

26 Panofsky, *Perspective*, 43.

27 Leonardo, *On Painting*, 64.

28 A confusing overlapping of the two retinal images appears by concentrating the gaze on one's finger and glancing at the view beyond.

29 Leonardo, *On Painting*, 64.

30 Clair, *Duchamp et la photographie*. A chapter from Clair's extended study of the relation of Duchamp's work to photography, entitled 'Opticeries', appeared in *October*, see Clair, 'Opticeries', 101–112.

31 Clair, 'Opticeries', 101.

32 Marcel Duchamp, *Salt Seller: The Writings of Marcel Duchamp (Marchand du Sel)*, New York: Oxford University Press, 1973, 75–76, quoted in Clair, 'Opticeries', 101..

33 *To Be Looked at …* is part of the permanent collection of Museum of Modern Art, New York, official website: http://www.moma.org/collection/object.php?object_id=78993.

34 The diagram is described as the 'horopter'. The horopter, from Greek *horos* 'limit' and *opter* 'person who looks', is a line or surface containing all those points in space of which images fall on corresponding points of the retinas of the two eyes. For a similar argument linking *To Be Looked at …* with binocular vision see Shambroom, 'Leonardo's Optics'.

35 The image features in François de Aguilon, *Opticorum libri sex philosophis juxta ac mathemacticis utiles*, (Antverp: Ex officina Plantiniana, apud Viduam et filios J. Moreti, 1613), 195.

36 The blind man using crossed sticks appears in René Descartes, *La Dioptrique*, 1637.

37 Schwarz, *Complete Works*, 54.

38 Clair, 'Opticeries', 103.

39 See Howard and Rogers, *Binocular Vision*.

40 Bruce, Green and Georgeson, *Visual Perception*, 137–54.

41 Nevertheless, not all distant scenes appear flat because the distance between viewed objects is also important. Fireworks, for example, although appearing at a great height, explode with a great expansion from the core which renders binocular depth. Moreover, the distances between clouds when they appear in layers render small disparities, giving a sensation of depth.

42 Nakayama and Shimojo, 'Da Vinci Stereopsis', 1811–25.

43 See Howard and Rogers, *Binocular Vision*, Chapter 8, 'Binocular Fusion and Rivalry'. There are two general explanations: fusion theory and suppression theory. In the older fusion theory the two similar images appear as one and are processed simultaneously rather than successively. However, in suppression theory the two superimposed images always rival each other and in any location in the visual field only one eye's input is seen at any time: the eye that dominates varies from place to place and alternates over time, resulting in a composite single image, a mosaic of dominance and suppression.

44 Crary, *Techniques*, 119.

45 Pellerin, 'Origins and Development', 43.

46 Quoted in Pellerin, 'Origins and Development', 43.

47 Quoted in Pellerin, 'Origins and Development', 43.

48 Crary, *Techniques*, 129.

49 Crary, *Techniques*, 128.

50 Pellerin, 'File BB3', 94.

51 Pellerin, 'File BB3', 91.

52 Haas, 'Last Duchamp Work', 32.

53 Clair, 'Opticeries', 103.

54 Clair, 'Opticeries', 104.

55 Crary, *Techniques*, 127.

56 Judovitz, 'Rendezvous', 187.

57 See Adcock, 'Duchamp's Eroticism', Judovitz, 'Rendezvous', Clair, 'Opticeries', Krauss, *Optical Unconscious*.

58 Reynaud, Tambrun and Timby, *Paris in 3D*, 67.

59 Photographer Denise Browne Hare photographed *Given* in Duchamp's New York studio before this was transferred to Philadelphia, Hare, 'Marcel Duchamp's *Étant donnés*'.

60 Duchamp, *Manual*.

61 For the details of an extensive research on the development of the landscape backdrop see Price, Sutherland, Homolka and Torok, 'Evolution of the Landscape: The Materials and Methods of the *Étant donnés* Backdrop'.

62 Crary, *Techniques*, 125.

63 Crary, *Techniques*, 125.

64 Crary, *Techniques*, 126.

65 Crary, *Techniques*, 126.

66 This description of stereoscopy echoes my linking of the technique to ideas relating to the fourth dimension as I describe in Chapter 4 'Visuality: *The Act of Looking*'.

67 Krauss, *Originality of the Avant-Garde*, 137.

68 Sylvester, 'Bicycle Parts', 53.

69 See Dennis Pellerin, 'The Anaglyph, a New Form of Stereoscopy' in *Paris in 3D*, 121.

70 Duchamp, *Bride Stripped Bare,* n. pag.

71 Krauss, *Originality of the Avant-Garde*, 138.

72 Quoted in Krauss, *Originality of the Avant-Garde*, 138.

73 Helmholtz, *Selected Writings*, 204.

74 Taylor, *Marcel Duchamp: Étant donnés*, 153.

75 Taylor, *Marcel Duchamp: Étant donnés*, 152.

76 Steadman, *Vermeer's Camera*, 14.

77 Clair, 'Classical Perspectivists', 48.

78 Clair, 'Classical Perspectivists', 48.

79 As we have seen in the introduction, Frederick Kiesler 'predicted' this effect of *Given* on the viewer, when he analyzed the *Large Glass* in his essay for the *Architectural Record* in 1937, see Chapter 1.

80 Jay, *Downcast Eyes*, 53.

81 Panofsky, *Codex Huygens*, 97.

82 Jay, *Downcast Eyes*, 29.

83 Jay, *Downcast Eyes*, 27.

84 Panofsky, *Perspective*, 49.

85 Panofsky, *Codex Huygens*, 93.

86 Evans, *Projective Cast*, 108.

87 Panofsky, *Perspective*, 31.

88 Evans, *Projective Cast*, xxix.

89 Pérez-Gómez and Pelletier, *Perspective Hinge*, 103.

90 Evans, *Projective Cast*, xxxiii.

91 Helmholtz, *Selected Writings*, 194.

92 Helmholtz, *Selected Writings*, 199. Helmholtz presents a simple experiment that uses a pair of prismatic glasses making objects appear shifted to the right: '[I]f we then try to touch anything we see, taking care to shut our eyes before our hand appears in sight, our hand passes to the right of the object. If we follow the movement of the hand with the eye, however, we are able to touch what we intend by bringing the retinal image of the hand up to that of the object. Again, if we handle the object for one or two minutes, watching it all the time, a fresh correspondence is formed between the eye and the hand in spite of the deceptive glasses, and we are able to touch the object with perfect certainty even when our eyes are shut.' According to Helmholtz, this proves that 'it is not the perception of touch which has been altered by comparison with the false retinal images; on the contrary, it is the perception of sight which has been corrected by that of touch'.

93 Helmholtz, *Selected Writings*, 194.

94 For more about Duchamp's boxes see Bonk, *Box in a Valise*.

95 See Section 3.3.1 '*Lumen* and *Lux*'.

96 Krauss, *Originality of the Avant-Garde*, 139.

97 In identifying the gas lamp as the equivalent of the perspectival vanishing point my analysis differs from Lyotard's, who has placed its position on the 'cunt'. '*Con, celui qui voit*' he says, 'He who looks is a cunt'. See Lyotard, *Duchamp's TRANS/formers* and Demos, 'Seeing Double'.

98 Wood's perspective demonstration is in the second volume of his *Six Lectures on the Principles and Practice of Perspective*, London 1804, presented in Kemp, *The Science of Art*, 185. Poincaré's models appear in Clair, *Marcel Duchamp: Catalogue raisonné*, 181.

99 The conception of a flat intersecting surface was unthinkable and unimaginable not because it was too difficult to grasp, but more likely, because it did not match the contemporary spatial schema; it was unsatisfactory aesthetically and useless as a convention.

100 Manetti, *The Life of Brunelleschi*. Manetti, a contemporary of Brunelleschi, wrote the biography around 1480.

101 Kemp, *Science of Art*, 167.

102 Giusti, 'Cutting Surface', 59.

103 Alberti, *On Painting*, II.31, 65. Alberti's book was originally published in Latin as *De pictura*, 1435. An Italian translation, *Della pittura*, was published a year later in 1436.

104 Alberti, *On Painting*, II.31, 65.

105 See Section 3.2.3 'Single Eye'.

106 Masheck, 'Alberti's "Window"', 35. The contested passage appears in Alberti, *On Painting*, I.19, 54.

107 Alberti, *On Painting*, I.20, 58.

108 See Section 3.1 'Squared Linoleum'.

109 Hamilton and Hamilton, 'Marcel Duchamp'. Transcript by the author.

110 Several commentators have discovered affinities between the two works. For instance: Paz, '* water writes always in * plural'.

111 Duchamp, *Bride Stripped Bare*, n. pag.

112 We will discuss further Poincaré's influence on Duchamp in Chapter 4.

113 Poincaré, *Science and Method*, 254.

114 Quoted in Schwarz, *The Complete Works*, 152.

115 Hamilton, *Collected Words*, 228.

116 Clair also uses this definition for the Bride. Well-known *écorché* studies include those of human figures by Leonardo in his notebooks. See Clair, *Sur Marcel Duchamp et la fin del' art*.

117 Matisse, 'Introduction', in Duchamp, *Notes*.

118 Jouffret, *Traité élementaire*. For a discussion of Jouffret's influence on Duchamp see Section 4.1.6 'Hypersolids and Anaglyphs'.

119 Lyotard, *Duchamp's TRANS/formers*.

120 Krauss, *Optical Unconscious*, 155.

121 Lyotard, *Duchamp's TRANS/formers*, 175–76.

122 Krauss, *Optical Unconscious*, 113.

123 Duchamp, *Manual*.

124 See Haralambidou, 'The Stereoscopic Veil'.

125 Schwarz, *Complete Works*, 742.

126 Fer, 'Surrealism', 236. In the novel a young archaeologist discovers in a museum of antiquities in Rome a relief representing a young woman stepping along, her flowing dress a little pulled up so as to reveal her feet, with whom he falls in love. Guided by this absurd desire he obtains a plaster cast of the relief and names her Gradiva or 'the girl who steps along'. The idea that he would never see her walk in reality fills him with regret and vexation. After a dream, he is convinced he will meet her in Pompeii, where he travels only to find a real woman stepping calmly along with Gradiva's characteristic gait. She turns out to be his childhood sweetheart Zoe who, by appearing to accept his delusion fully, brings about his cure.

127 Fer, 'Surrealism', 237.

128 Quoted in Fer, 'Surrealism', 235.

129 Schwarz, *Complete Works*, 848.

130 See Section 3.2.9.4 'Undressing'.

131 Duve, *Definitively Unfinished*, 475.

132 Schwarz, *Complete Works*, 880.

133 Schwarz, *Complete Works*, 880.

134 Wohl, 'Duchamp's Etchings', 174.

135 See Section 2.1.6 'Given: The Corridor, the Tower and the Fall …'.

136 Tomkins, *Duchamp*, 462.

137 Judovitz, 'Rendezvous', 191.

138 Anderson and Julesz, 'Illusory Contour Formation', 706.

139 Duchamp, *Bride Stripped Bare*, n. pag.

140 Duchamp, *Bride Stripped Bare*, n. pag.

141 Antonio Pollaiuolo, *Apollo and Daphne*, c. 1470–80. The National Gallery. *Daphne* in Greek means 'laurel'.

142 Duchamp, *Bride Stripped Bare*, n. pag.

143 Helmholtz notes that painting, although a predominantly monocular activity, can give an illusion of space by manipulating light angles, representing atmospheric perspective, and introducing human figures and cattle that indicate size. He concludes: 'houses and other regular productions of art' are useful to the painter because they give 'a clue to the meaning of the picture, since they enable us easily to recognise the position of horizontal surfaces'. Helmholtz, thus, sees architecture as a carrier of perspective. Helmholtz, *Selected Writings*, 200.

144 Helmholtz, *Selected Writings*, 201.

145 Helmholtz, *Selected Writings*, 201.

146 Helmholtz, *Selected Writings*, 203.

147 See Section 3.2.4 'Things to be Looked at with Two Eyes'.

148 Krauss, *Originality of the Avant-Garde*, 139.

149 Crary, *Techniques*, 122.

150 The light lasts for less than 1/4,000 of a second. No movement of the eye is possible, yet we receive a complete impression of stereoscopic relief. See Helmholtz, *Selected Writings*, 207.

151 Haralambidou, 'Stereoscopy and the Architecture of Visual Space'.

152 I used the drawing for the cover of the catalogue accompanying the exhibition, *The Blossoming of Perspective: A Study by Penelope Haralambidou*, London: DomoBaal Editions, 2007.

153 Similarly to Duchamp who collected the real branches during walks with Teeny, I collected the stereoscopic images of branches during walks with my family in Highgate Wood.

154 Leonardo, *On Painting*, 47.

155 Leonardo, *On Painting*, 52. He continues with a description of common mistakes painters make when they ignore perspectival

rules. All the examples are architectural: city gates that seem to come up to only the knees of the inhabitants and porticos with thin cane-like columns which might be grasped in a fist.

156 Leonardo, *On Painting*, 38.

157 Leonardo *On Painting*, 42.

158 Panofsky, *Codex Huygens*, 98.

159 Evans, *Projective Cast*, 146–47.

160 For more on Piero's 'Other Method', see Evans, *Projective Cast*, 151–52.

161 Evans, *Projective Cast*, 151.

162 Panofsky, *Codex Huygens*, 104, n. 1.

163 Pérez-Gómez and Pelletier, *Perspective Hinge*, 41.

164 Panofsky, *Codex Huygens*, 30.

165 Panofsky, *Codex Huygens*, 32.

166 Leonardo, *On Painting*, 39.

167 Golding, 'Uglow's Nudes', 9

168 Golding, 'Uglow's Nudes', 17.

169 Golding, 'Uglow's Nudes', 17.

170 Golding, 'Uglow's Nudes', 19.

171 See Section 4.1.8.2 'Fluids'.

172 Tomkins, *Duchamp*, 354.

173 Tomkins, *Duchamp*, 354.

174 BBC, 'Extracts'.

175 BBC, 'Extracts'.

176 Tomkins, *Duchamp*, 366.

177 Tomkins, *Duchamp*, 365.

178 BBC, 'Extracts'.

179 Schwarz, *Complete Works*, 790.

180 Duchamp, *Bride Stripped Bare*, n. pag.

181 Schwarz, *Complete Works*, 790.

182 Schwarz, *Complete Works*, 794.

183 Schwarz, *Complete Works*, 794, my translation from the French.

184 Tomkins, *Duchamp*, 437.

185 d'Harnoncourt and McShine, *Marcel Duchamp*, 306.

186 Schwarz, *Complete Works*, 794.

187 Duchamp's image was used for the cover of the first issue of the magazine in 1956, edited by Breton.

188 Schwarz, *Complete Works*, 805.

189 Clair, *Marcel Duchamp: Catalogue raisonné*, 125.

190 Schwarz, *Complete Works*, 242. 'Iron Maiden of Nuremberg' is a term used to describe torture devices in the form of anthropomorphic containers whose doors were fitted with spikes that pierced the victim when closed.

191 Schwarz suggests this is a way of punishment, *Complete Works*, 242.

192 d'Harnoncourt and Hopps, *Étant donnés*, 59.

193 d'Harnoncourt and Hopps, *Étant donnés*, 63.

194 See Section 3.6.10 'Appearance and Apparition'.

195 See Section 3.6.2 'Buildings and Bodies'.

196 Meighan, 'A Technical Discussion', 253.

197 Quoted in Blachut and Burkhardt, *Historical Development*, 27.

198 Valyus, *Stereoscopy*, 307.

199 Valyus, *Stereoscopy*, 307.

200 Aerial Archive, 'Introduction'.

201 Although some functions are mechanised, the stereo-plotter requires that the main recording function is performed by an operator with good binocular vision and stereopsis.

202 Blachut and Burkhardt, *Historical Development*, 106.

203 Valyus, *Stereoscopy*, 261.

204 Valyus, *Stereoscopy*, 262.

205 'Pause' is a term used by Duchamp to describe the *Large Glass*, see Chapter 2 and Section 3.7 'Given ...'.

206 To obtain a visual impression of the position of remote objects in space the distance between the two images must be large, equal to millions of kilometres or more. No earthly instrument could provide such a base. However, pictures can be taken at different times from two different points in the earth's orbit offering viewpoints separated by an appropriate base. Valyus, *Stereoscopy*, 271.

207 Newton, 'Medical Photogrammetry', 118.

208 Stereo-photogrammetry is also used for making accurate copies of sculptures.

209 Schwarz, *Complete Works*, 892.

210 Vuibert, *Les Anaglyphes*. According to Schwarz, on the day of his death, Duchamp received a call from the Librairie Vuibert to inform him that the red and blue glasses he had ordered in relation

to his development of *Anaglyphic Chimney* were available. He was very excited and went to collect them immediately after lunch. Schwarz, *Complete Works*, 266.

211 My translation from the French, Vuibert, *Les Anaglyphes*, 11–12.

212 Iles, 'Marcel Duchamp, Man Ray and the Desiring Machine', 45.

213 Govan, 'Last Work of Surrealist Marcel Duchamp Discovered'.

214 For more on the photographic and stereoscopic collaborations between Duchamp and Man Ray see, Ades, 'Camera Creation', 88–113.

215 Duchamp, *Writings*, 84–85.

216 Visual agnosia, an impairment in the recognition of visually presented objects after an accident or a stroke, is the loss of the mould, of the apparition without which one cannot reconstruct the appearance, the normal perception. See Farah, *Visual Agnosia*.

217 Duchamp, *Writings*, 85.

218 See Taylor, *Marcel Duchamp: Étant donnés*.

219 McLeer, 'Empathetic Blossomings', 21.

220 See Section 3.6.1 'Sculpture and Painting'. Some parts of the nude were indeed physical casts from a female body, such as the left forearm and hand, as well as the left leg.

221 See Section 3.6.10 'Appearance and Apparition'.

222 The use of nails would explain the trace of concave indentations, both on the early, small parchment figure and the parchment studies.

223 Taylor, 'Marcel Duchamp's letters to Maria Martins, 1946–1967/68', in *Marcel Duchamp: Étant donnés,* 402.

224 See Chapter 3, Section 3.2.10 'Left Eye'.

225 Haralambidou, 'The Stereoscopic Veil', 47. I was able to calculate the dimensions of the breach from the information in the *Manual of Instructions*.

226 Helena Papadakis, helped set up the survey and instructed me on how to use the equipment.

227 Photogrammetry glasses containing liquid crystals and a polarizing filter become dark when voltage is applied, but otherwise remain transparent. A transmitter sending a timing signal controls the glasses. The display alternately displays different perspectives for each eye, while the glasses alternately darken over one eye, and then the other, in synchronization with the refresh rate of the screen, using a technique called alternate-frame sequencing.

228 See Kemp and Cotte, *La Bella Principessa*.

229 See Dalya Alberge, 'Is this portrait a lost Leonardo?' *Guardian*, 27 September 2011 21.47 BST http://www.guardian.co.uk/artanddesign/2011/sep/27/lost-leonardo-da-vinci-portrait [assessed 16 October 2012]

230 Meighan, 'A Technical Discussion', 245.

231 For more on Reynolds' bookbinding career see Glover, 'Cendres chaudes', and Glover Godlewski, 'Warm Ashes'.

232 The reprographic technique relies on an optical illusion, which involves a blending of the tiny halftone dots into smooth tones by the human eye.

233 Hamilton, *Collected Words*, 228.

234 Roland Shearer, 'Response'.

235 A similar effect results from the use of the 3D scanner. See the work of ScanLAB, http://www.scanlabprojects.co.uk/ [accessed 23 March 2013].

236 Meighan, 'A Technical Discussion', 243.

237 Taylor, 'Marcel Duchamp's letters to Maria Martins, 1946–1967/68', in *Marcel Duchamp: Étant donnés,* 402.

238 Letter by Paul Matisse to Theodor Siegl, March 10, 1969, Philadelphia Museum of Art Archives, quoted by Meighan, 'A Technical Discussion', 243.

239 Alvey, 'The Cinema as Taxidermy', 23.

240 Chard, 'Photography as an Agent', 338.

241 Nat Chard has extensively researched Wilson's techniques. See Chard, *Drawing Indeterminate Architecture* and http://natchard.com/ [accessed 23 March 2013].

242 Taylor, 'Construction', in *Marcel Duchamp: Étant donnés*, 77.

243 Although rare and contentious, preservation of the human form after death is not unprecedented. See Jeremy Bentham's 'auto icon' on display in purposefully constructed vitrine with openable doors at University College London, and other examples in Morris, *A History of Taxidermy*, 88–98.

244 Admittedly, the process of taxidermy uses traditional sculpting techniques; however, sculpture does not usually include the application of animal skin on a mould.

245 Duchamp, *Du Signe,* 43–44, my translation of the French.

246 Duchamp, *Du Signe,* 43–44, my translation of the French.

247 Duchamp, *Bride Stripped Bare,* n. pag., and Hamilton, *Collected Words*, 182–93.

248 Duchamp, *Bride Stripped Bare*, n. pag.

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VISUALITY: THE ACT OF LOOKING

Duchamp's interest in perspective construction, non-Euclidean geometry and the fourth dimension, as well as stereoscopy, is directly connected with his 'antiretinal' stance. The first part of this chapter, 'Geometry of Vision', charts his ideas in regard to these visual representation techniques and geometrical theories. I suggest that Duchamp's staging of the popular illusionistic technique of stereoscopy in *Given* constitutes his contribution to the early twentieth-century search for the fourth dimension, while at the same time fulfilling his ambition to 'rehabilitate' the Renaissance technique of perspective. Furthermore, stereoscopy links Duchamp's notion of eroticism with his desire to question the dimensionality of perception. The second part of the chapter concludes with a detailed analysis of my installation/drawing, *The Act of Looking*, 2007, which is a full-scale redrawing of *Given* testing through a physical structure the ideas explored in 'Geometry of Vision' and my study in Chapter 3.

4.1 GEOMETRY OF VISION

4.1.1 ANTIRETINAL

Art critic Pierre Cabanne discusses Duchamp's 'antiretinal' stance:

> Cabanne: Where does your antiretinal attitude come from?
> Duchamp: From too great an importance given to the retinal. Since Courbet, it's been believed that painting is addressed to the retina. That was everyone's error. The retinal shudder! Before, painting had other functions: it could be religious, philosophical, moral.[1]

Cabanne notes that Duchamp uses the word 'retinal' in the way that many people use the word painterly, showing his objection to the sensuous appeal of painting.[2] The adjective refers to the retina, the eye's photosensitive, concave spherical inner surface. The prefix *anti* can mean 'against' or 'hostile to'. Accordingly, the term is often discussed in relation to Duchamp's 'readymades' – ordinary manufactured objects which, through simple modifications, for instance the addition of a signature, he transformed into art objects, against retinal art. Nevertheless, it would be a mistake to interpret Duchamp's antiretinal standpoint as purely intellectual and 'anti-visual', as it is often the case. His life-long preoccupation with stereoscopy, photography, drawing and optical machines not only reveals his deep interest in visual processes, but his determination to put art in the service of visual experimentation and research. Similarly to the way that perspective construction in art became a proof of a scientific understanding of vision during the Renaissance, Duchamp has also used art as experiment in search of hidden or lost visual dimensions beyond retinal excitation.[3]

The etymology of the word retina comes from the Latin *rete,* meaning 'net or netting'. It describes the regular, net-like, distribution of 'cones' and 'rods', the light-sensitive cells. As we have seen, Leon Battista Alberti conceived and constructed his perspectivist picture plane as a loosely woven net. Duchamp's frustration with retinal art, and perhaps the retinal perception of art, therefore, was not only in relation to vision that stops at the surface of the human (single eye) retina, but also its simplistic physical signifier: the flat picture plane. We have considered an interpretation of antiretinal to mean 'against' retinal art, but the prefix *anti* can also mean

'opposite of' or 'reverse', which I believe allows a more creative interpretation. By being 'antiretinal' Duchamp may have implied that his work was not only in antithesis, but also provided an antidote to retinal art: ability to reveal the 'depth' that retinal art hides. Far from being anti-visual, his stance was the opposite: he was against what he perceived as an oversimplification, flattening and deterioration of vision, and in search of lost dimensions in visual perception. Beyond clear evidence in his work, Duchamp has often declared his fascination with perspective construction and the transformation of visual entities in the fourth dimension in his notes and interviews. Furthermore, his two major works in particular, the *Large Glass* and *Given,* are antiretinal in that sense. They portray an expanded version of vision that thickens the act of looking and splits it into its constituent parts. Finally, differences in the interpretation of the word antiretinal reflect a disparity in the reception of Duchamp's work in the States, where the focus is usually on the readymades, and in Europe, where the complexity and nuance of his visual explorations in the *Large Glass* and *Given* are more appreciated.[4]

4.1.2 SPACE AS SYMBOLIC FORM

The American art critic and historian Hal Foster maintains that vision is inevitably entangled with what has been called visuality: 'the distinct historical manifestations of visual experience in all its possible modes'.[5]

> Although vision suggests sight as a physical operation, and visuality sight as a social fact, the two are not opposed as nature to culture: vision is social and historical too, and visuality involves the body and the psyche. Yet neither are they identical: here, the difference between the terms signals a difference within the visual—between the mechanism of sight and its historical techniques, between the datum of vision and its discursive determinations—a difference, many differences, among how we see, how we are able, allowed, or made to see, and how we see this seeing or the unseen therein. With its own rhetoric and representations, each scopic regime seeks to close out these differences: to make of its many social visualities one essential vision, or to order them in a natural hierarchy of sight.[6]

Vision, consequently, becomes the site for the construction of intellectual space. On the other hand, intellectual, aesthetic and social conditions also mould the visual. Perspective is a technique that constructs pictorial space largely according to the formula of empirical visual space. It is based on a simple abstraction of the psychophysiological 'givens'. German art historian Erwin Panofsky characterizes perspective as a 'symbolic form' in which 'spiritual meaning is attached to a concrete, material sign and intrinsically given to this sign':[7]

> And precisely here it becomes quite clear that 'aesthetic space' and 'theoretical space' recast perceptual space in the guise of one and the same sensation: in one case that sensation is visually symbolised, in the other it appears in logical form.[8]

He concludes that it is essential to ask of artistic periods and regions not only whether they have perspective, but also which perspective they have.

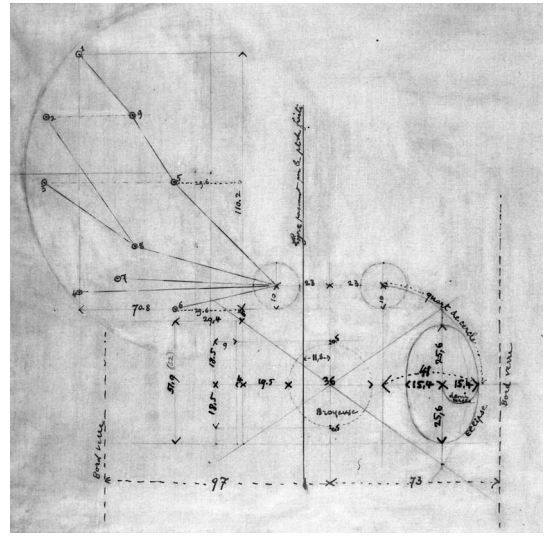
French mathematician and philosopher of science Henri Poincaré defines geometry as neither deriving from experience nor given *a priori* but as a convention. I define space similarly: as a culturally manufactured concept that changes according

to time and place. Traces of these changes can be detected in artefacts and theories in art, religion, science, architecture and other forms of artistic or representational expression.

4.1.3 DUCHAMP AND THE PERSPECTIVISTS

At first glance the intellectual and historical gap between the classical perspectivists of the Renaissance and Duchamp's work seems unbridgeable. His reputation as an artist renouncing established fine art methods and techniques suggests a rejection rather than endorsement of the rules of perspective construction. Nevertheless, on several occasions he proclaimed his profound interest in perspectival principles. In his interviews with Cabanne he makes clear the significance of perspective:

> Duchamp: … perspective was very important. The "Large Glass" constitutes a rehabilitation of perspective, which had then been completely ignored and disparaged. For me, perspective became absolutely scientific.
>
> Cabanne: It was no longer realistic perspective.
>
> Duchamp: No. It's a mathematical, scientific perspective.
>
> Cabanne: Was it based on calculations?
>
> Duchamp: Yes and on dimensions. These were the important elements. What I put inside was what, will you tell me? I was mixing story, anecdote … with visual representation, while giving less importance to visuality, to the visual element, than one generally gives in painting. Already I didn't want to be preoccupied with visual language …
>
> Cabanne: Retinal.
>
> Duchamp: Consequently, retinal. Everything was becoming conceptual, that is, it depended on things other than the retina.[9]



4.1 Marcel Duchamp, *Bachelor Apparatus: Plan*, c. 1931–33, after drawing of 1913. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

His interest was fuelled by his extensive study of perspective treatises while working at the Sainte-Geneviève Library during the end of 1913 and the whole of 1914. According to British artist Richard Hamilton, in the *Large Glass* Duchamp drew the Bachelor Machine with measured care (fig. 4.1).[10]

All elements were plotted to the nearest millimetre and the contact of the 'hand to the canvas' was minimized by the use of mechanical instruments.[11] The most remarkable aspect of the lower part of the *Large Glass* is that it was neither conceived nor composed as a two-dimensional image. Duchamp admitted: 'the projection [of each part of the *Glass*] in perspective [on the *Glass*] is a perfect example of *classical perspective*, I

mean that I imagined the various elements of the Bachelor Machine first of all as arranged behind the *Glass*, on the ground, rather than distributed over a surface of two dimensions."[12] The Bachelor features were, therefore, conceived from above and the first drawing of the whole apparatus is a 'plan', drawn in pencil black, blue and red ink on paper to scale (1:10), and later traced on tracing cloth and reproduced in the notes of the *Green Box*.[13]

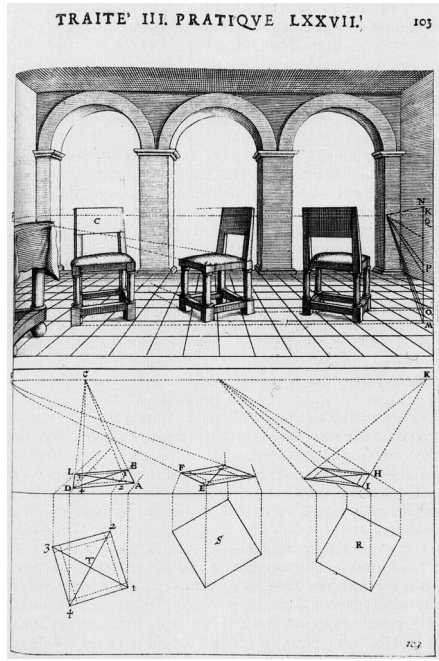
Hamilton identifies the circular platform of the Chocolate Grinder as the centre of the composition from which all other dimensions are generated. In conjunction with the plan, the diagram of a section carries all the vertical information to complete a three-dimensional record of the apparatus. Architects Elizabeth Diller and Ricardo Scofidio, who have also studied the *Large Glass* in detail, have shown that in Duchamp's perspectival plotting the picture plane is positioned at the middle of the composition, bisecting the Chocolate Grinder.[14] Furthermore, the central vanishing point is positioned on the dividing line between the two panels – the 'horizon' – and 11.8 centimetres left of the Grinder's centre.

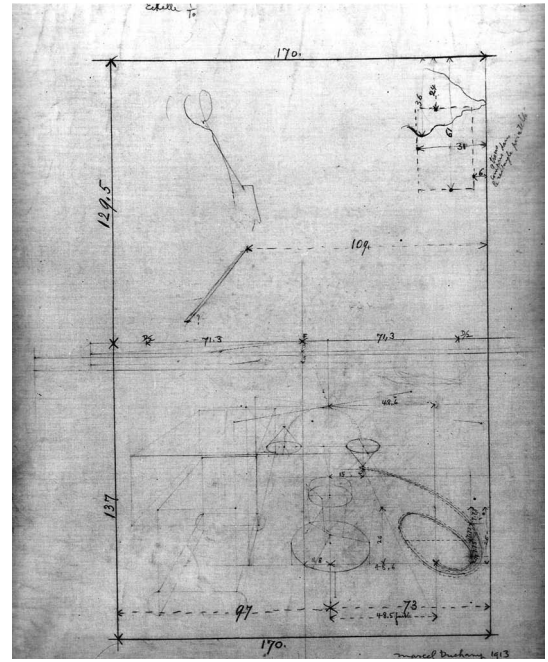
The two preliminary drawings organizing the view of the Bachelor Machine closely resemble the *ichni* of perspectival projection, the plan and section from which the space depicted in a perspective view is constructed (fig. 4.2).

Consequently, the represented space of the *Large Glass* is conceived through a set of orthographic projection drawings, as in architectural design, and is an exercise in projection accompanied by half-explanatory and half-poetic notes. By revisiting the notes and re-plotting the drawings, Hamilton was able to reconstruct the architecture of the *Large Glass* with a similar precision.

Duchamp's rejection of the retinal seems to contradict his deep preoccupation with perspective construction. Perspective construction is a representation method, which renders the ephemerality of visual phenomena measurable. Until perspective was invented, vision was mistrusted because it was not sufficiently understood. The ability to accurately draw the perspective view from a measured plan and a section became a geometric proof, convincingly similar when compared to natural vision from the same position. Soon, however, the arduous plotting of the architecture of vision in plan and section slowly degenerated to an effortless copy of a flat image provided by visual machines like the perspective 'veil' and the camera obscura. Thus, the monocular two-dimensional view that perspective construction propagated acquired immense and unquestioned power. This is what Duchamp repeatedly rejects as the retinal: the immediate imprint of a flat image on the eye as an elementary sign for vision, forgetting the original explanation and justification which brought it forth as an intellectual structure sanctioning mental space. Famously dismissive of Abstract Expressionism, which he saw as the epitome of the retinal, he remains a 'Cartesian', under the spell of the intellectual rigour of perspective construction.

He is thus interested not in the image that results from the use of the representation technique but, rather, the magic involved in a process which illuminates how space is remembered, constructed or even imagined. Similarly to the first practitioners of perspective, by plotting the lower domain of the *Large Glass* carefully from a plan and a section, he appreciates the coming together of the 'legitimate' image as a magical event (fig. 4.3).





4.2 Jean Du Breuil, plotting of chairs, from *La perspective pratique*, 1642.

4.3 Marcel Duchamp, first perspective study for *The Bride Stripped Bare by Her Bachelors, Even*, 1913. © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

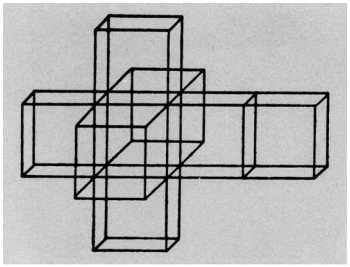
4.1.4 FOURTH DIMENSION

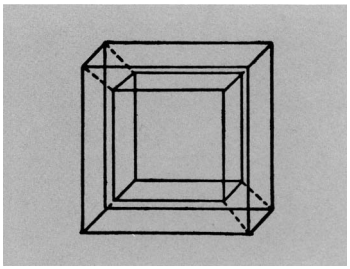
In the first two decades of the twentieth century, the idea that space might possess a higher, unseen fourth dimension was a dominant intellectual influence. According to American art historian Linda Dalrymple Henderson, the complex spatial possibilities suggested by a fourth dimension grew from developments in early nineteenth-century geometry (fig. 4.4).[15]

The popularization of these ideas during the later years of the nineteenth century began to capture the public's imagination. Preoccupation with the new geometries expressed dissatisfaction with materialism and positivism, giving rise to idealist and mystical philosophical theories.

According to Henderson, n-dimensional geometry 'emerged as a natural extension of analytic geometry, in which one or more variables can be added to x, y, and z'.[16] The initial challenge posed by the existence of a fourth dimension would confront all subsequent advocates: 'how can we visualise a new dimension, perpendicular to each of the three dimensions of our familiar world?' This new geometry asked for a redefinition of common geometric principles. In 'hyperspace' a rotation in the fourth dimension would occur about a plane instead of a line, and a 'hypercube' would be generated by the motion of a cube into a new fourth direction by analogy with the generation of a cube by a square moving perpendicularly to itself.

Different visualizations of these rotations and solids were presented in two-dimensional





4.4 H.P. Manning, hypercube representations, from *Geometry of Four Dimensions*, 1914.

diagrams, which offered no pretence of illusionistic qualities (fig. 4.5).

It was accepted that our conventional perception of the world could not allow the insertion of a fourth perpendicular into the intersection of the three dimensions that meet in the corner of a room. The spatial implications could only be imagined by approximation. However, the absence of obvious proof did not diminish the potency of the theory. In British schoolteacher and writer Edwin Abbott Abbott's popular novel, *Flatland: A Romance of Many Dimensions*, 1884, the fact that we do not perceive an extra dimension does not preclude its existence but simply signifies that we do not yet have the means to escaping our three-dimensional perceptual universe (fig. 4.6).[17] A higher dimension could well lie out there waiting for us to grasp or visit if we developed the right powers (fig. 4.7).[18]

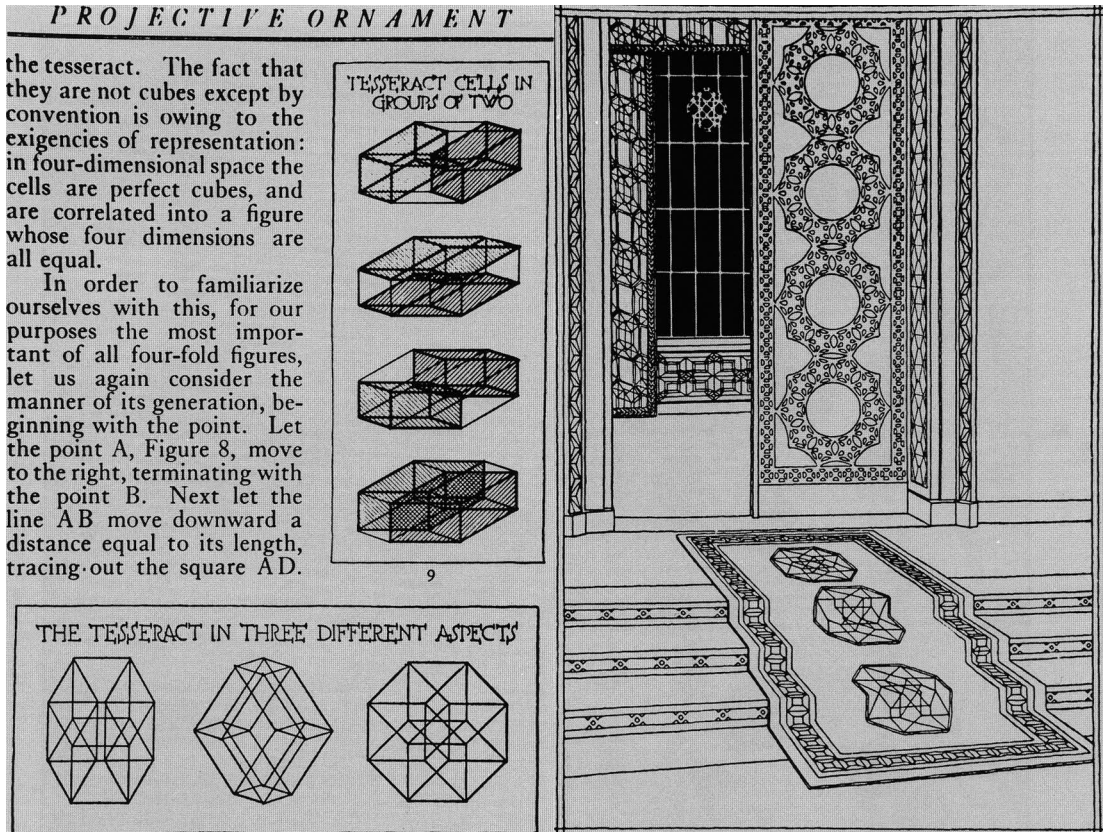
The controversy over geometric axioms informed further speculations about the nature of space. Austrian physicist and philosopher Ernst Mach suggested that there is more than one kind of space and that geometric space and perceptual space, 'physiological' space he termed it, are separate entities. More importantly, in France this differentiation between the spaces of geometry and perception was emphasized by Poincaré, who defined geometric space as continuous, infinite, having three dimensions, homogenous (all points are identical one with another) and isotropic (all straight lines which pass through the same point are identical with one another). However, he saw perceptual space as made up of three component spaces: visual, tactile and motor. He demonstrated that none of these spaces is continuous, infinite, homogenous or isotropic and concluded that for perceptual space 'one cannot even say if it has three dimensions'.[19] According to Poincaré, although deriving from perceptual observations, geometric space is not a direct result of our perceptions but an idealized space based on axioms that are merely conventions. He continued: 'experience does not prove to us that space has three dimensions, it only proves to us that it is convenient to attribute three to it.'[20]

4.1.5 PERCEPTUAL DIMENSIONS

Poincaré's distinction between the intellectual space of geometry and the different kinds of perceptual space leads to a series of questions. How many dimensions does perceptual space have? Can perceptual space be measured? Does tactile space have the same dimensions as visual space? Is there an extra dimension within the visual that is not yet discovered or perhaps simply overlooked?

Duchamp describes the experience of perspective diminution of sizes: '*Physically* – the eye is the sense of perspective. In this, *perspective resembles color* which like it cannot be tested by touch.'[21] The constant distortion of shapes of objects in perspective is an untouchable dimension within the visual, for instance one can never touch the circumference of the ellipse that a tilted circle forms on the retina. This disjunction between vision and touch in perspective was perhaps why the rules governing the distortion were not understood correctly until the Renaissance.[22]

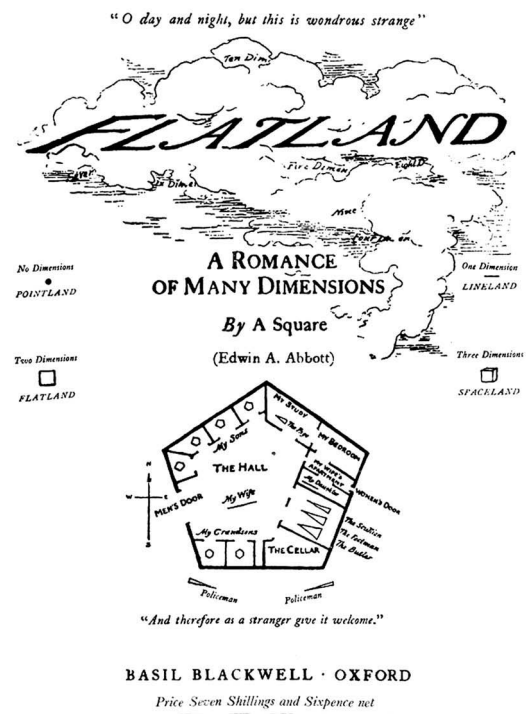
Another attribute of the visual, which is impossible to gauge through touch or the Renaissance invention of perspective, is the depth offered by binocular disparity. This extra sense of depth can also be seen as a hidden visual dimension. I would like to suggest that the fascination with

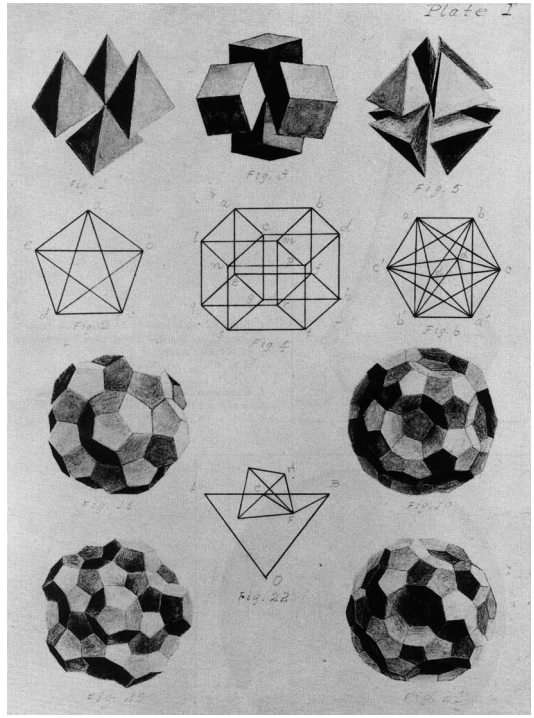


4.5 Claude Bragdon, *Projective Ornament*, 1915.

the fourth dimension could be an indication of a collective awareness that the perspectival spatial paradigm did not consider latent perceptual attributes. This was expressed as a nostalgia, a desire for something that cannot be defined, not because it is not there, but because we have not found it yet, or perhaps have lost the intellectual powers to grasp it.

In *Science and Hypothesis*, Poincaré, questions the dimensionality of perception and offers two examples through which we could perceive the fourth dimension. The first is based on an 'external' experiment, that is perception enhanced by light passing through refracting media of complicated form.[23] The second example is 'internal'. He claims that in vision the third dimension is revealed in two different ways: 'by the effort of accommodation' and 'by the convergence of the eyes'. He conceives these two sensations as always in harmony. If, however, these two muscular sensations were to vary independently, 'complete visual space will appear to us as a physical continuum of four dimensions'.[24] With these examples Poincaré argues





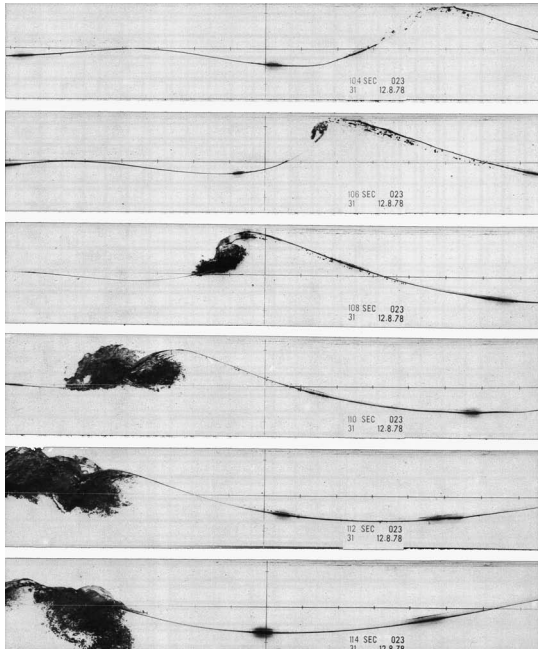
4.6 Edwin Abbott Abbott, *Flatland*, book cover, 1884.

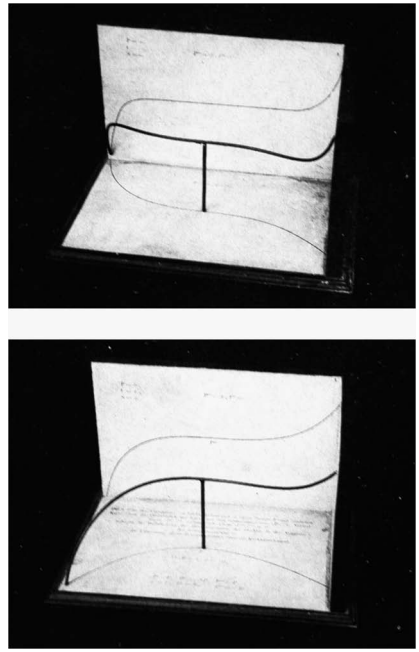
4.7 W.I. Stringham, regular figures in n-dimensional space, from *American Journal of Mathematics*, 1880.

that perception of the fourth dimension in the visual field is possible, albeit in improbable physical conditions that can only be imagined: either within an environment governed by different laws or with a different behaviour of the muscles in our eyes.

Additionally, Poincaré links our understanding of the performance of light with the way we perceive space. As we have seen, historical shifts in the conception of light can be responsible for analogous shifts in representational techniques. For instance perspective construction derived from the understanding of light as a linear ray.[25] Furthermore, it was inspired by a practice of surveying building, a monocular observation of geometric solids in architecture, which reflect light in a correspondingly geometric way.[26] An alternative understanding of the performance of light may suggest a space of higher dimensions and the method of observation, as well as the object observed, generate different types of geometry. Does the binocular observation of fluids – water and gas, which are also 'refracting media of complicated form' – inspire a new type of geometry (figs. 4.8, 4.9). Would a fourth or further dimensions emerge from a binocular survey of fluids?

Perspective, binocular depth, light, shadow and colour can be seen as untouchable visual dimensions only partially explored and understood. Research





4.8 J. Taylor, breaking of a plane water wave, from Milton Van Dyke, *An Album of Fluid Motion*, 1982.

4.9 Unknown, *Deux courbes au voisinage d'un point*, mathematical models from Institut Henri Poincaré.

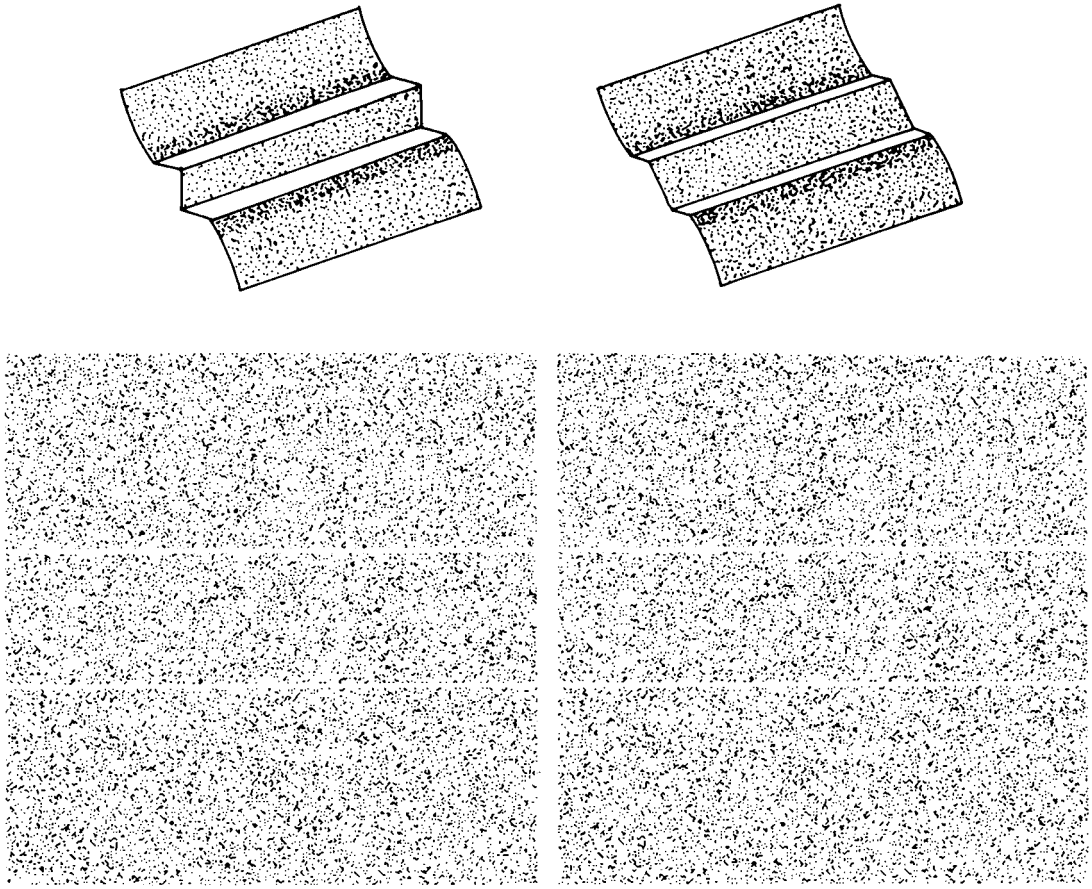
with random-dot stereograms reveals vision as a multifaceted structure, even more elaborate than Poincaré's imaginary scenarios (fig. 4.10).[27]

Normal visual perception, therefore, can be understood to measure more dimensions than the three ascribed by the observation of solids. So Poincaré's improbable conditions may not be exterior to our physical world. For instance, they may exist in the binocular observation of the behaviour of fluids, which has not been thought important, interesting or, to use Poincaré's term, convenient enough to inspire a new geometry. The glinting waterfall and the illuminating gas – two light-emitting fluids – as well as, the fluid nudity of a female figure observed through a strictly binocular door in *Given*, may be Duchamp's attempt to portray the elusive fourth dimension, and define an expanded geometry of desire.

4.1.6 HYPERSOLIDS AND ANAGLYPHS

The development of stereoscopy and the study of binocular depth, inaugurated by Wheatstone and Brewster in the first part of the nineteenth century, are contemporary with the first references to the fourth dimension, and similarities between illusory and textual descriptions of the fourth dimension and stereoscopic imagery suggest a closer connection between the two.

For instance, some of the diagrams attempting to describe four-dimensional hypersolids, particularly in mathematician Esprit Jouffret's *Traité élémentaire de géométrie à quatre dimensions et*

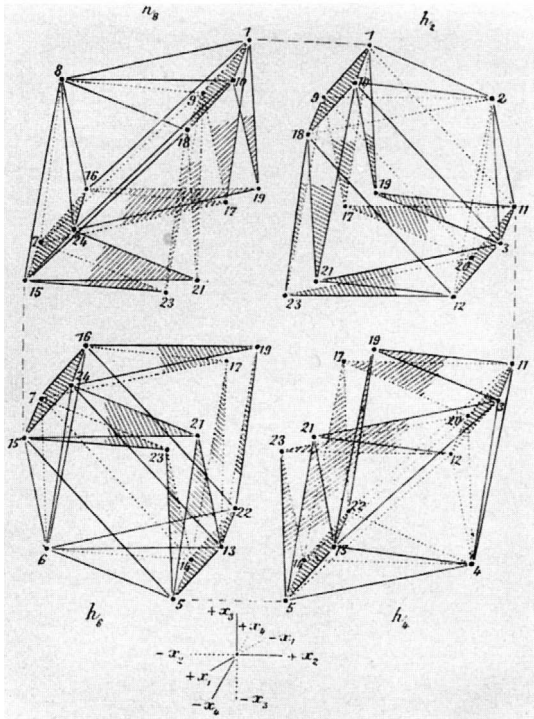


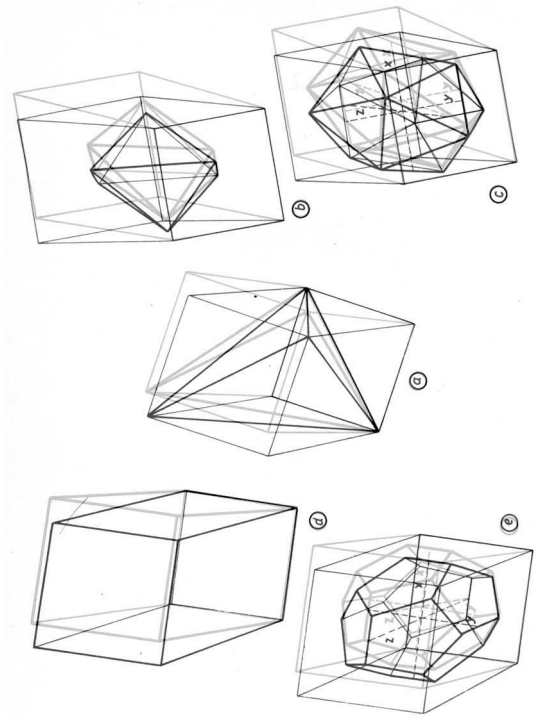
4.10 Howard and Rogers, depth contrast in a surface with no discontinuities, *Binocular Vision and Stereopsis*, 1995. By permission of Oxford University Press, USA.

introduction à la géométrie à n dimensions, 1903, look remarkably similar to anaglyphic stereoscopic representations of solids as in stereographer H. Vuibert's *Les Anaglyphes Géométriques,* 1912.[28] Through the use of red and green glasses Vuibert's anaglyphic geometric figures 'blossom' into an extra dimension, which is purely visual. Indeed, stereoscopy contributes an extra sensation and, therefore, inserts an additional dimension, or fourth perpendicular, into the perspective representation of three dimensions (figs. 4.11, 4.12).

According to Jouffret, 'if a three-dimensional object takes a demi-tour through the fourth dimension, it returns mirror-reversed and turned inside out'.[29] The rotation of a pair of gloves, for example, would result in the gloves being turned inside out, the left becoming right and vice versa.

This turning inside out is similar to the uncanny effect created by interchanging the two images of a stereoscopic pair, which is often referred to as





4.11 Esprit Pascal Jouffret, 'Perspective cavalière of the Sixteen Fundamental Octahedrons of an Ikosatetrahedroid', from *Traité élémentaire de géométrie à quatre dimensions*, 1903.

4.12 Nikolai Adamovich Valyus, anaglyphic diagrams, from *Stereoscopy*, 1966.

'pseudo-stereoscopy'. If the left picture is seen by the right eye and the right picture by the left the virtual stereo-volume is inverted. What is convex becomes concave, like 'a glove turned inside out'. Near objects retreat to the back and the background comes forward. During the course of his stereoscopic experiments Wheatstone was also aware of the phenomenon, what he called a '*converse* image' and compared to the relationship between a mould and its cast, resonating with Duchamp's concept of appearance and apparition.[30] Pseudo-stereoscopy causes an anomalous inversion, difficult to accept perceptually because it does not comply with experience.

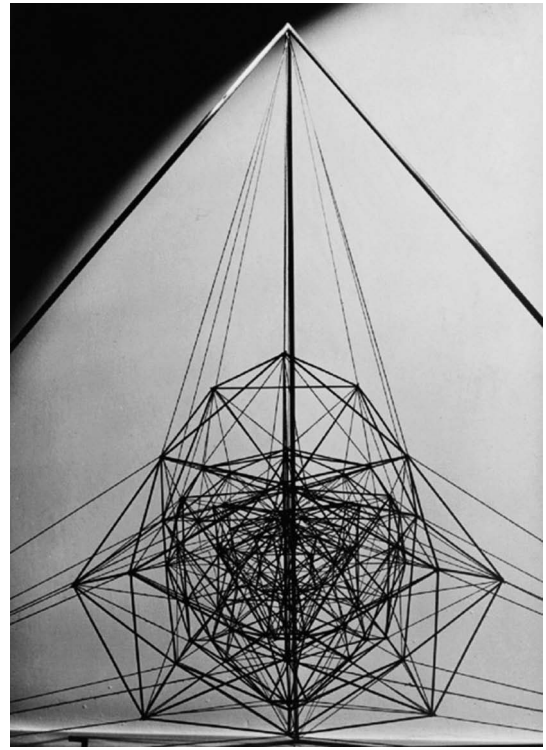
Shifting the images in the stereoscopic pair is analogous to what Jouffret describes as a rotation through the fourth dimension. In 'pseudo-stereoscopy' it is the perceptual system, not the object, that is turned inside out creating a mirrored universe behind the viewers' eyes, gazing towards the back of their head. The inversion is simple to detect in abstract geometric figures, but is often impossible to render in photographs depicting natural scenes, which reject stereoscopic fusion and stay confusingly separate. It takes a long time, for instance, for the mind to render the monstrous image of an inverted face, this being particularly unexpected and unnatural.

Is binocular depth, as captured and represented through stereoscopy and pseudo-stereoscopy, therefore, the missing illusory fourth dimension that the ubiquity of monocular perspectival techniques has eradicated? Because it has not yet been satisfactorily expressed mathematically or geometrically, or its exploration has not been deemed convenient enough, it remains a hidden and neglected dimension of visuality.

4.1.7 SCIENCE AND ART

The preoccupation with the fourth dimension and the questioning of Euclidean geometry naturally influenced artistic circles.[31] Their impact on Duchamp's thought is manifest throughout his work, especially the notes published in the *White Box*, which reveal his study of contemporary mathematics.[32] In his interviews with Cabanne, he admits to being influenced by the writings of French pseudo-mathematician and writer Gaston de Pawlowski and French mathematician and actuary Maurice Princet, whose work popularized ideas of four-dimensional geometries among fine artists.[33] Pawlowski's book *Journey to the Land of the Fourth Dimension*, which was inspired by Poincaré and Jouffret, was published in 1912, the same year as Vuibert's book on geometrical anaglyphs and a year before Duchamp started work on the *Large Glass*.[34]

For Duchamp, the fourth dimension operates as a metaphor combining disparate concepts under the same name. The inquiry into dimensions suggests an interest in science and the measurement of physical phenomena. American art historian Craig Adcock believes that Duchamp found in his reading of Poincaré a model for the making of art, using the language of



4.13 Man Ray, *Mathematical Object*, 1936. Photograph from a mathematical model at the Institut Henri Poincaré. © Man Ray Trust/ ADAGP, Paris and DACS, London 2013.

science and mathematics to express his aesthetic and philosophical preoccupations. Machines, changes of state, and operations formed the terminology for his explorations, and his working method resembles that of a scientist performing experiments to structure and test hypotheses (fig. 4.13).

Indeed, as we have seen, perspective construction as a 'science' played this experimental role during the Renaissance. It was used as evidence of the new theory of vision. A painting ceased to be a symbol, as it had been in the Middle Ages, and became a constructed geometrical configuration based on measured dimensions; correct plotting ensured that the resulting image would be similar

to the perceived retinal impression. Duchamp's intention is to introduce into art a similar precision and the exactitude of science. This intention is not born of love for science, however. On the contrary, he wishes to discredit science, but in a light-hearted manner. Irony is always present, he added.[35]

Finally, for Duchamp the fourth dimension operates as a metaphor for the unattainable. He borrows the need for precision from science and mathematics and applies it ironically to phenomena conceived as beyond the boundaries of measurability: desire, fantasy, narrative, chance, illusions and the image of a coveted female nude body. It is a reconfiguration, a breaking of the solid logic of mathematics and physical laws to meet the extra dimensions describing the complexity of human experience. Consequently, the rules and definitions of perspective, as a science of vision, strain, expand, or one might say, 'blossom'.

4.1.8 DIMENSIONS OF DESIRE

Since the first paintings in Lascaux, the practice of image-making has been connected with desire: the desire to capture and freeze the ephemeral character of vision. The charm of perspective seduced the artists of the Renaissance, to the extent that the art historian Giorgio Vasari describes the wife of painter Paolo Uccello as struck with jealousy overhearing him talking sweetly, apparently to a lover but actually to linear perspective, about 'her' magic and 'her' grace. Perspective aroused such feelings because it allowed the tactile exploration and quantification of the visual. Vision, a mechanism of reception, was now also an operational tool. The Renaissance practitioners were for the first time able to 'touch' vision, the outlines of objects in perspective distortion, with mathematical certainty. Just as the coveted image of a desired lover is at last consumed by touch, through perspectival painting Uccello was immersed in the tactile consummation of his gaze.

According to British cultural critic and architectural theorist Mark Cousins, desire is not a metaphysical category in psychoanalytic thinking, but one arising from 'the failure of existence' related to the fact that the baby is born early in comparison to other animals.[36] When the circuit of need and satisfaction is disrupted the infant is 'catastrophically precipitated into the zone of representations'. The unfed baby may hallucinate the satisfaction of feeding and this hallucination determines the creation of a desiring subject and a new substitute object. Born from the 'economy of non-satisfaction', the new world is one of desire and representation. This is a world from which something is missing: an abstract element coinciding with every object of desire and a longing to return to the place 'before desire'. Each desire designates the lost object, an object nowhere to be found, but always present as a lack: 'rather it is this lost dimension within which desire moves.' In a passage that could be a description of *Given,* Cousins asserts:

> Desire is both a representation and a means of analysing this representation. The subject's desire may be expressed as a wish, as a fantasy. This fantasy can be thought of as a little scene … [and] the subject's role in the fantasy might be obscure … dispersed across the fantasy in a way that complicates Freud's view that the author and the hero of the daydream are the same.[37]

Duchamp asks: What is the dimensionality of desire? *Given* is read here as a mathematical

operation on desire, a tactile exploration of his desirous gaze taking the shape of a lost lover. Desire takes many guises in Duchamp's work, and the following sections trace his attempts to capture and measure it.

4.1.8.1 EROTICISM

Eroticism was paramount in Duchamp's work:

> Eroticism is a very dear subject to my life and I certainly applied that liking or that love to my *Glass*. In fact, I thought the only excuse for doing anything is to give it the life of eroticism, which is completely close to life in general and more than philosophy or anything like that. It is an animal thing that has so many facets that it is pleasing to use it as a tube of paint, so to speak, to inject in your productions. It is there stripped bare; it is a form of fantasy.[38]

On several occasions, he implied a connection between the 'erotic act' and the fourth dimension.[39] For instance, when Serge Stauffer asked him, in a letter, whether Robert Lebel had quoted him correctly as having said that 'the erotic act is the essential four-dimensional situation', Duchamp replied:

> Without using those words, this is an old idea of mine, a pet idea explained by the fact that a tactile sensation wrapping all the sides of an object *approximates* a four-dimensional tactile sensation—for of course none of our senses has a four-dimensional application except perhaps the sense of touch; thus the love act, as a tactile sublimation, might give a tiny glimpse, or rather a tiny touch, of a *physical* interpretation of the fourth dimension.[40]

The erotic act can be seen as a tactile survey of another human body. Analysing the dimensionality of tactile and motor space, Poincaré concentrates on the muscular sensations accompanying all our movements, considering each muscle to be the source of an independent sensation. The aggregate of the muscular sensations depends upon as many variables as the number of muscles in the body: 'from this point of view *motor space would have as many dimensions as we have muscles*.'[41]

The fragmented mental image of a lover before the erotic act is constructed only by visual cues. The desirous gaze longs for an immersion in tactility. Eyes become prolonged fingers that cross the space and stroke the figure with an assertion of touch. In the tactile exploration during the erotic act, the lover acquires a missing dimension. The missing tactility of a desired figure is therefore haptically 'measured' by the body of the lover. Unsurprisingly contradictory on the same subject matter, however, Duchamp also said to Italian scholar Arturo Schwarz that 'sex is only an attribute, which can be transformed into a fourth dimension, but is not the definition or the status of the fourth dimension. Sex is sex'.[42]

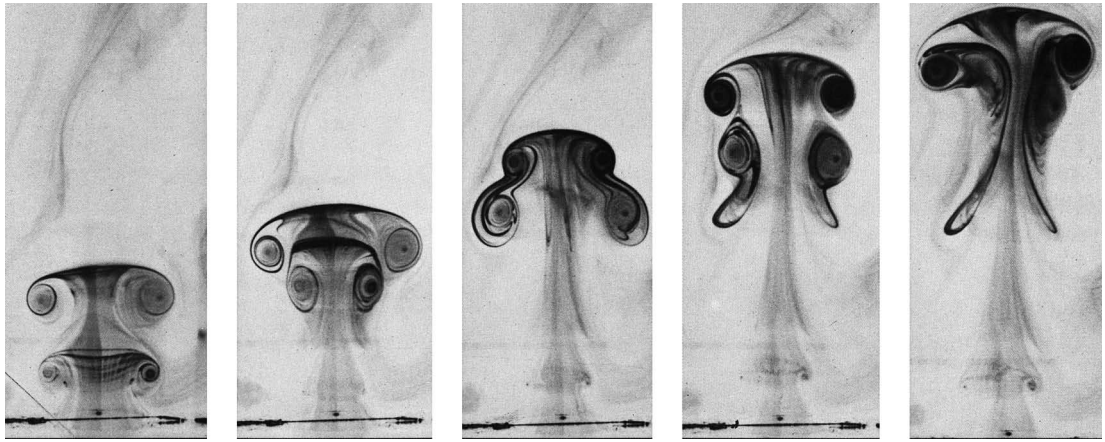
Finally, Duchamp's interest in eroticism as the fourth dimension may be also linked to the heightened sense of perception resulting from chemicals released into the brain when in love.

4.1.8.2 FLUIDS

According to Poincaré:

> *None of our sensations, if isolated, could have brought us to the concept of space; we are brought to it solely by studying the laws by which those sensations succeed one another* [emphasis in original].[43]

A change in space is always interpreted in the



4.14 Yamada and Matsui, double vortex ring evolution, 1971, from Milton Van Dyke, *An Album of Fluid Motion*, 1982.

same manner: '*by a modification in an aggregate of impressions*'. Poincaré distinguishes two kinds of change: of state and of position. In changes of position, the original aggregate of impressions can be restored by repeating the relative movements in reverse. The produced modification is corrected and an inverse modification established. A change of position differs from a change of state in that 'it can always be *corrected* by this means'.

Poincaré notes that images of external objects are 'painted' on the two-dimensional retina; these are '*perspectives*'. Solid objects are conceived solely as changes of position. The eye moves, as do the solid objects, so we perceive a succession of different perspectives of the same body taken from different points of view. The consistency of the laws according to which these perspectives succeed each other inspires the idea of geometric space and that of three dimensions. Geometry is the summary of the laws by which these images succeed each other. He concludes: 'If … there were no solid bodies in nature there would be no geometry (fig. 4.14).'[44]

Other objects, whose form varies only in exceptional circumstances, change position without changing form:

> When the displacement of a body takes place with deformation, we can no longer by appropriate movements place the organs of our body in the same relative situation in respect to this body; we can no longer, therefore, reconstruct the [original] aggregate of impressions.[45]

If the observation of solids inspires the conception of Euclidean geometry and three-dimensional space, what kind of space does the observation of fluids reveal?

The waterfall and illuminating gas in the title of *Given,* and the preface of the notes for the *Large Glass,* suggest Duchamp's interest in a spatial concept that goes beyond the study of solids. Water and gas are fluids and thus characteristic of a 'change of state'. Observation of the fluid behaviour of water and gas may suggest a different geometry dealing with more 'dimensions'.

4.1.8.3 BRIDE

The Bride, the female protagonist in Duchamp's major works, the *Large Glass* and *Given*, is the lost object designated by desire: her lost image is always present as a lack. However skilled the Bachelors, she cannot be reconstructed. She is 'this lost dimension within which desire moves'.[46]

The Bachelors are trying to capture the Bride and her imagined four-dimensional nakedness in their scope of forms governed by perspective. Her shape, hanging in the top part of the *Large Glass*, is all they can manage. Although dissected, skinned and revealed as tree-like, in an attempt to get more information about her visual constructability, her image remains fugitive. This undressing her from her skin might signify here an inability to measure the nude, a release of the desire flow, the longing for an immersion into touch, an imagined four-dimensional nakedness, a passage from three to four dimensions, and a blossoming into the fourth dimension.

The domain of the Bachelors invites the (naked) appearance of the Bride's body but she is disconnected from the framework, the technique for positioning her in space. The two domains are irreversibly separated.

Duchamp states that there are two strippings of the Bride, one by the Bachelors and one by the Bride imagining herself naked (fig. 4.15).[47] If the Bachelors can only undress the four-dimensional Bride in perspective, with what representational technique does she imagine herself being undressed? I suggest that if the *Large Glass* is Duchamp's attempt to describe the undressing of the Bride from the point of view of the Bachelors in perspective, *Given* is perhaps his second attempt to describe the undressing from the point of view of the Bride in stereoscopy.

According to Euclidean geometry, solids have three dimensions and can be successfully described in perspective, a monocular representation technique. The binocular observation of the naked skin of this desired figure, a surface that moves and changes in ways closer to a fluid than a solid, may suggest a fourth dimension existing only in vision. The nude is, therefore, a reappearance of the Bride in *Given* and can be seen as Duchamp's second attempt at the 'correct' representation of her naked skin.

4.1.8.4 EXPANSION

The word épanouissement, expansion or blossoming, reoccurs in the notes for the *Large Glass*. Artist and inventor Paul Matisse, grandson of Henri Matisse and Duchamp's stepson, explains the link between the word and Jouffret's treatise:[48]

> In several notes he describes her épanouissement as being either vertical or horizontal. He might be referring to her position in the process but these dimensional terms probably signify a new level of meaning entirely. Consider that épanouissement was also used by Esprit Jouffret, in his 1903 *Elementary Treatise on the Geometry of Four Dimensions,* a book we believe Marcel knew at that time. Referring to normal geometric elements Jouffret described them as being only the beginning of an épanouissement into dimensional fields of higher orders. Remembering Marcel's great interest in the four dimensions we suddenly find ourselves with the realisation that the Bride's épanouissement was also her complex expansion in the four dimensions as a result of being stripped bare by her bachelors even.[49]

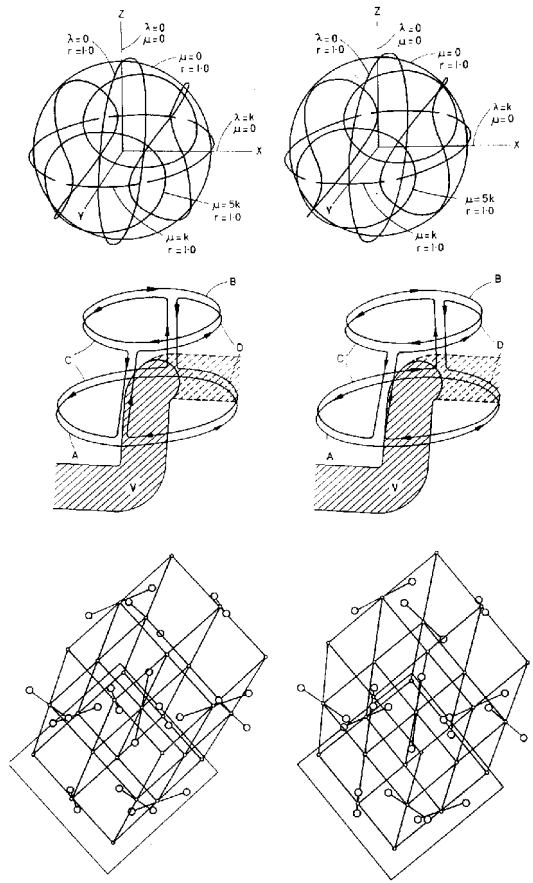
The word 'blossoming' brings together eroticism and the new geometry. In Duchamp's work it signifies a transformation, a change in state: the



4.15 Marcel Duchamp, *Bride*, 1915. Photograph The Philadelphia Museum of Art/ Art Resource/Scala, Florence. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

passage from virgin to Bride or from three to four dimensions, the undressing of the Bride, and the explosion of desire, horizontally for the Bride and vertically for the Bachelors (fig. 4.16).

Furthermore, as we have seen, his notion of blossoming is analogous to the process of 'fusing' the two flat images of a stereoscopic pair into a virtual three-dimensional volume.[50] The visual sensation can be described as an expansion from the plane of the image, similar to the expansion of petals from the centre of the bud. So stereoscopy also entails an *épanouissement*, a blossoming of form, in the mind.



4.1.8.5 STEREOSCOPY

According to Adcock, Duchamp did not think the fourth dimension existed but was a metaphor for discussing something invisible.[51] Adcock also finds a connection between the hypothetical kind of perception which Duchamp calls four-dimensional vision and the technique of stereoscopy, which, he believes, would have appealed to Duchamp as a way to interpret his elaborate speculations and link conceptually his major two works, the *Large Glass* and *Given*:

> In both of these pieces, Duchamp was concerned with the n-dimensional effects of stereovision; he was interested in the phenomenon for its own sake and appreciated its metaphorical usefulness in discussions of hypothetical ways of seeing—ways of seeing that could, in symbolic terms, allow the perception of four-dimensional figures.[52]

The spatial world of the stereoscope is 'dramatic'. According to Adcock, there are two kinds of three-dimensional vision: the normal spatial perception of the surrounding environment, and the 'louder' three-dimensional perception involved in stereoscopy: 'The very unusualness and intensity of stereoscopic images could serve as a metaphor for the fourth dimension – it was the third dimension plus something.'[53]

Stereoscopy as a representation technique connects the disparate but also synonymous concepts in Duchamp's work: eroticism, desire, the bride, fluids and blossoming. Moreover, it was a useful analogy for

4.16 Nikolai Adamovich Valyus, stereosopic diagrams, from *Stereoscopy*, 1966.

the perception of a fourth dimension.

As we have seen in more detail in Chapter 3, stereoscopy is connected with eroticism and desire because of its use in pornography. Fluid dynamics, gases and the Milky Way, which Poincaré also saw as a gas, are studied and measured by stereo-photogrammetry a technique deriving from stereoscopy. The expansion suggested by the word blossoming has been used by Jouffret to describe the fourth dimension and relates to the sensation of dilating space sensation in the stereoscope. According to Duchamp, blossoming coincides with undressing and, indeed, the earliest striptease sequences were often presented stereoscopically.[54]

4.1.9 DELAY

Although depending on a monocular understanding of vision, perspective construction became a ubiquitous formula affecting art, science and technology, and creating artefacts and theories which are appreciated not only monocularly. Similarly, the study of binocular vision defines a spatial schema which does not need to operate solely binocularly. On the contrary, it can affect intellectual rather than optical processes and reveal spatial qualities of sound, tactility, kinaesthesia, memory, imagination and language.

Depth perception depends on complex biological factors, but also social and historical ones. Stereoscopy is a representation technique based on a simplification and abstraction of binocular vision. It captures a moment of the dynamic spatiality of the binocular field and divides it in two pictures, the stereoscopic pair, which can be separately studied and compared. Consequently, stereoscopy expresses a simplified spatial understanding of binocular vision which might lead to a projective geometry or a drawing technique.

Duchamp's staging of *Given* is similar to stereoscopy, a 'delay' or 'pause' in the flow of binocular vision aimed to expose its overlooked operation. We can compare the act of looking through the peepholes to a fast stereo-photogrammetric process in the mind: the two retinal images, like a stereoscopic pair, are compared and differences between corresponding points are registered, perceptually moulding the volume of the scene. Pairs of visual rays, starting from the eyes at the holes in the door, intersect at points in the observed scene, creating notional triangles. Their automatically calculated trigonometry, the distance between the eyes and the two visual angles, offers a sensation of depth. Metaphorically, the visual rays like knitting needles weave the effectively planar retinal images into space and offer an optical sensation of diving into the visual field (fig. 4.17).

The points at which they intersect resemble particles of a fluid that in the case of *Given* has been cast or frozen in the form of the scene.

4.1.10 STEREOSCOPIC ARCHITECTURES

Architectural forms have always been a favourite subject matter of stereo-photography and stereoscopy (fig. 4.18).[55]

The use of stereoscopy and stereo-photography in contemporary architectural design, by contrast, is rare.[56] Some atypical examples of stereographic photographs being used for representational purposes, include Sauerbruch Hutton Architects, *WYSIWYG*, 2000, and Diller + Scofidio in their 1998 exhibition 'The American Lawn: Surface of Everyday Life'.[57][58] Although Louisa Hutton



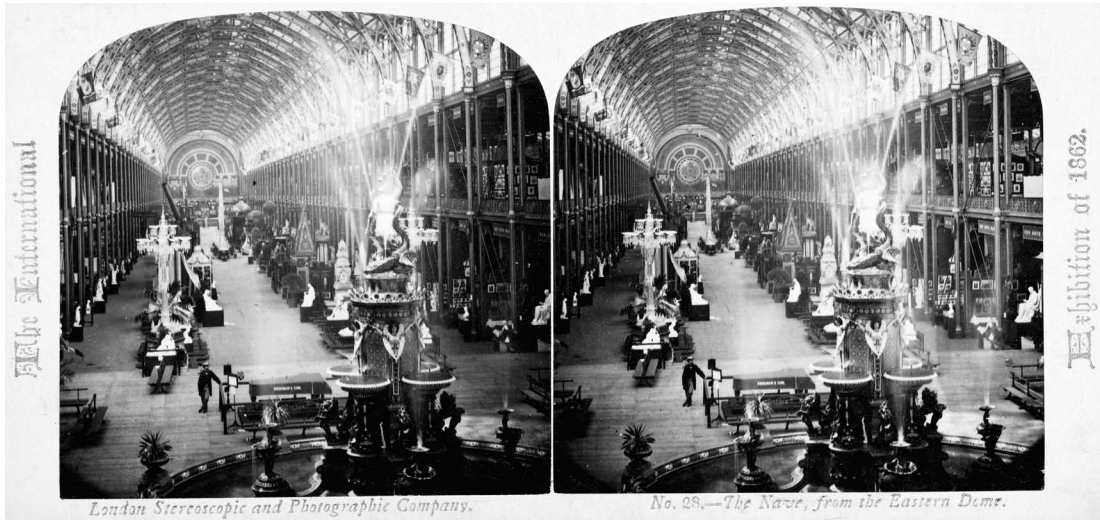
4.17 *Illuminated Scribism*, plate 8, 2003. Drawing by the author.

and Matthias Sauerbruch, in their introductory discussion with Mohsen Mostafavi, do not reveal the reasons that led them to choose stereo-photography for recording and presenting their designs, we find a hint in their discussion of colour. Sauerbruch talks about how 'colour can extend a space visually' and different tonalities and hues 'can create depth'.[59] The aim to capture this extra dimension of colour, therefore, might lie behind these stereoscopic views of their buildings that allow us to dive into their tinted architecture (fig. 4.19).

In one of the galleries of Diller + Scofidio's exhibition, anthropomorphic viewing glasses give visual access to stereo-photographs by Robert Sansone, depicting the often-disputed borderline between neighbouring lawns with three-dimensional precision. Here, stereoscopy is not merely depicting architecture, but used as an architectural device 'for seeing the quotidian lawn through new eyes'.[60]

Both of these examples are, however, representational and not propositional. Although widely employed to record the built environment in other disciplines, such as engineering, stereo-photography and its ocular tangibility seldom seem to make a contribution to creative architectural design. Perhaps the single example of an architect using stereoscopy creatively is Nat Chard. His early drawings of anatomical models exploit the interior of the body as a site on which he constructs stereoscopic insertions (fig. 6.37).[61]

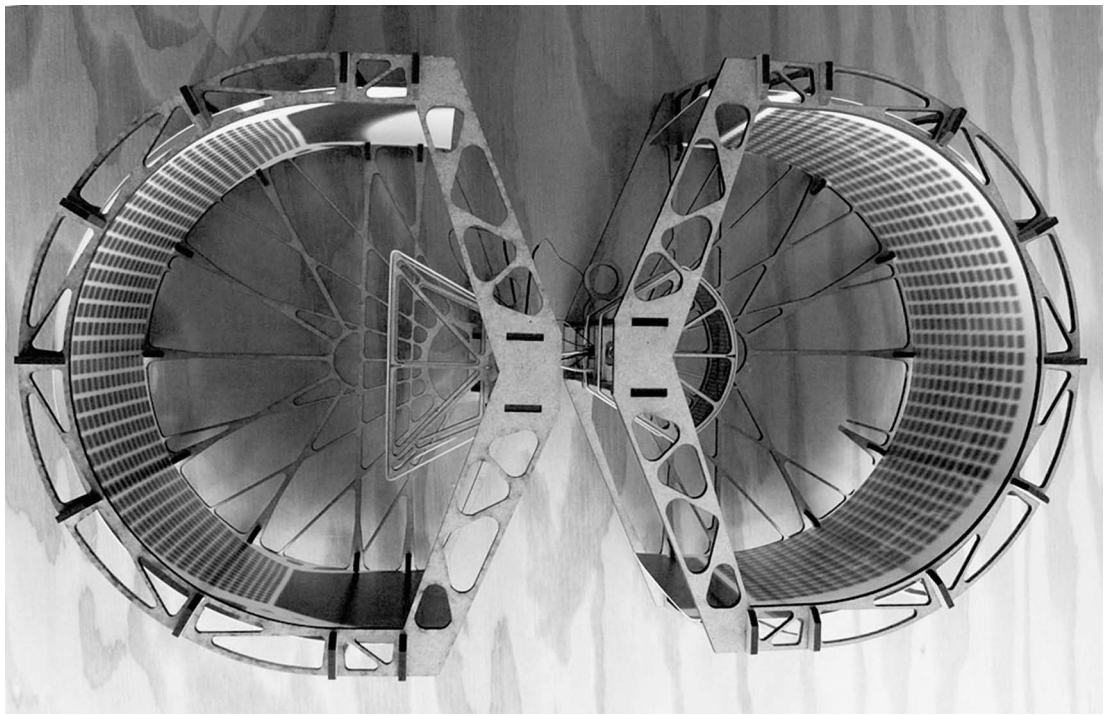
Furthermore, he uses stereoscopy as a research method in his study of the spatial potential of the picture plane in diorama painting. However, although for Chard stereoscopy is a drawing technique for





4.18 The Nave, from the Eastern Dome, the International Exhibition London, 1862. © Science Museum Pictorial/Science and Society Picture Gallery.

4.19 Sauerbruch Hutton, GSW Headquarters, Berlin 1999. Stereoscopic photograph by Jan Bitter and Markus Bredt. © BitterBredt.



4.20 Nat Chard, dioramascopes with curved picture plane, 2003.

recording and projecting spatial configurations, his work remains speculative (fig. 4.20).

Stereoscopy and stereo-photogrammetry use the pictorial qualities of photography to offer precise three-dimensional geometric information of a recorded scene. The stereoscopic camera 'constructs' the measurable architecture of a scene through photography by adding an extra dimension, suggesting a potential hybrid drawing technique. The possibilities that this opening up, or blossoming, involved in stereoscopic viewing can offer to architectural design has not yet been explored. Beyond the definition of a drawing technique it suggests a new diagram or an alternative spatial syntax describing the blossoming architecture of visual space.

4.1.11 THE BLOSSOMING ARCHITECTURE OF VISUAL SPACE

What are the parameters of this alternative spatial schema based on binocular vision that stereoscopy reveals? Unlike perspective and monocular vision, where proximity only influences the size of the objects on the retina, the sensation of binocular depth is geometrically proportional to the distance between observer and object, similar to a force field that contracts and expands. Akin to a magnetic field, the closer the viewer is to an object the stronger the visual effect of depth, while further away scenes become virtually planar. In comparison to

a monocular view, the binocular field is ambiguous because two different images combine to create a singular perception. Binocular visual space is not continuous because it splits around vertical edges of objects, creating areas of occlusion for each eye. Moreover, because of the symmetry of human perceptual organs and the position of our eyes, horizontal relationships are visually different from vertical because our visual field duplicates and expands horizontally. Finally, binocular visual space is not homogeneous, as it incorporates three distinct areas: that perceived by the left eye only, that perceived by both eyes, and that perceived by the right eye only. The sensation of a single, continuous visual field is a complex patchwork of binocular and monocular fragments.

It is therefore clear that the study of stereoscopy and binocular vision leads to the conception of a spatial schema different from Cartesian, perspectival space, which by comparison is single, continuous and homogenous. As we have seen, however, the ambiguity, discontinuity and lack of homogeneity that characterize binocular vision can also be quantifiable in an objective mathematical and scientific manner through stereo-photogrammetry. Stereo-photogrammetry uses hue, texture, light and shadow to precisely survey objects in three dimensions, turning pictorial qualities into measurable values. The geometry deriving from stereo-photogrammetry may also use these pictorial qualities, instead of lines, to describe new spatial configurations.

As we have seen, British art historian Martin Kemp connects the development of perspective construction to the Renaissance surveying techniques which used monocular observation to measure ancient Roman architecture. As we have seen, stereo-photogrammetry, a surveying method that uses binocular observation to measure landscapes, bodies, fluids and other complex spatial configurations, might inspire an expanded spatial schema suitable for representing their complexity. Consequently, the study of stereo-photogrammetry may also suggest a potential creative design technique able not only to describe, but also imagine, complex forms.

Central projection, the geometry underlying the perspective view, is a simple representation of the visual field of a single eye. Plotting a correct central projection through perspective construction requires precisely measured orthographic projection drawings. The information combined in this set of plans, sections and elevations offers a 'blossoming' of measured space. Stereo-photogrammetry indicates that a pair of central projection drawings connected to a known base (the distance between the two apices) can also offer a blossoming of measured space.

I call the projective system that might develop from a stereo-photogrammetric analysis 'bicentral projection'.[62] In bicentral projection two visual rays, connecting each eye with a point in space, form a triangle. However, the tracing around boundaries is not continuous, as in central projection, because left and right boundaries constitute rifts where the two projector lines split and every object creates a left and a right shadow of occlusion. No single intersection or projection plane cuts through the binocular visual field, but two spherical surfaces, the projection of the two retinas, constitute the double matrix for 'casting' depth.

Architectural drawing and photography share the same underlying fundamental syntax, a

Cartesian understanding of space, deriving from single eye observation. However, stereoscopy, a technique based on photography that remembers the 'other' eye, offers an expanded visual field and the possibility of measuring its architecture. The study of Duchamp's stereoscopic explorations points to a new representation technique – a cross between the precision of architectural drawing conventions and the pictorial qualities of photography – a new tool for designing the blossoming architecture of visual space that the stereoscopic camera 'constructs'.

Representation techniques not only make spatial concepts communicable, but also mould the space of the imagination itself. They set the necessary vocabulary and syntax for the conception and articulation of spatial and more specifically architectural ideas, and their limitations make some spaces not only impossible to draw, but, arguably, unimaginable. A study of stereoscopy affects the way we perceive coded representations of spatiality, such as drawings, photographs and paintings, and reveals an often overlooked, imperceptible boundary between two and three dimensions.[63] Attention to the way the two eyes work to form a single visual field also influences how one looks at oneself looking, making perception through vision a process of learning, which can be full of surprises. As Duchamp insisted, the pictorial impact of retinal excitation sometimes conceals spatial depth similarly to a veil. An awareness of the nuances of binocular space as revealed through a study of stereoscopy allows us to see through or beyond this ubiquitous obscuring veil. The study of Duchamp's *Given* constructs an architecture of desire and provides an alternative understanding of space which might unlock the erotic potential of architectural representation.

4.2 THE ACT OF LOOKING

A full-scale representation of *Given* in steel and waxed thread, *The Act of Looking*, gives material substance to the act of looking through *Given's* two peepholes.[64] *The Act of Looking* was the central piece, I designed specifically for my solo show 'The Blossoming of Perspective' at the DomoBaal Gallery in 2007, and was shown again in 'Speculative Models', a two-person show at London Gallery West in 2009 (fig. 4.21). For the construction of the piece I collaborated with Belgian architectural designer and researcher Emmanuel Vercruysse.[65]

The Act of Looking is a ghost image of Duchamp's assemblage, where all the main constituent elements – door, wall, nude body and illusionistic landscape – lose their materiality, while the invisible architecture of the gaze acquires substance in the form of intersecting weighted strings. Restaging the pattern of the visual rays that start on the two peepholes on the door and cross to optically touch the elements composing the interior view, *The Act of Looking* weaves a diagram of the binocular visual field.[66] Additionally, it is a three-dimensional drawing, meticulously plotting points describing the volume of the pornographic scene by hand. Although modelled on Duchamp's assemblage, *The Act of Looking* could be seen as a physical diagram of any binocular gaze from a static position, and a drawing in matter of the architecture of binocular visual space. The following section is an analysis of the piece in terms of the ideas that led to its conception and design followed by a detailed examination of all its constituent parts.

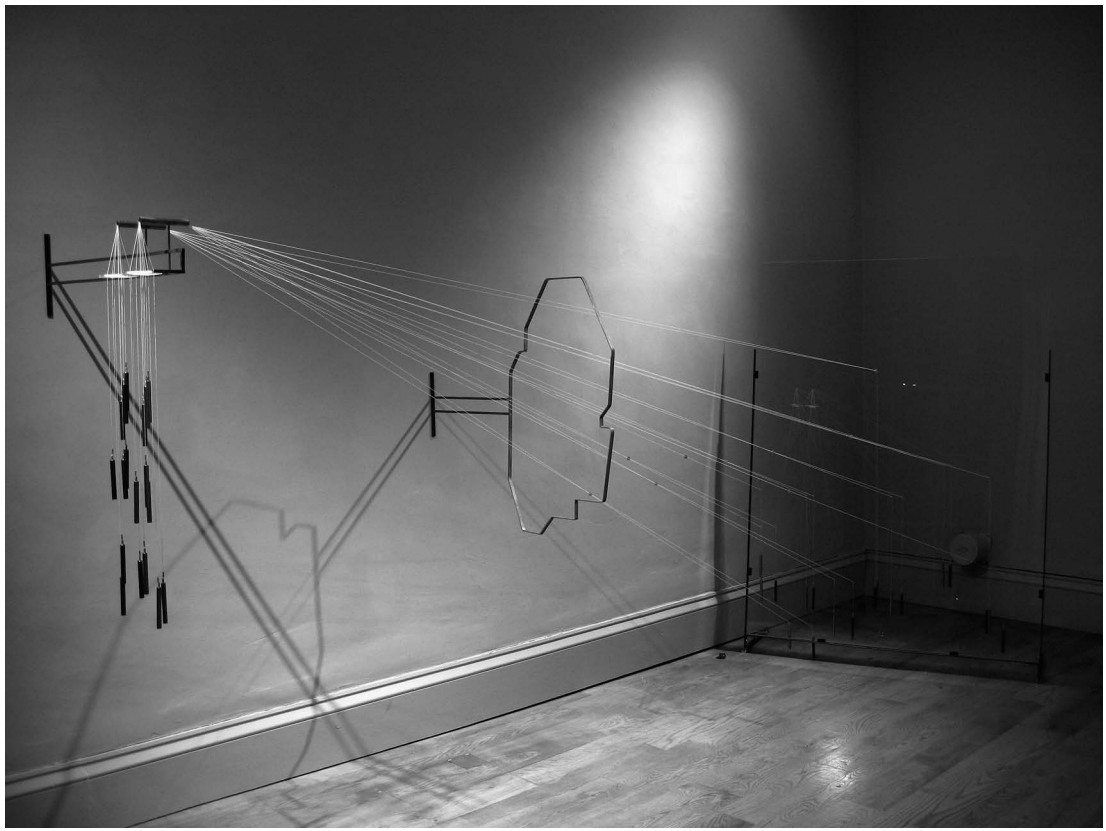


4.21 'The Blossoming of Perspective', exhibition view with *The Act of Looking*, DomoBaal Gallery, 2007. Photograph Andy Keate, 2007.

4.2.1 ENIGMA

In her essay 'Site-Writing: Enigma and Embellishment', British art and architecture historian and critic Jane Rendell discusses the work of art as an enigma, a transference of un-deciphered cultural meaning, for the artist and the 'recipient' but also the 'critic/recipient'.[67] Duchamp has also described the artist as a 'mediumistic being', and stressed the spectator's role in completing the work of art through interpretation and evaluation.[68] One might argue that all reception of art is an act of interpretation; however, *Given* is notoriously enigmatic, addressing the viewer with a riddle: Why is this woman lying naked in twigs? Who is she? Where is she? Why is she holding a gas lamp? Even the title of Duchamp's work is structured as the first part of a mathematical equation. Given the waterfall and the illuminated gas, what are we to make of this puzzling, and for most, disturbing image? The inconclusive ellipsis at the end of the title invites us, the spectators, to add our own interpretation and critical evaluation.

Beyond attempting to decode the verbal questions that *Given* poses, *The Act of Looking* aims to unravel the visual organization of clues in its *mise en scène*. Intrigued by the unresolved riddle embedded in the assemblage, I designed my



4.22 *The Act of Looking*, 2007. Photograph by the author, 2007.

research as an allegorical architecture: a full-scale diagram of the voyeur's gaze (fig. 4.22).[69]

As we have seen in Chapter 1, I see my work as a 'Figural Theory', where architectural design, drawing and making, in combination with discourse, assume the disruptive and creative role of Lyotard's complex term 'figure'.[70] *The Act of Looking* is my 'figural' redrawing of *Given*, which has a twofold purpose: it aims to unravel the perceptual and psychological space embedded in the structure of the artwork, while questioning the underlying syntax of representation techniques in architecture.

4.2.2 MANUAL

Apart from direct analysis of *Given*, through photography and drawing *in situ* at the Philadelphia Museum of Art, significant in the design and manufacture of *The Act of Looking* was the study of a specific document directly describing the construction of the original. Guiding my decisions was Duchamp's *Manual of Instructions*, the ring-bound folder providing numbered 'operations'



4.23 Marcel Duchamp, *Manual of Instructions for the assembly of Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage*. Philadelphia Museum of Art. Gift of the Cassandra Foundation, 1969. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

for assembling *Given*.[71] Duchamp took the opportunity to compose the manual when he transferred the assemblage to a new studio in 1965. He recorded every detail thoroughly: the folder contains hand-written descriptions in French, accompanied by black and white photographs covered with explanatory inscriptions, marks and numbers, supplemented by diagrams, plans, elevations, sketches and a scaled, folded cardboard model. According to curator Anne d'Harnoncourt, although there is an 'air of enigma to this matter-of-fact guide', Duchamp makes no attempt to explain the meaning of *Given*; he 'simply leads step by step through the process of putting the assemblage together' (fig. 4.23).[72]

By offering important information about the materials and construction details of *Given*, the *Manual* resembles an 'architectural construction specification', a document used in architectural practice offering detailed written descriptions of building components alongside drawings and diagrams. As such, it was instrumental during the final installation of *Given* at the Philadelphia Museum of Art.[73] The *Manual of Instructions* played an important role in the inception and composition of *The Act of Looking*, offering information about important construction details, materials and dimensions. *The Act of Looking* follows Duchamp's division of the process of assembly into operations describing the arrangement of *Given*'s constituent elements – door, wall, nude and landscape. As a consequence, my work is a practice-led analysis not only of *Given* but also the *Manual* itself. *The Act of Looking* is a redrawing of the *Manual*, an

embodied critical interpretation of Duchamp's process and methodology.

4.2.3 ADAPTATION AND ASSIMILATION

My research analyses existing pieces of work, such as *Given*, through adaptation. I create new work that interprets and restages the original and I employ design and physical construction as a research method to interrogate its underlying structure. Adaptation is often a translation from one medium to another, for instance from a novel to a film. For *The Act of Looking* I use the same medium as the original, the art installation and the assemblage, but I adapt *Given* as a three-dimensional architectural drawing devoid of any pictorial information. Through this adaptation, my work assimilates but also subverts the themes, methods and language of communication of *Given*.

Given is often described as an assemblage as it is composed from disparate found elements – for instance, the old Spanish door and the twigs collected from the woods – or entirely constructed by Duchamp – the tinted photographic landscape, or the cast nude. In his *Manual of Instructions*, Duchamp refers to *Given* as an *approximation démontable*, an approximation that can be taken apart, or disassembled, adding that the word *approximation* should convey a margin of improvisation, *'ad libitum'*, in its assembly.[74] Duchamp, indeed took the assemblage apart and reassembled it when he had to move studios in 1965. Already in the process of arranging the acquisition of the piece by the Philadelphia Museum of Art, his preparation of the *Manual of Instructions* had a twofold purpose: to aid his own accurate reconstruction in his new studio, and to provide a guide for the permanent installation in the museum, which took place after his death a few years later.

Akin to *Given*, *The Act of Looking* consists of distinct components. Setting it up involves attaching two sections to the wall, positioning another part on the floor and connecting all the elements together through a laborious weaving of the strings in situ (figs. 4.24, 4.25). In defiance of the 'extra rapid' contemporary consumption of images, *The Act of Looking* is a slow process of constructing the binocular gaze by hand.

Exhibited twice – at the DomoBaal gallery in 2007 and at London Gallery West in 2009 – the two versions of its installation differ slightly, making my redrawing of *Given* another '*approximation démontable*' allowing a level of *ad libitum*.[75] In contrast, however, the components that assemble *The Act of Looking* are not found but constructed from scratch, from materials that, as we will see, deliberately reference the pristine look of Duchamp's other major piece, the *Large Glass*.

4.2.4 DRAWING

The visceral impact of its subject matter – the blatant presentation and dazzling light effects – masks *Given's* underlying architecture. However, a study of Duchamp's *Manual of Instructions* reveals that although handmade and in a seemingly disorderly manner, *Given* is a precise structure. The scene has been carefully arranged according to covert measuring and organizing grids: hidden from view, a black and white squared lino on the floor provides markings for the positioning of different elements, similarly to an underlying drawing of a grid organizing a perspective view, and the numbered bricks on the broken wall act like notional threads on Alberti's veil.[76]





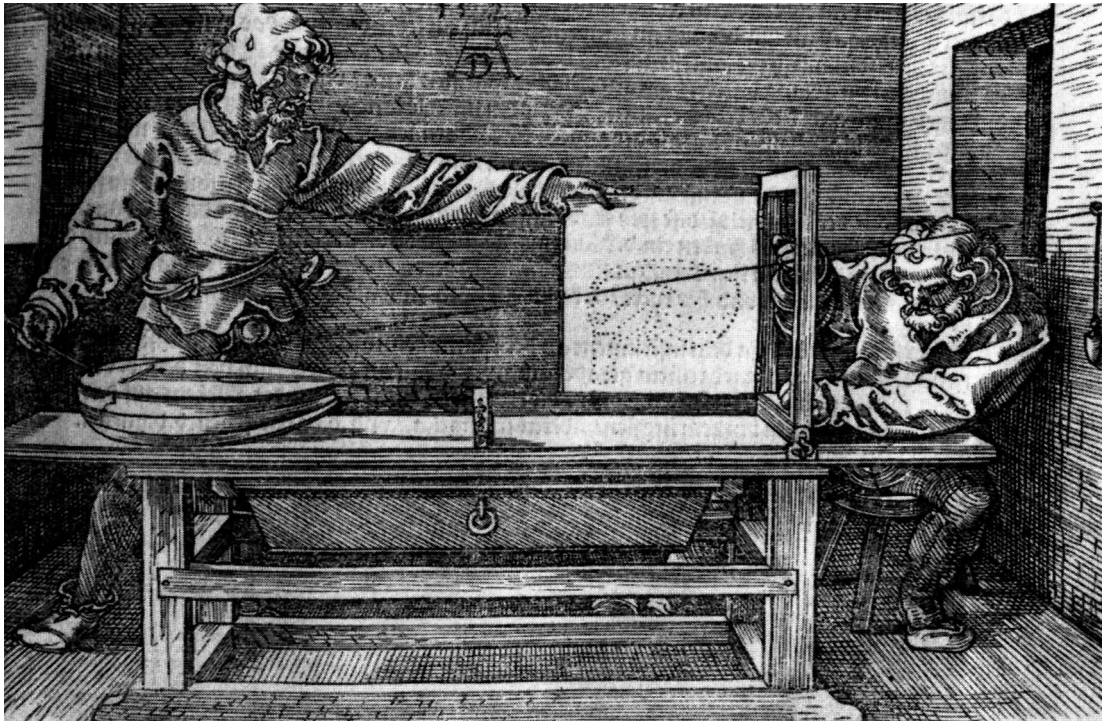
4.24 *The Act of Looking*, during the set up showing only one of the binoculars, 2007. Photograph by the author, 2007.

4.25 *Model of the Act of Looking*, 2007. Photograph Andy Keate, 2007.

The Act of Looking attempts to foreground this reading of *Given* as a meticulous drawing. It negates its everyday materiality and figurative render, and exposes the voyeuristic gaze travelling through the two peepholes in an abstract spatial diagram. In comparison to the physicality of *Given*, which is often described as vulgar, *The Act of Looking* is delicate and ethereal, but is also a drawing that treads the world of things: drawn not on paper but in space, in steel, Perspex and waxed thread, it is a full-scale diagram of the structure it dissects. Not unlike the drawing process depicted in Albrecht Dürer's famous woodcut *Man Drawing a Lute* from 1525 – a reference which we will analyse further below – the act of stringing the model became a laborious act of 'drawing' lines in three dimensions. As in *Given*, in *The Act of Looking,* drawing disengages from mark-making on a flat page or screen and becomes a physical performance in space (fig. 4.26)

4.2.5 COMPONENTS

The Act of Looking attempts to study and expose Duchamp's underlying stereoscopic architecture of desire in *Given*. At the same time it is a speculative drawing, exposing the under-structure of Duchamp's artwork, a physical embodiment of the memory residue the original leaves in the viewer's mind.



4.26 Albrecht Dürer, the drawing of a lute, from *Underweysung der Messung*, Nuremberg, 1525. Bibliothèque nationale de France.

The Act of Looking is constructed from a series of components which directly reference the constituent elements of *Given*. I represent the door with a steel structure carrying 'binoculars and spectacles'; the visual rays emanating from the eyes of the viewer with 'weighted strings'; the breach on the wall with an irregular 'steel frame'; selected points in the scene are marked by 'nickel silver discs', and the collaged image of the illusory landscape becomes a 'perforated Perspex sheet'. Below is a detailed analysis of all the components.

4.2.5.1 BINOCULARS AND SPECTACLES

At the Philadelphia Museum of Art, the visitor's first encounter with *Given* is a weathered door, a physical barrier concealing the view to the scene beyond. Light emanating from two peepholes at eye level hints at the secret diorama beyond. Conversely, in my work, *The Act of Looking,* the heavy physicality of the door disappears while the empty cavities of the holes acquire substance. Narrow steel tubes extrude the depth of the peepholes into a configuration that resembles a pair of binoculars. While representing the peepholes, the tubes also portray the lenses of the viewers' eyes placed against them. Nevertheless, the 'binoculars' are not intended to be looked through. Their purpose is to gather and carry the weighted strings representing the visual rays that





4.27 *The Act of Looking*, binoculars, detail, 2007. Photograph by the author, 2007.

4.28 *The Act of Looking*, binoculars, detail, 2007. Photograph by the author, 2007.

the viewer's eyes 'collect' when placed against the peepholes on the door of *Given*. The length of each tube extends, or to use Duchamp's terminology 'delays', the single point of intersection of the visual rays on the eye's lens. Both bunches of strings enter, traverse the tubes and release at the other end. After traversing each tube, the two bunches of strings drop, split, fan out and perforate two Perspex discs below, held horizontally in the same structure that supports the binoculars (figs. 4.27, 4.28).

Continuing the analogy and physical interpretation of the eye at the peephole, each Perspex disc is a counterpart for the retina, the light-sensitive tissue lining the inner surface of the eye. Rather than an imprint of light on photosensitive receptors, a halftone image of the view is etched on the clear Perspex disc in relief. Portraying the slightly different views for the left and right eye, the imprinted images derive from a digital manipulation of my *Stereoscopic Pair of* Given.[77] In the same way that visual rays gather at the eye's lens and fan out towards the retina, the strings gathered at the end of the metal tube fan out and penetrate each disc. Carefully drilled holes allow the strings to pass through; the positions of the holes are not accidental but correspond to selected points that constitute the three-dimensional constellation of the scene, as we will see later.[78]

If we were to continue another analogy, comparing parts of *The Act of Looking* with optical devices enhancing natural vision, the configuration supporting the Perspex discs resembles a pair of spectacles. The clear discs are held horizontally below the binoculars, like lenses in a steel frame. Both binoculars and spectacles are parts of a single structure representing *Given's* door and the peepholes. Designed to be attached on the wall, the structure holds one end of the weighted strings in suspension.

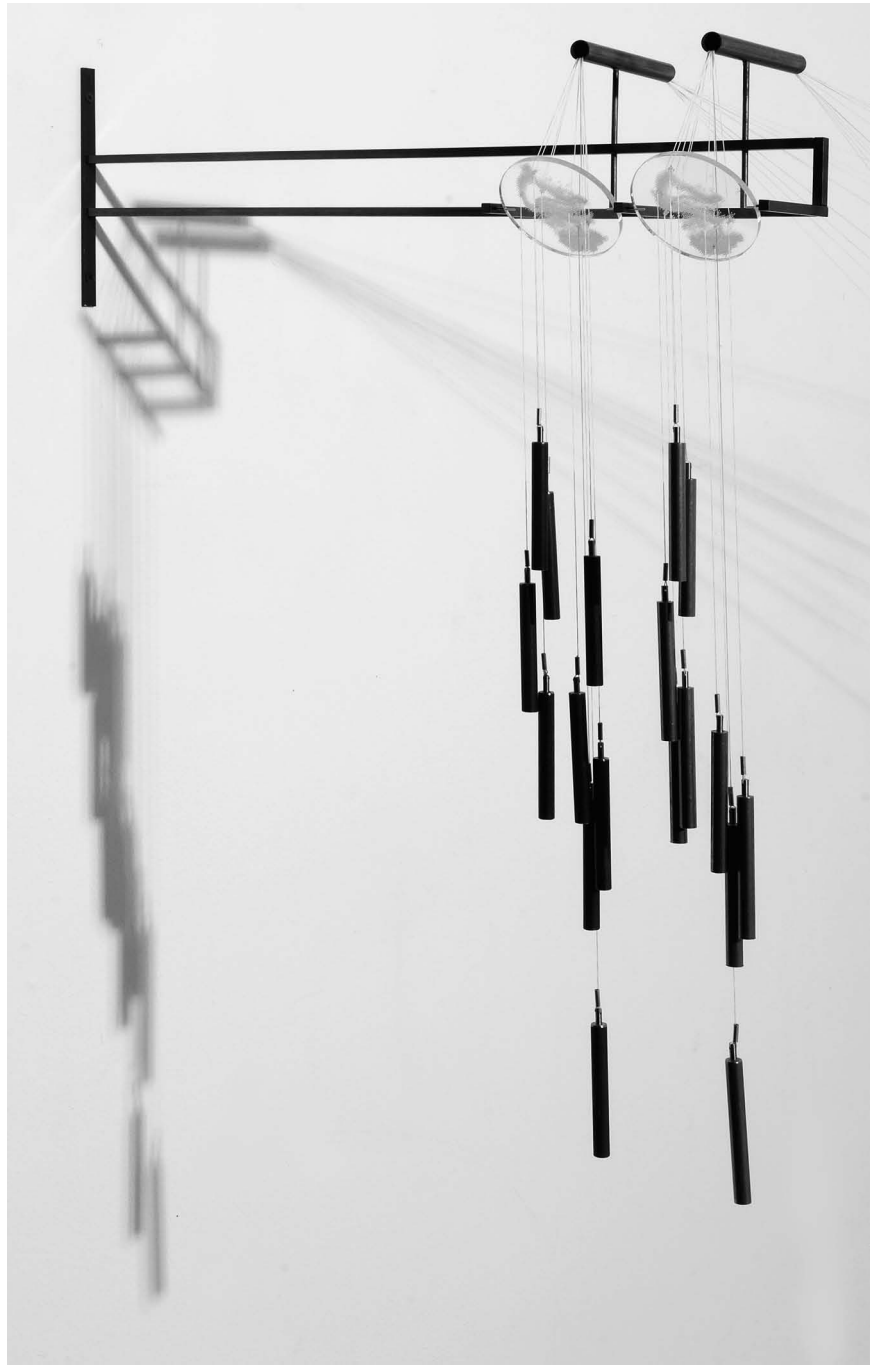
4.2.5.2 WEIGHTED STRINGS

My use of waxed twine to represent notional visual rays in *The Act of Looking* is inspired by the portrayal of visual rays as strings or threads in perspectivists' treatises.[79] Each peephole/eye collects nine strings, which are kept taut by weights on both ends. The strings represent visual or light rays, but are also equivalent to the process of 'drawing' a line between two points. I used whipping twine, a material for securing the loose ends of ropes in sailing, in white – in subtle contrast to the grey colour of the walls in DomoBaal gallery, where the piece was first installed. The white colour makes the strings glow when lit and differentiates them from their shadows on the wall. The weights keeping the strings taut were constructed from tubular steel sections: white for the right eye and black for the left (fig. 4.29).

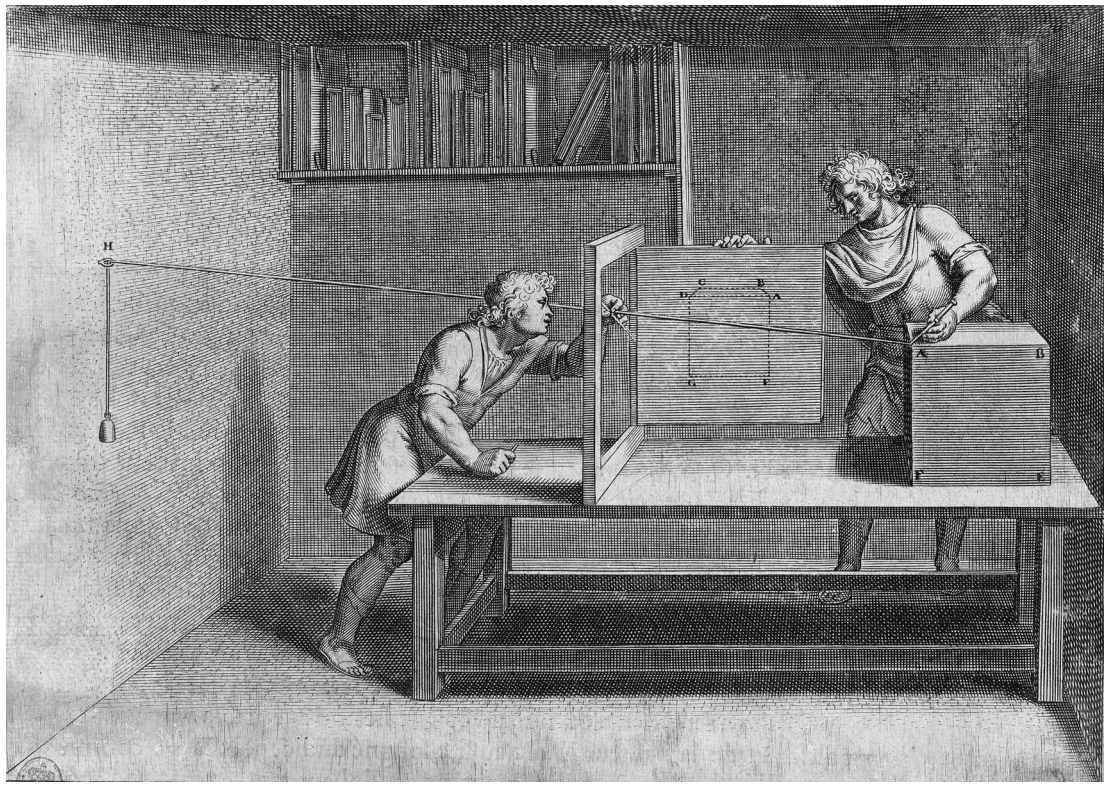
Installing the piece involves drawing the lines of the visual rays in space, a meticulous process that links all the elements of my assemblage. This is also a slow spatial weaving of the act of looking, a three-dimensional spider's web aimed at catching a volumetric trace of the desirous gaze. The strings are drawn in pairs, each pair connecting the two peepholes with one point in space.

The process of 'drawing' the strings in *The Act of Looking* relates to *Man Drawing a Lute,* Albrecht Dürer's woodcut (fig. 4.26). Dürer portrays a drawing exercise taking place in a small room dominated by a heavy wooden table, with two men performing the drawing.[80] Placed on one side of the table is an empty vertical frame, the picture plane resembling a window. A panel hinges out from the frame to reveal the drawing as it is being plotted. As the title attests, the drawing is of a lute, positioned on the other side of the table. Although I describe Dürer's famous drawing, it is useful to compare it with another version of the technique by Salomon de Caus, where a simpler geometric object – a cube – is being drawn (fig. 4.30).

In Dürer's woodcut, the first man, the instructor, touches the lute with a pointer attached at one end of a string; the other end is counterweighted and threaded through a hook on the wall. The taut line of the string stretched between the pointer and the wall passes through the empty frame of the picture plane on the table. The second man marks the intersection on the picture plane by using a repositionable crosshair, or a string with a bead. By closing the hinged panel back to the frame, the intersection will be marked with a point on the surface of the drawing that it holds. The mechanical, physical and embodied nature of this process has led American architect and architectural theorist Stan Allen to suggest that 'every operation in the diagram could be carried out by a blind man'. Although the instructor needs to be sighted, the man performing the repositioning of the bead on the frame could indeed be blind, as this drawing technique is primarily tactile.[81]



4.29 *The Act of Looking*, weighted strings, detail, 2007. Photograph Andy Keate, 2009.

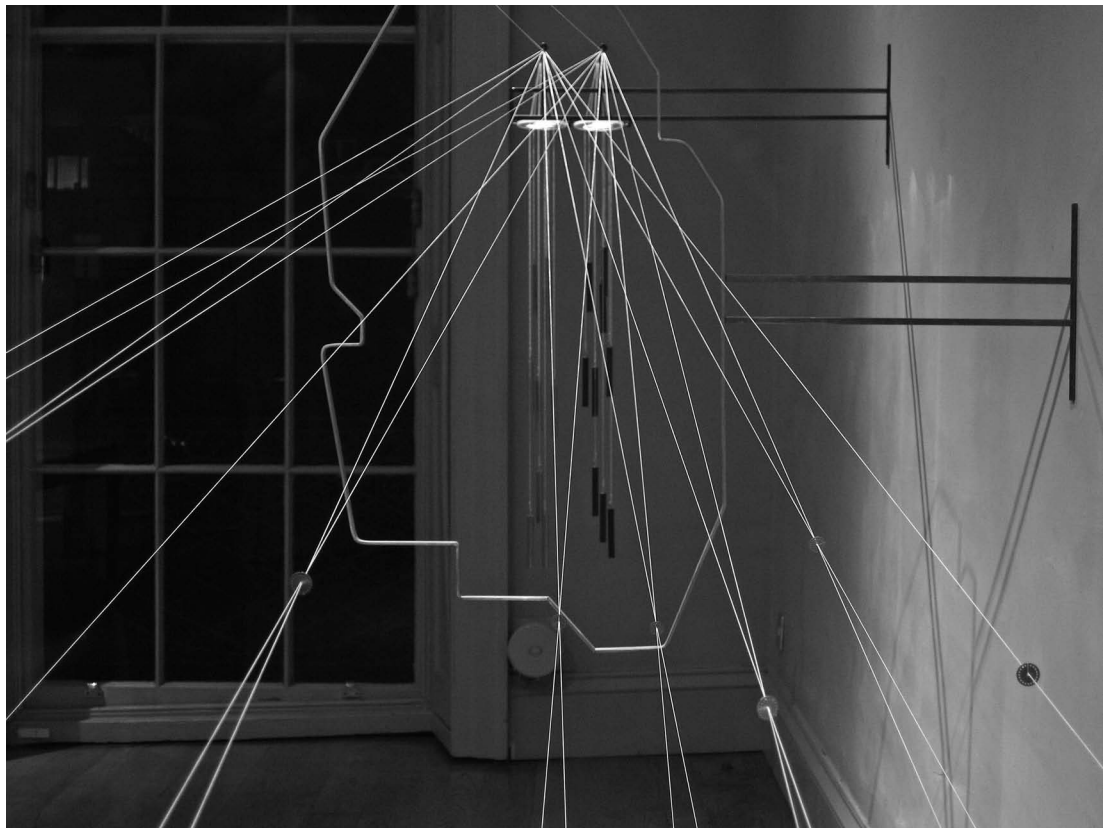


4.30 Salomon de Caus, the drawing of a cube, from *La perspective, avec la raison des ombres et miroirs*, 1615. Bibliothèque nationale de France.

The gradual, slow collection of points on the picture plane constitutes the correct perspective rendering of the lute from a specific point of view. This point of view is clearly not the one held by the instructor, and obviously not the one by the 'blind' man. The single 'eye' constructing the drawing on the picture plane is the hook, the eyelet on the wall, and the taut string represents the visual ray tracing the object it is looking at. Dürer's woodcut portrays not only a drawing technique but an 'act of looking' embodied in an inanimate object.

My aim was to portray, in an inanimate object, the act of looking through *Given's* peepholes. The difference from Dürer's drawing machine lies in the introduction of the 'other' eye, which makes this act of looking binocular, and the picture-making spatial. Instead of a single string hanging from an eyelet on the wall, the two tubes of the binoculars hold a complex web of strings composing a frozen snapshot of the intricacy and duration of the binocular gaze (fig. 4.31). Although demonstrating vision, the construction of *The Act of Looking* derives from a primarily tactile process of weaving the strings.

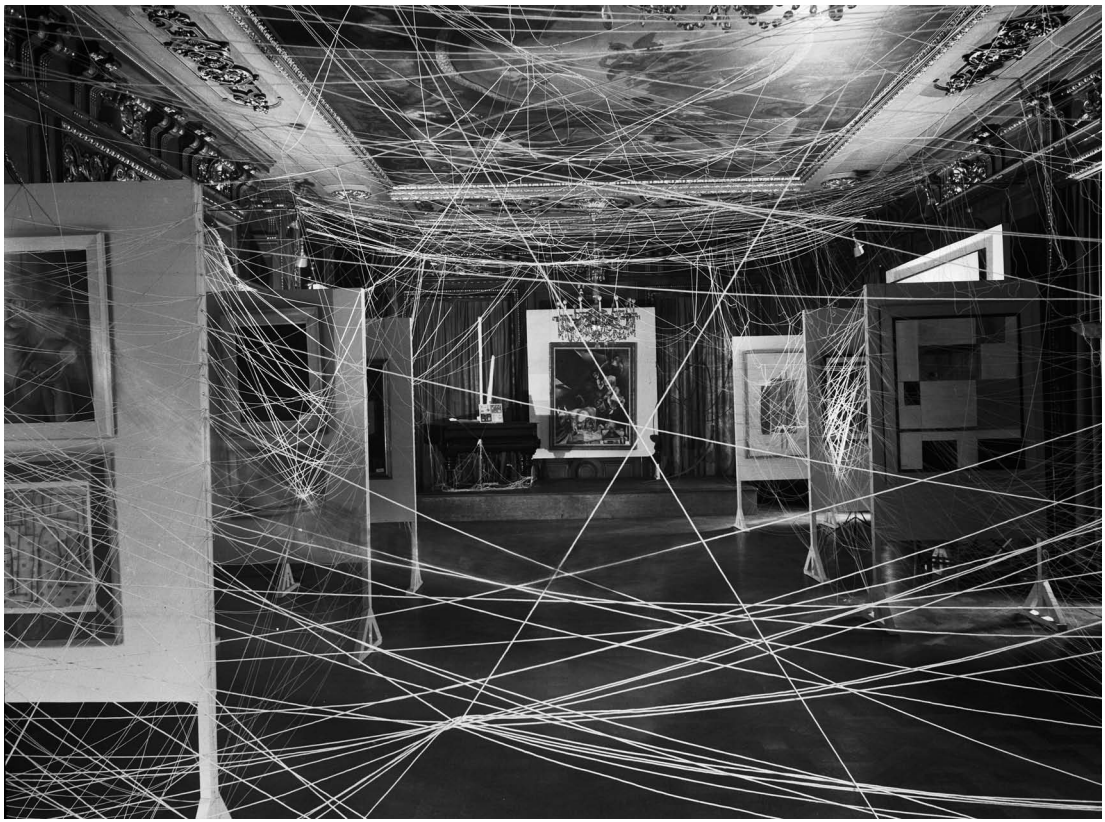
In this respect, *The Act of Looking* resembles another work by Duchamp, his design for the 'First



4.31 *The Act of Looking*, weighted strings, detail, 2007. Photograph by the author, 2007.

Papers of Surrealism' exhibition, New York, 1942 (or as John Vick calls it *His Twine*, in accordance with the original title given in the exhibition catalogue).[82] For this exhibition Duchamp wove a three-dimensional web of twine throughout the space of the gallery (fig. 4.32).

Vick discusses how the prevailing photographs erroneously suggest that the exhibited work was concealed in this thicket of crisscrossing strings standing between the work and the visitors' gaze. He shows that instead the twine was designed to define alcoves where the work was displayed. However, I would argue that Duchamp's design also references the perspectivists' portrayal of the visual ray as a string, 'drawing' a line between the viewer and the observed object. Similarly to my *Act of Looking*, Duchamp was seeking not to obstruct, but perhaps to portray the visitors' attentive gaze. 'Drawn' in space, *His Twine* solidified and exposed the additive, collective act of looking at fine art by the visitors, in the form of a complex web of strings.

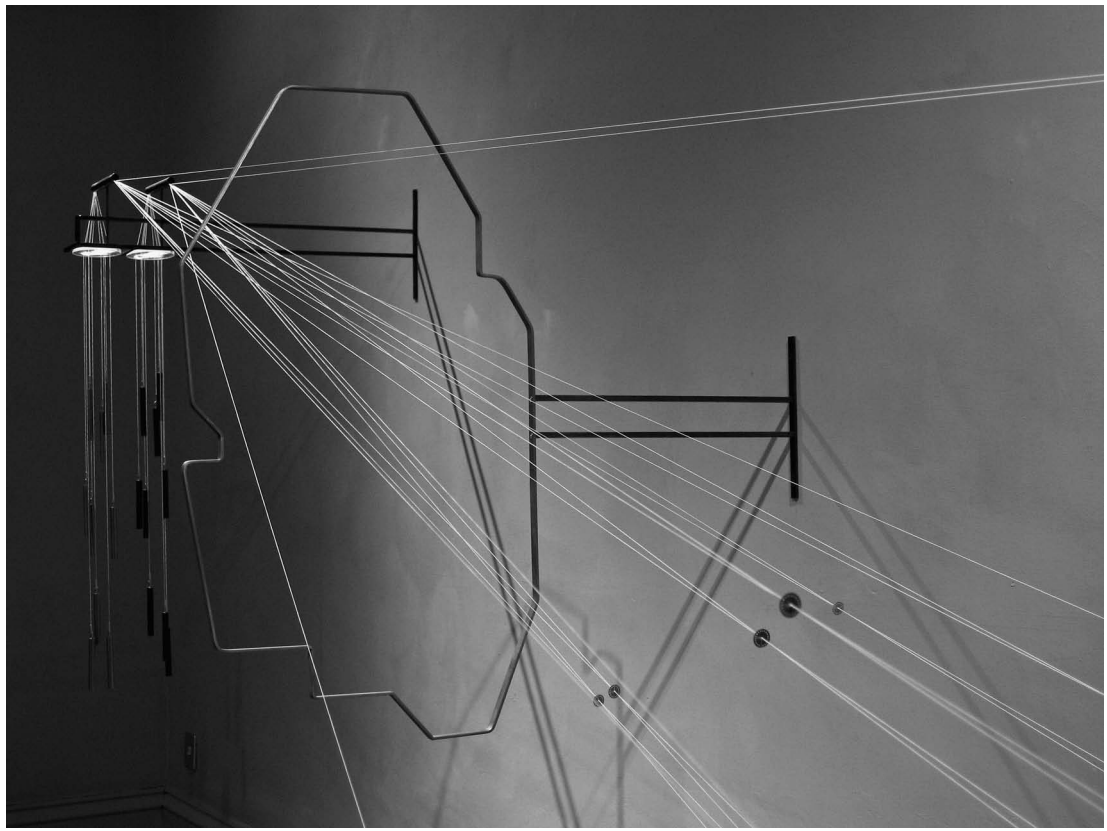


4.32 John D. Schiff, installation view of exhibition 'First Papers of Surrealism' showing string installation, 1945. Gift of Jacqueline, Paul and Peter Matisse in memory of their mother Alexina Duchamp 1972. © 2013 Photograph The Philadelphia Museum of Art/ Art Resource/Scala, Florence.

4.2.5.3 STEEL FRAME

In *Given*, parallel to the plane of the door, and before the brightly illuminated scene, stands a heavy brick wall which has been broken as if by a violent collision. As we have seen, however, in contrast to a first impression that this is an accidental shape, Duchamp's construction of the wall shows that the bricks were chiselled deliberately and precisely, in order to control the view.[83] In *The Act of Looking* the wall is absent, while the outline of the breach, the boundary between matter and void, acquires materiality. The closed shape of the outline was constructed by bending a thin flat steel section to form an irregular frame. The design of the shape of the steel frame derived from a photograph of the breach in Duchamp's *Manual of Instructions*. Through calculations based on the dimensions he has inscribed in his diagrams, I enlarged the photograph to full-scale and created a template that guided the bending of the steel. The frame is suspended vertically by a wall attachment, whose design matches the attachment supporting the binoculars (figs. 4.33–4.35).

Resembling the 'open window' frame in Dürer's



4.33 *The Act of Looking*, steel frame, detail, 2007. Photograph by the author, 2007.

woodcut, the irregular steel frame in *The Act of Looking* stands in the place of the picture plane. In Dürer's woodcut the image is formed as a collection of points derived by the repeated intersection of the single weighted string with a repositionable thread attached on the wooden frame. On the hinged plane, the flat surface receiving the traces of these points of intersection that will slowly compose the drawing is a terminal. In *The Act of Looking* there is no hinged plane, no flat surface on which an image from a single point of view is formed. Acting as portal rather than a terminal, the metal frame outlining the breach allows the pairs of strings starting at the two peepholes to pass through unobstructed, faithfully reflecting Duchamp's fracturing of the picture plane in *Given*.

The picture plane is not entirely absent in *The Act of Looking,* however. Split in two and then redoubled, it is indicated by my use of Perspex, with the two imprinted discs representing the viewer's retinas and the large rectangular sheet replacing Duchamp's landscape backdrop, which as we will see holds the other end of the weighted strings. In another famous woodcut by Dürer, *Draughtsman Drawing a Recumbent Woman*, the frame between





4.34 *The Act of Looking*, steel frame, detail, 2007. Photograph by the author, 2007.

4.35 *The Act of Looking*, view from the relative position of the door, 2007. Photograph Andy Keate, 2007.

the eye and the female figure to be drawn is not empty; it holds a loosely woven grid. In *The Act of Looking*, Alberti's grid, the perspectivist veil, has been unravelled. Instead of registering a plane between the eye and its object of desire, the veil encompasses the intermediary space weaving a dynamic but precise web of the gaze.

4.2.5.4 NICKEL SILVER DISCS

After traversing the breach, the two strings of each pair cross; their intersection defines a point, a binocular glimpse of the view beyond the breached wall in *Given*. Ten points are 'seen' from the two metal tubes representing the peepholes – however, each tube collects nine strings only. This is because two of the selected points are seen by one eye only. Specially designed, etched nickel silver discs slot into the intersections to act as markers. The selected points are:

1.	Lamp	Left and right eye
2.	Twig	Left and right eye
3.	Waist	Left and right eye
4.	Breast	Left and right eye
5.	Cunt	Left and right eye
6.	Waterfall	Left and right eye
7.	Top of tree	Left and right eye
8.	Left leg	Left and right eye

9.	Right leg	Left eye only
10.	Lock of blonde hair	Right eye only

The discs are registration marks of a three-dimensional redrawing of *Given*'s interior scene in space. The process of defining the intersections was similar to the drawing technique in Dürer's woodcut; it also involved two operators: Vercruysse and me. Dürer's single string, representing one visual ray weighted at the eyelet on the wall, intersects with the string on the picture plane. In *The Act of Looking* it is the intersection of the two strings 'emanating' from the binoculars that forms a point. Devoid of any pictorial information, this collection of points floats in space designating a constellation. As with an asterism, where figures of deities are projected on the formations of the stars in astronomy and astrology, the nickel silver discs, like stars, tether the imaginary view of *Given*'s interior, and the absent nude, in suspension (figs. 4.36, 4.37).

Furthermore, the configuration of the strings and the marking of the points in space is a physical incarnation of the principle of stereo-plotting in double projection that governs some stereo-photogrammetric instruments, as we have seen in Chapter 3. *The Act of Looking* transforms the instrument's operation into a three-dimensional material diagram.

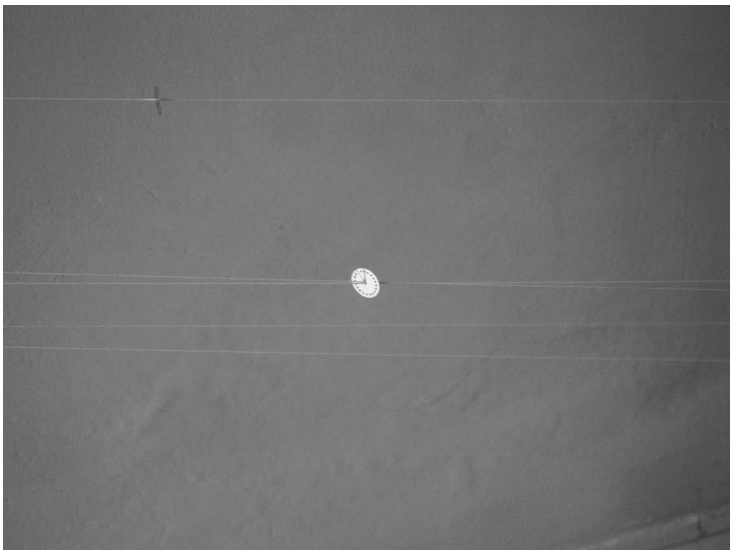
4.2.5.5 PERFORATED PERSPEX SHEET

An illusionistic landscape constitutes the background of the assemblage in Philadelphia. Duchamp carefully constructed this as a frame supporting a tinted photographic collage of parts of a real landscape, topped by a glass, blue paper and cotton sky and featuring a motorized contraption creating the illusion of light reflected off the flow of a waterfall. The plane of this frame is not parallel to the wall and the door, but positioned at a wide angle. According to Duchamp's diagrams and notes in *Manual of Instructions*, the panel also tilts slightly backwards (figs. 4.38, 4.39).

No trace remains of the composite landscape's pictorial information in *The Act of Looking*. In its place stands a clear Perspex sheet held by a minimal metal frame, which positions it at the same angle and tilt as the original. At closer inspection the sheet is perforated; tiny holes in pairs mark the points where the strings meet its surface. The vertical position of each pair and the horizontal shift between the two holes control the intersection of the two strings, so the constellation of these holes regulates the spatial configuration of the nickel silver markers in space. My perforated Perspex sheet is a template, therefore, controlling the form drawn by the strings. If this template were replaced by another featuring a different constellation of pairs of holes, then the intersection of the strings would form a different spatial drawing. Finally, after crossing the tilted surface, the weighted strings hang vertically. The slight angle of the tilt creates a pattern of vertical lines.

4.2.5.6 CONNECTION WITH THE *LARGE GLASS*

As we have seen, the *Art of Looking* is a full-scale drawing of the act of looking through the peepholes in *Given*, replicating some of its constituent elements as absence. Unavoidably, therefore, it references *Given*, yet it uses graphic abstraction often found in diagrams and architectural drawing. Duchamp's other major piece, the *Large Glass*, is also a 'drawing' of a desire-filled exchange, the portrayal





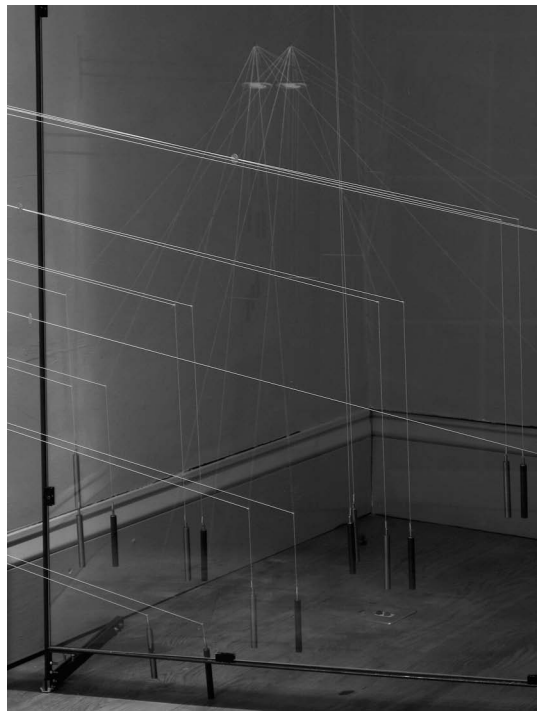
4.36 *The Act of Looking*, nickel silver disc, detail, 2007. Photograph by the author, 2007.

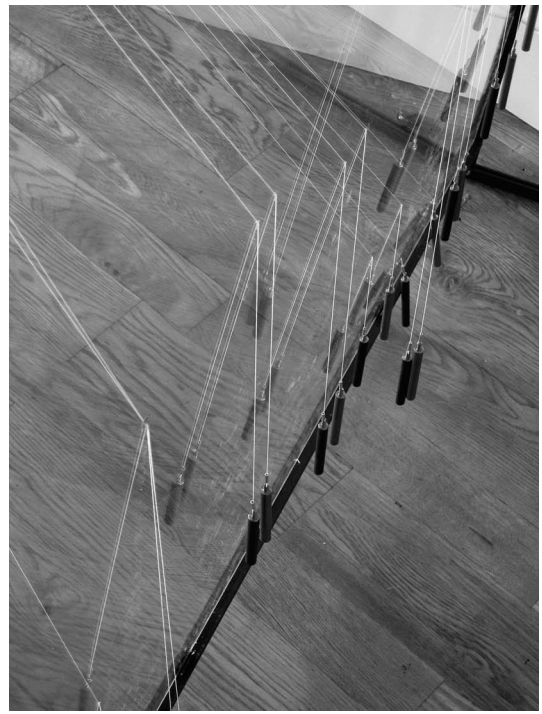
4.37 *The Act of Looking*, nickel silver discs, detail, 2007. Photograph by the author, 2007.

of an act of looking between the Bachelors and the Bride. Through his study of the fourth dimension combined with an intention to rehabilitate perspective, in the *Large Glass* Duchamp uses a plan and a section similarly to architectural drawing, as well as diagrams and graphic abstraction, to compose the process of capturing a fleeting view of a four-dimensional Bride.

While working on the design of *The Act of Looking*, I began to notice certain affinities not only with the layout of *Given,* but also the arrangement of the *Large Glass*. A defining moment in this progressive 'discovery' of a resemblance between my design and the *Large Glass* arrived when I had to decide the number of weights and, therefore, the number of strings composing the configuration of *The Act of Looking*. As the weights reminded me of the Eros Matrix, the configuration of the domain of the Bachelors, I had my answer: each peephole holds nine weights and, therefore, 'emanates' nine strings. Nine for each peephole, the weights refer to the Nine Malic Moulds, the Bachelors in their liveries hanging from the Capillary Tubes and defining the Eros Matrix.

By establishing this first link – a deliberate reference to the *Large Glass* – I discovered or constructed several other associations between the two works. The complex network of the Capillary Tubes, from which the Nine Malic Moulds are 'hanging', forms a conduit for the Illuminating Gas. Duchamp generated this network of lines by multiplying by three – rearranging and photographing a painting of the *Three Standard Stoppages*, an earlier work of 'canned chance' that he created by capturing the outlines of three fallen pieces of string. So each bunch of nine weights in *The Act of Looking* and the Malic Moulds in the *Large Glass* hang off a network of nine strings.



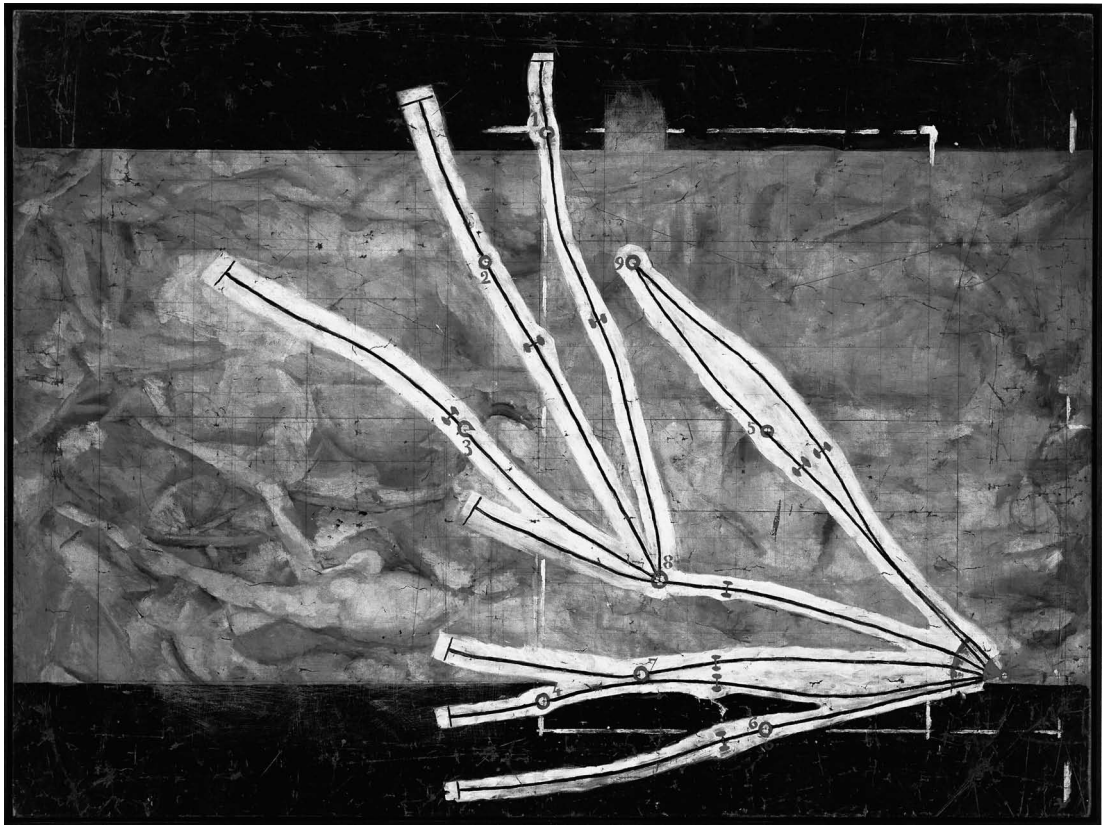


4.38 *The Act of Looking*, perforated Perspex, detail, 2007. Photograph by the author, 2007.

4.39 *The Act of Looking*, perforated Perspex, detail, 2007. Photograph by the author, 2007.

They are physically 'drawn' taut in *The Act of Looking*, while they are loose, fallen, copied and graphically drawn in perspective in the *Large Glass* (fig. 4.40).[84]

Nine in number as well, the drilled holes on each Perspex disc in the spectacles refer to the Nine Shots: holes that Duchamp drilled on the top glass panel in the *Large Glass*. Duchamp determined the positions of the holes as a chance operation by using a toy cannon and shooting matches dipped in paint. Another link between the three works, *Given* and *Large Glass* through *The Act of Looking*, solicits investigation which lies beyond the scope of this book: the Perspex Sheet – a preparatory study for *Given*, which we have analysed earlier, and whose role in the construction process has not been determined – is perforated with a dense constellation of holes but also features nine larger marked holes.[85] The discs signposting the intersections of the pairs of strings in *The Act of Looking* are acid etched in nickel silver and were designed to resemble the silver charts of the Oculist Witnesses. Finally, each intersection of the strings is similar to the Chocolate Grinder's scissors. Instead of a different set of strings for each point, the glider slides, causing the telescopic movement of the scissors as well as the up-and-down movement to meet different points in space (fig. 4.41).

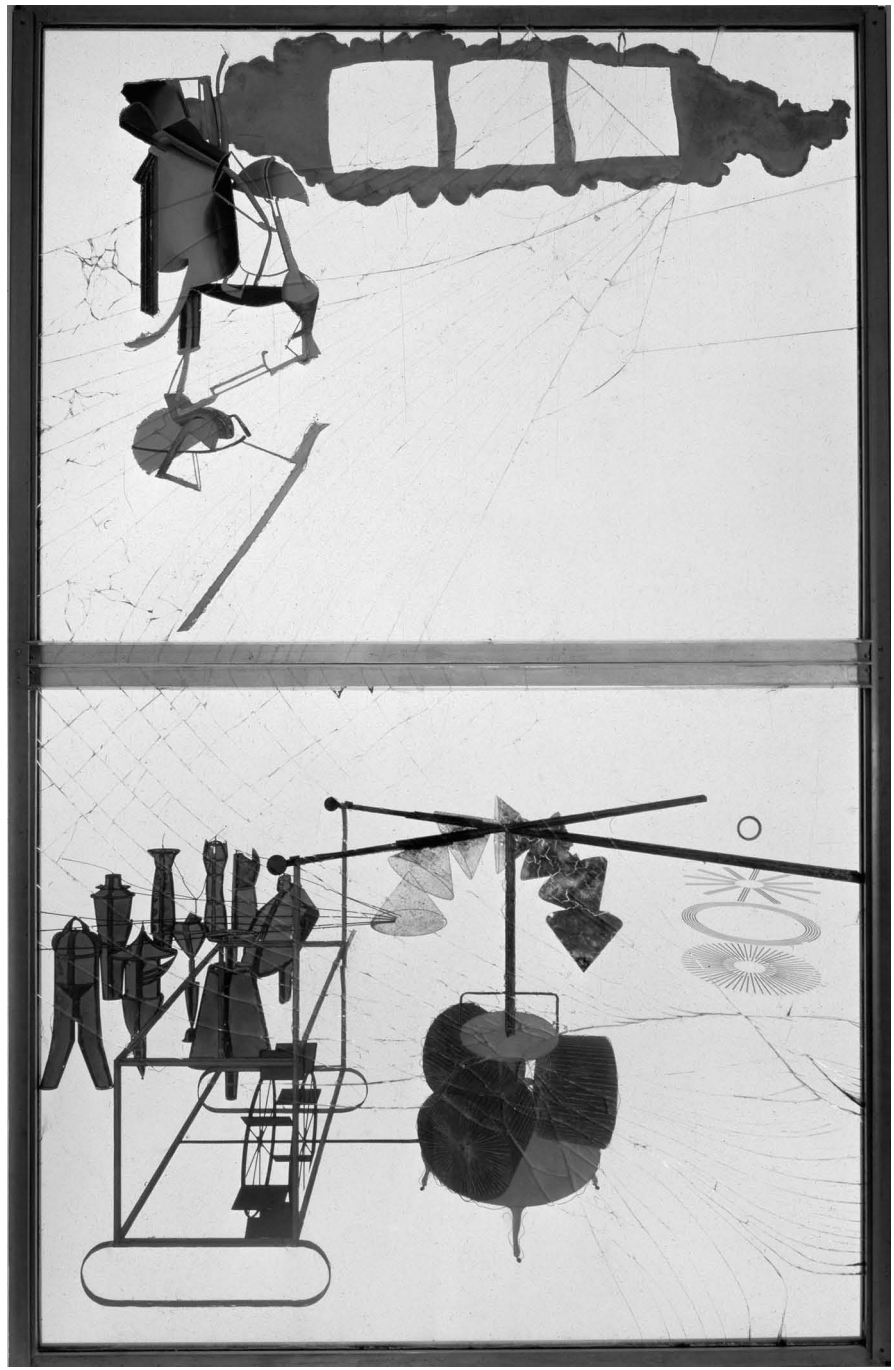


4.40 Marcel Duchamp, *Network of Stoppages*, 1914. Museum of Modern Art (MoMA). Abby Aldrich Rockefeller Fund and gift of Mrs William Sisler, 1970. Digital image, The Museum of Modern Art, New York/Scala, Florence © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

As a bridge between Duchamp's two major works, *Given* and the *Large Glass*, *The Act of Looking* embodies in a physical form an argument supporting the hypothesis that the two works share a similar set of preoccupations.[86] While the full implications of closely examining the correspondence between the *Large Glass* and *Given* through my *Act of Looking* are beyond the scope of this book, my analysis here and in Chapter 3 suggests that the *Large Glass* is perhaps Duchamp's first attempt to understand and portray the physical and poetic effects of binocular vision.

4.2.6 LOST DIMENSION

Through overexposure to two-dimensional media, computer monitors, retinal displays, handheld devices, and cinema and television screens – if not pages in books, magazines and newspapers – we engage with the world predominantly through picture planes displaying two-dimensional images and words. Scanning two-dimensional images is intellectually simpler compared with the complexity and ambiguity of binocular eyeballing. This simplicity and convenience of two-dimensional



4.41 Marcel Duchamp, *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)*, 1915–23. Front view. Philadelphia Museum of Art. Bequest of Katherine S. Dreier, 1955. Photograph The Philadelphia Museum of Art/ Art Resource/Scala, Florence. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

images is often translated aesthetically: we find flat images more appealing. Our ability to scan flat images, whether static or moving, at ever growing speeds has perhaps unavoidably led to the detriment of our normal binocular depth perception.

The technology most faithfully portraying this purely perceptual, but perhaps neglected, dimension in the visual is stereoscopy, alongside anaglyphic representations and holography. Since its discovery, stereoscopy has captured the collective imagination in bouts of popularity. While we are currently experiencing yet another sensationalist success of 3D cinema and television, it is useful to remember that in the past stereoscopic imagery and the paraphernalia involved in the viewing process – stereoscopes, red and green glasses – have often reigned briefly, only to be lost in obscurity again. Indeed, as Jonathan Crary has noted in his *Techniques of the Observer*, stereoscopy's dependency on a physical engagement with the apparatus and the synthetic nature of stereoscopic images – what he calls the 'referential illusion' – led to its original demise, when it surrendered to the single photograph.[87] However, stereoscopy does not fully represent binocular vision, and the recent re-emergence of interest in 3D representations in cinema, games and design are often perceived as sensationalist illusions even further removed from everyday perception. Have we forgotten how to look with two eyes? Is binocular depth a missing dimension not only in the visual, but also in our formation of intellectual and technological constructs?

Duchamp's four-dimensional Bride is rendered in two dimensions in the *Large Glass*, and cast in three dimensions in *Given*. But where is the Bride in *The Act of Looking,* and in how many dimensions is she portrayed? The arrangement of the strings is reminiscent of both Jouffret's diagrams of four-dimensional solids and Vuibert's anaglyphs, and their complexity makes *The Act of Looking* ideal subject matter for stereoscopic representation. Although coded as a constellation of points in space, the central allegorical motif in both *Given* and the *Large Glass*, the Bride, is absent (fig. 4.42). Her absence, the missing Bride in *The Act of Looking*, laments what I see as a lost, or perhaps repressed, dimension in the visual: the lost 'other' eye.

Notes

1 Cabanne, *Dialogues*, 43.

2 See note 7, Cabanne, *Dialogues*, 43.

3 For a detailed analysis of the role of science in Duchamp's work see Molderings, *Duchamp and the Aesthetics of Chance*.

4 An exhibition entitled 'Dancing Around the Bride: Cage, Cunningham, Johns, Rauschenberg, and Duchamp' hosted by the Philadelphia Museum of Art, 2012 and the Barbican Centre in London, 2013, focused on Duchamp's legacy and his influence on the direction of post-war American avant-garde art and culture as a whole. See the exhibition catalogue Basualdo and Battle, *Dancing Around the Bride*.

5 Foster, *Vision and Visuality*, 9.

6 Foster, *Vision and Visuality*, ix.

7 Panofsky, *Perspective*, 41.

8 Panofsky, *Perspective*, 45.

9 Cabanne, *Dialogues*, 38–39.

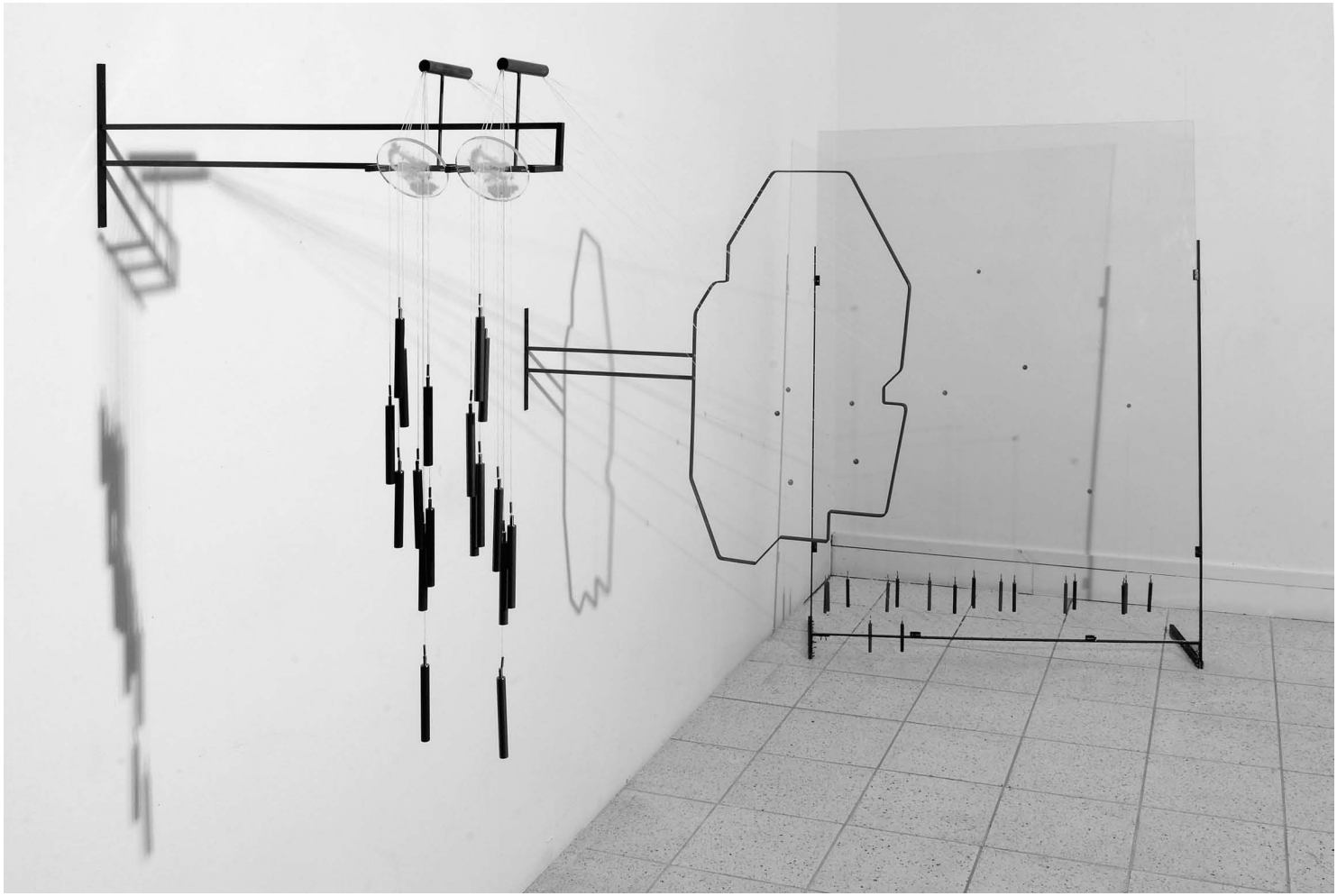
10 Hamilton's replica of the *Large Glass*,1965–66, is on permanent display at Tate Modern.

11 To guide his reconstruction of the *Large Glass,* Hamilton followed Duchamp's notes in detail, see Hamilton, *Collected Words*, 223.

12 Quoted in Clair, 'Classical Perspectivists', 40.

13 Schwarz, *Complete Works*, 580.

14 Diller + Scofidio, 'A Delay in Glass', *Daidalos*, 84–101. The architects studied the *Large Glass* in preparation of their stage design for the theatre play *The Rotary Notary and His Hot Plate* or *A Delay in Glass*. For more on this project see Chapter 6, Section 6.8.



4.42 *The Act of Looking*, 2007. Photograph Andy Keate, 2009.

15 Henderson, *Fourth Dimension*, 7.

16 Henderson, *Fourth Dimension*, 6.

17 Abbott, *Flatland*.

18 This idea is similar to the relationship between the real and its image as expressed by Plato in the metaphor of the cave and the world of 'ideas'. According to Henderson, some writers of hyperspace philosophy believe firmly in the reality of the fourth dimension, yet tend to oppose any form of positivism that requires empirical proof of its existence. Hyperspace philosophy is an idealist position connected with spiritualism, which later takes on elements of the occult.

19 Quoted in Henderson, *Fourth Dimension*, 36.

20 Quoted in Henderson, *Fourth Dimension*, 37.

21 Duchamp, *Writings*, 87.

22 The persistence of tactile cues and delay in intellectually grasping the effects of perspective has been noted in studies of the perceptual development of children. See Piaget and Inhelder, *Child's Conception of Space*.

23 Poincaré, *Science and Hypothesis*, 54–55.

24 Poincaré, *Science and Hypothesis*, 54.

25 See Chapter 3, Section 3.3.1 'Lumen and Lux'.

26 See Chapter 3, Section 3.4.1 'Intersecting Plane'.

27 Howard and Rogers, *Binocular Vision*.

28 See explanation of anaglyph in Chapter 3, Section 3.2.9.4 'Undressing'.

29 Quoted in Adcock, 'Duchamp's Eroticism', 149.

30 Quoted in Pellerin, 'Origins and Development', 43.

31 For an extensive study see Henderson, *Fourth Dimension*.

32 Duchamp, *A l'infinitif*.

33 Henderson, *Fourth Dimension*, 118.

34 See Pawlowski, *Voyage* and Vuibert, *Les Anaglyphes*.

35 Cabanne, *Dialogues*, 39.

36 Cousins, 'Where?', 111.

37 Cousins, 'Where?', 112.

38 Duchamp, 'An Interview'.

39 Duve, *Definitively Unfinished*, 348.

40 Duve, *Definitively Unfinished*, 348, n. 1.

41 Poincaré, *Science and Hypothesis*, 55.

42 Schwarz, *Complete Works*, 36, n. 4.

43 Poincaré, *Science and Hypothesis*, 58.

44 Poincaré, *Science and Hypothesis*, 61.

45 I substituted the word 'primitive' in the English translation – *primitif* in the French original – with 'original'. See Poincaré, *Science and Hypothesis*, [61].

46 See Cousins 'Where?' and Section 4.1.8 'Dimensions of Desire'.

47 Duchamp, *Bride Stripped Bare*, n. pag.

48 Matisse was responsible for the permanent installation of *Given* in the Philadelphia Museum of Art. He is also the inventor of Kalliroscope, a device for visualizing and studying rheoscopic fluids. The term rheoscopic means 'current showing' fluid. It consists of a suspension of crystalline platelets, which with appropriate illumination renders the evolution and movement of currents visible.

49 Duchamp, *Marcel Duchamp: Notes*, introduction by Matisse.

50 See Chapter 3, Section 3.5.3 'Cinematic Blossoming'.

51 Duve, *Definitively Unfinished*, 347.

52 Adcock, 'Duchamp's Way', 321.

53 Adcock, 'Duchamp's Way', 324.

54 Duchamp, *Bride Stripped Bare*, n. pag.

55 Richard Difford discusses the representation of architecture in early stereoscopy in Difford, 'In Defence of Pictorial Space', 295.

56 See Haralambidou, 'The Stereoscopic Veil'.

57 The exhibition took place at the Canadian Center for Architecture, 16 June to 8 November 1998. See Martin, 'The American Lawn', 196.

58 Forster, Hutton, Mostafavi and Sauerbruch, *WYSIWYG*. The book featuring stereoscopic images by Jan Bitter and Markus Bredt was published to accompany an exhibition by the same title, held at the Architectural Association in London from 18 November 1999 to 22 January 2000.

59 'Mohsen Mostafavi in Conversation with Sauerbruch Hutton', in Forster, Hutton, Mostafavi and Sauerbruch, *WYSIWYG*, 17.

60 Martin, 'The American Lawn', 198.

61 Chard, Drawing Indeterminate Architecture, 16.

62 'Bicentral' can be used to describe something that has, or affects, two centres.

63 Duchamp has described this 'imperceptible boundary between two and three dimensions' as the *inframince*, 'infra-thin'. See Matisse's publication of notes referring to the *inframince* in Duchamp, *Marcel Duchamp: Notes*.

64 *The Act of Looking* was first exhibited at 'The Blossoming of Perspective: A Study by Penelope Haralambidou', a solo show at DomoBaal Gallery in January 2007. For more images see www.domobaal.com [accessed 23 March 2013]. The work was shown again at 'Speculative Models: Air Grid and The Blossoming of Perspective', a two-person show at London Gallery West in April–May 2009, see www.westminster.ac.uk/schools/media/london-gallery-west/exhibitions/speculative-models [accessed 23 march 2013].

65 Vercruysse's input was instrumental in the design and construction of the steel elements of the piece.

66 See a review of the exhibition in Spankie, 'Speculative Models: Air Grid and the Blossoming of Perspective'.

67 Rendell, 'Site-Writing: Enigma and Embellishment', 150–62.

68 Duchamp, 'The Creative Act', 138.

69 See my essay in the exhibition catalogue, Haralambidou, 'Given: The Tower, the Corridor and the Fall ...'.

70 See Chapter 1.

71 See Chapter 3.

72 d'Harnoncourt, introduction sleeve in Duchamp, *Manual*.

73 See Taylor, *Marcel Duchamp: Étant donnés*, 136.

74 Duchamp, *Manual*.

75 The differences between the two installations are minimal, confined to the length of the strings and the tilting of the Perspex discs upwards.

76 See Section 3.1.2 'Grid' and Haralambidou, 'The Stereoscopic Veil'.

77 For a discussion of this work see Chapter 3, Section 3.2.10 'Left Eye'.

78 Architectural theorist Lorens Holm, who shares an interest in perspective, once mentioned a powerful mental image he experienced when he was studying the rules of perspective. He began to perceive the perspectivists' taught lines, representing visual rays, as daggers penetrating and cutting through the eye. The strings penetrating the discs in the *Act of Looking* brought back the memory for him, and became a physical embodiment, of this uncomfortable mental image. See Holm, *Brunelleschi, Lacan, Le Corbusier* and 'On Being Duchamp and Maybe Alberti, Even'.

79 The waxed string, or whipping twine, is used in sailing to wrap the ends of rope to keep them from becoming unravelled.

80 Molderings presents a detailed analysis of this drawing in his chapter 'The Thread as a Metaphor of the Visual Ray' in *Duchamp and the Aesthetics of Chance*.

81 Allen, *Practice*, 10.

82 See Vick, 'A New Look'.

83 See Chapter 3, Section 3.4.7 'Masonry Grid'.

84 Judovitz, *Unpacking Duchamp*, 68.

85 This comparison posed the question as to whether the Nine Shots and the marked holes on the Perspex sheet shared the same configuration of constellation. However, although testing different superimpositions I have not been able to detect a correlation between the two.

86 Other Duchamp scholars have also discussed the affinities between the two works. For instance: Octavio Paz, '* water writes always in * plural'.

87 Crary, *Techniques of the Observer*, 133.

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DESIRE: FEMALE NUDE DRAWING

A criticism I often receive when presenting my work on *Given* and my analysis of Duchamp's construction of the nude, is that I do not state a clear position regarding the shocking image the assemblage portrays. Additionally, by being deliberately non-figurative, my reworking of *Given* in *The Act of Looking* eliminates the pornographic iconography. As a female viewer, critic and architectural analyst, how do I negotiate entering a construct representing an apparent male desire? Is my resistance to addressing the explicit subject matter of *Given* a repression?

My typical answer is that I read *Given* primarily as a meticulous drawing of visual processes. I have no recollection of my first encounter with the photographic representation of the scene behind the doors in *Given*, and by the time I visited the installation at the Philadelphia Museum of Art for the first time, I had already developed a way of looking at Duchamp's assemblage as a calculated drawing. Prompted by the careful and detailed explanation of its construction in the *Manual of Instructions*, I deciphered glimpses of what could be seen as Duchamp's built treatise in spatial perception, concealed behind the provocative and titillating subject matter. In deliberate opposition to sensationalist reviews of the work – some have seen it as the scene of a violent crime, for instance – I was determined to unveil the hidden structure of this 'architecture of desire'.[1] Thus, I perceive the pornographic *mise en scène* of the work 'allegorically': as subterfuge – dazzling the viewer away from the clandestine significance of *Given* – but also, as allusion – pornography as a signifier for stereoscopy, the work's underlying theme and a representation technique which during Duchamp's early life became infamously connected with the presentation of lewd subject matter.

As we have seen, Duchamp states in his notes for the *Large Glass* that there are two appearances of the Bride, one by the Bachelors and another by the Bride imagining herself naked.[2] Although portraying a female nude, the scene in *Given* cannot be simply identified as a construction from a solely male point of view. The nude's gaze is inaccessible as her head is hidden by the edge of the wall, but as Thierry de Duve has suggested this creates a strange topology for the viewer.[3] When looking through the peepholes on the door, it is as if her gaze goes around and traps you from behind. The viewer is caught within the space created by the Bride looking at herself: within a female gaze.

Furthermore, *Given*'s immediacy and lyrical beauty, as well as perhaps its covert violence, has a potentially female origin, influenced by Duchamp's lover, Maria Martins, a woman with an allegedly aggressive sexuality.[4] Martins' temperament is evident in her sculptural work, which as curator Michael R. Taylor observes, in the 1940s became 'animated with a writhing, baroque exuberance that accentuated her themes of fertility, desire and sexual cruelty'.[5] Describing some of Martins' sculptures, Taylor often refers to them as 'terrifying'.[6] Combining the darker sides of surrealist imagery and her native Brazilian culture – especially the myths and legends of the Amazon river – the snake goddess in her *Cobra Grande*, 1942, has 'the cruelty of a monster and the sweetness of wild fruit', according to Martins.[7] Furthermore, Taylor sees her work *The Impossible III*, 1946 – depicting a male and female figure caught in a deadlock of desire and repulsion and

using sexual imagery relating to predatory animal and plant forms – as a direct reference to her relationship with Duchamp (fig. 3.12).

If the *Large Glass* is a portrayal of the amorous exchange between the Bride and the Bachelors from the Bachelors' technologist point of view in perspective, then *Given* is the portrayal of the same exchange, this time in stereoscopy from the point of view of the Bride: Maria.

Duchamp's concept of eroticism was a central driving force guiding many of his projects; he saw it as an underlying philosophy, a structure but also as a material like a 'tube of paint, so to speak'. Duchamp's definition of eroticism resonates with Elizabeth Grosz's definition of the creative impulse as a sublimation of sexual selection and seduction.[8] His work has often been criticized by feminist critics, but American art historian and feminist Amelia Jones reconstructs Duchamp as an 'indeterminably gendered author' negotiating contradictory notions of sexual difference and subjectivity.[9] Furthermore, as an attempt to blur gendered boundaries, he famously adopted a female creative persona Rrose Selavy.

Jones poignantly also discusses Duchamp's methods of seduction, on a personal level during his life, as well as the continuing allure that his work affects on viewers and critics alike until today. My long, unwavering preoccupation with his methods and ideas is an undeniable testimony of being under his spell: I am clearly a victim of Duchamp's powerful charm. However, most seductive I find his proposing of creativity as an architecture of a love affair; an internal game of seduction where the author oscillates between two roles: the seducer and the seduced, the Bachelor and the Bride. This requires a constructed notion of innocence, of not knowing, so that the seduction can take place and take you by surprise.

As we have seen, *Given*'s enigma invites diverse interpretations, and each interpretation reveals more about the interpreter/spectator rather than about Duchamp's actual intentions. I believe that his work operates in a similar way to a mathematical equation, as a robust structure of variables and constants, able to render different but consistently plausible results. Throughout my study, my interpretation of *Given* remains more or less the same: I see it as an irreducibly fascinating drawing of the architecture of desire. Always at the back of my mind, it keeps its secrets while retaining its potential to take me completely by surprise. In the next section I attempt to describe *Given* as a drawing describing the architecture of desire from an autobiographical point of view.

5.1 FEMALE NUDE DRAWING

My essay 'Drawing the Female Nude', published as part of a special issue of the *Journal of Architecture* entitled 'Problems of Painting and Building in Architecture' and edited by Victoria Watson in 2009, explores the themes of drawing and desire in painting and building. The essay analyses a painting – Euan Uglow's *Nude, from Twelve Regular Vertical Positions from the Eye*, 1967 – and a building – Adolf Loos's design of a house for the performer Josephine Baker, 1928 – that have as a common point of reference the drawing of a female nude.[10] In the essay, I mention Duchamp's work only in passing, but my reading of *Given* as a calculated three-dimensional drawing of a coveted female form influences the manner in which I discuss the selected painting and building. *Given* is, therefore,

a hidden link between the two works I analyse in 'Drawing the Female Nude'.

In *The Female Nude: Art, Obscenity and Sexuality*, art historian Lynda Nead claims that the female nude 'symbolizes the transformation of the base matter of nature into the elevated forms of culture and the spirit'.[11] Nead discusses the female nude in terms of 'containment' aimed at defining femininity and female sexuality: 'outlines, margins and frames – procedures and forms that regulate both the ways in which the female body is shown and the proper conduct of the prospective viewer.'[12] In the essay, I show how Loos's design aims to contain the exotic femininity of Baker in a theatrical domesticity for his voyeuristic pleasure, and how Uglow's painting dictates a way of looking at the female body beyond perspective distortion. The essay concludes by observing that, although the two works endeavour to capture an image of the female body, they primarily communicate an embodied act of drawing. The trace of the painter's observation, and the architect's imaginary occupation, is etched on the surface of their drawings. Their embodied act of drawing conveys a similar observation and imaginary occupation to the viewer. We do not only 'see' the images of two female nudes, spectral or dissected, but also the traces of the bodies of the two male authors. As viewers of the painting and readers of the architectural drawings, we are drawn into the space of the representation, and we are suddenly there, looking at them looking.

In response to Nead's central argument of the role of the female nude as containment of femininity, and inspired by Jane Rendell's work in *Site-Writing: The Architecture of Art Criticism*, the main art/architecture historical voice of this essay is 'interrupted' by short fragments of another autobiographical account. This secondary voice – by a female architect posing for a nude painting – recounts the act of drawing from the point of view of the model. The account is a partly remembered, partly constructed, autobiographical account of my experience posing for a nude painting by my husband, the painter James Lloyd, in 2004. Lloyd was a student under Euan Uglow's tutelage at the Slade School of Art, University College London, 1994–95, and the painting entitled *Penelope in the Bath* was shown at 'Being Present', a group exhibition at Jerwood Space in 2004. The work is now part of the private art collection by British fashion designer Paul Smith, whose portrait Lloyd painted for the National Portrait Gallery in 1998.[13] At the time of the pose I was in the initial stages of pregnancy with our first daughter Iris. The last sitting – or more precisely lying – I describe in the account is after my first appointment for a scan, when sectional, moving images of the foetus, seen for the first time on a screen, appear in black and white like animated drawings.

Reworked and presented as continuous text here, unlike the fragmented arrangement in the original essay, the account describes not a single containment but a series of overlapping gazes, frames, enclosures, vessels, or delineations, physical, optical and imaginary, which result in a Russian doll effect: the thing, within the thing, within the thing. Furthermore, I put forward the idea that drawing – before its traditional definitions in art and architecture, and even before any physical act or trace on a surface – is a way of looking, a desire to understand and measure the fleeting nature of visual space.

By being autobiographical this account is similar to Rendell's 'confessional' site-writing, for instance in 'Undoing Architecture' and *Confessional Construction*, which are driven by a 'love of writing'.[14] The confessional/autobiographical description of my experience of posing for a nude painting collapses my architectural designer playful gaze into the body of the nude which is about to become a mother, and allows me to assume a point of view analogous to the one of the nude female figure in *Given*: I inhabit the space created by the picture-making in a similar way to how the nude inhabits *Given*. Unlike Rendell, however, my confessional piece is driven not by a 'love of writing' but a 'love of drawing'; I see the account primarily as a drawing, albeit one I communicate through words. Changing the sequence of the words and the meaning of the title of the essay, I call the account/drawing: *Female Nude Drawing*. Although appropriate for representing the plotting of this intangible drawing in the mind, my use of words is also a translation.

> It is a sunny morning and I am lying in the bath. Patterns of light from the window immediately above the bathtub merge with the warped shapes of my legs and feet. The image of the small bathroom under a staircase, mirrored in the flat surface of the water, is deep. I visually enter and flicker my focus between two illusions: the window reflected and my feet refracted.
>
> I close one eye. I open it and close the other. The lines of the tiles behind the two taps shift with a jolt. Both eyes open again cast the single view. Apart from a limescale mark on the rim of the left, and a white spot of paint on the top of the right, the images of the two taps are identical. Hot water on the right, cold on the left.
>
> I decide to mix them: I focus on the image of the right tap with the left eye, and the left tap with the right eye. A monstrous single tap appears devoid of acceptable perspective distortion. I close both eyes and watch the impossible image fade.
>
> He is looking at me. I am looking back, but he does not see me. His focus moves from the canvas towards my outlines and back again. His eyes – following the contour of my shoulder, the edge of water around my left arm and the submerged forearm, leading to my fingers on my thigh – are empty.
>
> The water holds me. Parts of my body emerge from the surface of the water like islands. I can see three: a curve around my right arm and breast forms the coast of the first, my knees are the mountaintops of the second, and the third, the smallest one, consists of the caves between my toes.
>
> His gaze contains me. I feel the boundaries of the rectangular canvas cutting the space around the bath: the lower edge of the window, the tiles behind my head, the lino on the bathroom floor and back to the upper part of the taps. This room encloses us both.
>
> It is a sunny morning and I am lying in the bath for the seventh time. Everything is the same: my position, the taps, the tiles, the reflected patterns of light. Everything, apart from my body, which is changing; the measure is evident in the different curvature of the waterline around my three islands. Within the same room, the same absent gaze, delineated by the rectangle of the canvas, I carry her nebular image swimming inside me in black and white.

5.2 BREACH

In December 2007, I attended a lecture by the Dutch literary and art historian Mieke Bal, organized by the

Bartlett School of Architecture, UCL. In her lecture, 'Montage in the Turbine Hall: Doris Salcedo's Political Aesthetics', Bal discussed artwork by Colombian sculptor Doris Salcedo, more specifically her installation *Shibboleth*, part of the Unilever Series, which was on display at Tate Modern that year. Bal's lecture closely reflected an essay, 'Earth Aches: The Aesthetics of the Cut', which she contributed for the accompanying Tate catalogue.[15] Salcedo has clearly stated the political dimension of *Shibboleth* as 'the unbridgeable gap that separates humanity from infra-humanity', which she sees as an exposure of a history of racism: the untold dark side of modernity.[16] Furthermore, according to the Tate, *Shibboleth* was 'the first work to intervene directly in the fabric of the Turbine Hall' creating 'a subterranean chasm' that stretches its length and 'shifts our perception of its architecture': 'In breaking open the floor of the museum, Salcedo is exposing a fracture in modernity itself.'[17] In both catalogue essay and lecture, Bal traces a series of 'aesthetic strategies' that Salcedo employs with a 'consistency bordering on obsession' throughout her work. Bal identifies barely visible '*anthropomorphisms*', the attribution of human characteristics to objects, as the first strategy:

> Whether or not these small but insistent anthropomorphic traces were metaphorical or materially real, the metonymic principle at work safeguarded the presence of the victims of violence, otherwise disappeared. This oblique, near-invisible presence of the human form recalls the predominance of the representation of the human body in the history of Western art. It records art's complicity: in its acts of honouring the human body that inevitably erased those bodies that violence has dishonoured. Beauty and pain are bound together.[18]

Despite the clear political message, Bal's focus on the anthropomorphic nuances in Salcedo's work predisposed my perception of *Shibboleth*'s breaking of Turbine Hall floor as a violent intervention to a body. Consequently, while listening to Bal speaking in the darkness of the auditorium, I became increasingly uneasy with her use of the word 'cut' to describe Salcedo's work. Through reading the building as a body, I began to 'feel' the word as a slash. But the word cut is clean and contained, describing a deliberate, calculated act. Such deliberate, calculated acts are routine in architectural design, where the word cut is often used: 'cutting a section' or the precise cutting, with knife and ruler, of cardboard or other material to make a model, for instance. However appropriate to describe architectural design and perhaps Salcedo's process of installing the piece, I felt that the word failed to convey the full impact of the work on the viewer. Compounded by the fact that at the time I was expecting the birth of our second daughter, Kleio, in less than a month, my uneasiness grew. The presence of the crack on the floor of the Turbine Hall denotes a seismic event that has profoundly, and possibly irreversibly, damaged the body of this building. This is not a cut; it is a rupture, a breach resulting from an unimaginable violation – a trauma. A body has been damaged: the body of architecture metonymically representing the female body, my body.

But *Given* also features a damaged architecture: a broken wall. In the dark auditorium, for the first time I saw in my mind the structure of Duchamp's assemblage metonymically as a breached human body. Unlike other viewers, I have never found the depiction of the nude figure disturbing but

suddenly the anthropomorphic dimension of the work as a whole – with the door as head and eyes and the space beyond the door as a body containing the breached wall – was deeply unnerving. What has caused the violation of this body? The notion that the female figure on the other side of the wall has affected this destruction by breaching through began to provoke an alarming novel interpretation of *Given* for me.

Expelled from the closed dark chamber into the open landscape, she lies amongst twigs, naked and vulnerable. In anticipation of my second labour, the trauma of giving birth for the first time started grafting itself on Duchamp's edifice. The result of a physical transformation that is intellectually unacceptable, *Given* is an interior view of a body that has been violated from inside. Although profound and traumatic, this breach is not primarily physical. Another shattering has taken place, at once suddenly and gradually. Unlike the bittersweet dimension of loss that fuels the flow of desire, the rupture signifies the shattering of the architecture of desire itself, a seismic change of perspective, perhaps irreversibly damaging the construct of female creativity.

Concurrently, the memory of my first real encounter with *Given* in Philadelphia came to mind: standing in front of the door and looking through the peepholes, I was surprised by how the scene beyond, although portraying an open landscape, implied domesticity. Looking through the peepholes felt like looking into the interior of a room of a home. Furthermore, the work conveyed a feeling of tranquillity. The warm bright light and the constant silent flickering of the waterfall, like the fire in a fireplace, created a sense of belonging.

She is no longer hidden inside me, but neither is she back in the real world of the gallery. By breaching through and shattering the architecture of desire she has created a lyrically beautiful new landscape for herself. In its lyrical beauty, homeliness, belonging, enclosure, and containment, combined with the acceptance of an irreversible internal violent rupture and loss, *Given* became an unexpected but disquietingly accurate portrayal of childbirth: the thing, within the thing, within the thing.

Notes

1 *Given* has been connected to the unresolved Black Dahlia murder case, 1947. See Nelson and Hudson Bayliss, *Exquisite Corpse*, and Taylor, *Marcel Duchamp: Étant donnés*, 194–97.

2 See 3.4.10 'Occupying a Daydream' and Duchamp, *Bride Stripped Bare*, n. pag.

3 See 3.4.10 'Occupying a Daydream' and de Duve, *Definitively Unfinished*, 475.

4 In addition to a short analysis of her work, Taylor gives a detailed account of her alleged relationship with the sculptor and her teacher Jacques Lipchitz prior to Duchamp. See Taylor, *Marcel Duchamp: Étant donnés*, 26–32.

5 Taylor, *Marcel Duchamp: Étant donnés*, 30.

6 Taylor, *Marcel Duchamp: Étant donnés*, 29.

7 Maria Martins, 'Cobra Grande', in *Amazonia by Maria*, unpaginated. Quoted in Taylor, *Marcel Duchamp: Étant donnés*, 28.

8 Grosz, 'Sensation', 82.

9 Jones, *Postmodernism and the En-Gendering of Marcel Duchamp*, 205. Also see Emma Cheatle's work, a cross-disciplinary examination of a building, the *Maison de Verre*, 1928–32, through an artwork, the *Large Glass*, Cheatle, 'Part-architecture'.

10 See Haralambidou, 'Drawing the Female Nude'.

11 Nead, *The Female Nude*, 2. Nead offers a feminist response to Kenneth Clark's classic survey of the subject in *The Nude: A Study in Ideal Form*, New York: Pantheon Books, 1956.

12 Nead, *The Female Nude*, 6.

13 See Sir Paul Smith's portrait at the BBC 'Your Paintings' website: http://www.bbc.co.uk/arts/yourpaintings/paintings/sir-paul-brierley-smith [accessed 23 March 2013].

14 Rendell, *Site-Writing*, 27 and 53.

15 Bal, 'The Aesthetics of the Cut', 40–63.

16 Borchardt-Hume, *Shibboleth*, 65.

17 See http://www.tate.org.uk/whats-on/tate-modern/exhibition/unilever-series-doris-salcedo-shibboleth [accessed 23 March 2013].

18 Bal, 'The Aesthetics of the Cut', 46.

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DEFROCKED CARTESIANS: DUCHAMP'S INFLUENCES AND LEGACY

In the place of a conclusion, this part of the book explores Duchamp's architectural influences and his legacy on architectural design. It is primarily a collection of images of work by practitioners, who I call 'defrocked Cartesians'. As we have seen in Chapters 1 and 3, I coined the term 'defrocked Cartesians' from a comment Duchamp made in an interview, referring to his own fascination with perspective and ruled drawing. He calls himself a Cartesian, but nevertheless *défroqué* (defrocked), pointing to his simultaneous desire to subvert the rules of the spatial representation technique through irony. Similarly to Duchamp all 'architectural' practitioners presented here celebrate but also question and exceed the conventions of architectural drawing.

The first three defrocked Cartesians represent the source of Duchamp's architectural influences. These are: French mathematician, Minim friar and anamorphic art painter Jean-François Niceron, French draughtsman and architect Jean-Jacques Lequeu, and Austrian-American theatre designer and architect Frederick Kiesler. I draw parallels between their work – produced at different historical periods – and Duchamp's in connection to the themes of allegory, visuality and desire. For instance, Niceron motivated Duchamp's interest in visuality, perspective and geometry; Lequeu's drawings bear resemblances to both the allegorical setting of the *Large Glass* and *Given*'s erotic subject matter; and Kiesler's work, both individually and in collaboration with Duchamp, engages all three of the themes.

Following Duchamp's architectural influences, I present two philosophers. The first is German philosopher Max Stirner, a forerunner of individualist anarchism, whose work instigated Duchamp's conception of the *Large Glass*. Duchamp's exposure to Stirner's ideas led to his departure from externally imposed rules for making art and his search for a radically individual new paradigm. The defrocked Cartesian work directly inspired by Stirner, which is presented here, is Duchamp's. Unsurprisingly, the second philosopher is Jean-Francois Lyotard, best known for his articulation of postmodernism, who has written about the *Large Glass* and *Given* and whose design for the exhibition 'Les Immateriaux', 1987, I suggest was influenced in turn by Duchamp.

Finally, I present a selection of eleven projects by contemporary defrocked Cartesians, architects whose work I place within Duchamp's legacy in architectural design. These are: Bernard Tschumi, *Advertisements for Architecture*, 1976–77; OMA, *Delirious New York,* 1978; Diller + Scofidio, *A Delay in Glass,* 1987; Michael Webb, *Temple Island,* 1987; Ben Nicholson, *Appliance House,* 1990; Jonathan Hill, *Illegal Architect,* 1998; Nat Chard, *Indeterminate Architecture,* 2006; Victoria Watson, *Air Grid,* 2009; and Smout Allen, *Surface Tension,* 2011. I conclude with my project, *Déjà vu,* 2009–13.

The selection of work identifies a territory of exploration in architecture that seeks to redefine architectural thinking through a challenging of the syntax of architectural notation. Perhaps the sole link between the selected contemporary practitioners is that they all trained in architectural design – with the exception of the two philosophers, although Stirner may have inspired Duchamp's use of architectural drawing as an alternative art practice, and Lyotard has used perspective arrangement in his sketches analysing Duchamp's work. My short introductions define what I see as a connection to

Duchamp's work, which is either obvious, admitted or self-professed, and in one case, although the connection is evident to me, disputed by the author.[1] By including two philosophers, one stimulating Duchamp's musings and the other being informed by them, I would like to argue that the rest of the work by defrocked Cartesians presented here is also in philosophical pursuit. Employing what I have called 'Figural Theory' and through allegory, visuality and desire, they seek to pervert the rules of representation, beyond built architecture and often beyond aesthetics, reflecting the perversity of the human condition.

However, this is not suggesting that they form a collective as their defrocked Cartesian work remains uncompromisingly singular. What connects them, perhaps in Stirner's example, is an even self-destructive tendency to remain radically individual and a discouragement of any following. Just as Duchamp denounced belonging to any groups and challenged established definitions of art, the selected work resists categorization, proposing a refreshingly indulgent philosophy of space, an elusive practice at the margins of either art or architecture.

6.1 JEAN-FRANÇOIS NICERON

In one of his notes in the *White Box,* Duchamp makes a direct reference to Jean-François Niceron, 1613–46, a French mathematician, Minim friar and painter of anamorphic art. Duchamp most possibly studied Niceron's work, specifically his treatise *Thaumaturgus opticus*, 1646, at the Sainte-Geneviève Library, where he was employed as a librarian in 1913–14. In their essay 'Drawing the Maxim from the Minim: The Unrecognized Source of Niceron's Influence Upon Duchamp', 2000, Stephen Jay Gould and Rhonda Roland Shearer investigate the evident impact of Niceron's projective geometry explorations on Duchamp's work and identify specific details in the *Large Glass*, which are directly influenced by Niceron's ideas (fig. 6.3).[2]

During my study of *Thaumaturgus opticus,* however, I discovered another plate, which bears an uncanny resemblance to Duchamp's arrangement of *Given,* albeit without the plane of the door (fig. 6.2).[3] Niceron's drawings which portray anamorphic shapes perceived through precise geometric incisions on walls, suggested to me that Duchamp may have also designed the nude as an anamorphic form viewed from a precisely chiseled breach. Furthermore, Niceron's embodied performance of anamorphic plotting as portrayed in plate 33 (fig. 6.1) is a playful development of the principles described in my analysis of Durer's machine for drawing a lute, and has influenced the development of my work in *The Act of Looking*.[4]

6.2 JEAN-JACQUES LEQUEU

Jean-Jacques Lequeu, 1757–1826, a French draughtsman and architect, has been seen as a forerunner of surrealism. Little is known about his life, but a large collection of his drawings depicting designs of *architecture parlante*, allegorical or 'speaking' architecture, can be found at the Bibliothèque nationale de France; the collection includes some pornographic drawings, which are kept in the *Enfer* of the library. Philippe Duboy in *Lequeu: An Architectural Enigma,* 1986, suggests that Duchamp and Raymond Rousell might have 'tampered with Lequeu's drawings to concoct a character and oeuvre even more puzzling'.[5] Duboy discovers glimpses of 'Duchamp's convolutions

of mind' in Lequeu's drawings and advocates that their study leads to a reassessment of Duchamp's oeuvre. Indeed, Lequeu's unprecedented linking of lascivious eroticism with allegorical architectural drawing, as well as his practice of writing notes, is a clear precedent that has been largely overlooked by art-historical studies of Duchamp's work (fig. 6.4).

Lequeu's cross-dressing – in some of his self-portraits he presents himself dressed as a woman – foreruns Duchamp's alter ego Rrose Selavy (fig. 6.5). Furthermore, the explicit presentation of female genitalia in Lequeu's pornographic musings might have been a direct influence on Duchamp's arrangement of the pose of the nude in *Given* (fig. 6.6).

6.3 FREDERICK KIESLER

Duchamp met Austrian-American theatre designer, artist and architect, Frederick Kiesler, 1890–1965, in the mid-1920s in Paris. Fascinated by Duchamp's work, Kiesler published a visual essay analysing the *Large Glass* in the *Architectural Record* in 1937, thus introducing Duchamp's ideas to a wider architectural audience for the first time.[6] When Duchamp arrived in New York in 1942 he stayed at Kiesler's house for a few months and the two men remained in close contact until the early 1950s.[7] During that period they frequented the same intellectual circles in Paris and New York, collaborating on many projects including the design of exhibitions and publications (fig. 6.8).

Kiesler composed another fascinating collage dedicated to Duchamp, entitled '*Les Larves d'imagie d'Henri Robert Marcel Duchamp*', which was published as a triptych in the magazine *View* in 1945 (fig. 6.10).[8] Kiesler and Duchamp shared an interest in the mechanism of vision as a metaphor for creativity and both Kiesler's re-workings of the *Large Glass* in *Architectural Record* and *View* are 'prophetic' of visual themes Duchamp would explore many years later in *Given*. Finally, Kiesler's research project *Vision Machine*, 1940, demonstrates 'the flow of sight' and features a heavy brick wall indicating the division between the inside and outside of the human body; uncannily, this work by Kiesler can be seen as the missing link between Duchamp's *Large Glass* and *Given* (fig. 6.7, 6.9).[9]

6.4 MAX STIRNER

When in 1953, the 3 Standard Stoppages, 1913–14, entered the collection of the Museum of Modern Art in New York, Duchamp explained in the museum questionnaire that the work was a reaction against 'retinal' painting and a humorous application of a post-Euclidian geometry. He ended his entry by adding 'Cf. Max Stirner – *Le moi et sa propriété*' (fig. 6.11).[10]

Max Stirner, 1806–56, was a German philosopher, often seen as one of the forerunners of nihilism, post-modernism and especially individualist anarchism. In his most important work, *The Ego and Its Own*, 1845, Stirner launches a radical individualist critique of modern society, suggesting that creativity is based on a rejection of all systems and a rediscovery of the individual.[11] He condemns being part of any groups, societies or religions, and even goes so far as to denounce gender.[12] Stirner's improbable masterpiece has been referred to as the most revolutionary, and dangerous, book ever written; liberating and empowering, at the same time, its premise is truly defiant and destabilizing.[13]

Duchamp's exposure to Stirner's ideas is dated

around 1912, when he spent three months in Munich and radically changed his attitude in regard to the production of art (fig. 6.12). Ever since, he often mentioned Stirner, whose influence is also obvious in Duchamp's reluctance to be associated with any formed groups and his attempt to break from a defined gender position with the introduction of his female persona Rrose Selavy (fig. 6.13).

6.5 JEAN-FRANÇOIS LYOTARD

French philosopher Jean-François Lyotard, 1924–98, was one of the first scholars to be granted permission to study *Given* and Duchamp's *Manual of Instructions* prior to publication. The results of his analysis were presented in his *les TRANSformateurs DUchamp,* 1977.[14] In this publication, Lyotard puts across the idea that *Given* can be seen at once as an incarnation and a subversion of the abstract diagram of Renaissance perspective construction. To illustrate this, the philosopher drew on lined paper the layout of the assemblage in pencil (fig. 6.14). The diagram, although not elaborately plotted, is an attempt to demonstrate what he clearly perceived as an intentional geometry in the layout, therefore, revealing *Given* as a drawing. As I have mentioned before, this particular diagram and Lyotard's insightful analysis of *Given* have had a foremost influence on the development of my ideas presented in this book.

In turn, I would like to suggest that Duchamp's influence on the philosopher is evident in Lyotard's curatorial project for 'Les Immatériaux', a 'landmark' exhibition at the Pompidou Centre in 1985 (fig. 6.15).[15] The theme and arrangement of the exhibition signify an architectural 'blossoming' of Duchamp's concepts, such as the inframince, and even the design of the catalogue as a folder with loose index cards directly references Duchamp's publications of his notes (fig. 6.16).

6.6 BERNARD TSCHUMI

Advertisements for Architecture, is a series of postcards featuring jarring juxtapositions of words and images that French architect Bernard Tschumi created in 1976–77 (fig. 6.17–6.19). Two of the postcards present images of Le Corbusier's Villa Savoy in a state of decay that Tschumi had taken in 1965, just before the building was restored. The accompanying text is often overtly and provocatively erotic: 'Architecture is the ultimate erotic act,' Tschumi asserts. According to Tschumi, each Advertisement 'was a manifesto of sorts, confronting the dissociation between the immediacy of spatial experience and the analytical definition of theoretical concepts'.[16]

I would like to propose that each is a gesture equivalent to Duchamp's addition of the moustache and inscription of the suggestive innuendo *L.H.O.O.Q.* on a postcard of Leonardo's *Mona Lisa*. Like Duchamp's defacement and ridicule of the old master's image, by portraying an aged Villa Savoy, Tschumi defaces the presumed masterpiece of modern architecture in search of a new model for producing and consuming architecture based on desire. Furthermore, it is useful to mention that one of the first notes in the *Green Book* – where the title of *Given* derives from – starts with the word *avertissement*, which in French means advertisement but also announcement, notice or warning.[17] According to Hays, by replacing architectural drawings with a novel notational system using provocative photographs and texts,

Tschumi triggers, or opens up, a space for an alternative architectural experience.[18]

6.7 REM KOOLHAAS AND OMA

Between 1972 and 1977, the Office for Metropolitan Architecture (OMA), Rem Koolhaas, Madelon Vriesendorp, Elias Zenghelis and Zoe Zenghelis, worked on a series of allegorical projects sited in New York. Images and descriptions of the projects were subsequently included in an appendix to Rem Koolhaas's *Delirious New York: A Retroactive Manifesto for Manhattan*, 1978.[19] According to Koolhaas: 'The Appendix should be regarded as a fictional conclusion, an interpretation of the same material, not through words, but in a series of architectural projects.' Like Duchamp's allegorical architecture of the Bachelor machine in the *Large Glass,* the pseudo-historical narratives of the Manhattan projects add a fictional dimension to Koolhaas' critical historical analysis of New York. Sharing an equally episodic manner, they point to, and accentuate an allegorical tendency colouring the rest of his textual analysis (figs. 6.20–6.22).

Some of the drawings expose an explicit erotic dimension. Marion Vriesendorp's beguiling watercolours in the original publication present the towers of the city anthropomorphically, in post-coital positions. Unlike the unfulfilled, onanist desire in the *Large Glass*, the erotic encounter of the buildings in Vriesendorp's drawings gives birth to a new Manhattan.

6.8 DILLER + SCOFIDIO

Exemplary of Diller + Scofidio's trans-disciplinary approach to architecture is their early stage set design for *A Delay in Glass, or The Rotary Notary and His Hot Plate*, a performance piece commissioned for the Philadelphia Museum of Art's Duchamp Centennial in 1987. Recalling Duchamp's work, which they meticulously studied for nearly a year, the design 'subverts the space of the stage much the way the *Large Glass* subverts the space of painting and sculpture'.[20] Redefining the theatre of illusion, in which the proscenium bisects the narrative space of the stage, they introduce what they have called the inter-scenium, a suspended mirror, offering simultaneous views of the plan and elevation and an opaque pivoting panel that splits the stage in two (fig. 6.25). The characters, which are based on Duchamp's Bride and Bachelors, 'constantly exchange locations, physical states, and sexual identities in a game of temptation and denial'. One of them, *Automarionette*, or Juggler of Gravity, is named after a feature appearing in Duchamp's notes but not realized on the *Glass*. As part of their preparatory study for the design, Diller + Scofidio analysed the *Large Glass* through drawing, re-plotting the perspective from the plan, and discovering that the picture plane cuts through the centre of the composition (fig. 6.24). Beyond serving the immediate purpose of a stage set, their project operates as design research and offers new interpretations of Duchamp's work.

6.9 MICHAEL WEBB

Temple Island, a project by ex-Archigram member Mike Webb, was exhibited at the Architectural Association in 1987 (fig. 6.26).[21] The exhibition catalogue includes reproductions of his infectiously lyrical drawings accompanied by an elliptical text, that reads as a hybrid between poetry and a geometry textbook. According to Webb: 'Both in my

memory and upon an islet in the Thames at Henley reposes a temple: i.e. The incorporeal and the real (one), and though the site of each remains intact, the incorporeal temple is fading, so that, were its façade to be precipitated on to a dimensional surface, a bit of "restoration" work would become necessary so as to provide an image you could read.' (fig. 6.27) Webb's poetic drawings critically investigate visual representation. Precise graphic exercises in descriptive geometry contemplate projection as a means of not only drawing, but also remembering and imagining spatial phenomena (fig. 6.28).[22]

Temple Island, therefore, shares a similar premise with Duchamp's work: a reconstruction of an 'act of looking' at the object of desire – allegorically represented by the Bride or the nude – through drawing. Webb's project is also a drawn allegory, erecting an elaborate architecture of vision, or a vision machine, as an attempt to capture an image of the forever elusive object of desire: the fleeting childhood recollection of the temple and its veiled statue of a female figure.

6.10 BEN NICHOLSON

Ben Nicholson's project for an *Appliance House*, 1990, focuses on the pervasiveness of mechanical objects and appliances that 'apparently nurture homeliness'.[23] Splicing the raw material for his design from the Sears and Sweets Catalogues, he employs collage as a vehicle for rethinking the functions of each room. The unexpected juxtapositions of collaged elements question the closed circuit between intention and design and become a fulfillment of the designer's desire to harness chance by 'creating something that eludes forewarning or prediction'. (figs. 6.29, 6.30)[24]

Nicholson employs satire, a subgenre of allegory, to challenge social norms of inhabitation, as well as those of architectural representation. For the author, the act of naming becomes part of the design process and offers new forms of familiarity and plausibility, though giving a drawing a name, which is not necessarily associated with the things depicted, can be jarring. The difference between the image and its name creates a gap, within which the allegorical interpretation by reader/viewer takes place (fig. 6.31). Both the mechanical, satirical aspect of Nicholson's design and his use of chance through collage are reminiscent of Duchamp's techniques in the *Large Glass*, which Nicholson has closely studied.[25] Furthermore, Nicholson is a self-confessed admirer of Lequeu, whose work he was introduced to by his tutor Daniel Libeskind.[26]

6.11 JONATHAN HILL

In his project *The Institute of Illegal Architects*, 1996, Jonathan Hill asserts that architecture is made by design and by use and considers the relations between the architect and the user. His argument for an architect aware of the creativity of the user mirrors Duchamp's recognition of the role of the viewer in the creative act.[27] The *Royal Institute of British Architects* by Grey Wornum, c. 1935 becomes the site for his critical intervention: IIA is designed as a counter-proposition revealing RIBA's hidden assumptions. Hill's critique of the architectural institution, therefore, originates in allegorical architectural design (fig. 6.34).

Hill observes a difference between the use of words and images in his project. One sentence may explain a drawing and another contradict it or add further information. Certain drawings offer the reader/viewer

little opportunity for interpretation but in others 'the relationship between signifier and signified is loose'.[28] Comparable to the relationship between the *Large Glass* and Duchamp's accompanying notes, Hill's drawings, photographs and texts are analogous to the buildings they describe but are also conceived as a 'montage of gaps' where allegorical interpretation by the user/viewer might take place (fig. 6.33).[29]

The building consists of five spaces, each dedicated to a specific form of sensual or perceptual production: smell, sound, sight, touch and time, in connection to a set of transient elements the number and character of which is in constant state of flux. Hill's drawings bear close affinities with Kiesler's sketches for the 'Art of This Century' gallery where the Austrian-American architect and artist also explored architectural design as a machine for the senses inspired by surrealism (fig. 6.32).

6.12 NAT CHARD

Conventions of architectural drawing encourage ideas of certainty but Nat Chard's research project, *Drawing Indeterminate Architecture, Indeterminate Drawings of Architecture*, asks how architecture might also nurture the uncertain. It searches for ways of drawing as a rehearsal for inhabiting architecture, which nurtures an indeterminate condition. The intentionally elaborate design and 'didactic' appearance of his drawing instruments invites the viewer to bring their own specificity. Chard sees this as his main debt to Duchamp: creating objects with connections that are not completed and play a game of seduction with the viewer. Furthermore, like Duchamp, Chard is interested in work that is not linear and sees each piece as a vehicle for inquiry.[30]

Like Duchamp, Chard expresses a frustration with the entirely receiving character of the picture plane. He seeks to complicate its role as a pure receiver by folding it and expanding it into space. By his own admission he also aims to pervert the physics of light, not only by design but also by accident. His instrument capturing a paradoxical shadow, which hovers between the picture plane and the object exquisitely meets this goal (fig. 6.36).

Another set of instruments for drawing indeterminacy studies an expanded version of projection. Inspired by what he sees as Duchamp's exploration of projection as a physical act – the throwing of paint with a toy canon, the Ocular Witnesses, but also the dropping of strings in the Standard Stoppages – his instruments set a stage for capturing a visceral projection of paint, a non-Newtonian fluid, instead of light (fig. 6.37).

Finally, Chard's drawn insertions of mechanical figures in stereoscopic images of a female anatomical model are reminiscent of Duchamp's Bride. Her appearance without her skin, revealing the machinations of her internal organs, matches my reading of Duchamp's rendition of her as an *écorché* stereoscopically resisting the Bachelors' gaze seeking her extra-dimensional nudity (fig. 6.35).

6.13 VICTORIA WATSON

Originally inspired by the work of German-American architect Mies Van der Rohe, Victoria Watson's *Air Grid* manifests itself in two guises: physical models 'woven' with threads of shimmering colour supported by lightweight geometrical armatures and their digital equivalents 'hovering ghost like in electronic space'.

Piranesi's transgressive journeys into architecture's irrationality and Le Roy's view of

architecture as a genealogy of type and form inform Watson's *Air Grid* practice. Additionally, the *Air Grid* derives from a critique of the generative grid as a visual trope underlying Modernist thought. Watson at the same time celebrates but also questions and challenges the grid, infusing it with a playfulness that enjoys some science-fiction undertones. The *Air Grid* 'is an attempt to find another site for architectural work' or 'a new site in which to explore architectural ideas'. Watson's proposed intervention for the Corviale Void is at the same time aesthetically spectacular and intellectually provocative. *Utopian Adventure: The Corviale Void,* marks a celebration of the importance of history – of looking back – in the creation of new provocative ideas and designs.[31]

What links Watson's work with Duchamp's is the underlying hunt for a forever absent object of desire that she attempts to capture in the nets of her sublime grids. Furthermore, her interest in the metaphysics of colour resonates with Duchamp's notes and tests in colour, which remain largely unexplored.

6.14 SMOUT ALLEN

Surface Tension is a balanced network of devices analogous to the essential natural processes of the hydrological cycle, as well as the ebb and flow of tides and the motion of waves. Smout Allen's installation was developed for the 'Landscape Futures: Instruments, Devices, and Architectural Inventions' exhibition at the Nevada Museum of Art, Reno, in 2011.[32] The ephemeral, intangible and mythical nature of water is deployed and materialized in the form of rainbows, glories, halos and clouds (fig. 6.41).

As in the *Large Glass*, where water and gas, the two main elements fuelling the flow of the desire, are invisible, water, the notional activator of Smout Allen's elaborate machinations, remains absent. It is codified as the mechanical exchange between a group of clock-like Bachelors below and their cloud-like Bride hanging above, dressed in her warm shiny armour. A large circular mirror reminiscent of the Oculist Witnesses is the rotating computer regulating their exchange of messages. Sieves, Jugglers of Gravity, Capillary Tubes and Draught Pistons, Duchamp's names for elements composing the *Large Glass*, could easily be referring to the parts of Smout Allen's elaborate constellation (fig. 6.42, 6.43).

In accordance with a long history of drawings of theatrical machines pictorially harnessing nature through science, which includes Vitruvius, Leonardo, De Caus, Lequeu and Duchamp, the power animating Smout Allen's architectural machines, is perhaps an analogy for the imagination, the force that moves the human mind.

6.15 PENELOPE HARALAMBIDOU

My project *Déjà vu,* 2009–13 is a 'drawn' analysis of Alain Resnais's enigmatic film *Last Year at Marienbad*, 1961, based on a screenplay by Alain Robbe-Grillet.[33] The film takes place in a labyrinthine baroque hotel, where X, the male protagonist, meets A and confronts her with descriptions of their romantic involvement the year before, of which she has no recollection. A riddle of seduction, the narrative flips between present and past, memory and imagination and has been described as a love story, abstract thriller or philosophical puzzle.

Déjà vu consists of an abstract model of the Baroque hotel where the film's narrative takes place,

and a digital reworking of selected scenes specifically designed to be projected on the model, thus 'redrawing' the film in space (fig. 6.44). The three-dimensional model, made out of carefully drawing, cutting and folding paper, breaks the flatness of the single screen. Its simplicity reflects the elliptical Modernist narrative of Alain Robbe-Grillet's screenplay in contrast to the ornate setting. (fig. 6.45). Placed on a table, the model dressed with the luminous imagery of the film allows the viewer to circulate around and behind it and occupy this expansion of the picture plane at an intimate level (fig. 6.46).

Like Duchamp's *Large Glass* and *Given*, *Déjà vu* (re)constructs the architecture of a love affair. The ornate building becomes another protagonist and the design critically interrogates how the elliptical narrative links architecture to memory, imagination and desire.

Notes

1 Webb does not see a connection between his and Duchamp's work.

2 Gould and Roland Shearer, 'Drawing the Maxim from the Minim'.

3 Niceron, *Thaumaturgus opticus* and *La Perspective curieuse*.

4 See Chapter 4.

5 Duboy, *Lequeu: An Architectural Enigma*.

6 See Chapter 1, Section 1.1 'Introducing Marcel Duchamp' and Kiesler, 'Design-Correlation'.

7 Safran, *Frederick Kiesler*.

8 Kiesler, 'Les Larves d'imagie'.

9 For more on Kiesler's *Vision Machine* and his Design-Correlation Laboratory at Columbia University see Phillips, 'Toward a Research Practice'.

10 Naumann, 'Aesthetic Anarchy', 60.

11 See Welsh, Max *Stirner's Dialectical Egoism*. The original title in German is *Der Einzige und sein Eigenthum*, which can also be translated as *The Individual and His Property*. The work was first translated in French as *L'unique et sa propriété*, 1899, and the first translation in English was by the American individualist anarchist, Steven T. Byington with an introduction by James L. Walker in 1907.

12 In his call for liberation of gender prototypes Stirner's thought has invited interest from certain feminist thinkers, especially Dora Marsden, who nevertheless, and perhaps as a consequence of Stirner's influence, later came to denounce feminism.

13 James J. Martin mentions James Huneker's comment in his introduction to the 1963 publication of *The Ego and His Own*. Martin, 'Editor's Introduction', vii.

14 See Lyotard, *les TRANSformateurs DUchamp*, later translated as *Duchamp's Transformers*, 1990.

15 Hudek, 'From Over- to Sub-Exposure'.

16 See Bernard Tschumi Architects website: http://www.tschumi.com/projects/19/# [assessed 23 March 2013].

17 See Chapter 3, Section 3.7 'Given ...'.

18 Hays, *Architecture's Desire*, 144.

19 Koolhaas, *Delirious New York*.

20 See Diller Scofidio + Renfro website: http://www.dsrny.com/ [assessed 23 March 2013].

21 Webb, *Temple Island*.

22 Webb has kindly reworked the original *Temple Island* drawing in figure 6.28 specifically for this book.

23 Nicholson, *Appliance House*, 12.

24 Nicholson, *Appliance House*, 23.

25 Nicholson started studying Duchamp in 1976, even before he met Libeskind, who was a big advocate of the artist. Nicholson's interest continued and he moved to Philadelphia to be near the *Large Glass* where he was able to closely inspect Duchamp's notes and he set out to 'put them in order'. Additionally, during his second year at the Architectural Association, Nicholson wrote an essay on Duchamp, which is now lost.

26 For a hilarious description of Nicholson's journey to Paris to see Lequeu's drawings see Jourden, 'Ben Nicholson's Faith Based Initiative'.

27 Duchamp, 'The Creative Act'.

28 Hill, *Actions of Architecture*, 130–31.

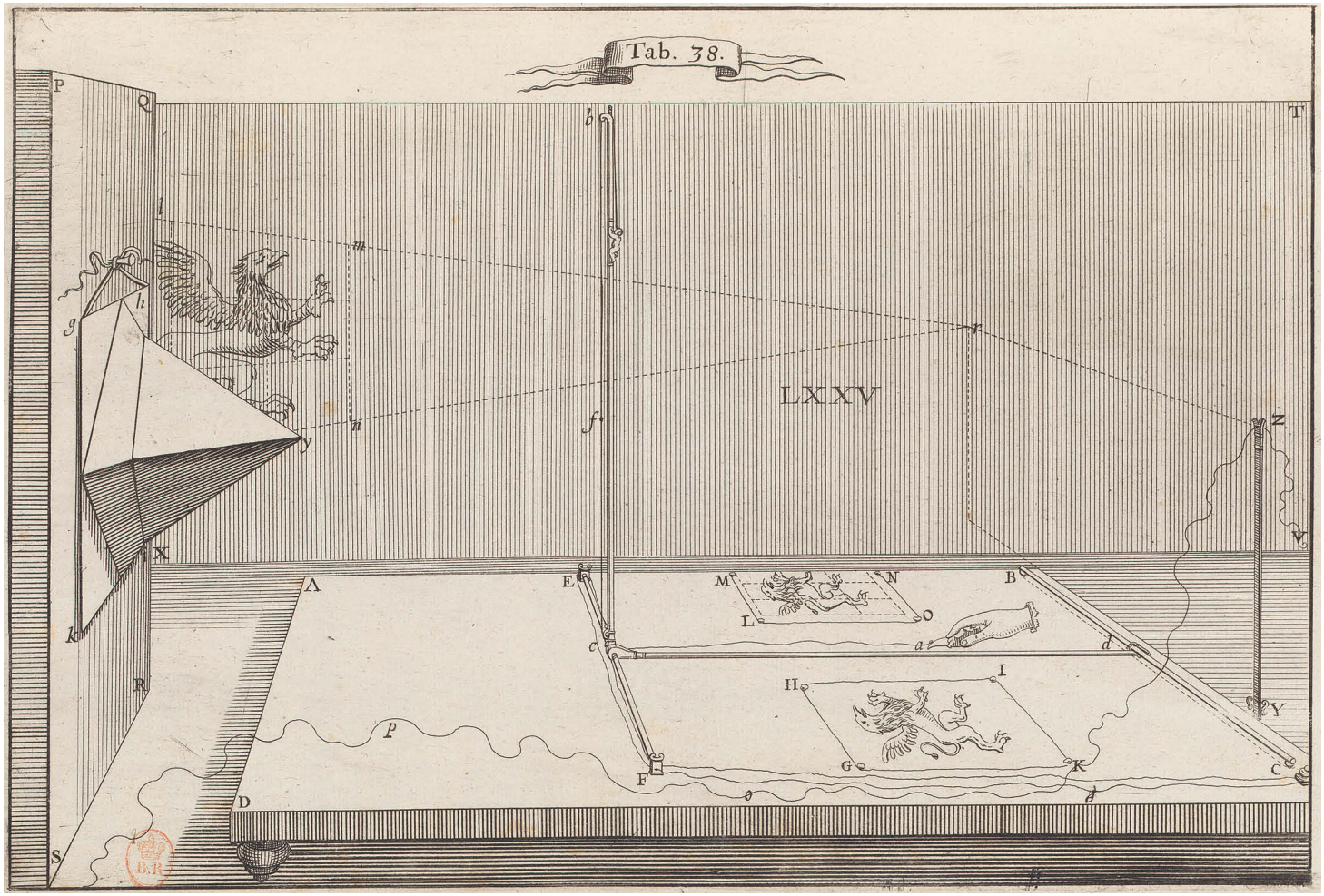
29 Hill identifies in the 'montage of gaps' an underlying structure governing the design of his book.

30 Chard, *Drawing Indeterminate Architecture*.

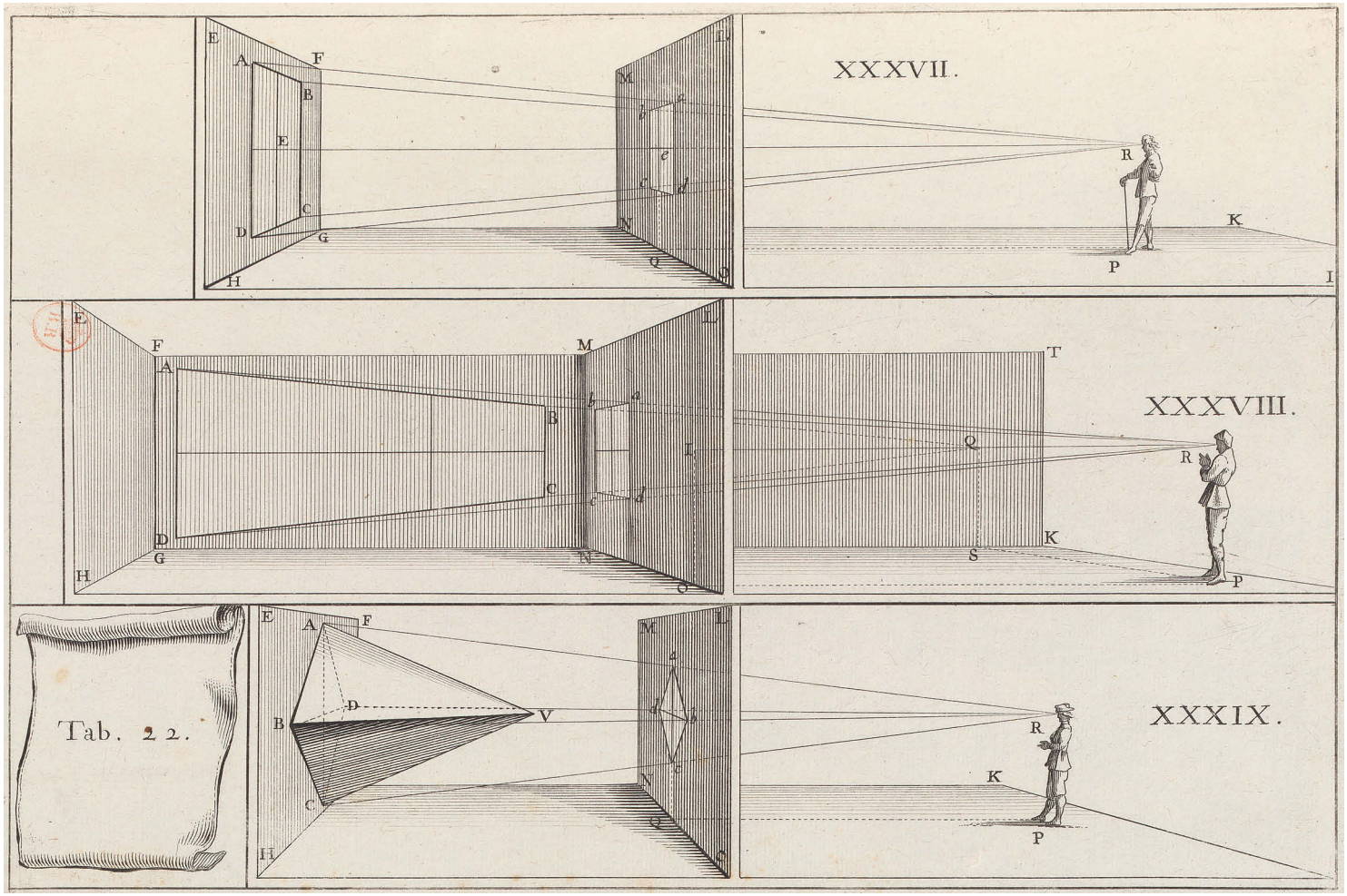
31 Watson, *Utopian Architecture*.

32 Smout Allen, 'Drawing'. For more on their work, see Smout Allen, *Augmented Landscapes*.

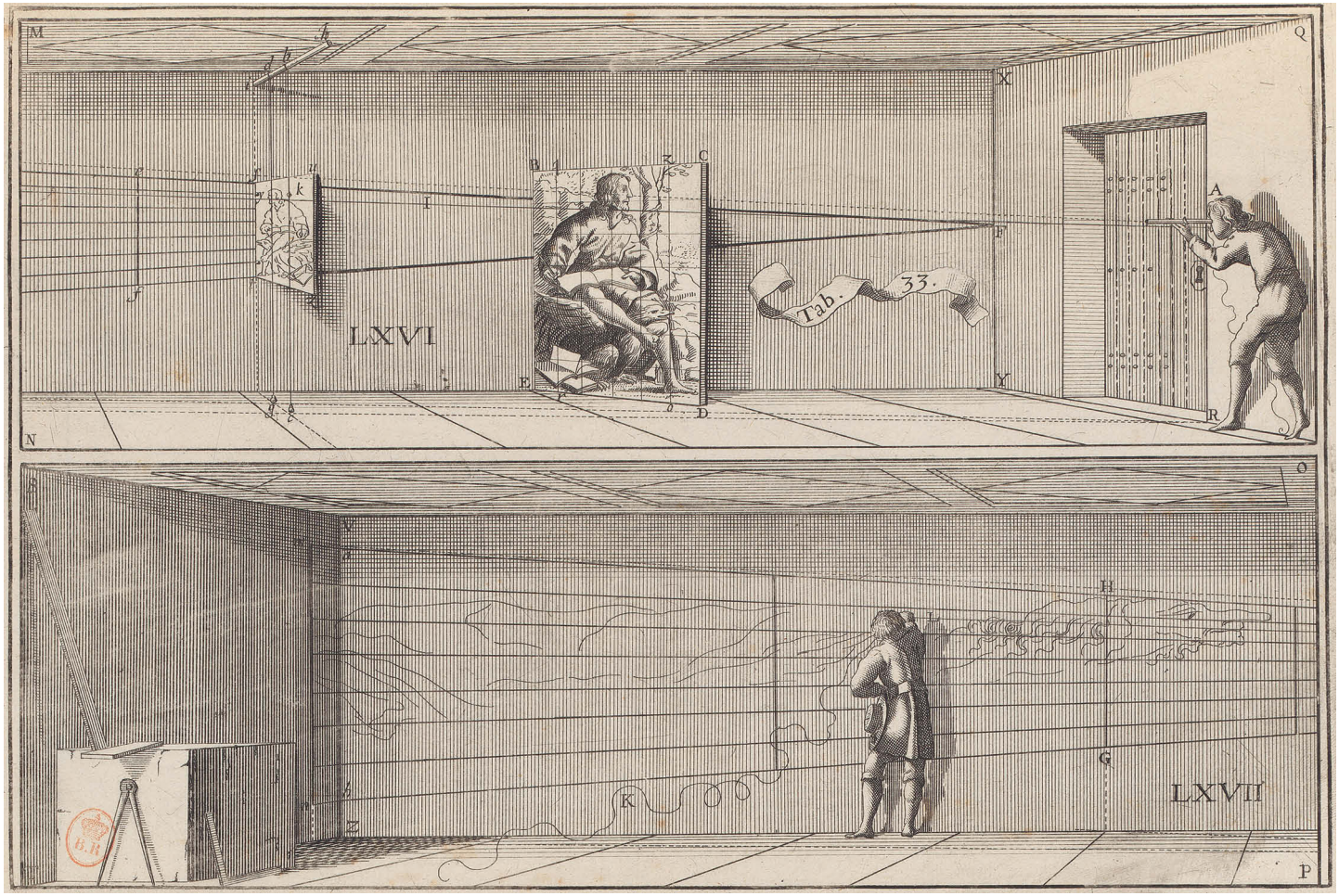
33 Haralambidou, 'The Act of Looking and Déjà vu'.



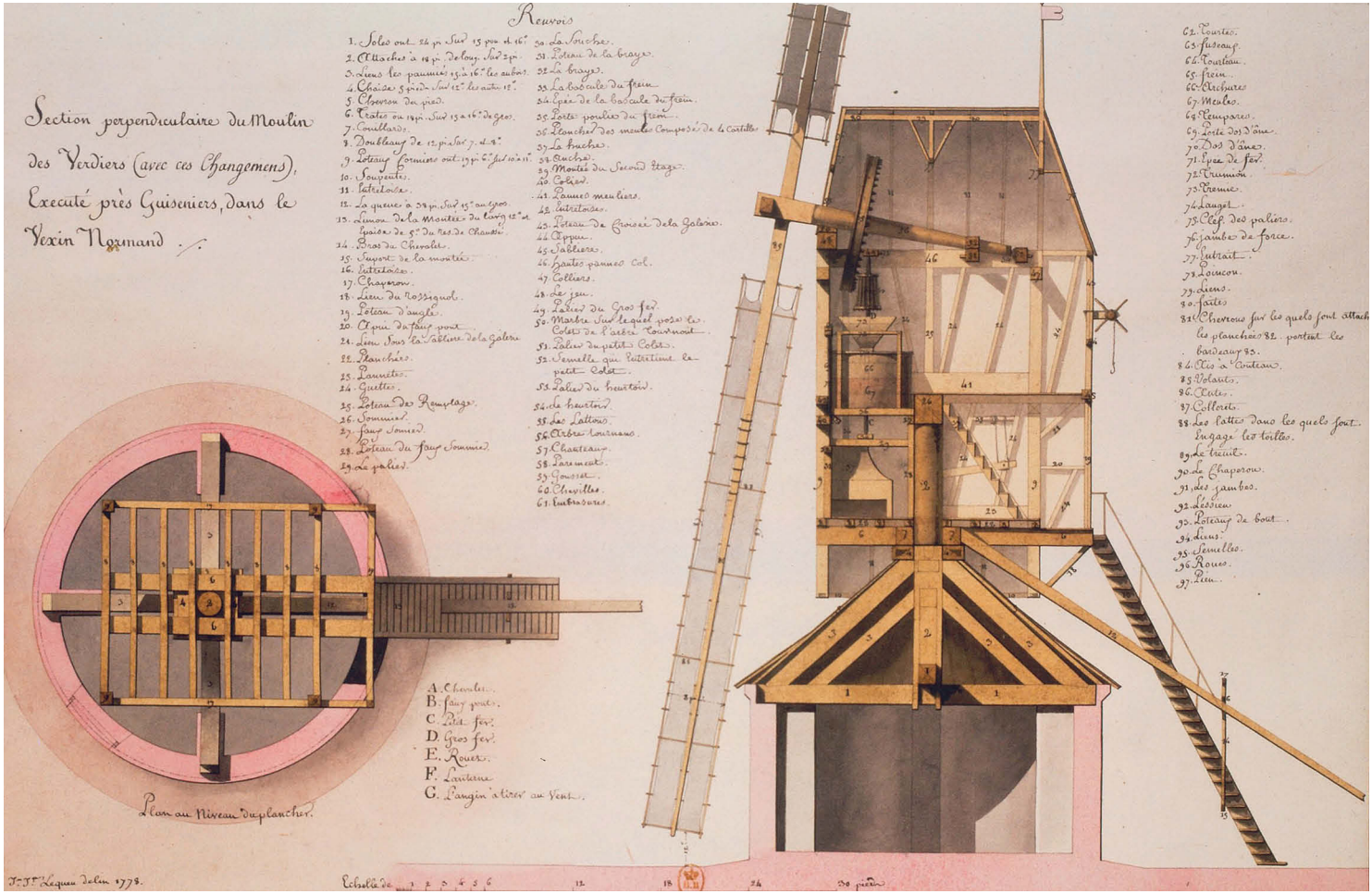
6.1 Jean-François Niceron, plate 38, *La perspective curieuse, La perspective curieuse du R.P. Niceron, avec L'optique et la catoptrique du R.P. Mersenne*, Paris, 1652. Bibliothèque nationale de France.



6.2 Jean-François Niceron, plate 22, *La perspective curieuse, La perspective curieuse du R.P. Niceron, avec L'optique et la catoptrique du R.P. Mersenne*, Paris, 1652. Bibliothèque nationale de France.



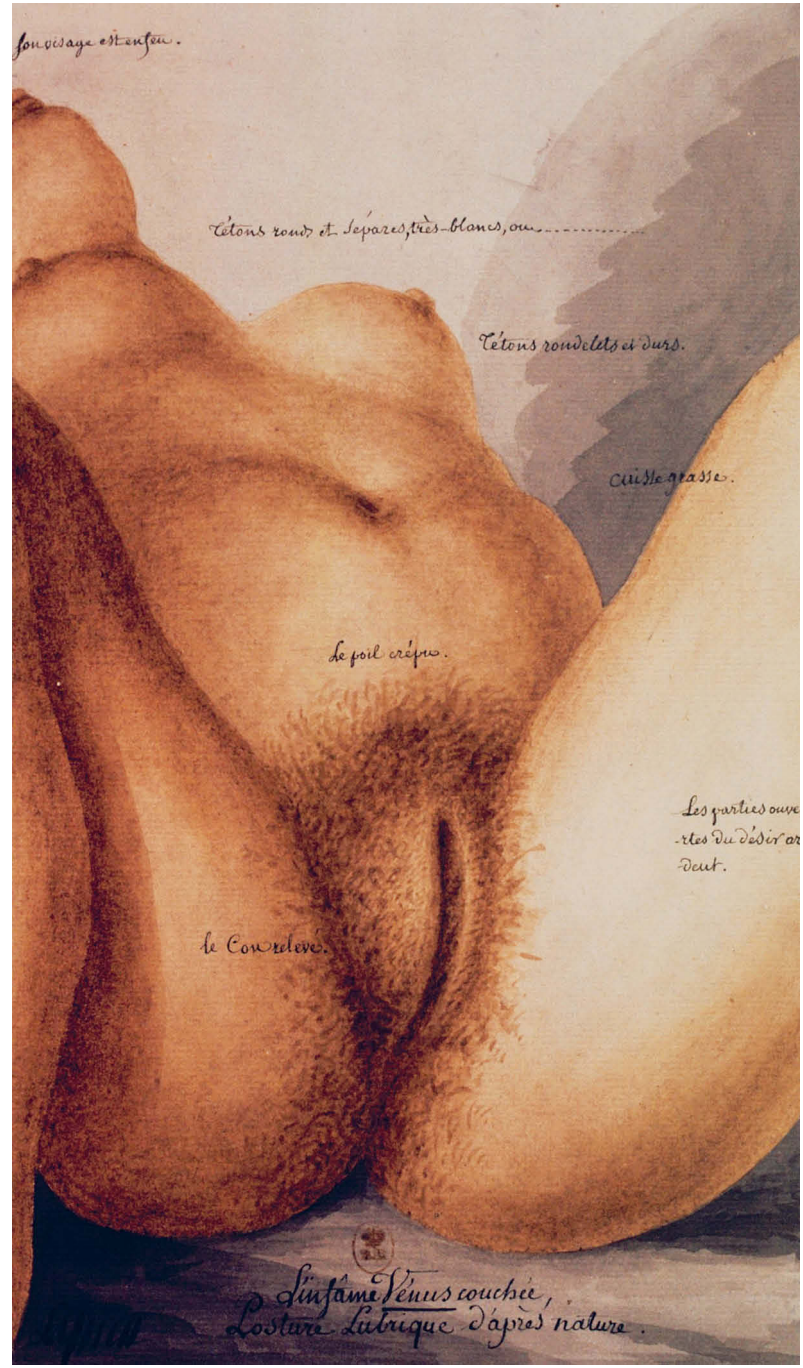
6.3 Jean-François Niceron, plate 33, *La perspective curieuse, La perspective curieuse du R.P. Niceron, avec L'optique et la catoptrique du R.P. Mersenne*, Paris, 1652. Bibliothèque nationale de France.



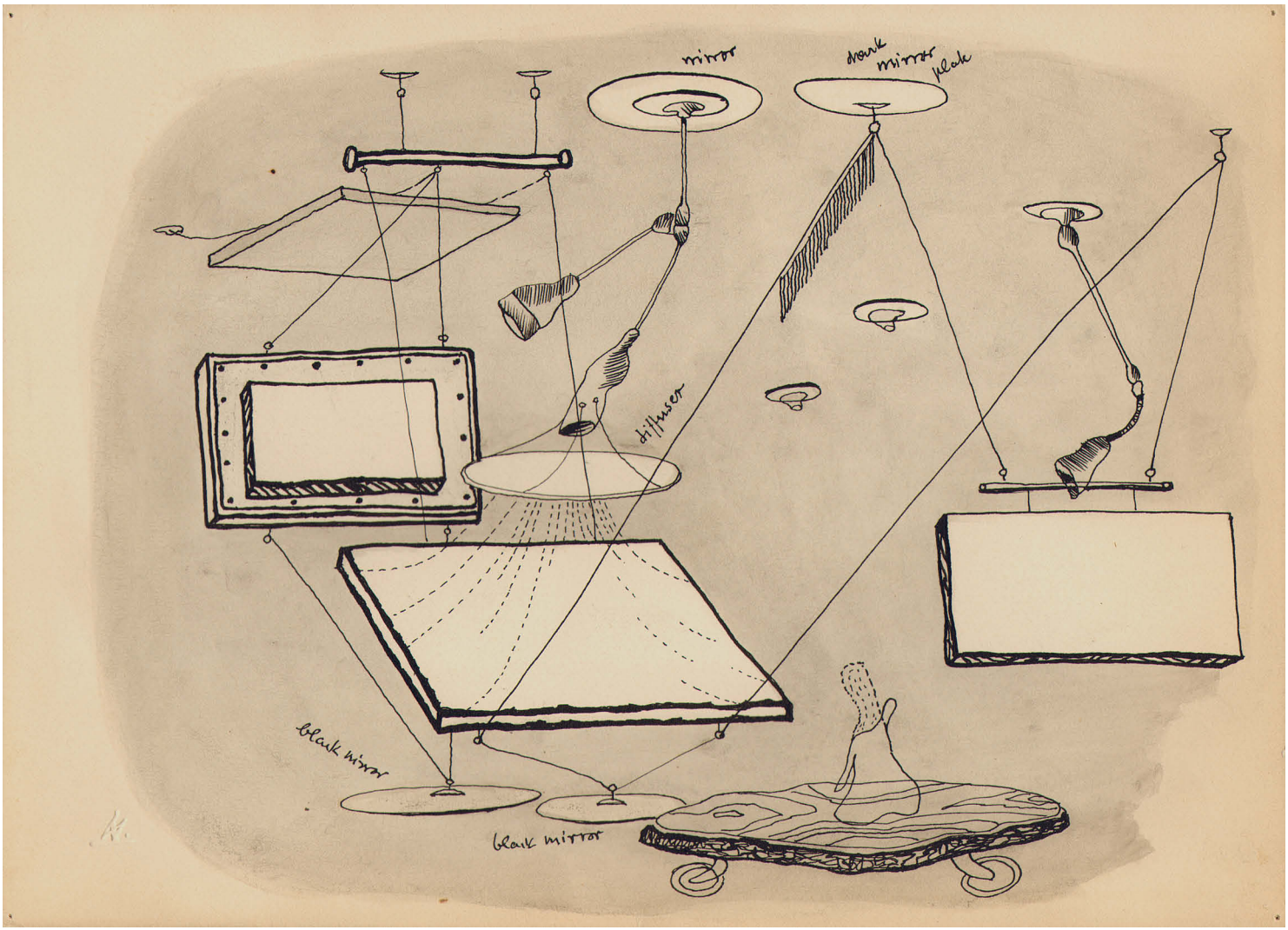
6.4 Jean-Jacques Lequeu, section of the Verdiers mill (with alterations), executed near Guiseniers, Vexin Normand; with plan at floor level, 1778. Bibliothèque nationale de France.



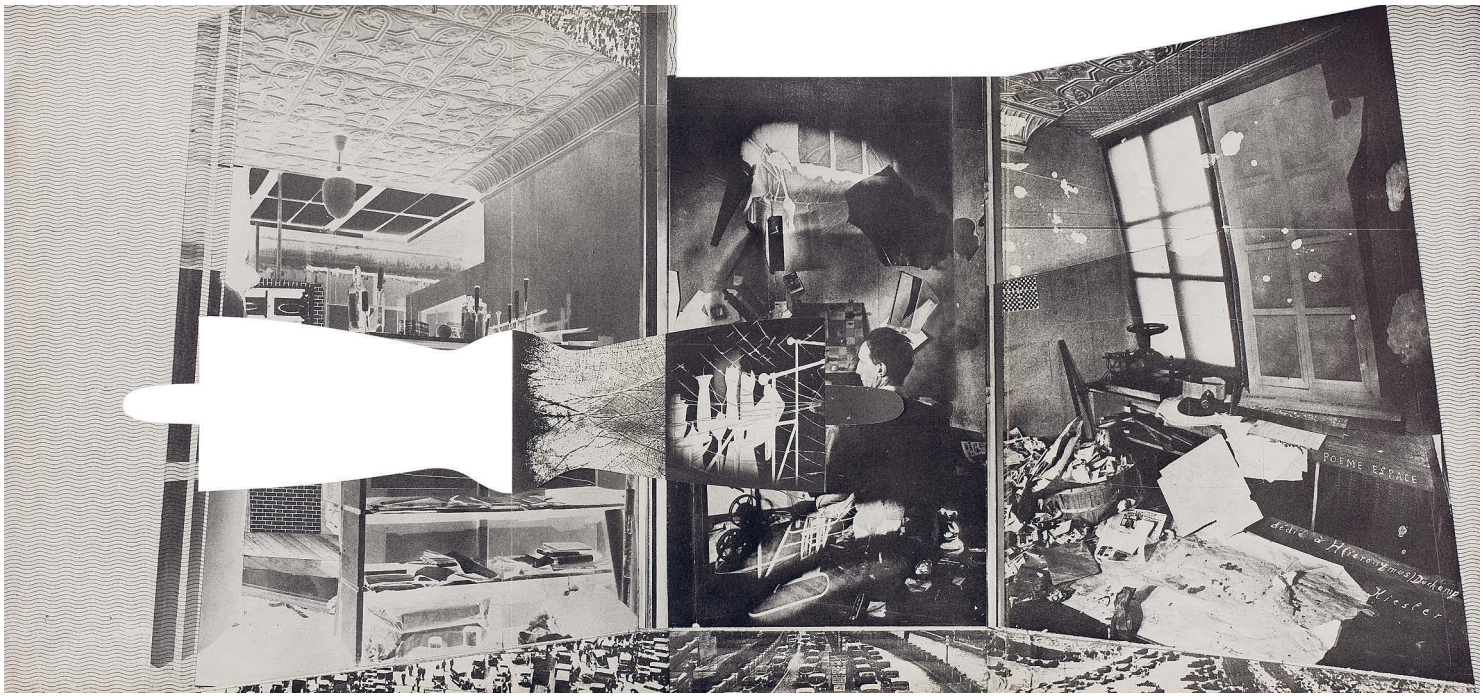
6.5 Jean-Jacques Lequeu, *Ad naturam imago Rothomagae*, 1773. Bibliothèque nationale de France.



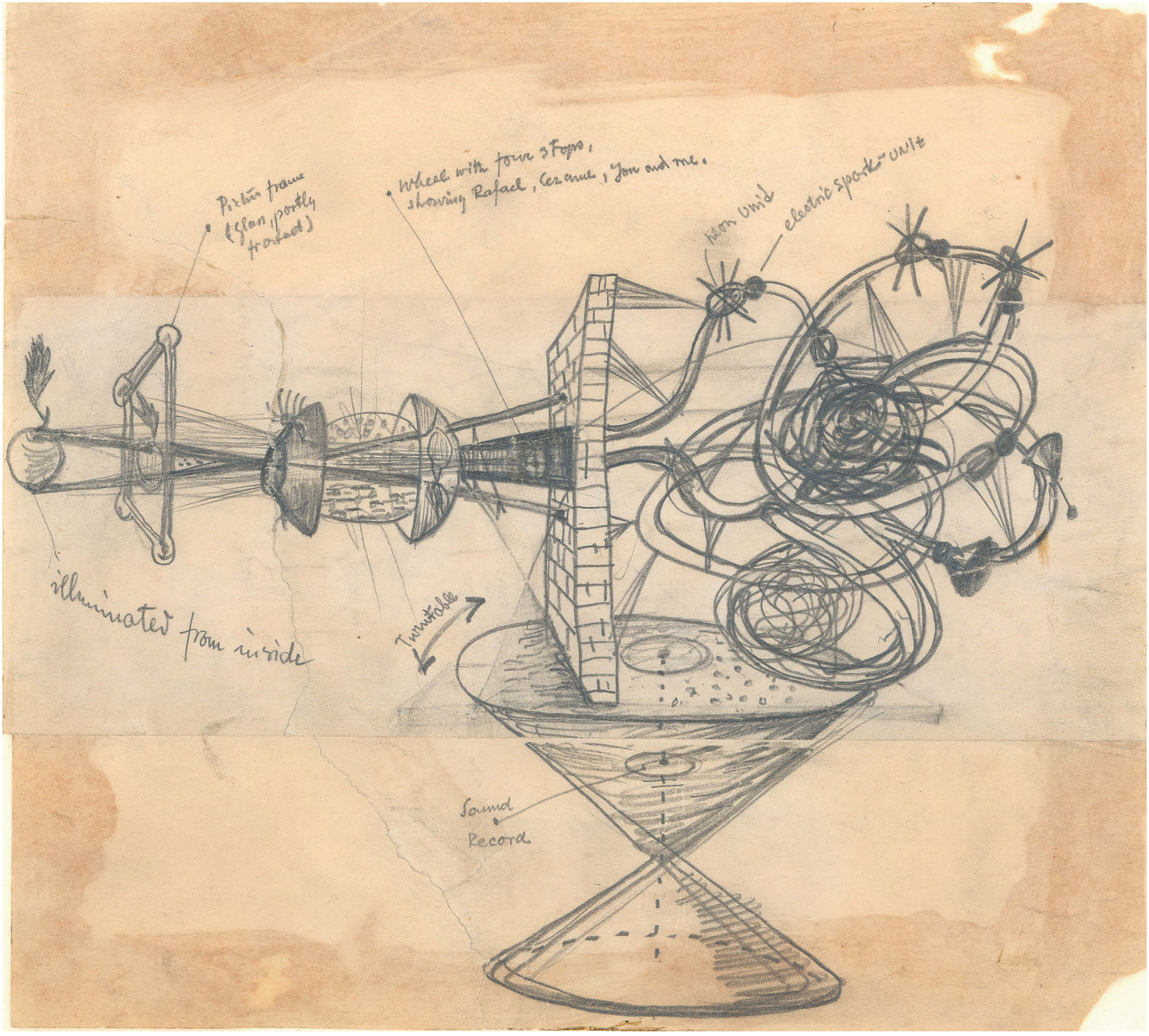
6.6 Jean-Jacques Lequeu, *L'infame Vénus couchée. Posture lubriques d'après nature (The infamous lying Venus. Lewd posture from nature)*, 1779–95. Bibliothèque nationale de France.



6.7 Frederick Kiesler, conceptual drawing for Lighting System, Art of This Century, India ink on paper, New York, 1945. © 2012 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.



6.8 Frederick Kiesler, front of triptych 'Les Larves d'Imagie d'Henri Robert Marcel Duchamp', published in *View*, Marcel Duchamp issue, Series V, no. 1, 1945. © 2012 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.


Perlin frame
(glass partly
frosted)
Wheel with four stops,
showing Rafael, Cezanne, Jon and me.
Neon Unit
electric spark unit
illuminated from inside
Turntable
Sound
Record



6.9 Frederick Kiesler, conceptual drawing for *Vision Machine*, pencil on paper, New York, 1938–41. © 2012 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.

6.10 Frederick Kiesler, inside the sculpture Bucephalus, 1964. Photograph by Hans Namuth. © 2012 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.



6.11 Marcel Duchamp: *Three Standard Stoppages (3 Stoppages Etalon)*, 1913–14. Bequest of Katherine S. Dreier. Digital image, The Museum of Modern Art, New York/Scala, Florence. © Succession Marcel Duchamp/ ADAGP, Paris and DACS, London 2013.

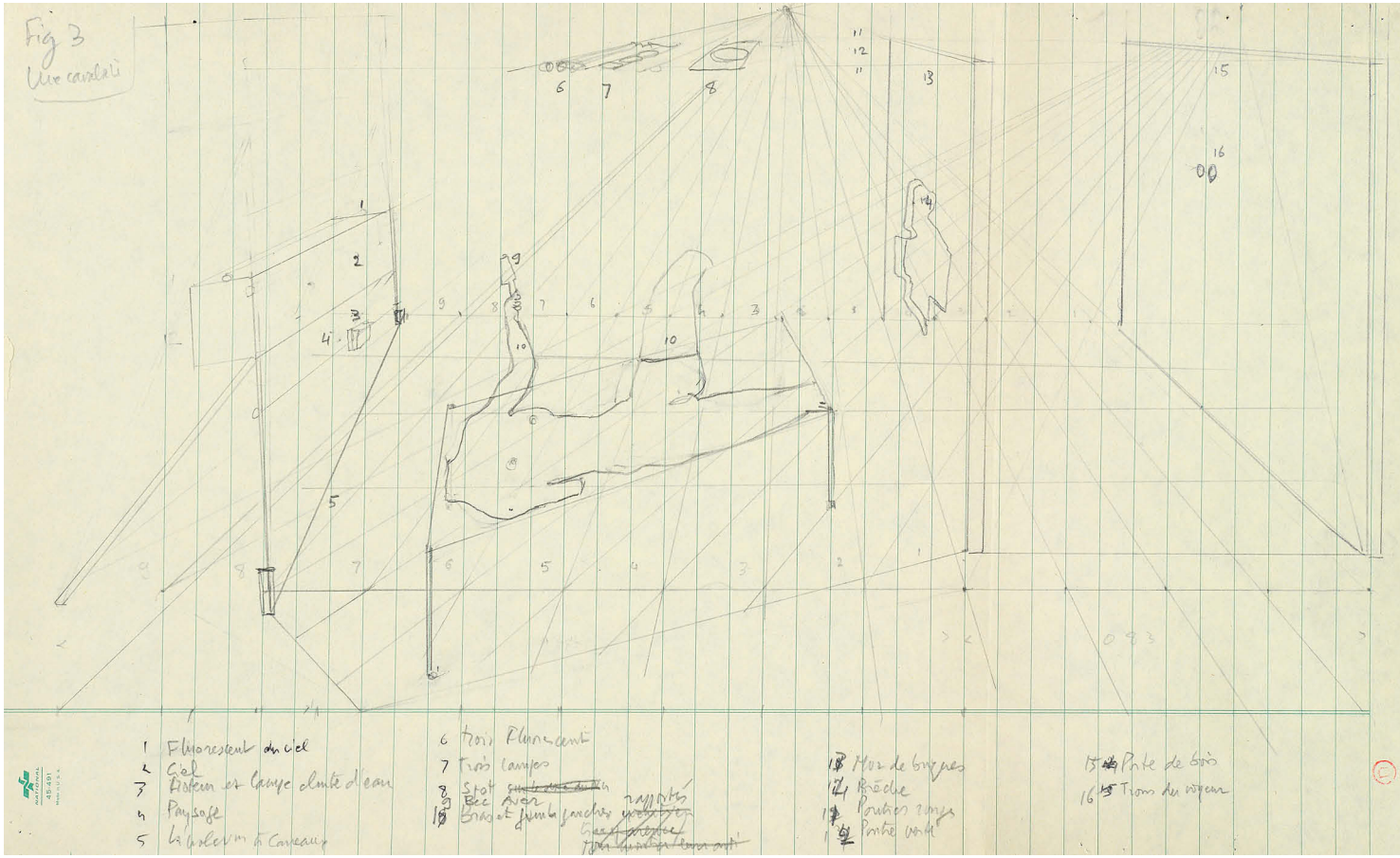


6.12 Marcel Duchamp, *The Bride Stripped Bare by Her Bachelors, Even (The Green Box)*, 1934. Box containing collotype reproductions on various papers. Anonymous gift, 2002. Digital image, Metropolitan Museum of Art, New York/Scala, Florence. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.

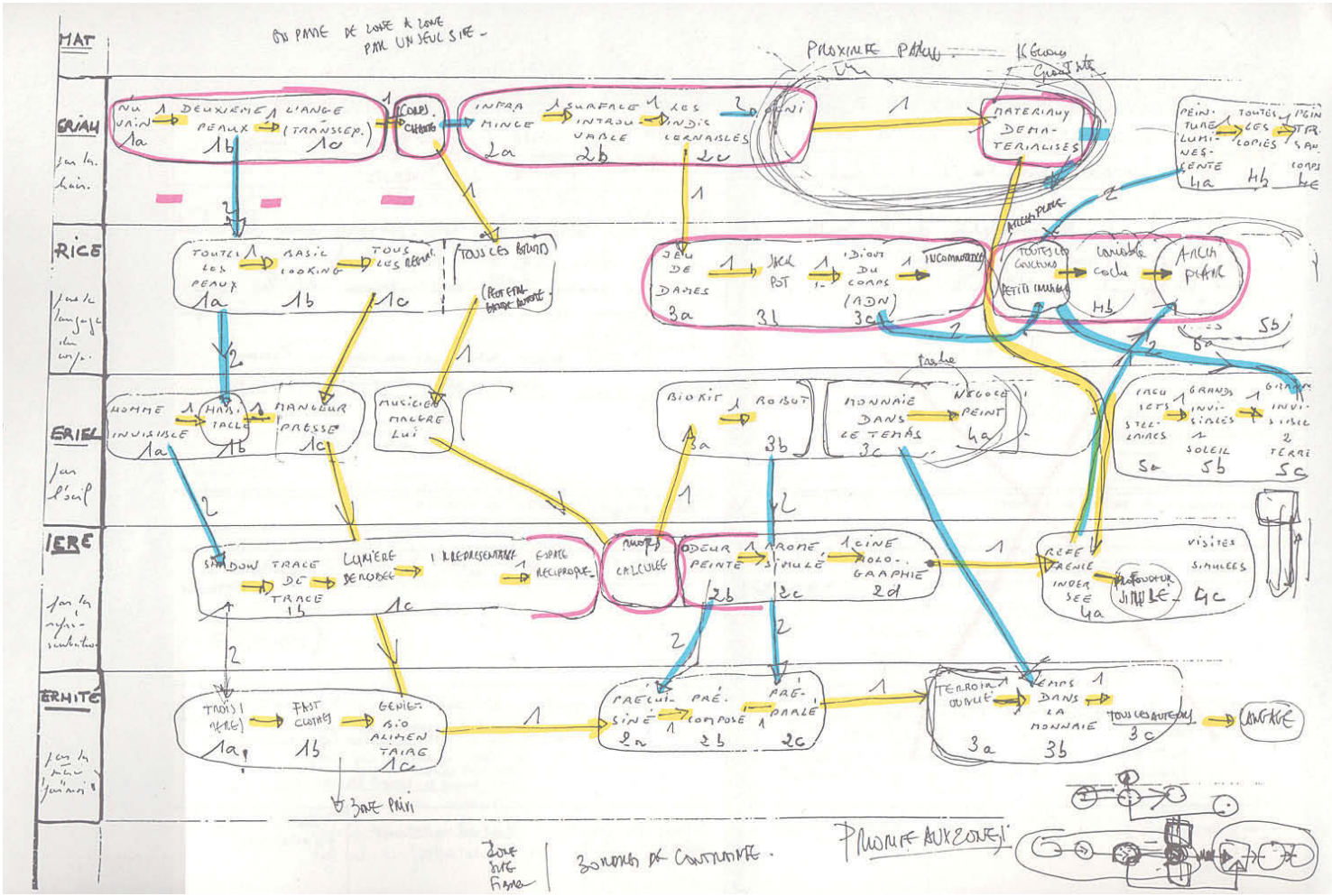

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6.13 Man Ray, *Marcel Duchamp as Rrose Selavy* c. 1920–21. Gelatin silver print signed in black ink, at lower right: lovingly / Rrose Sélavy / alias Marcel Duchamp. The Samuel S. White 3rd and Vera White Collection, 1957. Photograph The Philadelphia Museum of Art/ Art Resource/Scala, Florence. © Succession Marcel Duchamp/ADAGP, Paris and DACS, London 2013.



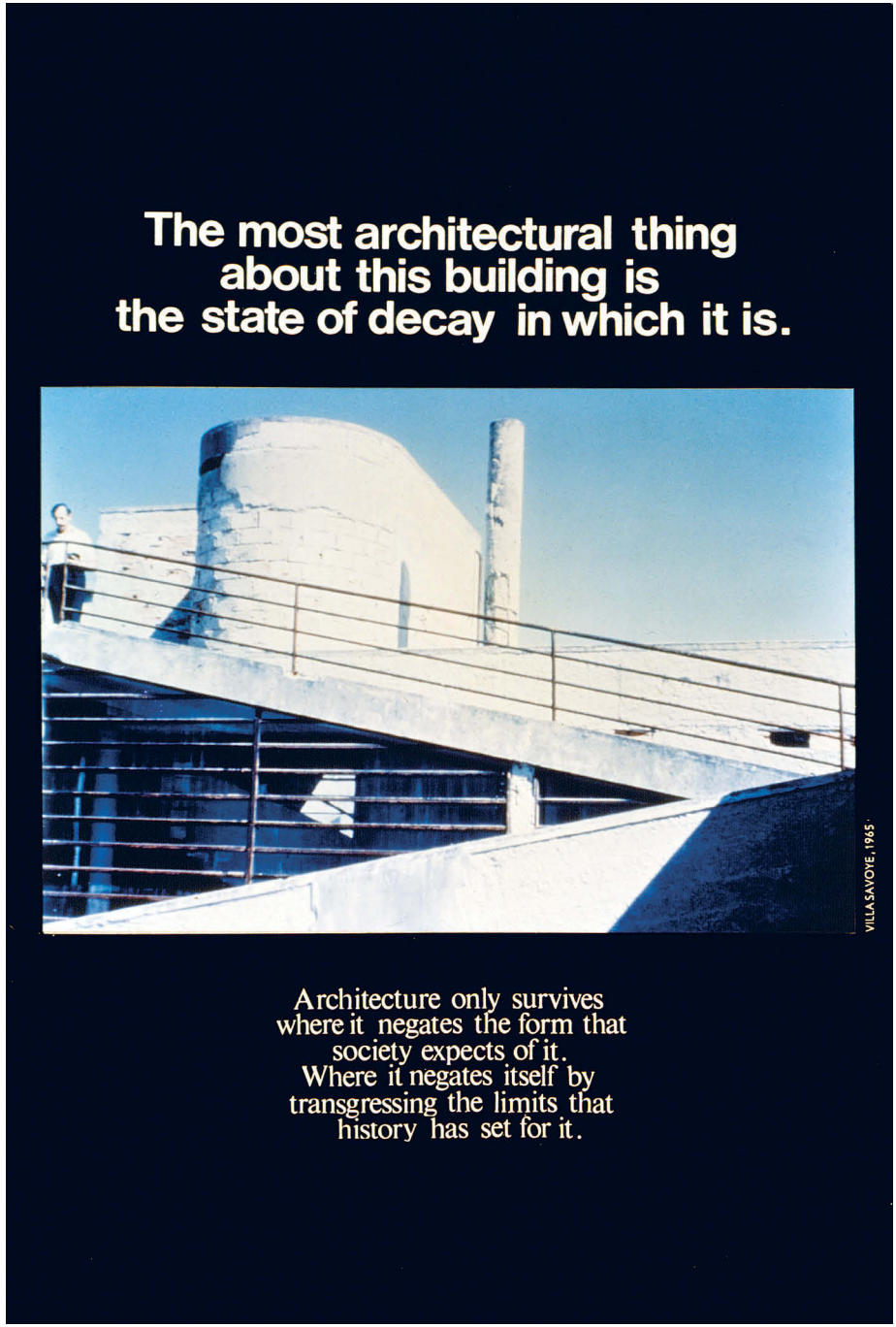
6.14 Jean-François Lyotard, *Vue cavalière d'Étant donnés (Approximate View of Given)*, manuscript page, 1976. © 2013. Bibliothèque Littéraire Jacques Doucet, Paris.



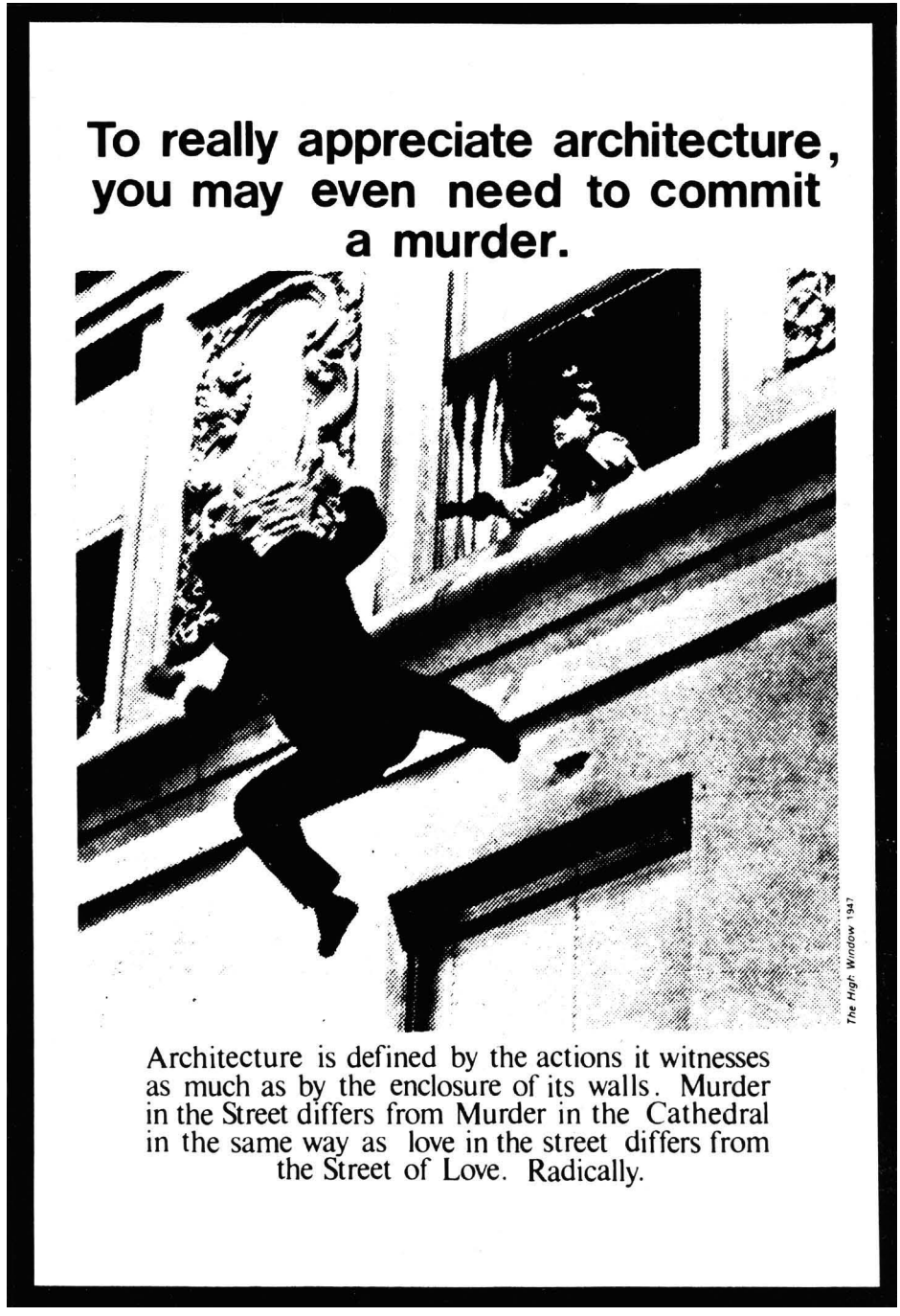
6.15 Jean-François Lyotard, diagram of conceptual and spatial arrangement from 'Les Immatériaux' exhibition catalogue, 1985.



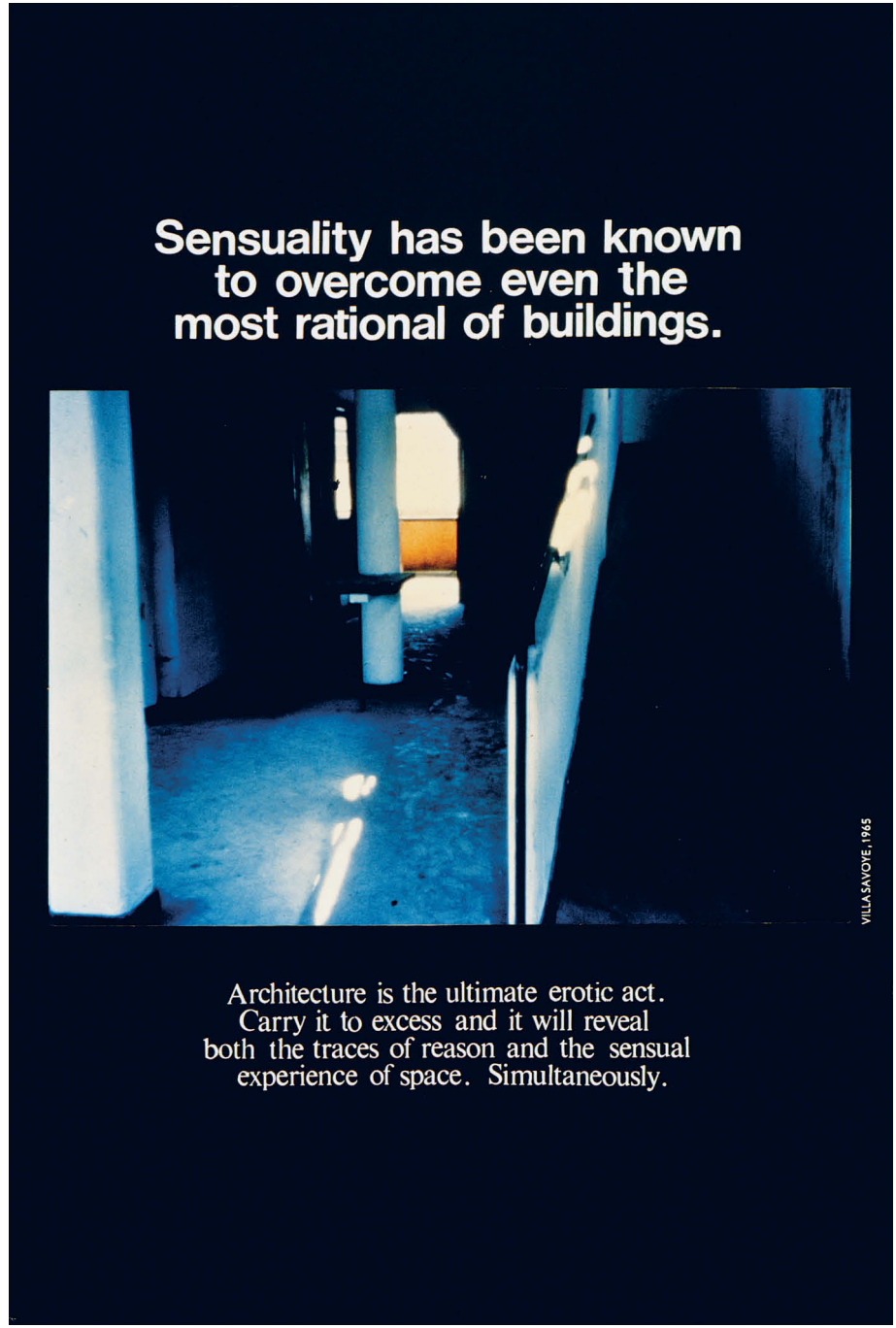
6.16 Jean-François Lyotard, loose pages from 'Les Immatériaux' exhibition catalogue, 1985. Photograph by the author, 2013.



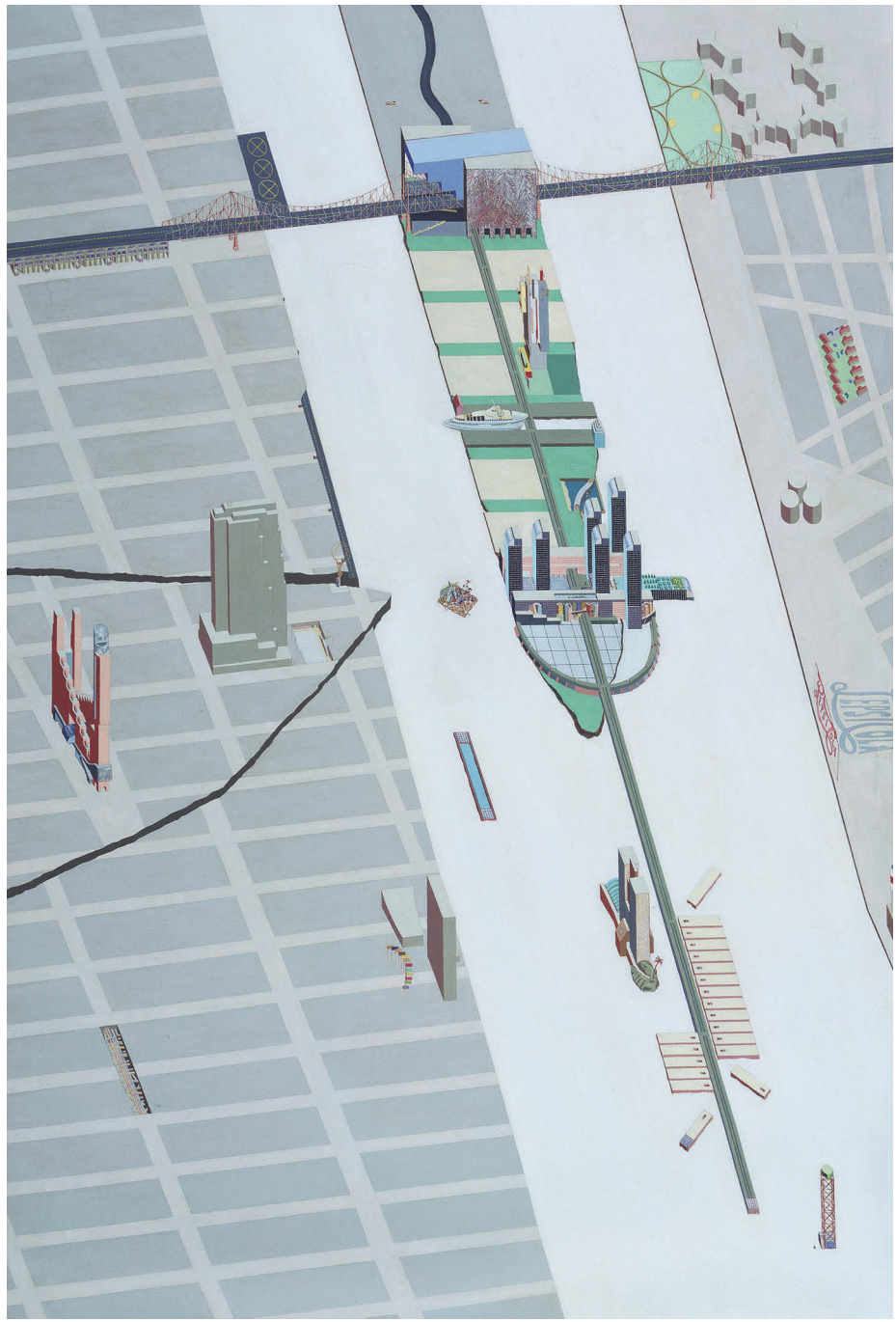
6.17 Bernard Tschumi, *Advertisements for Architecture*, 1976–77. Courtesy of Bernard Tschumi Architects.



6.18 Bernard Tschumi, *Advertisements for Architecture*, 1976–77. Courtesy of Bernard Tschumi Architects.



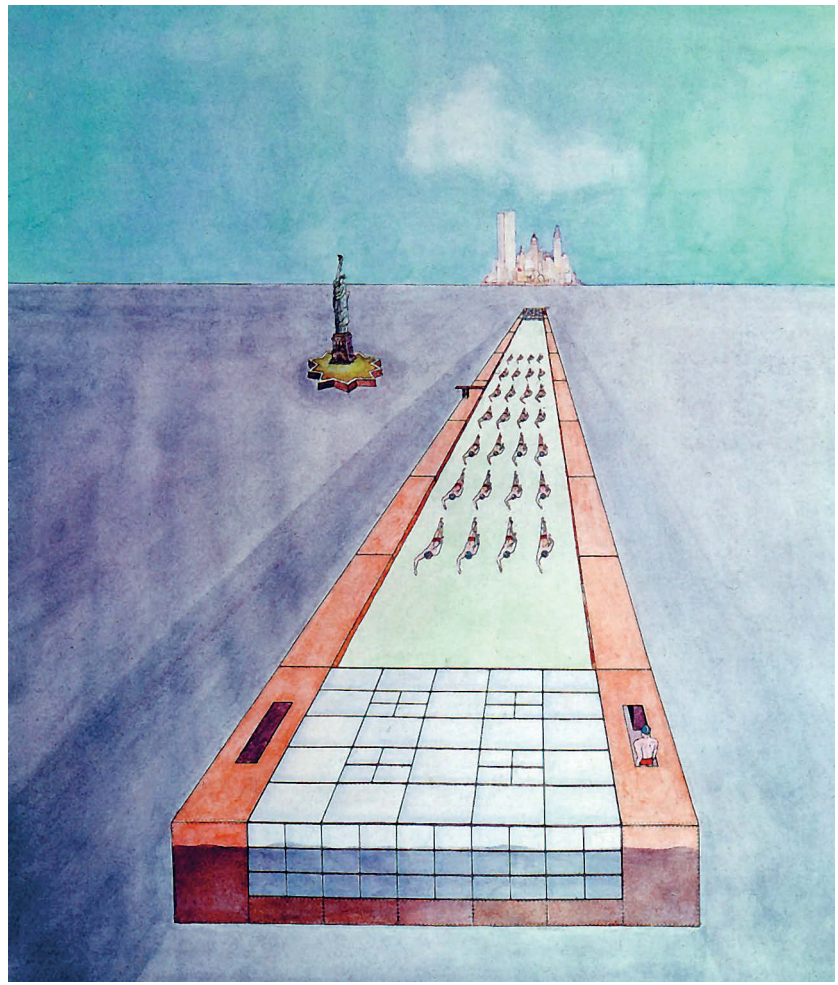
6.19 Bernard Tschumi, *Advertisements for Architecture*, 1976–77. Courtesy of Bernard Tschumi Architects.



6.20 Rem Koolhaas and Zoe Zenghelis, aerial perspective, *New Welfare Island*, Roosevelt Island, New York, 1976. Project by Rem Koolhaas and OMA. Gift of The Howard Gilman Foundation. Digital image, The Museum of Modern Art, New York/Scala, Florence © Rem Koolhaas 2013.



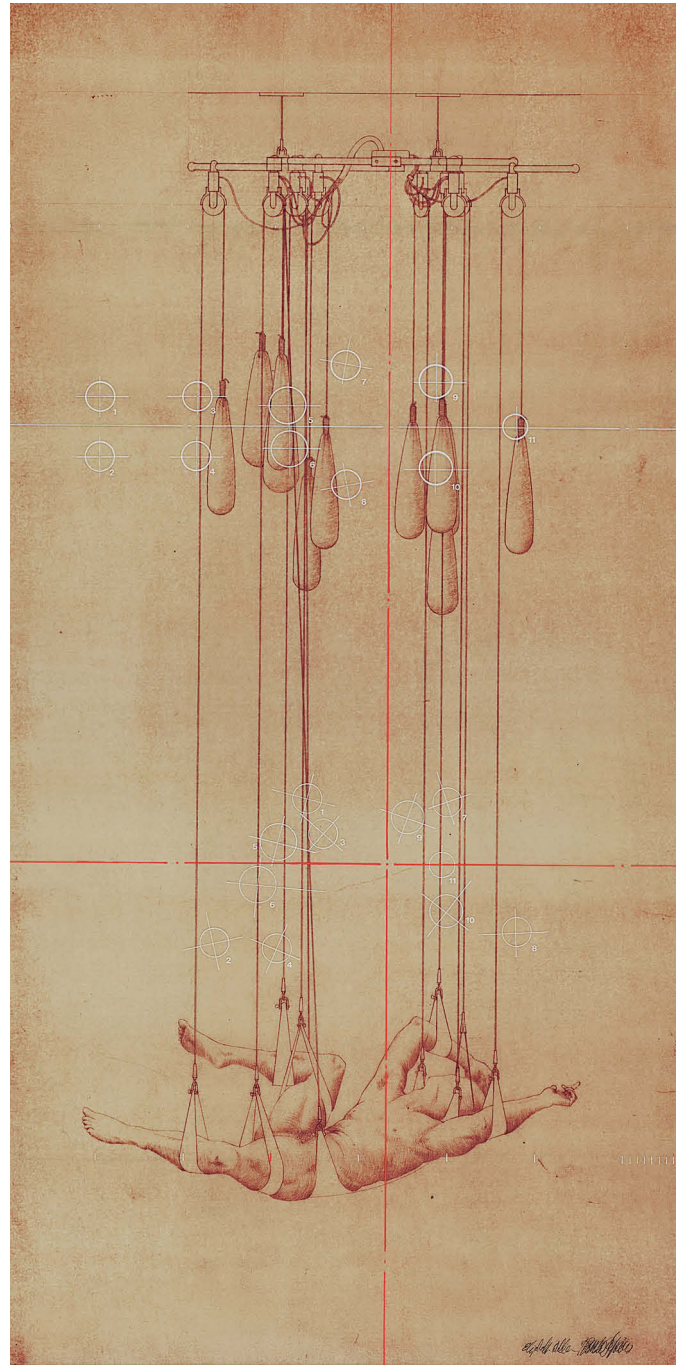
6.21 Rem Koolhaas and OMA, *The Story of The Pool*, 1977. Project by Rem Koolhaas and OMA. Image courtesy of OMA.



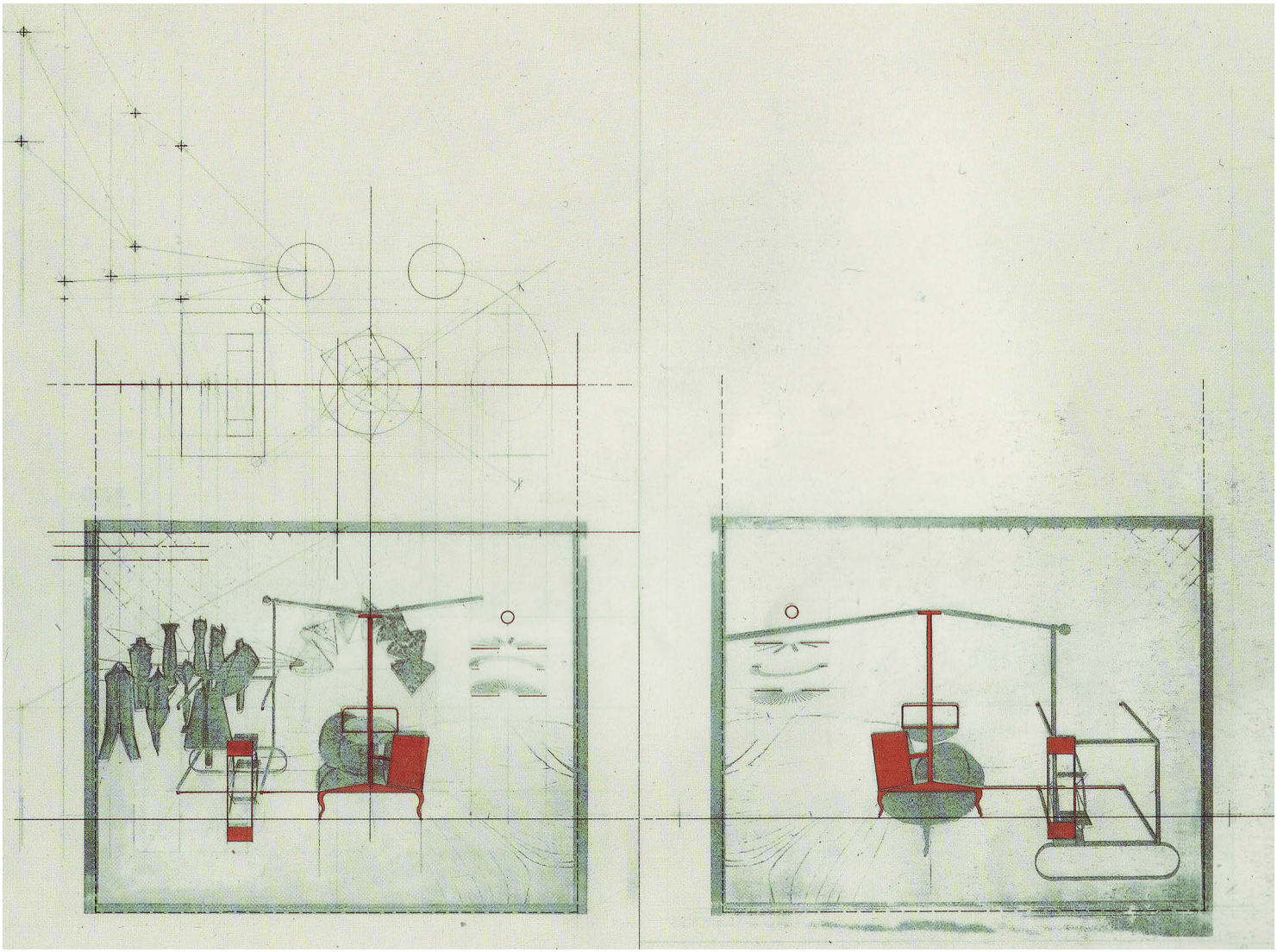
6.22 Madelon Vriesendorp, cutaway axonometric, *Welfare Palace Hotel*, 1975–76. Project by Rem Koolhaas and OMA. © Image courtesy of OMA.



6.23 Diller + Scofidio, view of stage with the four characters: Bride, bachelor, juggler of gravity, oculist witness, *A Delay in Glass*, 1987. Photograph by Michael Moran, 1987. Image courtesy of Diller, Scofidio + Renfro.



6.24 Diller + Scofidio, *Automarionette*, c. 1987. The Art Institute of Chicago. Gift of Celia and David Hilliard in honor of Stanley Tigerman and Eva Maddox. Photograph © The Art Institute of Chicago.



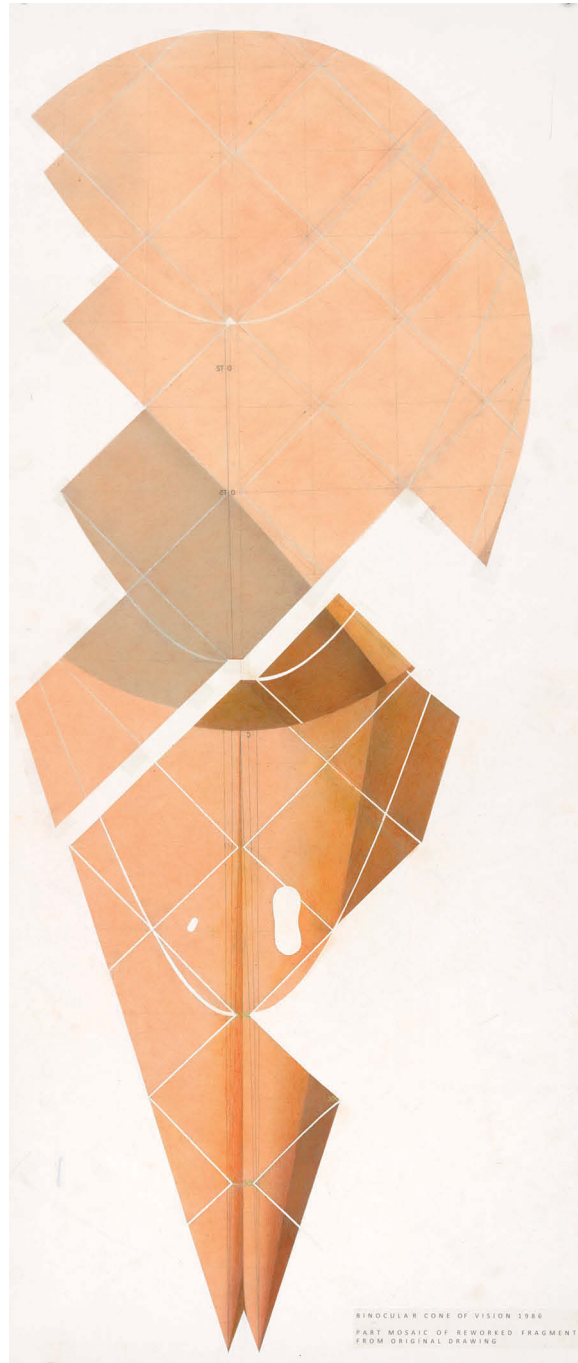
6.25 Diller + Scofidio, analysis of the lower panel, the Bachelor apparatus, *A Delay in Glass*, 1987. Image courtesy of Diller, Scofidio + Renfro.

6.26 Michael Webb, section through cone of vision, circular image, *Temple Island*, 2005. Image courtesy of Michael Webb.

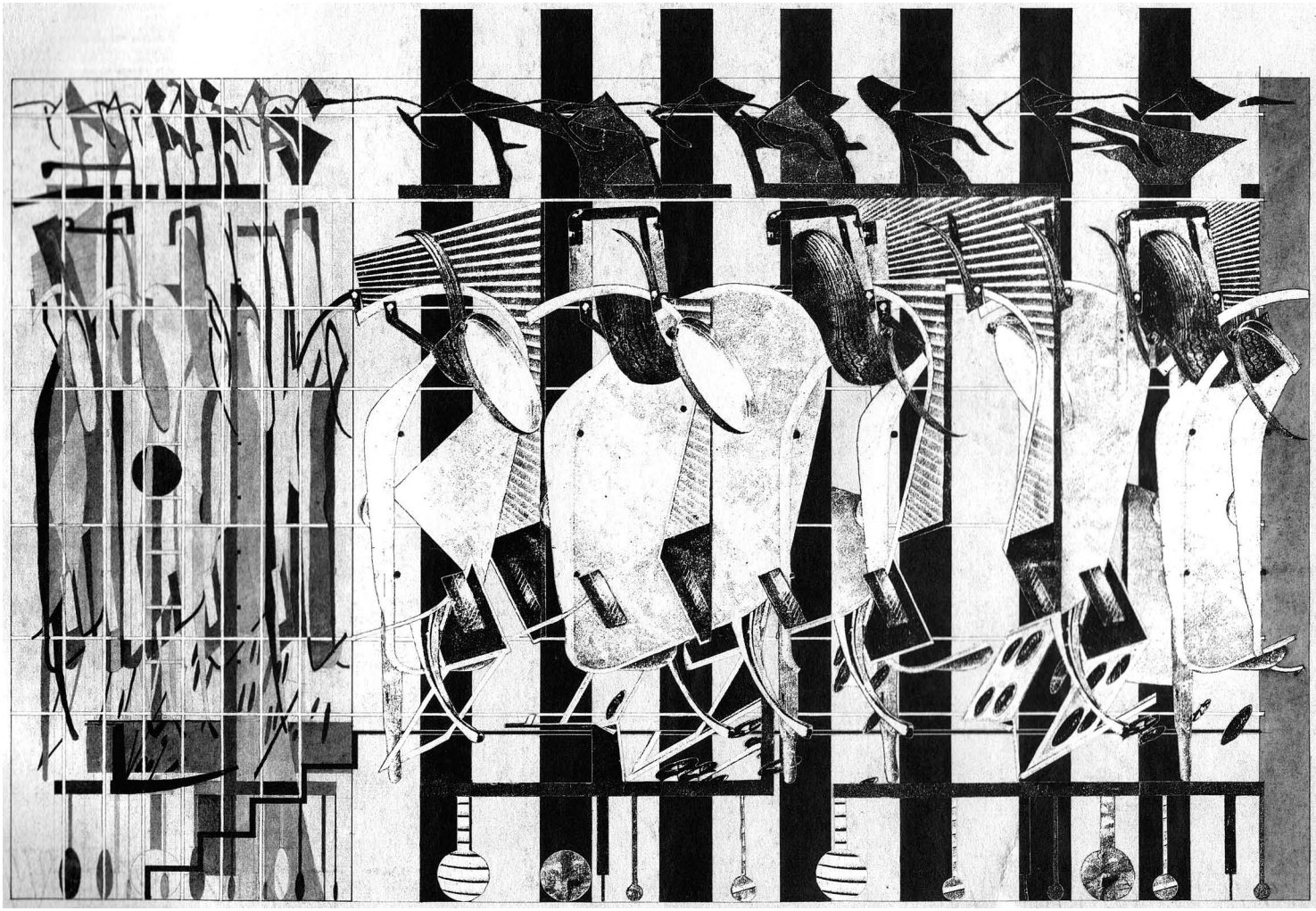
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original line of Jean Pellerin



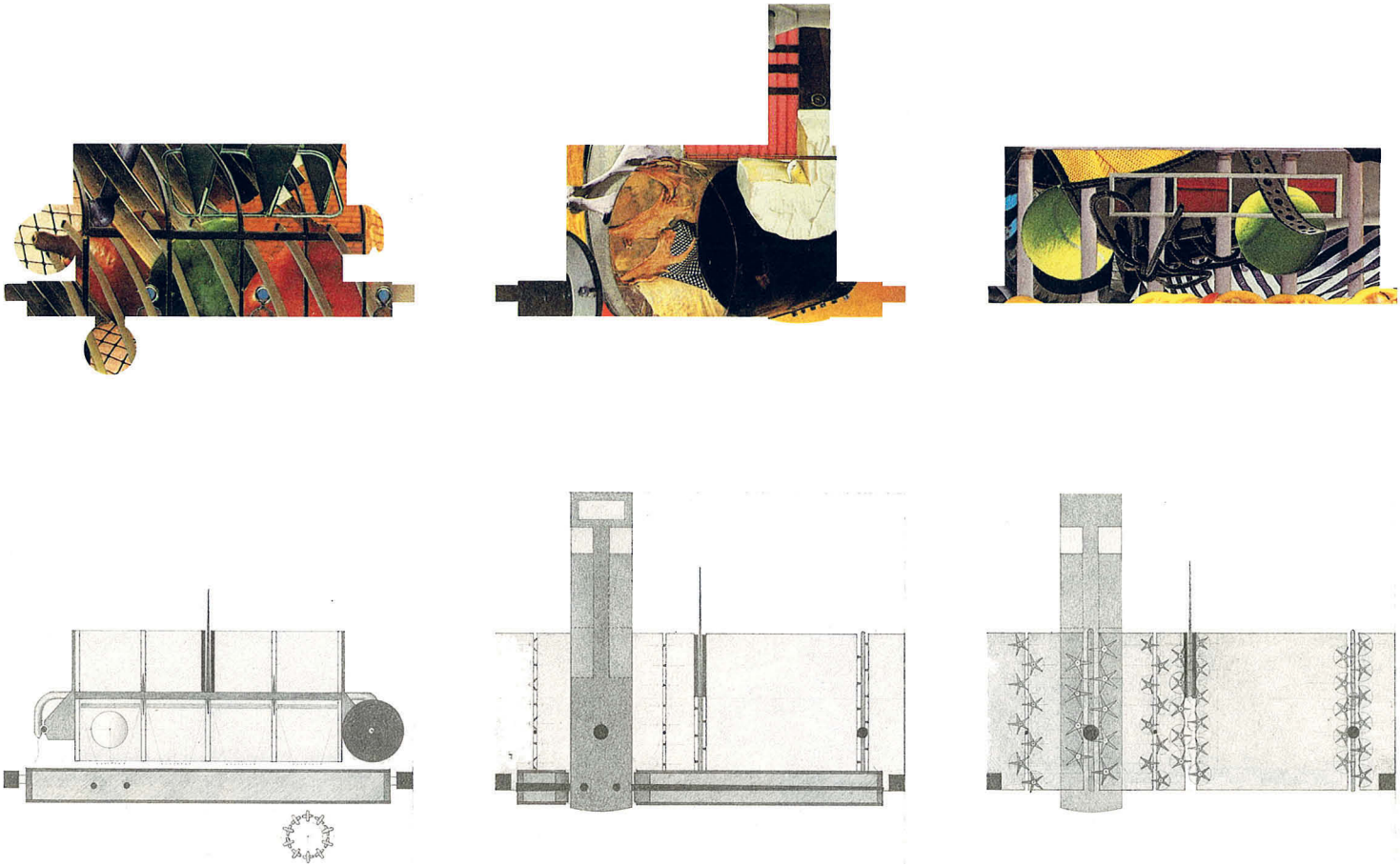
6.27 Michael Webb, mosaic of temple dome with circulating floodlight angle poise arm, *Temple Island*, 1990. Image courtesy of Michael Webb.



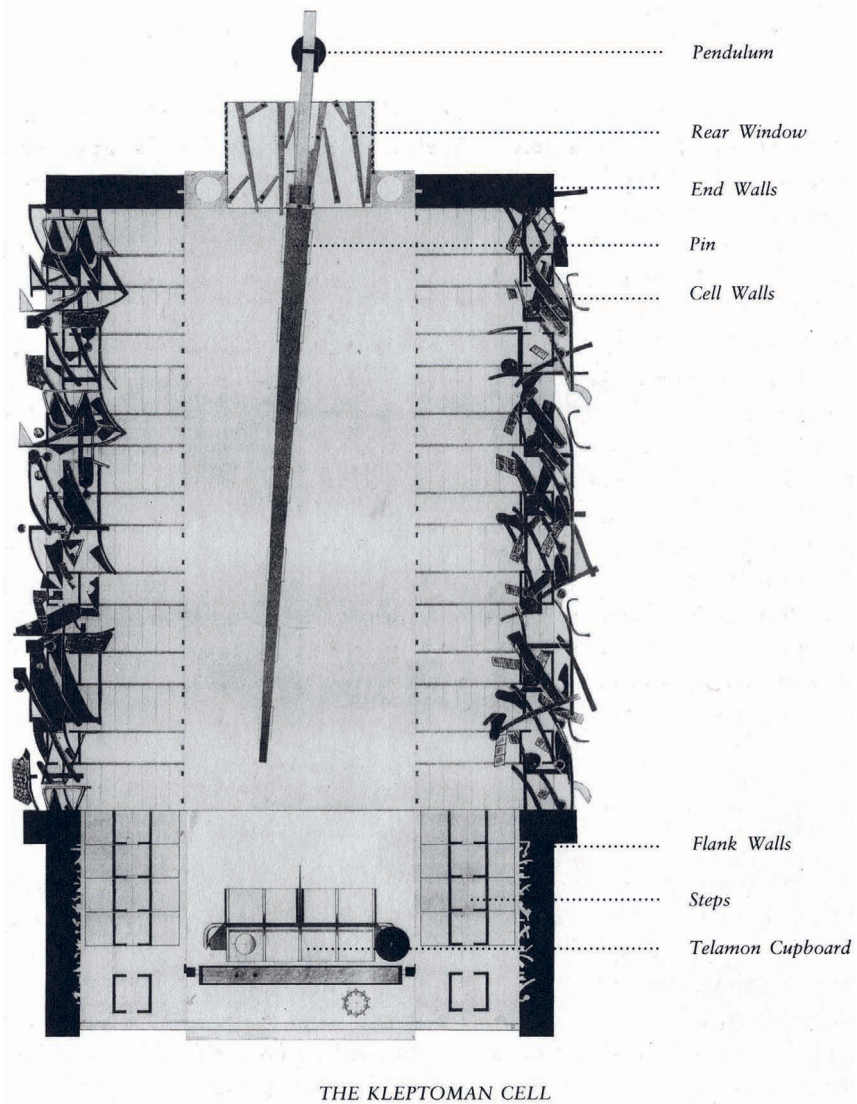
6.28 Michael Webb, binocular cone of vision from the project *Temple Island*, 1986. Part mosaic of reworked fragments from original drawing, 2013. Image courtesy of Michael Webb



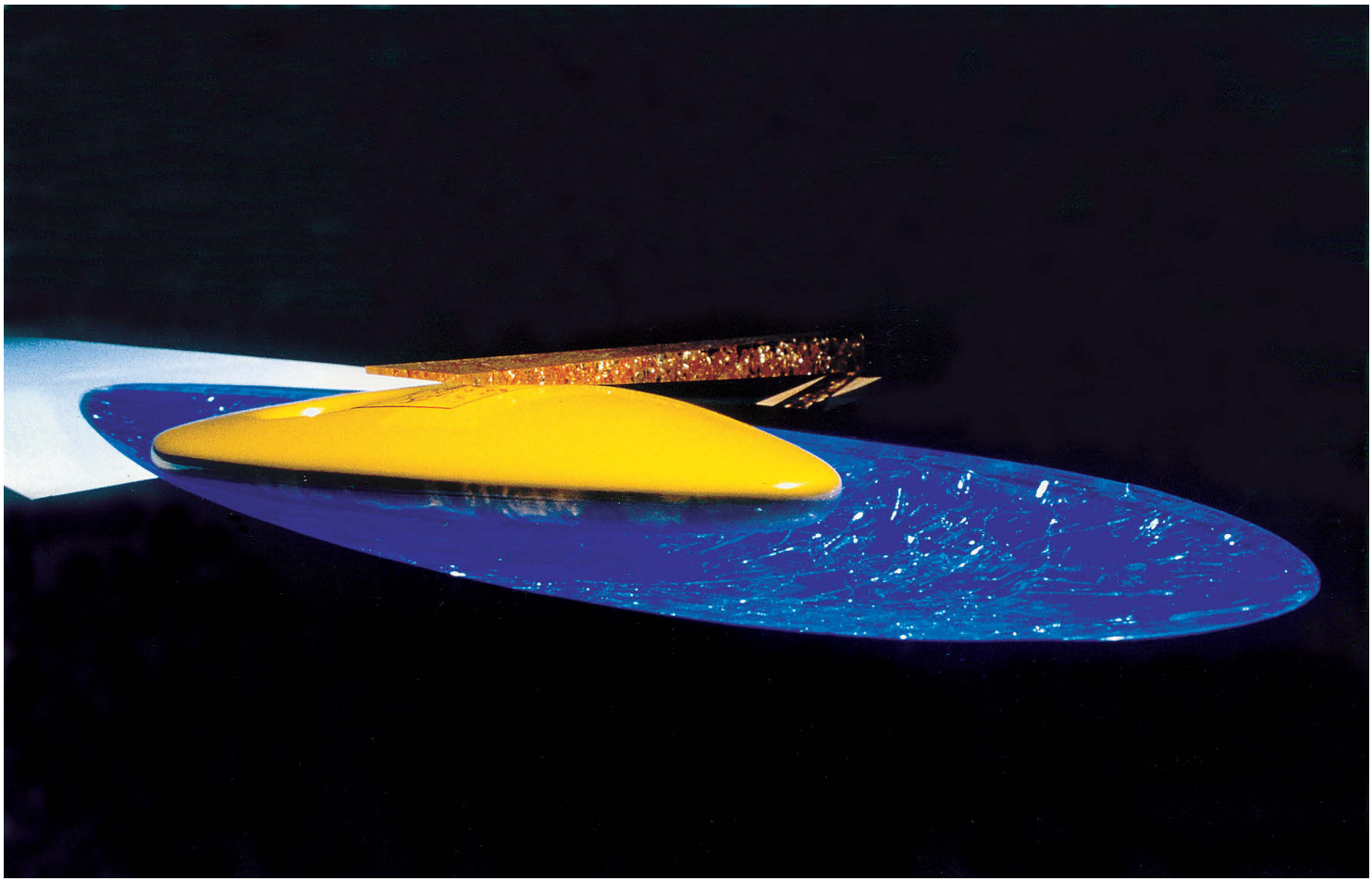
6.29 Ben Nicholson, 'Flank Walls', *Appliance House*, 1990. Image courtesy of Ben Nicholson.



6.30 Ben Nicholson, 'Telamon Cupboard' collages, *Appliance House*. Image courtesy of Ben Nicholson.



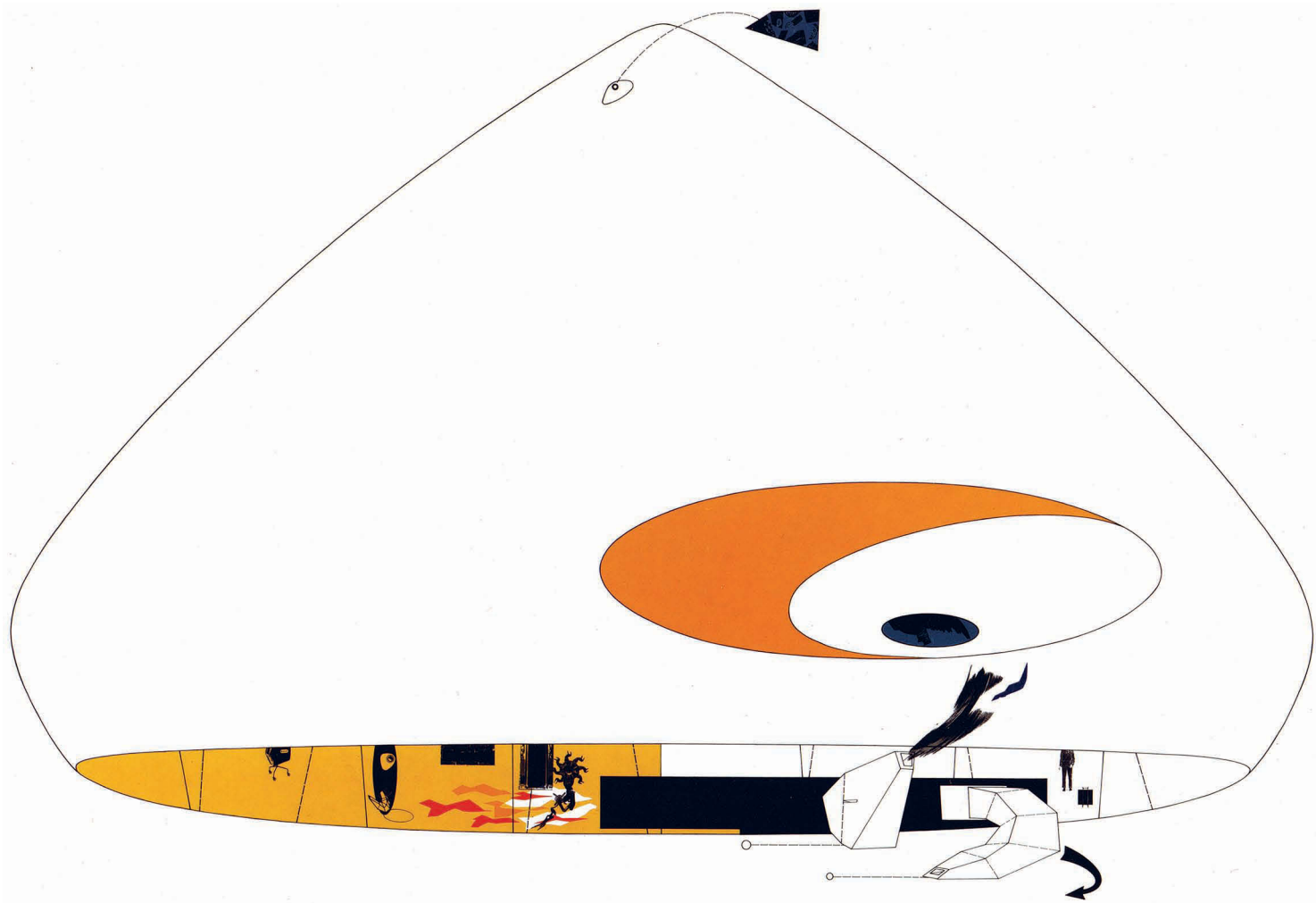
6.31 Ben Nicholson, 'The Kleptoman Cell', *Appliance House*, 1990. Image courtesy of Ben Nicholson.



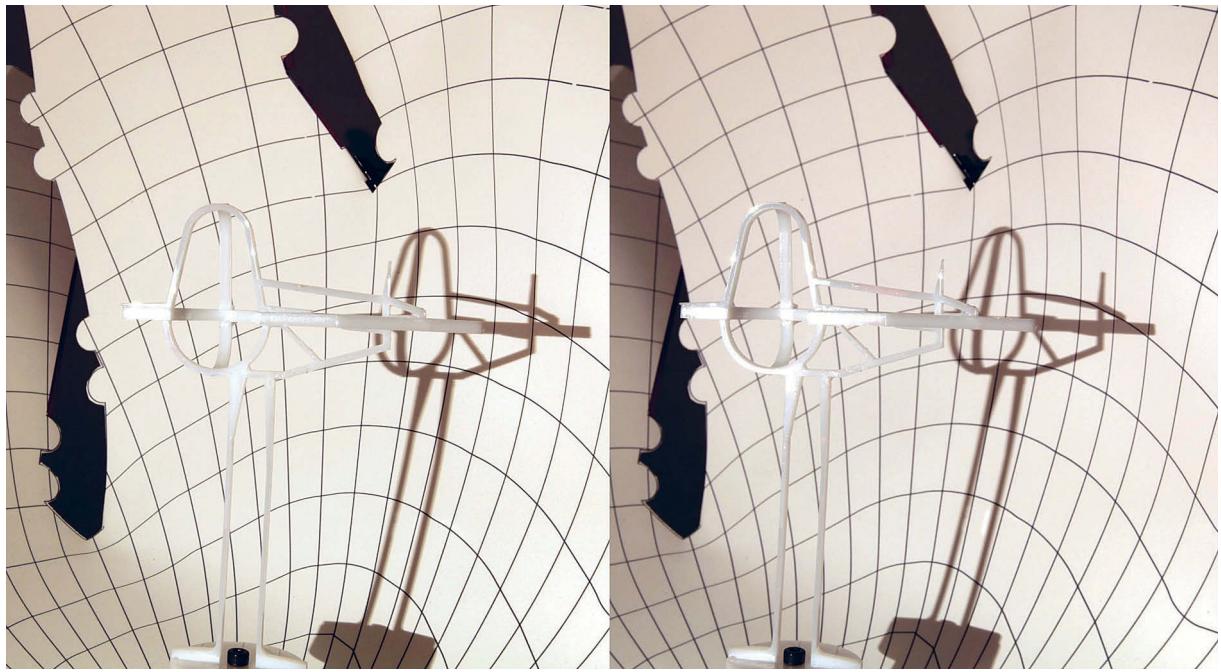
6.32 Jonathan Hill, exterior, *The Institute of Illegal Architects*, 1996. Model Bradley Starkey, Photograph Edward Woodman. Image courtesy of Jonathan Hill.



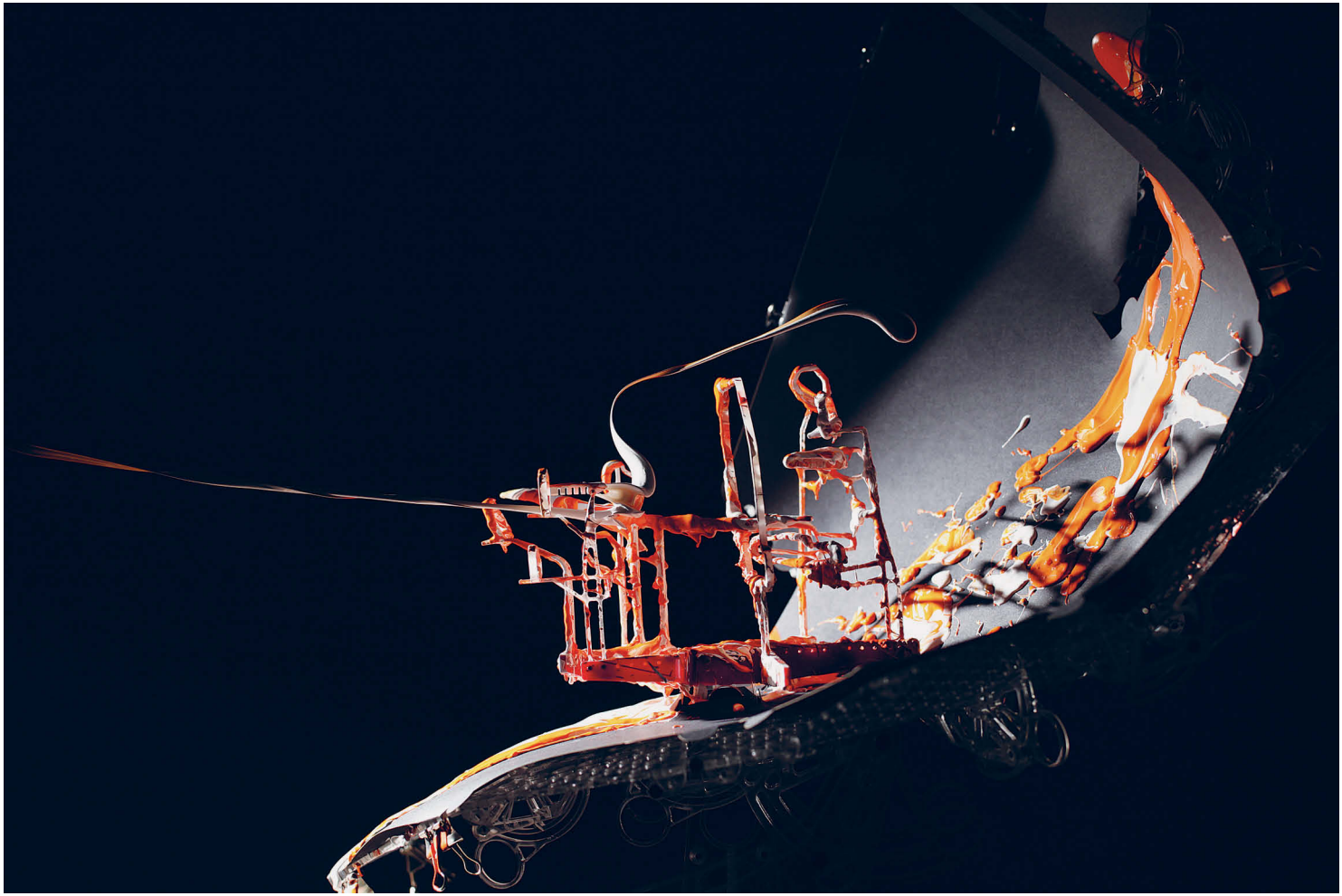
6.33 Jonathan Hill, *Model Fragments*, 1996.
Image courtesy of Jonathan Hill.



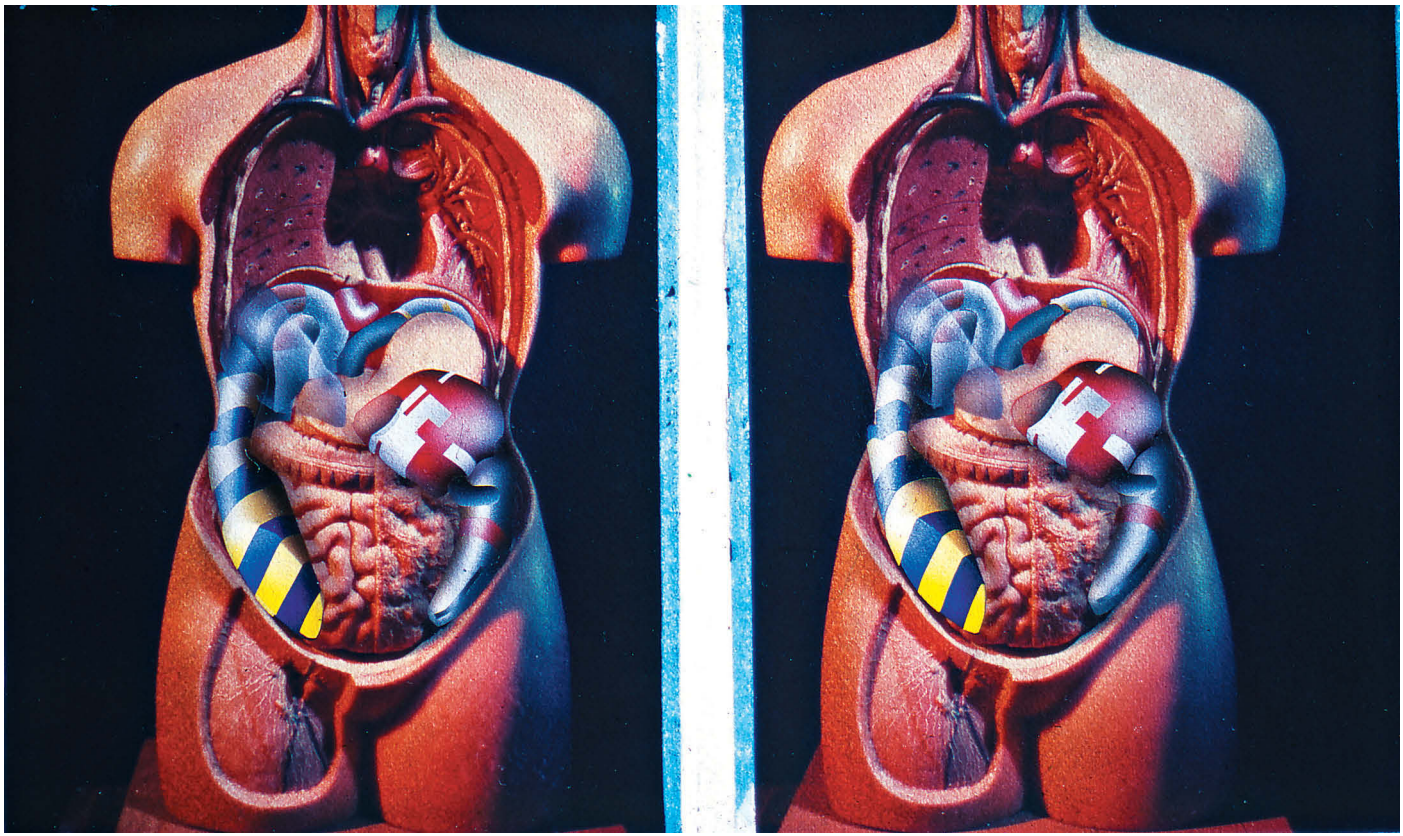
6.34 Jonathan Hill, perspective, 'The Production of Space for Sound (with Transient Elements)', *The Institute of Illegal Architects*, 1996. Image courtesy of Jonathan Hill.



6.35 Nat Chard, stereoscopic image of paradoxical shadow in instrument six, 2010. Image courtesy of Nat Chard.

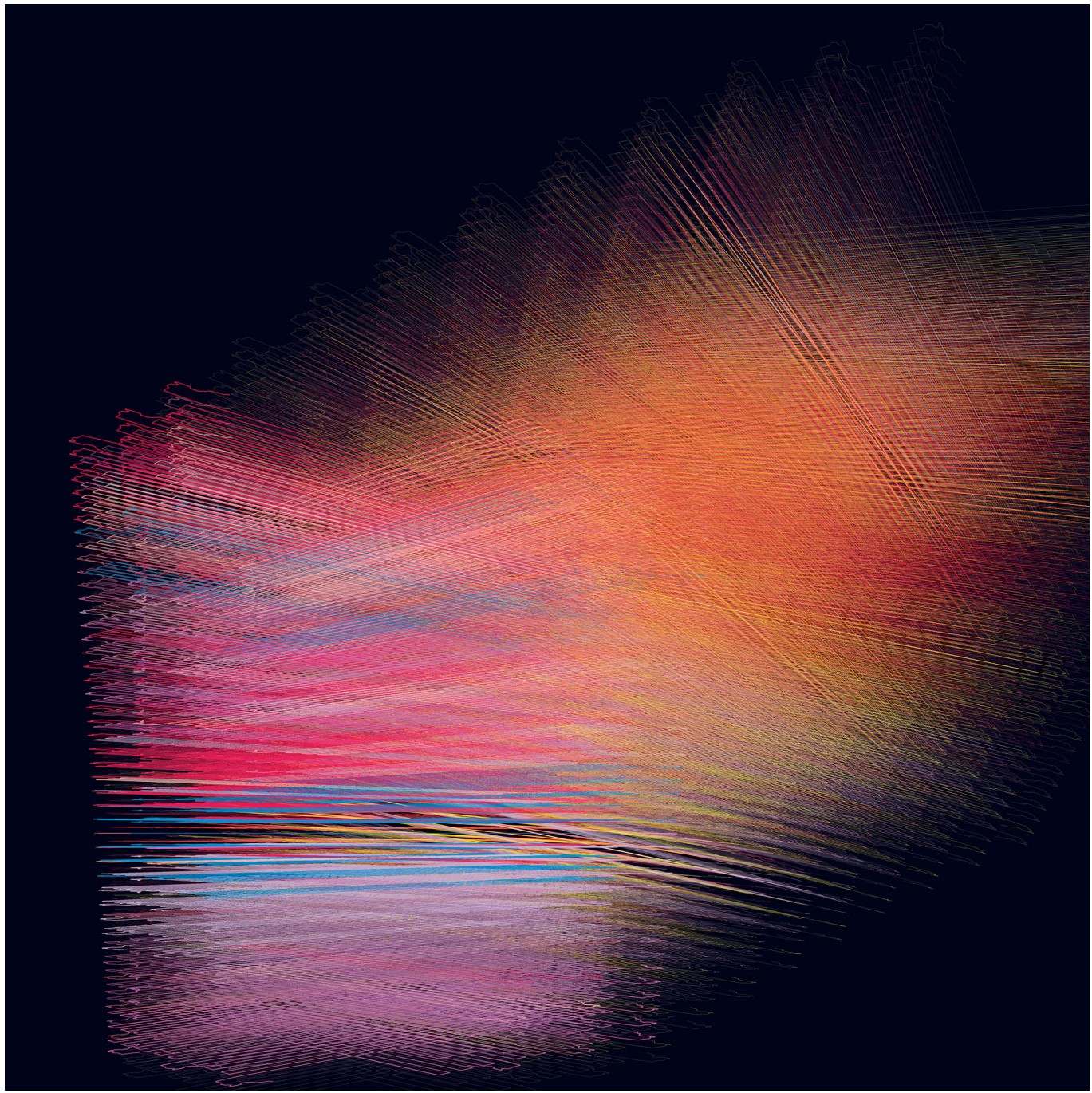


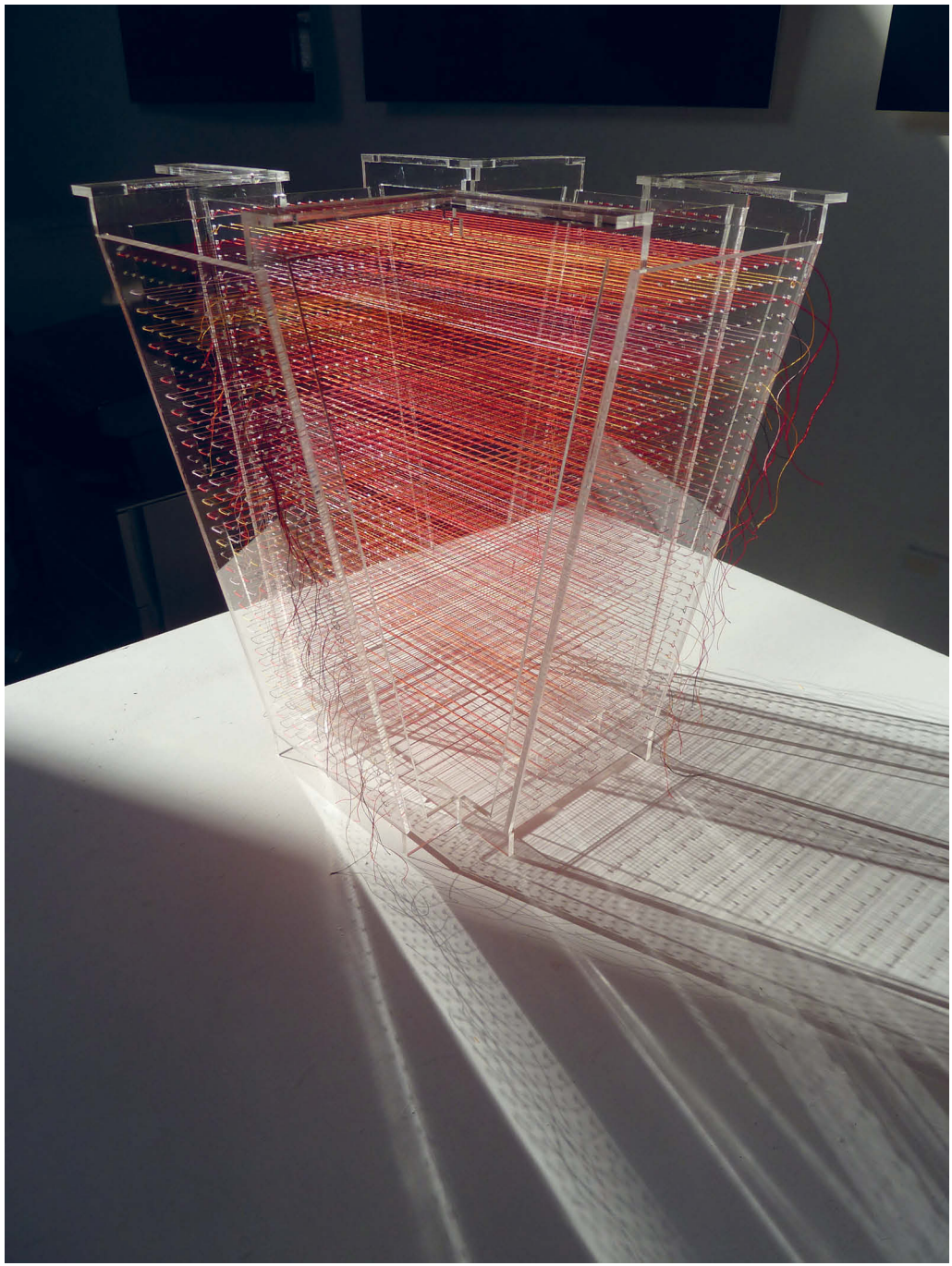
6.36 Nat Chard, projection of paint in instrument seven, 2011. Image courtesy of Nat Chard.



6.37 Nat Chard, *House Layer 3*, digestive power converter and storage, 1996. Image courtesy of Nat Chard.

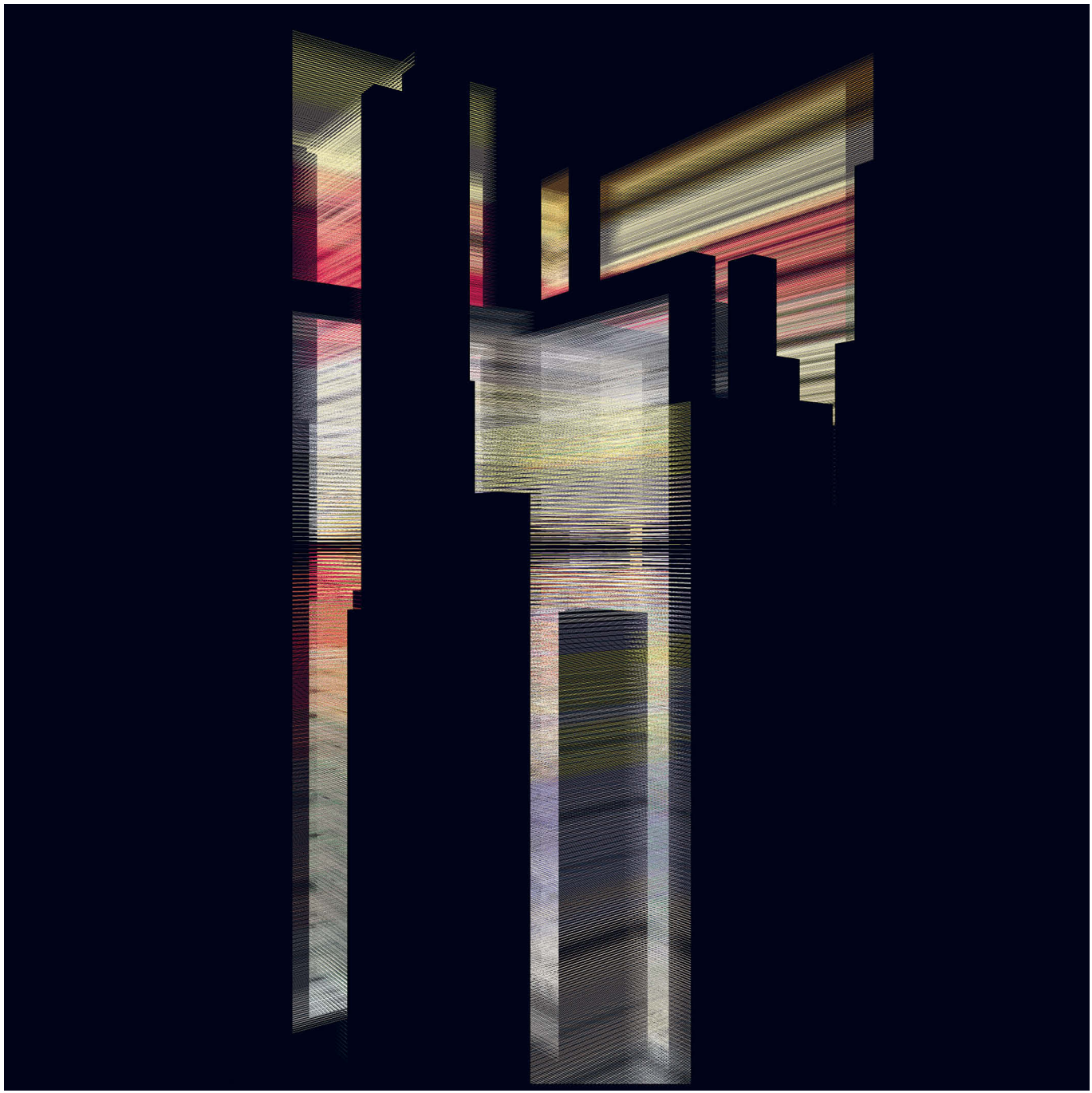
6.38 Victoria Watson, *Air Grid*, digital model, 2009. Image courtesy of Victoria Watson.

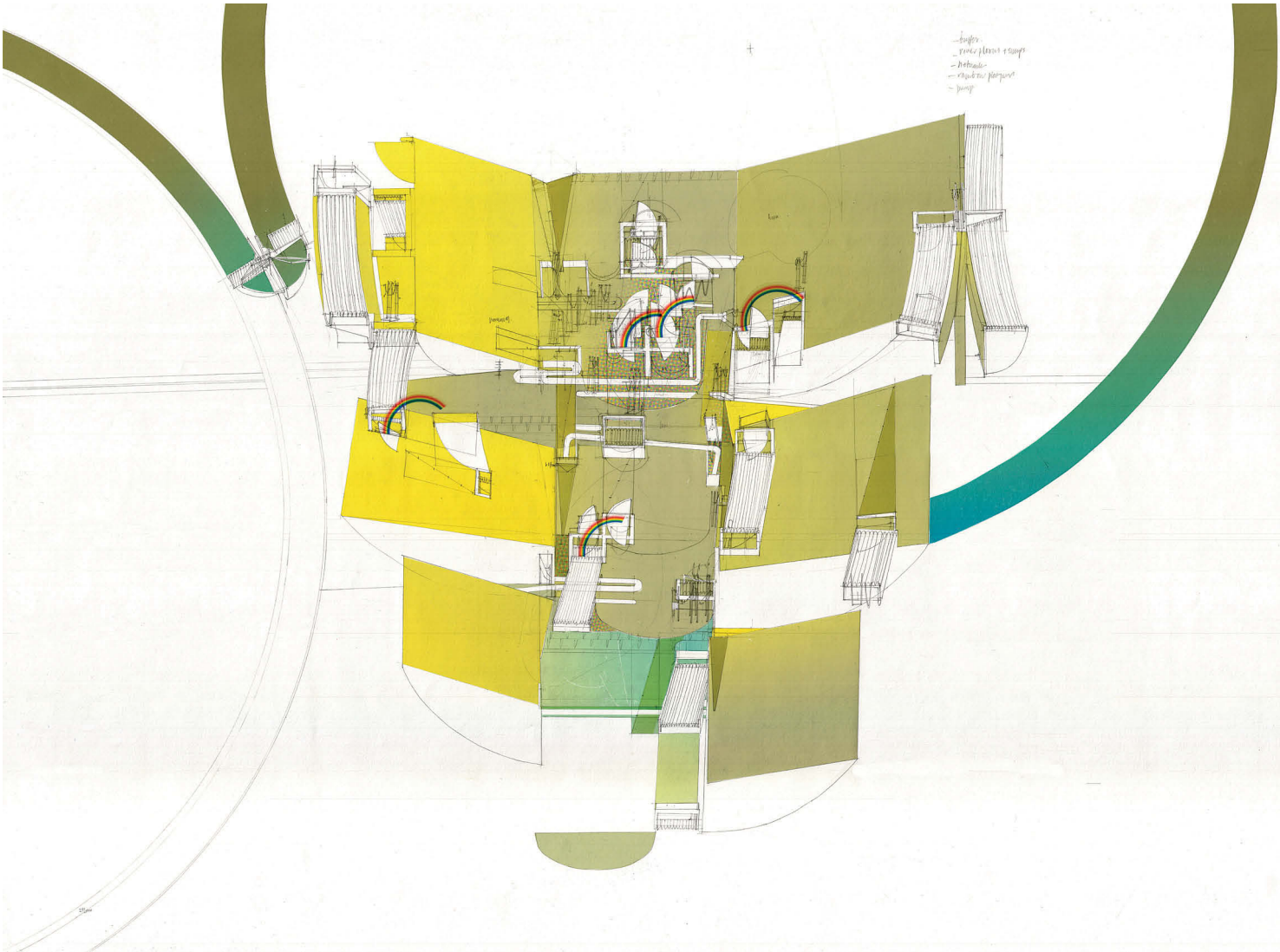




6.39 Victoria Watson, *Air Grid*, detail, 2009. Image courtesy of Victoria Watson.

6.40 Victoria Watson, *Air Grid*, detail, 2009. Image courtesy of Victoria Watson.





6.41 Smout Allen, *London's Hydro Infrastructure*, 2011. Image courtesy of Smout Allen.



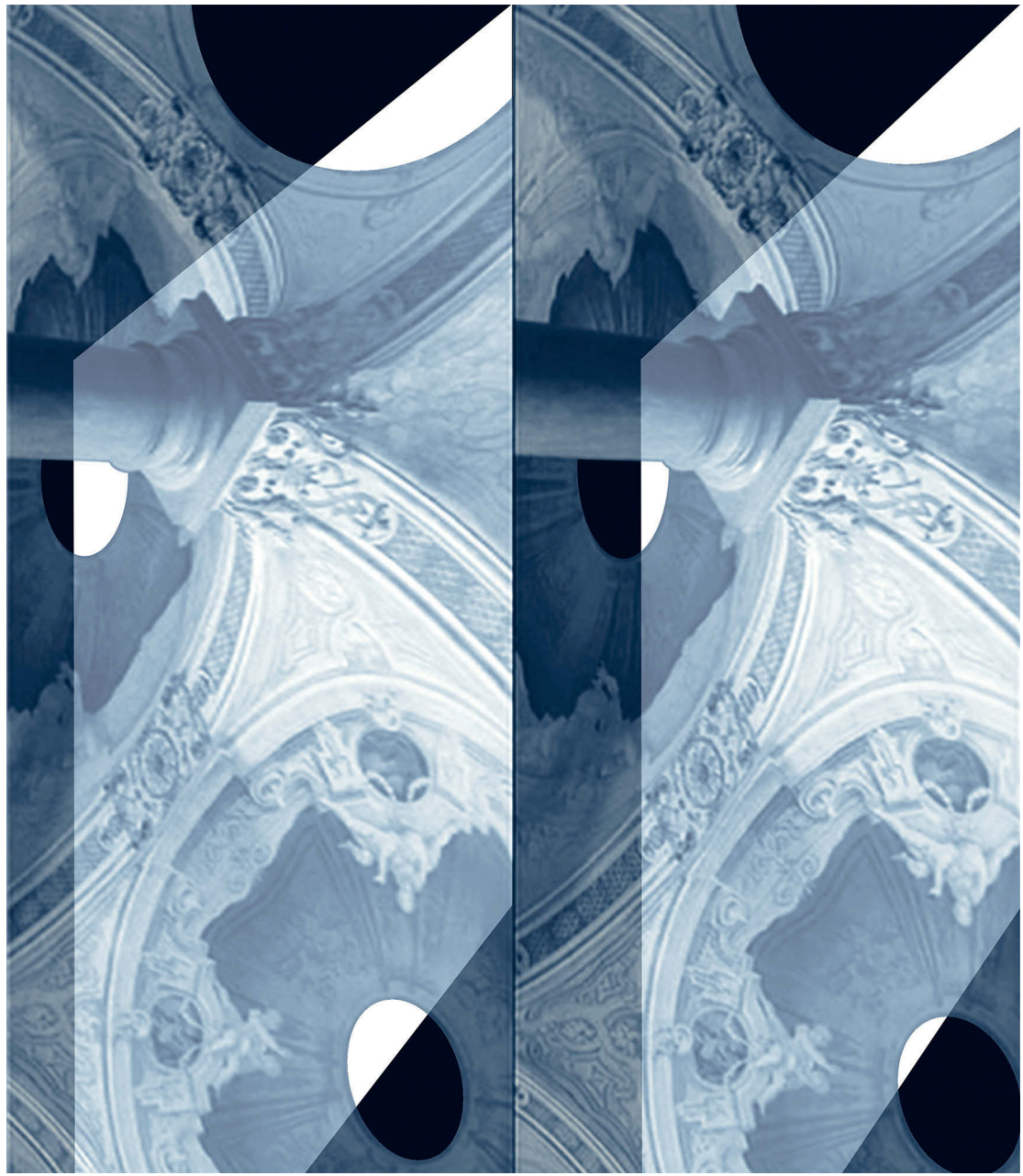
6.42 Smout Allen, *Surface Tension*, installation view, 2011. Image courtesy of Smout Allen.



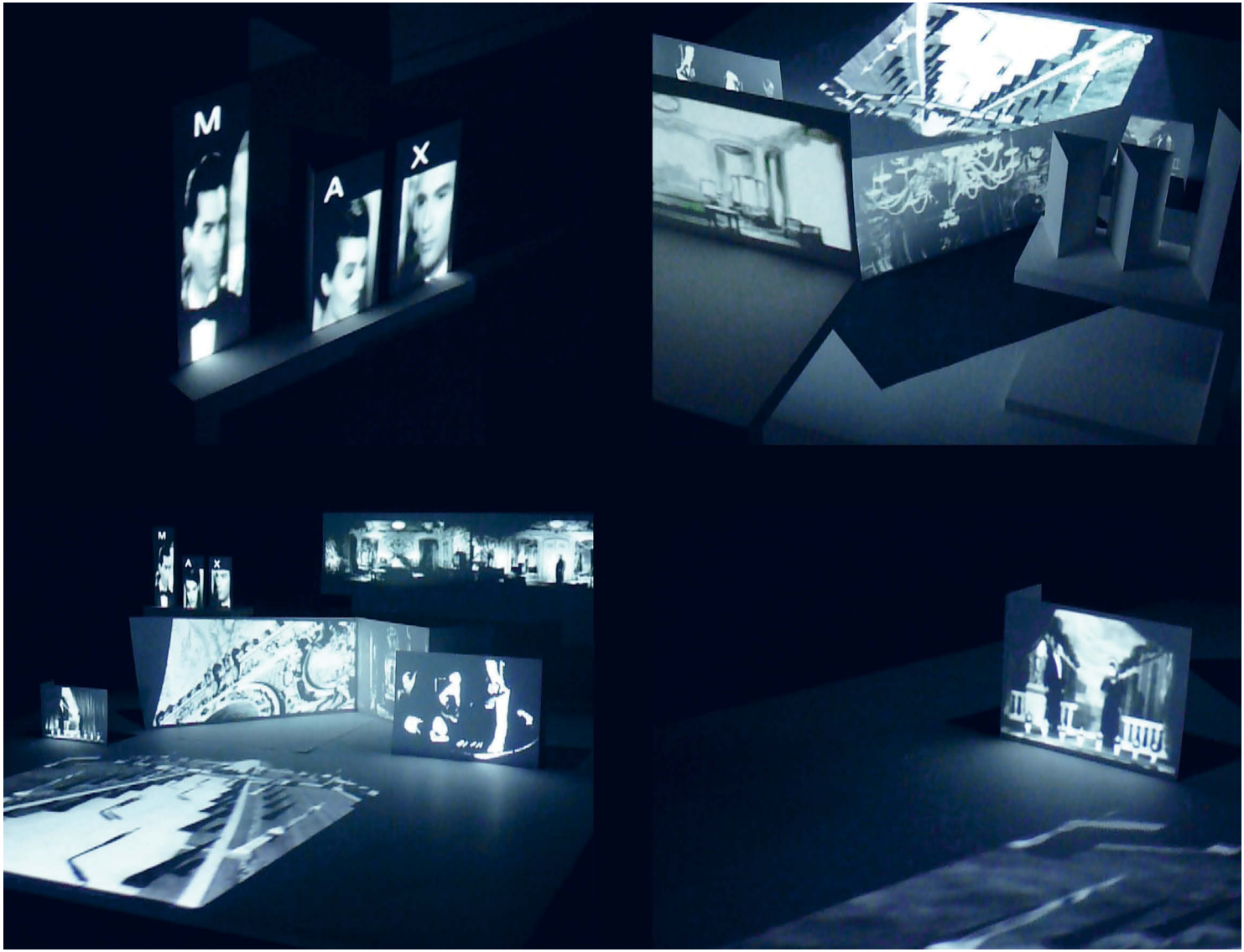
6.43 Smout Allen, *Surface Tension*, installation view, 2011. Image courtesy of Smout Allen.



6.44 Penelope Haralambidou, *Déjà vu*, installation view, 2009. Photograph Andy Keate, 2009.



6.45 Penelope Haralambidou, *Déjà vu*, stereodrawing on consecutive film stills, 2013. Digital image by the author.



6.46 Penelope Haralambidou, *Déjà vu*, still of composite film, 2013. Digital film by the author.

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