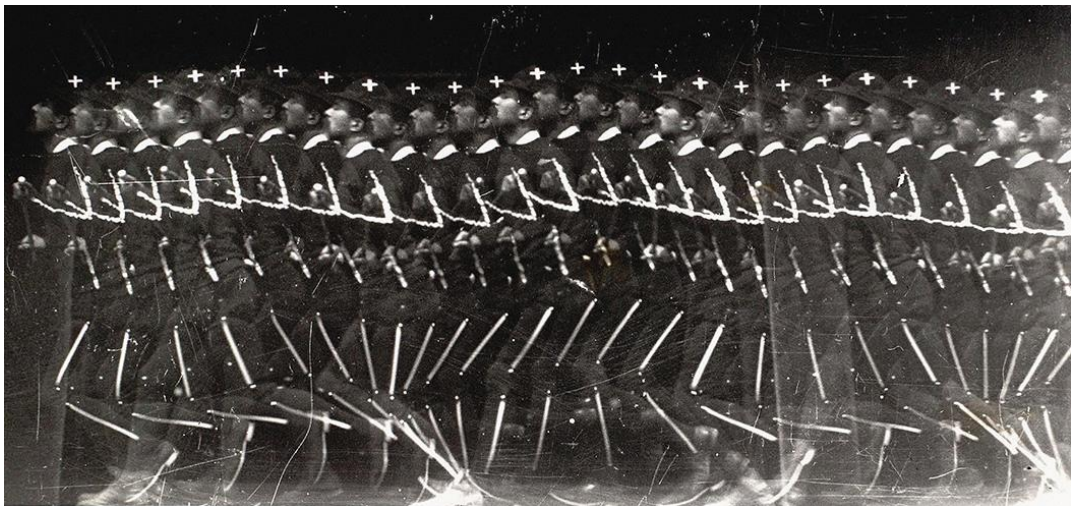


FOLLOWING THE INDEXICAL LINE:

Etienne-Jules Marey, Douglas Huebler, Sol LeWitt



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To António, Maria Elisa, Diogo, Constança, Artur, Bartolomeu and Baltazar, who make
everything worthwhile.

Abstract

The French physicist Etienne-Jules Marey (1830–1904) coined the term 'graphic method' for the array of recording devices that encoded phenomena in patterned lines such as seismographs, and chronophotography, also developed by Eadweard Muybridge (1830–1904). This research puts forward the *indexical line* as a new concept to locate and analyse how the *line* was informed by the *technology* of the 'graphic method' in experimental science of the nineteenth century and taken on by *the conceptual art movement* in the mid-1960s. It presents the redefinition of the line and its concomitant contexts such as drawing, technology, and abstract thinking, anachronistically. That is, *dialogically* across two time periods that re-assess each other through the scope of the *index*.

Stemming from semiotics and applied to film and photography theory, the *index* as schematized by Charles S. Peirce (1839 – 1914) is a sign with a direct relation with the 'real' as cause between the sign and the thing: the object causes the shadow or the photograph, which are the indices. This notion was applied to the art of the 1970s (Krauss 1977; Doane 1996/2007; Iversen 2017) as a traumatic trace; here, Peirce's notion is interpreted as a *measurable trace* to open it up to other potential readings, especially the conceptual project of an ego-less, unemotional array of data constituting the artwork.

So, what happens if this type of line originating from technology is in direct relation with the reality it expresses graphically albeit abstractly, like a photograph? And what possibilities does it open up when it shifts to art?

Through the case studies of the pioneers of conceptual art, Douglas Huebler and Sol LeWitt, who cross-referenced science, graphic and photographic endeavours across times, the indexical line provides a pathway from the graphic method to graphic expression, by introducing language, technology, maps, diagrams, and sequential photography into artistic practices. What is the consequence of such an introduction of science and technology in artistic formalisation of the artwork from the perspective of the subject (the artist-spectator)?

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The patient love of my family turns this research into an even more pleasurable and fulfilling project.

Table of Contents

Table of Contents.....	5
Table of Figures	6
I. Introduction.....	8
I.1. ‘Lines Are Everywhere’: A Curatorial Awakening	9
I.2. Beyond Drawing: Making Space for the Indexical Line	11
I.3. The Graphic Method	13
I.4. Constellating Anachronisms	18
I.5. Following the Indexical Line: A Methodology	22
I.6. Revisiting the Index, From the Graphic Method to Technology	28
I.7. Into New Territories.....	32
1 The Line as Index: Etienne-Jules Marey.....	35
1.1 Etienne-Jules Marey’s Smoke Chronophotographs (1899 – 1902).....	35
1.2 The Redefinition of the Line Through the Index.....	59
1.3 Abstracted Nature – Following the Indexical Line	78
2 The line as Information: Douglas Huebler	98
2.1 Playing with Indexical Lines, from Photographs to Words.....	98
2.2 The Graphic and the Photographic.....	115
2.3 The Ethics of the Indexical Line, Or What You Do With Information	128
3 The Line as Hypothesis: Sol LeWitt.....	151
3.1 Objectivity: A Diagrammatic Narrative.....	151
3.2 From Icon to Index (and Back)?.....	169
3.3 Lines	187
3.4 Diagrammatising thought, opening up to chance	195
4 The Line as Technology.....	207
4.1 The Graphic Method Between the Past and the Future: Living and Thinking Technologically	207
4.2 Drawing Technology.....	225
4.3 The Education of the Eye, a Deconstruction of the Traditional body.....	245
4.4 An Unknown Outcome: Lines and Surfaces	256
5 Conclusion	273
Bibliography	277

Table of Figures

Figure 1 Graphic notations of muscular shocks . From Marey, <i>Mouvement</i> , 1894.	15
Figure 2 Etienne-Jules Marey, Smoke Chronophotographs, 1899 – 1902 . Inclined curved surface, original paper print, 8,8 x 5,2 cm. Fonds Noguès n°59/30; tapered body, original paper print, 8,6 x 5 cm. Fonds Noguès n°5/57 ; inclined curved surface, vue posée, original paper print, 8,8 x 5,2 cm. Fonds Noguès n°59/30 ; 5 cm cylinder, original paper print, 7,9 x 5cm glued onto a chart with other prints. Inv. ML 10 (n° 25). © La Cinémathèque Française.....	35
Figure 3 Lygia Pape, Ttéia 1,c , 2003/2012, nylon threads, variable dimensions. Installation view at Moderna Museet, Stockholm, Sweden, 2018.	37
Figure 4 Jorinde Voigt, Nexus Study VII , 2011, coloured pencils, felt pen, ink, graphite on paper, 60 x 46 cm. Collection Centre Pompidou, Photo: André Morin. Donation of the Collection Daniel and Florence Guerlain, 2012. © Adagp, Paris.....	38
Figure 5 Marey’s Sphygmograph in use , 1860. <i>La Méthode Graphique dans les Sciences Expérimentales et Principalement en Physiologie et en Médecine</i> , 1885.	41
Figure 6 Etienne-Jules Marey, Flying Pelican , 1887, chronophotography on fixed plate, © Deposit from the Collège de France in 1978, Musée Marey, Beaune, France. Photo: J.-C. Couval.	43
Figure 7 Louis Daguerre, Boulevard du Temple , 1838, daguerreotype.....	44
Figure 8 Eadweard Muybridge, Skeleton of a Horse, Off the ground Whilst Running , 1881. 11,1 x 18,8 cm. @ Royal Academy of Arts Collection.....	49
Figure 9 Etienne-Jules Marey, Homme Squelette (Skeleton Man) , circa 1880.	49
Figure 10 Max Ernst, Blind Swimmers (Effect of a Touch) , 1935, oil on canvas, 92,3 x 73,5 cm.	57
Figure 11 Katherine Dreier and Marcel Duchamp at The Haven, her estate in West Redding, Connecticut, in 1936 with Duchamp’s Tu m’ above the Bookshelf and The Large Glass (1915 – 23) . Photo: Leslie E. Bowman, courtesy of Yale University Art gallery.	69
Figure 12 Marcel Duchamp, Tu m’ , 1918, oil on canvas, bottle brush, safety pins and bolt, 69,8 x 303 cm. Yale University Collection. Gift of the Estate of Katherine S. Dreier.	70
Figure 13 Marcel Duchamp, 3 Standard Stoppages , 2013-14	73
Figure 14 Etienne-Jules Marey’s portable sphygmograph . ©La Cinémathèque Française.....	73
Figure 15 Marey’s photographic gun , <i>La Nature</i> , 1882 (First Semestre), p. 329, ima: 333. 1 vol. ([4]-428 p.), 242 ill.; in-4. CNAM.	80
Figure 16 Parallactic apparatus at the Observatoire de Paris . <i>La Nature</i> , 1886, first semester, p. 25, ima. 29. 1 vol. ([4]-428 p.), 372 ill.; in-4. CNAM.	80
Figure 17 Eruption of the volcano Kracatoa . <i>La Nature</i> , 1883 Second Semester, p.260, ima:264. 1 vol. ([4]-428 p.), 305 ill.; in-4. CNAM.....	81
Figure 18 Muybridge’s chronophotographic display in Palo Alto . <i>La Nature</i> 1882, First Semestre, p. 277, ima: 281. 1 vol. ([4]-428 p.), 242 ill.; in-4. CNAM.	81
Figure 19 Emma Kunz, work nr. 002 , pencil and crayon on graph paper, 107 x 70 cm. Emma Kunz Zentrum.	87
Figure 20 Gerhard Richter, Cloud , 1969, 100 x 80 cm, oil and graphite on canvas. Private Collection.97	
Figure 21 Installation view of Douglas Huebler’s 1977 exhibition at ThomasLewallen gallery, South and North Wall	102
Figure 22 Contemporary Portraits and Other Stories (1977) ThomasLewallen Gallery records, 1970-1980. Archives of American Art, Smithsonian Institution.....	110
Figure 23 Douglas Huebler, Variable Piece #44 , (Global), 1971.	127
Figure 24 Douglas Huebler, Variable Piece #11 , Turin (1973).	135
Figure 25 Douglas Huebler, Location Piece #17 , Turin, Italy.....	138
Figure 26 Douglas Huebler, Variable Piece #101 , 1972.	139
Figure 27 Charles Le Brun, Fear and Despair . From <i>Conférence sur l’expression générale et particulière</i> (1668).....	144
Figure 28 Chevreul in conversation with Félix Nadar , 1886 (detail). Photograph. © Ministère de la Culture/Médiathèque du Patrimoine, Dist. RMN/Art Ressource, N. Y.	145

Figure 29 Sol LeWitt, Objectivity , 1962, oil on canvas, 127,64 x 127,64 x 24,77 cm. Collection National Gallery of Art, Washington DC.	151
Figure 30 Eadweard Muybridge, Running at full speed , 1872 – 1885. <i>Animal Locomotion: An Electro-Photographic Investigation of Consecutive Phases of Animal Movement 1872-1885</i>	159
Figure 31 Sol LeWitt, Run IV , 1962, oil on canvas and painted wood, 161 x 161 x 9 cm.	159
Figure 32 Sol LeWitt, Wall Drawing #51: All architectural points connected by straight lines (1970). Installation view at Botin Foundation, Santander, 2015.	163
Figure 33 Sol LeWitt, Run , 1960, oil on canvas, 151.8 x 151.8 cm.	169
Figure 34 Sol LeWitt, Floor / Wall grid , 1966, painted wood, 274,3 x 274,3 x 83,8.	171
Figure 35 Sol LeWitt, Wall Drawing #305: The location of one hundred random specific points. (The locations are determined by the draughtsman.) 1977(Detail.).....	196
Figure 36 Sol LeWitt, Wall Drawing 38: Tissue paper cut into 4 cm squares and inserted into holes in the grey pegboard walls (detail) , 1970.	199
Figure 37 Joseph Kosuth, One and Three Chairs , 1965. Wood folding chair, mounted photograph of a chair, and mounted photographic enlargement of the dictionary definition of 'chair' (82 x 37,8 x 53 cm), photographic panel (91,5 x 61,1 cm), text panel (61 x 76,2 cm). © 2020 Joseph Kosuth / Artists Rights Society (ARS), New York, Courtesy of the artist and Sean Kelly Gallery, New York	218
Figure 38 Joseph Kosuth, Titled (Art as Idea as Idea) The Word 'Definition' (1966 - 68), 144,8 x 144,8 cm, mounted photographic enlargement. © Joseph Kosuth.....	222
Figure 39 Etienne-Jules Marey, Sphere produced by the rotation of a metal thread . <i>Le Mouvement</i> , (1894).	228
Figure 40 Julie Mehretu Invisible Line (collective) 2010 – 11, Ink and acrylic on canvas, 347.3 x 758.8 x 5 cm.	230
Figure 41 William Kentridge Production of Alan Berg's opera <i>Lulu</i> for the Metropolitan Opera in New York. Website accessed 14 May 2020 https://www.metopera.org/season/2020-21-season/lulu/ . .	231
Figure 42 John Wood and Paul Harrison, Three-Legged , 1988, Video 3'00'.	254
Figure 43 Rebecca Horn, Pencil Mask , 1972, fabric and pencils.	255
Figure 44 Andrea Zittel, A-Z Time Trials , 2000 (detail), mixed media installation.	267

I. Introduction

'The ancient teachers of this science,' said he, 'promised impossibilities and performed nothing. The modern masters promise very little; they know that metals cannot be transmuted and that the elixir of life is a chimera but these philosophers, whose hands seem only made to dabble in dirt, and their eyes to pore over the microscope or crucible, have indeed performed miracles. They penetrate into the recesses of nature and show how she works in her hiding-places. They ascend into the heavens; they have discovered how the blood circulates, and the nature of the air we breathe. They have acquired new and almost unlimited powers; they can command the thunders of heaven, mimic the earthquake, and even mock the invisible world with its own shadows'.

Frankenstein, Mary Shelley, 1818

'Draw a straight line and follow it.'

Compositions, La Monte Young, 1960

I.1. 'Lines Are Everywhere': A Curatorial Awakening

Investigating the line in its artistic potential is currently timely. The Museum of Modern Art (MoMA) showcased, about a decade ago in 2010, an exhibition titled *On Line, Drawing Through the Twentieth Century*, followed by a number of other projects such as *Lines - A Brief History* at the Centre Pompidou Metz in 2013 and, more recently in 2016, *Line*, a collaboration between the Drawing Room and the Lisson Gallery in London.¹ From a curatorial point of view, this emphasis on the line has notably borrowed from other fields such as dance and performance or even anthropology.²

Drawing, however, seems to be inextricably linked with the line as a curating object of research. The latter remains unquestioned as such nevertheless, the curators reverting to drawing as a boundary-breaking and transversal questioning process, as an uncompromised discipline that carries crucial changes in artistic practice.³ The Centre Pompidou Metz exhibition website proposes that: 'it expands the definition of drawing to consider how lines form part of our daily lives and environment. Permanent or ephemeral, physical or metaphorical, *lines are everywhere*: in writing, in furrows across the landscape, and in the traces our gestures and movements leave behind' (my emphasis).⁴ The MoMA website echoes this reflection by stating that:

On Line explores the radical transformation of the medium of drawing throughout the twentieth century, a period when numerous artists subjected the traditional concepts

¹ *On Line, Drawing Through the Twentieth Century*, 21 November 2010 – 7 February 2011, MoMA, curated by Cornelia H. Butler and Catherine de Zegher; *Lines – A Brief History*, 11 January – 1 April 2013, curated by H  l  ne Guenin and Christian Briend; *Line*, 22 January – 12 March 2016, curated by the Drawing Room, London.

² *Lines – A Brief History* borrows its title from Tim Ingold's eponymous book (Ingold 2007) about the use of the line in anthropology and its inherence in any human activity.

³ See Enckell Julliard, J. (2015), for instance.

⁴ <https://www.centrepompidou-metz.fr/en/lines-brief-history> Accessed on 3 January 2020.

of drawing to a critical examination and expanded the medium's definition in relation to gesture and form. In a revolutionary departure from the institutional definition of drawing, and from the reliance on paper as the fundamental support material, *artists instead pushed line across the plane into real space, thus questioning the relation between the object of art and the world* (my emphasis).⁵

These texts reinforce the importance of the exhibitions by showing the pertinence of its subject outside of its walls: 'lines are everywhere', wrote the curators of *Lines*. One wonders what led to this self-evidence of the line. In this thesis, I argue that while the line introduces contemporary drawing in its innovative stance rather than as a traditional genre providing more access to specialists and non-specialists alike, there is in fact a new line which is an inherited tradition of nineteenth century scientific imagery combined with its use in the avant-gardes and, more precisely, in conceptual art.

Indeed, the way was paved by a few conceptual artists in the 1970s who used the line as a replacement for the much-derided notion of truth in favour of an ethical stance built upon the critique of the authority of mimetic resemblance; as Sol LeWitt said, 'a drawing of a person is not a real person, but a drawing of a line is a real line'.⁶ Anna Lovatt recently published an inquiry about the line from Minimalism to Conceptual art, focused on the redefinition of drawing as a discipline, equated with the French Nouveau-Roman (Lovatt 2019). Nevertheless, in her study the line is a probing tool as well and not the object of her analysis. This thesis, on the contrary, asks where LeWitt's 'real' line comes from as a seemingly uncompromised and autonomous abstract tool. This ethical perspective of the line as well as its push to the forefront of artistic creation for LeWitt

⁵ <https://www.moma.org/calendar/exhibitions/970> Accessed on 3 January 2020.

⁶ Oral history interview with Sol LeWitt, 1974 July 15. Archives of American Art, Smithsonian Institution.

but also Douglas Huebler, two pioneers of conceptual art, is the axis around which this research orbits, constituting its two central chapters. Indeed, I propose that the tall order of questioning the relation between the ‘object of art and the world’ through the line as an ethical stance against the authority of the artistic power of mimetic illusion was systematically at work in both Huebler and LeWitt’s establishment of a conceptual field of artistic practice and of a new kind of observing body, that Huebler called ‘the percipient’.

I.2. Beyond Drawing: Making Space for the Indexical Line

Following the aforementioned curatorial projects, it seems that the line in its potential for expansion makes drawing cease to be drawing: as a first-time central figure of the artwork, the line has the formidable task of pushing drawing from the paper into tri-dimensional space, from flatness to volume. Or perhaps it turns everything into drawing because lines are, indeed, everywhere, and they can provide a frame to assess the world through sketching, schemata, and diagrams, all of which were the documentation conceptual art relied upon to freely quote Huebler. Drawing, one can argue, is whatever constitutes a dynamic between the line and a surface, be it a unique or a multi-dimensional one. In this sense, if lines have pushed drawing into the world, where is the artwork and how does this shift affect the artist and the spectator? How does this redefinition of territories and their boundaries (or lack thereof) ultimately allow us to (de)construct the subject? This, it seems, is the crucial, overarching question formulated by this investigation on the line through its raw form as a conceptual tool that suddenly takes on, simultaneously, our living space and our diagrammatic minds.

The line paradoxically remains in the field of drawing while expanding it beyond its traditional or ‘institutional’ boundaries, materialised by the use of paper or cardboard. Indeed, drawing has been jumping out of its cellulose surfaces onto the walls such as in LeWitt’s murals and Douglas Huebler’s use of maps, diagrams or wall drawings, and the screens for a while now, and used for instance, quite seamlessly, in contemporary dance.⁷ As a founder and contributor of the French *Roven* curatorial platform dedicated to drawing, stemming from the eponymous magazine dedicated to the critical study of contemporary drawing (founded by the writer and curator Johana Carrier and the artist Marine Pagès in 2009), I have contributed with my colleagues to this new field of critical investigation and curatorial premise by co-curating an exhibition titled *The Graphic Method and Other Lines* in 2010.⁸ Here, the notion of ‘the graphic method’ was selectively applied to the notion of the line bypassing drawing in order to test its limits and understand if the parameter of the discipline was enough to understand what seemed to be both an old tool and a complete curatorial novelty. The artists invited to exhibit had different kinds of artistic practices, such as Paul Harrison and John Wood, a British duo who worked mainly with video featuring interactions with each other and with objects incorporating a sort of graphic schematization of everyday life, midway between slapstick and applied science.⁹

The ‘other lines’ segment of the exhibition title pertains to this concrete territory that I suspected to be overpowered by drawing instrumentalising the line, preventing it from being probed, through curatorial and at times critical insistence because it has been used as the probe itself. This allowed for an opening onto other sources for the line through an

⁷ See William Forsythe’s use of the line (and the dot) to explore choreography: <https://www.youtube.com/playlist?list=PLAEBD630ACCB6AD45>

⁸ *The Graphic Method and Other Lines*, 25 November 2010 – 15 January 2011, centre d’art de Gennevilliers, curated by Johana Carrier and Joana P. R. Neves.

⁹ Paul Harrison and John Wood, *Night and Day*, 2008, 24’18’’, Video HD

experience with artists and their work, that seemed to have been going on since the beginning of the twentieth century.¹⁰ The exhibition did not reject drawing as such but opened a pathway, namely for ‘the graphic method’, explained in the press release but mainly selected as a suggestion of a methodology that could include drawing but mostly relied on the line as such.

It was, as it were, the first applied method of *following the indexical line* and accepting wherever it took me. But not without asking: what is this line seemingly emancipated from drawing or emancipating drawing and redefining it? And what connection does it have with ‘the graphic method’?

I.3. The Graphic Method

What exactly is the graphic method? As in the aforementioned exhibition, I have introduced here the notion without immediately contextualising it for two reasons: firstly, to let its diffusing effect inspire the reader’s thinking and secondly to create space for its temporally distant scientific source. In its time period, the second half of the nineteenth century, the graphic method was seldom applied to art and was mainly a scientific methodology strongly reliant on the line and producer of an array of devices that led to a great deal of our contemporary forms of technology, such as motion capture devices or wind tunnels used in aerodynamics.

¹⁰ In 1920 Aleksander Rodchenko wrote in his diary, for instance, that he pondered about starting a movement called *Linism*, that marked a definite step outside of painting conventions: ‘I have about twenty sketches for paintings... I’ve cut out twenty sheets of Whatman paper the size of the glass, I’ll make coloured drawings. I am thinking of calling the new pieces ‘Linism’. The surface is dispensed with logically, and to express the greater constructiveness, the architecturality of the composition, the old favourite of paintings – texture – is dispensed as well. Work – is a pleasure. Life – is a torment. I just want one thing: to work like a machine for one year and do everything that is given to me for my whole life...’ (Rodchenko 2005, p.113).

The graphic method in its scientific intricacy is often overlooked in the art realm because of the many instances where artists have visually quoted its imagery across the twentieth century to today, from Max Ernst to Dóra Maurer. Images are stronger than old scientific papers. However, my research visits to the archives of the Cinémathèque Française and the Musée des Beaux Arts of Beaune, where most of the Etienne-Jules Marey archives are kept, dismissed this impression immediately, with its array of documents and machines, educational posters and letters.

The term ‘graphic method’ has a precise source. It was coined by the French scientist Etienne-Jules Marey (1830 – 1904) in the 1870s as a global expression comprising all the apparatus that he either perfected or invented, and their imagery [Figure 1].¹¹ That is, his graphic recording machines including chronophotography (sequential photography, brought about by the British photography pioneer Eadweard Muybridge in Palo Alto, detailing the horse’s gait in all its stages).¹² The graphic method, Marey’s life project, served the purpose of understanding mechanical, organic or induced movement by graphically rendering motion patterns. When introducing its final definition, the scientist wrote:

(...) our senses, with their perceptions that are either too slow or too confusing, can no longer guide us, but the graphic method resolves their insufficiency; it reveals an unknown world amidst this chaos. (...) The graphic method translates [nature’s changes] in such a compelling way that we might call it the very language of the phenomena

¹¹ Marey’s book *La Méthode Graphique Dans Les Sciences Expérimentales Et Principalement En Physiologie Et En Médecine* was first published at the end of the 1870s and then re-published with an addendum titled ‘Development of the graphic method through the use of photography’ in 1885.

¹² In 1872 the magnate Leland Stanford commissioned Muybridge with the task of photographing his favourite horse Occident running in order to find out if at any point the horse’s four legs would be in the air at the same time. In 1877, they had the idea of photographing the running horse with several aligned cameras, thus obtaining a photographic sequence of the horse’s run.

themselves, such is its superiority regarding all other means of expression. It will no doubt replace any other, whenever it will be necessary to define a movement or a change of state, in a word, any given phenomenon (Marey 1885, p. III).

Marey states clearly here, like LeWitt and particularly Huebler will, three quarters of a century later, the chaotic nature and insufficiency of perception and the need for a graphic language that captures change, which implicitly states the impossibility of understanding it through verbal expression. The paradigm shift of the graphic method reverses the roles of language and observation in relation to mechanical recording and hypothetical thinking.

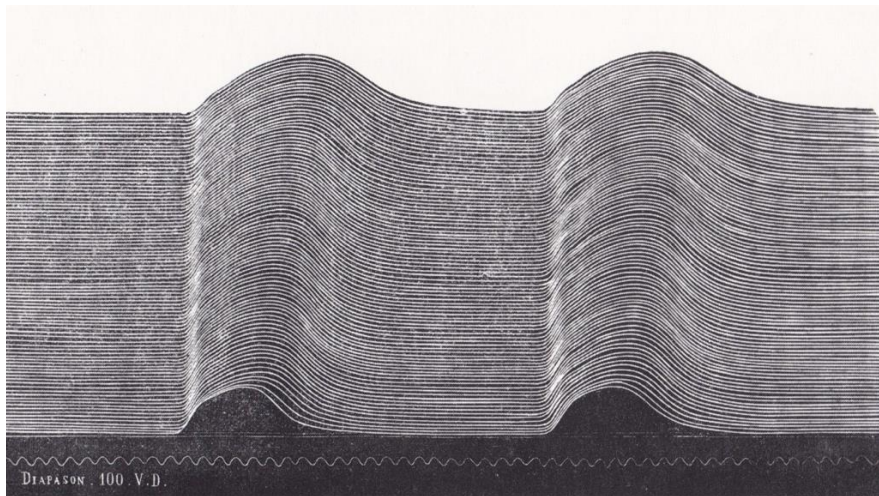


Figure 1 *Graphic notations of muscular shocks. From Marey, *Mouvement*,*

It was also an exhibition that brought this method to my attention. *Movements of Air*, Etienne-Jules Marey (1830 – 1904), *Photographer of Fluids* was held at the Musée d’Orsay, showcasing the scientist’s last opus, the smoke chronophotographs, showing lines made of smoke in an art context – the result of an institutional partnership between

the French Cinémathèque, Orsay, and the Collège de France for the 2004 *Mois de la Photo*, a multi-institutional event dedicated to photography throughout the month of November.¹³ This time the emphasis was not on the line (or drawing) in the title, and yet, the exhibition was constituted almost entirely of images of lines produced by a machine built by a scientist. Lines of smoke making twists and twirls or in straight parallel lines were equally perplexing and mesmerizing considering they were produced at the turn of the twentieth century by a man born in 1830. The Smoke Chronophotographs constitute the focus and the starting point of my first chapter, as both a materialised line (the object of the images), and an indexical one (the sign they formulate on the image).

In fact, the notion I want to put forward here, the indexical line, emanated partly from the visit to this exhibition in 2005, a time before the curatorial awakening to the line and its intrinsic de-territorialisation, that is, its intrinsic contemporary hybrid *modus operandi*. I sensed that the line seems to have arisen through photography and had been injected into graphic expression in the twentieth century. Or, more precisely, that *other lines* suddenly appeared as images and were conflated with the traditional lines of *disegno*, in a context of awakening to the realities of what Georges Didi-Huberman calls, in French, the modernity of *l’empreinte*, the imprint (Didi-Huberman 2008) – that is, a form of trace through direct contact as old and as irruptive as the line in the twentieth century through techniques of *frottage* and casting for instance. Historically, photography has been considered a chemical trace, and index, of a given atmosphere so these smoke lines redefining the notion of resemblance are, I propose, part of Didi-Huberman’s view of the *empreinte* as a paradigm shift of modernity through contact (whose development he finds in Pablo Picasso, Joan Miró, Max Ernst, Jasper Johns, Piero Manzoni, Bruce Nauman, Robert Morris and many others) framed here as a a distanced contact-reaction

¹³ *Movements of Air, Etienne-Jules Marey (1830 – 1904), Photographer of Fluids*, 19 October 2004 – 16 January 2005, Musée d’Orsay, Paris, curated by Laurent Mannoni.

through a new form of composite technology. In her book about the technology and aesthetics, Tamara Trodd has the same intuition, and inaugurated her investigation with an exploration of Paul Klee's use of transfer drawings in which 'we see the way [...] an avant-garde artist employs a range of material practices that feed into and come to constitute a newly apparatused kind of medium, under the pressure of new technologies' (Trodd 2015, p. 45). Because those new lines did not look like anything we experience as a physical reality it is easier to see them as traces, having lost the phenomenon that produced them.

Marey was a producer of traces.¹⁴ If he is not as well known now, he was famous in the nineteenth century through the popularisation of his inventions in magazines for the general public, demonstrations of his apparatus at the court, or even the Universal Expositions where he showcased his findings. The figure of the patterned line expressing nature's rhythms was perhaps even more accessible at the time to the general public than now, in our pixel emphatic era, although being more than ever surrounded by lines. Thus, the aforementioned contemporaneity of the line does not *automatically* belong to drawing nor, perhaps, to the history of observational drawing. On the contrary, the indexical line seems to emanate both from a nineteenth-century technology that seeped into our contemporary digital machines, and from a conceptual use of lines as information (Huebler) or elaborate mathematical hypotheses (LeWitt). In fact, drawing may very well be the framework through which we can analyse it instead, not really as a genre or a historically defined category but a form of techno-thinking. And it may retro-actively incorporate these new lines.

¹⁴ One of Marey's specialists, François Dagognet, sub-titled one of his books about the French scientist, *A Passion for the Trace* (Dagognet, 1992).

I.4. Constellating Anachronisms

Therefore, I am arguing against an essentialist vision of the line or drawing, considering that the first and the latter expand and take each other to new territories, augmented in their expansive energy by the technologies they bring with them. That is why, on a first level, Georges Didi-Huberman's book published in 2008 *La Ressemblance par Contact* was crucial for my methodology: in it, Didi-Huberman develops a technological form of thinking in order to bypass excessive formalisms and dogmatic appraisals of modernity. For instance: he discusses the accepted notion of Marcel Duchamp's indifference and neutrality (supported by Duchamp himself) through the focus on his technological endeavours namely moulding and miniaturising. Therefore, he opens our notion of the French artist as an 'indifferent and hidden producer', which he was, to that of a 'passionate and diligent reproducer', which he also was: Didi-Huberman thus inaugurates the notion of Duchamp's 'technical eroticism' (Didi-Huberman 2008, p. 268).

Didi-Huberman's method is not so much ignoring the artist's statements but combining them with close attention to extraneous technologies obsessively used by them but usually ignored by art theory. Therefore, it is not the Didi-Huberman of the excessive exploratory *pathos* or the symptom that I am looking to, but the Didi-Huberman of technology and imported methodologies from ethnology, archaeology, and other territories where technologies are the forefront of theory. Technology does not have an agenda, it follows its own inventive path without Greenbergian concerns of medium specificity or formalist restrictions – and yet, while it is at the forefront of the paradigm shift of the avant-gardes and neo-avant-gardes it remains constrained by the reductive lexicon of the medium. Technology thus provides an alternative to the insufficiencies of

the vocabulary of art history, stemming from its object of study. For instance, the *abstraction* of the indexical line is not the same *abstraction* of Abstract-Expressionists that conceptual art steers away from.

The second methodology that I employ, which is also presented in the aforementioned book, is a dialogic perspective across time, the second half of the nineteenth-century and that of the twentieth, reinventing themselves. I employ Didi-Huberman's vision of art history, here after Walter Benjamin, and in other instances the French historian Marc Bloch, as deeply anachronistic: the object of art history, the image (taken here in the broad sense of the art object), constellates heterogeneous times. Or, in Didi-Huberman's words, 'the time of the image is not the time of history in general' and it is therefore important to introduce 'difference in objects and anachronism in history', opposing evolutionary history based on the myth of the genius (Didi-Huberman 2002, p. 61). Technology is the ideal object for this methodology since it opens up artistic practices for technical solutions and their external, composite contexts without the constrictions of interpretative frames. Technology expands organically, as it were, according to the contexts it is used in and for; it is also an argument against the accusations of modernity being akin to indifference, to the '*n'importe quoi*', the 'gratuitous game with history' a critique addressed and derided by Didi-Huberman repeatedly (Didi-Huberman 2008, p. 311): the inherent anachronism of the image is a way to instil history with time and memory, rigid grids with lived time and individual experience in conflicting, heterogeneous presents. And although I do not embrace this aspect of Didi-Huberman's theory (for reasons I will explain further), it does make for a good understanding of his method against the paranoid critique of the '*n'importe quoi*': Didi-Huberman establishes a Freudian vision of anachronism as a symptom, that is, a dialectic, epiphenomenal, singular emergence of located history in the present, or, in

Blochian terms, memory. As Chaves Maldonado explains, ‘Bloch has postulated that the object of history is not the past but time, but the art historian [Didi-Huberman] proposes also that this time crossed by an anachronism that it carries, is converted into an impure element, a ‘historical montage’ that he calls memory’ (Chaves Maldonado 2015, p. 64).

Which is to say that the indexical line in experimental science is not the same as in conceptual art and that *this difference is what traces one back to the other*. Evoking ‘surviving’ images in the present, makes them pierce the contemporary membrane, changing it, and by the same token, transforming themselves.¹⁵ This toing and froing between eras, between the past and the present, hinges on the unseen objects that may or may not belong to art history, that irrupt, constellating objects such as the line and the people who experimented with them. The indexical line travels from *experimental* science of the nineteenth century to *experimental* art of the twentieth; the first period shifted its labour from metaphysics to physics, from alchemy to chemistry, from the ‘whys’ to the ‘hows’ resonating with conceptual art revealing processes rather than magically producing illusions. However, the displacement of vocabulary is not always a superimposition of gestures and practices, especially when bridged by technology on such a widespread level as the graphic method: conceptualism is certainly not positivist.

So, if ‘the object of history is not the past, but time’ (Chaves Maldonado Ibid.), that is, a lived and heterogeneous plasma that lives through memory, misunderstandings and individual or communal interpretations, the rigour of the (art) historian must comprehend difference, transference, displacement, re-grounding, and even misunderstandings, as much – or even more - as similitude and conceptual accuracy. The simple method of

¹⁵ Didi-Huberman’s publications are widely concerned with the notion of ‘survival’, or *Nachleben*, from his investigations into Aby Warburg’s redefinition of art history. However, his intriguing and fascinating article *The Surviving Image: Aby Warburg and Taylorian Anthropology* places the origin of the concept in Anglo-Saxon anthropology, more specifically, in the ethnologist Edward B. Taylor’s writings (Didi-Huberman 2002).

following the indexical line naturally brings upon this thesis a layering of different times and fields that will converge and diverge, revealing their transformations through different uses and instances. Indeed, Didi-Huberman proposes a model of thought that embraces not only the heterogeneity of time periods, but also of fields. This is a way of re-injecting life into art, often drained from it by critical priorities that ignore the intrinsic heterogeneity of creation. For the ‘objects’ themselves like the *empreinte* were neglected by history because they did not belong to the array of techniques considered purely artistic (Huberman 2008, pp. 11 – 23).¹⁶ For that reason they remain unconsidered within art history until they are automatically embraced as its tools or techniques such as when the line was put forward curatorially as ‘expanded’ drawing. So, while the line is approached as a curatorial tool, it has yet to be given due attention critically in itself.

In order to grasp the full scope of where Marey’s line comes from, I focused on the scientific and technological context of his entrancing images while flagging up their eerie contemporaneity. Marey’s work has often been pushed into the artistic realm with disregard for the scientific research they are an intrinsic part of. The reason why this happens, I venture, is because Mareyism is often the subject of comparative studies of influence rather than a dialogic study of conceptual and structural possibilities manifesting, amongst others, in art. Marta Braun reminds us that:

[Marey’s] graphic, chronographic, and cinematographic instruments were to him only instruments with which to observe and record movement in such a way that it could be measured and then quantified’, and, later on, ‘Marey is lost (...) [if] reduced to a ‘photographer’ pure and simple – a ‘precursor’ in areas he consciously avoided. And the meaning of his work, and therefore its beauty, is lost as well (Braun 1992, p. xx).

¹⁶ See Huberman’s critique of Giorgio Vasari’s notion of the ‘modern’ (2008, pp. 21-23).

Despite producing the most meticulous account of Marey's project in the English language, Braun dedicated the last chapter of her book to *Marey, Modern Art and Modernism*, a visual catalogue of formal influence between Marey and the avant-gardes of the turn and beginning of the twentieth century, from Marcel Duchamp to Naum Gabo.

I steer away from this method because it fails to answer my main question: where did Marey's abstract lines come from and what other possibilities did they create in artistic processes, as conceptual and mechanical tools? How do they express a technological way of relating with nature, or the world? What are the consequences of this burgeoning technology for the way we see and create images? My questions pertain to a wider, non-mimetic and differentiating field of new forms of representation and image-making: Marey's line is both a symptom and a vector of new developments in representation of nature, phenomena and human activity and one of the elements that broke the boundaries between science and art. I hope to demonstrate that the origins of conceptualism took on these questions by critically embracing the 1960's appropriation of the graphic method.

I.5. Following the Indexical Line: A Methodology

Marey's technology and concomitant imagery are therefore far greater and intrinsic to modern life than mere visual citations in painting. For that reason, I have underpinned my dialogic methodology with the knowledge of Marey's science and philosophy through careful reading of his own publications, in particular *La Méthode Graphique* and *Mouvement*, originally published in 1885 and 1894 respectively, as well as his archival material, which includes a wide array of machines designed by him at the Cinémathèque

Française (Paris), the Musée des Beaux-Arts (Beaune) and the Musée des Arts et Métiers (Paris). The eponymous *Movements of Air* catalogue provided the basis for my focus on Marey's scientific and technological project with Laurent Mannoni's text *Marey Aéronaute*, that unfolds Marey's contributions to aerodynamics and aviation.

In addition, I have followed the displacement of his theories and scientific findings into semiotics and artistic processes, thus anachronistically constellating territories and techno-visual strategies. This has led me to holistically consider Huebler and LeWitt's trajectory towards a graphic use of a line that did not completely make sense as *disegno* and resonated far more with the graphic method, rather than approaching this neo-avant-garde period from the usual scope of a stance against a traditional form of the medium.

I am convinced that no artist has ever decided to approach his, her or their work against the medium of painting or sculpture, in order to have the last word about it. Conceptual art may have defined itself against a certain state of affairs, particularly against the solipsistic force of Abstract-Expressionism and the overpowering presence of Minimalism, but it was mostly built as a concrete and tangible array of experiences.¹⁷ It is therefore as an inherently different kind of experience, both of creation and fruition of the art work that I approached it, with the array of non-artistic elements it claimed for itself, from the 'idea' and the 'concept', to the use of descriptive language associated with the graphic method's technology. LeWitt and Huebler's own writings and interviews, but also the articles published about their work in newspapers and catalogues of their time

¹⁷ New generations often define themselves against the previous ones. However, if one wants to deliberate how important the question of the medium was, it has to be stated that conceptual artists mused upon not only the Greenbergian stance regarding the medium, but the Minimal position against it. See, namely, Donald Judd's theory of 'specific objects' that already evacuates the genres of painting, sculpture or drawing, focusing on the material presence of the work amongst other human fabrications (Judd 2005, p.181). Conceptual art, in this sense, had been freed already from the dogmatism of critique and produced its own philosophy and array of critical texts amongst which LeWitt's *Paragraphs...* (1967) and *Sentences...* (1969), remain seminal. It is also understandable that for the younger critics Lucy Lippard, John Chandler and Lawrence Alloway, dematerialisation was underway, the natural evolution from the object to the graphic and photographic document.

that I had access to at the Smithsonian Institute's Archives of American Art in Washington DC, were useful to grasp the content and context of those experiences, the discrepancies between expectation and fruition, in order to understand where these artists came from.

I soon found out that while LeWitt was fascinated by the scientific objectivity of Eadweard Muybridge's chronophotographs, Huebler was reading epistemology with a Buddhist sensibility, which allowed me to read his vow not to add any new objects to the world as a Mareysian suspicion towards perception and common language, rather than an anti-commodity trend that sounds hollow if it is not rooted in a concrete ethical perspective. These original stances, allowed me to go back to Marey and to understand his anxieties toward the new findings he obtained with his sequential photography, as well as his incomprehension regarding representational art which, I suspect, he only appreciated when it conformed to his linear progressions, invisible to the naked eye.

Employing a dialogic method is paramount to argue for an anachronistic view of art history and of the image, which has consequences for the structure of the thesis. Conceived in four parts – four chapters -, it does not however abide by a linear structure whereby they follow each other in a linear logical progression. The first chapter is mirrored and expanded by the fourth because they are both dedicated to the graphic method seen through the parameters of technology (a composite aggregate of techno-thinking parameters, all visible and contributing to an outcome) in the nineteenth century and in the contemporary world.

Moreover, and because the starting point of this investigation is a dialectical correspondence between two time periods and two fields, each chapter presents itself dialogically as an intertwined method of to-ing and fro-ing between those two temporal and cognitive axis. The first and last chapters circle the two central chapters dedicated to

two artists and two different uses of the indexical line, Douglas Huebler and Sol LeWitt's, in a dedicated and investigative applied method of the anachronistic view, that is, in a contextualised analysis of the great lines along which the beginnings of conceptualism were written. The dialogic method here creates both a dialogue with technological development but also a divergent access to these artist's methods, less focused on using their words as mantras and more as one of the elements that allow for a critique of the displacement of technologies and for their processes of creation, including exhibition making and set-up of the art work in space.

Thus, I dedicate the first chapter to Marey to demonstrate how the scientific and technological context produced an indexical line and with it an indexical turn, towards more abstraction and less mimesis, more objectivity than subjectivity, through an automatic means of reproduction directly connected with nature or 'the real'. This abstract turn works only when it is at play with the icon as well, that is, with a form of likeness between the sign and its object represented by the association of linear patterns and photographic demonstrations. Therefore, this chapter implements a more precise lexicon around the index demonstrating the narrow use of Charles Sanders Peirce's semiotics in art theory, more precisely the three modalities of signs that establish the relation between signs, thought processes, and reality. The notion of an indexical turn devises different relations between life and art, proposing a causal process of representation, a new creation of signs embedded in the reality they represent. Will the indexical line turn out to outline a turn for the art object and process as a mediator between instances of existence, through a redefinition of the role of the spectator?

This question is addressed as in the second chapter through one of Douglas Huebler's lesser-known graphic works installed at the ThomasLewallen gallery in 1977, *North & West* (1977). I analyse how the line was used as a mediator between different

kinds of space (rather than an outline, as *disegno*) including the spectator's mindscape accessed through the instructions that constitute the work, written on the wall, alongside its 'lines'. This graphic installation was presented with an iteration of *Variable Piece #70* (1971) his quixotic project of photographing everyone alive thus illustrating the importance of the interaction between graphic and photographic endeavours. Through an overview of different exhibitions dedicated to 'conceptual photography' (*The Last Picture Show: Artists Using Photography, 1960-1982*, 2003; *Motion and Document, Sequence and Time: Eadweard Muybridge and Contemporary American Photography*, 1993; *Target III: In Sequence - Photographic series, sequences and sets from The Target Collection of American Photography*, 1982), I demonstrate how the method of isolating a single medium (in this case photography) is detrimental to the fruition of this engagingly playful strand of conceptual art. Furthermore, it bypasses what I consider to be the most important transition of the graphic method to the 1960s: the typology of Mareysian sequential photography was transposed onto an innovative and extremely contemporary dynamic between the elements of the work, echoing current notions of the 'in-betweenness' of the modern subject.¹⁸ Which is to say that even within photography theory there is still much to say about the ramifications of the medium, and the epiphenomenal pockets of exchange between artistic practices and expansions of photography in the realm of science and, more broadly, in technology as internalised structures.

That is why the third chapter focuses on the early paintings of Sol LeWitt as a case in point for what seemed to be a fascination with photography through the isolating of a

¹⁸ See Virginie Despentes' introduction to Paul B. Preciado's collection of essays *An Apartment in Uranus* about the trans experience: « This central story not of going from one point to another, but of wandering and in-betweenness as the place of life »; or: « ... from one language to another, from one theme to another, from one city to another, from one gender to another - transitions are your home » (Preciado 2019, pp. 24-25).

single frame of one of Muybridge's running figure, and turns out to articulate, through an internalised thinking of the seriality of chronophotography, a move from an illusionistic form of painting to geometric Structures based on permutations and, more importantly, to mural linear drawings. A passage from the chronophotographic to the graphic that allows for revisiting Muybridge's work in a way that throws light on the loopholes of artistic intentionality: was Muybridge's experimentalism informed by patriarchal manipulations of the image, for instance, as LeWitt was accused of later on, for instance? I found that the philosophy behind sequential photography, the graphic method, provides guidance to this turn towards a drawing stemming from non-artistic means of producing images with the added difficulty of the inheritance of the dialectics between iconic images and the indexical abstraction of the line. I take LeWitt upon his word of seeking 'objectivity' and evaluate what this means to him and how one can produce objective images. For this reason, I trace the apparition of his first lines, from the paintings containing a suggested line, to the ones forcing the viewer to break the line of reading and finally to the formidable task of conceiving lines in text form that would only materialise if drawn on the wall, interacting with it, and creating a completely new way of engaging with the exhibition space and with the viewer. Are LeWitt's works hypothesis akin to experimental science's whereby meaning is no longer sought for, but rather the unfolding of phenomena, the *hows* rather than the *whys*? Could this be the ethical stance of conceptualism? Or is it the abstraction of the indexical line and its game with the obscure and open-ended nature of its instructions the ethical position LeWitt contributed?

My last chapter, chapter four, is a point of arrival. By following the indexical line in an informed manner, one arrives at technology as a means to bypass dogmatic qualms about the medium and in order to encompass non-artistic methods. I employ Tamara Trodd's definition of technology as a form of incorporation of the non-artistic device into

the artistic, from the book-club to the fax machine (Trodd 2015, pp. 1-18). This implies a network, a connective force that drives creation through the impulse of ideation and realization. Following the indexical lines implies transversality, exploration and curiosity. Is drawing now re-defined as a form of techno-thinking that can be applied to creativity rather than engaging with it in a static form? The final chapter analyses 'internal structures' (Krauss 1977 Part 2, p. 58), particularly through the ground-breaking perspective of the chemist Pierre Duhem. Born thirty-one years after Marey, he was the first epistemologist to insist on the impossibility of science to know 'why', stopping at the functional, more playful, 'how'. Along those lines, I also base the conceptual standpoint of objective abstraction on the epistemologist N. R. Hanson's theories, particularly the book *Patterns of Discovery* (1958), that Huebler feverishly read, as he stated in 1989 to *Arts Magazine*: 'You might guess that I'd been reading guys like Robbe-Grillet in those days, although Hanson's *Patterns of Discovery* was extremely important to my practice' (Morgan, 1989). What repercussions are there for the body and perception once the first was analysed through patterned lines and the second dismissed as a mere decoder of information?

I.6. Revisiting the Index, From the Graphic Method to Technology

Why is Marey's line indexical? A brief account of the term is necessary for a better understanding of my first chapter dedicated to Marey's technology. The whole graphic method, I argue, is indexical. This thesis demonstrates that graphic and the photographic imagery opened up the prevalence of technology not only as images but also as structural processes of understanding and production.

The index is a semiotic term coined by another fascinating scientist, Charles Sanders Peirce (1839 – 1914), an American chemist, mathematician and linguist, who fathered semiotics. He most certainly did not anticipate how important the poorest sign of his tripartite typology of signs would be (the index is accompanied by the icon and the symbol). Indeed, the index is closely connected to its object, it is either a deictic (anything that works like and includes a pointing finger, from personal pronouns to the sound of a bell) or a trace of something like a shadow or, more importantly for media theory, like a photograph, which is the example Peirce himself uses for the sign he chose to call the index. The index works always in continuity with its object which makes it, in Peirce's eyes, a sort of 'compulsion' and a weaker form of language. Symbols, which are conventional signs, are far richer in Peirce's view for their autonomy from sources, and varied potential meanings. Because of this continuity and their potential to be traces, indices became important for photography and film theory to explain the causal relation, a chemical reaction on a surface, between the image or image-sequence with the thing it represents. This importance of the index, re-affirmed by the omnipresence of the technology it helps understand, despite Peirce's own hierarchy, confirms the occurrence of an *indexical turn*.

In contemporary art theory, the index was introduced by Rosalind Krauss in her two-folded article *Notes on the Index Part I and II* (1977) published in *October* magazine and since then widely read and debated. Margaret Iversen, another theorist of the index in her own right and whose work I also analyse, disclosed recently that she has been reading this text since it was published, for about forty years (Iversen 2019). Krauss conflated the index with its revised form by Roman Jakobson as a 'shifter', that is, a sign that acquires meaning through the context it is included in, such as the pronoun 'I', that refers to the

subject uttering a sentence. In Krauss' view, the index is a sign that needs to be filled by a presence. This unequivocally introduces the index as a negative form of desire.¹⁹

In her article, Krauss proposes Duchamp as the fatherly figure of the use of the index through his own interest in photography and his definition of the ready-made as a 'snapshot'. She then theorises two perspectives that would influence posterior readings of the index in relation to art through photography: 'as I have been presenting it, Duchamp's work presents a kind of trauma of signification (...)' and, further, she details the exact role of photography (that is, the indexical trace): 'it is not just the heightened presence of the photograph itself that is significant. Rather it is the photograph combined with the explicit terms of index'. The first remark, along with her references to Jacques Lacan, confine the theory of the index to psycho-analysis and the notion of trauma which are contradictory with Marey's technology as abstract representations of hitherto invisible and thus unknown and un-memorisable phenomena. Nevertheless, the notion that it is not just photography but the 'explicit terms of the index' that is relevant in the artist's use of it, and in my view, the indexical line that are of importance here. More so even than Krauss admitted herself, I will argue all throughout the thesis that it is the graphic method and not just photography that was crucial to identify the importance of this compulsive sign that, contrary to Krauss' affirmation, would affect the way we signify, rather than provoke a crisis of signification.

¹⁹ For further reading about the critique of notions of desire as lack contrasting with desire as anti-nostalgic plenitude see Braidotti (2006): 'The first residue of the negativity built into the psychoanalytic vision of desire as lack, and the subject as subjected to lack, law and the power of the linguistic signifier. (...) The 'noble' side of this vision concerns a political economy of affects such as mourning and melancholia, which I consider as a dominant ideology in capitalist culture'. (...) Rhizomic thought, on the other hand, is future-bound and relies on a revised version of the Bergsonian continuous present in order to sustain a vision of desire as plenitude, affirmation and becoming (Grosz, 2004)'.

It is this push of Marey's iconography into psycho-analytical readings of its images as lack, in detriment of his whole project that hinged so massively on that iconography, that prevents us from analysing in depth the graphic method and its importance as a graphically hybrid, technological re-birth of the line. It is because Marey refused to set his chronographic pictures in motion, because he aimed to detail more and more movement and its stages to measure it and anticipate it that I explore his array of technologies and technical images as silent information about the invisible ways of our own bodies and nature and the potential to build new machines, eventually a new body, moving away from the interpretation of the indexical line as trauma.

But what does this carry into art? The array of devices and concomitant imagery of the graphic method compose a hybrid number of technological tools, from the line to the machine, that by being used by artists enter the realm of artistic practice in such a notable way in the 1960s and 70s that it is no longer possible, I argue, to speak of the medium as a paragon of the artwork's identity in conceptualism. This thesis' innovative standpoint is to take conceptual artists at their word and accept that they created outside of the borders of art and that their heterogeneous material carried with it a form not only of scientific change, but also a societal change that touches us all. I aspire to implement a notion of technology as a hybrid, de-territorialised and re-territorialised notion, a relay of the graphic method. I hope that the new concept of the indexical line can excite artists, curators, theorists and amateurs alike to embrace schematic thinking and abstract technology as an operative, creative tool. It would also be a positive outcome if this study proposed a new and more fruitful way of enjoying LeWitt's mesmerising mural drawings and contributed to a wider knowledge of Huebler's still unlauded power of facetious wisdom.

I.7. Into New Territories

Therefore, I will argue on a final note that the indexical line is a technology that implies other technologies, other devices, and interacts with them. The indexical line emanates from a technological system akin to writing as drawing, close to asemantic writing so pervasive in outsider and contemporary art alike. But the indexical line is writing made by machines that accentuate the technological character of the act itself through their automated process. Writing, however, was always technological because it is hybrid, that is, it connects a number of disparate instances:

To be able to write we need – among other things – the following: a surface (a piece of paper), a tool (a fountain pen), characters (letters), a convention (the meaning of the letters), rules (orthography), a system (grammar), a system that signifies the system of language (semantic knowledge of language), a message to be written (ideas), and writing. The complexity results not so much from the number of essential factors as from heterogeneity. The fountain pen is at a level of reality different from that of, say, grammar, ideas, or a reason to write (Flusser 2014, p. 20).

Put this way, writing is a composite association of systems. When a machine does it, it almost gives us the impression of continuity between the phenomenon and the linear pattern it creates: a seismograph registers tectonic movements through sensors that inform a stylus. The difference when recording machines ‘write’, I emphasise, is that the language (the ‘convention’), the ‘characters’, the ‘rules’, the ‘system’, and the ideas stem from the phenomenon and we have to collect its patterns and accept that the indexical line is the writing of nature as Marey suggested himself. Nevertheless, it is no difficult

feat to understand that the acquisition of language and of cultural ‘gestures’ (to use Flusser’s expression) are as artificial to an individual as the language of Marey’s machines. In a way, the times we live in are defined by a comprehension of our systems as artificial components that work as independent and heterogeneous systems as stated, amongst others, by Deleuze and Guattari (1972, 1980).

Vilém Flusser, whom I employ at the end of Chapter 4, was undoubtedly the most original thinker of technology and its ramifications for the fate of humanity in the twentieth century, making it the central hinge of this philosophy, unlike Jacques Ellul or Lewis Mumford, who considered it a sub-category of the concept of technique. He proposed a reading of our technological time as post-historical: the line, for him, is connected with history – the line of printed writing – and the pixel, the quanta in our current time, now potentially disconnected from history. The latter, he sensed, is losing its linearity and acquiring a scattered form of temporality: ‘photographs are post-historical images, not only because they stand in the way of history like dams, but also because their generation depends on un-historical, post-historical, which is to say calculating, formal thought’ (Flusser 2002, p. 128). In our era, he explained, our scientific thought realised one can only calculate reality and not represent it; therefore, he argues, the debate around photography (that we should here understand as the primary form of technical images) is a misunderstanding because it relates this technique to the past rather than as a projection onto the future. Images no longer describe reality in a flux, they are autonomous entities rendering an abstract reality concrete.

‘With respect to post-historical images, we are illiterate, Flusser wrote, (...) we are incapable of decoding the ‘software’ generating these images. The hegemony of the literati was breached thanks to the invention of the printing press: everyone became a

litteratus. The same is possible today: everyone can become a programmer.’ In a certain way, I venture across this thesis, both Huebler and LeWitt proposed a sort of program.

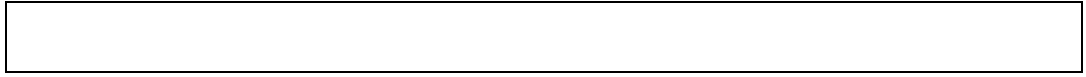
As such, this thesis hopes to contribute to a new line of enquiry about technology within art but also taken in a broad sense, and with the two paradigms of writing/language/graphics and automatic imagery, as the tip of the iceberg of programming, encoding, calculating, typical of our new way of inhabiting the world. By providing new concepts such as the indexical line, the indexical turn, the play between the index and the icon, my goal is to incorporate these more useful concepts in art theory so that the fruition of the ground-breaking creations of artists is more accessible on every level, and less powerlessly contemplative for the spectator. My anachronistic method associates Friederich Nietzsche with Douglas Huebler, Vilém Flusser with Etienne-Jules Marey in order to regroup thinkers and creators with similar concerns that provide a dialogic engagement with history. No single author has the answers, but many asked similar questions or worked in adjacent territories. By inverting usual methods, one may thus, rather than invoke a medium or a genre, use it as a relational tool, such as drawing was used curatorially thus unearthing the notion of the line, that I have followed here, I hope, to known territories in unexpected ways.

1 The Line as Index: Etienne-Jules Marey

1.1 Etienne-Jules Marey's Smoke Chronophotographs (1899 – 1902)



Figure 2 *Etienne-Jules Marey, Smoke Chronophotographs, 1899 – 1902. Inclined curved surface, paper print, 8,8 x 5,2 cm. Fonds Noguès n°59/30; tapered body, original paper print, 8,6 x 5 cm. Fonds Noguès n°5/57 ; inclined curved surface, vue posée, original paper print, 8,8 x 5,2 cm. Fonds Noguès n°5/57 ; 5 cm cylinder, original paper print, 7,9 x 5cm glued onto a chart with other prints. Inv. ML 10 (n° 10) La Cinémathèque Française.*



On the 19 October 2004, the Musée d'Orsay opened an exhibition, *Movements of Air, Etienne-Jules Marey (1830-1904), Photographer of Fluids*, dedicated to a series of seemingly abstract photographs revealing entrancing variations of strands of smoke against a black background [Figure 2]. The exhibition and catalogue texts specified that the twirling, drape-like smoke strands were produced between 1899 and 1904 by the physiologist and inventor Etienne-Jules Marey as a contribution to the study of aerodynamics (Didi-Huberman and Mannoni 2004, pp. 18-75). The smoke made air flows visible inside a purposely built machine with a box whose glass pane revealed the mesmerizing twirls performed by the smoke blown into it by virtue of a number of aligned holes, or channels, placed regularly in its side (11/12, 21 and 57 channels). For a modern spectator, immersed in the art of the twentieth and twenty-first century, these images were both exciting and intriguing but, most of all, they were irresistible. Or, in the words of Georges Didi-Huberman, 'trying to resist the feeling imposed on us by these marvellous scrolls is useless' (...) it is the feeling of watching pure beauty in the making, or being undone and redone incessantly before our eyes' (Didi-Huberman and Mannoni 2004, p. 177). My point is that Marey's images anachronistically conformed to the aesthetic of our times, namely the use of a sort of diagrammatic and organic line from Modernist sensibilities such as the Brazilian artist Lygia Pape's *Tréia 1, c* (2003-2012) installation to Jorinde Voigt's drawings, amongst many others, and thus resonated with contemporary art in an uncanny way [Figures 3 and 4].

In reality, notions of beauty were very different at the turn of the century, and Marey's images were culturally thriving, but elsewhere. More specifically, they had been, for a few decades, astounding the public for revealing nature's secrets, such as blood

circulation, or the behaviour of currents and air flows. And this series of photographed smoke strands was part of what was then called chronophotography, that is, the art of photographing a single phenomenon in a sequence of frames depicting and deconstructing its hitherto invisible stages to the naked eye. Sequential photography is now more often associated with the British pioneer Eadweard Muybridge who was indeed its first great developer starting with the horse's gait in Palo Alto, commissioned by the magnate Leland Stanford after reading in 1874, Marey's *Animal Mechanism: A Treatise on Terrestrial and Aerial Locomotion*. There is a curious entanglement of the two men's lives. Marta Braun notes that they both had the same initials and were born and buried in the same years, while sharing a passion for movement and the technological means of capturing it (Braun 2010, p. 133).



Figure 3 *Lygia Pape, Ttéia I,c, 2003/2012, nylon threads, variable dimensions. Installation view at 1 Museet, Stockholm, Sweden, 2018.*



Figure 4 Jorinde Voigt, *Nexus Study VII*, 2011, coloured pencils, felt pen, ink, graphite on 30 x 46 cm. Collection Centre Pompidou, Photo: André Morin. Donation of the Collection Centre Pompidou and Florence Guerlain, 2012. © Adagp, Paris

Movements of Air celebrated the 100th year of Marey's death; it was also an opportunity to remind the public that Marey played an important role in the development of chronophotography along with Muybridge and other even more obscure scientists for the contemporary amateur such as the astronomer Jules Jansen who chronophotographed the transit of Venus across the sun in an expedition to Japan in 1874 (Marey 2002, p. 123). For a number of reasons Muybridge's fame subsumed Marey's and this timid albeit delightful exhibition (considering Orsay's scale) wasn't enough to re-establish Marey's unique use of sequential photography – that he called chronophotography or chronography - to a wider audience. For despite an incredible success during Muybridge and Marey's lifetime, the latter's achievements fell into a relative obscurity, celebrated only – albeit vividly - by a niche of scientists, thinkers, and artists. For that reason, the smoke chronophotographs seemed even more fascinating and unresolved: how had they come to correspond so specifically to contemporary visual strategies and why? And were there more images – and lines - apart from these ones? And of what kind?

In fact, there is more to the obliteration of Marey's achievements. This interest in his use of photography also overshadows the immense scientific and technological background within which photography had a very specific role. For Marey was first and foremost a physicist and an inventor of graphic recording devices, precursors of the electrocardiogram or contemporary motion capture devices, for instance. He also wrote a number of books assembling all his devices and scientific finds under the umbrella of the graphic method, in particular *La Méthode Graphique dans les Sciences Expérimentales et Principalement en Physiologie et en Médecine* published first in 1878 and then in 1885 with an addendum dedicated to the role of photography within the graphic method. This title places Marey's inventions in yet another specific context which provides an additional clue to understand his images: experimental science. This is the expression used to designate nineteenth-century exploratory scientific methodologies using hypotheses tested by indirect observation, often through artificial recreations or apparatus created to replicate or probe phenomena, which thus overturned direct observation in favour of logical thinking and testing. This correlation between the line and scientific experiments, I found, was fundamental for the re-definition of the line, as well as its surprising connection with chronophotography.

Therefore, and within a highly technological turn, a *theoretical* stance in science was thus being established whereby logical thinking and scientific principles were the basis upon which science rested. Marey's machines contributed greatly to this by distancing the body of the scientist from its object through a complex set of apparatus and scientific imagery based on a graphic translation of phenomena through curves or patterned lines: the graphic method was established upon logical premises that machines corroborated or corrected with their linear patterns and graphs. Georges Didi Huberman, while entranced by this 'pure beauty in the making' of Marey's smoke chronophotographs, puzzles over

the ‘taboo of the touch’ they seem to harbour, ‘as if the human hand was an obstacle of principle to the fine knowledge of phenomena’ (Didi-Huberman and Mannoni 2004, pp. 177 and 187).²⁰ Marey’s graphic method thus participates in the epistemic and cultural shift of the nineteenth century which reorganised the dynamics between the eye and the hand, between observation and production and in which, I argue, the quality of the line – from its Euclidian definition to its technical use - would be irrevocably altered.

For, undoubtedly, the line has been a practical and speculative tool as far as history takes us: from the mysterious finger flutings in the caves at Rouffignac, to astrologic charts; from the lines of the hands to navigation maps or patterned scarification; not to mention the first explorations of the finger or the pen, whether on the sand or a digital tablet, made by children.²¹ Furthermore, the line gained a new recognition, particularly in visual arts, calling upon the brilliant anthropologist Tim Ingold into its research and curating fields, namely with his book *Lines, A Brief History* published in 2007, used as the title for the significant exhibition at the Centre Pompidou Metz curated by H  l  ne Guenin with Christian Briend in 2013.²² No longer could Ingold complain that his study

²⁰ Marey’s stance against the horrific practice of vivisection (operating on a living animal) pertains more to the poor nature of the information gathered from a subject in shock (as opposed to a subject recreating ideal conditions in a laboratory through the graphic method, that is, through non-invasive measuring devices), than to protecting animals from a painful procedure. The famous physiologist Claude Bernard, whom Marey succeeded as the chair of the Coll  ge de France, was a vivisectionist - a daunting prospect for his wife, who donated large sums to anti-vivisectionist societies (Braun 1992, pp. 10 and 15).

²¹ The Rouffignac caves, found by the archaeologist Abb   Breuil in 1956, located in the P  rigord in the southwest of France, are in interesting palimpsest as far as the line is concerned. 40.000 years ago, it was inhabited by the great bear first, and then its descendant, closer to our contemporary breeds. These animals scratched the soft and humid wall of the cave, carving parallel lines, on which pre-historic men drew, 12 000 years ago. Those, some pre-historians venture, provided the framework for the ‘finger flutings’ found in different places of the enormous and sinuous cave, and perhaps even the ‘style’ of finger carving of some of the beautiful animals drawn on the walls. These are mysterious serpentine lines covering a whole ceiling of one of area of the cave, for instance. One suspects that people lay down and made these marks with their arms outstretched, revealing a white layer under the red clay, making for an eerie abstract painting made of sinuous linear marks (that some pre-historians interpret as being snakes, while others call them ‘spaghettis’). Elsewhere, there are linear marks left by three fingers converging onto a point, made while walking along the wall where they remain, still bearing the fingerprints of the draughtsman or woman (Nougier 1978, pp. 14, 38, 47).

²² *Lines – A Brief History*, 11 January – 1 April 2013, curated by H  l  ne Guenin (Head of Programming of the Centre Pompidou-Metz) and Christian Briend (Curator, Centre Pompidou, Mus  e National d’Art Moderne, Drawings Department).

of lines was mistaken for a study of ‘lions’ (Ingold 2007, p. 1). The line has come to the forefront of contemporary art and theory, transversally, which is why the chronophotographic line is so intriguing. The beautifully executed illustration of Marey’s first invention, the sphygmograph or pulse reader, published in *La Méthode Graphique*, shows a hand, palm turned upward, idly waiting for the machine attached to its wrist to deliver its linear reading of the blood flowing through it. The hand is at rest, the apparatus is at work [Figure 5].

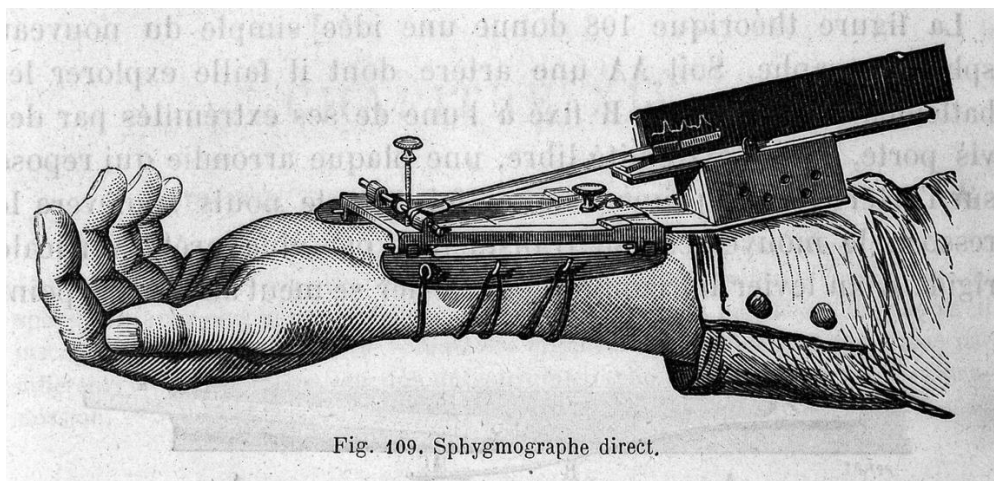


Fig. 109. Sphygmographe direct.

Figure 5 Marey’s *Sphygmograph* in use, 1860. *La Méthode Graphique dans les Sciences Expérimentales et spécialement en Physiologie et en Médecine*, 1885.

So, how did Marey move from the graphic recording devices he excelled at inventing and systematising to the use of photography? In fact, Marey started systematically using photography upon his discovery of Muybridge’s experiments in Palo Alto published in the scientific French newspaper *La Nature* in 1882 (first semester), in an article signed by his friend Gaston Tissandier.²³ But before that, he had invented his

²³ The origin of Eadweard Muybridge’s discovery of sequential photography was an example of a successful association of wealth, intellectual curiosity and technological virtuosity. The magnate Leland Stanford wanted to prove that, at a trot and gallop, there is a moment where the horse’s four hooves are suspended in the air – this was a highly debated question at the time. Muybridge devised the technology to prove it, starting in 1872 and pursuing a thorough study of animal movement until 1884 with Stanford and between 1883 and 1886 at the University of Pennsylvania.

first device in 1863, the sphygmograph (a portable pulse reader, an improvement on Karl von Vierordt's own invention), to which many followed. The sale of the sphygmograph allowed Marey to expand his practice and to endeavour a thorough study of movement, that is, 'the laws which govern the phenomena of life' (Marey, 1867, as cited in Braun 1992, p. 13) through the invention or betterment of other graphic recording machines such as the myograph, the dynamograph, the cardiograph amongst others. Movement was his life's passion and dissecting it his professional obsession. Closer to his discovery of Muybridge's chronophotography, Marey experimented with a 'photographic gun' (around the beginning of the decade of 1880), which took him from minute sequential photographs of 4 cm square each on a round glass plate to the accomplishment of chronophotography with high-speed film a few years after, enlightened by Muybridge's technique, which he improved.

Photography thus came as an extension to the *méthode graphique*, seen as a measuring and tracing device which the smoke series demonstrates with clarity: the smoke makes apparent how the air moves. In general, patterned recordings of sequential movement served to obtain a document through which it would then be possible to measure limbs in relation to each other, proportions, acceleration, pressure, variations of any kind by way of a complex system of sensors, wires and measuring devices.²⁴ Therefore, the line seems to have carried through from the graphic recording devices producing documents akin to graphs to chronophotography (very visibly so in the smoke chronophotographs). This transversality of the line from an abstract pattern to a photographic surface bearing a particular relation with reality, both representational and indexical, is worth investigating in its inner workings. It is also important to apply the dialogic method according to which the progression from one to the other works both

²⁴ For further reading about Marey's technical advancements and inventions see Braun 1992 and Dagognet 1992.

ways, thus highlighting similarities and crucial differences between both: the graphic recording devices produce a single, autonomous and continuous line, whereas photographic frames carry through the line from one to the other in a more truncated way and with the addition of the figure. In the graphic method, an abstract sign, almost a writing, is paired with a realistic, proto-cinematic image that carries with it the context the photograph is taken in [Figure 1 and 6]. This resonated with Marcel Duchamp, who avidly read *La Nature* with his sister Suzanne Villon, and then, inspired by Marey's iconography, went on to paint *Nude (Study) Sad Young Man on a Train in 1911* and later, more famously, *Nude descending a Staircase n. 2* in 1912 (Housez 2006, pp. 26, 95-96).



Figure 6 *Etienne-Jules Marey, Flying Pelican, 1887, chronophotography on fixed plate, © Deposit Collège de France in 1978, Musée Marey, Beaune, France. Photo: J.-C. Couval.*

Despite the relatively small scale of *Movements of Air*, the choice to show the smoke chronophotographs proved to be particularly wise. The curator, Laurent Mannoni, qualified these images as a 'kind of apotheosis of the Mareysian œuvre' (Didi-Huberman and Mannoni 2004, p. 7). Arguably, this fascinating series of images is as tantalising as a fire whose flames lick and consume what it touches; or better yet, as a permanent trace of such an ephemeral phenomenon - as it unfolds. It seems to be the exact opposite of the

famous 1838 daguerreotype of the busy but eerily empty Boulevard du Temple: the ten-minute exposure could not capture the passers-by, only two men who are not walking, the one having his shoes shined and the shoe polisher, thus managing to be the first people captured by a photographic camera [Figure 7]. By 1899 however, the camera shutters opened faster and the imprinted surface was no longer made of glass, rendering the photographic technique more efficient. So, while Louis Daguerre unintentionally managed to erase the familiar flow of passers-by at the Boulevard du Temple, Marey's smoke photographs, on the contrary, seized the moving smoke, that is, the secret of air currents, in a fastidious detail that will never be apparent to the naked eye.



Figure 7 *Louis Daguerre, Boulevard du Temple, 1838, daguerreotype.*

Moreover, Marey's last series of works is also the product of a technical breakthrough: they are, after all, the end result of the first wind tunnels ever created in the history of aerodynamics. Nevertheless, and despite this innovative streak, Marey was unsure of the smoke experiments, much awaited in the effervescent context of aerodynamics in the making at the turn of the century. Already ill, Marey was in touch with the American scientist Samuel P. Langley at the Smithsonian Institute, and it took some convincing on Langley's part for Marey to agree to develop what would become his

last major œuvre (Braun 1992, p. 214). The Smithsonian partly funded the smoke experiments that intimidated Marey because of their mathematical interpretation (already as a child, Marey would garner prizes for Latin and other subjects whereas Mathematics was his weaker subject at school (Braun 1992, p.2)). It is also possible that Marey, a 69-year-old established scientist with many responsibilities such as presiding over the Science Academy and the Medecine Academy while leading experiments at the Station Physiologique that he had so ardently fought for, felt tired and worn out by the disease and the loss of his life companion, Mme. Vilbort in 1893.²⁵ Marey regularly sent his findings to mathematicians, so his hesitation in pursuing this project is somewhat of an enigma, probably solved by a combination of factors (the falling out with his long-time assistant Georges Demeny in 1994 might be another important element).²⁶ The reality is that bespoke devices had to be built to produce these images that the exhibition *Movements of Air* showcased (or at least a re-creation as it is not yet quite clear how they worked). This is why the smoke chronophotographs expand our notion of photography, I argue, because the image is physically associated with *an artificial recreation of a phenomenon* through an apparatus; the smoke chronophotographs are a combination of a technology manifesting a physical law graphically through the use of a camera recording it and imprinting it on a surface. There seems to be a dialogic continuity between the

²⁵ The Station Physiologique was Marey's laboratory in the Bois de Boulogne, funded by the French Government, the city of Paris, along with private donations. It opened in 1882. It was torn down in 1979 to give way to an expanded Roland Garros stadium. Marta Braun had asked a friend to go there in the same year and, in a serendipitous turn of events, a worker informed the latter that they 'had discovered four large wooden cases' with Marey's plates and devices which sparked Braun's own research around the French inventor (Braun 1992, p. xiii). Only a 1914 stone relief celebrating Marey's career serves as a reminder of the Station Physiologique. The monument shows him sitting pensively, looking at a flock of birds, and men riding horses – depictions of chronophotographs. The men are at times in full volume and at others evanescent. On the protruding basis of the sculpture, a frieze of graphic method instruments including the sphygmograph lead to Marey's name and the year of his birth and death. In 1914 Marey as still seen as a creative scientific genius.

²⁶ Demeny was also a great inventor, but with a commercial aim that was alien to Marey's scientific mind. Therefore, when Demeny proposed to commercialise chronophotography, and started working on animated sequential photography, that is, to devise films, Marey was utterly uninterested, thus confirming my suggestion that the French scientist's perspective is experimental and pre-cinematic (Lefebvre, Malthête, and Mannoni 2000, p. 7).

logical premise, its artificial setting, the phenomenon, the camera, the line, and the law thus obtained.

So why is this series an ‘apotheosis of the Mareysian œuvre’? Mannoni explains that what seems to be a mistake on Marey’s part turns out to express his awareness of the special status of these images (Didi-Huberman and Mannoni 2004, p.7). For Marey calls them chronophotographs despite the fact that they are autonomous single photographs, unlike chronographic sets which, by definition, come in groups of several images in a specific sequence detailing the movement of a single phenomenon. One movement such as a man running or a bird flying is typically detailed by several images staging the different physical postures in a sequence made to be studied in the context of physiology, physics or aeronautics for instance.²⁷ Nonetheless, here, each point in the trajectory of the smoke can be read as a different moment in the trajectory of one single point, thus providing exceptional knowledge of air currents for the advancement of aviation.

So, the smoke chronophotographs seem to be the culmination of the Mareysian project of making nature explain itself through lines: a single photograph expresses the graphic translation of movement that Marey painstakingly extracted from less yielding objects of study, or with his graphic recording devices. Both apparatus, the graphic recording device and the photographic camera, seem to merge here, as the air flows suddenly made visible are linear streaks that *draw their own laws*. The sphygmograph, for instance, had an embedded stylus that scraped a sheet of paper covered with smoke: the black sheets streaming out of the device showed white streaks of lines translating the pulse against a black background, just like the smoke experiments. Didi-Huberman notes

²⁷ Herein lies the great difference between Muybridge and Marey: it has been noticed that Muybridge altered or omitted images in his chronophotographic work and that the grid he placed in his University of Pennsylvania body of work was used less for measuring and more to allude to a scientific background in order to please the Academic faculty. Marey on the other hand, fastidiously measured and timed his experiments in order to study them mathematically – of having them studied by third parties (Braun 2010, pp. 203; 206 and 210 - 211).

the striking visual coincidence between the smoke sheets and the smoke chronophotographs with their motif of a black background over which white linear patterns appear (Didi-Huberman and Mannoni, 2004 p. 191).

And yet, is it the apotheosis of Marey's work or is it a case of the phenomenon being a flow in itself, that is, a moving line? Mannoni refers to the technological advancement Marey worked for but also to the fact that these single frames work as sequential photography. He infers that Marey considered chronophotography a technology capturing occurrences of movement in time and that its scientific value was that the graphic rendering wrote its laws on the sensible surface of a sheet of paper, a thermic surface or the any other substratum. However, is it not the phenomenon itself that manifests as curves, segments, patterns because that is the nature of its consistency in the world? I argue that Marey's work is more engaging, from the point of view of the transversality of the line, when it painstakingly extracts graphics from nature, when it manages to graphically make visible the design of movement. For the graphic method is altogether based on the line, whether it is instantly apparent – such as with the smoke chronophotographs – or it is embedded in the captured movement. Which is to say that all of Mareysism resonates with contemporary art. But how did he do it?

Chronophotography was often but the starting point of a specific study. Because if photography was far more sensitive than the sensors used with graphic recording devices, the images it produced (unlike the smoke chronophotographs) were nonetheless blurry and superimposed. Marey had to undergo a series of technical strategies to extract graphics from nature such as the recording devices naturally did. One of his methods was to dress men with a dark tight suit with white lines running across the limbs, and photographed in an equally dark background so that the camera would capture the linear shapes of the moving body. The other method was to produce 'épures graphiques'

(‘schematic drawings’), drawings *extracted* from photographs by professional draughtsmen (Marey 2002, pp. 76 - 80). Because the dark suit made the flesh of the models disappear, and, in contrast, the white ‘bones’ of motion appear, it was named ‘skeleton man’ [Figure 9]. It is worth comparing it to Muybridge’s running horse skeleton [Figure 8]: both images aim at visualizing movement through a more diagrammatic mode. However, Muybridge’s staging is artificial and thus un-scientific: it is a recreation of what he has captured with living animals and does not have any causal relation to what it depicts - whereas Marey’s manipulation garners real, reliable results in contiguity with the phenomenon (which is a crucial detail for my argument), albeit translated by a coded system of lines. Here, one can measure the difference between scientific and artistic photography and the strategy of the image behind them: while Marey painstakingly marks and measures avoiding any kind of narrative, Muybridge plays with the accuracy of movement, while showing a dead and fleshless horse running, with the suggestion of a grin.



Figure 8 *Eadweard Muybridge, Skeleton of a Horse, Off the ground Whilst Running, 1881. 11,1 x 18,8 cm. Academy of Arts Collection.*

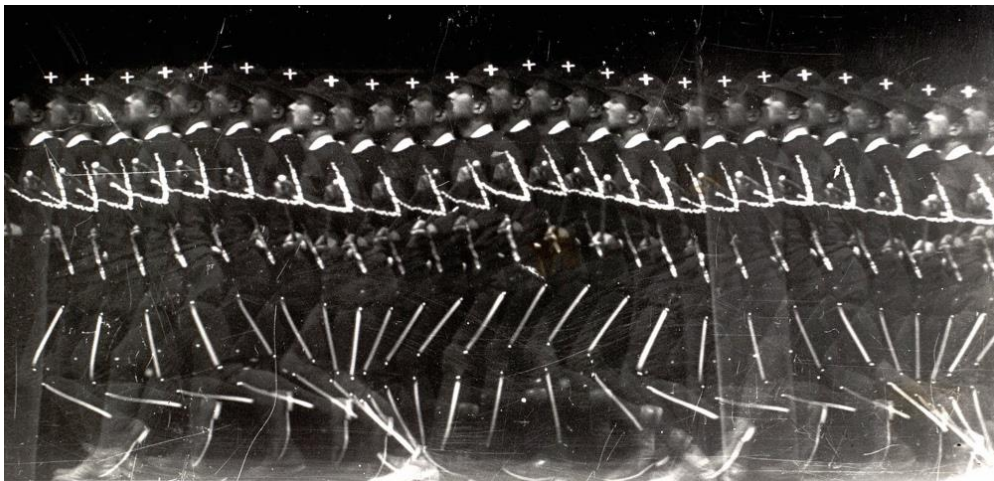


Figure 9 *Etienne-Jules Marey, Homme Squelette (Skeleton Man), circa 1880.*

This scientific background notwithstanding, there is a startling ambiguity to chronophotography in general and the smoke chronophotographic series in particular. Muybridge understood and explored this shifting aspect from the beginnings of his

ground-breaking practice as an ‘artist’ as he was described in the press apropos of his landscape photography of the American West in the 1870s to his *Animal Locomotion or Zoopraxography* lectures based on projected photography at the Chicago World’s Fair in 1893 amongst many other venues. Whether we consider Marey’s chronophotographic study of air currents through smoke as ‘pure beauty in the making’ or a pre-figuration of abstract art, it certainly speaks to a twentieth century aesthetic *based on the advent of new technologies*. I suggest that it even helped shape it, not only as a set of new possible re-configurations of representation, but also as the modulations of our conception of the world. We do not shape aimlessly or *ex-nihilo*: shaping and thinking work together.

Whether we relate the graphic method to Walter Benjamin’s philosophy of the reproducibility of the work of art, and images in general, (Benjamin 2008), or to Vilém Flusser’s expanded notion of the photographic to ‘technical images’ (Flusser 2011), there is an ambivalence of status in the graphic method’s extensive imagery. François Dagognet describes Marey as the ‘artisan of the modern world’, occupying ‘a position between science and art, caught in this odd double obligation’, and goes on to describe a canvas by the artist Hans Hartung in relation to Marey’s graphic renderings of muscular spasms (Dagognet 1992, pp. 131 - 133). This pertains more to the availability of images to be re-introduced in different times and contexts however, to their inner anachronistic status, than to Marey’s artistic dispositions (which were inexistent). I suggest that the question is not whether these images are scientific or artistic, but how the line’s transversality made connections between science and art, and to what consequences. It is especially crucial to understand the role technology played in it and what technology really is, considering the place it takes up in our life through imagery stemming from the second half of the nineteenth century. As I will argue in chapter 4, that these questions echo in particular Flusser’s vision of modern technology and its imagery as dialogic, as a

dynamic relation between the programmer and the decoder of the image beyond notions of photography as a medium and a static subject. Hence, I will argue that a new kind of spectator emerges, between the distracted ‘examiner’ who checks the minutiae of recordings from which it experiences a new kind of pleasure (Benjamin 2008, pp. 26 and 35), and the ‘player with information’ (Flusser 2011, p. 94) who decodes technological images as I will progressively uncover.²⁸

Paradoxically, I suggest, Marey’s own narrow view of art is responsible for the impact these images still have. His last chronophotographic *opus* challenges our idea of what photographic representation is through science and technology. For it worked unchallenged beyond dogmas of medium that were later to arise, to produce knowledge based on the transversality of the line. It was through the cluster of technologies of the graphic method that our values, our bodies and our behaviour changed. Pathology, physiology, systematic behaviour, image creation and distribution were all affected by this technological shift, which I consider to be an important vehicle for the introduction of abstract thought and abstract images in culture through artistic means. For it seemed to deliver an abstract and hitherto unknown – and unknowable – access to ‘nature’, rather than copying it. This visual access is nothing but the tip of the iceberg of the knowledge these images were instrumental for (the calculations, the following experimentations and the technologies that ensued). As images, they obtusely remain undefined, a powerful and unrestricted condensation of time and space in a vaporous linear medium, recorded by an invisible one, the photographic surface. Invisible, because one is reminded of Hollis

²⁸ Vilém Flusser’s philosophy is both visionary and utopian, and is intertextual with Walter Benjamin’s idea of technology: it is equally – and uniquely – as excited with their prospect of pleasure and creativity as it is ridden with anxiety with the availability of these images for fascist purposes. Having lived through the invention of the computer, it comprises a more specific view of what he calls the capacity of technological devices to ‘calculate and compute’, and of the inherited epistemology of the twentieth century that established reality, beyond our perception, as an abstract plane made of ‘emptiness’. Technical images are therefore not ‘explanations but visualisations’ (Flusser 2011, p. 47), projections onto the world and not from the world. They deliver symbols – codes – rather than extracting truths from nature.

Frampton's notion that photographs are 'less than nothing' (Frampton 2009, p. 9) and his sharp position against whoever tried to consider them as masterpieces or high art, and Roland Barthes' reminder that photographs disappear as an object under the subject they show (Barthes 1980). I suggest with Josh Ellenbogen however, that the surprising role of photography as the unveiling of nature's secrets (as opposed to the minute and precise representation of what we know nature to be) obliges us to re-think its role and its connection to technology in general because of the graphic method's multi-functional relation to it.²⁹

For Marey himself was utterly uninterested in the media he used; his life's purpose was to understand movement by any means necessary. In that sense, his imagery, in its achromatic freedom, was out of tune with the aesthetics of his own time - the antithetic, or perhaps complementary turn to both Realism and Impressionism. This imagery was even quite instrumental in the crisis that hit painting, along with Muybridge. Moreover, one of the things that connect both men (other than the same birth and death years) is the fact that they were not particularly attached to the representational specificities of the medium of photography or film, but explorers of its experimental potential to multiply perspectives and extracts 'truths', to follow the Mareysian lexicon. As Stephen Barber suggested about Muybridge, experimental film is more indebted to him than mainstream filmic productions (Barber 2012, p. 10). The same goes for Marey, who may be a pioneer of proto-cinema, but who inspired experimental and avant-gardist image-making in a much more profound manner.

Furthermore, Marey's commitment to the unveiling of life's mechanics made visible by the graphic method was closer to drawing than any other artistic discipline from a

²⁹ 'From approximately 1880 onward, in a diverse array of institutional and investigative contexts, different inquirers developed uses of the medium [of photography] in which the bedrock standard for what constituted a good or useful photograph – the ability to match what we see – no longer operated as it had' (Ellenbogen 2008, p. 1)

contemporary, dialogic point of view. Charles Baudelaire's peculiar dismissal of drawing in favour of colour in his critical writings about the 1846 Salon resonates, albeit negatively, with Marey's graphic explorations. He wrote: 'pure draughtsmen', are abstract, they are 'philosophers and pursuers of the essence of the essence' (Baudelaire 2005, p.86). The original version reads 'abstracteurs de quintessences', meaning, literally, 'abstractors of quintessences'. The word abstract is here used with an argumentative, negative tone, as by abstracting, one emptied one's subject of its vitality (in contrast, he sees the addition of colour as the life of art). Baudelaire sarcastically dismisses pure drawing as a quest for an essence that, by the same token, cancels out life through abstraction.

If one projects a contemporary notion of drawing onto Marey's case however, as my dialogic methodology does, drawing or graphic representation stems from the devices that artificially recreate a natural phenomenon: they are literally, indexically connected to life. From a current perspective and evoking media theory, the graphic representation delivers new, reflexive information. 'The medium is the message': the smoke twirls contain nothing other than themselves, they embody the information. Better still, like electric light for McLuhan, they *are* 'pure information' (McLuhan 2002, p. 8). As I have suggested, Marey's distanced stance regarding the media he nonetheless explored to the core may echo Marshal McLuhan's theories but also the twentieth century European avant-gardes and American neo-avant-gardes of the 1960s negating the medium as specificity and artistic autonomy.³⁰ The neo-avant-gardes of the 1960s and the post-minimal artists of the 1970s, evaded categorisation using historically uncompromised

³⁰ I agree with Tamara Trodd's position regarding the medium. Rather than insisting on the medium as a form of autonomy of art (an idea defended by Rosalind Krauss (Krauss 1999)), it is far more productive to see the disregarded medium in avant-gardes as the other side of the coin of media: a dialectic stance between the commodity and the 'resistance' to it, an uncompromised position regarding genres and disciplines, and their essentialist debates; a 'reshaping of the idea of the 'work of 'art'' (Trodd 2015, pp. 6-7, 154).

technologies or disciplines such as photography associated with drawing. These two disciplines did not count as fine art genres – one for its novelty and the other for its technicity - and came with the added layers of a totally new iconography or a relation to innovative cognitive faculties. According to Benjamin, drawing was one of the first arts to be reproducible, ‘long before printing did the same for the written word’ (Benjamin 2008, p.3) so, I argue, it was the perfect vehicle to understand graphic and photographic techniques.

The cultural ambivalence of the smoke chronophotographs, deeply rooted in science but also acclaimed by artistic circles for their eerie grace, is thus caught up in a time warp. They rendered possible future artistic and technical endeavours – from Hans Richter’s (1888 – 1976) animated abstract films to Attila Csörgő’s (b. 1965) photographs of geometric light shapes and many others - whilst also re-collecting older representations of undulating lines of drapery, water currents and wavy hair in painting, drawing or even sculpture. François Dagognet considers Leonardo da Vinci the ‘precursor’ of Marey, for instance (Dagognet 1992, p. 131) and, in fairness, the smoke chronophotographs do make one think both of Leonardo’s drawings of water flows and Gerhard Richter’s cloud paintings, particularly *Cloud* (1969, n. 242 of the catalogue raisonné), with its graphite annotations of the sea and the oil painting of a cloud hovering above.

Like Richter’s cloud, the smoke chronophotographs seem to hover above time, making connections. They unmistakably respond to the notion of abstraction and have had, as it has been thoroughly exposed, a certain ‘influence’ on avant-gardes of different periods and different movements. In fact, and contrary to what its wide use could lead to believe, ‘influence’ is one of the most imprecise notions of art history, because it only looks one way (from the past to the future) and it is mostly based on a historiographic

account of formal transference. I argue that what is captivating in Mareysian imagery is how we can come back to it and conflate contemporary knowledge to the implicit and explicit cognition processes that materialise in them and around them. If art history were only an account of formal contaminations its subject would be a dead archive unable to connect with a contemporary audience.

Certainly, Max Ernst's *The Blind Swimmer (The Effect of Touch)* painted in 1934 uses the smoke chronophotographs as a representation of contact within his own psycho-explorations of perception, touch and vision [Figure 10]. They are symbolically used to stimulate ideas of touch. Stepping away from 'bourgeois' iconography, scientific images allowed for a whole new exploration of modernity and its redistribution of the senses and the subconscious articulation within it. This is a testament to the influence of science – particularly of Marey's imagery - because Ernst, like many artists of this time, collected scientific imagery from the magazine *La Nature*. The same could be said for the Italian artist Giacomo Balla, who famously claimed Marey's iconography as a source of inspiration for his incorporation of movement in stages into his progressively more abstract paintings such as *The Hand of the Violinist (The Rhythms of the Bow)* from 1912. In her biography of Duchamp, Judith Housez recounts how important the friendship with Frantisek Kupka was for him because he 'was the first to take this scientific procedure of decomposing movement as a subject for his canvases and not, like Meissonier had done, in order to better copy nature' (Housez 2006, pp. 86 – 87).

My argument here does not exclude these visual quotations from Marey's legacy – they are obviously there – but assesses them as a small symptom that hides a much more decisive and contemporary relevance to Marey's project. They confirm the immense projection that Marey's imagery had but they also instrumentalise it for formal discussions about painting only. Just like Mannoni included simulacra of the machines

that produced the smoke chronophotographs as a reminder of its complex technology in *Movements of Air*, a broader study of Mareysian imagery as a new language and therefore a new relation to nature, experimentalism, technology and images has to step out of formal iconographic lists and consider that perhaps a typology of forms and devices, notions such as time and space, change and location, are far closer to Mareyism than visual quotations. I maintain that it is thus as a scientific project that the graphic method reaches its full potential as an epistemic turn hard to account for in its incredible outreach, from algorithms to motion sensors, but very obviously enmeshed in our technologically oriented culture and the symbolic system, cyberbody or posthumanist dispositions stemming from it. The smoke chronophotographs are deeply rooted in a scientific context that did not particularly consider art in any other way than to ‘correct’ its misrepresentations (like Muybridge’s horses ‘corrected’ many speculative paintings of horses in the air, legs outstretched).



Figure 10 Max Ernst, *Blind Swimmers (Effect of a Touch)*, 1935, oil on canvas, 92,3 x 73,5 cm.

If we analyse Marey's efforts in the domain of art, we soon discover that they were somewhat underwhelming due to his conservative view of the visual arts, especially when compared to what he was, in fact, producing. For instance, in 1887 he sculpted the famous seagull sequence of representations of the same bird in different stages of flight, adjoined to each other. This spectacular sculpture, made in bronze by a Neapolitan sculptor after Marey's positive mould, was to be a preliminary attempt to be followed by a set of sculptures representing human motion in 3D. In itself, the project is compelling, particularly the choice of adjoining the different representations of the same animal. However, Marey failed to see the modernist potential of his sculpture, presenting it as a starting point for a portfolio of three-dimensional prototypes for artists to represent movement *properly*. Marey introduced to the Académie des Sciences the first 'statue' of a runner that a certain Mr. Engrand agreed to sculpt after several images taken from different angles (the project did not continue and therefore no other stage of the man's run was produced). The aim was to help artists overcome an obstacle akin to not knowing

the laws of perspective, Marey announced. It is thus as a scientist and not as an iconographer that his relevance prevails as his next affirmation attests to: ‘photochronography’, Marey added before referencing Muybridge’s work, ‘seems to be available to service both the Arts and Science’, Muybridge’s efforts, he stated, ‘exerted a considerable influence on Art’. His use of the word ‘influence’ is a testament to his traditional view of photography being an ancillary tool for art. Marey’s ground-breaking thinking is to be found elsewhere than in this somewhat academic separation between photography and art, where the first serves the latter.

Looking at the smoke chronophotographs within their own scientific context reveals that there can be found formal and technological paradigms that resonate with avant-gardist strategies of making images while evading traditional artistic tropes – perhaps even, while evading art altogether and reaching a specific relation to the fabric or reality through alternative technologies. Although the formal reproductions and interpretations of Marey and Muybridge’s iconography may seem reductive, they cannot but carry with them some of the context they stem from. They also happen in a wider, much accounted for transversality between science, technology and art typical of the turn of the nineteenth century. Perhaps the transversality of the line allows us to rediscover the intricacies of this concomitance through a fresher and undogmatic perspective.

If these chronophotographs are special, it is also because they are a precipitate of the whole of Marey’s œuvre. Marey’s body of work makes what was subjective and fleeting become objective and spatial. Movement and time - that is to say, change – become if not philosophically defined, at least tangible and visible, measurable and understandable on a very specific basis, arising in a positivist time: it is not *why* movement and time exist that matters but *how* they unfold. In a reversal of knowledge systems, physics supersede metaphysics. And these images show it with precision, condensing information and

expanding vision beyond the capacity of the naked eye. The way they do it, is through a ground-breaking technology that creates new philosophies of perception through technology and a whole new system of signs.

1.2 The Redefinition of the Line Through the Index

Going back to the smoke chronophotographs means to examine photography while expanding upon the particular use of the line that it allows for. It both calls for a theory of photography and for caution while using it, as chronophotography, as I have argued, opens onto the whole of the graphic method, which is technologically varied. Nonetheless, the notion of indexicality already traverses two very different fields: the semiotic notion of the index has been called upon to understand the peculiar relation with reality that photographic images bear. So, traditionally, indexicality correlates two seemingly distinct fields, semiotics (the study of signs) and analogic photography and film. Hence, it is useful both for the technology of chronophotography and the ‘image’ it exposes: the line as a sign.

This is an innovative correlation that an investigation into the graphic method allows for: seeing the line as a photograph, that is, as a trace of a real event regardless of its representational value (its likeness to its subject). Rather than considering the line as a graphic tool – say, a plumb line - or a speculative one – a curve for example – I suggest we consider it *also* as a photograph. Or, more to the point, as a sign made by what it represents, an index. Just as a photograph is the chemical transformation on a surface of the occurrence it depicts, the graphic line is produced by the movement of the phenomenon it records. This is what film and photography theory traditionally designate as the indexical quality of analogic photography or film. The notion alerts to the abstract

quality of the medium (its blind reproduction) in addition to its ability to faithfully copy our perception of the world. In fact, analogic technology is characterised by this dichotomy of inherent abstraction and mesmerising likeness.

In fairness, the intricacy of the sign and the technology that produces it is not always evident for the consumers of technologically produced imagery. Admiring a photograph is seldom conducive to the awareness of the encounter of the atmospheric and the technological at its root. Nonetheless, I argue, and perhaps because of its intricateness to which we remain largely oblivious, the graphic method provides an important contribution to discuss the indexical aspect of photography as it is an abstract image and therefore doesn't copy anything we observe nature to be. This argument is also defended by Josh Ellenbogen in favour of a reassessment of photography through its scientific beginnings, to which I propose to add the hypothesis that the graphic method altogether is indexical, especially the line that stems from Marey's *appareils inscripteurs*, from his graphic recording devices (Ellenbogen 2008, pp. 1 – 25).

But how does a drawing device and a conceptual speculative tool such as the line come to be redefined by a technological translation of the laws of nature? The line remained unquestioned by Marey which makes for this hypothesis to be a dialogic proposal. It is not only the 'language of nature' but also an encoding that Marey considered natural, while, at the same time, Charles Baudelaire regarded it as artificial and abstract in drawing – lifeless. The only moment of doubt for Marey arose regarding the 'straight line', when he asked himself if it was found in nature or if it was a human invention, to which he concluded, quite unsatisfyingly, that we must have discovered the line through an empirical source, such as a 'straightened thread' (Marey 2002, pp. 42-43).

Firstly, indexicality is a widely debated concept and it remains unclear how and why it consistently became an unavoidable notion in the study of analogically produced

images. Secondly, in art theory, Rosalind Krauss introduced the index as a sign of the times in her seminal texts *Notes on the Index part I and II* published in *October* magazine in 1977 (Krauss 1977, vol. 3 - 4), sustaining her theory of a causal and existential relation between the artwork and life itself. To her, the index is an 'empty' sign such as her examples of the pronouns 'I' or 'you': they are empty because they have to engage with specific people in order to be operative – they are indexical because they are causally connected with the people they designate. This led her to Marcel Duchamp's work and to photography, an indexical form that the French artist used widely, along with the lexicon of the trace, the shadow, the negative mould, the line and the ruler, which are all traces or imprints, indexed to a representational origin with the exception of the ruler, that I will analyse further. As she accurately states, in the 1970s, 'it is not the just heightened presence of the photograph itself that is significant. Rather, it is the photograph combined with the specific terms of the index' (Krauss 1977, p. 78). I argue that the line is the most prevalent of all indices for it connects different materials and technologies. But what is the index, and is it a useful tool to analyse the specificity of chronophotography?

The index is a term coined by Charles Sanders Peirce, the man who invented semiotics. It is one element of a tripartite system of modalities of every sign: the icon, the index and the symbol. Very simply put – although Peircian semiotics is notoriously complex – signs can create relations between concepts and things by means of likeness (physical resemblance) – the icon; through a physical relation between the object and the sign – the index; and, finally, through an accepted use of a sign neither physically nor mimetically connected with its referent – the symbol. The index is therefore the 'pointing finger', inasmuch as I have to be in the vicinity of the thing I am pointing at, thus creating a relation of contiguity through presence and intention. This is the 'deictic' quality of the index such as in the adverbs 'there' or 'here'. This physical quality of the index can go as

far as a sign being physically produced by its object such as a shadow, hands clapping (in which case the clapping sound is the index) or, of course, a photograph. Peirce himself often uses the example of photography. For instance, when he writes about ‘likeness’, or the icon:

Photographs, especially instantaneous photographs, are very instructive, because we know that they are in certain respects exactly like the objects they represent. But this resemblance is due to the photographs having been produced under such circumstances that *they were physically forced to correspond point by point to nature*. In that aspect, then, they belong to the second class of signs, those by physical connection. (Peirce, 1894, pp. 5-6, my emphasis)

There is obviously, in this surprisingly clumsy account of iconicity, an ontological entanglement between the icon and the index in photography, which has given rise to an impressive amount of literature, especially since the 1970s. But what does Peirce himself say? He sets out to define the icon using photography, only to disassociate it from likeness because of the ‘physical connection’ between the photographic medium that creates a likeness almost by accident, *on the image*, because photographs are produced ‘under such circumstances that *they are physically forced to correspond point by point to nature*’. Not unlike Marey, Peirce seems to regard likeness in photography, inasmuch as it is linked with detailed representation object and context, in photography as an unwelcome and derivative accident: he acknowledges its reality but places it at the bottom of priorities when it comes to its potential utility.

Moreover, his description of the origin of likeness is symptomatic of a certain conception of photography: photographic images resemble things because they are physically imprinted ‘point by point’. This is uncannily evocative of chronophotography and its graphic renderings. Dots and lines were Marey’s language, as I have demonstrated before with the crosses and lines affixed to the Skeleton Man: the dot in motion is a line

in a graphic recording, just as a frame is activated by the sequence, in relation with other frames. In fact, this could have been a Mareysian description of photography reminiscent of the *épure graphique* had he been concerned with modalities of signs. Marey did equate his graphic method with a ‘universal language’, far more accurate than common language, a remnant of non-alphabetical symbols that traverse cultures (Marey, 1885, p. iv). Marey was not a linguist and he was more concerned with his scientific experiments that he efficiently wanted to inscribe in the nineteenth century Gestalt; nonetheless he was excited with the epistemic breakthrough of overcoming both the insufficiency of the senses and of language and therefore was aware of the cultural shift he had instigated.

However, as Ellenbogen incisively notes, Peirce himself was aware of chronophotography and of Marey in particular. He was even particularly familiar with the aforementioned declarations as he was commissioned to translate *The Graphic Method*. History displays a particularly ironic disposition in this serendipitous literary encounter: Peirce noted ‘charlatan’ in his marginal notes on *The Graphic Method* next to a passage where Marey envisions that technology would become – or replace - man’s intelligence and genius, which Peirce found egregious (Ellenbogen 2008, p.13). Marey was simply stating the ability of machines to produce readable visualisations of concepts or laws without human assistance, but Peirce failed to connect this somewhat grand affirmation with his own concept of indexicality, probably on account of his own reverence of the scientific mind.

For Peirce himself, despite a life of little recognition for reasons that are too long and somewhat speculative to detail here, was a man of science, the son of the important mathematics professor Benjamin Peirce, a trained chemist and astronomer.³¹ Here is how he describes himself:

³¹ For a fascinating and precise account of Peirce’s philosophy and life see Atkin 2016.

For ten years before this study began, I had been in training in the chemical laboratory. [...] I have paid the most attention to the methods of the most exact sciences, have intimately communed with some of the greatest minds of our times in physical science, and have myself made positive contributions – none of them of any very great importance – in mathematics, gravitation, optics, chemistry, astronomy, etc. *I am saturated, through and through, with the spirit of physical sciences.* (Peirce 1986, p. 25; my emphasis)

Highly intelligent and versatile, Peirce spent his younger years at the Harvard Observatory as a calculator and assistant, doing research from 1869 to 1872. As Alexander Robin recounts, for those three years Peirce produced a considerable number of glass plate images of stars – it is therefore not by mere speculative necessity that Peirce mentions photography but through empirical knowledge of its use in science (Robins 2014, p.10). It is therefore important to acknowledge with Robins that Peirce’s idea of photography was a very specific and scientific one which is corroborated not only by his biography but also in his own words – in the definition of likeness reproduced above, Peirce highlights ‘instantaneous photography’, which is nothing other than chronophotography.³²

Robin argues convincingly that little attention has been drawn to these words despite the crucial perspective they bring into the very notion of indexicality and its relation to analogic and film theory. Equally, little attention has been directed towards Peirce’s occupation as a stellar photometrist, producing images that by no means resembled stars: they simply measured their proportionate size (Robins, pp. 5-7). It is thus fair to say that Peirce’s notion of what photography was and its indexical condition bears a concrete relation with science. Photography was used both by Marey and Peirce as measuring

³² Robin takes his argument further by also acknowledging Peirce’s reference of composite photography which is a superimposition of images such as Francis Galton used to study physical archetypes. This kind of photography effaces the individual to obtain the type (Robins (2014), p.8).

tools, inherently abstract and graphic, of whose images iconicity was either stripped or completely absent. In the case of the smoke chronophotographs, there is no need to erase the icon as it yields to the necessities of science and adopts the shape of its particular sign: the line. Marey's last project is thus a sort of triumph of the index over the icon, of science over mimesis. I argue that from a scientific and even technological point of view a graphic sensibility, even an inherited notion of drawing, is far more present here than concerns with the photographic medium. In addition, this is one element that contributes to the implementation of the line and of a revisited practice of drawing in contemporary art, with the specific case of conceptualism with a much closer connection to the graphic method as a whole as I will demonstrate in chapters 2 and 3.

But for now, going deeper into the index from a perspective of abstraction and graphic rendering, one must also recognize that there is a strategic position to correlate photography and indexicality in art theory. In photographic theory, it is purposefully used to reverse the power imbalance between the index and the icon, to correct the invisible condition of the analogic medium and to take further notions of representation, proof, description, time and space marking of the image that functions also as a trace. It draws the spectator's attention to the chemical source of the images that for their potent mimetic qualities acquire an iconic status nonetheless: particularly beautiful film stars are, after all, called 'icons' whereas their mysterious aura was impressed on a surface 'point by point'. While recognizing this angle as an exciting line of research, important for journalism for instance, it is however not my goal here to explore the notion of the index as proof.

My issue with the use of the index is that the notion is extracted from Peircian texts in contemporary theory without regard to the fact that the three modalities work together and are intrinsically connected in every sign; or even without a specific notion of what

kind of photography he had in mind. This reduces and confuses the application of indexicality to the work of art (Robins 2014, pp. 10-14). The index is not merely a ‘corroboration of an existence’ (Doane 2007, p.129) but a specific sign whose configuration forms data, coded information which, in Marey’s case, seems to be, prevalently, *an indexical line*. One of the main questions regarding the smoke chronophotographs and the graphic method in general, keeping in mind the wide use of the line in contemporary art, is, I argue, *how indices redefined the line*, and *what the consequences of this redefinition are*. The proposed notion here is that Marey’s lines are graphic and photographic recordings which thus turn the line into a mechanic product, and index, in a world of predominantly iconic imagery.

Therefore, it seems that Krauss’ focus on the index only tells half the story: condensing the decade she alludes to (the 1970s) under the auspices of the index as a seminal starting point by now, albeit valid only if one recognizes, on the one hand, the index as data expressing information and, on the other, its dialectical relation with the icon and even the symbol. In reality, Marcel Duchamp’s painting *Tu m’* (1918) that Krauss defines as a ‘panorama of the index’ (Krauss 1977a, p. 70) bears, I suggest, a far more complex relation to the index in the sense that it not only has indices but moves on into the territory of iconicity by representing indexicality. The protruding bottlebrush (impossible to see on a frontal image of the painting) casts a shadow indeed, that a professionally painted hand, which was commonly used, at the time, as signage, shows [Figure 12]. The hand’s index finger, which is Duchamp’s way of announcing his interest in the deictic, is pointing at the real shadow of the bottlebrush, an index, while all the *painted* shadows of the ready-mades are iconic representations of indices. It is as if the index is broken by its representation, but at the same time invites for self-referral that bypasses Peirce’s intuition that indexes do not become anything other than themselves.

Nevertheless, once the painted image of a shadow is recognized as an icon, albeit bearing a relation of likeness with an index, it performs a sort of theatrics of the trace, but having lost the initial connection, the necessary contiguity with the object (which are here Duchamp's referred art works). Bearing in mind that this was commissioned by Duchamp's long-time friend and admirer Katherine Dreier, these shadows of past works must have been either jokes or tokens of appreciation – possibly both. Duchamp may have tried to represent his friend's knowledge of his work and perhaps even her favourite pieces. For Dreier and Duchamp had an ambiguous, perhaps at times intimate, relationship – she was an older rich patron, he was a young immigrant artist who enjoyed the company of older women. At any rate, Dreier used her power to make Duchamp work with oil painting, which he first refused to do. This was a very different operation compared to his *Large Glass* (1915-23), which was transparent and by no means a painting in the traditional sense. The *Large Glass* bore floating signs, references, *jeux de mots*, rather than turpentine and gesso.

Duchamp worked on *Tu m'* during the week-end like a *peintre du dimanche*, a Sunday painter, literally, since he had a job during the week. The painting was meant for Dreier's library [Figure 11]; so, forced to produce something in a strange format adapted to the architecture of his friend's house and with a medium he had discarded, Duchamp made it a 'lexicon of his main ideas between 1912 and 1918', which was an era when he moved on from cubist and futurist painting to the ready-made, from icons to signs in general and their dynamics – to ideas (Housez 2006, p. 203). Knowing how the French artist considered painting to be a retinal affair, he certainly played with the relation between the eye and the ideas through the most contemporary of signs, the index – to which he obliterated the defining contiguity, that is, a causal relation with the ready-mades.

Housez recounts that Duchamp wrote several notes about producing ‘*un tableau d’ombres portées*’, ‘a painting of cast shadows’, which certainly puts the emphasis on the indexical figure of the shadow, valid only in relation to the object that produces it. It is also a painting about self-possession and the possession or loss of one’s work, which is not surprising since he hated working on *Tu m’* and hated the painting itself as well, as he confessed years later (Housez 2006, p. 2003). It may be the first conceptual painting, whereby he gave his powerful and somewhat tyrannical friend shadows of his major creations, and not the real ones, and therefore as images of indices and not icons representing faithfully what is usually the object of desire for the collector, the artwork, as if the work existed only as an idea of the real thing for her and not in its material form. This commission uncannily embodies the battle between conceptualism and painting, indices and icons, between the sheer desire of possessing the thing itself through its artifice. Does Dreier thus possess all the works from 1912 to 1918 or does she possess their idea?



Figure 11 *Katherine Dreier and Marcel Duchamp at The Haven, her estate in West Redding, Connecticut, in 1936 with Duchamp's Tu m' above the Bookshelf and The Large Glass (1915 – 23).* Leslie E. Bowman, courtesy of Yale University Art gallery.

In *Tu m'*, the story of the index is more intricate and complex than it might appear. There is a humorous circularity, a tautological quality to it. But more importantly I argue that there is a conscious notion that signs evolve and that the most abstract and disconnected quality of language – its symbolic, communitarian, gregarious quality - overtakes any supposedly direct relation with concepts and things. Via repetition, things become an acquired taste, Duchamp opined in a filmed interview with James Johnson Sweeney, surrounded by his work at the Museum of Philadelphia (Duchamp, 1956). Which is why Duchamp sought a mechanic and dispossessed way of creating art so that he would not be reflected in the art, but the spectator. Moreover, the repetition of the ready-mades, echoing the reproducibility of a commodity that has to be available for everyone, but the same, was Duchamp trying to create a symbolic existence for his creations.

Krauss interprets the index as a proximity, ‘a message without a code’ (Krauss 1977b, p. 59), even a fusion of life and art, whereas in fact the index denotes both a proximity and a profound distance between the sign and the phenomenon it codifies through the added layer of the code itself. Krauss did not seem to notice this artificial aspect of the art of the sixties and the seventies while duly noting the artists’ intention to reconnect with life in a different way. But the use of unconventional, relatable materials from photocopies to words, filtered new encodings of information that would become new conventions, and even new styles.



Figure 12 **Marcel Duchamp, *Tu m'***, 1918, oil on canvas, bottle brush, safety pins and bolt, 69,8 x 11,5 cm. Yale University Collection. Gift of the Estate of Katherine S. Dreier.

A work of art, Duchamp seems to say, inevitably becomes a symbol: his title is made of two indices ‘you’ and the reflexive ‘me’ but any French speaker will complete the sentence, generally with the word ‘emmerdes’, which turns the title into ‘you fucking bore me’ but is closer to the expression ‘you are full of shit’ as ‘merde’ in French means ‘shit’. It can literally be translated as ‘you fill me with shit’. Duchamp’s wit is his ability to say so much with so little – and so grittily. Perhaps, also, this was a reaction to Dreier herself, or even a private joke between them. But the fact that most texts assume that is what Duchamp meant (when in fact he meant ‘tu m’ with its suspended notion to be completed by the spectator, or Dreier) speaks for the symbolic becoming of any

association of signs, reflected in Dreier's incomprehension of his abandonment of painting – on Dreier's desire of an icon (like Ernst's references to Marey's imagery are icons of indices). Duchamp understood that Dreier's commission encapsulated the ongoing discussion between modernity and its public. This power and the limitations of the symbol are prevalent in the title, which is projected onto the spectator: the responsibility of its meaning is passed on to him / her / them. What comes to mind is every symbol, that is, every idiomatic expression one can think of. The primary focus on the index, I aim to demonstrate, by following the indexical line, shifts the focus and the responsibility of the work onto the spectator, turning the artist himself into a witness of his / her / their own work.

Peirce himself is aware that signs are not fixed entities, especially when it comes to symbols:

Symbols grow. They come into being by development out of other signs, particularly from likenesses or from mixed signs partaking of the nature of likenesses and symbols. We think only in signs. These mental signs are of mixed nature; the symbol-parts of them are called concepts. If a man makes a new symbol, it is by thoughts involving concepts. So it is only out of symbols that a new symbol can grow. *Omne symbolum de symbolo* (Peirce, 1894, p. 10).

What happens when I am dealing with the concept of the index? As a culture, we assign specific meanings to words or signs in general. Namely here, we associate boredom with painting based on what we know of Duchamp. In fact, Peirce considered the symbol – language, any organised system of signs - as the most valuable of the three modalities as it is what allows for more meaning – ‘symbols grow’. Hence, the value of language increases as its contact with reality decreases, the sign fills up and carries meaning. Which means that, unlike the American avant-gardes Krauss referred to, Peirce

did not see the contiguity between sign and its object as a meaningful combination. In fact, one suspects that the reason why for him symbols were stronger pertains to the relation they bear with ideas and concepts. Indices are caught in a strange deictic relation with reality, they map out and measure. They are merely indicative, informative, structural.

But what happens when the index is applied to an abstract kind of marking or trace, not only indicating change and movement, but also bearing specific information about it such as the graphic method? Duchamp's play with the index can provide the seeds of an answer to this question. His critical and humorous deconstruction of signs also applies to the notion of the scientific trace functioning as a measuring, mathematical tool. He was well aware of Marey's work and was fascinated by the trace in all its forms, especially the line. Duchamp's *3 Standard Stoppages* (1913-14) is a clear reference to that [Figures 13]. He made rulers from the irregular lines obtained through a premise, evocative of experimental science, specifically: dropping three one meter threads from one meter high and turning their aleatory shapes into wood rulers.

This is of course yet another jest at the French scientific context: the meter was the standard measuring unit, developed by the French in the eighteenth century. It is a strange – and seemingly impossible - passage from index to symbol as it was created in relation with the earth's circumference, thus *indicating* proportionally, but it is also a universal convention detached from its original calculation. The development of the metric system and its proposal as a universal reference is a culturally French concern of the eighteenth and nineteenth centuries, echoed by Marey's defense of the universal calibration of measuring devices in the International Congress of Physiology at Cambridge, England, in 1898 (Braun 1992, p.222). The box containing the *3 Standard Stoppages* evokes the one

where the sphygmograph was contained, for one of the major improvements Marey brought to it was the fact that it was portable [Figure 14].



Figure 13 *Marcel Duchamp, 3 Standard Stoppages, 2013-14*



Figure 14 *Etienne-Jules Marey's portable sphygmograph. ©La Cinémathèque Française.*

Duchamp here alludes to the 'standard', that is the universal rule, the unity of measure regulating the modern world. He understood the linear index as a measurement and produced a seemingly light-hearted critique of universal standardisation. Is art

critically engaging with the index while seeking, not a proximity, but a relation with life? What are the modalities of relation between the index and what it indicates? What is that reality Krauss alludes to and how does the line operate in it?

Margaret Iversen provides a more detailed account of the index. Her first paragraph detailing the evolution from Peirce to Krauss is dizzyingly sharp (Iversen 2017, p.17). She explains that it has an ‘existential’ or a ‘causal’ relation with the referent. It either points to a referent in the presence of the speaker, hence it is deictic, such as the index ‘there’ points at a thing or a person within the subject’s eyesight or environment (this is the existential cause); or the index is ‘physically impressed’ by the referent, the classical example being the footprint (this is the causal relation). The latter sense is the one usually applied to photography, which is sometimes designated as a trace – that is, a more substantial and less ephemeral one, like a footprint.

However, Iversen states, both meanings of the index can be applied to one single object: take the example of a footprint on the sand; it is not only proof of someone having passed in a specific location, but it can also indicate a close relation – it was made by someone and it attests to his / her / their existence. For instance, for Robinson Crusoe, a footprint can denote a human presence in a space that was deserted for a long time, which indicates the existence of someone on the island – the end of his exile - and not only an origin of a shape, a positive to its negative. This would be, according to Iversen, a juxtaposition of the deictic and the causal functions of the index, the continuity and the physical cause. Iversen (and she is not alone in this) thus equates the indexical quality of the footprint with a ‘presence’. ‘On this account’, she concludes, ‘the index has an inherently traumatic power’ (Iversen 2017, p.18).

The index, however, is for Peirce the measurable aspect of the trace: for example, it shows if the person was running or walking and possibly how long ago. There is an

infatuation with the notion of presence and its correlate, absence, in the theory of the index applied to art – Georges Didi-Huberman, in his otherwise profound analysis of the ‘*empreinte*’ (‘imprint’) also describes the ‘*empreinte*’ in terms of absence and presence but with the added compelling element of ‘contact’ as his main focus is the trace of a shape onto a yielding material (Didi-Huberman 2008, p.18).³³ This is a confusion between different aspects of the sign: on one hand, the footprint as a measurable sign is an array of data providing useful information about someone, in the example above. On the other, the deictic sign has to operate *in contiguity* with the subject. That is, you have to be in the presence of someone saying ‘there’ and next to the referred location – it is a relation established between a location and people. Or one has to be analysing a location through precise data on a map, for instance, regarding one’s own position. What happens with the indexical line is that, regardless of Peirce’s notion that an icon does not produce symbols, the linear pattern, its raw form of inscription, is transformed into information regarding a pathology or physical distance, for example.

The index is not however, a proof of presence. The index can only point at an existing thing in someone’s environment or location in more abstract terms as it is a physical manifestation of data. It is therefore a mark of an existing thing but not a proof of existence. For all we know, the hypothetical person having left a footprint on Robinson’s island may be dead when Robinson discovers it. Or, to explore a less emotionally charged example: one can measure a star that no longer exists, since its light can be travelling still while its source may have already disappeared. What Iversen describes from this trace of a body, a passage, is an emotional projection: an inherently melancholy reflection through concepts of time and space about the passage from

³³ Didi-Huberman also mentions Duchamp several times, and his own explorations of what he calls *ressemblance par contact*, likeness through contact. Huberman studies the trace as a point of contact and exchange between two surfaces, with the resulting loss of volume and gain in the matrix, the graphic appearance of absence.

presence to absence – this is a strong argument for iconic photography that marks what ‘was’, especially for Barthes. Iversen’s interpretation of the index pertains to psycho-analysis and ‘trauma’. The index, I argue, denotes relations more than meaning, desire or loss. The latter are the viewer’s own projections which are elevations or relations between indices, icons, and symbols which are all, we should not forget, at play in one single sign. Thus Barthes’ *Camera Lucida* (1980) is a book more about the loss of a parent than about photography.

There is nothing wrong with an existential or even a psychoanalytical appraisal of the index (Doane 2007, Iversen 2017 for instance). I suggest, nevertheless, that it oversteps an innovative and exciting structural relation between the index, the viewer and the world. After all, the sphygmograph produces an indexical sign in the patterns it presents inasmuch as it measures the pulse; this does not elude the fact that that pulse, even when configuring a certain motif denoting a pathological or healthy condition, is unique to that person. Thus, the index *can* be equated with a mark of singularity not only in a timeline – a specific moment – but also existentially. However, in the case of the Mareysian line this seems to be a dead-end. Marey’s use of the index is clearly to extract laws from nature, to make it *speak*. Singularity, like iconicity, is a sort of ghost haunting science. In its application – the line as a sign of health or disease – it is merely functional and does not say much about the individual. Rather, it compresses him into a number or an array of data. And this, I argue, is one of the most important aspects of the trace: it is not emotional in itself – after all, it is a sign ; its use shifts the responsibility of an emotional content in art to the spectator, rather than representing it. Which is to say, contradicting Krauss, that icons may be emotionally closer to the viewer than indices, which are connected to the fabric of life, but interpose an encoded abstract language

between them, that Iversen calls the ‘graphic trace’, or an ‘indexical diagram’ (Iversen 2017, p. 67).

So, upon closer inspection, there is a layered reality to the index in itself. But if one goes back to Peirce’s definition of iconicity in a photograph the consequences for the intricacy between likeness and trace are also complex. It is almost as if one could separate three instances of the photograph: the chemical reaction (indexical), the foundation of the image (material) and the image itself (iconical). But as I have argued, one of the different characteristics of chronophotographs is the fact that, although they may depict natural movements of fluids and flows, there is no possibility of comparing them to the phenomena themselves as they are not visible to the naked eye. One must infer that, were we quicker and more perceptive, this is what phenomena would look like.

Therefore, rather than being ‘messages without codes’ as Krauss defined the index, they *seem* to be codes without messages – looking at them without their codex is like watching a sports game without knowing the rules. Their openness may be what disconnects them from having to show something specific –and thus from singularity. They portray laws that are stable and defined, calculated and rationalised. Hence, their scientific rigidity doesn’t prevent them from a play with references, from likenesses to abstract thought, from strands of hair to narrative structures for they do not look like anything we can perceive in nature. Noticeably, the literature around the smoke chronophotographs compares them to representations rather than to real things. This speaks to our tendency to visually identify signs and to assert meaning to them, which alerts us to the biggest conundrum brought up by the rise of formal abstraction and the introduction of abstract thought in art as the major element in the image: the complicated relation between abstract forms and ‘nature’, ‘life’, the ‘real’, or whatever notion a

specific period calls the wholeness of what makes our world identifiable, functional and meaningful.

It is thus clear that the epistemic turn of the nineteenth century brought with it a visual rendering of phenomena we can only calculate or see through different media. Most of the notions we deal with, from atoms to quanta, are what we understand, correctly or not, as elemental qualities of the things they constitute but look nothing like them. We are also provided with an array of images and structures that end up meaning that there *is* something with a certain type of behaviour that rules our lives, albeit completely inaccessible to the senses.

1.3 Abstracted Nature – Following the Indexical Line

How telling that the scientific magazine that Marey wrote for, along with so many other scientists of the time, and that artists so avidly consulted, was called *La Nature*. It clearly states, with such a title, that the findings exposed in its pages, from agricultural innovations to meteorological devices, redefined ‘nature’. The magazine’s subtitle was *Revue des sciences et de leurs applications aux arts et a l’industrie (Magazine about science and its applications to the arts and the industry)*. Its first issue, published in 1873 by Gaston Tissandier, who was a meteorologist and chemist in his own right, presented the deep need for such a magazine because ‘political newspapers provide each week accounts of the Academy’s sessions, and hire a scientific editor. Science is everywhere: it appears at every instant, we even witness its presence in novels such is its general span’. He goes on to explain the importance of fine illustrations and the role they play in explaining to the layman the intricacies of science. Never, in any instance, is ‘Nature’ explained, revered or even acknowledged in any other form than its phenomenal

manifestations as ‘fine geological landscape’, ‘an insect’ or a ‘shell’. But the relation between drawing and science is praised: ‘what disadvantage would there be in embellishing a figure of science? Why would it not be a work of art if it does not cease to be exact and serious?’ (La Nature, 1973, 1st issue, Preface, 1 vol. (viii-424 p.), 231 ill.; in-4; url: <http://cnum.cnam.fr/redir?4KY28.1>). This correlation between exactitude and art is new, and unexpected, albeit already at work in certain schools of Realism and Impressionism, which were challenging notions of representation. An artist like Georges Seurat for example, whose fleeting dots of colour decomposed and constellated vision, based his artistic project on scientific theories of perception.

La Nature’s philosophy remained clear in the content of the magazine, which was to approach nature from a scientific view and explain the methodologies and the outcomes to the layman. The incredible success of the magazine is a testament to the porous quality of scientific finds of experimental science, permeating the imagination and the culture of the second half of the nineteenth century. Furthermore, the illustrations of *La Nature* are particularly enchanting even (or even more) for the non-specialist: diagrams, machines, clouds, architectural plans, tools, animals, everything was drawn to the utmost detail [Figures 15, 16, 17 and 18]. Nature was thus cut up, displayed, dismantled, unfolded, catalogued and labelled. Hence, from a contemporary perspective, I argue this is a clear symptom of the redefinition of reality by technology, when technical drawing still had the validity of science; but when also, conversely, science had the potential to redefine life as we knew it. For *La Nature* had articles about distant erupted volcanoes, unknown animal specimens, all the possible categories of clouds, the telephone, the orometer, and many more new ways of looking at nature or using its seemingly inexhaustible energy in unexpected new fashions. Marey was a regular contributor to this publication,

participating in this new zeitgeist of making magic with science, delivering and being delivered through fascinating images [Figure 15].

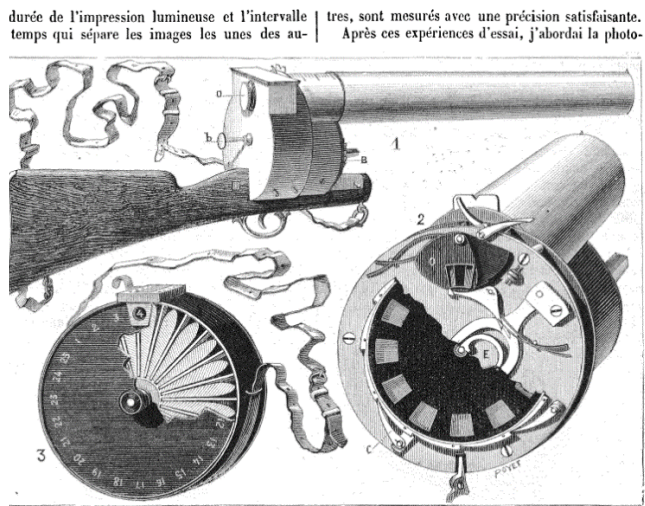


Figure 15 *Marey's photographic gun*, *La Nature*, 1882 (First ?), p. 329, ima: 333. 1 vol. ([4]-428 p.), 242 ill.; in-4. CNAM.

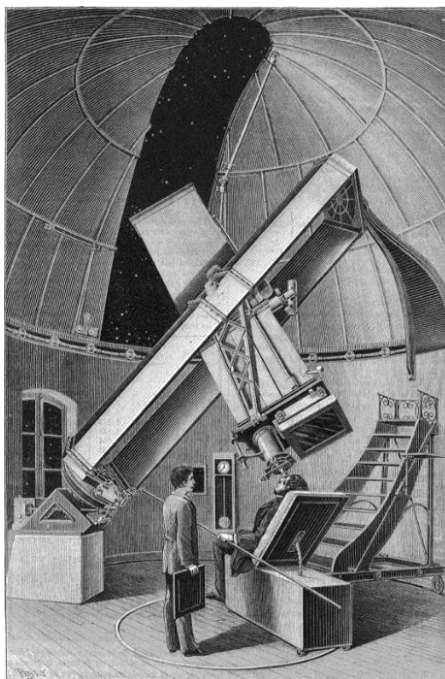


Figure 16 *Parallactic apparatus at the Observatoire de Paris*. *La Nature*, 1st semester, p. 25, ima. 29. 1 vol. ([4]-428 p.), 372 ill.; in-4. CNAM.

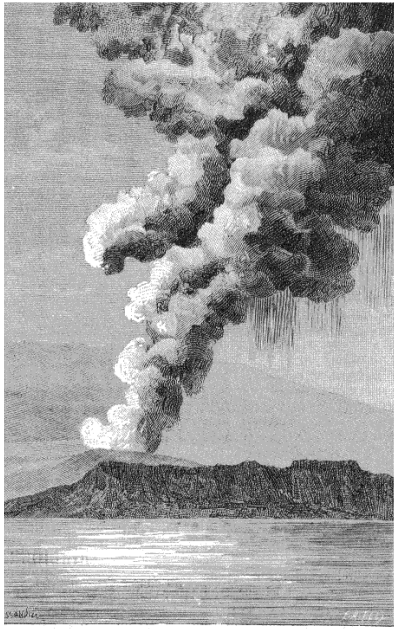


Fig. 1. — Éruption du volcan de Crakatoa avant le tremblement de terre du 27 août. (D'après le *Graphic* de Londres.)

Figure 17 *Eruption of the volcano Kracatoa*. *La Nature*, 1883 Second Semester, p.260, ima:264. 1 vol. ([4]-428 p.), 305 ill.; in-4. CNAM.

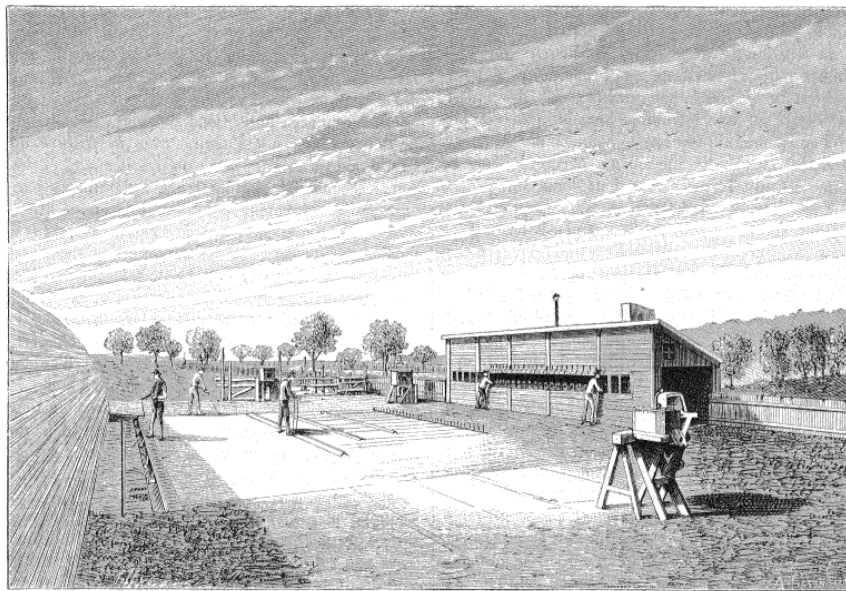


Fig. 2. Disposition de la piste et du hangar contenant les vingt-quatre objectifs photographiques pour la photographie instantanée des animaux ou de l'homme en mouvement.

Figure 18 *Muybridge's chronophotographic display in Palo Alto*. *La Nature* First Semester, p. 277, ima: 281. 1 vol. ([4]-428 p.), 242 ill.; in-4. CNAM.

Marey was a man of his time, fascinated by engineering, and dreaming of attending the *École Polytechnique*. He only studied medicine to please his father thus escaping an

even more dreadful prospect for him, which was to obey his mother and join the priesthood. Like many young people in the first half of the nineteenth century, he was fascinated by mechanics. But unlike most, he was truly gifted. Marta Braun describes him as having ‘brains at the fingertips’ (Braun 1992, p. 2). Like the famous magician Jean-Eugène Robert Houdin (1805 - 1871) before him, he played with clocks and devices, making toys for his friends at school. Such hobbies could take an intelligent mind to many types of work. On one hand, Robert-Houdin (after whom Houdini named himself), expert watchmaker and illusionist, developed a modern type of conjuring in Europe, and, on the other, Marey deeply changed technology and its uses. Both have in common the fact that they circumvented perception and played with what is and what is not visible, drastically changing our relationship with the world. It is as if technology provided a mental framework to take their own fields into modernity. Robert-Houdin wrote a fascinating book, titled *Secrets of Conjuring and Magic: How to Become a Wizard*, breaking down the myth of the magician, explaining how the conjurer has to be quicker, more sensitive and surer than the sense of vision and touch (Houdin 2012, p. 37).

Marey’s first and last project, the sphygmograph and the smoke chronophotographs, are worth comparing in light of the relationship to nature and how they both expanded and condensed our view of it. The sphygmograph was presented at Napoleon III’s court, for instance, upon the request of the Emperor himself; it was presented at the 1863 Universal Exposition and became a staple in every practitioner’s office. It was reliable, portable, readable, thus replacing the stethoscope which depended too much on the physician’s ability to hear clearly and which did not produce an objective account of the pulse in the form of a document. So, the first indexical device Marey worked on provided a strictly linear trace of movement, completely abstract and readable.

This was not the first graphic recording device ever produced, but it was the most precise and the first of a long line of systematic graphic accounts of any form of movement, from the trajectory of a ball in the air to the flight of a dragonfly. While Houdin made one see impossible things, Marey brought to the forefront of science a form of technology that had a little bit of magic too, that seemed to speak in tongues, or to write a foreign new language. It is not surprising that with the rise of scientific technology, a wave of spirituality and conjuring took over people's minds: this new world, with machines, widespread communication, and nature's rhythms being revealed certainly took hold of imagination, thus combining what in other areas had been disjointed: rather than originate a pious society, technology sparked utopias and dilated the world. But Marey's devices, in particular, seemed to simply place a glass on the wall of phenomena in order to amplify their ongoing murmurs. *And the linear patterns coming out of them made it seem like nature's language was inherently abstract*, which, I argue, is one of the most striking consequences in the epistemic shift it thus provoked, or at least was embedded in. Moreover, it condensed them into a single line that inherently represents movement but also, stemming from movement itself, contains in each moment of its course, valid, differentiated information about the specific body in motion it expresses. This was an innovation brought about by technology, upon which, as we saw, Marey had a polemic stance that Peirce found preposterous.

The virtual fight between Peirce and Marey has real consequences for the way we think our relation to nature through technology. Traditionally, at least since the Renaissance and clearly still for Baudelaire, the line is connected to thought. It is an ideal and simple element structuring notions of space and relations in general, be it through a curve or a sketch. It is indeed, already in itself, an abstract form of thought that materialises eventually. The first occidental definition of a line is Euclidian. In Jorge Luis

Borges' short story *The Book of Sand* (1975), the narrator, looking for a tangible form of the infinite, dismisses the line, the reader intuits, because it is too speculative. However, as I have demonstrated, Marey's line is photographic, preponderantly indexical, which ties it to the fabric of reality, albeit in an encoded way. The first calibrated device Marey produced, the sphygmograph, translated blood circulation into lines. This translating capacity is what propelled Marey to affirm that machines (and here he had in mind both graphic and photographic devices) replace human genius. The reason why Marey announces that machines replace human thought is because they simply do: they establish patterns that only extremely complex calculations would have obtained, without the aid of human thought. Hence, I identify abstraction, information and technology as intrinsically linked, as if suddenly, in a strictly figurative and narrative tradition where ornament is the only abstract form, linear shapes, diagrams, graphs and curves come to the forefront, rendering information understandable, even measurable, and the undertow of phenomena tangible.

Therefore, I argue that the indexical line breaks the line's causal relation with thought in the tradition of Renaissance's *disegno*; it breaks the causal relation between what the mind thinks and what the hand draws. For devices, complex apparatus producing new imagery, a new informed line, affect the way we even consider the line and its function. Or rather, perhaps, the machine does what *disegno* did before. And whereas Peirce considers signs as things that 'convey[s] to a mind an idea about a thing' (Peirce 1998, p. 5), he does not consider the potential for Marey's indices to articulate and express, better yet, to produce new knowledge. The index merely indicates. However, Peirce describes what indicating means and what function it has: the index provides 'information' (Peirce, 1998, p. 7). *There* is a house; the sound of a sneeze conveys the physical reaction to cold; the smoke – or air — moves *this* way; someone

walked / ran *here*. The information exists in a network of experiences that the indication can relate to in order to be placed – it is only a stretch to consider that indicating and informing is also a form of correlating, of establishing new dynamics.

Marey's vision may have exaggerated the role of his linear patterns as a language but his affirmation that machines replace thought merits some consideration, I will argue across this study. Of course, Peirce is concerned with what each sign does, their specificity. It is useful to understand the limitations and definitions of each one in order to understand how we reason. Nevertheless, Peirce's system is complex because, as he recognises himself, with the compelling example of the map (or any diagram), 'it is true that one and the same sign may be at once a likeness and an indication', to which one can add *on the same level of the sign*. Because, in the map, the configuration of places is like the real place proportionally, but the points indicating cities or villages are indexical because they relate the experience of place with the subject's location (Peirce 1998, p. 8). In fact, I suggest that this intricacy of likeness and indication, and what superimposes itself in this relation is crucial to the study of lines and to the understanding of post-industrial images.

So how exactly does this interfere with our notion of nature, as Marey would say, or 'the real' in a more contemporary echo of the art of the 1960s and 1970s? Does it relate to the rise of abstraction as an interpretation of nature? The Swedish artist and visionary Hilma af Klint started her abstract works two years after Marey's death, 1904. His machines drew under nature's dictation whereas Klint was told by spirit voices what to create, at least in her first years as a spiritual painter. Klint spent a lifetime studying these structural and linear paintings and drawings to understand their meaning like one looks at a sphygmograph record having lost the pattern coda.

Additionally, and later, in 1938, the Swiss healer Emma Kunz drew symmetrical diagrams with the guidance of a pendulum as healing charts [Figure 19]. What these two women have in common is the compulsion from the public and professionals alike to introduce them as pioneers of abstraction whereas their practice is a complex superimposition of spiritual and medicinal concerns with drawing and painting. Brice Curiger notes about Kunz that ‘these works appealed to fields of knowledge beyond the world of art, while only marginally referencing science and its history, or the geometric ornament prevalent in many cultures’ but he also remarks that Kunz’s indifference to art sparked a change in artistic practices. ‘Such an approach was to spawn the countercultural nimbus that found such resonant appeal during the 1970s, in particular’ (Kunz 2019, pp. 61-63). Curiger means by that that her eccentric abstraction led to explorations in art that discouraged the notion of pure art and compelled artists (but much earlier than in the 1970s in fact, closer to the end of the 1950s - someone like Vito Acconci for instance), to expand the artistic territories into theatre, psychoanalysis, science, and many other cognitive and creative operations. Scientific drawing, either esoteric, alternative or more scientifically grounded, sparked interest for different reasons, from Duchamp to the Surrealists and later with seminal figures such as Sol LeWitt, because it grounded art outside of exhausted debates between movements and art history genres that were no longer valuable, but that seem to prevail across history until now.



Figure 19 *Emma Kunz, work nr. 002, pencil and crayon on graph paper, 107 x 70 cm.*
Kunz Zentrum.

There is something mesmerising in Kunz’ practice nonetheless, which could contribute to persuade us that the line entered the realm of language as a potent sign through a mediation akin to nineteenth century technology, recomposing traditional (albeit alternative) stances: Kunz’ fascination with Paracelsus, the use of the pendulum, the healing power of natural ingredients. For instance, it was observed that ‘she worked fast, without a break, sometimes for over twenty-four hours. Anton C. Meier, one of the rare people to witness Kunz at her work said: ‘There was no counting, no calculating, no measuring, no geometrical construction: only the execution of a different inspiration’ (Kunz 2019, p. 19). Kunz believed in the ‘pictorial power of nature’, and numbers (Kunz 2019, p. 18), which does nothing against the temptation of assimilating her healing

charting to graphic recording machines, automatically rendering nature's laws into patterns.³⁴

In another attempt to understand and relate Mareyism to Modernist abstraction, Laurent Mannoni, included some of Alfred Stieglitz's *Equivalents* (1925-1934) in *Movements of Air*. Stieglitz produced a series of photographs of changing skies often interpreted as a quest for abstraction in nature, thus introducing the notion of 'natural abstraction', different from a pure pictorial one. Equivalence is a similarity in value but not in substance, which means that the photographed skies were a record of a specific day without any trace of its specificity. In these, it is as if nature itself leaves a trace of its inner workings but also of the artist's transitory moods. The camera is the interface of this peculiar relationship between the artist's psyche and the atmospheric abstract landscapes. 'I wanted to photograph clouds to find out what I had learned in forty years about photography', Stieglitz declared (Goldberg 1981, p.272), as if testing the medium. Nonetheless, this comparison falls prey to the visual quotations and similitudes with Mareyism that bear only a superficial resemblance. For Stieglitz's clouds are recognizable skies that test the potential symbolic relationship between atmosphere and a saturnine disposition, changing moods - a poetic magnitude.

Thus, these images are as much about the equivalence between the ethereal skies and the artist's inner states as they are about the immediate symbolic power of photography itself; about the power of nature's trace and its equivalent status regarding the recorder of the trace, and not the machine itself. In a way, I argue, probably somewhat outrageously, Kunz's body is closer to Marey's apparatus: it functions like them, impersonally, channelling nature, vibrating, marking, translating, than Stieglitz's camera. For one has

³⁴ Emma Kunz is not a mere visionary with posthumous glory. Hans-Ulrich Obrist, in his contribution for the aforementioned catalogue of her exhibition at the Serpentine Galleries he curated himself, notes that he first knew her through the therapeutic powder AION A that she invented of a healing rock in a Würenlos quarry, regularly used by his family (Kunz 2019, p. 51).

the feeling that Stieglitz sees the camera as an alter-ego, a mirror. I will further relate how the advent of the body as machine is one of the transformative passages from science to art in the twentieth century – or within this new territory that seems to transubstantiate genres and create a common ground between disciplines that had been separated hitherto. The question that surreptitiously imposes itself although I have no space to explore, pertains to art history and curating: is medium and formal likeness always a valid connective between artistic projects?

There is something intangible, impossible, in Stieglitz's equivalences, they expose what is deeply personal, at the verge of incommunicability, as completely objectified. But they conflate the sky and the photographer mediated by photography in an iconic setting, while expecting an indexical precision – which turns out to be an impossible fusion between subjectivity and objectivity negotiated by the trace. In *Equivalents*, a sort of indexical hope that cannot be attained looms in the lack of horizon paired with a conspicuous desire for abstraction, a sort of formal reach within nature itself.

In contrast, I argue that in Mareysian imagery singularity is derivative, and, moreover, the index is inevitably associated with its apparatus, just as the smoke chronophotographs were the product of an experiment artificially recreating a phenomenon. And finally, there seems to be a relationship between the graphic and the photographic through the line. Marey looked for patterns, for sameness, for nature's laws – and not for nature itself, be it human or non-human. At the end of his presentation at the *Académie des Sciences* in June of 1901, published in *Comptes-Rendus de l'Académie des Sciences*, about the smoke chronophotographs and machines, and after having assessed Mach and Helle-Shaw's contributions to the study of air and water flows he notes that: 'it will be considered, I think, as proof of my method's precision the fact that if we repeat the same experiment twice with the same conditions the images obtained will be identical

and superimposable for all the points that are not situated in the swirls' (Marey June 1901, p. 6). Sameness, not existential difference, is at the root of the indexical line.

Experimental science is a reversal of what the scientific method had been until the beginning of the nineteenth century and Marey is keen on highlighting this: *dropping direct observation as a scientific technique* is a recurring plea throughout his writings and, therefore, looking at nature was not a productive end per se. Indeed, experimental science relegates observation to the final stage of the operation, and places hypothetical and logical thinking as its starting premise. Rather than observing the phenomenon and dissecting its stages through analysis and calculations, experimental science produces a logical hypothesis, creates an artificial environment to test it, or a device to capture its mechanics, which produces an image to render them. In the case of Marey's endeavours, the passage from one to the other is operated by the apparatus created or adapted expressly to accommodate the phenomenon it attempts to capture and translate. This is not only brought about by photography but by any technological recording device – photography is but a branch of the graphic method.

If Peirce used photography as a problematic example of indexicality, he could have used any recording device. Thus, I believe, the restricted view of the technological index as a mark of presence or existence brought about by photography impedes a further appreciation of modern and contemporary art, reducing most abstract projects using the index to a sort of romantic disposition towards what is inaccessible rather than a critical exploration of abstract thought prevailing over the senses, which can extend to a form of graphic healing language as in the case of Kunz – we often think of Kunz as a healer that delved into art but never reverse the thought, that is, that Kunz used artistic expression cognitively. As the next chapter will illustrate, dropping the recording devices of this particular aspect of technological imagery of the nineteenth century, and focusing on

photography only, which in itself is complicated enough by its origins and its courtship of painting's genres, may be one of the reasons why there is such an incomprehension of the artistic strategies of the neo-avant-gardes that use diagrams associated with photography.

As I have argued, photography is thus embraced by Marey for its graphic properties: to inscribe movement on a surface through the means of abstraction and graphic inscription. For instance, in the third chapter of his book about movement, Marey alludes to the 'marvellous sensitivity' of the invention of a 'capillary electrometer' by Lippmann in 1887, that captured 'all the electrical variations that occur in living organisms'. Despite the evident qualities of the device, Marey notes that it still needed to be made into an '*instrument inscripteur*' (Marey 2002, p. 65). This French expression designates 'tracing devices', an expression that doesn't completely cover the full meaning of the word '*inscripteur*', which is the adjective in French corresponding to the verb 'to inscribe'. Marey's devices were 'inscribers', they wrote by leaving a mark. They created a document unlike Foucault's pendulum that drew small lines on the sand making it impossible to carry the results of his demonstration of the earth's movement.

It is easy to see what was lacking for Marey: to turn it into a machine able to capture electrical impulses in organisms and inscribe them on a surface. To obtain a document out of it. To that effect, Marey explains that 'we managed to do it through the use of photography' (Marey 2002 p. 65). He *inscribed* the electric flow on the electrometer (which was only visible through a microscope) that appeared as a line first and then a column whose top oscillated like that of a graph produced by tracing machines. It is worth noting that Marey uses photography to inscribe and not the other way around: he does not photograph first or focus on the iconic, he manipulates photography in order for it to become an '*appareil inscripteur*'. Just like the smoke, electricity produced its own graphic illustration. Margaret Iversen describes this as a 'hybrid' form of 'representation'

that she calls the ‘graphic trace’. She considers diagrammatic information to be ‘incompatible’ with the index, except for the case where ‘diagrammatic representation [is] generated by [its] object’ (despite the fact that Peirce himself explains that diagrams are a complex interlocking of indices and icons). That is, where graphic and photographic apparatus produce readable documents. Iversen still conflates it with the ‘unique’ as a mark of singularity though most likely influenced by further developments of the indexical in contemporary art: ‘the graphic trace is a hybrid type of representation: *it is an indexical diagram*. It takes from the index a registration of something unique – the impress of an individual – while incorporating the diagram’s abstraction from what is immediately given in perception’ (Iversen 2017, p. 67).

The story seems to point another way though. The line associated with the index within graphic and photographic technology render data objective rather than underlining its subjectivity or singularity. This is precisely Josh Ellenbogen’s stance: his point of view is that the epistemic turn redefined our representation of nature, or even image as representation, claiming that the kind of photographic work led by Marey does *not represent reality, it produces it*. Or, more specifically (and this is about the famous image produced by Ernst Mach of a bullet’s trajectory): ‘Photography *does not reproduce data* in such images, but *instead it produces them*’ (Ellenbogen 2008, p. 3; my emphasis), he recognizes that this is not only a specificity of photography, although his book’s premise is that scientific uses of photography should expand our definition of the medium: ‘Marey, in fact, seems to construe the graphic form as that which binds together all his various devices, seeing it as the shared terrain of photographic and non-photographic representation’ (Ellenbogen 2008, p. 199). This is a crucial appraisal of the impact technology has on nature: it expands it, multiplies it – *it makes it*. Or it makes more of it. Or, perhaps, it produces another dimension of it. All of this was sensed by artists who

looked in many directions into the potential for the real to unfold and multiply, from Duchamp's *inframince*, to Alexander Rodchenko's move away from texture and surface through the line among many other such projects.

In this sense the graphic method, by producing data through purposely built devices, challenges the notion of representation as mimesis – and perhaps even evaluates mimesis as something more ominous than representation (marketing is notorious for creating a need for things we did not know we desired). The graphic method creates realities rather than reproducing nature. Having dedicated the first steps of his lifelong research to the study of the blood flow and the heart, Marey tackled an issue very early on that would prove crucial in the study of aerodynamics but also helpful regarding representation: are machines mimetic, that is, do they copy their natural models or are they anti-mimetic and functional? Now, each time we look up to catch a glimpse of an airplane noisily passing by or travel inside one, we know: airplanes do not copy birds, butterflies or any other flying creature, albeit bearing a vague resemblance of shape. They are like Jacques de Vaucanson's 'Digesting Duck' (created in in 1739), an automaton that was presented by its inventor as a duck robot of sorts, whose mechanism was supposed to replicate the digestive system of the bird. One would introduce food in its beak that seemingly swallowed it; after a certain time, the animal would defecate the 'digested' food. A century later, the French magician Houdin studied the duck's digestive system only to find out that food pellets were introduced in its belly and then expelled to give the erroneous impression of a whole digestive cycle. If it weren't for the complexity of the automaton, Houdin would have gladly introduced it in his shows (Houdin 2010, pp. 156-160).

This goes for the mimetic machines, more akin to magic than to science. The issue of reproduction as opposed to production applies to the apparatus, the iconic and the

indexical aspects of graphic and photographic imagery. Marey's experiments were famous for simplifying functions of the organism in order to understand them. Marey defines photography in absolute terms – not even acknowledging other uses for it such as landscape photography or botanical studies – as a way to 'compare, through authentic images, the present to the past' (Marey 2002, p.123). The example he provides expresses his utter disinterest in any form of visual conformity to a retinal image of reality: several portraits taken across time reveal the effects of ageing. It is as if, for Marey, a single photograph did not bear any interest and that images could only be assisted by other images to be relevant, thus inscribing, through change in the lines of the face, the passage of time.

But how does the mere act of photography impact nature and our conception of it?

Hollis Frampton explains how it operates, through a unique parallel:

[...] the photographer does make something and what it is, is easy enough to say, if I may be permitted a homely simile. A butcher, using only a knife, reduces a raw carcass to edible meat. He does not *make* the meat, of course, because that was always in the carcass; he makes 'cuts' (dimensionless entities) that section flesh and separate it from bone.

The photographic act is a complex 'cut' in space and time, dimensionless, in itself, as the intersections and figures in Euclid's *Elements*... and, in the mind, precisely as real.

Certain photographs, through the justice of their cutting, even seem to share a privileged identity with their subjects. Every visitor to Mount Rushmore [...] hastens to bring home precisely the image he has already seen, hundreds of times – in photographs [...]. (Frampton 2009, p. 20)

Frampton goes on to establish the iconicity that is so important for a non-scientific (in Mareysain terms) use of photography, to describe the first photography as a sort of geomancy through projected lines. But what concerns us here is the 'cut' into 'dimensionless entities'. Echoing Ellenbogen's take on the graphic method of the multiplication of data, Frampton nevertheless has a more synthetic view of it, perhaps

because he is thinking of photography and not the expanded notion of the graphic method we have developed so far. He notes something important which is that the butcher does not *make* the meat, such as the photographer does not *make* reality – the butcher makes *cuts* into it. However, the butcher produces a hitherto non-existent food: a steak. This would lead us to the difficult debate of novelty versus reinvention but I maintain that Ellenbogen's argument for production against reproduction – of a new version of food, for example – is a valid and all too unexplored interpretation of technology's action on nature. Moreover, technology on the whole, produces data *and* data-making machines, documents *and* apparatus which communicate in terms of information, the index. It is a circular system whereby the information produced only exists because of the technology that allows it to exist – the information only makes sense because we made the machines based upon criteria of required information. The graphic method, devoted to movement, encoded data through the line, which is the figure of movement per se, through a speculative and schematic scope (it is a dot, a unity, in motion).

Ellenbogen wonders why the line is the encoding of movement. However, how can one not recognise the formal serendipity of the line corresponding to the 'dimensionless entity' mentioned by Frampton? Not yet a figure, not yet a shape, self-referential and visually evident to any mind, the line inhabits an in-between space that takes it from the most speculative form to the most immediate, self-explanatory position (think of a person explaining how to travel from Washington to New-York as opposed to a map delineating the way). Sybille Krämer writes that

in reality there are no two-dimensional planes or one-dimensional lines; but by inscribing a line onto a surface of a voluminous body, the surface, which has depth, is transformed into a plane, which has no depth. The act of drawing a line causes this metamorphosis to occur (Faietti *et all* 2015, p.10).

The line is a mediator. That is Krämer's premise, stated clearly in her title *Graphism and Flatness: The Line as Mediator between Time and Space, Intuition and Concept*. Neither in nature nor outside of it, the line cuts into epistemic territories, between an embodied notion of the world and a speculative one. It is not clear whether it is materialised by the surface that grants it a skin, or if the surface itself is dematerialized once it bears a line on its own skin: as Krämer notes, the inscription of a line on a volume operates a transition from surface (3D) to plane (2D). But as any chronologic recording can be reshuffled, the trace also upsets time. After all, movements are traces in the making. This in-between of the line, with Mareysim, became a specific relation with nature through a sort of indexical awareness of invisible phenomena that affects not only how we see nature but also how we see the line. The indexical line comes in a circular system whereby it is produced by an apparatus that was designed to produce readable information without the interference of the human hand, human perception in general or even, one must add, human will. We build machines but their processing has a life of its own.

In the smoke chronophotographs, after Marey's effort to extract diagrams from nature, or compelling nature to produce its own patterns, the line finally emerges on its own, in its own non-mimetic, self-sufficient, tautological and indexical nature. The indexical line, both synthetic and analytical, expands and condenses nature, attuning us to its invisible waves. The index can indicate something even if the 'something' in question can potentially be inaccessible (an image caption, the codex of a certain pattern for example). That is, the indexical line inherently contains information. This is the crucial point that correlates the patterned line on its own as it emerges from the graphic recording devices and chronophotography. The index is a free-standing kind of image even if being inherently informative, thus creating connections with other representations

that will appear diagrammatic too. This pairing of the graphic and the photographic, the line and the image, the diagram and the document will make several appearances throughout the twentieth century, but it will be the end of the 1960s and the 1970s that will expand upon its full potential through conceptualist strategies.



Figure 20 *Gerhard Richter, Cloud, 1969, 100 x 80 cm, oil and graphite on canvas. Private collection.*

2 The line as Information: Douglas Huebler

2.1 Playing with Indexical Lines, from Photographs to Words

The mediator is a facilitator. It should enhance the elements it brings together: a dynamic entity is the hidden force behind two or more things coming together. That is why drawing or *disegno* was considered the father of all arts in the Renaissance according to Giorgio Vasari who called painting, sculpture and architecture the ‘arts of drawing’ but did not consider it an artistic genre in itself. Drawing is a mediator inasmuch as the line, as Sybille Krämer claims, is a mediator. One could state, on a literal level, that both drawing and the line are mediators of the figure, perhaps even content. But Krämer goes as far as saying that the line is a mediator between concept and intuition, time and space. Because the line unites seemingly different operations of the mind and complementary but radically different notions such as time and space by revealing, giving concept, image and body, it disappears under the focus of such massive operations. This dimensionless entity, the line, despite being bodiless can make-up volume, and despite being wordless, can delineate an understandable concept such as a triangle, a cube, or a direction.

I argue that when the mediator stems from machines, understood both as a conceptual and practical tool, it is bound to become the focus of attention. For once, what mediates becomes more important than the mediated parties; the line as measurable or existential trace comes to the forefront of representations. Graphs, diagrams, maps, graphic expression in general are understood as more than immediate representations: they are the subtle mediators of our relationship with ourselves and the world. They have

an intrinsic beauty or a mysterious power. They have been considered the measures of truth and the rulers of our behaviours. They are automatic and portray every invisible or visible movement with a computing accuracy. They have in common with art this ability to ‘make visible’ as Paul Klee so beautifully said.

Nonetheless, they are almost too powerful and crushing. They seem limitless as long as the machine is powered-up. They contain more information than our brains can measure themselves without help. They are confusing albeit related with a code-system that renders them, like mathematics, understandable by everyone, regardless of mother tongue. Their specific power is that they have taken over the way we represent ourselves because they so literally embrace the way our brains work. After all, recording machines were invented by us, devised by us, so there is a reflexive quality of the line that not only describes the world, but also describes us by the same token. And this reflexivity, I believe, could not remain unquestioned. There was an inherent philosophical take to be had on the apparatus of the graphic method that was never really claimed because it moved on to cinema and photography as genres, and because it was involved in other issues of the nineteenth century such as Vitalism and Positivism.³⁵

I posit that this is what the conceptual artists took on, not consciously as a study of the indexical line, but as a tool that was simultaneously historical, stemming from geometry and *disegno*, but also inherently new, as a tool that enamoured and invaded our representations, the indexical line, and finally as a specific relation with language. For, if scientifically the line is understandable by all through a code system, when it comes to any other form of message, ambiguity strikes. Cultural traits affect lines as much as they

³⁵ For further reading on Vitalism, see Braun 1999, p. 10 – 13. This particular debate is of interest because it opposes physics and metaphysics, and forced scientists to ponder upon the limits of science: it discussed whether there is a vital force, a life principle that does not depend upon the living organism, a spark of life that ignites it beyond the physical properties of living beings. Vitalism was directly opposed by Materialism with its Cartesian belief that living beings are machines and that life principles are to be found in their mechanisms.

affect vocabulary or body language: conceptual artists had seen that with abstract art and the way it forced itself into a universal truth through the subjectivity of the painter. They have also watched Minimalism form a new rule of self-imposing, hieratic ‘specific objects’, ‘neither painting nor sculpture’, as per Donald Judd (2005). And they looked at this double-sided entity, the graphic and the photographic, as a new form of objectless documentation, neither artistic nor pedestrian, neither invisible nor monumental, with the line as its subtle mediator.

I also propose that the use of the line by conceptual artists deemed them to be intrinsically philosophical for time and space, utterly complex notions despite their primal status (Immanuel Kant considered them to be the innate notions one is born with), are the most abstract of tangible notions. One knows what time and space is, one can measure them, and yet it is utterly impossible to find out if they are innate notions with no real existence, or existing notions the brain simply cannot grasp or define. Not being philosophers themselves and not particularly interested in philosophy as such (with the exception of Joseph Kosuth) they settled for paradox, and not unlike Lewis Carroll with his love of logics, mathematics, and puns, artists such as Douglas Huebler and Sol LeWitt set out to build a ludic field of experiments with the newly discovered powers and territories of the indexical line.

This brings us to 1977 when Douglas Huebler had a solo show at the ThomasLewallen Gallery in Santa Monica where he exhibited *North & West* (1977), a line and text-based wall drawing, not unlike Sol LeWitt’s intricate instructions much differing visually from their realisation [Figure 21].³⁶ But, faithful to his technique of juxtaposing text and linear drawing in the work, Huebler played with the inadequacy of the relation between the text and the spectator’s perception of the lines on the wall

³⁶ ThomasLewallen Gallery records, 1970-1980. Archives of American Art, Smithsonian Institution.

instead of using the text as a faithful yet visually disconnected description like LeWitt. He added colour to this dynamic, making the experience of *North & West* seem like a complicated and dry assessment of the exchange between cognitive and perceptive faculties - only to dismantle this first impression. The text on the 'south' wall states the following:

Beginning at the extreme left edge of the surface the top most plane (represented by a red outline) extends into the space behind the picture plane at an angle of 45° until terminating, 17 feet deep, upon contact with a plane of bold green colour at the extreme right itself extending inward towards infinity, although it appears here only as a 12 inch vertical line, inasmuch as it is exactly perpendicular to the picture plane; simultaneously, and similarly, the lower 'red' plane is inwardly extensive, at a 90 ° angle, towards infinity; although the actual length of each red plane is 24 feet foreshortening causes them to be exactly 17 feet long, while the indeterminate length of the green planes is so radically foreshortened as to make them seem to be simply one dimensional; between these spatially dynamic forms appears a 'blue' plane which is situated exactly on the picture plane and is co-extensive with it and continues, in its extensity, to conform with the surface planes of the adjacent walls thereby functioning to mediate, in a natural manner, the oppositions between literalism and illusionism contending to be the pre-eminent expressive form of this representation.

The text on the 'north' wall continues:

During every instant that these word appear before the percipient the ends of both lines appearing above are imperceptibly extending towards infinity while the colour of the lines ('yellow') is expressing its normal tendency to advance into the space ahead of the picture plane by extending, at the speed of sound, across the space of this room and back – again across and back – and so on, all the while generating a colour 'mix' with the blue lines sufficient to create 'greenish' aura in the space between these walls.³⁷

³⁷ Ibid.

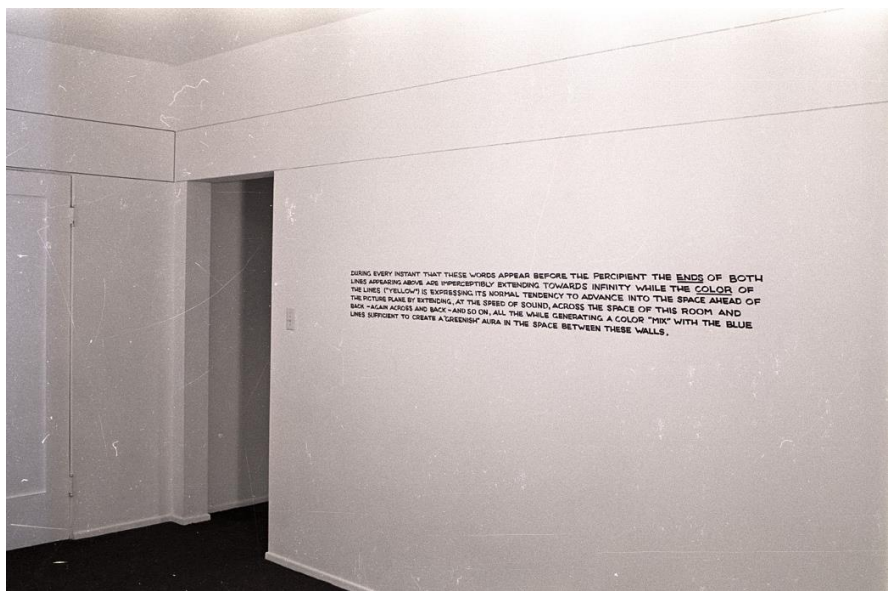


Figure 21 Installation view of Douglas Huebler's 1977 exhibition at ThomasLewallen gallery, and North Wall.

The art historian Susan C. Larsen, reviewing the exhibition for Art News in February 1978, admits that 'trying to match the configuration of coloured lines with the verbal

description results in a state of confusion'. Focusing intently on the details of the experience of the work as they were dictated, she did not mention that the text is a hybrid affair, mixing geometry (the 'plane', 'infinity'), theories of colour and perception (the basic mix of blue and yellow producing green), philosophical science-fiction (the plane extending at 'the speed of sound') and art history jargon. There is an overarching philosophical science-fiction narrative, which is a play with indexical lines – lines that indicate something invisible to the naked eye but that are nonetheless of an informative nature. (An infinite line, for instance, is by definition something one cannot experience.) Furthermore, iconicity – the relation of likeness between a sign and its object - slides in there, through the cracks of what Huebler refers to as 'literalism' and 'illusionism': the text indicates a line so one can remain at this basic level of understanding through likeness (the line corresponds to my idea of the line) or embark on an 'illusionistic' affair that is not, however, optical, but dependent upon the text and the ability to imagine, for instance, extended planes at 90 or 45 degrees from a few lines on the wall.

Hence, in a surprising twist, 'illusionism' hinges upon the notion that the lines on the wall are indexical rather than iconic (rather than playing with perspective or *trompe l'œil* for example), that they indicate a larger phenomenon than their appearance on a surface as its trace like Marey's smoke chronophotographs. It is an indexical fantasy. Is conceptual speculation optical illusionism since it is based on a visual clue? Or should we call it conceptual illusionism, a *trompe-l'œil* for the mind's eye? At any rate, I suggest, this forged indexicality hinges on the notion that through words we build realities that exist only, in objective terms, in a schematic form which translates realities through deictic language or indexical lines. Thus, here, I argue, *there is a concomitance between lines and words* inasmuch as they function in an isolated manner, as elements of an antagonistic relation between icons or indexes, but also between icons and their objects

(between lines and the real line, and between colour planes and the imagined colour plane).

Huebler plays with the notion of pseudo-scientific demonstration and the ensuing absurd intricacies between likeness and indication, between plain information and mental associations. Moreover, and to make it more tautologically complex, the status of the text on the south wall is reduced to a literal relationship with itself describing exactly what it is doing, that is, to build an ‘opposition’ between literalism and illusionism fighting to be ‘the pre-eminent expressive form of this representation’. Which is to say, in simpler terms, that what the text is describing - a fight between literality and illusion - is realised by the text itself. Without it, there are just red, green, blue and yellow lines forming a beautiful diagrammatic composition.³⁸ This circularity, functioning in an almost mechanic way, resonates with the graphic method, with its indexical lines. The new element here, I point out, is language. Based upon it, or oriented by it, is the experience of the spectator, included in this circular *modus operandi*. So, how does it unfold?

One could argue that indexical illusionism fails as, in the words of Larsen, it induces a ‘state of confusion’ in its effort to make the concept work against the obvious finite nature of the lines and the inconspicuous reality of the ‘planes’. Larsen explains why the state of perceptive confusion settles in: the lines are ‘so thin’ that even the slightest suggested or adjacent colour perceptions are ‘subtle and fleeting’ – she notes that the

³⁸ This opposition between illusion and literality has several ramifications. The first one is the closed circuit of pre-conceptual operations such as Robert Morris’ *Box with the Sound of its own Making* (1961), which was a box made by the artist and whose building noise was recorded and enclosed in it. Christine Kozlov, who initiated the techno-conceptual strand still valid today with artists such as Christian Marclay, in ‘Information, No Theory’ (1971) used a reel-to-reel recorder to endlessly record and erase the noise of the gallery. Secondly, this circularity echoes, in a critical manner, Greenbergian medium specificity whereby the work of art explores the essence of the medium it is thus reflexively expressing. It excludes, however, the authorship and its emotional and subjective projection, such as Alberro points out about LeWitt, for instance, stating that his method of production ‘negated the ‘I’’ by adopting ‘an external program’ – a ‘predetermined concept’ or ‘idea’, focussing on its mental process as well as its process or realisation, thus eliminating personal traits. Thereby ‘this new regime of absolute literality and materiality resulted in highly reflexive works’ (Alberro 2003, p. 38).

‘‘greenish’ aura’ does not appear as stated, that is, as a mixture of the yellow and blue lines ‘and was never intended to do so’. In other words, the viewer’s perception fails to be enraptured by the experience announced by the text; or the text promises something empirically impossible. This is an acknowledgement of the farcical nature of Huebler’s work but fails to suggest its humorous spirit: take, for example, his description of a plane that extends to infinity ‘although it appears here only as a 12-inch vertical line’; this is conceptual humour at its best. Like the Don Quixote of geometry, Huebler makes us comprehend (and wonder what this comprehension is), with an inward eye, mere drawn lines as planes in an unattainable dimension - or, more *literally*, inside the wall.

However, iconicity ends up being the default condition of perception. The painstaking review is a well-meaning, serious undertaking – Larsen did play the game – but that did not have enough space to take on the complexities of Huebler’s relation to perception nevertheless, that is, his complete lack of interest in it. The much quoted first part of Huebler’s 1968 statement, is complemented by a program, from the third to the fifth and final sentence, that anachronistically reminds us of Marey’s claim that the graphic method bypasses perception through a new language made visible by graphs and chronophotography:

The world is full of objects, more or less interesting; I do not wish to add any more.

I prefer, simply, to state the existence of things in terms of time and/or place.

More specifically, the work concerns itself with things whose inter-relationship *is beyond direct perceptual experience*.

Because the work is beyond direct perceptual experience, awareness of the work depends on a system of documentation.

This documentation takes the form of photographs, maps, drawings and descriptive language (Huebler *in* Siegellaub 1969).

Huebler's statement was a whole program that was obliterated by the success of its first sentence 'the world is full of objects, more or less interesting; I do not wish to add any more' which became a tagline, a manifesto in itself probably because of its Zen Buddhist affiliation, certainly for its provocative nature regarding production and the de-commodification of the work of art. The neutrality of the language is, however, also affiliated to the legal contracts and pertains to the importance of the 'dialogic relationship between instructions and viewer participation' (Alberro 2003, p. 80), which was crucial for Huebler, as I will explore further. Alberro makes a striking argument for its affiliation to marketing strategies based on the study of the exhibition *Douglas Huebler: November 1968* orchestrated by Seth Siegelaub (Alberro 2003, p. 72-83). Nevertheless, and for what it is worth, this statement is far more ethical than market-oriented, positioning the artist and the spectator in a unique understanding of perception. Huebler seems to describe Marey's methodology even more rigorously than him because he adds the important use of 'descriptive language'. Moreover, his claim to state the existence of things in terms of time and space is a claim for indexicality over iconicity, of marking over representing. But one mustn't take avant-gardist statements to the letter. Huebler toys with the viewer, promising what he can't give and giving what no one anticipated.

The game is indeed far more complex than it seemed and not, by any stretch of the imagination, a fastidious psychomotor experiment rooting the viewer in the certainty of his / her / their own experience. It 'never intended to do so', Larsen conceded. Such as Marey's chronophotography unsettles because it lifts the veil on something our perception is either too slow or too rapid to grasp, Huebler's games with indexicality and words explore the expansion and reduction of ideation and imagination, working against each other, through perception. Indeed, they seem to go further than simply 'beyond perception' as his statement famously declares. Hence, 'the awareness of the work

depends on documentation'. This 'awareness', I argue, is far more important than simply a choice of documentary material it passes onto the viewer, although it is not immediately clear what kind of awareness it is. I am tempted to call it an indexical awareness, a time/place marking that the categories he established for his work (bypassing traditional genres of painting and sculpture) explicitly convey, such as *Location Pieces* and *Duration Pieces*.

This is to say that the visible part of the art work is a mere trace of a much bigger and extra-sensorial endeavour. Nevertheless, the precise status of 'documentation' is never specified. Lucy Lippard and, immediately after her, the British critic Lawrence Alloway pondered over this phenomenon: Lippard notoriously described this passage to text and image as a 'dematerialization of the art object' first in an article co-signed by John Chandler for *Art International* in February of 1968, and in 1973 in *Six Years: The Dematerialization of the Art Object from 1966 to 1972*, whereas Alloway, in a less glorified manner, talked and wrote about 'the expanding and disappearing work of art' in 1969.³⁹ In his article, Alloway quotes Lippard and Chandler giving them due reverence for having explored this perspective five days before him as his lecture, upon which the article is based, dates back to the 7 December 1968 (and already includes quotes from LeWitt's *Paragraphs on Conceptual Art* dating back to October 1967). Alloway introduces the phenomenon of documentation, on the same level as the land-art movement and new materials such as 'reflecting and transparent materials'. His dynamic notion of expansion and disappearance is introduced as such: 'the minimum requirement of aesthetic identity in a work of art has been legibility as an object, a degree of compactness (so that the object is united, composed, stable). In the sixties, a number of non-compact art forms (diffuse or nearly imperceptible) have proliferated' (Alloway,

³⁹ His eponymous article in the magazine *Auction*, III/2 (October 1969) is presented as 'notes for a lecture given at the Parke-Bernet Galleries on December 7, 1968, which will be repeated on TV Channel 13'.

1975 pp. 207). He goes on to propose seven items denoting this change, 'conceptualisation' being the sixth. The description of conceptual art is interestingly technological: 'propositional art. Art separated from perceptual hardware'. The software would then be the idea, based on language. Documentation being, by definition, an external factor to the subjectively based perception, separated from 'perceptual hardware'. One thinks of Huebler's statement qualifying the linguistic substratum of the work: 'what I say is part of the artwork. I don't look to critics to say things about my work. I tell them what it's about. / People deny words have anything to do with art. I don't accept that. They do. Art is a source of information (Huebler, May-June 1969).

As I have argued, the reversal of traditional functions of the body and the mind is thus operated, firstly through the use of documentation as an objective account of extra-sensorial realities, and secondly through the dismissal of perception and symbolic language. Marey also dismissed common language and perception:

(...) science faces two obstacles that hinder its course: firstly, the defectiveness of our senses in our quest for truths, and secondly the insufficiency of language to express and communicate the ones we have acquired. The purpose of scientific methods is to bypass these obstacles; the Graphic Method attains this goal better than any other (Marey 1885, p.10).

It failed to question the status of language within science though. Huebler dismissed perception as not being the realm of the 'work' but he did not say what perception does in the work, just as Marey does not say what language does in science – although neither are abolished altogether. Perception and language still play a role, but, as I have suggested, their traditional one is reversed, they neither report nor explain anymore.

In fact, both men dialogically provide an 'answer' for the other's unaddressed issues. Huebler describes what language does within an experimental, scientific, indexical

context: it is 'descriptive', and it is 'information'; and Mareyism provides a hint as to what perception does in conceptualism: it comes second, it decodes (which is equivalent to 'it is not the work'), as a simple path to the mind. Experimental science labours over hypotheses, creates artificial settings for them, and goes on to test them, turning perception into a mere receptacle, detached from its own body, tuned into the diagrammatic body as phenomenon. Perception is the acting interface between the information and the mind.

Huebler, of course, complexifies this state of affairs with an unscientific, uncompromised technique, working as he is, a century on from Marey's first experiments. He adds to this reversal of status of perception and language, the social context scientific experiments of the nineteenth century era rejected. Immersed in the sixties, the indexical turn plays with mass and timed production, statistics and algorithms, and technology already part of day to day life. I suggest that Marey and Huebler dialogically working together emphasise a cultural trait ever more prominent: the image as information, rather than a window through which to look at the world; the image as a projection onto the spectator; a responsibility passed onto him / her / them. Huebler goes even further: the image as *interactive* information, playing a game where the viewer had for the first time to renegotiate not what the art was, in a Duchampian way, but what his/her/their role was within the construction of the art work, enmeshed as it was in an extra-sensorial affair.

Larsen recognised that the result of the whole experience is not 'the usual aesthetic pleasures, except perhaps, the pleasure of a self-possessed awareness'. Has the 'here and now' of the work of art shifted to the body of the spectator as opposed to the 'aura' of the art object here? (Benjamin 2008, p.5). Is she describing the spatially rooted and embodied dynamic nature of the experience or its speculative humour? Her role as an art critic

obliged her to assess the importance of such curious endeavours rather than explore its newness for which she would not have space. She resorted to a general overview and a traditional conclusion. Ending her assessment on the other work on display, *Contemporary Portraits and Other Stories* (1977) which is a set of photographic portraits with captions using idiomatic expressions (such as ‘at least one person who feels trapped by marriage’) ‘illustrating’ them, she sees in the overall exhibition overall a paradoxical relation between ‘art and literature’, and its ‘relevance to everyday life’. So there seems to be here an assimilation of the project to traditional genres, of the image to ‘art’ and the text to ‘literature’ expressing the general incomprehension of the deepest layers of the conceptual program in an otherwise compelling review, published as late as 1978, 11 years after LeWitt’s *Paragraphs* or ten years after Huebler’s much laboured upon declaration of not wanting to add anymore objects to the world.

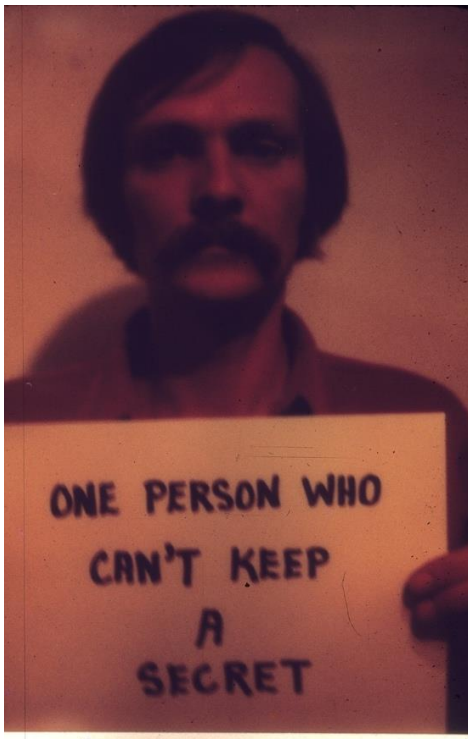


Figure 22 Douglas Huebler *Variable Piece #70*, 1 slide: col.; 5 x 5 cm. *ThomasLewallen Gallery records, 1970-1980. Archives of American Art, Smithsonian Institution.*

Furthermore, the expectation of a given visitor seems to be, unwittingly, the traditional 'aesthetic pleasure', as Larsen remarks, stating its absence. It is an unfruitful discussion at this point to inquire about conceptual art's ability to induce pleasure; what is of the utmost importance is its potential, largely unexplored, to understand the paradigm shift of modern society into a tension between the visible and the invisible mediated by a line, and a text, and thus produce new forms of exploring art. Or perhaps a redefinition of what art is and what it does. For Huebler, for instance, the visitor is the 'percipient'. He is a sort of machine wired in a certain way thus reacting with his body and his mind. The 'self-awareness' is an important clue to the work as it at least acknowledges the inclusion of the visitor or 'percipient' in the work itself. Indeed, if conceptual art favours ideation rather than realisation, the viewer is the key element for it to exist, in a dynamic response to what he engages with. In that sense, and even if the vocabulary of the review remains unsatisfactory, the work *existed* through Larsen.

The work, as it were, seems to take Benjamin's text literally: 'even with the most perfect reproduction, *one thing* stands out: the here and now of the work of art - its unique existence in the place where it is at this moment' (Benjamin 2008, p. 5). Here, the 'unique existence' hinges not on the art as object but on the art as experience depending upon the spectator's body. In that sense, the title of the work *North & West*, itself descriptive, is of importance: cardinal points help situate, locate a point in space, and are also typical of American street denominations. Therefore, the work being simply documentation activated by a dialogical experience, the 'abstract idea of its genuineness' (Benjamin 2008, p.5) is diverted to another dimension of the work, beyond perception understood as a relation between subject and object rather than a form of decoding of information. And this is nothing short of a socio-political manipulation of modes of

behaviour and of cognitive uses of the body - decoding and re-encoding might be another kind of pleasure of modern societies.

So, what is the basis of this redefinition of art and its relation to the ‘percipient’? I suggest that the association of photography, linear drawing and descriptive text is the innovative *modus operandi* of conceptualism, in a replication of the graphic method’s materials, albeit in a new, uncompromised position – that is, without the obligation of scientific truth. It would be disingenuous to state that the graphic method served as a framework; rather, the extended technological impact of the graphic method’s materials imposed itself as the new modernity. Huebler, for instance, was interested in science but may not have read about Marey specifically; nonetheless, the epistemic turn of the graphic method had already permeated everyday life as will be more apparent in chapter 4 where I argue that the graphic and photographic association of the nineteenth century extended to the twenty-first century as technology rather than as the graphic method itself, in a unstoppable evolution of the apparatus, that superseded notions of the medium and medium specificity that art history entangled itself with nonetheless, preventing access to the conceptual project as an extension of abstraction in art through thought.

Huebler designed his exhibitions in a thorough and reflected manner. It is important to regard them as a whole endeavour where the selected works complement each other. There is a relevant aspect of the exhibition, which is the complementarity between the ‘documentation used’, diagrammatic work and a photography and language based project: *North & West* was placed in dialogue with *Contemporary Portraits and Other Stories* (1977), which is to say that the graphic and the photographic constituted the whole of the exhibition, bridged by what turns out to be an unreliable narrative. *Contemporary Portraits and Other Stories* stems from *Variable Piece #70* (1971) whereby Huebler unrealistically vowed to photograph every living person until his

death.⁴⁰ Here, the photographs of people are accompanied by idiomatic expressions that serve as an indicator of their interiority, but sound both sibylline and artificial. This version of *Variable Piece #70* tackles ‘contemporary’ portraits presenting Polaroids of a person holding a placard with sayings such as ‘one person who bears no grudge’ along with short biographic texts written by the Australian author Murray Bail. As with the line based works, photography here cannot be disassociated from the text. And, again, like *North & West*, the text makes the viewer embark on a speculative trail, assessing personal prejudices and the meaning of the ambiguous and undetermined information provided. More than ‘descriptive’, the text is an abstract fiction; as unreliable as the artist’s overall claims. The descriptive quality is there, but it is by no means a guarantee of reliability or factual truth.

Huebler purposely chooses idiomatic expressions which are clichés, ready-made ideas about everything under the sun as the artist himself stated. ‘From those thousands of photographs’, he wrote in a statement for the ThomasLewallen gallery, and referring to photos of crowds he took for *Variable #70*, ‘one is occasionally selected, in a random manner, and a kind of cultural ‘ready-made’ has been associated with it [...]. When I began exhausting time worn clichés, I made-up cliché-like characterizations of my own’.⁴¹ A photograph is also called a ‘cliché’ in French, stemming from the earlier meaning of ‘stenotype’, a plaster mould for printing. A cliché is a worn-out trace of a culturally prejudiced idea.

One is reminded of Pierce’s description of likeness being an accidental similarity because photography ‘*is physically forced to correspond point by point to nature*’. Similarly, idiomatic expressions are ‘expression[s] whose meanings cannot be inferred

⁴⁰ This piece served as a template for a great deal of his late seventies works up until Huebler’s own untimely death in 1997.

⁴¹ *ThomasLewallen Gallery records, 1970-1980. Archives of American Art, Smithsonian Institution.*

from the meanings of the words that make it up', separately, each point or each word are abstract, but together they somehow produce a generic meaning that one would not think to take literally.⁴² Rather, they correspond to a cultural trait, an accepted idea in a specific community, addressing issues such as the difficulties of marriage or vindictiveness, just as photography emulated pictorial genres such as portraits or landscape views, thus incorporating in the iconic and the indexical, symbolic expectations.

Photography is here placed in the same status as text, testing singularity against clichés, through a form of accidental likeness and an indexical hope of catching the truth. Alloway proposed the 'function of the cliché' as his first item operating the expansion and disappearance of the art object because 'the use of the cliché in the context of art connects public signs with personal system. Clichés dissolve formal boundaries (as in Roy Lichtenstein)' (Alloway 1975, p. 207). Taking Lichtenstein's use of the cliché to another even less traditional context, Huebler produces images that are less seductive and more banal; like most conceptual photography, it is of an 'anti-expertise, anti-glamorous' quality' (Alloway 1975, p. 201). Photography has a way of dissolving boundaries in a more effective manner as it replicates reality while not providing anything other than self-reflective information: *this* happened at a certain time and place in the more or less retraceable past. Huebler's explanation to his gallerists continues:

I hoped that the random manner of the fabrication made it clear that I not only was not pointing at any one person [but] I was [also] challenging any percipient to think carefully about his, or her responsibility for the use of the information offered; that challenge set in opposition to the compulsion to use available 'myths', or to almost instantaneously generate a new one to fill the emptiness of 'appearance' where it exists in a natural state (underlined by the artist).⁴³

⁴² <https://www.thefreedictionary.com/idiomatic+expression> [consulted on 2 January 2019].

⁴³ ThomasLewallen Gallery records, 1970-1980. Archives of American Art, Smithsonian Institution.

In this sentence Huebler exposes the shift from subject to spectator. The human factor in the work operates in real life and real time, while decoding the work in a dynamic relation to data, that is: graphic and photographic statements.

2.2 The Graphic and the Photographic

‘Conceptual photography’ has regularly been included in photography exhibitions, sometimes along with chronophotography or sequential photography, usually with links to narrative or story-telling and concerns with time, the everyday, and social issues. This is to say that conceptualism in its use of photography seen as a means to record a happening or to establish an idea has been the object of an introduction in the history of photography, albeit, as I will demonstrate here, not always with the necessary nuanced approach to the difference between *graphic uses of* photography and *exploring the medium* of photography. For, as Nancy Foote wittily wrote in her famous *Artforum* article, ‘for every photographer who clamours to make it as an artist, there is an artist running a grave risk of turning into a photographer’ (Foote 1976, p. 47). Even when there is attention to the photographic medium regarded as a means to an end distanced from an essentialist approach, the emphasis on the medium undermines the conceptual program as a whole, especially in Douglas Huebler’s work, despite the term Foote proposed for conceptualists as ‘anti-photographers’.

One of the strands of American curation is an exploration of photography as a medium or as ‘high art’, which is contrary to the conceptual premise of avoiding genres

or disciplines for their specificity.⁴⁴ It certainly has its advantages - it promotes a vision of photography that would have made Hollis Frampton proud: as a technology, photography is what one makes of it; nevertheless, approaching photography as an ever-evolving technology does not seem to be the point of these medium-oriented exhibitions. In Huebler's case, for instance, photography is part of the category of 'documentation' and it is not totally distinguishable from its counterparts such as text and diagrams, even if it does play a specific role within it.

As it is becoming clearer, the concomitance between the line and the word in Huebler's works is extensible to photography: these forms of documentation, for the artist, are not the work, they are the interface between perception and ideation, activated by the 'percipient'. The graphic, the photographic and the word are all part of the visual interweaving of information within a sign system, as I have demonstrated. Therefore, and with all the pedagogic betterments these projects focusing on photography bring about, they also undermine the still largely misunderstood conceptual project, in particular Huebler's complex articulation of a critical use of information and its program of mediating a self-aware relation of the spectator with it.

The most recent iteration of this tendency was *The Last Picture Show: Artists Using Photography, 1960-1982*, curated by Douglas Fogle in 2003.⁴⁵ Although it clearly states that the emphasis is on artists 'using' photography, it nevertheless isolates the medium. The purpose of this exhibition and its carefully edited catalogue was to propose an encyclopaedic account of artists using photography but also of critical texts

⁴⁴ This may be explained through the European counterpoint: 'since no genuine fine art photography had existed in Europe in the decades leading up to the emergence of the Conceptual Art movement, there was no possibility for an anti-photography to develop', Stefan Gronoert explains, apropos of the differentiated relation between photography and conceptualism in the American and the European continent (Fogle *et al* 2003, p.86).

⁴⁵ The exhibition travelled from the Walker Art Centre in Minneapolis to the UCLA Hammer Museum, in Los Angeles, the Museo de Arte Contemporanea de Vigo in Spain, and the Fotomuseum Winterthur in Switzerland, between October 2003 and February 2005.

starting from 1969, with a text authored by Vito Acconci, to 2002 ending with one by the British curator James Lingwood. In between these dates there is a wide range of texts from Nancy Foote's aforementioned article to historic articles by authors such as the French photography author Jean-François Chevrier or the American art critic Douglas Crimp. In addition to this historic account, there are six commissioned texts by Molly Nesbit, Pamela M. Lee, Kate Bush, Stefan Gronert, Melanie Marino, and Geoffrey Batchen. Hollis Frampton's accounts of photography are not included and the texts collected are not restricted to the time period of the exhibition.

The new turn of the medium to a 'usage' rather than a 'specificity' or 'essence' that this exhibition and book proposed is theoretically marked in Fogle's introductory text by Yves Klein's staged photograph *Leap into the Void* (1960), which shatters, according to the curator, the 'decisive moment' of the snapshot through its obvious manipulation that the author presents as 'problematic'. It is not the purpose here to evaluate this choice, and one must recognize that there is a concern, not specifically addressed but underlying the proposal, of marking the 1960s specificities regarding photography that would spread onto the two following decades, in a new conceptual setting. But Fogle's perspective struggles to detach itself from Surrealism and other avant-gardist uses of the medium, which were in fact already 'problematic', that is, non-essentialist and rigorously parasitical, placing the onus of the times of the systematic broadcasting and publication of images in the media.

Stating the importance of conceptualism in the new uses of photography, within this period marked by the widespread use of broadcasting and printed press ending mysteriously in 1982, Fogle muses upon the 'last picture' and, along with Louise Lawler (quoting her work *Why Pictures Now*, 1981), asks 'why pictures now?' adding the question mark to the sentence. He thus somehow contradicts the premise of the exhibition

which places those twenty-two years as a proliferation of the photographic medium in artistic differentiated practices, but softens this sophistic question by adding another ‘inseparable’ one: ‘what kind of pictures?’ - concluding that the history of photography is ‘plural’.

Despite its openness, this framework adheres and replicates the art history trope of an arch of beginnings and endings, an evolutionary theory that, at its best, denotes a certain tiredness of the critic and, at its worst, creates a fictional crisis of reductive categories such as the medium-based ‘photography’, it seems, even while promoting its diversity. From the perspective of conceptual art, *but also of the connections between photography with drawing, science and technological experimentation that includes seriality and sequence at its roots*, it would perhaps be more productive to ask where photography leads to or how we come to it. For photography as *a* history, especially considering its roots and its becomings (namely digital platforms and social media) might have taken by now a different stance and what Fogle considers photography to be might be relegated now to the same position as oil painting, that is, a very specific and traditionally informed way of producing an image. This of course does not in any way obliterate its validity and the possibility of its innovation within its parameters – any medium is valid inasmuch as artists, both photographers and ‘anti-photographers’, use it.

On the other hand, more than a decade before *The Last Picture Show*, in 1993, an important touring exhibition titled *Motion and Document, Sequence and Time: Eadweard Muybridge and Contemporary American Photography* curated by Jock Reynolds, then director of the Addison Gallery of Contemporary Art in Andover, Massachusetts, focused essentially on the subject of photography through the scope of the photographic sequence, which is a key element to some conceptual practices that is seldom addressed (with the exception of the American artist Dan Graham’s text in *The Last Picture Show*

catalogue).⁴⁶ An interesting polemic arose when the show was being set up at the Smithsonian National Museum of American Art: its director, Elizabeth Broun, considered LeWitt's work *Muybridge I* to be 'degrading and offensive' as she stated in a letter to Reynolds dated July 9, 1991. 'For me', she continued, 'peering through successive peep-holes and focusing increasingly on the pubic region invokes unequivocal references to a degrading pornographic experience'. It is true that the work is made in a way that the viewer peeps through several circular holes (as if through the lens of a camera) of an elongated white box to see sequential photographs of a woman approaching until the image shows her navel - and not her 'pubic region'.⁴⁷

This is a telling example of a work where the indexical is staged: the chronographic reference is evident, and the much sought-after rapport with the viewer is operated through the approaching subject via an image sequence – the indexical measure of movement - in this case a naked woman in a direct reference to Eadweard Muybridge's experiments. And yet it is the iconic modality of the image that prevails in Broun's analysis and even overpowers it as she ended up seeing a pubis that is not there.

It is the traditional analysis of the photographic image as visual convention that triumphs, immediately taken to a symbolic level by evoking pornography through the apparatus of the peep-show. Charles S. Peirce, in his acknowledgement of the accidental iconicity of the images (photographs are 'forced' to resemble their object 'point by point'), separates the substratum of the photograph and the image: this is one of photography's difficulties as a sign within Peirce's system. But it is also a difficulty

⁴⁶ Exhibition held at the National Museum of American Art, Smithsonian Institution, Washington, D.C., June 28-Sept. 8, 1991, and five other museums (Addison Gallery of American Art, Andover, Massachusetts; Long Beach Museum of Art, Long Beach; Henry Art Gallery, University of Washington, Seattle; Wadsworth Atheneum, Hartford; International Museum of Photography, Rochester) Oct. 18, 1991-Fall 1993.

⁴⁷ Archives of American Art, Smithsonian Institution.

worth facing, I believe, for a conceptual relation with the medium alters our relation to it and to the images it harbours: ‘a photograph and its image are not synonymous and he [Peirce] can discuss them in isolation. That is, the image is only the iconic and symbolic aspect of a photograph; while its indexical element is conceptually separate even if visually indistinguishable’ (Robins 2014, p.5).⁴⁸ This is to say that there might be an antagonistic – or at least dialectic – relationship between icons and indices that is the basis of a politically oriented analysis of the work. Notably, notions of male gaze are still prevalent in the avant-gardist art of the 1960s onward from Yves Klein’s *Anthropométries* (in which he uses naked female bodies to paint) to Robert Whitman’s pioneer installation work, such as *Shower* (1964), where the projected image of a woman showering in red liquid onto a real shower makes it difficult to bypass voyeuristic or representational clichés.

This is hence not to say that Sol LeWitt wasn’t replicating a much declined and tired trope of the naked woman as an object of voyeurism but, as it will be detailed in the next chapter, this was clearly not the main concern of a man who would a few years later resort to systems of permutations and never again produce any figurative work in the traditional sense of the word. The burdening iconicity of this image makes it apparent why Sol LeWitt took the leap to permutations of geometric forms and to linear mural drawings. Historically, when the exhibition took place this leap had been operated more than two decades ago which makes Elizabeth Broun’s interpretation more enigmatic and therefore more meaningful as to the power of the icon and the symbol when it comes to photography. Marey and Peirce’s thought makes this shift more apparent: in chronophotography the line is extracted from the image because it is virtually there and

⁴⁸ We know that in Marey’s case that is often not true, the index supersedes the icon through the indexical line: the image probably resembles the phenomenon but the naked eye cannot distinguish it and therefore will never be able to have an iconic relation with it.

yet it remains invisible to most untrained eyes.⁴⁹ That is why the Smoke Chronophotographs are so haunting; it takes a geometer's or a physicist's mind to see the lines with the mind's eye in other chronophotography, effectively what motion trackers do nowadays. Peirce, on the other hand, provides the key to a conceptual use of photography which is invariably connected to measuring, to information and to the substratum of the photographic apparatus.

More to the point and going back yet another decade, Anne Tucker's exhibition at the Houston Museum of Fine Arts, *Target III: In Sequence - Photographic series, sequences and sets from The Target Collection of American Photography* in 1982, was a sophisticated account of chronophotography, connecting it with seriality in the neo-avant-gardes of the 1960's and 1970's and which included, amongst other conceptual projects, works by Douglas Huebler under the category of 'montage'. This includes works that are 'serial (from the root, to join) and sequential (from the root, to follow), where specific juxtapositions create meanings not apparent from seeing the photographs individually'. To introduce this idea, Tucker contextualises in the previous sentence that the idea of 'montage', 'is used here not in the traditional visual arts sense, to make a composite, but rather in the literary, musical, or filmic sense where separate pictures maintain their identity but also gain from association' (Tucker, 1982, p. 8).

This description of 'montage' is crucial as an association of text and image albeit fitting far more the structure of publicity, for instance, than that of literary endeavours perhaps with the exception of André Breton's *Nadja* (1928) or the French Nouveau Roman. One can say with Alexander Alberro that 'the egalitarian pursuit of publicness and the emancipation from traditional forms of artistic value were as definitive as the fusion of the artwork with advertising and display' (Alberro, 1992, p. 5). Nevertheless,

⁴⁹ The idea of the trained eye or the 'educated eye' is addressed by Marey in *Le Mouvement* and in chapter 4.

‘montage’ resonates with Huebler’s work as this technique relates to publicity’s film and photography.

The exhibition also included photographs by Sol LeWitt (under the umbrella of concerns with ‘time’), two gelatin silver photographs from the series *Brick Wall, B#4*, 1977. The press release explains in detail what chronophotography is and how it works in an artistic context informed both by the history of nineteenth-century scientific imagery and the paradigm shift of the 1960’s and 1970’s regarding the medium, which other critical accounts ignored: ‘a sequence is defined as two or more photographs considered one, indivisible work, or one photograph in which a series of negatives are printed sequentially. These works explore *artistic problems which cannot be solved by a single photograph within the traditional rectangular frame*. The sequence format has been used to depict elapsed time, vast or many-sided locations or objects, relationships, events, and stories’ (my emphasis). The idea that a single photograph is not enough to approach certain subjects is essential here, I believe, and points at juxtapositions of perspectives or events unfolding in time and space.

Tucker reminds us that ‘the combination of image and language is more frequent in sequential photography than in any other photographic formats’. In this sense, chronophotography instils a behaviour in the spectator that is both analytical and synthetic, that details, differentiates and schematizes. The moving image solves the relationship between the images for the viewer whereas sequential photography is interactive and open ended. It produces a diagram of the gaze, an intellectual appraisal through a graphic disposition of the correlation between the eye and the mind.

It is therefore natural that this schematic association between image and text, which is evocative of time and location planning or mapping, would be linked to narrative devices. Michael Leja’s exhibition at the Boston Institute of Contemporary Art four years

earlier, open from April to June 1978, *Narration*, bridged the gap between story-telling and conceptualism through photography and film. It placed Douglas Huebler's work in the category of the play with notions of identity along with the feminist artist Eleanor Antin, for example, seeing in *Variable Piece #70* 'mythic proportions' in its 'quixotic efforts to photograph everyone alive'. Whenever there is an existential take on conceptual endeavours, a certain romanticism slips in, that Huebler very clearly manipulated to his advantage.

And what about narration in this context of image and text? In an inversion of LeWitt's abandonment (before it even begun) of the association of figuration, motion and sequence in favour of geometric seriality, Leja sees the 'serialism and formal permutations that is the basis of much minimalist sculpture' as a suggestion of 'narrative'.⁵⁰ Muybridge is also referred to for his 'analytical photosequences' in relation with Ed Ruscha and others. But more importantly, this exhibition marks a break in traditional narratives in order to highlight new forms of story-telling based on 'time' and 'duration', two indexical notions that Huebler worked with all his life.

The challenge is to understand what it means to deal with time, and identity, and any other substratum, conceptually. Moving to more recent years, and to close the circle, the publication in 2011 of the book *Photography After Conceptual Art* edited by Margaret Iversen and Diarmuid Costello, includes a text about Huebler's photography. The term 'after' shows that again art theory falls prey to the notions of influence and posterity rather than to focus on questions of possibility – of what was rendered possible by certain artistic strategies and / or visual and plastic formalisations. Moreover, the analysis of the conceptual art work is, I insist, eschewed by the prevailing concern with photography as a medium rather than as a technology.

⁵⁰ Archives of American Art, Smithsonian Institution.

The essay, penned by Gordon Hughes, states that Huebler's approach to the photographic is to give himself an impossible task in order to both destroy system based photography and, more to the point in this article, portraiture: to 'flatten the subjective resonance of his faces' (Hughes 2011, p.76). This is specifically about *Variable Piece #105*, London (1972) where very obviously Huebler 'stretches the credulity' of the spectator. In it, Huebler states that upon each photo taken of a shop mannequin, he took a photo of the first person of the same gender that he saw; the astonishing result is that they look alike, despite the – alleged - randomness of the process.

If one has followed Huebler's process since the end of the 1960s, one knows how unreliable his statements are or how 'truth' is irrelevant, which does not prevent Hughes from fighting Huebler on his own territory, saying that the statement seems, 'to me at least, frankly unbelievable' (Hughes 2011, p.71).⁵¹ However, it is obvious that Huebler has always placed doubt at the heart of his systems, rather than 'throw[ing] adherence to his own system into doubt' as Hughes concedes: doubt is at the very heart of Huebler's multi-media statements. If one cannot trust the author's statements, one cannot trust the author. Therefore, one can follow Hughes' argument that 'the system itself is designed precisely to frustrate the kind of authorial nuance one would expect in a [Diane] Arbus' (Hughes 2011, p. 75). Huebler is certainly not sharing *his own* vision, at least directly, nor does he endeavour to represent a concrete reality.

This outrage can only mean two things: firstly, that Huebler's oeuvre remains largely unexplored compared to artists such as LeWitt or Lawrence Weiner; and secondly that

⁵¹ Does one really need to know if, as stated in the *Variable Work Dusseldorf – Germany – Turin, Italy of 1970-71*, 'the artist (...) flippe[d] a coin that will determine the direction towards which he will begin to 'hitch-hike' towards one or the other gallery' (By that he means Konrad Fischer (in Germany) or Sperone (in Italy)? I would argue that, on the contrary, it is important that the spectator doesn't know and has no way of knowing. Huebler is far more concerned with the indexical emptiness of the medium, which is characterized by a potential measure of things imprinted but not an existential guarantee of the veracity of the traces shown.

conceptualism itself has lost its other denomination, common in the 1970's, to which the exhibition *Information* at the MoMA in 1970 and curated by Kynaston L. McShine gave due reverence, of 'information art'.

Hughes reminds the reader that Huebler provides a contact sheet as 'proof' of veracity, 'an inclusion that, of course, proves absolutely nothing: twenty seconds, twenty hours, or twenty days could have lapsed between the seconds of photographs for all this tells us' (Hughes 2011, p. 75). Of course, as Anne Tucker asserted, Huebler's photographic work is a sort of montage, inasmuch as it does 'join' images that do not logically or chronologically follow. But Hughes' argument is that Huebler's project is to dismantle not only the 'authorial nuance' of photography but the traditional photographic art of portraiture. As if, like Marey, Huebler did not contemplate mainly series of images rather than a single one and did not detach himself from the medium to look at it as a sign system rather than a medium with its limitations, and justified glories like Arbus' candour towards subjects that were hardly ever celebrated for their visual existence.

To do so, Hughes rightly notes Huebler's use of the 'look-alike', the 'double', the 'doppelganger' as an attempt to destroy the art of the portrait. He refers to the work *Variable Piece # 44, Global*, (1971) which is indeed a crucial piece in Huebler's exploration of the visually similar: several people were invited to provide a photo of themselves in 1971 and another in 1981, placed side by side in a grid-like composition in the final rendering of the decade-long project (with a few missing images, giving the term 'being off the grid' a compelling illustration).

Perhaps traditional portraiture is at stake here; but is it not far more ingenuous than that? This is a sombre endeavour, a solemn evaluation Huebler asks of his participants: who knows what one can read in one's own face after a happy, or, on the contrary, a disastrous decade? One could say that we are here in a direct relation with the subject

through the work – and a projective stance for the general ‘percipient’. Huebler recounts how he enjoyed telling people they were beautiful for one of his projects:

I have a work I’ve made which I walk up to people and I say ‘You have a beautiful face’ [...]. At the instant I’m saying it, I mean to give them a gift [...]. And I can say that about any face because every face is. That has to do with my interest in appearance and suspending these kind of value judgements about appearance. It also developed for me out of being in the streets, using the camera and finding out the power the camera has and the social reactions that people have to it [...]. To pose for your photograph or in front of a television camera is to be the most self-conscious that you can be, and it’s a self-consciousness without a reflection [...] (Huebler 1977, p.41).

To the question whether he means it when saying to a person he / she / they are beautiful, Huebler replies: ‘I do. It’s a question of not giving special value to any appearance. I think that any face is beautiful because it’s with us. It may not be the face of my sexual desires [...] but it is that humanity that I am speaking to, and the fact that I share that humanity with you’ (Huebler 1977, p. 42). There is an *ethos of the portrait* here, beyond Huebler’s obvious interest in self-reflection for the participant and the spectator. In fact, self-reflection and self-consciousness, emerging from the process of the work and not only in the final work, are the vectors of a form of Buddhist literalness: what we gain from these portraits, is humanity, ‘my’ humanity and the ‘other person’s’ humanity. Desire, is certainly not the focus here, as I have argued in relation to indexicality. But only text and image can make iconicity and representation derail which is, I argue, Huebler’s project: his art was turned towards life and fought art categories in order to get them out of the way, rather than to destroy them.

Huebler does not efface the subject: the person photographed emerges even more self-contained once the ludicrous system set in place is dismantled: they are not ‘doppelgangers’, or ‘doubles’, they are themselves, unique, irreducible, imponderable – humans-who-were-in-a-place. The photographic sequence in time – and certainly in

space too – delivers portraits that are far more than a cultural subject: they deliver a subjectivity *because* they are opaque rather than legible. One could argue, perhaps somewhat sophisticatedly, that these are *real* portraits as they do not present anything other than the limit of our physical appearance, while revealing the ludicrous tool that similitude is. They are, in a way, a violent critique of iconicity *as a tool for evaluation and thought and not as an artistic genre*. Huebler’s critique, I maintain, is not geared towards representation per se, it is aimed at our thought systems and how they revert to basic categories – even in front of representation. They do not efface the cultural either: his images are a testament to the time through its technology and the social elements it captures, to a certain extent. To us, in 2019, they mark a specificity of the 1970s, if not only for the unquestioned, dis-gendered, ‘universal’ stance of a white straight male talking to people about their beauty in the street.



Figure 23 Douglas Huebler, *Variable Piece #44*, (Global), 1971.

2.3 The Ethics of the Indexical Line, Or What You Do With Information

My analysis has been outlining a shared responsibility between the spectator and the artist who not only had to solve the imbalance between the critic's tentative appraisal of his work, but also the inherited values of the art world. Huebler himself, as I will point out, had to understand his position within the art world while striving to build a new connection to it, particularly to the *person* he was so at pains to connect with for if there was a rejection of the artist's ego there was, conversely, a welcoming of the spectator's experience. There seems to be an ethical position to choose an indexical turn rather than oppose the market and commodification. I propose that there is a new ethos of the art object at work in conceptualism that created its own field by critically incorporating inherited technological motives amongst which media and not the medium, and even (although this is not the subject here) advertising models as these also followed a technological strand.

In 1974, LeWitt (whose work will be explored further in the next chapter) told Paul Cummings in an interview:

I can't paint a picture of a person because to me it wouldn't be ethical. I mean, I can draw a line on a wall because I think it's an ethical act. And it's necessary in terms of how I think or how thinking of a particular art world goes. I don't like art work that is frivolous in this kind of way. But I think it's a very big problem as to how the art is used, of how the artist is used and exploited' (LeWitt, 1974 July 15).

The last sentence in itself could potentially constitute a whole research project, and Alberto Alberro's analysis – particularly *Conceptual Art and the Politics of Publicity* (2003) where he explores Seth Siegelaub's approach to the gallery as strategic marketing - can help in situating where artists had agency and where they didn't. But this somewhat

restrictive story, based on the character of Seth Siegelaub, does not explore the ethical stance of the index against the icon as a subjective image (the painted picture of a person referred to by LeWitt).

There is, indeed, an ethical stance in some conceptual works that takes up an immediate form as a reflection of advertisement techniques. However, there is more to it than merely an illustration or manipulation of the new language of advertising. Conceptual art, because it uses this familiar language, has a way to penetrate the viewer's mental, real, and projective space. This is more clearly visible in the role of the collector, which is a somewhat idealized and more accessible spectator – at times, even, a collaborator. For, not only does the conceptual artist promote a self-reflexive attitude in the spectator, much like an advertisement does but without the purchase (the product and its lifestyle reverts to himself if he / she / they buy it), he also develops a new way of selling and buying art, but also of showing and perceiving it.

Buying conceptual art is buying an idea, the concept, with a considerable disregard for the immobility of the medium in favour of the dynamic of the relationship: owning the work for the collector, very often, means acquiring a signed certificate and, in the case of Sol LeWitt, for example, a 'diagram' – and then, to paraphrase Lawrence Weiner, either to make the work or not. Now that we have moved on to performance art being sold with a certificate, and at times a contract almost obliging the owner to produce and perform (or hire performers), this seems trivial, but it did inaugurate a new relationship with art that does not seem to translate yet onto mainstream critique and the general public's awareness. Therefore, while the art historian focuses on internal problematics of the medium, the posterity of Minimalism, or laments the concessions to the market by the conceptualists such as Lucy Lippard did as early as 1972, deeming their project, at least partially, a failure, (Lippard, 1973, 263), the conceptual artists were developing a

dynamic relation with their audience as a network. Between 1968 and 1972, Sol LeWitt alone had at least twenty solo exhibitions in commercial galleries in America and Europe. One wonders why Lippard, who was and remained all her life a close friend of LeWitt's, did not pick up on this, rather than believing and promoting the myth of conceptual art's fight against commodification as a fight against commercial viability and success which seem to be equivalent, but are not. This network of differentiated access to the work the conceptualists developed is illustrated by the way quite a few of them took the book form as art seriously, which made books such as *Art Conceptuel, une entologie* possible, for instance. Published recently in France, this book is both an anthology and a translation into the French language of conceptual instructions for DIY art *avant l'heure*, or, more accurately, a way of 'reading' the conceptuels (Hermann, Reymond, Vallois 2008, p. 10). Disconnected from questions of direct ownership, this book, filled with language-based works emphasises the conceptual experience through a differently used medium⁵².

In it, Ghislain Mollet-Viéville states that

beyond my own initiatives, my conceptual art collection is a device to produce meaning, and should also be apprehended in relation to collective practices with the aim of activating my conceptual works by others, somewhere else and in different ways (...).

My collection of concepts thus favours an art of scattering and infiltration with a spectre of possibilities aiming to link up complementary operations. It constitutes itself and develops within a scenographed society in which I end up finding more reflexions about art in artworks / objects. (Hermann, Reymond, Vallois 2008, pp. 464-465)

⁵² On several occasions I used these instructions with students and exhibition happenings to create specific experiences. The students and spectators either left with 'a LeWitt', or simply ignored the object once the experience was finished.

The ethical stance of conceptualism, I argue, was always built *elsewhere*, more specifically in a new form of art ritual performed by the collector more directly and with perhaps more long-term personal gain, but also by the spectator in a variety of substrata that hinged on the ability for any of us to stop, think, activate, think, look, and stop again. Circularity, self-refenciality and tautology constitute the essential choreography of conceptualism, one that does not merge art and life – contrary to what one might assume – but that creates a new, reflexive place in the world like a distorted mirror creating new images and new territories.

For, if there certainly was, especially for artists such as Huebler and LeWitt who were older than Joseph Kosuth and Lawrence Wiener for example, the necessity of selling and living off their art, there was also a critical involvement with the times. I have argued that the approach to conceptualism through photography as a challenged medium rather than a document undermines our relation to the conceptual project which played with concepts, signs and sign systems rather than with specific mediums. For conceptual art was building a new place for the artist and the work within society as a whole rather than challenging all its structures. It is somewhat bewildering that art theory and history forgets with such aplomb the uncomfortable onus on the medium that Clement Greenberg placed and which Minimal and Conceptual artists tried to steer away of. In a way, conceptualists were closer to the gallery and museum system rather than to the role of the art critic who, with the exclusion of Lippard and Alloway and a few others (he first with a certain disconnected form of self-projection and the second with a dry, disconnected descriptive stance), had an excruciating time trying to understand their project. Hughes was not wrong in thinking that Huebler had a critical disposition toward art but it is not photography in particular that concerned him, it was the whole system of art production and art criticism, within an even larger system of information, signification and

mystification. A few months before his exhibition at the ThomasLewallen Gallery in 1977, Huebler detailed his project of articulating documentation rather than musing upon media:

My art sort of sprang from, a lot of it, from the fact that I began to think it was a lot of bullshit that the critics were writing about art and the fact that they could endow appearance with some mystical or mythic quality by simply investing it with words. I'm speaking about the languages of art which are the mythologies of art, which are two-dimensionality, space, plane, extensiveness into infinity from the picture plane and so forth. I am using language to do it and the language is on the drawing. The language is not divorced from the image in a book somewhere. That's why I call them drawings.

It's a criticism of art but it's not a criticism of art alone. *It's a criticism of what I consider to be the irresponsible use of signifying.* We have come to a point where things are very accessible and the more they get stacked up with myth, the more easily they're consumed and the more bullshit they become. I would like to try to help unload this stack of myth. This stack of myth is related to man, his culture, and not just art. I'm using art to speak through these concerns. (my emphasis, Huebler 1977, p.41)

Huebler's explanation of the use of drawing is disconnected from medium polemics. He ultimately recognizes that his use of language is not equal to a writer's for instance. He uses the page and diagrammatizes ideas. What kind of art is this if not a new, non-reactive, positive form of art? But more compellingly, he works towards an awareness of the methods of signifying, which means that he is aware of the ones already always contained in non-diagrammatized language. He continues:

My basic concern, and I could call it conceptual in this sense, is to point out that there is an equation built, as I've been saying, between the perceived image or sign and the language that directs your attention to the sign. Whether the sign is a photograph, a dot on a page, a series of photographs or a series of dots or lines, it doesn't matter. There is a relationship between the visual and the cultural, the language. These signs are givens.

The point, line or photograph is given. They are, in a sense, specifics, I point from the specific towards the general (Huebler 1977, p.41).

His emphasis on photography is not as a medium but as an active and cultural production of signs that count as data, that is, a piece of information that elevates the specific 'towards the general'. Huebler took photography as an iconic powerful tool to be associated with indices, first through the Stieglitzian process of equivalence and secondly through the concepts of similitude and identity. However, as Anne Tucker noted, his technique of 'montage' leads to two things: firstly, the use of several images working with / against each other and the adjoined text and / or diagram; secondly the use of sequentiality leads to a play with the semiotic notion of likeness; which, in turn, approaches the philosophical and existential notion of identity. In this sense, we could not be further from a Kraussian notion of the index: rather than connecting the artwork to life, the index and the icon working together through seriality, within a graphic and photographic process established linguistically, devise a distance between the subject, the percipient, the document and the artwork. They cut the meat, as it were.

By following the indexical line, we have thus disentangled the intricate use of mechanical images, language and, through them, time and space in Huebler's work, forming an entirely new territory where boundaries are blurred (is it literature? Is it fiction? Is it photography?) and other fields, such as science, are claimed, only to compose a make-shift multidimensional field of practice that refreshes and reassesses the exhibition space through a new role give to the spectator.

Huebler multiplies instances of 'location' (rather than the grand notion of space) and timed experience (instead of the abstract and ungraspable notion of time), and, through this multiplication, challenges notions of veracity against notions of the self. Therefore, Huebler's use of look-alikes or 'doubles' create and test the logic of equivalence and

identity as operative dynamics of thought. His exploration of identity is a critical stance regarding personal projection onto images: that is, asserting ontological meaning through similarity.

This is blatant in two works he conceived in Turin, Italy, *Variable Piece #11, Turin* (1973) [Figure 24], and *Location Piece #17, Turin, Italy* (1973) [Figure 25]. The first places the artist at a Piazza in the city, taking pictures from which he randomly chooses three in order to associate them with three notions of ‘ominous’, ‘poetic’, and ‘spirited’. To complicate things further, Huebler adds that ‘the truly sharp-eyed observer will immediately see which specific image belongs with which specific word’. This should warn the spectator that this particular work reverts to his / her / their responsibility in the use of equivalence as a valid strategy.

PHOTO NOT



AVAILABLE

HOTO NOT



AVAILABLE

Figure 24 Douglas Huebler, *Variable Piece #11*, Turin (1973).

The deceitful challenge for the ‘sharp-eyed’ spectator mimics advertisement strategies where the consumer is described as cleverer if he / she/ they choose the advertised product. However, the randomness of the process inherently critiques the carefully chosen and fabricated images of ads. Therefore, one feels both in familiar and alien territory. Eerily, there is some level of projection and, if not of similarity as we are in the territory of equivalence, at least of an existential assessment of the information provided in terms of intelligent assessment. Huebler invites us to consider the urban fabric as a network of information with a unilateral and single meaning (which is not unlike the uses of Instagram by private and public users, for instance).

About three years later, Huebler explored the notion of projection in a far more curious and eerie manner. *Location Piece #17, Turin, Italy* is almost a short story, a piece of fabricated fiction backed up by a barely convincing photographic testimony and a map. The artist took several photographs in order to access a specific perspective across the river Po. When he developed the film, already in America, he *allegedly* noticed a doppelganger looking straight at the camera. A man who looked like him ‘at least more so than most everyone else in the world’, as Huebler states in the adjoining text to the photographs.

This is a delightful piece of writing that contradicts its own statement with the relatives ‘at least’ and ‘most’. It also plays with notion of identity and self-identification – which were questions that photography and indexicality addressed in the nineteenth century through technology used as a form of measurement, from Francis Galton to Charles S. Peirce. Because the images used are in black and white, they are more susceptible to an evaluation based on measurement: Huebler’s doppelganger image is so blurred that the viewer finds himself looking at the facial features as if measuring

footprints on the sand, that is, sorting out the distance and shape of the eyes, the nose and the mouth.





Figure 25 Douglas Huebler, *Location Piece #17*, Turin, Italy.

To complicate things further, Huebler devised a project that declined the notion of identity through a number of statuses.

On December 17, 1972 a photograph was made of Bernd Becher at the almost exactly after he had been asked to ‘look like’ a priest, a criminal, a lover, an old man, a policeman, an artist, ‘Bernd Becher’, a philosopher, a spy, and a ‘nice guy’, in that order.

To make it almost impossible for Becher to remember his own ‘faces’ more than two months were allowed to pass before prints of the photographs were sent to him; the photographs were numbered differently from the original sequence and Becher was asked to make the ‘correct’ associations with the given verbal terms.

His choices were: 1. Bernd Becher; 2. Nice Guy; 3. Spy; 4. Old Man; 5. Artist; 6. Policeman; 7. Priest; 8. Philosopher; 9. Criminal; 10. Lover



Figure 26 Douglas Huebler, *Variable Piece #101*, 1972.

This work bears the date of March 1972 and is signed in the habitual manner by Douglas Huebler stating that ‘the photographs and this statement join together to constitute the final form of this piece’. The first reaction to this project can be a dismissive suspicion for it looks like a joke, especially knowing that Becher and Huebler were friends, and by looking at some pictures where evidently Becher took this opportunity to amuse himself with the idea that someone was dealing with portraiture in the way that he and his wife, the artist duo Bernd and Hilla Becher, were dealing with industrial constructions through photographic repertoires organised in grids.

However, this piece assembles all the important notions regarding photography and its graphic component of an elementary relation to a subject – any subject. Huebler specifically asked his friend to represent with his facial features generic conditions or statuses, the ‘cultural ready-mades’ he often alluded to. (The ‘Nice Guy’ expression is a delightful double-bind: one knows how prejudiced, biased (based on looks and manners)

it is and yet once uttered, it conveys a meaning that we all seem to know although no one can explain it. It is a real cliché.) In addition, the information conveyed to the subject and the viewer alike, as a starting premise, is doomed to fail and to become an amusing conundrum that we will nonetheless play with. The added information presented to the 'percipient' of the work is of the utmost importance: the photographs were set to rest, the subject was given time to forget them, and then asked to correlate the generic status to the facial expression of his choice. In this piece everything is revealed, all the information is passed on to the viewer. But what is this information and how efficient is it? What does it do?

This is a project where the graphic in the photographic is apparent not only in the process of the photographic technique, its indexical quality, but also in the way one looks at the subject: the lines on the face that create an expression. Much like the mural drawing of blue, yellow, green and red lines at the ThomasLewallen gallery, one must operate a mental construction of turning the lines that make-up a face into the elusiveness of an expression. And yet, unlike the mural drawing, this will not induce a 'state of confusion' such as Larsen described it, but a sensation of familiarity. This is the territory where the iconic and the indexical interact: one is instructed to look at a photograph in order to recognize something, to look for a likeness. And here is where the indexical, as a mere, objective, data-recording aspect of the image fails.

The passage from the graphic to the photographic in the sense of the passage from the index to the symbolic through the iconic, is a human automatism. One does not stop to think about the indexical nature of the image, neither does one read the lines of the face as if to decipher a strange calligraphy, nor even does one need to reassemble those interpretations in order to reorganize the image and finally, just then, identify an

expression. But when this automatism is reversed, and one is set to look for something intuitive, the mechanisms of intuition are revealed.

And yet, nothing here seems to flow as it should. The information, the premise of the work and its development, seem all wrong. How does one look like a policeman? What is the facial expression of the 'Nice Guy'? And, the best and most amusing of all, how does Bernd Becher look like Bernd Becher? In fact, this is a game that uses the icon and the index to get to the symbol: the conventional meaning, and how it lines our prejudices - and how these feed our understanding of the world. If, Huebler seems to say, it is the viewer's responsibility to take on the image of someone photographed and to carefully deconstruct the symbolic signs as they are, 'empty appearances', one enters into another realm of retinian bliss, a more existentially prone mode of image consuming. If one measures this graphic program against Diane Arbus' use of the photographic medium, one can be surprised with the outcome: is she not denouncing the symbolic through the graphic condition of misalignment of the misfit? Doesn't Bernd Becher, when it comes to himself, end up choosing a passport-type of image, a conventional gaze into the camera denoting a self-assured man? The image he chose as 'himself' could very well have fallen into the category of the 'Nice Guy'.

Cleverly reassembling both existential and publicity tropes, Huebler provides a blueprint of societal expectations regarding images and the new way we read them, in a capitalist society basing its capital on information. Money is information; self-image is information; identity is information... And their intrinsic malleability is at the same level of intensity as the will to believe what they are telling us. We live in a society that consumes artifice and promotion willingly and, most of the times, knowingly. Now more than ever we oscillate between social media and articles dismantling their artificiality. One intuitively places oneself in Becher's place – one imagines *being* the manipulator.

First of all, the photographic image is deconstructed as graphic information: like a good drawing, it is made with lines, a game of shadows and lights that render it almost voluminous, almost life-like. However, the photograph is not pure convention – it is photo-chemically extracted from a space-time continuum. However, has drawing ever been pure convention and can conventional signs be unequivocal? Can one really read a face? Or is a face part of a context, one or several projections, a culture, a specific set of ‘givens’ as Huebler liked to say, that make-up a set of meanings one can never be completely sure of?

One of the best examples of this existential and linguistic deconstruction is a modern appraisal of Charles Le Brun’s drawings of emotions. An avid reader of René Descartes, Le Brun was the official painter of Louis XIV and became the director of the Académie royale de peinture et sculpture in 1663. Probably influenced by Descartes’ *Passions of the Soul*, a book that deals with emotions as the internal and external feelings the body endures, LeBrun went on to produce a number of drawings to teach how to draw a whole panoply of emotional states.

This project is a perfect example of how philosophical inclinations and their cognitive interference can affect the outcome of artistic practice. Descartes was the first philosopher to see the body as a machine made of different parts, in a mechanist vision of the world as a network of causes and effects. The starting point of the *Passions of the Soul* is a description of the organs and their functions, having presented this section as the place where he would explain succinctly ‘the way in which the machine of the body is composed’ (Descartes 1990, p.40).

The passions or emotions are defined as stemming from the mind to eventually end in the body and differing from the passions of the body such as hunger, the sense of cold or physical pain. Descartes explained that, what would be considered later as a relation

between weight, pressure and motion, little ‘animal spirits’ were responsible for a part of the blood stream to pass first through a heart valve for instance. These ‘spirits’ were diverse and animated with a strength that would make them flow in a ‘straight line’ and attain an organ; an example would be how the ‘vapours’ of the wine consumed by a person would affect its eyes, brain and steadiness. These elemental creatures were also what established a relationship between the soul and the body through a gland in the brain, the ‘pineal gland’ (Descartes 1990, pp. 59-62). The gland is, for instance, the converging point of each image formed in the eye and in the brain, thus presenting the soul with only one image.

Le Brun devised two books on how to express human nature and emotions through drawing. The face is thus presented as a screen where passions appear; Descartes was a dualist that believed the world to be made of two substances, the *res cogitans* and the *res extensa*: the thinking substance and the extended or physical substance⁵³. Unlike Spinoza, who considered there to be a parallelism between both substances but never an action of one upon the other, Descartes imagined a gland to be the passage between the mind and the body. Therefore, the face appeared as a screen where internal and external projections expressed single, specific states.

⁵³ This is still a strand of advanced capitalism whereby the mind devises ways of using nature and organic bodies (that Descartes saw as machines) in order to turn them into products



Figure 27 Charles Le Brun, **Fear and Despair**. From *Conférence sur l'expression générale et particulière* (1668)

Le Brun may have been inspired by these interfaces between internal and external ‘passions of the soul’, but his drawings are visual enigmas. One almost wonders if the captions weren’t shuffled. Fear looks like anger. Despair looks like disgust - or anything else. Expressing emotions visually is a difficult task especially when it is taken out of context. Rather than specific emotions these drawings illustrate how expressions are ambiguous, how any sign is ambivalent, and the human face is, more often than not, an ‘empty appearance’ as Huebler wittily put it, when presented as an image without context. Uncannily, these images seem to announce the ludicrous outcome of an experiment Felix Nadar did with Chevreul in 1886. He photographed himself talking with the scientist, who celebrated his hundredth anniversary. As recounted by Josh Ellenbogen, this experiment which, when one looks at the pictures, seems to have captured eerily disconnected and unrecognizable emotions, produced a set of photographs that ‘show poses and expressions one cannot possibly see on one’s own (...) [but] in regard to our lived, perceptual experience of Chevreul, have little to offer’ (Ellenbogen

2008, p. 36). Or, as Alphonse Bertillon deemed them, they are ‘more resembling than nature’ (Bertillon 1885, as cited by Ellenbogen 2008, p. 36). Which is to say that photography brought about a separation between technological truth and the truth of perception. For it is one thing to distrust perception in a cognitive context but what about everyday life? What is also clear is that Le Brun got to these images through drawing, that he excelled at. They could not have come from any technical device as photography was far from being invented in his time. Could drawing be a skill not only of the hand, but of perception too? Is the draughtsman a specialist in seeing? And, more importantly, is drawing a mechanic operation? That is, is there in drawing a part that, while stemming from those converging images in the brain Descartes mentioned, operates mechanically, extracting the lines from the shadows and the chiaroscuro from the play of light on surfaces?



Figure 28 *Chevreur in conversation with Félix Nadar, 1886 (detail). Photograph.* © Ministère de la Culture/Médiathèque du Patrimoine, Dist. RMN/Art Ressource, N.Y.

I have argued that rather than using the index as a direct relation with life, Huebler multiplied the instances of information. The line, as a conventional or technological compression of data is not only self-reflexive, but it is also laden with information. The line was always indexical but its status of trace or mark was always superseded by iconicity and symbolic representation – even when it clearly became dysfunctional, as with Le Brun’s drawings. The schematic use of documentation creates a diagram where

every connection counts, every line is meaningful, and its meaning is passed on to the spectator as its responsibility.

The use of maps in Huebler's work also denotes this relation to the self through the line and the diagram. By 1978, Huebler had entered into a process of juxtaposition of the many graphic and photographic mediations. One of them, not mentioned hitherto, was the use of maps. The curator Christopher Cook explains the remnant reference to sculpture in Huebler's work through maps. The 'Site Sculpture' works are a trace of Huebler's Formica geometric sculptural endeavours between 1966 and 1967, and whose shape the artist transposed onto maps. At the time, Huebler started becoming interested in Land Art, and decided to travel to remote places in order to devise new work; while doing so he endeavoured to 'mark' his trajectories on maps. 'The maps 'saved' each trip as an entity – a description of movement through time and space' thus associating *Variable Piece #1* (1969) with the Formica sculptures (Cook 1972, p.). This piece describes the placement of 'small fabric stickers' on several locations in New York describing a square within a square, within another square. (The stickers worked in the urban space like dots on a page.) Of course, the work is inaccessible as such, perceived only partially, provided one could go the site indexed on the map and still see the stickers. It is also a testament to Huebler's renunciation to the emancipation of the work into landscape and its specific transitive form between monument and ruin, of which Robert Smithson's *Spiral Jetty* (1970) is the quintessential incarnation. The map itself generates the only global visual assessment of the work, an indexical affair through the marked itinerary on it, transposed onto the real space of the street, the fabric stickers as the dots indicating a location.

Maps are complex things when it comes to understand where the icon, the index and the symbol are: they resemble territories point by point voluntarily (unlike photography whose iconicity is seen as accidental by Peirce) and therefore are from this perspective

iconic. However, the points indicating cities, villages, rivers, mountains for instance, are indexical as they *indicate* a location where the map-user can go and they measure distances proportionally. The symbol pertains to all visual conventions, like the colour brown to depict mountains for example. Moreover, between the trace and the deictic there is a time reversal. The deictic operates in the present or the virtual: one can use a map in a future travel one is planning or could virtually undertake; as a mark (the ‘saved’ trip), the index is what remains of a past incidence.

The way Huebler was marking maps functioned as a photograph, as the remaining vestige of something that happened, in the form of a linear measurement. The way he used maps in his works played with both instances of the measurement and the virtual action, of the trace and the deictic. Huebler placed the stickers himself, allegedly - and the document is not *proof* of that, it is rather a *claim* of authenticity – but it *located* the stickers so the viewer could virtually go to the sites and verify the act. In fact, Huebler had no real need of placing the stickers because the rumble and tumble of the city is intense enough to have caused the stickers to disappear within minutes. Most likely, the only thing Huebler made was this document as the activation of a conceptual divagation playing with the viewer’s projection onto real and imaginary space. Better yet, its concept-based nature denounces imagination as the source of ‘real’ mapped space and the totality of the mapped ‘real’ space as an experience one can only have partially which makes it a construct – a symbol.

‘Sculpture’ here works as an older layer of the palimpsest, as memory of a displaced project to make land art. It also marks a shifting point between objects and documents, between making and marking. In an interview for the *San Diego Union* newspaper in 1988, Huebler recalls the moment where he realised that the solution was not to expand into nature as he first thought, but to approach art making in a completely different

manner, informed by Zen Buddhism. This happened when he took some of his Formica sculptures from his studio to his summer house in Cape Cod: 'here's where the Zen Buddhism comes in: that I am not about to overwhelm nature. I would have to make them bigger; paint them red for instance. Do any number of things that would put me in competition with nature. And the Zen intuition I had developed simply would not permit me to do that. That's when I stopped making sculpture'. This is a conceptual echo of Hollis Frampton's notion that, like the butcher does not make meat but the cut – the steak, the photographer does not make the real but cuts it into photographs. That photographs – or, by extension based on the indexicality of all methods used by Huebler, lines, dots, maps, texts, that is, documents - are 'dimensionless entities', ideal to measure consequences of actions.

In the late 1960s, Lucy Lippard was keen on the idea of 'energy'; in a panel discussion that took place at the New York Shakespeare Festival Theatre on the 17 March 1969, she asked if the conceptual works could be seen as 'energy'. Seen as cut meat, that could almost be taken literally. The ethos of the indexical line seems to place on the viewer, the percipient, the vitality of that energy. Huebler did not present empty maps but marked maps. And there is a difference:

To follow the plot is like navigating with the map. Yet the map effaces memory. Had it not been for the journeys of travellers, and the knowledge they brought back, it could not have been made. The map itself, however, bears no testimony to those journeys (...), the map eliminates all trace of the practices that produced it, *creating the impression that the structure of the map springs directly from the structure of the world* (my emphasis, Ingold, 2007, p.24).

In general, the map, rather than a testimony of past experience, is a deictic, it points to real space, to an activation in the present. Although it 'effaces memory', it nevertheless

carries the promise of experience. It is indeed an empty vessel waiting for an experience to complete it. It is not by mere chance that it became a form of material for twentieth century artists, as it is made with lines and produces lines: of behaviour, of trajectories. Our GPS systems and Satnav devices take this multidimensional characteristic to another level nowadays. They break the unicity of a designated territory - the map - and adapt it to the location of the user by tracing and re-tracing lines that react to the incoming information about traffic and construction works.

Returning to Hughes' notion of 'authorial nuance', by dealing with information, documentation, data or energy, however one wishes to call it, conceptual artists shed their subjective skin in favour of philosophical concerns through manipulations of realities and a connection with the spectator. Moreover, the choice of the line as one of the axis of the work and of indexicality as the frame of its immersion in reality, of its dialogic impact on the world, has yet another consequence. The line is not, contrary to what the myth of Apelles and Protogeny has us believe, the vector of any kind of skill.⁵⁴ A line is a line. Perhaps that is why children's drawings are always so compellingly 'beautiful', for lack of a better word. Antonio Machón, a specialist and collector of children's drawings, quotes Picasso as saying 'it took me four years to draw like Raphael, but a lifetime to paint like a child' (Machón 2013, p. 28). This means that the line is disassociated with skill and associated with an uninterrupted flow between mind and body, one expressing

⁵⁴ This is what Pliny the Elder recounts in Book XXXV of his Natural History. When visiting Protogeny's island, Apelles went to see the master but he was not home. Apelles asked the old woman who opened the door if he could leave him a note: on a big canvas, Apelles drew a line so exquisite that Protogeny, upon his arrival to his studio, recognised immediately that only Apelles could have drawn it. A great master of drawing himself, Protogeny drew a new line within that line in another colour. The day after, Apelles called on the master again, and, again, he wasn't home. The young artist saw with reverence that a line had been drawn within his own, and proceeded to draw yet another line, in another colour, finer, more perfect, without hesitation. When Protogeny arrived, and saw this other signature, he gave up and recognised Apelles' superiority. This is the first mention of the line in art history. Apelles, to whom the motto 'not a day without a line' is attributed, had a posthumous notoriety during the Renaissance. His motto encapsulates so perfectly the Renaissance's focus on *disegno* and on the discipline of sketching that it could have been Raphael or Da Vinci's.

the other dialogically. Both are indexical dreams whereby the line is either reflexive or a form of superior mediation between the spirit and the world. Sol LeWitt himself doesn't differentiate lines in terms of status but in terms of relation with one another and with the space, as I will demonstrate in the next chapter. One would be at pains to locate the 'masterpiece' in LeWitt's or Huebler's work. There is a horizontal quality to their projects, a multifaceted condition that accompanies the times and challenges them. More than bypassing the artwork as commodity – which is, for any artist, a refusal to live off from the work produced - conceptualism reversed statuses and functions in thinking, making, viewing and owning the work. They re-negotiated the notion of quality, of where the value lies and what the spectator does. But more importantly, they moved from aesthetics to ethics, and from contemplation to a pleasurable awareness, within an experimental disposition, that has taken over the art world since.

3 The Line as Hypothesis: Sol LeWitt

3.1 Objectivity: A Diagrammatic Narrative



Figure 29 Sol LeWitt, *Objectivity*, 1962, oil on canvas, 127,64 x 127,64 x 24,77 cm. Collection
! Gallery of Art, Washington DC.

Despite being considered, along with Douglas Huebler, the founder of conceptual art, especially through his two seminal texts *Paragraphs on Conceptual Art* and *Sentences on Conceptual Art* published (1967 and 1969 respectively), LeWitt did not produce work in direct connection with language, advertising strategies, and sign systems specifically. Far more diagrammatic, his conceptual journey seems to start where others' stops, in a unique detachment from the systematic use of photographic imagery and self-reflective linguistic conundrums.

Nevertheless, LeWitt's life work was dedicated to geometric abstraction or, more specifically, to diagrammatic renderings of written instructions stemming from a unique

analysis of sequential photography, word play and indexical lines. Indeed, he notoriously declared Eadweard Muybridge to be his major artistic influence and spent a great deal of the beginning of the 1960s emulating this fascination with sequential photography.⁵⁵ I argue here that the whole of the graphic method is a clue to connect LeWitt's fascination with chronophotography and his move towards his lifetime project: mural drawings stemming from instructions.

Among LeWitt's series dedicated to Muybridgian imagery there is an exceptional work that struggles to extract itself from painting through a grid-like format and the sequentiality of reading, protruding and receding onto itself: it is called *Objectivity* and is dated 1962. The work is composed of 25 squares arranged in a 5 x 5 grid; each horizontal line of five squares spells 'ob/je/ct/iv/ity'; the squares of the first line advance towards the spectator, protruding from the surface; the following is on the surface of the 'painting'; and the remaining lines recede progressively into this sort of painting box. The natural consequence of such an arrangement of letters, for the spectator, is to start reading the word 'objectivity' diagonally rather than just horizontally. But the fun really begins when the word is deconstructed and one reads each line vertically, an exercise that culminates with the impossible word 'ityityityityity'.

Not cutting the word into syllables produces the effect of marking up a figure with letters such as one does in geometry rather than treating the word as a signifier. It also

⁵⁵ Oral history interview with Sol LeWitt, 1974 July 15. Archives of American Art, Smithsonian Institution: 'One of the biggest influences was when I first came to New York, a friend of mine living in New York for some time had gotten this from an old artist who had died, and he had a first edition Muybridge. (...) I borrowed it. I should return it. I hate to return it. I was always turned on to Muybridge. After, the still life paintings evolved into little figures that I took out of Muybridge. I had one figure in each painting. Then it always became the same one of the man somersaulting. I think that Muybridge was really the biggest influence on my art of any older artist (...).'

mimics the automatic rendering of movement by the camera through aleatory cuts. Moreover, the ocular choreography the work stimulates apposes a performed, invisible diagram over the rigidity of the grid – what Tim Ingold calls ‘ghostly lines’, that is, lines that are mental, immaterial but that guide our cognitive approach to the world (Ingold 2007, pp. 47-50).⁵⁶ In fact, as the previous chapter details, sequential photography, working as a dynamic relation between images, creates a different kind of image-reading, far more engaged, and whereby the mind’s eye diagrammatically mirrors the structure delineated from frame to frame. LeWitt’s *Objectivity* is an interesting moment in his development as it used chronophotography to upset the uniformity of linguistic structures of meaning. It also, as we will see, deconstructed his own interest in Muybridge, as he took the very word that defined his fascination, ‘objectivity’, and broke its uniformity.

In a panel organised by Seth Siegelau in 1969 titled, simply, ‘Time’, Douglas Huebler explained his relation to time through his own use of sequential photography: ‘*I’m interested in denying the sequential, normally accepted role of time. That is by demonstrating how objects or the position of things change. I’ve done that by having elements, events or materials actually change as they would normally in sequential time, documenting the changes photographically, and then scrambling the photographs so that there’s the priority of the linear. It’s just a way of pulling something out of a series and calling it work*’.⁵⁷ This manipulation of photographic sequences by Huebler operates in reflection of a scientific background where sequential photography extracts information about phenomena, and whereby linear time sequences are essential to attain a specific

⁵⁶ Tim Ingold agrees that this notion of ‘ghostly lines’ is problematic. While he describes them as lines ‘that have no physical counterpart in the world’, he concedes that they can be charted and translated into maps. He also acknowledges that they are cultural, in the sense that the nervous system devised by acupuncture is real for those who practice it but unknowable and unimaginable for those who aren’t familiar with it. Palm reading could very well be another example of lines that exist schematically as a reference point for the real lines of the hand, but only for those who know the practice and believe in it.

⁵⁷ Lucy R. Lippard papers, 1930s-2010, bulk 1960s-1990. Archives of American Art, Smithsonian Institution.

knowledge about phenomenal change. But what interests Huebler is that if there is a linear sequence, the information *will be* read, despite the order having been shuffled, thus demonstrating a psychological fact rather than a physical one. And by the same token he demonstrates the conflation of phenomenal truth and text, all being understood in the same structural manner, through the previously assimilated indexical line transubstantiated into a form of integrated behaviour.

Therefore, by ‘denying the sequential’ through the manipulation of a given linearity Huebler nevertheless affirms its structural prevalence; LeWitt on the contrary, forced the spectator to follow a line in the grid that paradoxically burst its arranged format and shuffled meaning. Hence, readable, narrative-like lines guide consciousness, perhaps because they have been structuring it through textual configurations for four centuries since Gutenberg. Even if, with the advent of technology, ‘linearity is decaying spontaneously’ (Flusser 2011, p. 15) with the omnipresence of pixelised images, and the discovery of quanta (which makes-up images as an abstract organisation of dots as surface). I will analyse Flusser’s perspective on technical images in the next chapter, but his remark resonates here with the orthonormal sequences in LeWitt’s *tableau*, or perhaps, more accurately, table (like the periodic table with its assigned symbols for known and unknown elementary matter). The conceptual association of deconstructed image-sequences and unreliable texts presents a hybrid construct of overlapping structures of linearity and exploded grid configurations, or ‘quanta’ and ‘protons’ in the Flusser lexicon.

So, indeed, by the time the graphic method (in its *photographic* form) got to Sol LeWitt, it wasn’t thus seen as a statement of truth (as it was to Marey). Instead, it was a manipulation of information that did not stem from observational methods but from the thing itself as internalised behaviour. Whether the information was true on a scientific or

ontological level, that was not the question anymore, as we are in between a form of language – chronophotography, the line - and things being directed towards us as a coded, relatively unknown reality.

Chronophotography and the graphic method, when transposed onto art, play by new rules. They propose a narrative in a new form: anti-climactic, self-referential, multi-faceted and open-ended; but, more importantly for LeWitt, they bring in objectivity, for the phenomenon expresses itself through the recording of the camera, and, as such, is susceptible to manipulation. Objectivity is not so much here a universal truth or a certainty – what are those anyway? – but the ability to say that the art came from a mediator, be it the camera or the line. In fact, LeWitt's career is an interesting approach to the possibility of choice and objectivity. Because there is, since the work stems from LeWitt himself, a kind of personal choice; however, it is not where the viewer expects it to be. Circularity, that is, choosing the word describing what motivates the work which in this case is 'objectivity', breaks the representative curse, the to-ing and fro-ing between the work and the world with the artist as the filter between both. The work is turned outwards and not inwards, which is, as it is becoming evident, the specificity of the work – or the image - as screen instead of a window onto the world.

The graphic method replaces the human hand and eye to produce knowledge with an apparatus whose automation Flusser defines as 'a self-governing computation of accidental events, excluding human intervention and stopping at a situation that human beings have determined to be informative' (Flusser 2011, pp. 18-19). Scientific information, in particular, must be objective. Laden with data, the line, like the photograph, is 'self-governed' in its assessment of the accidental (the phenomenon) and is programmed to produce images that will be understood on an intellectual level as objective information that everyone can understand. Lewis Carroll imagined the

impossibility of the indexical that is, the inability to produce information through lines and location: passionate about logic, mathematics and words, he wrote in 1876 about ‘a large map representing the sea,/ without the least vestige of land:/ And the crew were much pleased when they found it to be/ A map they could all understand’ (Carroll 2006, p. 28) – this is a passage of *The Hunting of the Snark*, a tale about the chase of an imaginary sea creature by a strange crew to whom an empty map is given, unburdened with cardinal references, borders, meridians, or latitudes and longitudes. How do you catch an imaginary sea creature? By shedding all the geographic reference points and all the tools that would allow one to - imagination takes over and the objective has to become the fleeting subjective. This is, of course, a proof *ad absurdum* of the necessity of conventional signs hinging on indexicality but also of the limits of their interaction with the world. For the indexical line, and as much as it is visually entrancing and conceptually convincing, is a sign corresponding to a set of readable codes. And if one does not possess the necessary knowledge for it, a map is useless. In this sense, the indexical line is close to language, it is acquired as a set of abstract codes intrinsically related to the world to the point of creating it.

In ‘objective’ photographic images, if there may be a technological bias, there isn’t a human one for the scientific context, rather than providing a personal perspective turns seeing into a deciphering game. LeWitt saw how these photographic sequences exposed phenomena without judgement, personal perspective or fictional stories: they were scientific and therefore strived to be as impersonal as possible. Or at least they seemed to. At any rate, LeWitt chose the running man rather than Muybridge’s exploding chicken or the naked woman pouring water as his subject: an uneventful, almost neutral or utterly banal subject [Figure 30]. Moreover, it didn’t really matter where the man in Muybridge and Marey’s experiments was running to, or why he was running, it mattered *how* he was

running. The camera's eye describes the different stages of the run and the mind's eye diagrammatizes the movement – there is a constructive reflexivity between those two modes of sequencing, the mechanical diagram and the mind, that details a new kind of analytical thinking based on hypothetical statements ('a man runs from A to B...'). Hypothetical thinking leads back to experimental science, the methodology of establishing potentials to test existing laws.

Claude Bernard defined experimental science as an 'induced observation' and the observer as such:

(...) The observer must be the photographer of phenomena; his observation must represent nature with exactitude. He must observe without any preconceived notion; the observer's mind must be passive, that is, silent; he listens to nature and writes under its dictation.

But once the fact is noted and the phenomenon well observed, the idea arrives, the reasoning intervenes and the experimenter shows up to interpret the phenomenon (Bernard 2008, p.21, my emphasis).

This dichotomy between observer and experimenter is bridged by an objective, photographic mind, 'passive', 'silent', writing under nature's dictation' for the experimenter to 'show up' and reason. Observation must be photographic: Bernard was a physician and as such could not rely on apparatus as relentlessly as Marey did; he therefore wishes the perceiving mind to work like one, and imagines observation separated from reason. The experimenter is the positivist waiting for exact data to analyse.

Experimental science created a new subject and a new disposition toward phenomena, breaking the chain of observation and thought. Perceptual awareness does not make phenomena tangible unless they are recorded from a hypothetical stance and

photographic objectivity. In the absence of an apparatus, the mind must operate like a machine, automatically, like a 'self-governing computation of accidental events excluding human intervention'. The hypothetical mind, this objective, flawless tabula rasa operates from 'possibility' within the range of the apparatus: 'the apparatus does as the photographer desires, but the photographer can only desire what the apparatus can do' (Flusser 2011, p. 20). If the mind is compared to a machine and starts operating like one, its limitations are the limitations of the information obtained. 'Objectivity' both affirms and breaks this curse: it uses language as the tool of communication but it breaks its subjective streak with the affirmation of an outward and exterior, material, non-observational stance.

The difference between traditional images and technical images, for Flusser, is that the first stemmed from the object and the second from 'calculation' activated by our fingertips. 'In this way', Flusser wrote, 'keys will free us from the pressure of changing the world, overseeing it and explaining it, and will free us for the task of giving meaning to the world and life in it' (Flusser 2011, p. 29). This is the path of objectivity; but what does it become when transposed to art?



Figure 30 Eadweard Muybridge, *Running at full speed*, 1872 – 1885. *Animal Locomotion: An Photographic Investigation of Consecutive Phases of Animal Movement 1872-1885*.



Figure 31 Sol LeWitt, *Run IV*, 1962, oil on canvas and painted wood, 161 x 161 x 9 cm.
2020 The LeWitt Estate / Artists Rights Society (ARS), New York

LeWitt's Run IV (also of 1962) associates image and text, rather than having the words behave like images [Figure 31]. It is impossible not to measure the gap that separates the word and the figure, the classifier and the body in motion, the signifier and the signified. For here the image provides far more information than the word and yet, the word allows for the spectator to acknowledge a direction of thought. One is not looking

at, say, a fugitive or a Greek athlete in the throes of potential failure: LeWitt focuses on the action, the suggestion of movement from A to B but without telling its story, or, rather, without identifying the subject and his inner motivations, choosing to focus on the event itself and its objective narrative detached from emotional factors.

LeWitt is not concerned with speed and neurological facts; he is interested in the movement from A to B (for which *Run IV* is still merely a suggestion), whether it is through reading a descriptive verbal account or through the image delineating a hypothesis of a man running, since LeWitt only replicated one of Muybridge's frames of the running man rather than the unfolding of the run through its chronophotographs, thus effacing the scientific information [Figure 30]. In a sort of McLuhanism before its time (*Understanding Media: The Extensions of Man*, with its catchphrase 'the medium is the message', was published in 1964), LeWitt stripped information of its content and exposed a tautological, self-sufficient entity, and open-ended representation of the concept of running. Unlike Carroll, he was more concerned with the index than with the convention, if the first is a dialogic entity, in a continuous relation with its object, the symbol detaches itself from the world and creates a cultural network.

However, the work also establishes a gap between the word and the figure that conventionally narrative film and especially advertising (which typically uses text-image structures) diverts us from. Even the colour used ends up being tautologic: the last row of running men is red on red. And, lastly, the work is organised in grid form, as if the word was a function of the figure or vice-versa. Much like Huebler's concern with lines and linearity – which are two different things – LeWitt reorganises the surface of the canvas in a way that it no longer reads as a personal projection, that is, a whole and dense entity with a 'degree of compactness (so that the object is united, composed, stable)' in Alloway's words to describe traditional painting and sculpture (Alloway, 1975 p. 207).

Run IV is a readable surface organised in little squares – one would be tempted to say, in a proto-pixel configuration. This figurative presence, at least in his drawings, will eventually disappear, in a move away from photography's iconic prevalence, even within its sequential version. So, a few years later, the edges or elements on a wall (hypothetical As and Bs, or diagrammatic points) are associated through a simple line, such as in the mesmerising *Wall Drawing #51: All architectural points connected by straight lines*, 1970 [Figure 32]. By seeking objectivity, LeWitt was exploring the makings of an image in the age of information. The indexical turn became far more than a measuring-prone, technologically involved time. It became, to go back to Flusser, a 'transfer of existence to the fingertips' (Flusser 2011, p. 29), a focus on the index as a sign, a deictic, and as a finger pointing to show or to use 'keys'. It became almost about the finger showing itself as the pointing finger while dismantling invisible structures and potential relations in 'real' space, rather than recreating it. LeWitt describes this crucial moment as a form of objective literalness:

Back around 61, 62, I did things using one figure, the running figure repeated, and then like an arrow pointing that way, and then the word 'run.' These things could be done on different levels. They were done as three dimensional paintings. I also was very intrigued by Albers, but the thing about Albers that I couldn't grasp was that if he has colours that were receding, they should, I thought, physically recede; and if they advance, they should physically advance.

Mr. Cummings: Rather than an illusion, optical.

Mr. LeWitt: Yeah, rather than an illusion. This, I think, was partially from the understanding of what [Jasper] Johns was doing, with three dimensional things were three dimensional, and two-dimensional things were two dimensional. I thought this was a very good idea. Then I thought, 'Well, it should be applied to Albers. 'In the meantime I had all these Muybridge ideas in my head, so actually it came off much more simple than it seems. They had just too many things going on, too many ideas in them. Then I

discarded the figure, and the word, and the symbol, and just started doing three-dimensional things.⁵⁸

The different iterations of *Wall Drawing #51* have two beautiful outcomes: the first is the use of the line as that pointing finger, but working dialogically. It points both ways, it connects elements, it conjoins architectural indifferent functions on a surface. Like a digital graphic platform (emphasis on the term ‘digital’ which can only connote the pointing finger as the notion of handmade is obsolete in that context) it connects regardless of function or hierarchy, pointing to the integrity of the wall, the surface, the given platform of the appearing diagram. Secondly, from another perspective, and because *Wall Drawing #51* shows relations that weren’t there *necessarily*, it alerts the viewer to the experience of space, better yet, of life forms, as a random configuration that could have happened in another form, or that one could make happen differently. By making aleatory connections through an automatism of the mind, LeWitt reveals the unnecessary order of things, using architecture as an invented space like a case-study. As if reality itself was hypothetical.

⁵⁸ Oral history interview with Sol LeWitt, 1974 July 15. Archives of American Art, Smithsonian Institution.



Figure 32 Sol LeWitt, *Wall Drawing #51: All architectural points connected by straight lines*
Installation view at Botin Foundation, Santander, 2015.

The passage from icon to index was inherently there in Muybridge's images although they often veer into the imponderable of art, undeniably. The British inventor also produced a narrative for these images, using the Zoopraxiscope and his own presence as a narrator in lectures that could take as long as three hours, and that led him to tour across the world between 1880 and 1895; the content of these lectures remains a mystery still - we only know that the projected images were very specifically timed according to Muybridge's programmed explanations (Barber 2012, pp. 72-75). Whether Muybridge remained neutral or on the contrary used his subjects in a lascivious and voyeuristic way, it is as hard to tell and it is impossible to deny. Knowing the ambivalent

nature of his imagery, it is difficult to pin-point certain choices, especially regarding the naked or almost naked women, men and children. One clue seems to be the context of his later project, the *Motion Studies* (781 plates made between 1884 and 1885), that is the University of Pennsylvania, his companionship and collaboration with the artist Thomas Eakins (also a professor there at least until he was expelled for revealing the groin of a male model to a mixed audience in 1886), and his studies of the human body channelled towards painting.

Desire, even hubris, is a driving force behind art. Nevertheless, if Muybridge was acquainted with painters, and seemed to cater to them, he was also involved with science, notably with the physician Francis X. Dercum for whom he made, along with two other doctors, about twenty studies of patients with disabilities, included in his *Motion Studies*. Moreover, and strikingly, Muybridge was also one of the subjects of his own photography, naked and long bearded, with a thick, almost frowning brow, immersed in specific activities, and self-labelled as an 'ex-athlete' (Solnit 2003, p.225).

Therefore, while it is tempting to assert the intrinsic manipulatory role of the chronophotographer, it is also compelling to imagine the fervour of following this new path of the endlessly declinable phenomena, departing from metaphysics and religion towards the relative objectivity of science, allowing oneself to discover the intricacies of the very definition of life: movement. Including oneself in the stream of subjects and objects, as Muybridge did, reinforces the new conviction, against Vitalists, that humans are submitted to the same laws of physics that apply to the rest of the world. Rebecca Solnit notes about an 1883 prospectus, *The Attitudes of Man, the Horse and Other Animals in Motion*, its 'nonchalant Darwinian listing of humans among the animals' (Solnit 2003, p. 220). Muybridge produced a potentially endless frieze of human and animal movement types, depicting everything with enough distance to appear like a

study, and, conversely, enough intimacy to disturb audiences that deemed it uncivilized. In his own words, the project ‘embraced a large number of actions incidental to men and women in the course of their every-day life; we followed the farmer to his field and the blacksmith to his anvil, the athlete to his recreation ground, and the child to its nursery; the lady to her boudoir, and the laundress to her wash-tub. We have them running, jumping, wrestling, facing, washing, sweeping, scrubbing, dancing’ (Solnit 2003, p. 222).

This description evokes posterior psychological theories like behavioural psychology, and literature experiments close to it such as John Steinbeck’s *Tortilla Flat* (1935), echoing my reading of Duchamp’s *Tu m’* (1918) as an eternal return of the icon and the symbol and its inherent existential narrative. This objective take also bears the potential to re-define positivism within a post-humanist frame of thought: more than a sense of power over nature’s principles, why not understand this sharing of nature’s laws and elementary matter as evidence that there is no standing for anthropocentrism, and that our knowledge of the mechanics of nature gives us the advantage of technology but also of safe-keeping and not of endless manipulation? Our cognitive limit is bounded by the everlasting question why, which was progressively eliminated in science since the Enlightenment. This is what Bernard himself realised in 1886 when he wrote that ‘our sentiment always asks the question why, our reason shows us that the only attainable question is the how; for now the only question that interests the savant and the experimentator is how’ (Bernard 2008, p. 68).

The Muybridgean chronophotographic frieze is an illustration of the paradigm shift of experimental science, a three-sided perspective of the ‘hows’ of animal locomotion. Its objectivity is certainly bounded by everyone’s subjectivity or desire (including the photographer’s) facing an iconic depiction of the human body in particular, which was also the limit of Sol LeWitt’s experiments with Muybridge-like imagery. It also

unintentionally illustrates ingrained misogyny and racism of the times – Marta Braun makes a compelling argument regarding the latter when she notes that the measuring grid, denoting anthropologic studies, appears in Muybridge's *Motion Studies* with the only non-white model, a boxer named Ben Bailey (Braun 2010, pp.192-196).

Meanwhile, here stands the image across time and its intrinsic power, with its meaning suspended between science and art, where subjectivity and objectivity appear entangled in equal measure. But if it is difficult to pinpoint exactly the cognitive field developed by Muybridge, it shouldn't be as difficult to understand Marey's; however, Thierry Lefebvre also suggests that by the time Marey had managed to find funds and to finish building his Station Physiologique, chronophotography was no longer exactly in the realm of science. It seemed to have moved onto the field of scientific illustration but also, and more importantly, to that blurry notion of objective transmission, or, one could say, of diagrammatic thinking, a sort of wordless philosophy. He quotes one of Marey's letters dated 12 November 1883, in which the great inventor asks his assistant Georges Demeny to send him a few chronophotographs to his mansion in Polisippo: 'A proof of one or two 'clichés' of the Skeleton Man walking or running would please me immensely. I would like to have them continuously in front of my eyes. It brings out ideas' (Manonni *et al* 1999, pp. 22-23). Lefebvre goes as far as suggesting that Marey published prolifically to justify his researches and not the other way around.

And indeed, focusing solely on the experiment itself, and its prolific imagery, who tires of looking at these phenomena unfolding, mesmerizing like the flames in a fireplace, or the waves forever licking the shore? Scientific contemplation garners 'ideas'. Therefore, not only was experimental science setting up a new ethos within the paradigm shift of the nineteenth century, that of the limits of what science *can* do, it was also affecting the way humans tell stories, any stories, even their own. Marta Braun is one of

the authors who sees the *Motion Studies* as a sexualised, projective, almost fictional form of narrative (Braun 1992, pp. 210 - 215). Echoes of Alain Robbe-Grillet's *La Jalousie* (1957) resonate, combined with a potentially voyeuristic technology that rendered possible reality TV: Solnit points out that one of Muybridge's wife's declarations in court was that he used to peep 'in at her as she lay sleeping' (Solnit 2003, p. 226).

For LeWitt, nevertheless, 'the logic of the serial image was the important thing [...]. At first it was the image, then it became the fact of seeing things from three different angles, as they emerged and changed. It had a beginning and an ending. A kind of philosophical realism'.⁵⁹ So, LeWitt himself firstly got entranced with a simple and contemplative, or perhaps illustrative, relation with the 'image' and moved on to seriality and later to the diagram, or, more precisely, to data and its graphic expression. For, I maintain, Muybridge was undressing his subjects in the wake of a physiological awareness in science that harboured the potential of a voyeuristic technology as well – following the Framptonian notion that technology is what one makes of it. He mimicked the scientific measuring devices with his background grid and his display of the phenomenon's sequence. Both artistically and scientifically, he provided several viewpoints of the same phenomenon thus creating a certain scientific coherence but also a visual disconnection that suggests an ontological multi-faceted condition.

This could, of course, stimulate a romantic, Proustian projection of a kaleidoscopic world but it could also take on another form with conceptual art, that of the end of all idealisms, of the metaphysical 'whys', which a short story by Herman Melville sensed in 1856, *The Piazza*. In it, the narrator idealizes a place in the mountains where a window refracts the sunlight; seen from the plain, it looks desirable, better; only the person living in the mountains, in remoteness and forced asceticism, also idealized the narrator's house

⁵⁹ Oral history interview with Sol LeWitt, 1974 July 15. Archives of American Art, Smithsonian Institution.

(the opposition is made even deeper as the person living in the mountains is a young woman, whereas the narrator is an older man). Both perspectives annul each other and ground each character in their own multifaceted realities; after all, the narrator's house also revealed other perspectives, perhaps not from the piazza, but from opposing windows. This short story remains puzzlingly unresolved, a mere parallax wandering. Moreover, the story seems to expose the narrative mechanisms of the novelist, who multiplies viewpoints, but seen here in an almost schematic way. What thus remains is the structure of the images within their sequential organisation and dialogic quality, represented by the contrasting complementary between the two characters' perspectives. For LeWitt, the exposed visual narrative of chronophotography was seriality and change, first 'the image' and then 'the fact of seeing things from three different angles, as they emerged and changed'.⁶⁰ This is an essential turning point for LeWitt, I propose, whereby he holds the figure as a promise of a line and then a diagram.

Objectivity here is thus not a belief in the truthful account of photographic devices; it is more a disconnection from the ego and a focus on the dynamics of things, unaffected by feelings or personal projections. An enamoured relation with relations, an infatuation with the literal. Rather than a statement of truthfulness and realistic value, it is a focus on the mechanisms of documenting, and perhaps even *making* change. In fact, there is a difference between the complex act of seeing and the act of documenting: the latter being disconnected from the mind of the seer, like Douglas Huebler's book of reference, *Patterns of Discovery*, states from a scientific point of view: 'seeing is an experience. A retinal reaction is only a physical state – a photochemical excitation. [...] People, not their eyes, see. Cameras, and eye-balls, are blind' (Hanson 1958, p. 6). One recognizes the separation between the retinal and *seeing* - a Duchampian trope. In fact, for the sake

⁶⁰ Ibid.

of expanding the universe of conceptualists, it is worth noting that when Huebler picked up N. R. Hanson's epistemological musings he had difficulty engaging with Duchamp (Alberro and Norvell 2001, p. 145) and was doing so through John Cage. If it is true that Hanson was a reference for Huebler but perhaps not for LeWitt, one thing is certain: much like the graphic method resonates with LeWitt's graphic development, Hanson's theory also denotes a zeitgeist of the time whereby perception was linked to cognitive faculties, whereas the surrealists linked it with the unconscious previously. The 'automatic' mode, detached from conscious projections (such as the *écriture automatique*), was for conceptualism turned towards the world as recorded information, rather than to the internal world of dreams and impulses.

3.2 From Icon to Index (and Back)?



Figure 33 Sol LeWitt, *Run*, 1960, oil on canvas, 151.8 x 151.8 cm.
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New York.

In the beginning of the 1960s, LeWitt was only seemingly experimenting with Abstract Expressionist paintings; in fact, he was combining (one might almost say drowning, when looking at certain layered paintings produced in 1960) specific concerns with language and repetition while looking, fascinated, at Muybridge imagery which was

serial and arranged in a grid format – as I have argued, in a sort of proto-pixel format, oscillating between iconic and indexical concerns.

He was also looking at Josef Albers' abstract geometric painting, whose work he was introduced to by Robert Slutsky at the end of the 1950s when he was working at I. M. Pei's studio (LeWitt 2018, p.211). In hindsight, LeWitt's use of geometry is akin to Albers: it is not so much about geometry but about what you can obtain through its repeated patterns; 'the most interesting characteristic of the cube', LeWitt wrote, 'is that it is relatively uninteresting' (LeWitt 2018, p. 172). The lines of the square could be extended onto other dimensions, reaching volume without dramatically changing the inherent shape of the square.

Painting or building the square and the cube posits not only a concern for objectivity in the process, it also allows for the mind's focus to be emulated by the regularity of the figure. The eye moves along the line, rather than embracing a complex shape. Moreover, the repetition of the shape takes geometry to a linguistic affair, to the emptying of the sign, to the release of its specific meaning into other potential ways of playing with it. In LeWitt's case, the square progressively turned to three-dimensional space and drawing: a number of works decline the cube, and even make this declination the object of the work, notably *Variations of Incomplete Open Cubes* (1974), but also a number of *Structures* he produced between 1964 and the end of the 1970s. The association between the sequential grid and Albers' *Homage to the Square* (a long series of paintings started in 1950 where three or four squares are set inside each other with varying colours) is at work in LeWitt's experiments at the time, as he stated so himself, in a move from evocative three-dimensionality to volume.

More to the point, it becomes increasingly fascinating to unfold LeWitt's complex combination of kinetic photography, language and geometry and how they were

conducive to isolate the line in such rigorous splendour as one finds in his mural drawings, but also in his *Structures*. About his series of *Modular Cubes or Grids and Cubes* between 1965 and 1968, which were cubic grids against a wall or extending in space, LeWitt wrote that ‘the three-dimensional object grew out of a two-dimensional grid. In the piece on the lower left [*Floor/Wall Grid* (1966)] a strong light was used to cast dark shadows against the wall, almost obliterating the white structure. The stronger the light, the less one would see of structure and the more one would see of the shadow’ (LeWitt 1978, pp. 64-65). One wonders if LeWitt is referring to the potential for three-dimensionality only or if the projected black lines on the white wall already physically, and visually, flagged up, for him, the potential of mural drawings. And is the grid reminiscent of Muybridge’s ruled backgrounds or the grid in which the chronophotographs are arranged?



Figure 34 Sol LeWitt, *Floor / Wall grid*, 1966, painted wood, 274,3 x 274,3 x 83,8.

Probably all these developments can be inferred from his statement. In fact, and particularly in the more intricate pieces such as the *Cube Structures Based on Nine Modules* (1977), the structures seem to be activated independently of the volition of the artist through their given structure, the lighting and the position of the spectator:

according to the view-point, they form different corridors and projected meshes, diagrams on top of diagrams, seemingly to an infinite degree although the numeric system they rely upon seems to suggest a finite number one could eventually calculate.

The *experience* of these structures can be quite dizzying, like a ‘jungle gym for the mind’, as an anonymous viewer remarked to art critic Grace Gluek for her eponymous article in the *The New York Times* of the 29 January 1978. They carry the information that produce them as such, but they also produce more information through the relation between their environment and their form, complicated by the specific perspective of the spectator who becomes utterly aware of the fact that a mathematical rule is at work *through* him / her / them, not unlike the famous anamorphic skull in Holbein’s *The Ambassadors* (1533), but more proliferous. Nevertheless, the latter is a mimetic representation of an object, whereas LeWitt’s work is a play, through variation, permutation and interpretation, with lines and geometric shapes. So, can we affirm that conceptualism, in his case, was a dialogic move from icon to index?

The association of the automated projection of lines through the permutation system, and the shadow of the structure on the wall makes it clear that a new subversion was about to emerge in LeWitt’s work: the dismissal of the human figure, the foregoing of the sheet in drawing and language in the work, the use of the wall as both an ephemeral and an architectural substrate. Two years after the making of *Floor/Wall Grid*, LeWitt responded to an invitation to participate in a group show at Paula Cooper’s gallery by producing his first mural drawing, simply titled *Wall Drawing*, 1968. Strikingly, the graphic method seems to explain more clearly LeWitt’s interest in Muybridge and his particular attention to the shadows – which are almost textbook examples of the indexical – of his linear structures. Marey saw the graphic method as a new form of language that overcame the ambiguity of common language and could be understood by everyone; he

also considered it to be the language of phenomena, that is, nature speaking without a human intermediary other than technology. Just like the camera in his hands, or Muybridge's for that matter, LeWitt's lines are materialisations of simple mathematical rhythms that unfold regardless of the artist's emotional state or any statement of intention. They produce a wordless answer to a descriptive instruction. Or, more specifically, I argue, LeWitt's language (for lack of a better word, and to echo Marey's beliefs) opens up a realm of expression beyond words and figures that spoke to the heart through the mind.

However, this state of affairs is complicated by the indexical line we have been following, whether it be materialised and three-dimensional, or flat and drawn: if LeWitt's line stems from the graphic method's legacy, but also from the 'concept' or the 'idea', how can we interpret it in relation to 'nature', or, as Rosalind Krauss put it, 'the world'? Philosophically, we oscillate here between idealism and material realism. And that is also the intrinsic question carried through by the indexical line or the graphic method in general: do lines exist in nature, and if it is the case, is graphic expression the natural, linguistic flux of life, or do we encode this manifestation, clearly flowing between the incomprehensible ways of the world into the realm of signs by means of technology that almost eerily produces a language that 'we can all understand' (unlike Carroll's void graphic rendering)? A materialist such as Friedrich Nietzsche took it upon him to shake up science from its positivism, stating that causality 'does not involve any comprehension':

But how could we possibly explain anything? We operate only with things that do not exist: lines, planes, bodies, atoms, divisible times spans, divisible spaces. How should explanations be at all possible when we first turn everything into an *image*, our image!

It will do to consider science as an attempt to humanize things as faithfully as possible; as we describe things and their one-after-another. We learn how to describe ourselves more and more precisely. Cause and effect: such a duality probably never exists; in truth, we are confronted by a continuum out of which we isolate a couple of pieces, just as we perceive motion only as isolated points and then infer it without ever actually seeing it. The suddenness with which many effects stand out misleads us; actually, it is sudden only for us. In this moment of suddenness there is an infinite number of processes that elude us. An intellect that could see cause and effect as a continuum and a flux and not, as we do, in terms of the arbitrary division and dismemberment, would repudiate the concept of cause and effect and deny all conditionality. (Nietzsche 1974, pp. 172-173)

Nietzsche's criticism of positivism hinges on two important things: we shall not confuse our language with nature's and refuse to understand that lines are projections, they are images of us; and we shall not forget that the detailing, the analysing of reality (through a mechanist, or causal relation) is nothing but a cut-up, a mere capturing that our own speed opens up as a possibility. This denies the grand affirmations of truth by Marey and points at life as an unattainable continuum. However, didn't the graphic method already potentially sustain this idea of an on-going flux of invisible phenomena whose flickering line was the only measure and tangibility for us, that appeared as an indomitable line one could potentially watch for as long as the movement lasted?

On one hand, we learn how to describe ourselves in further detail with technology and science by creating images. Despite this never being an explanation, it is a form of cognitive enhancement such as Marey provided to physiology and aeronautics. On the other hand, the tools science arms us with are not part of the world but of imagination and its correlates, schemata, concepts and diagrammatic images. These technical images cut the world into more or less graspable entities –in Peirce's syntax, the idea of the sign, or its mental image, is designated by the word '*interpretant*', which denotes a dialogic

relation with the object and its sign through a form of translation, for lack of a better word. The particular innovation of Nietzsche's philosophy, especially when compared to idealists such as Immanuel Kant, is that rather than imagining that things have an unattainable principle, he rejects the 'grand ideas' altogether (principles, values, origins, primary causes), and is closer to the neurology of the twentieth century understanding living beings in a motion within a given time and space, whose consequence is that of *conceiving* life as a continuum, a flux.

There is a notion of endlessness in the graphic expression of movement – even the chronophotographs with their dark background are like the depths of the sea where we know of an unattainable and profuse life. But, to pursue Nietzsche's logic, it multiplies instances of projection of the human mind and its elementary figures. The graphic method provides an objective and mechanic rendering of the way movement is imprinted on the mind, through points and lines, but with far more detail, with far more sensibility to change, to speed, to extreme slowness. It is not the thing itself that we are in touch with, but with our own ability to conceive it, that immediately overpowers us for it is endless and filled with information our brains do not compute while apparatus do.

One could say with Josh Ellenbogen that the graphic method apparatus is like an enhanced mind, and produces 'creatures of reason', an expression taken from the epistemologist Pierre Duhem (Ellenbogen 2008, pp. 195-217). Conversely, when using mathematical elements to produce drawings, LeWitt is producing lines not exactly like a machine, but more precisely using a mechanic operation of the mind – which presumes that reasoning itself is at least in part a machine. In fact, in Peircian terms, he is producing icons in the most interesting sense of the word: LeWitt does not seek to represent an object faithfully, but to represent operations of the mind, relations between entities through diagrams; and 'diagrams resemble their objects not at all in looks; it is

only in respect to the relations of their parts that their likeness consists' (Peirce 1998, p.13).

However, some words used in LeWitt's instructions are indices such as 'right' or 'left', 'above', that is, any word that functions as an indication in the physical world (Peirce 1998 p. 15-16). Thus, there is an exciting and complex interaction between icons and indices in LeWitt's work, although the origin of the mural drawings seems to have been indexical continuity, or, as Peirce says, 'a real connection' – a mesh of linear shadows (Peirce 1998, p.14). LeWitt saw shadows of his grid-like structures projected on the wall, linear structures that were materialised information already (relations between measurements, lengths and depths), and he only had to look at the empty wall as a surface where the mind would project itself, and its tools, in a game of reflection. For the mind often operates like a mechanism. The icon is to the index what geometry is to the indexical line. The index is whatever roots the icon, that is, a relational image, in reality, be it a mental reality or a physical one.⁶¹

Peirce associates thought to a form of machinery that he compares to the Jacquard loom. For him, thought is not an active phenomenon but an automatic one: 'the untrained mind does not see that every machine whatever is a *logical* machine working out incessantly new conclusions from premises as long as the steam is kept up' (Pietarinen 2015, p. 884, my emphasis). Thus, Peirce associates the logic process to the working machine. Deeming Marey a charlatan for stating that the graphic method's apparatus could replace human genius did not prevent Peirce from associating logical algebra to a Jacquard loom after all. So, on one side we have a brain that is part of nature and on the other a reminder that *thought* is mostly a passive and *natural* state of logical rules

⁶¹ The word 'man' is an index of the mental representation of the man, and the word 'there' is an indication of a specific place. The indefinite pronoun 'everything' is considered by Peirce as a 'universal selective index' (Peirce 1988, p. 21).

unfolding (unlike *thinking*, which Peirce considers to be a dialogic faculty), which is to say that our spiritual nature is in part automated and that the products of technology are akin to the products of the mind.

But before exploring the intricacy of concepts, ideas and language as matrixes extracted from the mind, it is essential to understand LeWitt's negotiations with 'the world'- especially coming from that immaterial realm of ideas and concepts, how concrete space dialogically includes the indexical notes of the instructions. That is: if the instructions use the wall to be made concrete (however passible they may of not being realised), they operate a relation between an indication of place and an iconic relationship of elements to each other. LeWitt's work was seen as essentially indexical, which is not an invalid claim. But it takes us further into the work to understand how there is a play between icons and indices that reflect what Peirce calls 'reasoning' in an era where, as we have seen with Nietzsche, reason is no longer looking for answers.

For instance: is the exhibition space 'the world'? This would be an odd question were it not for the progressive neutralisation of the gallery, prompting Brian O'Doherty to christen it as 'white cube', a direct affectation connected with an idealised emptied space, a dematerialised specular area, which is not only the art work but also the exhibition space itself (O'Doherty 1986, pp. 14: 'we have come to a point where we see not the art but the space first'). Krauss' notion about 'LeWitt's ambition to draw or mark on *this* [world]' is part of a reflection regarding LeWitt's choice of working directly on the wall of the gallery from 1968 onward, and his own affirmation that 'the physical properties of the wall, height, length, colour, material, architectural conditions and intrusions, are a necessary part of the wall drawings' (LeWitt, cited in Krauss 2010 pp. 207-208). Krauss hinges her reflection on the idea of necessity, which is a compelling argument, especially knowing that for LeWitt, 'all ideas need not be made physical'

(LeWitt, 1969) but when they are, and they become murals, the wall is *necessarily* part of the drawings.

It is no coincidence that Krauss builds an argument regarding ‘drawing as a species of marking in this world’ (Krauss 2010, pp. 208) through an analysis of the wall in LeWitt’s work. Krauss’ text was produced for an exhibition called *Line as Language* that took place at Princeton University Art Museum in 1974. This is a Mareysian title, with the ambition of defining a new line and with it, a new form of drawing that is not illusionary. LeWitt served as the introductory case study, the one that would provide the clearer, the most astute and the most indexical use of the line, for in her view indexicality is the form that presence takes on, it is the marker of existence. However, the Mareysian quality of this line Krauss analyses, against the backdrop of minimal artists such as Frank Stella, is that it does not revert to a private system, but to an open and understandable process that artists such as LeWitt but also Richard Tuttle and Dorothea Rockburne (the latter using mathematics in a far more complex way than LeWitt) brought to the territory of ‘evidence’ (Barry Le Va could be another comparable case study as he saw his scattered sculptures as *proofs* of an unattainable event).

The wall plays a crucial role in this new function of drawing, in its extension, its inseparability from the architecture, the space, or, more precisely, its room, the building, the street, the city, ‘the world’; through the noise, the texture, the colour, the drawing tool’s inscription as a line. ‘The significance of the wall as a medium for line or drawing is, then, that it becomes the ground of a refusal to separate idea from existence’ Krauss argued, (Krauss 2010 p. 215). The index is often seen as evidence, rather than the Peircian notion of measurement, but one cannot ignore the relationship with the space itself, hinging on the wall, as Krauss so accurately describes. Nonetheless, in fact, the ‘significance of the wall’ is not so much ‘a refusal to separate idea from existence’, as an

uncanny materialisation of the idea in the world as line, and the consequences of such a translation. More than a form of wordless language, it is an interface between the mind and the body, the idea and the object, the object and the interpretant. Leonardo da Vinci may have been right in saying that there are no straight lines in nature, but the truth is that there are no straight lines in the mind either as such. How they appear and what they say is the crux of all of LeWitt's work, especially knowing how near impossible it is to visualise LeWitt's instructions. How surprising is it to realise that one can visualise the word 'square' but not the detailed description of a specific square, say, for instance, 'a 50 cm line in a right angle with another line of the same size, repeated two more times until it meets the beginning of the first line' (and this little exercise reveals how playful it must have been for LeWitt to reinvent diagrams).

One wonders what the interpretant may be in some wall drawings, as there is no way that one can have a mental image of it. In that sense, for LeWitt to affirm that 'all ideas need not be made physical' is not the same thing as Lawrence Weiner stating that 'the piece may not to be built' a few months after LeWitt himself.⁶² For Weiner bases his work on simple statements (and in 1968 on simple actions) easily imagined, whereas LeWitt's instructions, even the simpler ones, demand a considerable *calculating* effort most times impossible to achieve, with some exceptions. The big part of LeWitt's murals however, are closer to the indexical line that promotes an abstract awareness of a phenomenal fact through data, phenomena that one cannot see and can only imagine through that information.

In that sense, it is important to look at the line and at the development that it undertook in its relationship with the wall, and the space around it. Krauss describes it as

⁶² '(1) The artist may construct the piece. (2) The piece may be fabricated. (3) The piece may not be built. [Each being equal and consistent with the intent of the artist, the decision as to condition rests with the receiver upon the occasion of receivership.]', Lawrence Weiner as cited by Alberro 1999, p.527.

a kind of line ‘that has been stripped of the powers of metaphor’ (Krauss 2010 p. 208).

This is to say that the line never reaches the modality of symbol; Peirce reminds us:

‘icons and indices assert nothing’ (Peirce 1998, p. 16). The symbol is a conventional sign using icons to connect meanings to things and thus produce statements. In LeWitt’s work, as Krauss sees it however, the line maintains itself organically connected to the hand that drew it, the wall that bears it and the indices that produced it in the form of text. It reveals the roughness or smoothness of the wall, it is tautological in the sense that rather than projecting the viewer somewhere else through figuration, it takes him / her / them full circle to the space where they already are: a wall with a certain texture, with (a) line(s) on it, and perhaps even colour. It is literal.

Most accounts of the exhibitions of LeWitt are never about the abstract idea where the line takes us either - although they could have been. Words such as ‘elegance’ and ‘beauty’ are often used, even by his close friend Lucy Lippard. The line, as an index, produces the trace of the hand, measuring the edges of the space, or the location of a certain point in relation to another. This becomes especially vivid when one recalls that the wall drawings were, more often than not, realised by assistants painstakingly following LeWitt’s arid instructions. If one looks at the wall drawings exhibited in June 1971 at the Lisson Gallery in London, the lines are rough, quite uneven, seemingly produced with a graphite stick [Figure 35]. By then, LeWitt was still testing the materials and the consequences of his choices, such as sending out ambiguous instructions that others would realize (in the case of the 1971 Lisson exhibition, several students made them). He also tried to use nails whose trace oxidized on the wall at the end of the exhibition, an information communicated by letter to the artist by the founder of the gallery, Nicholas Logsdail, who was an active and intelligent participant in the conceptual method, so much so that he produced books that would be sold alongside the

exhibitions (these were so important to LeWitt that he based his 1974 exhibition at Lisson Gallery on the book *Location of Lines* made for the occasion, and that the wall drawings exhibited in the gallery were simply reproduced).⁶³

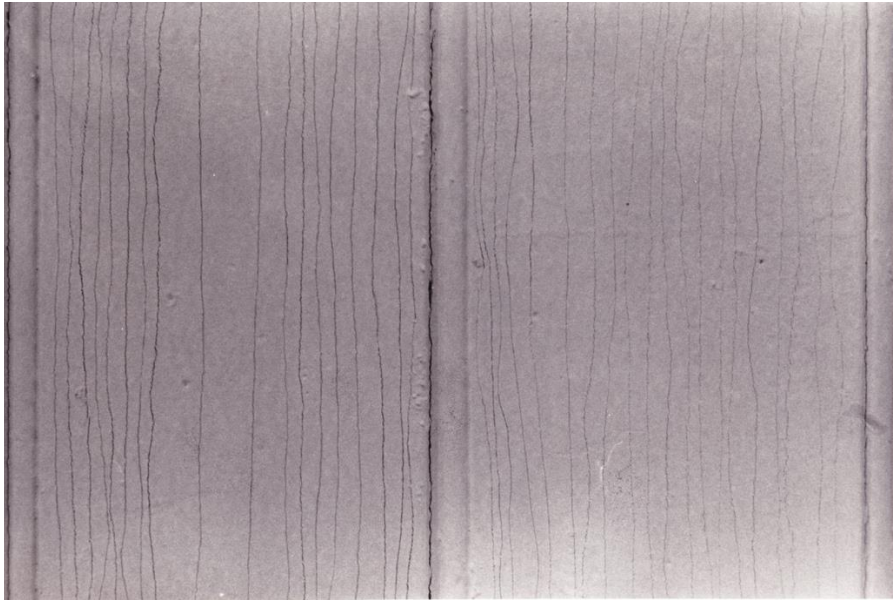


Figure 35 Sol LeWitt, *Lisson Gallery, 1971* (detail). Lisson Gallery Archive.

The 1974 exhibition at the Lisson gallery is an essential project to dig deeper into LeWitt's method of making lines appear, and with them, the mechanisms of the mind. Its title, *Location of Lines*, as mentioned, came with an eponymous book. A letter from his then girlfriend, Mimi, to Nicholas Logsdail, mentions a visit to 'Doug Huebler', an artist who was also reinventing fine art categories, and using the term 'location' since 1968, associating different forms of conceptual location, from maps to sites. Locating lines, in LeWitt's case, associated the wall to the page since the drawings in both 'locations' were the same – the similarity was that the page and the wall were taken as a whole, contrary

⁶³ The information and quotes pertaining to both Lisson Gallery exhibitions were obtained through the Lisson Gallery Archives, unless stated otherwise.

to the first drawings LeWitt made at Paula Cooper gallery, where ‘only a square (usually about 4 x 4 feet) was drawn’ (LeWitt 1978, p. 93).

Can one state that the drawings are on the wall, on the page, and in mental space? ‘Wall drawings are to be considered as ideas rather than objects’, LeWitt wrote (LeWitt, 1978, p. 95). LeWitt multiplies instances of existence of the lines that are all, albeit real, transitory spaces: the surface of the page or the wall, the mind. But what does this say about the line made concrete if these spaces are mediators, like the line is a mediator, between the index and the icon, or better between the world and the idea associated with the concept? For although the whole of the instruction seems to be impossible to visualize in most cases, each item such as a green line has a likeness or icon that it corresponds to: we have an idea of what the green line is.

Can one say that, rather than a dematerialized ‘thing’, conceptual art turned the exhibition space into the mediator of a mental operation between imagination, intuition and reasoning? In reality, Lucy Lippard’s famous definition of the art of the 1960s and 1970s as a form of ‘dematerialisation’ was as useful as it was detrimental to our relation and experience to conceptual art. From a curatorial standpoint, the dematerialisation of the art object focuses on the exhibition space as an entity – and indeed, artists from Hans Haacke to Andrea Fraser have based their art on that subject. But beyond this phenomenon of art folding into itself critically around the axis of its institutions as normative spaces, there is the simple fact that stripping art of its materiality was never the crux of conceptualism – rather, there is materialisation of thought through its indexical manifestations, that is, connecting effectively with the mind – inasmuch as thoughts or their mechanics can be measured and traceable.

But this latter premise is the one that conceptualism hinges upon, and the reason why the physical existence of its artworks is so evanescent. Because they are, like Henri

Bergson's definition of the image, more than a representation but less than an object.⁶⁴

LeWitt, in particular, produced what turned out to be seen as beautiful diagrams, when he set out to work with the most neutral information he could find, rendering the instructions both precise and interpretable, and therefore their realisation, *variable* within a certain scope. Consider *Wall Drawing # 289: A 6-inch (15 cm) grid covering each of four black walls. White lines to points on the grids. Fourth wall: twenty-four lines from the centre, twelve lines from the midpoint of each of the sides, twelve lines from each corner. (The length of the lines and their placement are determined by the draughtsman.)*, 1976; or even *Wall Drawing 957: Form derived from a cube*, 2000. None of these instructions are imprecise and yet they contain a margin of variety wholly dependent upon the maker.

One can say that the wall's importance is concomitant with the importance of the maker of the drawings, and of his /hers / their mind. Kathan Brown of Crown Point Press, San Francisco, remembers working with LeWitt in 1971 on *Lines, not long, not straight, and not touching; Lines in four directions, superimposed in each quarter of the square progressively* and *Bands of colour in four directions and all combinations* as 'difficult because they were so simple' (LeWitt 2009, p.23).

There are consequences to the establishment of a new hierarchy between the idea and the image as LeWitt operated it – and the most interesting ones pertain to their material realisation. As we saw, Peirce considered diagrams to be mainly iconic signs because they correspond to the premise, by analogy and not likeness, point by point. The purpose of the diagram is to translate a function, but it can do it approximately only. One

⁶⁴ In the introduction to *Matter and Memory*, written in 1910, to escape both realism and idealism Bergson stated that 'matter, in our view, is an aggregate of `images.' And by 'image' we mean a certain existence which is more than that which the idealist calls a representation, but less than that which the realist calls a thing; - an existence placed half-way between the `thing' and the 'representation' (Bergson 1912, p. vii).

can perfectly draw a rough map of our neighbourhood and signal places and a simple arrow to locate or to show a direction. The proportions do not need to be exact, which relates the diagram with a preponderantly indexical modality of indication and organic relation with its object. Peirce explains that one does not need to draw a geometric shape perfectly for someone else to understand what we mean, which for him defines the function of the diagram (Peirce 1998, p.13). There is a difference – but also an interrelation - between a likeness through a drawing, an indication of place or of direction, and a translation of a function.

What about the relation between the diagram and its description? Or, in LeWitt's case, the relation between the instruction and its realisation, that, within a certain scope, could differ through the interpretation of the assistant? The exploration of the distance between manifestations of the same matrix is the common ground of many conceptualists, and this means that this tripartite format of the work, idea – instruction – realisation, can be explored in different ways. One need simply to be reminded of the seminal *Definitions* series of works (mid-1960s to the late 1970s) by Joseph Kosuth to realise it, whereby the object, its photographic image and its dictionary definition were placed side by side as the artwork. This is not too far from Muybridge's multiplication of viewpoints of the same phenomenon that, rather than render it as a whole, unique phenomenon, seems to uncannily cut it and separate it – to multiply its dimensions of reality.

But more importantly, this iconic status of the diagram (the line as an idea of a line) was used by LeWitt to contain the physical existence of the idea in a loop of non-hierarchical manifestations: in the plan, with the drawing of the wall piece, for another wall drawing presented in 1969 at Paula Cooper gallery, LeWitt wrote: 'the wall drawing is perceived first as a light tonal mass – light enough to preserve the integrity of the wall

plane – and then as collection of lines. Neither the wall drawing, this drawing in ink, or the photographic record of the wall drawing are definitive but all are of equal importance’ (LeWitt 1978, p. 93). LeWitt was thus concerned at the time, and during the years after that, with the physical status of the work since the wall drawings were ephemeral and only the plan, or what was later to become the diagram, remained. And while the physical realisation of the work demonstrated a new world where images stemming from a form of calculus were de-hierarchised, they nonetheless were also sold and entered the chaotic jurisprudence of materialisation (which, again, makes dematerialisation even further removed from the realities of conceptual work). Whereas ideas can belong to everybody, diagrams were bought and possessed. If the diagrams were in a drawer, they also could potentially exist in a multiplied state. Who can control that? In that sense, there is a remarkable accuracy in LeWitt’s work circulation: the wall drawings establish a sophisticated manifesto (especially through their simplicity) for a world without hierarchies and fuelled by splendid hypotheses, and, in a drawer, an instruction is a potential drawing, an encapsulated hypothesis. ‘The first step in the discipline of the scientific spirit [should be] that one would not permit oneself any more convictions’ – that is, to view hypotheses as ‘modest’ and as ‘a regulative fiction’ (Nietzsche, 1974, p. 280). Poignantly too, the new status of the artwork highlights possession as a financial transaction that does not hinder the experience of the work for others (any work can be made right now, should the reader decide it) and even, in certain instances, a sense of responsibility for the artwork (as seen with Huebler in a very specific way).

The production of the work – that is, the quality of the line and the diagram created – also evolved in time. LeWitt wanted an unpretentious line and therefore realized that the best person to make the drawings was a non-artist, that is, an unskilled and untrained person. A letter from Nicholas Logsdail regarding the 1974 exhibition states that the

mural drawing was ‘made with great care’. LeWitt’s stance changed throughout the years, becoming less experimental and more attuned to the presence of the drawing (not to say its quality). In an interview, LeWitt granted that he would ‘make lines from 9 to 1 AM’: his work was a well-balanced mechanism of translating thoughts into diagrams through the indexical line and bringing them into *this world* as a form of threshold between the physical laws of nature and the graphic, logic laws of thought. He balanced his practice between ideas, logos and intuition: ‘the artist is a mystic rather than a rationalist’ (LeWitt 1969), after all, meaning that LeWitt probably oscillated between both reason and intuition or, as I argue, merged both notions. They form a strong cultural Cartesian framework that he tried consistently to break. For I argue that geometry is not colder than an irregular line, and a fast, figurative drawing is not emotionally stronger than the mesmerizing *Cube Structures Based on Line Modules*.

LeWitt was interviewed for *The New York Times* of 30 April 1987 by Rita Reif, on the occasion of the first auction of conceptual art works in the 1980s, about the potential of several versions of the same drawing being hung at the auction house and at the collector’s home: ‘at first I was against it’ he claimed, ‘but it seemed absurd to require that one be painted out until after the sale is completed. Anyway, the ownership is shown on a certificate’. Not only is LeWitt playing with the legacy of the graphic method, but he also plays with the performative aspect of the language, turning the collector into an active part of the physical potential of the work. The legacy of the indexical line is at play here in an intricate relationship with the iconic status of the diagram, but it also ramifies into two types of language: its performative function (from the owner to the maker, not forgetting, of course, the viewer), and its descriptive nature in the form of instructions. LeWitt is a man of his time and, although Peirce’s semiotics are an immeasurable framework to understand the graphic method, J. L. Austin’s *How to do Things With*

Words (1955/1962) did introduce the idea that statements are performative as opposed to affirming truths.⁶⁵

3.3 Lines

In 1978 LeWitt had a comprehensive solo exhibition at MoMa for which a fascinating catalogue was published. Not only did it contain three texts by Bernice Rose, Robert Rosenblum and Lucy Lippard, but it also included commentaries by the artist himself, alongside images of the works. Moreover, it classified the works into categories that did not correspond to Fine Art genres, not even drawing, the only discipline mentioned, which was seen in art history as an ancillary technique for the major genres since the Renaissance. There are 'Photographic Pieces' listed which, one might say, was a concession to what was becoming, at least in America, a new genre. More compellingly, even, there is a chapter dedicated to 'Lines', from page 109 to 119. And, tellingly, the first works included in it are the wall drawings with irregular lines such as *Lines Not Short, Not Straight, Crossing and Touching; Lines Not Long, Not Straight, Not Touching*; and *Vertical Lines, Not Straight, Not Touching* (all 1971). Next to the two images of these irregular types, LeWitt noted:

Done in five bays at the Guggenheim Museum's VI International in 1971, these wall drawings were a survey of the use of lines. The titles had become more and more descriptive and important. The draftsmen and women were given the widest latitude in doing those drawings. In every case the results differed when the same drawing was done by another person, even though the same plan was followed. In that way the artist and

⁶⁵ If I sign a marriage contract I am changing my marital status; if I wave no with my finger when someone asks me to enter my study, I am making them stop. Hence, words do things or make you do things.

those doing the drawings became collaborators, and the result was better than either could achieve alone (LeWitt 1978, p. 110).

The emphasis here is on the interpretative and collaborative aspect of the wall drawings and perhaps the openness of the lines echo that. LeWitt compared his wall drawings many times to Bach's fugues, open to the interpretation of the musician. But they also borrow from the hypothetical language of science, just as Spinoza borrowed from geometry its structure of theorems for his major opus, the *Ethics*. (Indeed, Carl Andre deemed LeWitt to be 'our Spinoza' (LeWitt 2009, p. 11)). The mural drawings are hypothetical propositions that the draughtsmen and women test without expectations of a specific result, however contained within a frame of possibilities it may be. In the MoMA catalogue, LeWitt mentions the collaborators by name, some of whom turned out to be artists themselves, such as Markus Raetz (who is presented as a 'Swiss artist' who did the wall drawing 'exceptionally well' (LeWitt 1978, p. 95)) or Adrian Piper, for instance. Considering the importance of the institution and the careful work that went into it, naming assistants in a catalogue is particularly meaningful.

The status of this elemental line itself in LeWitt's work is intriguing; it does not correspond to a genre, it is not a tool, it is not geometric per se. And yet, the line was declined in so many ways in the long instruction-titles he found for his works from his first mural drawing in 1968 at Paula Cooper gallery in New York onward – 'straight', 'horizontal', 'not short', 'yellow', 'not touching', 'connecting', 'one inch long', 'parallel', 'broken' for instance – or even identified more precisely – 'arc', 'grid', 'circle', or 'geometric figure'. The lines seem to naturally emanate from geometry and its counterparts, the diagram and its theorem (even when it is irregular for it is defined negatively, and with geometry as a point of reference: 'not straight').

In fact, the line realises its full potential within LeWitt's concern with three things combined: the idea the work stems from; the space where the work is installed; and the spectator / owner. This combination of a speculative tool such as the line in real space providing a human scale for his mural drawings affects the usual play between index and icon: LeWitt described the line projected onto the wall like a geometrized (or at least abstract) Plinian myth of the origin of drawing as a shadow, that is, an index. On the other hand, LeWitt equates the line with matter in the same text, before the description of the shadows: 'the grid and the cube had the same ratio of line (matter) to interval (space)' (LeWitt 1978, p.65). This materialised line translates, for LeWitt, into an exploration of space through matter. This echoes the abstract rendering of space and object in geometry through diagrammatic translations while providing the line with a material existence (as a source and a scientific rule applied to phenomena), such as the bodies in motion in Marey and Muybridge's sequential photography. I propose that herein lies the passage between chronophotography and the use of the line for LeWitt.

There is, in this passage, a dynamic relation between idea, matter and image. Notably, Peirce's conception of the diagram as an icon or likeness forces us to reassess notions of resemblance and, in doing so, also to reassess the iconical value of LeWitt's mural drawings. LeWitt's lines have a specific relation with the body and the space, becoming a parallel existence of the 'diagram'. In reality, and to corroborate this multifaceted dimension of LeWitt's work, one should be reminded that LeWitt provided his collectors with what he called diagrams, that is, the signed drawing and instruction to make the work, should it be realised, and which he sometimes included in catalogues. The twelfth sentence of his *Artforum* article is clear: 'For each work of art that becomes physical there are many variations that do not' (LeWitt 1967). So, the range of forms that the work takes on is part of the work, and this multiform condition opens up new realms

of existence in the world, just as photography slices reality into images. Just a year before *Sentences...* was published, LeWitt had produced his first wall drawing and participated in Seth Siegelaub's exhibition-as-book, the *Xerox Book* – he was no longer tentatively experimenting, and had become a fully formed conceptual artist relying on the line as a single, self-sufficient entity. The crucial years between 1960 to 1968, explored iterations of the line that would inform its conceptual version.

The performative linearity of chronophotography was clearly at play in LeWitt's reading of Muybridgean imagery, that is, the parallel it drew with the movement from left to right of the occidental way of reading text. In addition, this movement of reading was also multiplied and reviewed by the threefold perspective LeWitt particularly praised: Muybridge's three perspectives of the same phenomenon both helped build it but also perturbed the uniqueness of a specific sequence – this was directly translated into the geometric multiplication and permutation system LeWitt devised that so clearly manifested itself on paper as an instruction and so disruptively materialised for the viewer. Therefore, the implicitly performative line working in a horizontal way from left to right had its direction multiplied up and down and from right to left, or even diagonally. That is: if the eye first diligently reads the image as it should, according to the tradition of word-deciphering, it is only a matter of time before the availability of the images exposed in a grid-like manner stimulates a wandering of the eye that goes from the horizontal form of reading to the multidirectional function of the diagram. Therefore, the grid both organises and disturbs sequences. It de-hierarchises lines. Moreover, it tells the body to behave in a certain way, to perform the task of reading, but it also allows for a less unilateral and monolithic behaviour. LeWitt's reading of chronophotography is diagrammatic in the sense that it performs in terms of lines, first a horizontal one and then all kinds of lines within a gridded rectangle.

As we've seen, photography counted, in a scientific context, more as a series of images to connect between each other and between series, rather than a single image to gaze at. Marey famously had his chronophotographs precisely sketched out in order to see the evolution of movement. Which is to say that priority is given to connection over contemplation, dynamics over iconicity. Herein lies the crucial contribution of chronophotography to a visual philosophy of time and space: because it explores images before they are set into motion, because it comes before cinema, they are inherently experimental, they undo what the mind cannot comprehend conceptually, time, space and change. Sequential photography is inherently diachronic in its visual and diagrammatic analysis of change inasmuch as we consider that in stretching time, it cuts the phenomenon into segments that work together across time and not simultaneously. It doesn't matter if it is a second or a whole day, once phenomena are cut up, sequentialised, the move from one image to the next provides a wide array of data that turns each image into a whole entity validated by the fact that it is ensconced in a sequence nonetheless. Chronophotography takes an instant and breaks it into a series of identically framed moments, each containing information valid only, visually at least if not always scientifically, in relation to the other frames. It both stretches time and concentrates it, methodically and schematically.

Additionally, sequential photography is dialogic, that is, always in relation to otherness, always open-ended. It places images in dialogue with each other, thus creating disparate means of comparison and analysis, after the fact, and after the image, which is the hypothetical basis experimental science hinges upon. The line materialises this inherent reorganisation of the image as it connects points, thus creating new relationships. Photographic diachronicity entails dialogism for it affects the order in which things can be viewed or present themselves, creating para-narratives: the eye and the mind can

explore series of images in a non-sequential manner. In chronophotography there is no traditional narrative. A physician might focus on the moment the foot touches the ground rather than the movement that led to it or stems from it. Therefore, the dialogic character of the images can also work across different sets of images, such as all the images by means of which Muybridge recorded the horse's gait in Palo Alto to test the same idea, that is, that the running horse's legs are all in the air at a certain moment.

Hence, LeWitt's *Structures or Permutations of an Open Cube* for instance, are the same or similar premise working across several iterations; furthermore, LeWitt physically would make a model for each one and then 'rotate it' rather than mathematically calculating the 122 positions of the 'open cube' (LeWitt 2009, p. 17). This unexpected *diachronicity of the instant* is also dialogic in the sense that it is framed by a hypothesis that the chronophotography tests and evaluates; it is connected to a verbal description of a given thesis previous to its technical testing. The image has to go back to the hypothesis, reassessed by its diagrammatic expression, and vice-versa. Therefore, by replicating the repetition of image-sequences, LeWitt used lines that are heavily infused with information, stemming from the 'automatic' condition of any logic system.

LeWitt never stopped using photography in an indexical manner, that is as a relation between different images measuring up an idea or reality, particularly in his books that he deemed more accessible to a wider public. He set about photographing 'grids' (LeWitt 1978, p.158) found in urban contexts such as brick walls or sewer covers. In another compelling photographic book project, named *Autobiography (1980)*, he decided to take photographs of every item in his studio. Although the book sets the elements photographed in a grid, the lifeline of the artist and each arrested moment of it in the form of object images, replicates the line of time and the point (or *punctum*, if we care to dig deeper into photography theory) of the spectator's attention. There seems to be a relation

between the mind, observation and the image when the viewer is discouraged from finding narrative plots and twists, or curiosities in the style of social photography. There seems to be a basic structure made of lines and dots, with potential endless configurations, of our way of assessing information. The novelty brought about by Muybridge and even more so Marey, was to have built a technology that yielded to a hypothesis and produced its diagram stemming from nature rather than geometric rules. In doing so, they avoided iconicity as much as possible while using an elementary geometric tool, the line, as the beginning of motion, a line from A to B, and also its trace. But can we consider diagrams the trace of abstract thought? Are they indexical of the realities, the structure, the mappings of the brain?

Euclid's first postulate, 'To draw a straight line from any point to any point', is the graphic hypothesis on which is founded the notion that there are drawings which may be considered to all intents and purposes equivalent to abstract thought. By literally *drawing a hypothesis*, the postulate at once recruits drawing to the cause of deductive reasoning and furnishes *quod erat demonstrandum* with an image; *it warrants a line to draw a conclusion (a theorem) and the a priori to compel reality as surely as a geometer constructs figures* (Gansterer *et al* 2017, p.66, my emphasis).

Anthony Auerbach's text above (part of a decade-long book project led by the artist-researcher Nikolaus Gansterer about diagrams beautifully titled *Drawing a Hypothesis*) relates Euclidian geometry to drawing hypotheses which turns diagrams into something 'equivalent to abstract thought'. For LeWitt, his diagrams that could be seen as 'work sheets', are 'an integral part of the work, which shows the viewer that this is not just a haphazard and random and chaotic statement as it might seem if you walked into a room and saw it without any idea of the structure' (LeWitt 2018, p.255).

This statement is important in two ways: firstly, it demonstrates the importance of the viewer; and secondly, it clearly acknowledges the diagram as an iteration of the work (which is the idea) and, consequently, diagrams in general, but it does not equate the murals or the structures as diagrams themselves. This does not mean that they are not diagrammatical – they obviously are – but they are realisations in situ, in the space, and rooting them there has its consequences. They are no longer thoughts, but physical entities. In his work, a premise is set, and there is no hierarchy, no masterpiece, no best or worst, no pivotal moment as soon as the lines, the cubes, seriality and language are established in their own specific roles.

However, in his mural drawings, it is reality itself, represented by the ‘real’ wall, that will provide the accident, the difference, the unknown. It is also the execution, that LeWitt always duly authors, that can bring about the discrepancy regarding the hypothesis stated: in fact, in all his titles that work as instructions, the expression ‘what if?’ could be added. That is where LeWitt strays from a traditional philosophical project: rather than truths, he is interested in possibilities. This is his ethical stance: to stay away from judgement as a value of truth and support the value of interpretation. As much as semiotics play a role in understanding LeWitt’s work, what is adamant about it is the refusal to acknowledge its potential meaning, that is, how it can build a symbol. This is manifest in LeWitt’s refusal of beauty, a cultural construct built upon a constantly redefined notion of harmony and its repetition throughout cultural elements and means of communication. Formal interpretation is the assistant’s responsibility but what is the viewer’s? Refraining from conventions? Retracing the making of the work? Imagining how they would have made it? At any rate, the feeling one might be overwhelmed by in any conceptual work, is solely the viewer’s responsibility as it pertains to his / hers / their own history and emotional ability. That is why conceptual art has been regularly

criticised as ‘cold’ and ‘solipsistic’ for the validity of emotions is only affirmed through the power of communication and the ability of sharing. However, if we turn this critique around, is it not on the other hand the affirmation of the powers of communication as a strength of the individual to reach out to others rooted in concrete experience rather than in abstract and disembodied values?

3.4 Diagrammatising thought, opening up to chance

There is one element in the above statement by LeWitt left to flag up: the importance of the linguistic instruction included in the diagram. Language’s specific status in LeWitt’s work is of major importance as the (drawn) line is derivative of it. In fact, just as in experimental science, there is a reversal of the function of language in relation to the image: as Auerbach suggests above, the hypothesis (or theorem) ‘compels reality’ and the diagram provides the visual demonstration, going beyond the usual cognition methods. Language is no longer explanatory and diagrams are no longer illustrations. Rather, language sets up a hypothetical reality and the diagram details it in a different manner than a treatise would do, in a visual and direct fashion. The descriptive nature of instructions or experimental statements strips them from the un-scientific variables of emotions, feelings or thoughts processes. It denotes choices nonetheless, at least in the general conceptual orientation, such as locations of lines or of points, a recurrent trait of LeWitt’s work. Nicholas Baume proposes the notion of identification rather than creation (LeWitt 2008, p. 15), stating that the artist ‘identified’ the 122 versions of the *Incomplete Open Cubes*. Modernity is full of redefinitions; nevertheless, LeWitt’s statements stand at the edge of a finite form of unpredictable variability, open to the physical properties of the space and the outsourced makers’ skills and specific choices, within the parameters established. Certain wall drawings are less prone to variability than others but they

mostly welcome randomness and the aleatory. Oftentimes, the work is partly rooted on the fact that it is an interpretation by a third party and establishes a relation with him / her / they such as *Wall Drawing 305: The location of one hundred random specific points. (The locations are determined by the draughtsman.)* 1977, where the humorous claim for specific randomness is a typical LeWittian jest. LeWitt's wall drawing instructions encompass randomness but once they are made in a given space, they acquire specific coordinates, laws, locations and a time-space frame, at least of their physical manifestation. Far more than a philosophical joke, this title claws at the inscrutable paradox of change that chronophotography and the graphic method tried, and failed, to overcome: it is impossible to understand change; it is only possible to establish sequential facts.

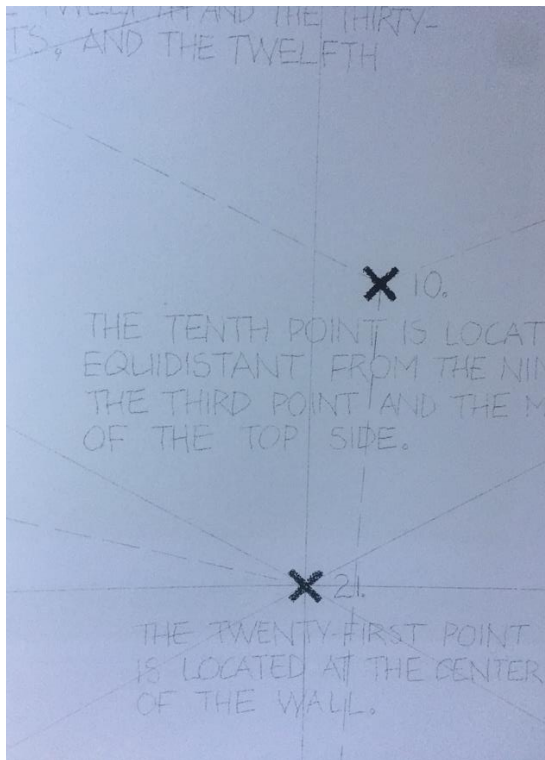


Figure 35 Sol LeWitt, *Wall Drawing #305: The location of one hundred random specific points. (The locations are determined by the draughtsman.)* 1977(Detail.)

Nevertheless, language is also the point of arrival in the ‘chain of development that may eventually find form’ (LeWitt 1969) of the artwork, stemming first and foremost from a concept. It is the first element of materialisation of the artwork, the one that one stops at or carries through. It is the formulation, the formula, the hypothetical *mise-en-forme*. It is the transmission of the play between idea and concept that LeWitt and all other conceptualists take as ‘the real artwork’. For ‘the concept and idea are different. The former implies a general direction while the latter is the component. Ideas implement the concept’ (LeWitt 1969), which is to say that there is a complex interplay in the ideal realm of the work that language crystallises. Although the words and numbers and, one supposes, the arcs and grids, referred to or used in LeWitt’s work are ‘art’ rather than literature or mathematics (LeWitt, 1969), if they stem from concepts, they certainly replicate the mechanics of the mind. Because one question that remains unanswered is why the prevalence of the line, and even the straight line, in artistic endeavours of the twentieth century to the twenty-first? What is the relationship between the line and the mechanics of thought?

Peirce formulates two convictions that connect the straight line to modernity. The first is that thought processes are imbued with the forms that science takes on, and conversely, that the mind uses as a tool of thought; for instance, in dynamics movement is thought of, and observed, in a straight line. And, thus, the straight line becomes a tool of thought. The second is that, based on Euclidian geometry the straight line was deemed, erroneously, as an elementary form when, in reality, it can be complex as Peirce writes:

the straight line appears to us simple, because, as Euclid says, it lies evenly between extremities; that is, because viewed endwise it appears as a point. That is, again, because light moves in straight lines. Now, light moves in straight lines because of the part which the straight line plays in the laws of dynamics. Thus it is that our minds having been

formed under the influence of phenomena governed by the laws of mechanics, certain conceptions entering into those laws become implanted in our minds, so that we readily guess at what those laws are (Peirce, 2016 p. 146).

Hence, the ‘chain of development’ of the work is deeply enmeshed in specific patterns of thought. Peirce suggests that the scientific development of a time takes form – diagrammatises – in the scientist’s brain. One can certainly stretch this notion to the non-specialist, who is even more immersed in diagrammatic renderings of science that are far more understandable than its formulas, although he hasn’t taken part in the efforts to find them. It so happens that the line has been part of the cognitive system at least since Euclides and, when looking for an elemental and ‘uninteresting’ form like the cube, the line seems to be more than suitable. One of LeWitt’s early experiments with wall drawings shows precisely that. It is *Wall Drawing 38: Tissue paper cut into 4 cm squares and inserted into holes in the grey pegboard walls* (LeWitt 2009, pp. 132, 133).

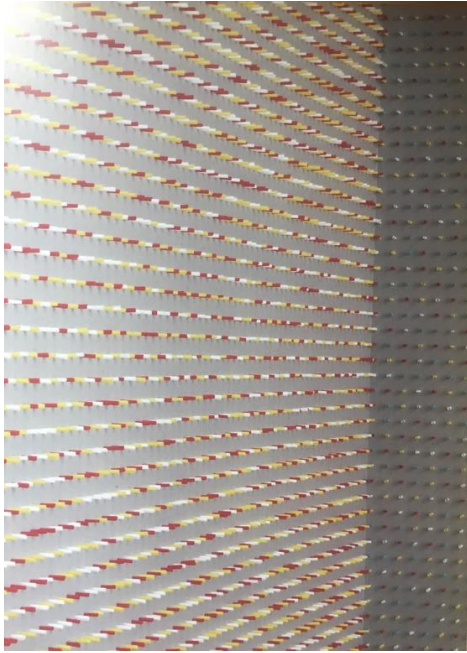


Figure 36 Sol LeWitt, *Wall Drawing 38: Tissue paper cut into 4 cm squares and inserted into the grey pegboard walls (detail)*, 1970.

The instruction is simply stated: the maker of the work cuts tissue paper (or has it cut) into 4 cm squares and then proceeds to place them in the holes of the pegboard, that is, a hardboard with aligned holes. The concept is straightforward: on one hand, there is an architectural surface that allows for the making of lines; on the other, there is a transformation of the flat figure of the square into a small cylinder that is read, in the space, either as a protruding coloured line or as a coloured point. The general concept of the piece relies upon the passage from the flatness of the square to the line in volume and, also, from the specificity of a square to the one of a cylinder that turns into a line; furthermore, the concept is implemented through an idea that seems to derive from the specificities of a wall bearing holes in a linear fashion, that is, a potential grid.

The title of this work in the MASS MoCA catalogue is elliptic. If one looks at the first iteration of the *Wall Drawing 38* at the Tokyo Biennale in 1970 and its illustration in the 1978 MoMA catalogue, the title is different and, under it, LeWitt wrote one of the

most extensive texts of the catalogue, mentioning none other than Eadweard Muybridge. The title was, at the time, *Progressive Colours on Four Walls*. Hence, the emphasis was on the colours and not the action of cutting and rolling. The mention of the material is ‘coloured paper, one room, approximately 12 x 30 x 30 ft’, which can lead us to believe that the importance of the colours and the wall combined can denote both the concept and the context, mediated by the idea. Furthermore, the chapter in which the work is placed is *Serial Structures* (that leads to *Serial Drawings* and then *Lines*), in which LeWitt explores his own idea of chronophotography, of a progression of change, structurally, graphically and in its rarefied form, linearly. The title, that progressively became a form of instruction, is certainly the implementation of the work, without which its realization would be impossible. Whether the concept of this work in particular is, for instance, the seriality, the structure, the progression or the chromatic organisation, the title renders the work possible, imaginable and physical. But it also leads to a specific cognitive area, to its creative space and the elements one can play with there. LeWitt wrote, adamantly, about this piece:

The work of Eadweard Muybridge has had a great impact on my thinking. This piece was done after some years of thought and experimentation and was the source of much of the serial work. At this time there was a search for a more objective method of organization as a reaction against the idea that art was composed with great sensitivity by the artist throughout the production of the work. This reaction eventually led to a theory of art that offered the idea that the original conception (perhaps intuition) of the work of art was of primary importance; the work would be carried through without deviation. It proposed the notion of the artist as a thinker and originator of ideas rather than a craftsman. Others, perhaps more able, could carry out the artist’s design. If one used an analogy to music, this would place the artist in the role of a composer rather than a player. Of course, the artist could also carry out the idea (LeWitt. 1978, p. 77).

This passage is of great importance because it positions *Drawing 38* as a source directly connected with the experiments of Muybridge but so fantastically stepping away from their authorial aesthetic. It places Muybridge as having affected LeWitt's 'thinking' which is crucial since he posits the artist as more of a 'thinker' than a 'craftsman'. But the two most important aspects of this statement are, firstly, the association of the idea to the statement (that the artist can also 'carry through') and, secondly, that 'original conception', that is, the concept itself is associated with intuition in a more understandable way than in the first item of *Sentences*.... This is the core of LeWitt's philosophy, and perhaps the reason why his work is visually gratifying: reason is associated with intuition, with mysticism. Or more accurately, it is the crystallisation of a graphic research a long time in the making; LeWitt himself built an intuition based on chronophotography, on Albers' work, on the experience of the architect as an artist conceiving rather than building (working at I. M. Pei's studio), on the outcomes of science and linguistics, on the rejection of an emotional path as a basis of the work, and thus reversed, the processes of drawing, whereby a graphic method irrupted, from almost a century before, as the ideal way to explore ideas and giving them an existence, through an unengaged maker.

The reversal of the processes of drawing is akin to the reversal of the status of thought, language and making. LeWitt describes the making of the drawing after the passage quoted above, carefully detailing the placement of the colours on each of the four walls (white on the first, white and yellow on the second, white and yellow and red on the third, and, finally, like in the other walls, an 'equal number' of the same colours would be used, this time adding the colour blue). Cutting and rolling the paper and then placing it on the wall so the paper would constitute the drawing is an argument for the unskilling of drawing, and, by the same token, of materialising thought through the creation of a colour

diagram. Similar to his paintings of the 1960s, his word / image works, the colours, placed randomly, protrude and retract, creating a false sense of necessity – after the passage above, LeWitt carefully describes the making of the *Wall Drawing 38*, specifying that ‘the colours should be inserted at random with no thought of arrangement or design’ (LeWitt 1978, 77). Our brain always has a way of finding a rule, a law, and that is what conceptualists play with. LeWitt’s instructions, laconic, mostly, especially the ones between 1968 and 1974 are not mathematical formulas, as many claim, nor are they a perfect description. They can be seen as equivalents to the images they ‘implement’, to use LeWitt’s expression. But they can also be seen as diverting fully from what they generate, as the cognitive field they stimulate and the mental image they could but often fail to stimulate is not the same as the experience of the work or the idea it belongs to. They become, in a way, a field of their own, a beautiful and obtuse description of a diagram, with the illusion of perfection and stability and the rigidity of an instruction. In a way, they open up the gap between the unobservable (such as the passage between randomness and specificity) and the unimaginable, measuring up the knowledge that flows through them but never in them. Thus, *Wall Drawing 305* (Fig 34) reproduces the circularity of cognition through the linguistic and physical placement of the points: which came first?

Peirce’s philosophy is famous for the claim for an ‘objective idealism’, that leads the philosopher to write that ‘matter is effete mind, inveterate habits becoming physical laws’. This is an affirmation of reality as being a dynamic relation with the world that, through habit, establishes a state of things we all can agree upon. In that sense, the formulation of a concept through an idea stated with descriptive language does ‘compel reality’, creating something non-existing before but also understandable, for the artist is

playing with the mind's tendency to diagrammatise, and the ability the body has of performing the diagram.

For the Renaissance artist, it was clear that *disegno* was a product of the mind from Giorgio Vasari to Federico Zuccari whose notion of *disegno* was as a synonym of 'concept'; he saw *disegno* as 'segno di dio' by deconstructing the word (di-segno>segno di di+o), in a bold cosmographic interpretation. Scholastic philosophy stated that god was the source of all creation and, therefore, *disegno* was the trace of god's conception, or in modern terms, of concepts. One can envisage concepts as an imperfect trace of total knowledge, as incomplete images of the whole of nature. Furthermore, one can find in Zuccari an affinity with LeWitt's chain of development starting in the ante-chambers of the mind, working between the concept and the implementing idea, since he devised different dimensions of what he called internal *disegno*: *disegno* of god, of the angels and of man. If *disegno* is *the trace of god* in the sixteenth century, the concept and the diagram seem to be indexed to the *idea* in the twentieth – the line being the vehicle of this dynamic.⁶⁶

It would be naïve to consider the language used by LeWitt as simply descriptive, neutral. The desire for neutrality underlies a re-discovery of the power of language disengaged with subjective biases, which is one of the main traits of the twentieth century's experimental art, bleeding into mainstream culture in so many guises, from pop culture to film, from Laurie Anderson's *O Superman* to Stanley Kubrick's *2001 Space Odyssey*. Nicholas Baume, while affirming the importance of language for LeWitt, explains how the work's creative licence relies upon it, and is thus right in saying that

⁶⁶ Federico Zuccari published a more intricate but sadly far less famous art history account of the arts than Giorgio Vasari's *Le vite de' più eccellenti pittori, scultori, e architettori* (1550) titled *L'idea de' Pittori, Scultori, ed Architetti* in 1607. It is a philosophical view on the status of *disegno* as a form of conceptualisation that materialises as drawing.

‘the detailed spatial relationships that structure the drawings are made literal via language. The results are drawings of extremely simple forms made in an exceedingly complicated way’; he goes on to quote LeWitt himself who, aware of this process, was also aware of the fact that his language was not entirely scientific and could be seen as common language taken to a degree of unforeseen complexity that harbours its own specific philosophical quests: ‘the more information that you give, the crazier it gets until to construct a very simple form or figure such as a circle you could have three pages of text’ (LeWitt 2008, p. 16). Baume’s reading of the *Location* works is compelling: language here is taken to a creative, almost poetical level, and becomes an exercise in literalness that pushes the boundaries of reason to the realm of delirium.

There is no other place like the Bonomo tower in Spoleto, Italy, where this is more prevalent, according to some accounts of what remains from the time LeWitt spent there in 1976. Rye Dag Holmboe provides a striking description of what it is to discover these prolific *Location* drawings, that she considers to be ‘studio drawings’ rather than finished works since they were produced in an isolated state and in a remote place: the artist drew lines from architectural elements and the spectator performs the making of the drawings through the lines and the descriptive, utterly complicated text, running along them. There is a dimension of lunacy in the Bonomo tower experience, from the author’s perspective, since the ‘process of drawing has transformed the physical space of the studio into a psychic and corporeal space, both involuted and solipsistic’ (Dag Holmboe 2018, pp. 105 – 126).

Whether LeWitt himself felt this space as if he was a ‘madman in his cell’ or not, it is true that he was involved in a ‘process that was potentially infinite’ since the lines generated by the space generate other lines themselves. If one can argue for a finite system in other works, the Bonomo tower seemed to show LeWitt’s inner workings, his

testing of ideas, and the system taken to an extreme level. But more importantly, it shows the ‘degree to which chance elements determine the direction of LeWitt’s lines, while also lending the studio drawings a performative character’: every hole on the wall, every hesitation, every mistake reveals, in this studio experiment the irrational decision of creating connections, of establishing a dynamic dialogue between elements on a wall that are part of a whole but only contextually connected. It seems that LeWitt was at odds with his own subjectivity (Dag Holmboe quotes an interview where LeWitt confesses to have felt like a prisoner of his own system), testing the ethical use of the line, which he saw as de-hierarchised, but which was also his trademark, his signature, his *fonds de commerce*. If this is certainly an acceptable interpretation of LeWitt’s state of mind in Bonomo, one can also note that the 1978 MoMA catalogue, published two years later, manifests an ownership of the work beyond conceptualism, minimalism and enclosed premises. Moreover, one can imagine LeWitt excitedly exhausting possibilities, making his own drawings that he commonly commissioned others to do, and exploring the element of chance that irrupts, according to Peirce, because no law is absolute: there is ‘an element of indeterminacy, spontaneity, or absolute chance in nature’. A rule, applied in general, seems invariable and certain, but when it manifests itself in a small number, it is more exposed to chance. And if LeWitt was, indeed, a prisoner of his own system, there is nothing like performing it himself, in order to unfold the chance elements that pertain to every singular manifestation of a general formulation, the machine that makes the art.

4 The Line as Technology

4.1 The Graphic Method Between the Past and the Future: Living and Thinking Technologically

Conceptual art took on technology in a very specific, controlled, minimal, and slightly ‘poor’ way. In a sense, and that is why the relation with the graphic method is such a dialogically productive endeavour: conceptualists promoted a relation between photographic documentation, graphic expression and textual literalness that is very similar to scientific imagery of the nineteenth century and its apparatus, with the exclusion of the most scientific instruments such as pulse readers, while drawing inspiration from them. There is, in fact, a strand of conceptualism that did connect more closely to technology and devices: the artist Donald Burgy for instance, used data in his creative process, and even underwent a lie-detector test with none other than Douglas Huebler in March 1969 as one of his art projects (Lippard 1997, p. 51).

Nonetheless, there seems to be an anachronistic disposition for certain conceptualists who did not systematically engage with the most advanced techniques of their time. Or rather, who engaged with the technology directly inherited from the turn of the century in whatever form it was taking for them, in the present. *Ad absurdum*, we can look at what Douglas Huebler and Sol LeWitt *seldom* used: film, computers, appliances, automobiles, slide projectors and a one-time Xerox adventure (a still expensive endeavour at the time).⁶⁷ Nevertheless, while not directly used, the existence of these technologies was suggested: the accessibility of the landscape strongly indicates the use of a car and maps;

⁶⁷ Tamara Trodd points out that Xeroxing, in 1968, was still an onerous affair and when Seth Siegelau was refused sponsorship by Xerox for his *Xerox book*, he printed it in a corner shop with ‘old-fashioned off-set printing’. Moreover, Mel Bochner was able to produce his *Working Drawings* in 1966 by using a ‘free staff photocopy card’ without which the project would have been otherwise unfeasible (Trodd 2013, p. 145).

computed and processed data undeniably points to the advent of digital processes to gather and organise data not only in the 1960s, but also in a visionary sense, and on a widespread manner, at the turn of the twenty-first century with the evolution of digital platforms. But more importantly, reverting to a conceptual status of the artwork itself resonates with the scientific truth being invisible and available only as visualised information.

Therefore, conceptual processes and technology are connected and even if the latter is not always directly used, its mode of *thinking* (its internalised structures) is utilised as a creative process based on a new cognitive stance. Thought processes were affected by experimental science and their technological turn changing roles ascribed to immediate perception and to language in particular. Huebler and LeWitt, while using processes referring to computing and processing data, were engaging with the biggest, relatively recent shifts in human history: mechanically reproduced text and image (the Gutenberg print) and photographic devices used as indexical technology to visualise natural phenomena that inconspicuously rule our lives.⁶⁸ In that sense, the introduction of the work to a subject through the spectator is crucial to understand the critical stance with which the works embraced this new form of reality, through a new reality of form: abstract, linguistic, technological and thus, interactive or activated.

From Vilém Flusser's point of view, humanity is advancing towards a higher degree of abstraction, from the invention of text (which he describes as a brief phenomenon in the existence of humanity) to the invention of technical images. This 'brief' moment, he states, is the passage from the invention of history with linear texts, to post-history, with

⁶⁸ LeWitt's prolific publication of artist books and his implication in the bookshop and artist book edition house, Printed Matter, Inc., as a founder in 1976, attests to the importance of books in his career. Recently, an exhibition there showcased 'more than 75 book works – including octavo paperbacks, staple-bound booklets, and folio sets' (<https://www.printedmatter.org/programs/events/877> [accessed 28 October 2019] about *Book as System: The Artists' Books of Sol LeWitt*, exhibition organised by Emanuele De Donno, from June 28 to September 29, 2019).

the release from linearity indexed to reading patterns through the advent of technology and, more specifically, technical images. ‘Linear texts have only occupied their dominant position (...) for about four thousand years’ he wrote (Flusser 2011, p. 5); however, ‘technical images’ (having started with photography) confuse this linear pattern, and therefore speech and reality as a fluid narrative.

Texts are concepts strung together like beads on an abacus, and the threads that order these concepts are rules, orthographic rules. (...) Both text and image are ‘mediations’. For a long time, this was not easy to see because the orthographic rules (above all logic and mathematics) produce far more effective actions than the magic that has come before. And we have only recently begun to realize that we don’t discover these rules in the environment (...); rather they come from our own scientific texts. (...) We lose faith in the laws of syntax. We recognize in them rules of play that could also be other than they are (...), the orderly threads finally fall apart and the concepts loose coherence. In fact, the situation disintegrates into a swarm of particles and quanta, and *the writing subject* into a swarm of bits and bytes (...).

He goes on to explain that if the world can’t be understood, it can be calculated and computed, thus rendering these new kinds of images ‘visualisations’ of abstract thought rather than ‘depictions’ derived from observation - projections rather than captures.

Flusser writes about the ‘hallucinatory power that has lost its faith in rules’ of the former rather than the mere ‘observation of objects’ of the latter. (Flusser 2011, pp. 9-10, 13).

Because images are no longer, as the graphic method so impeccably initiated, imitations of what we see but a projection of invisible states of phenomena that supposedly communicate through the diagram of their own rules, ‘our image maker’s imaginations are infected with conceptual thinking, with trying to hold processes still’ (Flusser 2011, p. 13). The move from the graphic method to technology carries with it a disintegration of linearity, of narrative and, ultimately, of the traditional form of humanism - a monolithic subject.



Figure 37 **Douglas Huebler, 1970.** Source: http://www.ubu.com/concept/huebler_vertical.html.

In Flusser's theory, text and image, the line and scattered particles have a special kind of entanglement that is not always easy to understand but that he ultimately considers to be the dynamic paradigm of the West. The work by Huebler reproduced above exemplifies this association along with the question of the line as a sub-paradigm of narrative direction and technological laws (or 'rules') that Huebler associates with words and sentences come undone by their potential manipulation and concomitant alteration. When shown to an audience this graphic work often draws frank, spontaneous laughs. Partly because it is a familiar line – it is the laugh of recognition - and partly because it *is* a different kind of truth: it demonstrates - rather than represents- our experience on earth, a never-ending spin that we would know nothing about were it not for science. The demonstration occurs internally in each person's mind. The words are

descriptive and vague: it is the subject's knowledge that infuses the line with information. The graphic renderings of simple but abstract realities seem to be more tangible and populate our minds more than our experience of nature, which Gaston Tissandier pre-empted by promoting beautiful illustrations for his magazine *La Nature* (see chapter 1).

Huebler creates this fiction to show us what we do not see, thus reversing the graphic method: the line is not created by nature, but by the conjoined minds of artist and viewer through the mediation of a simple line. The latter diagrammatises the movement of the earth; it is therefore disconnected from the movement in the time it nevertheless expresses. It is also a deeply modern perspective of space and time, a regulated, conventional recreation of our experience on earth torn between the knowledge of our place in the galaxy and our human-scale, our traditional notion of 'landscape' being challenged here. The vertical line denotes the human stance, the body upright, the stick-man; nevertheless, against the conventions of representation (horizontality for landscape, verticality for portraiture) it conveys the vastness of space and the efficiency of our tools to project it. Huebler's work, with the active participation of the viewer's knowledge and physical existence in the world, manages to unfold two realities at the same time, the two discrepancies between linearity of text and multi-directional potential of the technical image, between the knowledge of an orbital planet and the stillness of our experience of being on it.

Huebler often produced these schematic works. In his 1972 catalogue for his two-fold one-man show at the Museum of Fine Arts and the Institute of Contemporary Art in Boston, the cover is a white surface with a dot at the centre and a sentence at the bottom stating 'the point represented above, exactly at the instant that it is perceived, begins to expand in every direction towards infinity: it continues to expand at the speed of light for the entire time that these words are being read but returns to its original essence instantly

after the last word has been read'. The first page bears the name of the artist and, underneath, the categories under which the catalogue is sub-divided: 'Location Pieces'; 'Site Sculpture'; 'Duration Works', 'Drawings'; and 'Variable Pieces' (Huebler 1972, cover and first page). In the 1979 catalogue for his solo show at the Van Abbemuseum in Eindhoven, the same type of work that was under the general designation of 'Drawings' (such as the one on the cover, described above) is referenced as 'Graphic Works' (Huebler 1979, p. 9). Huebler's 'drawings' often play with affirmations of location and time placing the spectator in an ambivalent situation through scientific references or pseudo-behaviourist tests.

This notion of drawing is thus recurrent in Huebler's work, albeit from a disconnected relation with the hand. It appears in a very specific network of distribution and presentation: this particular drawing, *The Line Above...* and others of the same series, were often placed in books or simple A4 sheets. Hence, his drawings were not always in an exhibition space, invoking real space, human scale, which is an easier way of jumping off from the tangible experience of being *in* space, to imagine *outer* space. Here, the experience is more abstract, a mental exercise. It is no different than reading about the inexistent axis around which the earth turns, and which is a fine example of one of those 'ghostly lines' Ingold mentions, those artificial yet conventionally inescapable lines to navigate both real space and knowledge.

Drawing – understood as graphic, conceptual expression - had sophisticatedly been associated with the mind since the Renaissance but remained in reality an ancillary technique serving painting, sculpture or architecture until the end of the nineteenth century. In the twentieth century, via science through an independent form of the line, drawing ended up being 're-defined' (Jennifer R. Gross, 2015), as a hinge between the mind and the body (understood as a physical phenomenon), in a continuum flux. It is not

so much a discipline as it is a form of techno-thinking. This re-definition of drawing does not imply, however, that drawing started being produced by machines only, but rather that the hand and the brain started being seen as machine-like. Henri Michaux famously wrote that with his drawings he

(...) wanted to draw the consciousness of existing and the flow of time. As one takes one's pulse. Or, again, more modestly, that which appears when, in the evening, the film has been exposed to the day's images, but shorter and muted, is rerun. Cinematic drawing... My own particular film was scarcely more than one or two or three lines meeting up here and there with a few others, now forming a thicket, now a plait, further on joining a battle, rolling into a ball (Michaux 1972, as cited by Hetrick 2017, p.52).

It is impossible not to note the relation established by Michaux between technology and hyper-sensibility, between the recording machine and the body, a much more original take on automation than the recurrent complaint since the nineteenth century, of its inherent danger of dehumanisation⁶⁹. He captured that cinematic feeling through the use of the psychotropic drug mescaline from the mid-1950s for a whole decade which de-connected and re-connected differently the flesh to the nervous system, the body to the brain, thus reversing the habitual power relation between the mind and the project. Rather, it turned the mind into the project itself to reveal its hidden mechanisms through a drawing hand that worked technologically, rather than from observation.

This cinematic description of the experience of drawing and creation entranced with the hallucinatory power of mescaline highlights Michaux' interest in the complexity of the brain and its undercurrents rather than the unidirectional use of rational thought that led a lot of Marey's projects in quest for laws. Ed Krčma pointed out Michaux's indexical

⁶⁹ Rosi Braidotti's posthumanist and nomadic theory is based on the need to avoid the irrational dread regarding technology or its transhumanist blind glorification. See Braidotti 2011, pp. 58-62.

concern with drawing through his sinuous lines in a series of drawings titled, like Marey's book published in 1894, *Mouvement*, produced in 1950-51, as if the hand was a 'seismograph' (Krčma, 2019). Brought forth by recording and photographic machines, the indexical quality of the line overturned its iconic modalities by opening the possibility of new relationships with reality: the advent of dynamic, continuous and abstract 'images' that, amongst other things, relocated our relationship with our own bodies and mind. What kind of relationship it might be is, I believe, one of the most exciting outcomes of this investigation, especially since conceptualism was wrongly deemed to be disconnected with the physical world by focusing on ideation. More than a mere technical enhancement, technology became a way of thinking, behaving and relating to the world. Technology bridged science and all other creative and cognitive areas of our lives. In the twentieth century, the notion of truth was expanded.

From an artistic perspective, technology can be defined and used in a very specific way that transcends the dichotomy nature / artifice or even human / machine. In concrete terms, this separation seems illogical at best because, very simply, machines are made by men. Tamara Trodd's notion of technology is an all-encompassing concept that does not concentrate solely on the machine or on automatic devices. Coined from an internal perspective to artistic creation and its theory, it stretches the notion to heterogeneous domains – or, rather, as the introduction of heterogeneity to art. It also encompasses the way it affects all the agents of artistic production (the viewer, the artist, the institution and the gallery). Through her analysis of Walter Benjamin's vision of art informed by photography, she describes technology as 'a technical means that has not yet become associated in artistic practice with a tradition of use, and which functions as an integer in a compound material practice'. Re-reading Benjamin, Trodd reinstates his notion that technologies are 'unpretentious makeshifts made for internal use'. In this sense, and

following Berthold Brecht, her vision of technology comprises any system of production / information from the ‘book club’ to film, that is, any system of production, distribution and / or communication as a network - that he called an ‘apparatus’ (Trodd 2015, p 5).⁷⁰

A technique is a means of production, a way to induce a physical property into a specific function; whereas technology translates phenomena into information and it creates a coded, open-ended, abstract and dynamic or relational system *in which the subject is included*. While a technique effaces itself under the final result of the work it sustained, technology ‘functions as an integer in a compound material practice’ (Trodd, *Ibid.*). That is, it remains visible as such, like photography and text expose themselves as such, in their literal, reproducible and technical capacity, within a composite ‘*material practice*’ that is made of whole entities that associate but do not dissolve themselves to produce a third thing. The third thing exists, the art object, but alongside the technology that made it possible and that is an integral part of its existence. I propose to compare this notion of technology as an association with a concrete method of making exterior to traditional art practices and that remains visible as such, to the notion of the line as a mediator, to the twentieth century abstract and conceptual art’s tendency to place mediation, and thus, the subject, at the centre stage of production. The visibility of the mediation, the process or the method is a way to engage the viewer in the work, like the instructions of LeWitt’s drawings as titles or the bureaucratic sentence Huebler always

⁷⁰ This notion of the ‘apparatus’ in Brecht’s thought is not far from Giorgio Agamben’s reading of the notion of ‘dispositif’ in Foucault’s theory (a ‘dispositif in French ranges from the ‘way elements of a machine are arranged’ to ‘the technical appliance’, not to mention the final wording of a written law). In 1977, the French philosopher almost came to a definition of the term as ‘in the first place, a resolutely heterogeneous group that includes speeches, institutions, architectural installations, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral, philanthropic propositions, said, as well as what is not said, these are the elements of the device. *The device itself is the network that is established between those elements*’ (*my emphasis*, Foucault 1977 as cited by Agamben 2006, pp. 9-10). This is a relational term as much as a machine that functions almost automatically, encompassing behaviours and thought systems. This denotes the importance of thinking about technology as we produce technologically in all areas; we exist and produce within composite or heterogeneous systems that function like machines.

added to his 'documents': '[description of documents] join with this statement to constitute the form of this piece'. It is a relational strategy.

The multiplication of instances in conceptual art, from the concept to the document not to mention the spectator's appropriation of the work, which, as I have demonstrated, both in Huebler and LeWitt, are crucial to its sense of completion, are what makes conceptual art a technological operation. But how exactly does it relate to the graphic method's form of abstraction? And what is the exact articulation between the mind and the technology through the concept? The very special kind of anxiety conceptual art provoked was related with the engagement, or lack thereof, of the art with the physical world. So much so that we tend to forget to inquire about the articulation of thought with technology through this schematic kind of drawing. Exploring the burgeoning epistemology of the turn of the last century provides some clues to this enquiry.

Pierre Duhem, thirty-one years younger than Marey, published a seminal book about '*la théorie physique*', two years after Marey's death, in 1906. It was a pioneering work of epistemology where Duhem explores the specificities of cognitive processes in physics and where, more importantly, he defines the mental process of an experimental theory, and its concomitance with machines. Perhaps because of his 'ultra-Catholic conservatism' (Ellenbogen 2012, p. 56), he is keen on separating physics from metaphysics, stating that a theory is not an explanation but a symbolic representation that corresponds mathematically to a certain phenomenon. And, for that reason, physics is an open science vulnerable to change because its laws are 'provisional' (Duhem 1906, p. 284), which connects to Nietzsche's notion that scientific hypotheses are 'regulative fictions'. Moreover, and more precisely, a theory is considered as an 'economy of thought' obtained through the powers of abstraction: locating a 'material point' and applying to it an electrical charge means to use two forms of abstraction (the point and

the notion of an electric charge), thus allowing us to collect facts and turn them into laws (Duhem 1906, p. 109). More to the point, and because theory is not an explanation but a representation, it starts with a collection of principles rather than an observation to be submitted as logical hypotheses to the rules of mathematics.

Of course, the studied phenomenon must be *measured* in some way for a theory addresses what lies beyond perception and deals with quantities (of intensity, of speed, of pressure, of density, for example) – therefore, theory is intrinsically related with machinery able *to measure what the eye cannot see*, which Duhem states early on and maintains throughout the book. *La Théorie Physique* is a compelling read whereby Duhem comes to terms with the fact that theory in physics relates to a hidden nature of phenomena impossible to empirically assess; and where he states that the theories thus produced do not conform to nature but produce a symbolic and idealistic version of it. His prose is an admirable exercise of limpidity and precision through vivid examples illustrating how abstraction uses experimental instruments: it always juggles two images, that of the machines with their materials (copper, steam for instance) and the schematic version which is the interpretation (pressure, degrees of variation for example). This leads us to ask the question: what about other cognitive dimensions such as language or images?



Figure 37 **Joseph Kosuth, One and Three Chairs**, 1965. Wood folding chair, mounted photograph of a chair, and mounted photographic enlargement of the dictionary definition of 'chair' (82 x 53 cm), photographic panel (91,5 x 61,1 cm), text panel (61 x 76,2 cm). © 2020 Joseph Kosuth Rights Society (ARS), New York. Courtesy of the artist and Sean Kelly Gallery, New York

By the time Joseph Kosuth produced the seminal conceptual work, *One and Three Chairs* (1965) we are in a relativity and quantum theory time where not only is science considered an ideal representation, but reality itself is considered an aggregation of things we cannot see and that materialise in the shape of things that are culturally agreed upon and that we call objects. The scientific mind of the twentieth century includes these questions of communication regarding the equation between scientific truth and immediate perception. The physicist N. R. Hanson discusses in his major opus whether Kepler and Tycho see the same thing when looking at a dawn, only to conclude that they do not, because 'there is a difference between a physical state and a visual experience' (Hanson 1958, p.8). Therefore, perception can be a source of pleasure and functional guidance, but it can mostly tell us a diversity of things about the world according to our cognitive disposition – it can in fact conform to that disposition. There is a passage of this

text that must have touched Douglas Huebler in a very specific way (see chapter and sub-chapter 2.1). Hanson writes:

(...) so something about their visual experiences at dawn is the same for both: a brilliant yellow-white disc centred between green and blue colour patches. Sketches of what they both see could be identical – congruent. In this sense, Tycho and Kepler see the same thing at dawn. The sun appears to them in the same way. The same view, or scene, is presented to them both' (Hanson 1958, p.8).

Therefore, only a schematic or graphic – literal – rendering of what they see could potentially be congruent between the two scientists' visions.⁷¹

In a simplicity so hard to attain, marked with an almost demonstrative spirit, *One and Three Chairs* affirms the era of multi-dimensionality and relational existence, of the dynamic between instances of truth or, more specifically, life, in a continuum flux of exchanges. *One and Three Chairs* is composed by a chair, a photography of *the same* chair (but there is no assurance that it is indeed the same chair, it could be a chair of the same style) and the definition of the dictionary of the *word* 'chair' which is also, interestingly, an enlargement of a photography. The work is composed of an object, a photographic image, and the image of a definition, that is, the image of a group of words composing statements. These are descriptive, corresponding to the literal spirit of the time. Are we observing rules (recognizing that a chair is an object used to sit on) or are we contemplating the accuracy of the object, the definition and its image?

This could be a semiotic affirmation of reality as a cluster of different signs denoting the same thing, close to Peirce's 'objective idealism'. The same Chinese woman can be

⁷¹ Only colour could provide a discrepancy in experience but Hanson was trying to make a point and perhaps daltonism or achromatism were not helpful here. They do, however, establish his ultimate argument, which is that the visual experiment itself could be, through scientific knowledge of physical conditions, utterly different.

designated by those two different signs, 'Chinese' and 'woman' – a Peircian example. But what are the consequences for us, are we at a crisis of the self and the human? Are we disintegrating? This can only be a rhetorical, tongue-in-cheek question. The crisis of the subject has been long established by many philosophers and across the nineteenth to the twentieth century, from Friedrich Nietzsche to Michel Foucault. We inherited these views of change for, as Braidotti sums up, 'the alternative views about the human and the new formations of subjectivity that have emerged from the radical epistemologies of Continental philosophy in the last thirty years do not merely oppose Humanism but create other visions of the self' (Braidotti 2013, p.38).

Much has been written about these first works by Kosuth, particularly about the multidimensional nature of each 'thing', leading to the question of what exactly *is* the thing, and if we can presume that the 'one chair' of the title is the object made of wood, which means that the chair, the object, is the common platform, the one we can all agree upon. The abstract and ideal nature of language is in fact the axis around which all these questions revolve: the work *Titled (Art as Idea as Idea) The Word 'Definition'* (1966-68), by enlarging the definition of the word 'definition' simply shows the power of tautology, the circular nature of language (already indicated by the repetition of 'Idea'). In fact, one could say that the object is the icon and the photograph the index, turning the definition into the symbol, the description of what the chair means. However, indexicality is a strong link between all of these images that are in a continuous relation with each other, indicating, pointing a finger, at one another over and over and over. At a time when the computer was about to become a commodity the notion of the deictic changed since Duchamp placed a pointing finger in *Tu m'*; take Vilém Flusser's association of the pointing finger with the use of the keyboard:

(...) we concentrate our attention more and more on our fingertips, a hypothesis that can be confirmed in the ubiquitous sight of the relevant gesture: pressing buttons. But fingertips don't just press, they also point toward something, mean something beyond themselves, indicate what they mean. (...) What I would like to do is ask a specific question: what do technical images indicate, to what do they point? And in the same context: what meaning to technical images have? (Flusser 2011, p. 41)

The background of the indexical line that promoted this photography-text framework in conceptualism, and that led to a concomitant manipulation of language towards a non-metaphorical function of literality and tautology, that Hanson describes as being the only possible common ground, strongly indicates here a contemporary position of a 'relational subject constituted in and by multiplicity, that is to say a subject that works across differences and is also internally differentiated' (Braidotti 2013, p. 49). This work literally embodies the transversality of the line and the technological function of mediation, cancelling out borders of medium and territory, of high and low culture, and ultimately of fields of knowledge. Technology and language are its vehicle, and the images associated with it, the schematic visions one upholds against an outdated version of reality, that is, the notion that there is a 'real' chair, rather than a dynamic construct between object and representation, subject, and context.



Figure 38 Joseph Kosuth, *Titled (Art as Idea as Idea) The Word 'Definition'* (1966 - 68), 144,8 x 144,8 cm. Printed photographic enlargement. © Joseph Kosuth

In 1894, when Marey was at the height of his career, he wrote about ‘chronography’ in his opus *Le Mouvement* stating that, ‘as much as the language that expresses relations of duration and succession is slow and obscure, its graphic representation [through lines in relation to a ruler] is clear and easy; it is really the *natural* expression of these relationships’ (Marey 2002 pp. 20 - 21, my emphasis). He did see the time graphics as an emanation from the graphic method, that he saw as the language of nature. Marey then goes on to praise W. Playfair’s chronological tables ‘of the different sovereigns that ruled England’, lamenting the fact that the French did not do the same (Ibid.). This is proof that the now omnipresent graphic rendering of measurements of time and movement through graphs, or mechanical means was a complete novelty still by the end of the nineteenth century, and how much Marey advocated for it in all areas of abstract thought – Marey’s importance was, more than inventing measuring and graphic devices, his unflinching promotion of a unique mode of encoding. Better yet, this is proof that Marey advocated for measurements, that is, for an indexical shift to analyse all kinds of change, across different cognitive fields. He continued: in experiments where time relations are

important, we must ‘inscribe automatically this graphic expression, that is, *to force* the phenomenon itself to trace its duration on paper and the instant when it occurs’. This is an allusion to how graphic machines are complemented by photography, which ‘gives us precise measurements of time relations that escape observation’ (Ibid., here ‘observation’ pertains to the mechanic inscription of phenomena).

This ambivalence between what is the *natural* expression of time and other phenomena, as previously established in *The Graphic Method*, and what is *forced out* of the physical world, unveils a somewhat Cartesian vision of science and nature. Mareyism places the apparatus in an ambiguous position (just like man and his consciousness in Cartesianism ruling over nature as if separated from it) both in nature and outside of it, in communion with it and forcefully making it talk, as extracting the hidden nature of phenomena through a notion of the physical world as a mouldable entity ruled by the power of the mind, and whose expression the scientist abstracts by means of hypothetical testing. This view conforms to the tendency of conflating technique and technology, that is, to consider humans as a tool-making species following the Greek tradition of the opposition between *techne* and *phusis*, and by extension, to consider these tools as enhancements of physical faculties.

In other words, machines are invented by us and planted in the physical world as products of our brain to improve the natural tendency of organisms (the fantasy of their uprising against humanity is nothing but a reversal of this conception). In reality, the apparatus seems to be the alien in this relation. After all, the human body is studied and probed by machines; but the machines themselves seem to live in this in-between life and death, belonging and estrangement, much like Mary Shelley’s *Frankenstein*, if we do not acknowledge their own function. However, in the case of graphic machines, an ambivalence prevails and Marey, who was no epistemologist, was famously volatile

about the ontology of the graphic method: when phenomena are encoded through lines, I venture, they are not only the ‘natural’ language of nature, they are also the ‘natural’ language of the mind. As indices, they are in a continuous relationship with the phenomena but the only way we have to acknowledge the indexical fact expressed by the graphic method is through tools of the abstract mind such as lines, points and planes. And Marey agrees, and states, that the graphic method is the most appropriate form of language to express the truth about the physical world. But the truth is schematic. The line is already in itself a form of abstraction, more than a mere translation as Didi-Huberman so eloquently describes: ‘this transmission only translates by schematising’ (Mannoni and Huberman 2004, p.195), it carries in itself complex information despite the simplified form of a curve or a pattern. It is synthetic in its form but prolific in the quantity of information it contains.

Moreover, the computing function of this technology upsets the quiet notion that it is a mere enhancement rather than ‘mixtures of human-machine in which the outcome or specific forms of the relation are not prefigured in the initial conceptualization’ as suggested by the media theorist Mark Poster in his introduction to the seminal work by Vilém Flusser *Into the Universe of Technical Images* (Flusser 2011, pp. xviii – xix). After all, *La Méthode Graphique* is filled with examples where graphic recording machines and photography collect and synthesize data, not replacing human faculties but doing something humans cannot possibly do such as producing a photographic recording of the movements of a planet that ‘reduces the amplitude of movement, or amplifies it to a more suitable scale’ (Marey 1885 p.2); better yet, the photographic apparatus thus produces complex mathematical calculations with an automatic image, that is, progressive theoretical knowledge with the ‘all-at-onceness’ of automation, to borrow Mark Poster’s

expression regarding photography (Flusser, *Ibid.*: xvi).⁷² Thus, the graphic method schematises quicker than the brain does; it produces images that the brain understands but could not have produced. In fact, in their graphic clarity, technological apparatuses are not very different from the cognitive operation devising scientific theories.

4.2 Drawing Technology

Not unlike drawing since the Vasarian tradition up to the heated discussions at the Académie Royale de Peinture et Sculpture in the seventeenth century and later Baudelaire's comparison of drawing to a sort of visual philosophy, chronophotographic images are described by Marey as meant more for the 'mind than the senses' (Marey, 2002, p.303). This cross-over between the tradition of drawing and the new indexical technology defines an indexical and anachronistic territory of the line as *empreinte* meaning both the imprint and the trace, that is, the ability of the trace to bring about different historic periods in its articulation with the present: 'the anachronistic point of view, which is first of all a moment, a trial of anachronism, imposes itself when history is lacking. Not to take its place, but in order to birth it in a place that it didn't know hitherto' (Didi-Huberman 2008, p.12).

This overlap of the indexical between a redefined form of drawing and scientific photography had consequences for the expansion of drawing as a modern form of expression. This whole new array of images from graphic renderings to sequential photography still seem to await history, to simultaneously seek and defy a specific status,

⁷² The whole sentence expresses the same idea in relation to text, introducing the separation established by Flusser between a text culture and a technical image or 'telematic' culture: 'The temporality of reading photographs is an all-at-onceness, not a linear progression'.

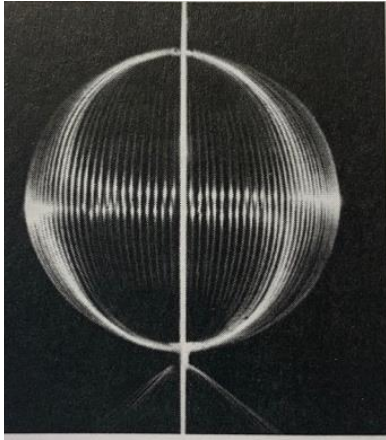
especially if one leafs through Muybridge's *Animal Motion* series but also, despite their scientific aims, the on-going experimentations at the Station Physiologique.

Didi-Huberman asked, in his text for the catalogue of the smoke chronophotographs at the Musée d'Orsay: 'is there any other way to leaf through this series of plates than as a big collection of visual poems evoking every time period at the same time, from the Greek drapery to the laboratory imagery?' (Mannoni, Didi-Huberman 2004, p. 177, my emphasis). One could say with Didi-Huberman that the index, like its sub-category, the *empreinte*, has not only the power to conflate different times but also diverging tropes of modernity. This is true for the contradicting loss of the origin, the Benjaminian 'aura', and uniqueness: Marcel Duchamp's *Female Fig Leaf* (1950) may be a matrix of a seated vulva, but it also exposes the shape of the woman whose body was used. It seems to have stolen some of her individuality, now revealed in reverse as a negative, although the title also indicates a sort of origin, as if the fig leaf Eve used had somehow absorbed her shape. Moreover, the revered method of traditional sculpture is used, casting bronze, but reversing the negative and the positive, showing the space *around* the body rather than the space *of* the body, thus initiating a wave of physical engagement with space as the one in between things, the relational space, rather than the one filled with matter, which will be explored with an intense sense of experimentalism by Bruce Nauman and of grief by Rachel Whiteread (*Ghost* (1990) for instance, is a positive of the negative space of a living-room with its fireplace, 'translated' in a spectral white plaster).

There is also the paradoxical dissemination of beginnings through inventive mechanical reproductions with its concomitant losses: authorship, hand-making, authenticity, and even a scientific purpose (Didi-Huberman 2008, p.18). Stepping away from Didi-Huberman's reflexions on sculpture and object, one can think of manipulations of film. Nonetheless, *conceptualism transposes uniqueness onto newness within*

experience in many ways, the most important of which being the unique participation of the spectator. This new conflation of science and art, but also of contradicting times and conceptions of nature through technology has an influence in how we think and therefore build our environment and ourselves. Huebler's graphic explorations oftentimes dismantle constructs in order for the spectator to build upon an awareness of how the mind, the body and perception work in different ways than the simple object-representation pairing. For it to happen, science had to have taken a turn to experimentation – conceptualism only had to include a thinking subject.

For instance, Marey himself produced a number of studies of mathematical geometric shapes made with moving threads, arresting their movement with the chronophotographic camera, not unlike the smoke chronophotographs, but without always having a clear reading or purpose for them. The mathematical shapes ended up in the second chapter of his book *Le Mouvement* as an illustration of how photography has a tendency to 'replace drawings, plans, relief figures'. He starts by explaining how photography can produce a proportional reference and automatically draw volume through light, thus replacing observational drawing of perspective (Marey 2002, p. 37).



7. Sphère engendrée par
a rotation d'un fil de métal
rillant.

Figure 39 Etienne-Jules Marey, *Sphere produced by the rotation of a metal thread*. *Le
ent*, (1894).

Whether we name it graphic expression, *disegno* or drawing, the reality is that the progressive interest and practice of drawing throughout the twentieth century until today emerged from both a technological turn and a rediscovery of Renaissance theory. For instance, Robert Roseblum's contribution to LeWitt's 1978 MoMA catalogue seems to have the very clear aim of including LeWitt's work alongside Renaissance and Baroque painting, asking: 'wouldn't 'Conceptual Art' apply far better to the work of Leonardo da Vinci than to that of, say, Vito Acconci, a Conceptual artist who uses his very body and voice in his art?', and explicitly saying that LeWitt's 'mural fantasies can even coexist happily in rooms also decorated with late Baroque painted ceilings' (LeWitt 1978, p. 15 and 20). Meanwhile, later in the catalogue, LeWitt writes about Muybridge's 'great impact' on his 'thinking' (LeWitt 1978, p. 77). This shift to drawing did not happen, however, without a graphic prevalence in technology, if not at least because of its rhizomatic nature. Or perhaps, drawing drew itself closer to the open heterogeneity of technology, rather than to the wholeness of the medium, for its free-moving detachment from any form of hierarchy in the arts. For instance, while following a similar train of

thought with a list of habitual techniques used in drawing, Krčma (who has extensively researched the interconnection between drawing and technology) nevertheless asserts that ‘the materials, techniques and functions proper to drawing throughout its history are so varied that claims for the kinds of unity and coherence characteristic of a medium are difficult to sustain’ (Krčma 2012, p. 9); he also claimed, a few years later, that drawing is defined ‘against’ other disciplines or practices and is thus ‘historically contingent’ (Krčma, 2019).

Besides, drawing is as much *of* art as it is *out* of art claiming several creative and scientific fields for itself without settling for one in particular, not to mention the foundational experience of making lines in the development of the child learning to draw and write. This is consistent with Trodd’s notion of technology as fertile territory to which a series of imported techniques bring new functions, allowing it to associate itself with other languages and materials used in an artwork. Moreover, it has the interesting role of a basis for artistic production and the potential to promote ambitious projects seen nevertheless as anti-monumental, from the South-African artist William Kentridge’s operas to the African-American artist Julie Mehretu’s murals. One thing is certain, its indexical nature brought it to the front of artistic production for its intrinsic automation – from *frottages* to indirect or blind drawing – and its closeness to the appearance of mechanically (re)produced images.



Figure 40 Julie Mehretu *Invisible Line (collective)* 2010–11, Ink and acrylic on canvas, 347.3 × 758.8 × 5

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In order to understand the association between the graphic in the photographic, I propose to go back to William Henry Fox Talbot's account of the invention of photography, which takes him to two recollections. The first one is of using a *camera lucida* to painstakingly draw; the second was of the *camera obscura* which stimulated the desire to copy the images inside the box or refracted by a prism and not, as it were, nature itself: 'how charming it would be if it were possible to cause these natural images to imprint themselves durably, and remain fixed upon the paper!' Daguerre also entertained similar musings (Thomas *et al* 1997, p. 29). From Fox Talbot's account, the invention of photography seems to be related, on one hand, to his poor drawing skills and, on the other, to his desire to capture the 'natural images' light drew as whole entities than to copy what he directly saw. He seems to have been more fascinated with the image than with direct observation as if the flat perspective contained in the small apparatus was both a drawing and a new specimen, never seen before. Nevertheless, he titled his photographic compilation *The Pencil of Nature*, which suggests that he saw a graphic relevance in those images that yielded nature's secrets for the unskilled draughtsman, thus arising the non-specialist perspective within art, as the avant-gardes and neo-avant-gardes will endeavour as well, for different reasons.

There seems to be an intrinsic relation between *graphie* (understood both as drawing and writing) and technology, between writing and drawing seen as a singular paradigm, and the means to produce them (Flusser is not wrong to combine both the printed text and the printed image). Photography stemmed from an impatience with the hand, a clumsiness in the eye-hand dynamic, the discovery of an *automatic image that revealed its graphic secrets while maintaining the appearance of reality* (one mustn't

forget that the first photographs were monochromatic, not unlike charcoal or chalk drawings). Fox Talbot must have had the impression of extracting images from nature much like Marey with his graphic instruments with the considerable difference that Fox Talbot was not unhappy about the iconicity of the abstracted image.

Isn't there already here one of the many seeds of this dismissive treatment of the eye-hand dynamic in favour of the indexical-iconic battle taking place through the encoding apparatus? The notion that there are 'natural images' and therefore not an unmediated relation with the phenomenon but a projection that a surface can cut through and expose, may have stemmed from mirrors, reflections, shadows, that all anticipate the sensible surface that produces the 'all-at-once' image *both at a distance and through contact*. This ambivalence of 'touch without subject' (Manoni and Didi-Huberman 2004, p. 187) and contact at a distance is one of the main contributors for the re-definition of drawing. The press, lithography, and all kinds of mechanical reproduction of images, including casting and imprinting, are sensible inscribable surfaces through contact. Contact (with the stylus) and distance (from the phenomenon), albeit mediated through the 'natural image' or the 'artificial image' (the drawing for lithography, the text for the press), are concomitant notions of the same phenomenon of the sensible surface – an epistemic pairing that is particularly prevalent today with the screen that can both be 'touch sensitive' and wirelessly connected.

The seminal work by Denis Oppenheim *Two-Stage Transfer Drawing (Returning to a past state)*, *Two Stage Transfer Drawing (Advancing to a future state)*, of 1971 is a video of a drawing of a drawing, which means there are three degrees of separation if we count time, the future and the past, but also contact with the skin seen as a surface. Oppenheim filmed himself drawing on his son's back and vice-versa (his son drawing on him); the person whose back was being drawn on had to then reproduce the drawing on a

sheet of paper. If the son was drawing on him, Oppenheim considered it a move from the present to the future, from childhood to maturity, since the artist's body was the surface on which the drawing was made. Thus, the subtitle *Advancing to a future state*.

Conversely, the artist drawing on his son's back, that is, using his son's body as a drawing surface that 'can be seen as an immature version' of the artist's, allows him to 'make contact with a past state' (Oppenheim, 1971 as cited by Krčma 2012, p. 173).

This version of filmed drawing complexifies the instances of graphic expression, with the black and white video, the 'document' created (the drawing on a sheet), and to the intermediate ephemeral felt, but not seen, by the draughtsman on his skin to be replicated blindly by the hand. There is no observation, the process is blind, just like Robert Morris' *Blind Time Drawings*, that he produced from 1973 to 2009 following very specific instructions with his hands filled with graphite or charcoal, but with his eyes blindfolded. Such a blind contact with the mediation of the text, results in a dialectics of distance and contact foregoing vision as a means to draw. It also replicates the process (and not the gesture) of the fingerprints on a keyboard or a mother board, as the keys are blindly activated and produce an array of probabilities or combinations, rather than a skilled calligraphic line. Nevertheless, the way Oppenheim operates his line is also close to *graphein*, to a combination of writing and drawing, producing a form of meaning, or, more precisely, of abstract information. This project, and many forms of blind drawing that are intrinsically anachronistic, combine technological processes with old paradigms of *graphein*, or *disegno*.

How did the graphic method in its diagrammatic relation with Fox Talbot's vision of photography as drawing, contribute to re-organize our practices of drawing? Huge distances from the phenomenon did not minimize the ability of photography to produce graphs. Gaston Tissandier's article for the magazine *La Nature* (issue nr. 5, 1873) gave a

precise account of how photography was used by virtue of a clockwork system and lit gas to provide a graphic account of meteorological variations. The title of the article very naturally merges both techniques: *Les Instruments enregistreurs photographiques* (*Tracing photographic devices*). Registering the empty slot of thermometers, for example, that were filled with light, the photographic documents provided a negative gradation of the phenomenon. Tissandier's text closed upon a futuristic vision, foreshadowing what would be a technological reality less than a century later:

At any rate, the future will prove that tracing is the fundamental basis of meteorology, which can only formulate its laws by underpinning them through continuous observation. — The day will come when observatories will function on their own: the luminous ray will write in silence the course and the variation of all apparatuses; the observer will only have to consult, once a day, the sensitized recordings where nature will have, as it were, marked with its own seal the periodic or intermittent changes that exert incessantly their mysterious influence!

The reason why photography was used as a tracing device was simply because the phenomena to be recorded did not provide enough force to move a stylus upon a sheet of paper. Too volatile an effect to move any mechanical device, the alterations of mercury inside the glass tubes had to use light, which, in turn, had to be registered in another way. Photography thus provided an ultra-sensitive surface allowing for the changes in the thermometers and barometers to appear on a sheet of paper. But more pertinently, Tissandier suggests that there is a need for constant observation through machines, a bio-surveillance, or an eco-awareness, depending upon the project tied to it, that is rendered possible through machines – and albeit still approximate and not always accurate this visionary statement proved itself to be right. Nature's 'mysterious influence' is tracked and interpreted, to the best of our abilities. In light of Oppenheim's drawing, the

proximity with modern and contemporary drawing techniques is striking: the sensibility of a surface; marking a progression across time; automatic drawing; abstract renderings.

At any rate, this data collection and graphically rendered movement of life is directly connected with the appearance of the technological document, the outcome of computing and calculating. If we think of other graphic devices before the technological turn of the nineteenth century, there is a proximity and a profound epistemic difference based upon the stability and novelty of the data. The sundial for instance, invented by the Babylonians, transformed both light and shadow into information: its gnomon cast a shadow on a marked surface indicating the time. Nevertheless, the shadow would never create a mark on the surface; in continuous motion, it was activated according to mathematical calculations that had previously devised the patterns of stable progression and not, as with graphic machines, an individual variation. For even if the information obtained through a sphygmograph corresponds to known patterns that indicate known laws, their application pertains to a specific context. There is not only a potential of infinite knowledge (as long as the graph can graphically transmit) but also of a direct inflection of the course of things in real time, real life.

There are two differences between the sundial and Tissandier's account of the use of photography in meteorology, one technical and the other epistemological. Firstly, the sundial is not an imprinted surface, it does not produce a stable trace; secondly, there is the premise upon which both systems are based, that is, the experimental quality of the nineteenth century apparatus. The objective in the photographic device measuring the variation on the thermometers is to mark a pattern in order to infer an atmospheric seasonal curve of temperature by virtue of its unique instances, whereas the sundial is expected to show known data day after day. Gnomon (the triangular part of the sundial that projects a shadow) in Greek means 'one that knows or examines' – its function is not

experimental, pre-determined: the calculation came before. In the sundial there is neither an inscription nor a 'truth' transmitted. The gnomon is an apparatus that marks the passage of time according to a previously acquired knowledge.

Inscription made its way into scientific imagery in many ways, and therefore into contemporary drawing as 'mark-making', but the most spectacular was, in 1851, Foucault's pendulum. It was attached to the ceiling of the Panthéon and its rotation throughout the day proved the earth rotation on its axis; in order to make this phenomenon visible the pendulum had a pointed edge which left marks on a bed of sand. In twenty-four hours the oscillating movement of the pendulum marked a complete circle. Twelve years later Marey would invent the sphygmograph; twenty-seven years later he detailed in his second book the uses of the graphic method in experimental science (Marey, 1878) that he republished with an addendum in 1885 titled *Le développement de la Méthode Graphique par la photographie*, after having discovered Muybridge's sequential photographs of horses in motion and having invented his 'photographic gun', denoting the increasing importance of photography within the tracing apparatuses and the graphic method at large. In 1851, Gaston Tissandier was only eight years old which shows the relatively rapid development from graphic ephemeral demonstration to graphic inscription and how embedded the idea of graphic expression of phenomena was already in the 1870s, at least in the scientific realm. Graphic inscription thus brought about the document, the stable data, encoded in a schematic transmission of the phenomenon whose origin is remote and encapsulated in the flow of life and of the past. Nevertheless, the document becomes disengaged with the phenomenon that it records and almost replaces: as Flusser suggested, the technical image's condition is that of a projection and, as such, an indication not only of what was, but also of what else could be. This is the nature of the potential manipulation of the document and the extra

data provided by a context, that Huebler and LeWitt demonstrated with such beauty and humour.

Drawing thus had the potential to be understood as the interface between knowledge and the phenomenon through inscription, *but* it also harbours an inherited form of critique of the power and the limitations of the indexical line. Duhem writes about how the phenomenon always escapes the rigidity of the schemata producing laws. Take the notion that temperature spreads in a given body. The mind understands it geometrically whereas in the physical world the phenomenon unfolds in an irregular manner. The epistemologist elaborates an almost poetic description of this ‘theoretical fact’ and the ‘practical fact’: ‘the body is no longer a geometric solid; it is a concrete block; as sharp as its edges may be, none of them are the geometric intersection of two surfaces, but a spine more or less rounded, more or less dented [...]’ (Duhem 1906, p. 216), the description of the irregularity of the concrete block goes on until Duhem concludes that the degree to which one approaches the intangible truth depends on the precision of the thermic measuring device. If Duhem’s concern has more to do with the exact status of a theory rather than technology’s effect on it, experimental science must still rely on measuring devices, however, and their status is ambivalent. Duhem establishes that the scientist has two images: a concrete vision of the apparatus and a schematic and precise translation of the data observed: ‘when Regnault did an experiment, he had facts before his eyes, he observed phenomena; but what he conveyed of this experiment wasn’t the recollection of the observed facts but the abstract symbols that assimilated theories allowed him to replace the concrete documents he had collected with’ (Duhem 1906, p. 237 – 238).

Hence, there is a double-bind for the scientist: ‘the scientist only gets to the symbolic world by imagining, alongside the material instrument in the lab he or she perceives, a schematic representation of it that incorporates the theoretical propositions in which the

scientist believes' which makes him 'twice removed [...] from the immediate object of perception' (Ellenbogen, 2012, p. 64). By extension, this double-bind is true for the modern person in an increasingly digitalized society. We are 'twice removed' from the immediate object of our concern, more often than not, through screens, satellites, sound devices that paradoxically reveal information and, by the same token, measure up the incremental distance between the modern consumer and the world of data constantly delivered to him /her/them. The question therefore is, to paraphrase Flusser, how to draw the concrete out of the abstract (Flusser Ibid., p. 39), which is why we need a *poietic* take on technology.

There is another aspect to Duhem's theory that resonates with the graphic method's modernity which is the economic use of means, the less is more ethos, the minimal reduction to the essential, the conceptual turn against making for the sake of making, an ethos to which drawing also corresponds, with its direct use of poor or makeshift materials.⁷³ Ellenbogen elaborates a relation between Duhem's theory of the economy of thought and the economy of the line mediated by technology through 'drawing'. He rightly focuses on the use of drawing by Marey to interpret the data collected by his instruments, and the schematic image the scientist apposes to the instrument to interpret its data as drawing in Duhem's theory too (Ellenbogen, 2012, pp. 208 – 217). The latter argument is less convincing for its over-interpretation of the graphic nature of the representations obtained through experimental apparatus. In fact, Duhem insists on the notion of 'abstract and schematic representations' to detail what the abstract

⁷³ Although specialized drawing tools are relatively more expensive than regular materials, they remain accessible, especially when compared to video production, shipping of artworks, conservation technologies for instance. This is reflected on the market, whereby drawing still remains one of the most affordable types of work. In 2018, 'contrary to popular belief, the proportion of paintings purchased for less than \$5,000 is the same as that for photographs: 74% of works on canvas and 74% of photographs change hands below this price, and the ratio for sculptures is 73%. The ratio climbs to 83% for drawings (which are still 'original' works) and 90% for prints (multiple works) <https://www.artprice.com/artprice-reports/the-art-market-in-2018/affordable-art/> [accessed 20 January 2020].

representation of the measuring instrument is and how it is disassociated from its 'concrete image' (Duhem 1906, p.248). When a physicist does an experiment: 'two very distinct representations of the instrument with which he operates take hold simultaneously of his mind; one is the image of the concrete instrument that he manipulates in reality; the other is *a schematic type of the same instrument, built by means of symbols delivered by the same theories*; and it is on this ideal and symbolic instrument that he reasons, the laws and formulas of physics apply to it' (Ellenbogen, 2012, p. 252, my emphasis).

Perhaps the notion of the diagram is more accurate than drawing in the case of Duhem. Moreover, it serves to elaborate on the kind of drawing Marey practiced – a drawing that abstracted diagrams from chronophotography: indexical lines. Ellenbogen considers precision instruments as 'prosthetics for the mind' (Ellenbogen 2012, p.195) which seems accurate but reductive in the sense that it reaffirms the separation between *techne* and *phusis*, between a technical enhancement and the physical world, rather than a fusion of expertise between machines and reasoned organisms.

Conceptualism fully embraced the graphic language that emerged from these 'creatures of reason' as an internalised system to visualize and understand space. However, Huebler's conceptualism seldom stopped at this pedagogic level, and usually aimed to reveal and revel in the mind's ability to embrace new and unconfirmed information.

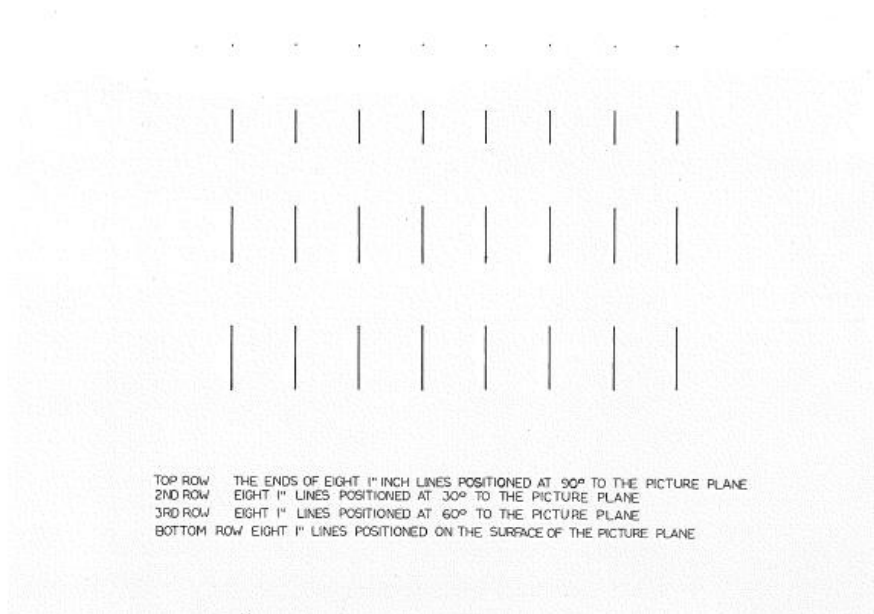


Figure 42 Douglas Huebler, *Drawing, No Title*, ink on paper, 26 x 35,60 cm. From Douglas Huebler, *November 1968, Exhibit. Cat. 1968*.

Huebler's four rows of eight one inch lines above use the schematic, graphic visualisation of planes and directions to play with the ability to fictionalise with them. If we consider lines, planes and surfaces as operative and idealised signs to read the world and to measure it, at the intersection between abstract and concrete, between image and reality, how can we play with them, just like we play with words? The measurement is patent in the degrees at which a line is perceived, thus commanding the size of its drawing on the surface of the paper. But that is not what Huebler asks the reader to see.

What we *see* are eight lines (or dots), all the same size, at various degrees. Or, on the contrary, we don't see them the way we are asked to and the whole exercise is to force our perception to accept that these lines are piercing the surface of the drawing and entering another spatial dimension. These are indexical lines in the sense that they indicate something that we cannot actually experience in any other way than through an

abstract operation. This indexical game affects our faith in perception but it also manipulates our faith in seeing what we are not supposed to see; it excites the mind to uphold the act of seeing to another standard. It makes the mind interact with the body using the common ground for sharing perceptions with fellow humans: the point, the line, the location, and the surface.

However, rather than connecting this vision of disrupted and multiplied surfaces with a phenomenal fact, Huebler leaves the reader to this abstraction of the eyes and speculation of the mind, as if to affirm that there is another kind of space, a speculative one, where these operations occur, turning the drawing into a mediation between real space and a sort of mindscape where abstract images make sense – because what is on the drawing is indeed logical. Huebler often shifts his experiments back to the viewer's internalised conceptions as if to place the source of experiences in a semiotic reality affected by science and technology, that is, about the tools one thinks with (from mathematics to likeness) and the images one needs to produce in order to understand a reality beyond metaphor.

LeWitt's method is in some ways the reverse of Huebler's when it comes to wall drawings. The lines are not there, only the rules to draw them by. The relation to mental space occurs through the mediation of the wall, although we tend to think of the wall as the ultimate non-necessary destination of the work because of the conceptual ontology of the non-object, established by LeWitt, amongst others. Nevertheless, with the wall, there is a substantial relation with its material specificity, although in a contemporary art context, the wall is usually white, very much like an idealised surface or space. In fact, there was a tendency to associate it more to the page than to real space – the wall became a shifting entity, a surface, a thing with physical properties, an idealised space, or a dirty, real, lived location. Take *Wall Drawing #305*, 1977 whose instruction is: 'The location of

one hundred random specific points. (The locations are determined by the draughtsman)'. Like many of LeWitt's wall drawings, #305 places on the maker the responsibility of the shape obtained. Its sibylline statement associates the seemingly contradictory words 'random' and 'specific' which are two key words for technological images: aleatory phenomena are rendered as specific information.

The role of the maker, oftentimes eluded because of the strong rhetoric around concepts and less around making, is key here. As mark-making, drawing is no longer, in its most extreme practices, the style of the authors as much as the murmurs of a given dimension of reality such as geometry, language or geography. LeWitt established a co-authorship not unlike the dialogic relation between the photographer and the camera:

The myth of the author (and the original) distorts the fact that the production of information is a dialogue. Now that messages are reproducible, this fact can no longer be disguised. A photograph, for example, is the result of a dialogue between the photographer and the photographic apparatus (and a whole series of less obvious conversation partners), and it is ridiculous to call each one of these partners 'author'. Given the copy shop and the Cybernetic control of dialogue, all authors, founders, donors, Moseses, Founding Fathers, and Marxes (including the Holy Creator) have become redundant. (Flusser 2011, p. 98)

Flusser explains somewhat outrageously that the consequence of the huge amount of data processed and treated by technology is that there is no space for inner dialogue anymore. 'Instead', he concedes, 'we have outer dialogue, intersubjective conversations that are disproportionately more creative than any of the 'great people' could ever have had, dialogues such as those that occur in the laboratory or work team, in which human memories are linked to artificial ones to synthesise information' (Flusser 2011, pp. 99-100). This de-centralised subject is not a submissive subject – or at least Flusser hopes

not - but a 'self-forgetfulness' typical of what happens when one plays. In a stance not unlike Braidotti's post-humanism with its refusal of individualism as an ethos of becoming and interconnectedness between self and others including animals and machines, Flusser sees humans as 'artificial intelligences', agents of endless play, creating immortal games (Flusser 2011, pp. 100-103).

This team work, along with a projective drawing experience, was a crucial moment in LeWitt's professional life before becoming a full-time artist. In the beginning of 1955, he worked as a graphic designer in the architect I. M. Pei's studio, doing graphic and three-dimensional designs.

Working in an architectural office, meeting architects, knowing architects, had a big effect. An architect doesn't go off with a shovel and build his foundation and lay every brick. He's still an artist. [...] It opened up a whole new idea of what art could be made and it wasn't until later in the 1960s that I became re-involved in that kind of thinking, but it was exemplary at the time. (LeWitt 2018, p. 201)

Although LeWitt doesn't specifically highlight teamwork, but rather the conceptual basis of the work, the architect's studio is still a collaborative setting. The latter is also a correlated process of the aleatory and the programmed, a combination of random and specific. The relationship between the random, or the 'given' as Huebler calls it, that is, between the real world seen in a non-romantic, abstract and scientific way and the specific is the bridge between the context, the potential and the realisation, the rooting of an experience as information – and not an object – in the 'real' world.

Famously, LeWitt said that 'obviously a drawing of a person is not a real person, but a drawing of a line is a real line' (LeWitt 2018, p. 251). Rather than interpreting this affirmation as an identification between the artwork and reality, one should see it as a way of making something in the real world, informed by the powers of the graphic

method. The notion of 'real' drawing emanates from this technological, projective notion of the line, its indexical proximity, sometimes causality between itself and the object: the line can make things in this world, it can change it, alter it. It can 'make' (as opposed to simply merge with life, as Krauss intuited). The experience of the architect studio but also the experimental photography gave LeWitt a notion of creation as external dialogue. Nietzsche himself, after asking what exactly godless humanity can do, turns to architecture freed from the oppressive nature of churches (Nietzsche 1974, pp. 226-227). At any rate, the conversion between science and art, bridged by technology, happens because the lines, drawing, were always at the root of the artist's mind.

Duhem places technology half-way between the material world and the sign, in a form of continuity that is also a passage from one dimension to the other, from the concrete experience of the world to its expressive mode in conjunction with its interpreters (as in semiotics, where a sign 'means something to somebody'). Unlike most theories of photography that relate the loss of information of the technical image, scientific practices at the root of its development are, on the contrary, carriers of information, and, more importantly, surprise. As an indexical device producing lines and feeding graphs, these instruments are elaborate producers of diagrammatic traces of nature's 'language' that, in reality, would be nothing more than a scratch on a surface were it not for the mind's 'theory' to provide schemata with which to interpret the line as data.

But the photographic also bears images that relate to the world in terms of non-diagrammatic likeness. Duhem is right: theory is rigid. When insisting upon the indexical nature of analogic devices, photo and film theory ignores the iconic fascination that it contains nonetheless and, consequently, the fact that this hybrid nature of technological images is crucial to understand the society we live in. Moreover, when proclaiming

photography as a ‘prosthetic of the mind’, and while rightly establishing the theoretical nature of machines, one fails to acknowledge that with such machines, ‘the outcome or specific forms of the relation are not prefigured in the initial conceptualization’ (Flusser, 2011 pp. xviii – xix). That is to say, machines whose indexical nature prevails over the iconic or the symbolic, have a way of reorganising the dynamics of cognitive processes, of creating a culture, an aesthetic (as ‘unskilled’ as it may be), and even being open to its own development.

This open-endedness of technology is often ignored in art theory: photography and film are not ‘genres’, they are technologies that developed since their invention, spreading into different forms of existence (photographs are very often now shown on screens rather than printed on paper, for instance, they may be analogic or digital). The film-maker and thinker Virgilio Tosi, who connects the birth of cinema with nineteenth-century scientific experiments with photography and other types of recordings, reminds us that cinema as a form of spectacle that may one day be reduced to a ‘marginal phenomenon’ as it can be replaced by ‘new, more global methods of audio-visual mass-communication’ (Tosi 2005, p. 12). Art theory will remain caught in a fruitless loop, in a compartmentalized rut, if it does not incorporate within its reflection of disciplines and practices the aesthetic borderlessness of technology (against the stiffness of the medium).

4.3 The Education of the Eye, a Deconstruction of the Traditional body

Marey never yielded to the seductions of cinematic imagery. In fact, the cinematograph was a temptation of his assistant Georges Demeny who saw the incredible potential of putting images in motion through his invention of the Phonograph - Demeny claimed to have invented cinema, namely in a conference on the first of February 1909

titled *How I Invented Cinema* (Lefebvre, Malthête and Mannoni 1999, p.9). This difference of interests provoked a painful separation between the two men, thus ending a fourteen year-long collaboration. Marey was clear regarding Demeny's ambitions, declaring in what was probably the last letter he wrote that he deemed his experiments 'sans intérêt', 'uninteresting' (Lefebvre, Malthête and Mannoni 1999, p.519).⁷⁴ In a letter to the administrator of the Collège de France dating from April 1894, requesting a replacement for Demeny, Marey explained his goal at the time objectively and with simplicity: 'to solve [damaged paper] physiological problem of the mechanism of locomotion in living beings' (Lefebvre, Malthête and Mannoni 1999, p.515). Movement and its scientific writing was his main life goal and nothing would violate this commitment, not even the experiments led by his brilliant assistant who went on to work on the cinematograph and gymnastics (his two passions, apart from the violin) despite a campaign against him, relentlessly led by those loyal to Marey after his death in 1904.

More to the point here, Marey was never fascinated by the iconic and narrative potential of the graphic method, always describing photography in a relational way, and through its ability to measure and provide the right proportions. It was the abstract relevance of the graphic method that was useful to Marey and not its entertaining potential.⁷⁵ That is why, albeit unknown to LeWitt, for instance, at least during the years that he was looking intensely at Muybridge's chronophotography, the graphic method is a crucial tool to capture conceptual art's interest in abstract thought as a dialogue between diagrammatic endeavours, photography and text.

The graphic method produced an array of visual information that confirms the way we now look at the world, having assimilated it, perhaps because of its deep-seated

⁷⁴ In fact, Marey was in his deathbed and the writing is not his. He must have dictated it, or trusted a close relative or friend to word it for him (Lefebvre, Malthête and Mannoni 1999, p.519).

⁷⁵ In fairness, Demeny tried to use technology in order to enhance human functions.

traditionalism, across fields (science and art, physiology and sociology, for instance), but in correlation with a sense of absolute newness. For Marey writes: 'it is true that [chronophotographic images] prepare us to better observe nature, and, in an animal in motion for example, to look for attitudes that we hadn't perceived before'. Marey produces reflections about the change society underwent due to his new technology. He was aware of his revolutionary influence on modern reality and how we build our place in it. This stimulates what the inventor describes as 'an education of our eyes', as if perception was perhaps insufficient but also adaptable, that relies, he explains, on an apparatus to literally put it in motion, the phenatiskope. In his words, 'the eye's education can be made even more complete if, by presenting images in a certain way, we render the impression of movement in a condition where it is used to grasp it' (Marey 2002, p.303). Is Marey suggesting here that technology can insert more information in the natural flow of perception? And what would be the consequences for such an endeavour?

Basing his explanation on Plateau's discovery of 'retinal persistence' (the fact that images remain on the retina for the duration of 1/3 of a second), he details the way the 'charming toy' (the phenakisticope, which evolved into the zoetrope) sets images in motion. Marey mentions Muybridge's use of the latter by using glass discs bearing elongated drawings to correct a transversal compression of the images typical of this particular device. Obviously, the objective of the 'education of the eye' is to decode nature more precisely, but also to decode indexical documentation: this is emphasised by the example of George Demeny's 'Photophone', which was an elaborate device meant to reproduce the movement of 'the face, the tongue and the lips accompanying speech'; the device was tested on deaf people who successfully could read the images and understand the words being uttered (Marey 2002, p.312). This is indeed an example of an 'educated

eye' as most people are unable to read lips, which, incidentally, is a skill that can potentially be taught and learned.

Would this be a concession to the image in motion, to proto-cinema? Not at all – Marey's interest was to arrest or accelerate movement and thus obtain what pure observation could not. In his typically straightforward writing, Marey states that putting images into motion as such would be nothing more than a couple of 'puerile attempts' if they were mere reproductions of what the eye sees naturally. In fact, these devices are useful for the eye's education because, in conjunction with one another, they can slow down fast phenomena and accelerate extremely slow processes. As noted before, Marey's conception of the photographic image is related with the comparison of the images across time: he mentions a 'curious experiment' imagined by Ernst Mach of taking photographs of the same person in the span of a lifetime and then placed in the zoetrope, thus displaying 'all the phases of human existence' (Marey 2002, p.303).

In this sense, Marey's conception of the graphic method, across the technology he either invented or perfected, is of a concomitance between indexical graphs, photography as a measuring device producing such graphs, and motion image as long as it relates graphic knowledge with motion observation through the manipulation of its speed and its education of the eye. The fervour with which Marey defended his technology as a new language had him eschew the importance and the redefinition of intelligence and thought and did little to advance a more psychologically oriented analysis of technology that would come later, in euphoric and pessimistic terms simultaneously, through thinkers rather than scientists, such as Walter Benjamin. The question lingers however, and, I argue, is still being answered today: how was abstract thought redefined and relocated through technology and what kind of new behaviour did it produce?

This brings to mind the difference of status that the apparatus and its imagery have in Duhem's theory: for him, the theory is both the starting point and the point of arrival of physics, hinging on the ambivalence of technology that is more 'for the mind than for the senses'. In science, the priority is the conceptualization and not the medium which leads to a detached relation with the technology used that, anyway, as the short overview of motion devices by Marey shows, is ever-evolving. In that sense, there is a parallel between technology and theory: it is open-ended, in development, 'provisional'. Nevertheless, it is of pivotal importance for the way the scientist thinks his testing and for the way the results of the tests appear. The ambivalence of technology, its mediating capacity, makes it both of the mind and of the senses, while its materiality is forgotten in the background. This is perhaps one of the reasons why, relying heavily on a technological framework, conceptualists refused the notion of object and, rather, embraced the idea of documentation. In the words of Anna Lovatt, LeWitt's embracing of drawing occurred in a non-traditional way, 'against prevailing notions regarding the immediacy, directness and primacy of drawing, LeWitt devised a drawing practice that was always already mediated by technologies of reproduction and communication' (Lovatt 2010). In artistic practices, at least, one can locate the conceptual project from the end of the 1960s to the end of the 1970s as a real operative investigation into the way technology is a way of making concrete, of realising abstract notions rendered borderless and accessible, through the association of science and art through technology, with its heavily reliance upon a new form of linguistic use.

If it is true that conceptualism was anti-bourgeois, it is less true that it was anti-commodity. Rather, it redefined what a commodity could be, taking it to a conceptual and linguistic level, with the complicity of the market with its patrons and collectors (Alberro 2003, p.40). Its real allegiance was to technology and information systems that were far

less engaged in medium specificity and more prone to the provisional status of the imagery derived from reproductive technologies. Medium specificity was a Greenbergian trope that Minimalism and posterior movements tried to counter the best they could. This disengagement from medium specificity is far more realistic even when it comes to our imposed role as perpetual consumers of images from all sources, and that is where conceptualism plays a socio-political role of awareness towards the mechanisms of information consumption.

The notion of 'medium' exists, after all, beyond categories of art history, an all-encompassing notion that traverses territories, from the press to art-making, as a mediator. Lovatt argues in favour of this perspective convincingly, taking yet another possible view of LeWitt's work as an encoded message, transmitted (by him), interpreted (by the maker) and diffused (by the wall) with the inherent noise of every message. The medium is not the message as there is a separation between content and the message itself, which leads Lovatt to write that

beyond the visual arts (...) the term 'medium' continued to describe an intermediary space that was fundamentally contingent rather than autonomous, relational rather than specific. The language LeWitt used to describe his work's mode of address – 'transmitting' 'information' like 'a conductor from the artist's mind to the viewer's' – was derived, consciously or unconsciously, from the burgeoning fields of information and communication theory (Lovatt, 2010).

Nevertheless, and perhaps because of its very specific focus on scientific, descriptive language, conceptualism got entangled in a linguistic loop that went from self-reference to repetition. Where does the marketing end, that is, the intrinsic manipulation of the spectator, and the reflection – the education, the betterment - begin? Conceptualism was not a philosophy, nor a prescriptive ethos, and its engagement with technology was

sometimes conscious and deliberate, and sometimes intuitively connected to the zeitgeist. The originality of its premise was to connect the ideal and abstract source of technical images, to borrow Flusser's expression, with the exhibition space and the body of the spectator, giving him / her / them agency and a new kind of awareness through linguistic, graphic and iconic means.



Figure 43 Joseph Kosuth, *Self-Described and Self-Defined*, 1965, red neon tube lights. Berardo Museum, Portugal. Photo taken by the author. © Joseph Kosuth

The body of conceptualism is seldom remembered and even argued for perhaps because its relationship to the spectator seems so abstract. But abstracting is body-based: it relies on the eyes, on perception, on location, or time. Albeit philosophically difficult notions, these actions are also natural and rooted in human existence. Hence, while 'educating the eye' machines create a new type of perception, new types of skills, a new body. And this is the new body we are equipped with, and which is re-adapting constantly to new technologies: that is why berating them (the paradigmatic example here being gaming) digs even deeper rifts between generations. Never before the baby-boomer

generation have humans undergone such dramatic changes in gestures of the body, in perception, behaviour regarding information, leisure and living habits, still evident today.

The Photophone experiment mentioned previously pushes the ‘education of the eye’ further, and within the context of artistic practices. In an insightful reflection, Marey recounts how chronophotography details moments where the movement is slower thus producing images that are more familiar to the eye; in contrast, it also reveals ‘extremely fleeting states of the face’, movements that are part of a ‘gradual transition’ where none of its stages can be isolated. This was rendered obvious by an experiment with the keeper of the Station Physiologique who Demeny and Marey chronophotographed screaming, thus obtaining images of the face ‘so weirdly contracted that it resembled a sequence of quite ugly grimaces’ (Marey 2002, p.194). Oblivious to the fact that chronophotography breaks the flow (the ‘gradual transitions’) of life while revealing its inner workings Marey asks himself, in an insightful reflection, if the ‘ugly is nothing but the unknown’, if ‘the truth hurts our vision when we see it for the first time’. The ‘truth’ for Marey is scientific theory as was the positivist stance at the time. This cultural expression notwithstanding, Marey confesses that Demeny and himself have asked themselves this question many times, particularly when Muybridge’s horses in motion were first revealed to the public, and whose representations used in painting befuddled the public. And yet, he notes, after this first puzzled reaction, the public learned how to expect movement to be represented (this is a typical passage from the iconic to the symbolic). ‘Until where will this education of the eye go? What influence will it have on art? The future only will tell’, he concluded (Marey 2002, p.194).

Today counts as Marey’s future; there certainly is a lesson to learn from the way technology took over and brought in a new dialectics of contact and proximity. The play between the index and the icon took so many relevant paths that there could be a whole

study dedicated to this. It seems that in many ways this education is ongoing and yet that the manipulation of the body through images is also thriving. Recently, from Cindy Sherman's notorious photographic project of mimetically rendering typologies of mostly female bodies (and one wonders to what extent this replication is helpful), to the British duo Harrison and Wood's hilarious and graphically sorted filmed scenes of their own bodies both trapped in a given environment and in the video image, to Rebecca Horn's bio-mechanical devices, there would be a lot to unpack in this complex area. Nonetheless, this takes to the origin of this battle between icon and index in the conceptual context first and foremost.

I have argued that this intricate relation between abstract thought in indexicality and recognition through similitude in the icon starts with conceptualism in a self-reflexive and critical way through the line and graphic renderings in general. The inheritance of the graphic method does not go without a critical stance regarding its advancements, and its traditionalisms. If LeWitt abandoned the figure in favour of the line in his mural drawings, he never ceased to take photographs in a conceptual process of exhausting the motif and on the look-out for patterns in projects such as *Photogrids* (1978), in which LeWitt collected photographs of linear and regular patterns in urban settings, both *of* architecture and *on* architecture; *Brick Wall* (1977) with pages of irregular renderings of horizontal and vertical lines in brick walls, like a match-up between the mind and the camera's eye; *Autobiography* (1980), the aforementioned project of photographing everything he had in his studio, and in the same year, the less known *Sunrise and Sunset at Praiano*, a collection of sunrise and sunset pictures, letting the motif display itself rather than correspond to an emotional state *à la* Stieglitz, and others. Huebler, on the other hand, was far more systematic in his graphic enmeshment of words, lines and images as I have explored in chapter 2. This prevalence of the iconic in conceptualism

happens, however, in a relational use, whereby images are only relevant across time, in a dialogic connection with each other or with documentation that provides a context, a critical conundrum, or a diagrammatic rendering that multiplies its form of existence and echoes mental mechanisms of assimilation of information.



Figure 42 John Wood and Paul Harrison, *Three-Legged*, 1988, Video 3'00'.



Figure 43 Rebecca Horn, *Pencil Mask*, 1972, fabric and pencils.

The education of the eye doesn't work without the whole body following.

Nietzsche's *The Gay Science*, first published in 1882 and re-published in 1887 with the addition of a Preface, Book V, and an Appendix of Songs, announced the death of god to the world. But it is also in this book that Nietzsche imagined an encounter between science and art, between what he called the 'philosophical physician' and the artist. Nietzsche wrote, in the 1887 Preface, that he was 'still waiting for a philosophical physician (...) to muster the courage to push my suspicion to its limits and to risk the proposition: what was at stake in all philosophizing hitherto was not at all 'truth' but something else - let us say, health, future, growth, power, life'. This is a bold statement – and an inherent, almost Duhemian critique of the transposition of the philosophical notion of 'truth' to positivism. Or rather, Duhem published an almost Nietzschean book for the German philosopher foresaw a science of the future whereby humanity would study itself: its habits, patterns, and physiology, for example, in order not only to know itself but also to build another way of being.

In this sense, the way his visions were recuperated by authoritarian regimes is not much different, albeit even more catastrophic on a human level, than the way Marey's inventions were used to regulate and control work. At its worst Mareyism favoured Taylorism and at its best, it allowed for experimental studies of a psychological, behavioural, or physiological nature. Nietzsche's philosophy seems to point at an historical, social and political body, that is not only a biologic set of organs and functions but also a work-in-progress, a malleable tool whose capacities are moulded by the ideologies that inform it particularly through science and technology. It is therefore logical to note that Nietzsche foresaw that 'anyone who now wishes to make a study of moral matters opens up for himself an immense field of work. (...) So far, all that has given colour to existence still lacks a history. (...) Has anyone made a study of different ways of dividing up the day or of the consequence of a regular schedule of work, festivals and rest? Is there any philosophy of nutrition? (...) So far, science has not yet built its cyclopic buildings; but the time for that will come' (Nietzsche 1974, p.81). Art, however, while probing these techniques, brings in a critical and relational subject to them, animating its generic conception of the human.

4.4 An Unknown Outcome: Lines and Surfaces

It is difficult to look at technology with an engaged and fearless outlook like authors such as Vilém Flusser or Marshall McLuhan did, and the latter of whom, Bochner admitted, partially inspired the *Working Drawings* (1966) project. After all, Marey and his peers were not only assessing the power of engagement of their instruments with the world, they were also producing them. Conceptualists, on the contrary, were witnesses of the third industrial revolution, whereby the old structures were still in place and spreading

(from the railway to communication devices) but also when new devices established the widespread use of a ‘keyboard’ which made us less aware of the science ‘inside’ the devices:

(...) mechanical typewriters have archaic keyboards. With word processors, writing by pressing keys has long since become an opaque process, an event that occurs in a black box to which the presser has no visual access. An apparatus is not a machine, and its mechanical aspects have disappeared. By observing how images are synthesised on a computer screen by pressing keys, we can, looking back in a sense, recognize the miracle of mechanical button pressing as well: it is the miracle of calculation followed by computation, the miracles to which technical images owe their existence. (Flusser 2011, p. 24)

Vilém Flusser’s theory of technology, from which he draws an existential philosophy, eschews theories of representation and posits, rather uniquely, that technical images are projections instead of signs standing for something already existing. They compute and calculate, turning whatever image they produce into two things: a concrete objectification of an abstraction; and a form of processed information irradiating its novelty onto the world. Therefore, technical images are the result of a chance operation, an aleatory process occurring within a certain set of potential occurrences; they are probabilities. They are borderless, in the sense that they traverse fields and join skills: ‘for [Flusser], photography [which he uses as a wide ranged technique and later on substitutes with the notion of ‘technical image’] is an overcoming of the artificial separation of culture into science, technology, and art’, explains Andreas Ströhl (Flusser 2002, p. xxv).

The ‘black box’ however, represents the unknown processes of concretisation modern technology has spread far beyond the shutter of analogic photography and film. For if photography was the basis of Flusser’s first foray into media theory with the

publication of an incendiary book titled *Für eine Philosophie der Fotografie* (*Towards a philosophy of Photography*) in 1983, he published two years later a more encompassing book that went beyond photography and dealt with computers and televisions as much as the historical first technical imagery, thus implicitly embracing the transversality of its scientific beginnings, the graphic method, *Ins Universum der technischen Bilder* (*Into the universe of technical images*).

But already in 1973 Flusser had opposed ‘lines’ and ‘surfaces’, the line of writing and of history, and the surface of the screens as image-bearing flatness, from which ‘we get the message first and then try to decompose it’ (Flusser 2002, p. 23). In this short but acutely innovative text, Flusser devises his theory opposing the linearity, conceptual process of writing, to the all-at-onceness, immediacy of surfaces, of technical images. In short, he says, ‘the synthesis of linear and surface media may result in a new civilization’, titling his next chapter *Toward a Posthistorical Future*, and thus posing what would be his life project, to understand the place of freedom and meaning in a technological society where lines (history) and images (post-history) are fighting each other and creating a new subject (Flusser 2002, p. 31).

In a discombobulating paragraph, Flusser describes the passage from lines to surfaces and the way concepts play a role in the engagement with both:

When man assumed himself subject of the world, when he stepped back from the world to think about it – when he became man – he did so mainly thanks to his curious capacity to imagine the world. Thus, he created a world of images to mediate between himself and the world of facts with which, because of this distance-taking process, he was beginning to lose contact. Later, he learned how to handle his imaginal world, thanks to another human capacity – the capacity to conceive. *Through thinking in concepts, he became not only subject to an objectified world of facts, but also to an objectified world of images.* Now, however, by again having recourse to his imaginal capacity, he is

beginning to learn how to handle his conceptual world. Through imagination, he is now beginning to objectify his concepts and thus to free himself from them. In the first position, he stands in the midst of static images (myth); in the second position, he stands in the midst of linear progressive concepts (in history); in the third position, he stands in the midst of images that order concepts (in 'structures'). But this third position implies a being-in-the-world so radically new that its manifold impacts are difficult to grasp. (Flusser 2002, p. 32, my emphasis)

Flusser's whole philosophy can be described as the development of this thesis of concepts and images to an assimilated form of structure producing conceptual and abstract images, and whether it is possible to find (or extract) meaning and freedom, in them. Perhaps the method here is to conflate all these times together, anachronistically, rather than an escalation, a progression. Now, whether Flusser saw this as a positive potential outcome or a negative one, he post-modernistically places in the hands of the spectators we have all become the potential outcome and, in this sense, he is a utopian fearing a dystopia of a discursive, fascistic society as opposed to a structural and dialogic one where concepts and images are rendered concrete and build a new society bypassing the 'Big Brother'.

But going back to the quoted passage, Flusser alerts us to the fact that there is a relation between concepts and images working together, almost in an independent, mechanic, assimilated manner, and that we need to intervene by structuring and extricating concepts from images. The difficulty of grasping this potential new reality is patent in many forms of literature and media theories, and especially in the production of technology itself such as Marey's, and of cultural projects that are less moralising than demonstrative, such as the conceptual use of the indexical line and the sequential or dialogic image. It is most peculiarly echoed in a work of literature that invented a technology which is neither cinema nor photography, but a technical image, where the

place of the body is rendered immaterial, rather than making concepts concrete as Flusser intended the future to do.

Both the fear of technology and its irresistible iconic power was profoundly expressed in *The Invention of Morel*, published in 1940 as a futuristic assessment of the advent of photography and film.⁷⁶ Its author, Adolfo Bioy Casarès, imagined a conflation of the two with the addition of volume: in an island where the narrator chose to hide from the authorities, a tri-dimensional film is projected by a machine activated by tides. Even this hologram machine invented by the cruel Morel lacked something – life -, although it produced images so real that the narrator had to spend his time on the island hiding from them, thinking they were real people. In a spectacular plot twist, the narrator falls in love with Faustine (who was one of the people-turned-into-characters of the film endlessly projected on the island), whom he progressively and carefully approaches; a love that remains intact, perhaps even more effervescent, despite the outrageous discovery that none of the people on the island are alive, her included.

The group of friends was filmed without their knowledge or consent by Morel. But the filming process killed its subjects, placing their image in a time loop where, while their bodies decayed from the exposure to the toxic technology, their three-dimensional image, forever listening to the same song and having the same conversation, came back cyclically, for as long as the mechanism worked. The *denouement* of the short novel is uncanny and tragic: the narrator chooses to film himself artificially dialoguing with Faustine, spending time with her, despite his inevitable, physical death caused by Morel's technology. The parallel between the love of iconic images and hopeless, romantic projection is inescapable: one explains the other. Images and love thrive in repetition, and long for eternity (wasn't Daguerre's wife worried about his sanity, writing to a friend that

⁷⁶ The famous book, with an introduction by Jorge Luis Borges, inspired the conceptual artist David LaMelas who went on to make a film titled *The Invention of Dr. Morel* in 2000.

he could not sleep until he found a method to fix the images he obtained?): ‘To be on an island inhabited by artificial ghosts was the most unbearable of nightmares, to be in love with one of those images was worse than being in love with a ghost (perhaps we always want the person we love to have the existence of a ghost).’ Perhaps conceptualism’s rejection of projection and ego pertained to this blind power of the icon, this narrative prison one cannot escape: once watched, a film remains imprinted in the brain, even on a subconscious level. Self-reflexivity and repetition, when indexicality prevails, excite emotions differently, and does not provoke imitative or cathartic behaviour.

This iconic, looping prison in which the narrator willingly immerses himself at the cost of his own life is a makeshift reality that, in order to look real, has to bring about death onto its protagonists. The ghostly reality of iconic images, especially the ones in motion, creates another dimension that cannot connect to our tangible reality, unlike the indexical desire to draw a ‘real’ line as opposed to a composite of lines making up a portrait. If the line is real and acting upon our environment, portraits create a whole other dimension of fantasy with the added danger of seeming more real than reality itself (this dichotomy is one of the reasons why Plato dismisses artists from his Republic). And despite the availability of the image as a document, as indexical, what surfaces is its unavailability to become concrete.

But perhaps what Bioy Casarès is pointing at is the novelty of the technical image, the kind of desire it creates, the kind of behaviour it induces, as well as its omnipresence that, whether we like it or not, mediates our relation to work, to leisure, to love and friendship. It is also reminiscent of E. T. A. Hoffmann’s *Olympia* and other automatons that inspired lust, corresponding to a tradition of technical icons that trigger a desperate longing. It also evokes the myth of Pygmalion, and many other idealisations of the perfect lover, of the stale opposition between life and art, if one follows Flusser’s critique

of authoritative images as opposed to dialogic surfaces, where art wins every time. This tradition could be seen as a distant echo of a separation between *phusis* and *techne*, of a Cartesian take on the world, that inevitably separates us from technology and nature, more so since the 1960s where it seems to magically operate from a 'black box'. So, technology, while pulling towards the future also carries its own anachronistic weight. But is this the only way to address the subject arising from this state of affairs, from this endlessly mediated relation we have with the world?

There is an old and outdated debate between figuration and abstraction, a very Western and perhaps even demagogical debate, that is nonetheless carried through in technology where photography and film theory now seem at pains to understand how indexicality – the guarantee of an abstract substratum of the technical image - prevails when we are no longer in an analogic era. I hope to have shown that the association of literal language and images, the diagram, drawing in general and a technological mind-frame serves as a composite and undeniable reality that created a relational and varied subject, aware of the abstract nature of images and feeding off of them as well as nurturing a special interest for mainly iconic images that are rooted in a substantial relation with reality nonetheless. The rise of auto or self-fiction is a telling symptom of this tendency to indexicalise fiction and produce a new subject from it, in an external dialogue – the latter aspect being, for Peirce, the very nature of the act of thinking.

Computers and television turned everyone into spectators disconnected from the process of fabrication of the images consumed. The internet, however, that seemed to be peaking in between the lines of Flusser's visionary philosophy, is a whole other affair. Soon, he announces in the mid-1980s, computers will connect subjects all over the world. Huebler, Trodd, argues, in shifting the order of his photographs and making us connect information in a non-linear way, was also thinking rhizomatically, in terms of digital

networks. If anything, self-referentiality also connects with this state of things that evolved into what we are today. The subject is no longer the centre of experience, he/she/they are an element of the chain of events whose source comes from scattered information. Caught up in a descriptive loop, the responsibility of the spectator has shifted from an aesthetic appreciation to an ethical awareness.

In the penultimate decade of the twentieth century, enthralled by the abstract, minimal, and conceptual experience, Douglas Huebler, in an interview with Arthur R. Rose (an alias of Joseph Kosuth) for *Studio International* in February 1989, positions himself alongside the ‘percipient’:

(...) whatever is visual simply washes through the comment, and remains as itself – well, I’ve made a lot of work that reveals that process. Anyway, that’s what has interested me all along. I mean, not the pronouncement of *meaning*, but pointing toward the way meaning is formed. It’s like taking myself out of the centre and standing back with the percipient, discussing the various ways we may regard what is there to be perceived (Huebler 1989, p.47).

This shared space between the artist and the spectator - or percipient - reverses the traditional communication system established by art whereby the artist was the ‘communicator’, the spectator the receiver and the artwork the conveyor of the message. But it also challenges the very notion that there is meaning, or that meaning is fruitful. Here, the artist establishes an idea, to take LeWitt’s vocabulary, conceptualizes it and creates a technological system – from machinery to an external system of production such as maps and trips (in the system-based Troddian perspective of technology) – and waits, alongside the spectator, for the results of his experiment. The outcome of which, as in Huebler’s *Variable Piece # 44, Global*, (1971) where the participants had to send their own photographic portraits several years apart, was a ‘known unknown’.

In fact, the idea of the work is compelling intellectually, but it is the image that makes the experience poignant – a take on the portrait discussed in chapter 3. At any rate, when the structure of images is dialogic, the outcome of the work is not complete until its activation by the participant percipient, or the makers of the work (in the case of Sol LeWitt) and the atmosphere in which it is shown, that is the ‘given’ wall the work will be installed on. Following a similar logic, LeWitt delegated the production of his drawings – but also his sculptures, whose makers were mentioned in the invites for his exhibitions – putting an ideal ‘spectator’ as a maker, and himself as the recipient of his own work, whose outcome was never far from expected but impossible to predict precisely, unless the instructions were specific and not random. Considering the importance of the market, especially in the 1960s and 1970s for innovative art that felt modern, it was quite a feat to sell something one hadn’t made with one’s own hands. Nevertheless, the highly industrialised American society was ready for a language that emulated a new subject and that created a new physical and intellectual experience. In this sense, American conceptualism, albeit imbibed in European philosophy from Wittgenstein to Nouveau Roman, was deeply enmeshed in American capitalism. It is somewhat puzzling, I think, to apprehend how the art market has currently turned towards an iconic, contemplative and speculative affair, when not even five decades ago, there was such an effervescent need for novelty and engagement. This disengagement, that Flusser deemed fascistic and that Bio Casarès described as an empty form of desire to be surface impeded us as a society to fully engage with our bodies, with the networks, with the association of concepts and images through structures. Nevertheless, some conceptual endeavours, particularly of a gendered, mostly female take (artists such as Ellen Atkin, Mary Kelly, Susan Hiller for instance), are now more likely to be embraced and dealt with.

Conceptual practices did try to bring forth another exploration of the gendered body and of the territory, usually through basic and elementary practices such as charts. The British conceptual artist Mary Kelly is notable in this regard with her series *Post-Partum Document* (1973-79), has her charting her child's development with items, data and interpretations that took conceptual art to a level of feminist notions of life. Taken to the exhibition space, these series disrupted the analytical stance of the spectator facing works such as Kosuth's play with literalness and the construction of a new, more aseptic subject, taking him / her / them to their own experience of childhood, or parenthood, or simply to the intricate obsessions of a human being responsible for the formation of another human being. The passage of time is also at stake here, but it is neither psychological nor objective. It is not historic nor subjective. It is a concession to linearity, reminding us here of Marey's fascination with time friezes, a linearity broken by the inevitable growth of the child but also the idiosyncrasies of the relationship between the parent and the baby –the artist as parent.

Post-minimal generations of artists such as Andrea Zittel also took on this practice of surveying, charting and analysing. Currently redefining living spaces in her California desert estate (*A-Z West*) through her own experience and production, she worked, as a post-minimalist artist heir to conceptual practices on a specific project that interrogated the 'natural' cycles of life: *A-Z Time Trials: Free Running Rhythms and Patterns* (2000). The question she asked herself echoes in reverse the epistemic turn of the nineteenth century: 'what would it be like to live without any source of imposed time?' She set out to live in a closed space without external light, without time or weather information for a week in Berlin from the 31st of October to the 6th of November of 1999, while she videotaped her ensuing activities and life rhythms. This is, notably, a turn of the century

work. Zittel wrote, for the exhibition showcasing it at Regen Projects gallery in Los Angeles, titled *A-Z Time Trials*:

Free Running Rhythms and Patterns has been an experiment that I've wanted to carry out ever since I was eight years old and read in an Encyclopaedia Britannica about a sleep study on human subjects who were placed in caves so that their sleep patterns could be observed. The human subjects were observed to slowly develop longer circadian cycles than the 24 hour solar cycle. This seemed particularly interesting if one were to try and determine whether the biological rhythm or the solar rhythm were more 'natural'. For me this instilled a personal theory that there is no one overriding 'reality' or nature that everything else can be based on.

Beyond this hypothesis, and what sets my own 'experiment' apart from that of a scientific experiment, is that I wanted to know what it felt like to live 'without time'. None of the scientific time studies ever wrote about what the subjects of these studies thought, felt, or how they reacted. It seemed relevant to create a test for myself in order to observe my own experiences. It also seemed ironic that by staying at home and by using no equipment, special vehicles, or exotic locations, I could create this amazing adventure.⁷⁷

This project is compelling in its contradictory goals: on one hand, the artist chose to replicate an indexical experiment, measuring up life's cycles, arriving to a typical post-modern conclusion of the hybridity of time constructs and biological rhythms; on the other hand, the dream of living without time is consistent with a romantic desire of remoteness and authenticity that we no longer are entitled to, if we ever were. Or perhaps even, it is reminiscent of past generations: time was not governed by a worldwide convention and the concomitant apparatus that measure it and deliver it. At any rate, the artist's body here takes the role of the guinea-pig, of the human 'x' testing an open hypothesis, that of

⁷⁷ *A-Z Time Trials: Free Running Rhythms and Patterns (in an isolated human subject)*, solo exhibition at Regen Projects Gallery, Los Angeles, USA from 5 February to 11 March 2000: <https://www.regenprojects.com/exhibitions/andrea-zittel/press-release> (accessed 13 April 2020).

biological time but allowing itself to register non-scientific data. Or better yet to turn non-scientific information into data.

Indeed, Zittel was interested in everything that the scientific experiments she read about did not mention: the subject's experience of the test. Nevertheless, the perspectivist theory is in its full force here when Zittel concludes that the 'natural' rhythm, the circadian time, is not an objective reality. The very premise of this project is based upon the graphic construct of a traceable and theorised body although Zittel's conclusion is to deconstruct its biological wholeness. The outcome of this experiment was an exhibition, turning the experiment into charts, quantitative and qualitative information. She turned herself into the subject of the experiment, without the mediation of the machine for the body has replaced it.



Figure 44 Andrea Zittel, *A-Z Time Trials*, 2000 (detail), mixed media installation.

This unique work is a direct inheritance and critique of the conceptual approach and its assimilation of nineteenth century technology and imagery. The artist foregoes machines and traces their influence on her body through time-related rhythms. She charts. She draws. She produces boxes with maquettes of living spaces representing *desiderata* pertaining to unbound time. These are expressed by sentences printed on the maquettes such as ‘time to know people better’ or ‘time to read every book I ever wanted to read’. Her name is often included in her projects through her initials, A. and Z., that serendipitously correspond to the first and the last letter of the alphabet and are often used as an idiomatic expression meaning fastidiousness. One is reminded of Nietzsche’s musings about architectural spaces although in Zittel’s case they do not correspond to high ceilinged immense spaces, quite the contrary. *A Z West* is Zittel’s living project of a house and work space integrated in the surroundings, both socially and intimately in the middle of the Joshua Tree desert. She moved there in the year 2000, the time where she tested circadian rhythms.

If the artist’s body became the maker, the viewer, the experimenter and the experimented upon, what about the images, the drawings, the lines? Zittel’s work expresses the anachronistic and dialogic conjunction of romantic ideals and fantasies (some of her sculptures are utopian islands and rocks) with a new stance regarding the production of information. Rather than a melancholic take on traditional images such as the narrator in Bioy Casarès’ fiction, one can have a more pragmatic attitude toward this indexical turn of charted behaviours that can also be a release of the body and its creative projections.

Moreover, this new and updated recording technology was the birth of an automated surface more akin to a screen than to a canvas. For, like Tim Ingold pointed out, ‘there can be no history of the line that is not also about the changing relations between lines

and surfaces' (Ingold 2007, p. 39). If the canvas or the parchment paper is the retainer of a projection from the mind of the artist through his/her/their hand, the photograph is an image that was captured as a whole and that projects onto the viewer in return – its indexical quality has the effect of bouncing back to the world and locating the subject in time and space, whether it is a connection fuelled by desire or recognition of the photograph's context. Any image is interactive, but the screen cuts the flow of nature and projects a hitherto invisible aspect of it as a new reality. It bounces back from whence it came, whereas traditional images, as Flusser calls all images before the advent of technology, open up to an imaginary world that is clearly separated from this one, producing an idealised (even when it is negative) world where our bodies have no place. This idealisation of human life echoes notions of desire as a hole one needs to fill with an impossible experience.

Ingold situates the change in the perception of the surface in the 'demise' of writing. He points out that handwriting, before the invention of the printing process and the mass-distribution of text, produced a writing experience akin to an exploration. There were choices to be made and different directions to take: between the drawings that bled into letters and the marginalia, medieval books offered a wayward experience of writing. The print brought about a linear, one-directional and scarce form of text that 'one looks at' in opposition of the manuscript that one 'moves *through*'. 'It was the technology of print that broke this intimate link between manual gesture and graphic inscription', he writes, proceeding to argue that writing is 'the one thing [the author] does not do'. He may scribble, but that is one of the many things he will do to produce his text from 'talking to oneself to pacing the walls of one's study'. He concludes that the final result of the text, a 'pre-composed' block of words for an empty surface that was neither written by the

author nor by the printer bears no relation to the chain of gestures that the author undertook in order to make it exist.

This form of mechanisation of writing is seen by Vilém Flusser as the birth of history, just as the advent of technical images is its recent death; an annihilation started by the photographic medium. The printed text is a linear sequence of events that, as a culture, we see as a recording of a chain of events all connected to each other in a time-line, which produces a narrative flow that we use to tell our own story. Images dismantle this linearity. Like Ingold's description of the hand-written text, that functioned like an image, in fact, technical images connect elements on a uniform surface that functions as a whole, an 'all-at-onceness' that compulsion pierces (Peirce describes the indexical as 'compulsion', as a direct relation between the sign and its object mediated by the interpreter's body), that it follows according to an idiosyncratic re-organisation. Texts are, by opposition, linear, sequential, in line, pre-organised, logical, straight.

I want to argue here that media theory, and especially visionary, excited takes on what is here and what is to come, as Duhem suggests for physics, are always somewhat schematic. Philosophy seems to be always caught in the idea of progression – if not evolution – or, as Flusser says in his aforementioned text *Line and Surfaces*, 'all this is utopian' (Flusser 2002, p. 34). The graphic method, by now, can be seen as the spark that started the technological fire of scientific imagery, of the indexical turn, of the submission of any technical image to the claim of a real implementation in reality, of the tracing of human behaviour and, in its best attempts, to the creation of a playful subject, aware of itself and the trick his mind has in stock, as well as the creative pull it can have.

However, the space-time relation it redefines is not a simple overturning of linearity and text in favour of rhizomes and images. Anachronism is not only the life of images, it is also the condition of the technological man. For the old formats are still here, with their

intrinsic power and their own historical weight, from colonialism to the printed press, from humanism to phallocentrism. If Muybridge, the artist, altered sequences and produced an uncanny superimposition of different simultaneous images of the same phenomenon, Marey the scientist, created a precise system that may have produced fragment of fragments, but that still imposed the linear order, the writing performance of the left to the right, over the cinematic potential of chronophotography and over the iconic-indexical contemplation of a single image.

Before the advent of a technology that broke the barriers of science and culture, could Sybille Krämer have written that ‘the interaction between line and plane is fundamental to humanity; it is an invention and a cultural asset’? (Faietti and Wolf 2015, p. 10)? In this thesis, I have argued for an anachronistic notion of art history, one that constellates rather than draws up charts of influences, one that considers images as entities ‘awaiting history’, both of history and outside of it, potentially specific and redefined and powerful enough to also reconnect loose ends. Technological images such as Marey’s have the power to have been of their time, and of their field, but they also created, beyond the misfortune of mass-production and Taylorism, and the beauty of sequential photography of the drawing of a muscle spasm, a breaking of barriers between science, technology and art. This does not go without consequences, I have argued, and the conceptual movement foresaw the potential of creating another kind of image, technical images, that would engage with the body of the artist and spectator in different ways. I also suggest that along the way, and for those who particularly understood the dry humour of conceptualism, this project lost its specificity and became nowadays either a romantic take on images as traces (Iversen) or a humorous and seemingly light-hearted way of producing.

Krämer concludes that ‘through the medium of the line it is possible to represent everything that exists, everything that does not yet exist, and everything that can never exist’ (Faietti and Wolf 2015, p. 16) and she goes on to note that charting history through a line makes it reversible and endlessly re-interpretable. I have argued here that this mediation came to the forefront of art practices but also of modern life, to an extent, and lines, as ‘laboratories of cognitive power’ but also of dialogic potential and thus post-humanistic relevance as creating relational subjects rather than fixed existences, are now used in conjunction with surfaces. It is up to us to take them up this challenge and therefore re-evaluate the whole of the conceptual project, with its other gendered, proliferous or even more technological endeavours that are yet to be re-evaluated in a broader manner, after my first attempt at making them less art historical, and more urgent and anachronistically relevant.

5 Conclusion

In this thesis, I have shown that the second half of the nineteenth century produced a new line whose simplicity contrasted but also depended on the apparatus that produced it. Etienne-Jules Marey's expression of 'the graphic method' perfectly encapsulated this circular process of scientific devices and their line-based imagery. The hypothesis produces the machine that produces the image: this strongly resonates, I have argued, with the 1960s and 70s conceptual re-organisations of the interactions between brain faculties and physical realisations. Think of LeWitt's 'the idea becomes a machine that makes the art' (LeWitt *Paragraphs...* 1967).

I have demonstrated how Marey's array of graphic and photographic devices translated movement into patterned lines. Even in the case of photography the figure analysed, be it a bird or a person, had to be drawn out of the photograph into a diagram by a draughtsperson Marey hired. Although stemming from a scientific ground, this new line blossomed in many areas, one of which is the artistic field where another kind of line, *disegno*, had been the technical support of all genres, painting, sculpture and architecture. The elemental quality of this new line contradicted the line of *disegno* which one can consider to be a recorded gesture of the hand (so also indexical in its own way, thus the term 'mark-making' recently applied to drawing) with the intention of creating a discernible outline of an identifiable thing. However, although it marks movement, the line of *disegno* does not produce abstract documents. By contrast, this new nineteenth-century line is simple, either regular or straight, but it is mostly diagrammatic, with a tendency to be abstract or to represent abstract thought; it also is laden with information. It delineates conceptual hypothesis in their process of testing physical laws.

I have introduced this new line as – mainly – indexical, a term largely previously employed in relation to photography and film. When one follows the indexical line one is

confronted with a whole array of recording devices, their documentation, and the new uses of language stemming from the technological re-organisation of the world where a hypothesis is presented to a machine that tests it mostly in mathematical or scientific descriptive terms. This non-artistic line took over representations at a moment when art – perhaps adapting to this overpowering of technology – was particularly open to non-artistic processes of graphic expression at the turn of the twentieth century. The Futurists, for instance, were inspired by Marey; but on a deeper, more processual level art practice absorbed the indexical line from Duchamp's *3 Standard Stoppages* to Emma Kunz's pendulum drawings.

Thus, some artists associated the line of *disegno* and the indexical line, a combination I tend to name 'graphic expression' rather than drawing. There is never a clear cut break with the past: times overlap and converse and the uses of these types of line by the twentieth century pioneering neo-avant-gardes are no exception. This is my anachronistic methodology at work, considering that there is no other way than a dialogic connection between times, knowledges and disciplines to understand how an image is formed.

Noting the use of *disegno* and the index is akin to providing a new dialogic relation between the icon and the index. In a more specific way, conceptual artists propose a sort of synthesis between abstract art and figurative uses, diagrams and mechanically produced images. However, the purpose of this study was not to propose a neatly defined art historical landscape of the conceptual process, but to access it beyond the dogmatic discussions that took place at the time, overly informed by pro or anti-Greenbergian positions and using on a superficial level the seductive seventies ethos of liberation from established powers. The de-commodification of the artwork for instance, is a debatable notion that one could argue to have foreshadowed the dematerialisation of capital more

than criticise the art market because the main male conceptual figures of the movement were quite efficient in selling their work. Instead, I have argued that the real argument for conceptual art was to re-define the relation with the art object as an active involvement rather than a contemplative stance.

Conceptual art has been linked to advertising (Alberro 2003) and to the Nouveau Roman and experimental literature (Lovatt 2019); I have complemented those studies with science and technology, as a new kind of sign that brought with it a reorganisation of perception, faculties and a mechanical trait in its processes and even materials. Both Huebler and LeWitt's work consciously resonated and interacted with the graphic method's imagery and technology; both artists critically engaged with this inheritance that took over society too.

This is also a way of purposely distancing this study from the clichés of 1970s art critique in order to touch upon the point of contact between conceptual art and life rather than feed into the reactive mechanism against previous generations. In reality both Huebler and LeWitt were weary of the language of critics more than anything else, because it informed the experience of the artwork before the viewer even came in contact with it. Trying to subvert this state of affairs, I have endeavoured to build a perspective beyond notions of the medium and the genre in order to immerse myself and the reader in the experience of conceptualism as a deeply investigated new form of thinking and relating to life, as a technology.

Moreover, the underlying question to my method is: are we relying on unsatisfying categories in art theory? Should we not build other notions to write and think about the artistic creation and experience in order to connect it with the contemporary life and also the past time periods it is still involved in?

For those reasons, I have embraced notions of technology, machinery, documentation, abstract thought – and the perhaps apparently complex notion of the indexical line, noting its undebated use in curating. Nevertheless, I advocated here for a more embodied and researched use of the line because it opens fields of study and of empirical pleasure. Following a post-humanist philosophy, I have steered away from ‘hyped-up neogothic horror’ regarding technology and followed the indexical line into territories where our neurological system, its sheer adaptability to the machines it creates and that influence it back, is re-educated and relocated (Braidotti 2011, p, 55). The cyber-body is a reality that we cannot afford to overlook, with its potential to be measured and traced but also re-invented and nomadic, in the sense that it is deeply averse to essentialist notions. Moreover, with Braidotti but also Flusser, I have engaged in a reflexion of positive desire, of projection rather than nostalgia of history (for Flusser) or nature (for Braidotti) without blindly following dangerous trends (fascism for Flusser) and (disembodied trans-humanism for Braidotti).

Finally, I want to point out that the study of Huebler and LeWitt’s work should be given its due attention also as a way to access conceptual women artists whose contribution to the period is sometimes even more extreme because they created without the boundaries of the market, of what is sellable, and their work is currently under researched. The work of these radically innovative women will form part of my future research: Eleanor Antin, Chana Horwitz, Mary Kelly, Ana Hatherly, Irma Blank, and so many others.

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