Still-moving Engrams: The Ecstasy of Bodily Gestures in Chronophotography and its Contemporary Reproductions

Francesca Scotto Lavina, "La Sapienza", Università di Roma

Abstract

In the 1880s chronophotograpic still images dissected the otherwise indistingui-shable stages of bodily movement, revealing both the discontinuities between still images that are hidden in cinematic images, and the details of gestures that are imperceptible to the human eye.

According to recent film theory, chronophotography reveals that aesthetic frui-tion is not based on continuity alone, but also on instantaneity, discontinuities of movement and the dichotomy of immobility and motion.

The essay argues that chronophotography can express the *dynamis* of Warburg's engrams and Ėjzenštejn's expressive movement, as well as its organic nature and the qualitative changes it enacts on the body. In Ėjzenštejn's opinion, the changes that occur in the work of art trigger the spectator's imitative process, which in turn is responsible for ecstatic flow.

The article considers *Choros* (Langan and Maher, 2011) and the media art project *White Horse Hills* (Wood, 2002), both of which render chronophotographic, engram-like images of movement through digital techniques. In their analysis, I claim not only that they both emphasize their chronophotographic effect, but moreover that they strengthen the *dynamis* of gesture, thus demonstrating its importance in aesthetic fruition when it is in line with the laws of nature.

Prelude: the Aesthetic Dissection of Gestures in the Chronophotographic Images of Movement

Movement has been thoroughly discussed in cinema theory: the focus has been on the ontology of movement in relation to cinematic image rather than on the material nature of movement itself in relation to its inner component, gesture.

Gesture was first brought to our attention in the 1880s with the advent of chronophotography, a technique developed by the physiologist Étienne-Jules Marey and the photographer Eadweard Muybridge to create a succession of snapshots of movement taken at equidistant intervals of time.

Marey and Muybridge, like other chronophotographers and scientists of the same period, developed different methods of dissecting the otherwise imperceptible stages of movement. Marey's first experiments were represented by graphs whose lines reproduced people's movements[1] or sculptures, reflecting his intention of showing only the phases of movement.

Marey believed these graphs gave a false impression of continuity, so he developed a photographic gun to record twelve snapshots per second from the same angle. Muybridge, on the other hand, used a battery of cameras to record the subject's movement from different angles.

As a consequence, Marey's analytical reproduction of movement addresses the qualitative changes of the body. Marey's snapshots render the trajectory of movement and its sense of duration; see *Man Walking* (Marey, 1882),[2] where a black suit hides the body's features to bring out the stages of movement in one interval of time.

Muybridge's sequences describe qualitative changes of the body in relation to different positions in space,[3] such as in *Woman Walking Downstairs* (Muybridge, 1887),[4] which clearly shows the bodily features.

Chronophotographers animated the sequences of their snapshots by using a Zoopraxiscope creating the illusion of movement to entertain larger audiences.

Despite their different techniques[5] both Marey and Muybridge's single snapshot freezes a set of gestures in an eternal any-instant-whatever, by realizing their *mise en pose,* which reduces a movement to zero by suspending each single gesture in its execution phase and allows the spectator to focus on its unperceived details.

The sequences of snapshots crystallize the whole movement in an eternal present progressive and realize a *mise en geste* of the image by extracting the gestural features of a movement; e.g. a dance, gallop or walk; however the montage of a chronophotographic sequence reveals the discontinuities between the still ima-

---

[1] This technique did not show any characteristic of the observed object and made the use of captions necessary in order to explain the object's relation with its movement. Marey's graphs are available at <http://cnum.cnam.fr> [accessed 30 September 2015]. Philippe-Alain Michaud, *Aby Warburg and the Image in Motion*, trans. by Sophie Hawkes (New York: Zone Books, 2007 [2004]), pp. 87–90. Étienne-Jules Marey, *La Méthode Graphique dans les Sciences Expérimentales et Principalement en Physiologie et en Médecine* (Paris: G. Masson, 1878), p. 108. Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830–1904)* (Chicago: University of Chicago Press, 1992), pp. 8–41.

[2] Marey, *Le Mouvement* (Paris: G. Masson, 1894), quoted in Michaud, p. 89, fig. 26.

[3] Tom Gunning, 'Never Seen this Picture Before; Muybridge in Multiplicity', in *Time Stands Still: Muybridge and the Instantaneous Photography Movement*, ed. by Phillip Prodger (Oxford: Oxford University Press, 2003), pp. 222–72 (pp. 224-25).

[4] Eadweard Muybridge*, The Human and Animal Locomotion Photographs*, ed. by Hans-Christian Adam (Köln: Taschen, 2010).

[5] Braun. A comparison between *Man Walking* and *Woman Walking Downstairs* and its animated Gif simulating the effect of the Zoopraxiscope (available at <http://www.wikiwand.com/en/Nude_Descending_a_Staircase,_No._2> [accessed 20 December 2015]) shows the differences between Marey's analytical purposes and Muybridge's creative and artistic intents.

ges of movement, which, by contrast, cinema makes inaccessible to conscious human perception by its apparatus.

Chronophotographic sequences show analytical images of movement, or rather, images of the gestures, which make up movement, and not 'movement-images' that are peculiar to cinema according to Deleuze. By questioning Bergson's thesis on movement Deleuze argued that continuity of movement is inherent to cinematic image, which he contrasted with stillness of photographic poses, which doesn't belong to cinema.[6]

By contrast, not only did still images appear in chronophotography and then in the projections of early cinema in the 1900s in order to arouse spectators' astonished reactions,[7] but they were also reintroduced by avant-garde movements, such as Structural Film. Directors, like Hollis Frampton,[8] drawing their inspiration from chronophotography, used the tension between stillness and motion to investigate the laws of perception and the 'unconscious optic'.[9]

Thanks to a renewed interest in chronophotography, in Early Cinema and in avant-garde movements, since the 1980s film scholars have developed a new film history and theories,[10] which consider still images, such as the 'Still-Moving Field',[11] and argue that aesthetic fruition is not based only on continuity, but also on instantaneity and discontinuities of movement.[12]

Chronophotography, among all the pre-cinematic forms, appears to be the most meaningful expression of the dichotomy between immobility and motion, and moreover its montage demonstrates tangibly that movement can be created using a series of still images.

The chronophotographic montage of movement actually reminds us of Bergson's thesis that movement consists of qualitative changes of matter (a tran-

---

[6] Gilles Deleuze, *Cinema 1: The Movement-Image,* trans. by Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1997 [1986]), pp. 23–28. See Raymond Bellour, 'The Film Stilled', *Camera Obscura*, 24 (1990), 99–123 (pp. 99–100) (first publ. as 'L'Interruption, l'instant', *La Recherche photographique*, 3 (December 1987), 51–63).

[7] Gunning, 'An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator', in *Film Theory and Criticism*: *Introductory Readings*, ed. by Leo Braudy, Marshall Cohen (New York, Oxford: Oxford University Press, 2009), pp. 736–751 (pp. 740–41).

[8] Mark Hansen, 'Digital Technics Beyond the "Last Machine": Thinking Digital Media with Hollis Frampton', in *Between Stillness and Motion: Film, Photography, Algorithms*, ed. by Eivind Røssaak (Amsterdam: Amsterdam University Press, 2011), pp. 45–72.

[9] Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction*, in *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zohn (New York: Schocken Books, 1969). Rosalind Krauss suggests that Benjamin came up with the idea of the optical unconscious thanks to Marey and Muybridge's chronophotographic sequences. Rosalind Krauss, *The Optical Unconscious* (Cambridge, MA: MIT Press, 1993).

[10] *The Cinema of Attractions Reloaded,* ed. by Wanda Strauven (Amsterdam: Amsterdam University Press, 2007).

[11] Røssaak, 'The Still Moving Field: An Introduction', in *Between Stillness and Motion,* pp. 11–26.

[12] Garrett Stewart, *Between Film and Screen*: *Modernism's Photo Synthesis* (Chicago: University of Chicago Press, 1999), pp. 27–73.

sition of forms) in relation to its duration. These changes are perceived as a succession of immobile sections, that is, snapshots of reality, that are cut by the brain, in much the same way as in cinematic montage, to create an illusion of perceptual continuity.[13] In turn, Bergson himself was influenced by chronophotographic experiments dealing with animal locomotion,[14] which fragmented movement into any-instant-whatever by imitating the (cinematographic) mechanism of perception and revealing its discontinuity.

Chronophotography calls into question the importance of still images sequences dealing with the oxymoron of static movement in the aesthetic fruition. By an aesthetic of dissection such images reveal details of movement that, despite being unperceived by human consciousness, are crucial to capturing the qualitative changes that are immanent to movement.

The Ecstasy of Expressive Gestures: The Chronophotographic Engrams-like Images Sequences

The gestural details revealed by chronophotography disclose the organic characteristics of movement, its physicality, the irreversibility of its duration and its dynamic and emotional potential, which history of art scholars have debated in depth in relation to painting and sculpture.

Both the *mise en pose* and *mise en geste* of Marey and Muybridge's chronophotographic sequences are reminiscent of the sense of motion rendered by Renaissance paintings and sculptures, analyzed by art historian Aby Warburg (1866–1929), who claimed that such still images triggered emotional responses.

Warburg, and before him, his art historian professor, August Schmarsow, were deeply influenced by Robert Vischer's thinking in the 1870s. The philosopher argued that works of art representing particular forms based on conformity to the design and function of body parts (eyes, muscles, limbs, posture as a whole) aroused particular responsive feelings.[15] Schmarsow emphasized the role of gestures in the appreciation of visual arts, and Warburg, following his teaching, during his studies of Renaissance paintings, claimed that some gestures and bodily postures, which he distinguished as *pathosformeln* (forms of pathos), are constantly reproduced in the history of art. He suggested that such gestures and

---

[13] Henri Bergson, *Creative Evolution,* trans. by Arthur Mitchell (Mineola, NY: Dover, 1998), pp. 302–04. Different branches of sciences, such as psychology, physiology and neuroscience, have been addressing the complex phenomenon of the human perception of motion. 'Neurophysiological and imaging experiments support […] biological movements might be recognized by analysing sequences of body shapes that correspond to "snapshots" from movies of complex movements', which supports Bergson's thesis. See Martin A. Giese and Tomaso Poggio, 'Neural Mechanisms for the Recognition of Biological Movements', *Nature Reviews Neuroscience*, 4 (March 2003), 179–92 (p. 180).
[14] Braun, pp. 280–81.
[15] Robert Vischer, *Über das Optische Formgefühl: Ein Beitrag zur Ästhetik* (Leipzig: Credner, 1873).

postures rendering the sense of motion are imprinted in our memory because of their emotional power. He used the term 'engrams', a term he borrowed from evolutionary biologist Richard Semon (1859–1918), to describe these images in terms of their energy. Since 1927, Warburg had been collecting various examples of *pathosformeln* in his *Mnemosyne*,[16] whose panels join sets of still images (engrams), which make sense in relation to each other. Not only does each panel represent a general theme, but it also portrays energy in motion (*dynamis*), flowing among the engrams in a way that is quite similar to juxtaposed chronophotographic images.[17]

Moreover chronophotography 'reproduces movement as a function of any-instant-whatever',[18] that is, one 'instant, which is equidistant from another'.[19] Chronophotographic instants are privileged, because they are 'remarkable or singular points, which belong to movement […], but simply not ordinary, not regular […], an organised set of any-instant-whatevers through which the cuts have to pass'.[20] These characteristics give them their organic nature that does not belong to (unnatural) 'poses'.[21] According to Ėjzenštejn, organic means being natural and in harmony with the laws of nature[22] and it is the basis of pathos.

Chronophotographic still images are actual images of natural gestures, whose expressivity turns such images into forms of pathos.[23] Ėjzenštejn claimed that expressivity is peculiar to such organic gestures blending the instinctive and the conscious or goal-oriented features of movement.[24] Such gestures are deeply imprinted in the human memory because of their emotional meaning as a result of natural evolution.[25]

In *Woman Dancing* (Muybridge, 1887),[26] the dancer emphasizes the expres-

---

[16] Aby Warburg, *Mnemosyne. L'Atlante delle Immagini*, ed. by Martin Warnke and Claudia Brin (Turin: Aragno, 2002).

[17] Michaud, p. 86.

[18] Deleuze, *Cinema 1*, p. 5. Deleuze used 'privileged instants' in Ėjzenštejn's meaning, that is, 'pathetic', 'moments of crisis'. Ibid.

[19] Ivi, p. 6

[20] Ibid.

[21] Ivi, p. 5.

[22] For 'organic', 'pathos' and 'ecstasy' see, Sergej M. Ėjzenštejn, *Non-indifferent Nature: Film and the Structure of the Things*, ed. by Herbert Marshall (Cambridge: Cambridge University Press, 1987 [1964]).

[23] It is worth noting Warburg's forms of pathos are related to bodily expressions and gestures, while Ėjzenštejn's deals with the pathetization of not necessarily pathetic raw material through the use of montage. See Sylvia Sasse, 'Pathos und Antipathos. Pathosformeln bei Sergej Ėjzenštejn und Aby Waburg', in *Pathos: zur Geschichte Einer Problematischen Kategorie*, ed. by Cornelia Zumbusch (Berlin: Akademie Verlag, 2010), pp. 171–90.

[24] Ėjzenštejn, Sergei Tretyakov, 'Expressive Movement', trans. by Alma Law, *Millennium Film Journal*, 3 (Winter-Spring 1979), 30–38.

[25] Both Ėjzenštejn and Warburg were deeply influenced by *The Expression of the Emotions in Man and Animals* published in 1872 by the evolutionary biologist Charles Darwin, who argued that emotions are expressed by facial expressions and bodily movements.

[26] The image is available at MoMa website: <http://www.moma.org/collection/works/44243?locale=en> [accessed 20 December 2015].

sivity of her solo ballet by sensually moving the draperies of her transparent dress; her gestures bring to mind the study of the nymph in motion in panel 39 of Warburg's *Mnemosyne.* Moreover we manage to perceive expressivity in the stylized silhouette's oriented walk represented in *Man Walking* reminding us of the 'zig zag'[27] and the snake (*dynamis* par excellence according to both Warburg and Ėjzenštejn)[28] in the *Laocoön* sculptural group (*Mnemosyne,* panel 6).

Whenever an artist manages to capture the expressive gestures, as in aforementioned examples, he stimulates the spectators into recalling forms of pathos and allows expressive gestural language to prevail according to natural laws.

Ėjzenštejn argued that such a language and the sense of touch triggered by the sight of the gesture are the inner components of emotional response; he also claimed that such a response is primitive and prelogical and it causes a sort of regression to an earlier form of thinking, where the distinction between motion and emotion is less clear and, as a consequence, it allows to represent ideas in a very tangible way.[29] Moreover, Ėjzenštejn's concept of the audio-visual images (he used the Russian word *obraznost*) describes the connection between visual motifs and general ideas or topics in art, in short: empirically invisible abstractions.

The expressive gestures of the chronophotographic engrams-like images are visual motifs that crystallize into stable forms leading to a plastic composition of the shot in pathetic terms.[30]

Such stable forms are montaged, as in Warburg's panels, in an organized set of images of organic gestures.

Whenever montage, in Ėjzenštejn's opinion, manages to arrange a set of images according to a pathetic composition of all its elements, it means producing a rhythm[31] and showing qualitative changes, which occur in the image and contemporaneously in the bodies of the spectators because of an emotionally induced imitative process. This produces the spectator's transition from one physical state to another, that is, a 'going out of himself',[32] responsible for generating an 'ecstatic flow', which deeply affects the spectator's body at an unconscious level before he becomes aware of it.

Chronophotographic montaged sets of still images show the transition from

[27] Michaud, p. 286.

[28] Ivi, p. 285–87.

[29] Ėjzenštejn was deeply influenced by the research of two psychologists, Vygotsky and Lauria, arguing that the origins of language lie in gesture itself. This assumption might be confirmed by recent neuroscientific trials demonstrating that language, as well as cognition, might have evolved through gestures and body language because of the closeness of the mirror neurons and the Broca area, the part of the brain which produces language. Luciano Fadiga, Laila Craighero, Alessandro D'Ausilio, 'Broca's Area in Language, Action, and Music', *The Neurosciences and Music III, Disorders and Plasticity*: Ann. NY Acad. Sci., 1169 (2009), 448–58.

[30] Ėjzenštejn, *Nonindifferent Nature*. Ėjzenštejn, *Towards a Theory of Montage*: *Selected Works II*, trans. by Michael Glenny, ed. by Glenny and Richard Taylor (London: BFI Publishing, 1991).

[31] Ėjzenštejn, *Film Form: Essays in Film Theory,* ed. and trans. by Jay Leyda (London: Harcourt Brace Jovanovich, 1949), pp. 72–82.

[32] Ivi, p. 166.

one gesture into another, which is directly related to the flow of privileged any-instants-whatever extracted by movement. The composition of the whole movement creates a rhythm and produces the qualitative changes (claimed by Bergson as well) mirrored into spectator's body. This draws him into motion through a (mental) imitation of the expressive gestures of the image.

With montage the degree of muscle contractions, the various limbs positions and the changes of direction in the movement manage to express Warburgian *dynamis,* which affects the senses at various levels and intensities.

In fact, chronophotographic sequences 'move-with the feeling of the movement taking form' and therefore spectators 'feel-with […] the intensive passage from the virtual to actualization […], what is amodally felt [...] at the threshold of sight'.[33]

The Dynamic Echoes of Gestures in the Digital Chronophotographic Reproduction

Digitization has given further impulse to new film theory and the Still-Moving Field and has paved the way to a deeper dialogue between cinema, chronophotography, photography in general, and other arts, such as painting and sculpture.[34] Digital effects manage to 'animate and complexify the apparently frozen or fixed time-frames'[35] of chronophotography and therefore they enhance its potential to emphasize the details of gestures and movement.

Nowadays chronophotography inspires the spectacular effects of mainstream cinema, the most famous of which is the 'bullet-time effect' of *Matrix* (Lana and Andy Wachowski, 1999),[36] as well as experimental films and art projects, in which immobility (still images of movement) and movement(-image) can flow into each other or even coexist in the same frame, as in *Choros*, an experimental film by Michael Langan and Terah Maher (2011).[37]

We can already see this in an analogical predecessor of *Choros*, *Duo* (*Pas de Deux,* Norman McLaren, 1968), from which Langan and Maher drew their inspiration. In *Duo*, the dancer's still figures are duplicated to create two figures moving about the stage contemporaneously. The moving images of the figures remind us of the process of 'going outside oneself' and seem to physically represent the concept of Ėjzenštejn's ecstasy.

---

[33] Erin Manning, *Relationscapes: Movement, Art, Philosophy* (Cambridge, MA, London: MIT Press, 2009), pp. 94–95. Manning's considerations refer to Marey's work.
[34] These arts have been deeply influenced by chronophotography since the 1920s. See Marcel Duchamp and Giacomo Balla's paintings, avant-garde movements of Kinetic art and Futurism and, in the 1970s, Francis Bacon's paintings.
[35] Hansen, p. 57.
[36] Røssaak, 'Figures of Sensation: Between Still and Moving Images', in *The Cinema of Attractions Reloaded*, p. 321.
[37] *Choros*, online video is available at <http://langanfilms.com/choros.html> [accessed 20 December 2015].

In *Choros*, the digital technique, besides reproducing this effect, adds the chronophotographic effect vividly producing a chorus of gestures (fig 1).

Choros is a significant example of the charm of gestures made apparent through digital manipulation and allows us to explore the tension between stillness and motion and the dissection of the chronophotographic effect by 'finegrained temporal intervals'.[38]

The *mise-en-scene* of the solo ballet of Maher, who is one of the directors as well as the dancer on stage, is in line with Muybridge's effort of reproducing the fascination of dancers' gestures,[39] as privileged any-instants-whatever.

After dissecting the movements of Maher's figure into thirty-two engrams-like image (juxtaposing the body's gestures side by side) digital compositing sets them in motion in the continuous flow of a movement-image. The result is a continuous overlapping of figures hauntingly echoing every graceful and deliberate gesture of the dancer (fig. 2) reminding us of *Woman Dancing* animated by a Zoopraxiscope.

Every chronophotographic sequence of Maher's gestures starts from a still image of a single figure and merges into another still image recomposing thirty-two Maher's bodily images in a unique figure. As the stillness is perceived, Maher's body sets in motion another movement that gives rise to the same process once again.

In some of the frames, still images of Maher's figure coexist with chronophotographic sequences of her movement (fig. 2), which strengthens the composition of the image in pathetic terms by contrasting stillness with motion. Even though this clearly reveals the paradox of immobility immanent to the moving image, both still images and chronophotographic sequences render the sense of movement, as in the images of Warburg's *Mnemosyne* or in the kinetic artists' paintings, such as *Nude Descending a Staircase* (Marcel Duchamp, 1912, oil on canvas, 147×89.2 cm, Philadelphia Museum of Art, Philadelphia).[40]

However, in spite of the astonishment of audiences of Early Cinema at the transitions from moving to still image and vice-versa, and besides the disclosure of the optical unconscious that Structural Film directors aimed at, the emotional appeal of experimental cinematographic forms like *Choros* seems to be the result of the ecstatic flow triggered by the qualitative changes occurring in the image of the dancer's body.

Flowing in sequence, Maher's expressive gestures generate a continuous flow of privileged any-instants-whatever extracted by movement rendering a sense of

[38] Hansen, p. 57.
[39] Laurent Guido, 'Rhythmic Bodies/Movies: Dance as Attraction in Early Film Culture', in *The Cinema of Attractions Reloaded*, pp. 139–56.
[40] Image available at <http://www.wikiwand.com/en/Nude_Descending_a_Staircase,_No._2> [accessed 20 December 2015].

duration expanding into space. The gestures seem to create a rhythm, crucial to pathos and to spectators' (mental) imitative process of Maher's movements.

The rhythm is enhanced thanks to the close match of the tempo of the soundtrack, *Music for Eighteen Musicians* (Steve Reich, 1976) with the number of gestures created by using the chronophotographic digital effect, thus showing that 'the attitude of the body is like a time-image […]; the gesture is already a different time-image, the order or organization of time'.[41]

The pathetic composition of *Choros* images (fig. 2) often realizes figures of montage that Ėjzenštejn had previously analyzed in still images, such as Balla's paintings[42] or the aforementioned *Laocoön* sculptural group,[43] which he defined the totem of movement, as did Warburg.

As in *Laocoön*, the montage is based on the collision of elements (colours, forms) that are re-composed after being decomposed to give each of them a pathetic role.[44] Montage 'brings a succession to simultaneity […], [and] propagates a dynamic impetus'.[45] Maher's pale limbs are highlighted against a dark background and are further accentuated by the appearance of small flames and fireballs illuminating the movements. Their red wake simultaneously collides with the darkness of the stage, which in turn, collides with the brightness of a green field in the last sequence (conflict of colour and form). Nevertheless Maher's still figures often appear larger than the moving figures in the background (conflict of volumes and planes).

As in Warburg's *Mnemosyne* panels, the images render the force of movement acting on Maher's body, its *dynamis*, its '*vis elastica*' […], [its] affective athleticism',[46] which brings the digital composition of the image closer to Francis Bacon's paintings. This means making 'the interior forces that climb through the flesh […] [and] the spasm visible'.[47] These forces reorganize the body in the most natural (organic) postures according to the body's inner attitude: turning around, standing still, falling asleep or getting up.

The visual rendering of the digital chronophotographic effect makes some of Maher's bodily traits, such as her face, indistinguishable, as in Marey's works, except for the last frame. At the same time the image vividly presents the details of her vibrating gestures, as in Muybridge's chronosequences. This further collision of elements draws our attention to Maher's contracted muscles and pathetic postures. The white dress, which gently contours her dancing body, reminds us

---

[41] Deleuze, *Cinema 2: The Time-Image,* trans. by Hugh Tomlinson and Robert Galeta (Minneapolis: University of Minnesota Press, 1997 [1989]), p. 195.

[42] *The Film Form*, p. 50.

[43] Ėjzenštejn. 'Laocoön', in *Towards a Theory of Montage*: *Selected Works II*, pp. 109-202.

[44] *The Film Form*, pp. 31–63.

[45] Michaud, p. 286.

[46] Deleuze, *Francis Bacon: The Logic of Sensation*, trans. by Daniel W. Smith (London, New York: Continuum, 2003), p. 41.

[47] Ivi, p. XI.

of the flowing draperies of the aforementioned *Woman Dancing* and of the nymphs-like images of Botticelli and Ghirlandaio's paintings analysed by Warburg in panel 39 of *Mnemosyne*.

In some of the shots, the chronophotographic effect deforms the Maher's face and body, an effect we see in *Two Figures* (Francis Bacon, 1961, oil and sand on canvas, 198×142 cm),[48] thus rousing the spectators to create 'original relations which are substitutes for the form'.[49] This is what Bacon does according to Deleuze, who claimed that these relations erase the figurative data and create levels of sensation through 'a non figurative resemblance for the same form'.[50] This process stimulates creativity as the brain attempts to interpret the figures and to find the correlations it needs to arrive at a unitary perception of the elements.[51]

In fact, Ėjzenštejn believed that the audience's emotions are heightened when a film presents incomplete fragments that spectators are required to assemble themselves,[52] actively and emotionally.

The juxtaposition of Maher's gestures generates images (*obraznost*), whose visual motifs bring to mind the mythological Icarus spreading his wings (fig. 3) or the nymphs in motion (figs 1, 2), both represented in panel 39 of *Mnemosyne*, or one of the *Niobides* sitting on the floor on her bent knees in panel 5 (fig. 4). These visual motifs also generate empirically invisible abstractions, because they recall ancestral images that are deeply imprinted in our brains because of their (unconscious) association with sexuality and fertility,[53] such as the peacocks spreading their tails during courtship rituals (fig. 3) or flying birds (fig. 5) reminding us of Marey's chronophotographic studies of birds' flight.[54]

Unlike *Choros*, Jeremy Wood's locative media art project, *White Horse Hill* (2002), explores the representation of bodies in motion by reducing them to black dots, so focusing solely on movement in the same way as Marey when he erased the body's features.

The participants in this locative media art project are given a GPS mobile

---

[48] Available at <https://artimage.org.uk/4602/francis-bacon/two-figures--1961> [accessed 20 December 2015].
[49] Ivi, p. 158.
[50] Ibid.
[51] Thanks to the activation of the limbic system, a complex set of structures primarily responsible for our emotions, the process evokes an agreeable sensation. See Vilayanur S. Ramachandran, William Hirstein, 'The Science of Art. A Neurological Theory of Aesthetic Experience', *Journal of Consciousness Studies*, 6 (1999), 15–51, <http://www.imprint.co.uk/rama/art.pdf> [accessed 20 December 2015].
[52] *Towards a Theory of Montage*.
[53] The exaggeration of such bodily traits by the artist overstimulates specific areas in the brain responsible for the 'peak shift' effect; i.e. the perception of essential elements (colours, forms and movements) that allow spectators to give the figures emotional significance. This process is heightened by the limbic system, which joins these elements in a unitary perception in order to achieve an aesthetically pleasing experience. See Ramachandran.
[54] Braun.

Fig. 1: *Choros* (Michael Langan and Terah Maher, 2011). The simultaneousness of the moving image of thirty-two Maher's figures and of the chronophotographic sequence.

Fig. 2: *Choros*. On the right the chronophotographic dissection of bodily gestures, on the left the still images of Maher's figures.

Fig. 3: *Choros*. Chronophotographic sequence reminding us of both Icarus (see *Mnemosyne,* panel 39, figure 1) and a peacock opening its tail.

Fig. 4: *Choros*. Chronophotographic sequence reminding us of Niobides's posture (see *Mnemosyne*, panel 5, figure 6).

Fig. 5: *Choros*. Chronophotographic sequence deforming Maher's traits reminding us the figure of a flying bird.

device and are asked to stroll through White Horse Hill, in Uffington. As soon as each participant steps forward, a dot, which represents the GPS coordinates, appears on a display which draws animated GPS tracks of the trajectory.

The aim of this work is to trace a human presence within a delineated public space and to use the data collected from the sensors to visualize both individual and collective movements via a representational system.

Wood's project allows the participants to map their course in physical space and to share their maps by means of GPS mobile devices: they can reformulate their physical space actively by using strolling movements, which reminds us of Benjamin's idea of *flânerie*.[55]

At the end of the walk, the succession of dots forms an undulating line merging into the still image of a continuous line graph, creating a false impression of continuous movement.

Wood's graphs are similar to Marey's first experiments, which produced only a *mise en ligne* of movements.

The locative projection is created by the expressive gestures of both the artist and the participants, which trigger the spectator's abstract representation of the participants' movements in a process of imitation.

The juxtaposition of dots side by side in Wood's undulated line going in different directions does, in fact, evoke the idea of human movements. The swedish psychologist Gunnar Johansson demonstrated that spectators shown only ten

---

[55] Benjamin, *The Arcades Project*, trans. by Howard Eiland and Kevin McLaughlin (Cambridge, MA: Harvard University Press, 1999), p. 442.

light dots moving against a dark background on a videotape were immediately able to identify the movement of the dots as those of a human being.[56] In Wood's progressively composed animated lines we can (mentally) visualize the strolling motion of a person, and we can associate human steps with flight in his sculptures. The overlapping lines in Wood's images are indirect evidence of the tracks of human body in movement, and are, therefore, time-images, which establish a direct relation to any-instants-whatever.

The animated lines depicted in Wood's graphs also represent visual motifs, as 'zig zag' or the silhouette of a snake, like the one in the above-mentioned *Laocoön* group, considered by Warburg to be a pure manifestation of energy. In fact, Warburg claimed that the most representative and universal form of movement is the serpentine form. Nevertheless, the aesthetic value of lines was recognized by artists such as Paolo Uccello during the Renaissance, and later emphasized by Cezanne, cubists and abstract painters, like Mondrian or Malevich, and kinetic artists, such as Calder.[57]

Wood also created GPS sculptures, representing the participants' bodily movements,[58] which give rise to an ancestral image resembling Marey's chronophotographic sequences and sculptures, such as the *Flight of seagulls* (Marey, 1886)[59] and reminding us of Calder's kinetic sculptures, e.g. *Mobiles*, which have the appearance of dots blown in different directions by the wind.[60]

As in *Choros*, the process of forming a unitary perception triggers an agreeable emotional state in the spectator. The process involves consciousness and cognition and further enhances the aesthetic experience.[61]

Warburg and other contemporary art historians, such as David Freedberg, and neuroscientists like Zeki, argued that the sense of movement is crucial to the spectator's emotional response.

In the 1880s, chronophotography was introduced as an experimental technique and produced engrams-like images representing the *dynamis* of movement in still image sequences consistent with Ėjzenštejn's idea of the organic and of pathos. Pathos lies in an appreciation of the details of expressive gesture, revealed by both the paradox of the immobility of the still images of movement and by the chronophotographic aesthetics of dissection. *Choros*'s visual echo ex-

[56] Gunnar Johansson, 'Visual Perception of Biological Motion and a Model for its Analysis', *Perception & Psychophysics*, 14.2, (1973), 201–11, quoted in Giese and Poggio.
[57] Neuroscience has confirmed that the line is essential to the brain's perception of movement, because its view overstimulates the area of the brain that responds to fast movements. Semir Zeki, *Inner Vision: an Exploration of Art and the Brain* (London, Oxford: Oxford University Press, 1999).
[58] Animated graphs and images of *White Horse Hill* project are available at: <http://www.gpsdrawing.com/gallery/maps/whh-model.htm> [accessed 20 December 2015].
[59] Marey's motion studies and images of seagulls' flight are available at <http://yin.arts.uci.edu/~studio/resources/175/marey.html> [accessed 20 December 2015].
[60] Images of Calder are available at <http://www.calder.org/work/by-category/household-object> [accessed 20 December 2015].
[61] Neuroaesthetic trials support this assumption. See Zeki and Ramachandran.

periment improves the visual potential of chronophotography: the overlapping gestures reveal that the *obraznost* effected by natural movement is etched and deeply imprinted in the brain, thus creating high (e)motional potential. Wood's *mise en ligne* of gestures leads us to awareness that we, as humans, can experience motion through an imitative process, which, as Ėjzenštejn claimed, lies at the basis of the ecstatic flow.

Finally, not only do the aforementioned artistic forms extend the limits of human perception, as in Structural Film, and allow gestural language to prevail, but the digital effects also strengthen the *dynamis* of the engram-like images in a more organic way when they are set in motion by giving a false impression of continuity. Cinema works in this way, as does the brain, when it forms a unitary perception of the image of movement. The analysis of the use of digital effects in these forms offers a deeper insight into how the 'movement-image' can represent gesture to improve its dynamic characteristics and emotional power.