

The Gendering of Movement

A comparative analysis of Eadweard Muybridge's and Étienne-Jules Marey's chronophotographic studies of the human body in relation to the tradition of the nude

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Abstract

Both Eadweard Muybridge's and Étienne-Jules Marey's chronophotographic studies of the human body were undertaken as a purportedly scientific means of analysing movement. The perceived objectivity of these embodied representations of movement was effectively upheld by the supposed impartiality instituted by the camera. In recent years, many scholars have offered alternative readings of these photographs. One key aspect often highlighted is the encoding of gender, particularly evident in Muybridge's chronophotographs. However, rather than addressing the subject of these photographs – namely, movement – scholars tend to analyse the gendering of the body itself. On the other hand, given that in Marey's chronophotographs the corporeal body itself vanishes into an abstract pattern, the question of gender has been altogether neglected. This thesis follows from such scholarship that challenges the presumed objectivity of such studies, arguing that both Muybridge and Marey's photographs evince the gendering of movement itself. By visually analysing these photographs in relation to the tradition of the nude, this comparative analysis highlights the way in which the gendered codes that historically informed artistic representations of the human body are echoed in the work of both chronophotographers. Moreover, it takes into account the circulation of the photographs within wider socio-cultural currents centered on the body in the late nineteenth century, and subsequently considers the broader historical ramifications of these projects. This thesis is therefore exemplary of revisionary approaches within the history of photography, and art historical scholarship more broadly.

In the second half of the nineteenth century, both scientists and artists increasingly sought to comprehend, and subsequently render visible, that which was imperceptible to the human eye – namely, movement. Eadweard Muybridge’s and Étienne-Jules Marey’s chronophotographic studies of the human body were at the forefront of such endeavours. While upon comparative analysis the technical and aesthetic points of divergence in their respective practices become apparent, one of the striking similarities between both Muybridge and Marey is the way in which their seemingly objective studies of movement were conditioned by gendered norms. While movement cannot inherently be conceived of as gendered, and despite the purported objectivity instituted by the camera, Muybridge and Marey’s embodied photographic representations of movement are nevertheless inextricably gendered. As Linda Williams argues, chronophotography was ‘less an impartial instrument than a crucial mechanism in the power established over that body.’¹ Situating these studies in relation to the tradition of the nude highlights the ways in which they both depart from, and conform to, the gendered codes that historically informed aesthetic representations of the human body according to a dichotomous valuation of masculinity and femininity.

After his initial 1877 success of empirically proving the ‘unsupported transit’ thesis, in 1884 Muybridge began to conduct an extensive series of photographic experiments in the study of movement under the auspices of the University of Pennsylvania. The collective results of this work were published in 1887 under the title *Human and Animal Locomotion* – a monumental work composed of 781 plates and 19,347 individual photographs.² While Muybridge recorded both human and animal subjects, approximately 340 of the plates feature nude men and women. His subjects would perform parallel to a battery of twelve cameras set on timers and spaced at even intervals, producing a sequential arrangement of separate frames

¹ Williams, “Film Body: An Implantation of Perversions,” 20

² Mozley, “Introduction to the Dover Edition,” vii

of movement. However, because each photograph was made by a different camera (in tandem with the moving subject), the subject and the camera seem to move in unison and thus effectively cancel out the sense of movement; the only aspects that change are the gestures of the subject.³ As such, although these photographs make visible the incremental gestures usually lost in the blur of continuous movement, movement is not really captured in the images; it is rather only inferred through the sequential ordering of the images.

In recent years, many scholars have highlighted the encoding of gender in these chronophotographic studies. As Shawn Michelle Smith argues, while enacted under the rubric of science, Muybridge's subjects are 'caught in a cultural web of anxieties and desires, not only about gender, but also race, class and sexuality.'⁴ This is initially evident in the representation of the movement of the champion athletic male body as the base standard against which all deviation would be judged. Such photographs were used as examples of a new paradigm of physicality, based on the image of the vigorous body that could withstand neurasthenia, or 'American nervousness,' developed through a modern system of physical education.⁵ However, this visual language of the 'idealised' male body harks back to classical art styles which informed the tradition of the male nude. As Abigail Solomon-Godeau writes, 'in establishing maleness as the emblem of (ideal) humanity, and relegating femaleness to the realms of alterity, difference, and corporeality (the body itself), classical art styles promote a dichotomy that affirms the equivalence of "Man" with "human."⁶ By asserting the superiority of the male, and consequently the secondary position of the female, the *Animal Locomotion* chronophotographs emphasise distinction based on gender – further emphasised by the covert

³ Braun, *Picturing Time*, 237

⁴ Smith, "The Space Between," 77

⁵ Braun, *Eadweard Muybridge*, 196

⁶ Solomon-Godeau, *Male Trouble*, 13

hierarchical organisation of the plates, influenced by secondary strains of Darwinian evolutionary theory, as well as the emergence of anthropometric photography.⁷

This dichotomy is not only rendered through representations of the exemplary virility of the male body. What is perhaps most striking about Muybridge's studies of the human body is the way in which the female body is actively differenced, relative to the male.⁸ Given that movement cannot inherently be conceived of as gendered, the gendering of movement would rather need to be extraneously signified. As Williams argues, the photographs evince a tendency to add superfluous detail which far exceeds the obvious anatomical difference between male and female to the women's movements – details which tend to mark her as more embedded within a socially prescribed system of objects and gestures than her male counterparts.⁹ For example, while both male and female bodies enact various forms of simple physical activity such as walking, running, and jumping, when women's bodies are put through a similar progression of activities, their movements tend to be feminised.¹⁰ For example, the sequence in *Plate 14* depicts a woman walking, yet she does so with her hand, rather coyly, held to her chin [Figure 1]. In the single instance in which a woman runs, *Plate 70*, she is again differentiated by the gesture of grasping her left breast with her right hand. Such superfluous details have no parallel in the male sequences [Figure 2].

This differencing is also evident in the more complex sequences of activity. While the physical activity completed by the male models includes throwing and catching, kicking, boxing and wrestling, in many instances women are engaged in comparatively novel, often domestic, activities such as pouring water over each other or rather depicted in comparatively

⁷ Gordon, *Indecent Exposures*, 68

⁸ Linda Williams argues that the perceived lack of women's visible sexual difference incites a need to suppress the threat of castration her body poses for a male viewer. See Williams, "Film Body: An Implantation of Perversion."

⁹ Williams, "Film Body: An Implantation of Perversion," 24

¹⁰ *Ibid.*

passive sitting or kneeling poses. Moreover, while male models employ props in order to facilitate different kinetic activities, female models, on the other hand, perform comparatively arbitrary, often domestic, forms of movement involving props such as a broom, bucket or pitcher, suggestive of domestic chores. The props associated with women's bodies are never just devices used to elicit movement, but rather serve to invest her body with a gendered surplus of meaning. In this way, the gendered movement of the female models is performatively constituted in front of the camera as a means of distinguishing their movements against the dominant male body.¹¹

Muybridge's photographs also deviate from their purportedly scientific aims, as highlighted by Janine A. Mileaf, in the way that the scenarios staged by female models were scripted according to the codified gestures of academic art.¹² In her analysis of *Plates 427, 428 and 429* [Figure 3, 4, 5], each entitled *Woman Disrobing Another*, Mileaf highlights the similarity between Muybridge's photographs and the *Venus Pudica*, or *Venus of Modesty* – a classical female nude. In each photographic sequence, one female model undresses another by unravelling a transparent toga-like costume from around her body. As her costume unravels, the model hides her face behind her raised arm, and lower the other arm in front her pubic region. This representation is characteristic of the objectified passivity of the female nude – she exists simply to be looked at, as an object of desire.¹³ Mileaf elaborates upon this reading in relation to the work of the French academician, Jean-Léon Gérôme, who often portrayed the motif of a woman being disrobed in front of a male audience and subsequently adopting the gesture of the *Venus Pudica*, such as *Phryne before the Areopagus* (1861)

¹¹ As Judith Butler defines, 'Gender is the repeated stylization of the body, a set of repeated acts within a highly regulatory frame.' See Butler, *Gender Trouble*, 43

¹² Mileaf, "Poses for the Camera," 45

¹³ Walters, *The Nude Male*, 8

[Figure 6]. As she stands before a panel of judges, her clothes ripped from her body by Hyperides, Phryne assumes the Venus Pudica pose.

However, although Muybridge's photographs immediately appear to reproduce such conventions they also contradict them – bearing more resemblance to the Realist movement, in which artists came to rely less on convention and idealised subject matter and more on direct observation.¹⁴ Moreover, Muybridge's sequential representations of the female body in an intermediate level of undress draws attention to the very *act* of disrobing. In doing so, these photographs contradict the rhetoric of the female nude, according to which, as John Berger argues, 'men act and women appear.'¹⁵ Muybridge's sequential photographs contain time and its experience,¹⁶ visualising the consecutive stages leading up to, and away from, the moment of total disclosure. In this way they are suggestive of a process, rather than a static state of appearance. In contrast to painting, in which the act of undressing could only be implied, Muybridge's photographs emphasise the woman's nakedness as the sequential frames literally capture the act of disrobing. On the contrary, Gérôme's depiction of Phryne transcends this act of disrobing, instead fixing the moment of complete disclosure in the pose of the Venus Pudica.

This emphasis on nakedness is also evident in the striking resemblance between the first frame of Muybridge's *Plate 493* and the last frame of *Plate 498* and Thomas Eakins's painting, *William Rush Carving His Allegorical Figure of the Schuylkill River* (1877) [Figure 7, 8, 9]. In Muybridge's photographs, a naked woman is captured in the act of getting dressed, her clothing laid strewn over a chair. Similar undressing scenes are staged in *Plate 430* and *431* [Figure 10, 11], each entitled *Taking Off Clothing*, in which a woman removes

¹⁴ Gordon, *Indecent Exposures*, 41

¹⁵ Berger, *Ways of Seeing*, 47

¹⁶ *Ibid.*, 61

her drops her dress until she is completely naked. In the foreground of Eakins's painting, a nude model poses in contrapposto atop a small pedestal. The cast of light highlights the curves and imperfections of her body. To her left, the model's clothes lie strewn on a chair. The presence of the model's clothing on the chair explicitly alluded to the very act of disrobing that had preceded the painting, deeming it unacceptable.¹⁷ Of the presence of the clothes cast carelessly over the chair, a *New York Times* critic wrote, 'This gives the shock which makes one think about the nudity – and at once the picture becomes improper!'¹⁸ Even more so than in painting, Muybridge's chronophotographs, placed outside the boundaries of the contained, idealised nude, threatened to invite sexual fantasy. Given that nineteenth-century obscenity legislation took the criterion of stasis for its definition of an acceptable display of the naked female body, Muybridge's serial recording of motion heightened the threat of obscenity in an entirely new way.¹⁹ As Lynda Nead writes, if the 'purity of the female body depends upon stasis . . . then movement begins to toy with the possibilities of obscenity.'²⁰ In this way, Muybridge's sequential representations of the female body can be seen to depart from the tradition of the nude which was necessarily dependent upon the passive stasis of the female figure. Therefore, although Muybridge's purported subject, motion itself, is often considered entirely absent in his photographs of women,²¹ these particular instances rather evince the gendering of movement itself.

Although the work of Muybridge and Marey is often conflated, upon analysis, Muybridge's 'scientific-looking,' yet effectively realist photographs can easily be distinguished against Marey's scientific rigour. As Braun suggests, 'compared with Muybridge's *Animal Locomotion*, Marey's studies are everything that Muybridge's are not:

¹⁷ Ibid., 83 – 84

¹⁸ Quoted in Gordon, *Indecent Exposures*, 84, f/n 25

¹⁹ Ibid., 86

²⁰ Nead, *The Female Nude*, 85

²¹ Smith, "The Space Between," 77

disinterested, accurate, analytic and systematic.’²² However, while Muybridge’s representations of the human body were filled with an excess of narrative detail that Marey sought to eliminate, although perhaps in a more implicit manner, Marey’s photographs evince the same gendering of movement as in Muybridge’s photographs. Marey conceived of the body as an aggregate of information from which knowledge could be retrieved, and therefore sought not to represent the body, but to discover the laws that governed it.²³

After coming into contact with the work of Muybridge, Marey replaced his early indexical graphic inscriptions with photography, subsequently developing his own chronophotographic technique. His invention of a chronophotographic gun with a revolving cylinder capable of shooting twelve frames per second enabled him to register the successive positions a subject occupied within a single frame [Figure 12]. These images not only departed from Muybridge’s separately framed images, but also disrupted the foundations of Western representation. As Braun notes,

‘Since the advent of linear perspective in the Renaissance, the frame of an image has been understood to enclose a temporal and spatial unity . . . Marey’s photographs shattered that unity; viewers now had to unravel the successive parts of the work in order to understand that they were looking not at several men moving in single file, but at a single figure successively occupying a series of positions in space.’²⁴

This shift away from the spatial and temporal conventions of ordinary perception would result in a pictorial language of simultaneity that was emblematic of the indivisible flux of modernity, evident in Marcel Duchamp’s fractured representation of the body in *Nude Descending a Staircase* (1912) [Figure 13].

²² Braun, *Picturing Time*, 254

²³ Doane, *The Emergence of Cinematic Time*, 54

²⁴ Braun, *Picturing Time*, 66

However, while the chronophotographic technique enabled the representation of time through movement – the correlation of space and time as a body successively changes its position – the legibility of such representations were impaired by Marey’s desire to decrease the intervals between the successive positions of the subject.²⁵ The overcrowding of detail in the photographic method meant that figures overlapped and outlines became indistinct [Figure 14]. In order to resolve this, Marey excised details from the image by clothing his subjects completely in black, with luminous white dots on their joints, connected by lines, and photographing them against a black background [Figure 15]. The result was a geometric chronophotographic image, in which the integrality of the body, in its qualitative, corporeal embodiment, vanishes into a repetitive pattern of lines and points – an abstract image which effectively mimicked the graphic method [Figure 16, 17].²⁶ Such schematic renderings of the human body bear no resemblance to traditional representations of the nude, given that the figure itself is effectively erased. Moreover, as well as being fundamentally different to those depictions of the human body produced by Muybridge, Marey’s images but also completely contradicted the realistic nature of the photographic medium. Rather than a descriptive representation of the body, through chronophotography Marey sought to decompose, and subsequently rationalise, the body’s movements.

As Anson Rabinbach has highlighted, simply making visible the relationship between time and space was arguably not the most important feature of Marey’s work. Rather, his interest in producing these motion studies was ‘decisively productivist,’ and intended to have practical application in the field of modern ergonomics.²⁷ Marey sought to discover the ‘langue inconnue’²⁸ of the body’s forces by analysing the external conditions that impact

²⁵ Doane, *The Emergence of Cinematic Time*, 46

²⁶ *Ibid.*, 54

²⁷ Rabinbach, “Time and Motion,” 92 – 93

²⁸ *Ibid.*, 93

upon movement, in order that one's energies could be deployed in the most efficient way possible.²⁹ In this way, Marey's chronophotographic depictions of the human body depart from the ideological conception of ideal beauty that informed the tradition of the nude, displacing notions of the ideal body that were based on exemplary musculature and harmonious proportions. In the context of an increasingly industrialised society, this new image of ideal physical vigour was instead understood to be found in superb physiology, defined as a matter of efficiency and resistance to fatigue.³⁰

Thus, Marey's studies of the human body were heavily influenced by the increasing realisation of the body's physical limits. In particular, his studies were central to the national project of physical reform initiated in the aftermath of the French defeat in the Franco-Prussian war in response to the perceived decline in the physical and moral vitality of the French nation, but also deep anxieties about the virility of the French male body.³¹ During this time Marey began working with the assistance of George Demeny, a key figure in the movement who saw physical education as a means of national regeneration, at the Collège de France.³² That the solution to this crisis was initially conceived of in relation to the reform of national discipline indicates the way that ideas of masculinity implicitly permeated throughout this project. Although Marey's visual representations of the human body were rather androgynous, mechanomorphic forms, the latent gendering of these otherwise abstract photographic images is evident in the fact that these photographs exclusively capture the performance of the male body. The absence of the female body further suggests that Marey's ergonomic representation of the human body, optimised for efficiency and protected against fatigue, was masculinised.

²⁹ Ibid., 116

³⁰ Rabinbach, "The Body without Fatigue," 46

³¹ Braun, *Picturing Time*, 67

³² Ibid.

The perceived degeneracy of fin de siècle France also coincided with concerns related to the nemesis of fatigue. Fatigue was considered a threat not only to the individual, but to the future of the industrialised nation as a whole. The search for a means to combat fatigue through increasing the endurance and fortitude of the citizen therefore became of vital interest to both science and the state.³³ However, while fatigue was a widespread problem within modern society, a distinctive characteristic of the illness was that it was most commonly experienced by men involved in occupations demanding an unflagging devotion to the task, or a high degree of emotional pressure.³⁴ This evidence suggests the implicit gendering of fatigue which would become deeply embedded in the pathologies of the ‘labouring body,’ as well as characterising Marey’s own search for quantifiable determinations of the human body. Thus, Marey’s chronophotographs not only rationalised the body’s movements, but also enabled the effective gendering of movement. As in Muybridge’s covert dichotomy that affirms the equivalence of ‘Man’ with ‘human,’ for Marey, the male body also serves to define standards, according to which the female body is necessarily inferred as ‘other.’³⁵

Muybridge’s and Marey’s chronophotographic studies of the human body are exemplary of the way in which ‘modernity produced its own image of the gendered body.’³⁶ As demonstrated in relation to the tradition of the nude, in Muybridge’s photographs the gendering of movement is effectively performed, whereas in Marey’s images the gendering of movement is rather conceptually inferred through the circulation of the photograph in wider socio-cultural currents centered on the human body. The way in which these embodied representations of movement legitimate pre-existing gender norms highlights the very way in

³³ Ibid., 68

³⁴ Rabinbach, “The Body without Fatigue,” 51

³⁵ Marchessault, “Men in White, Women in Aprons,” 317

³⁶ Garb, *Bodies of Modernity*, 11

which photography was instrumental to reaffirming the body as an object of knowledge and an element in the relations of power.³⁷ As Elspeth Brown writes, gender is not ontologically given, but is rather a category articulated and contested in the realm of culture in relation to human bodies whose gender specificity becomes knowable, in part, through visual representation.³⁸

³⁷ Foucault, *The History of Sexuality*, 107

³⁸ Brown, "Racialising the Virile Body," 631

Illustrations

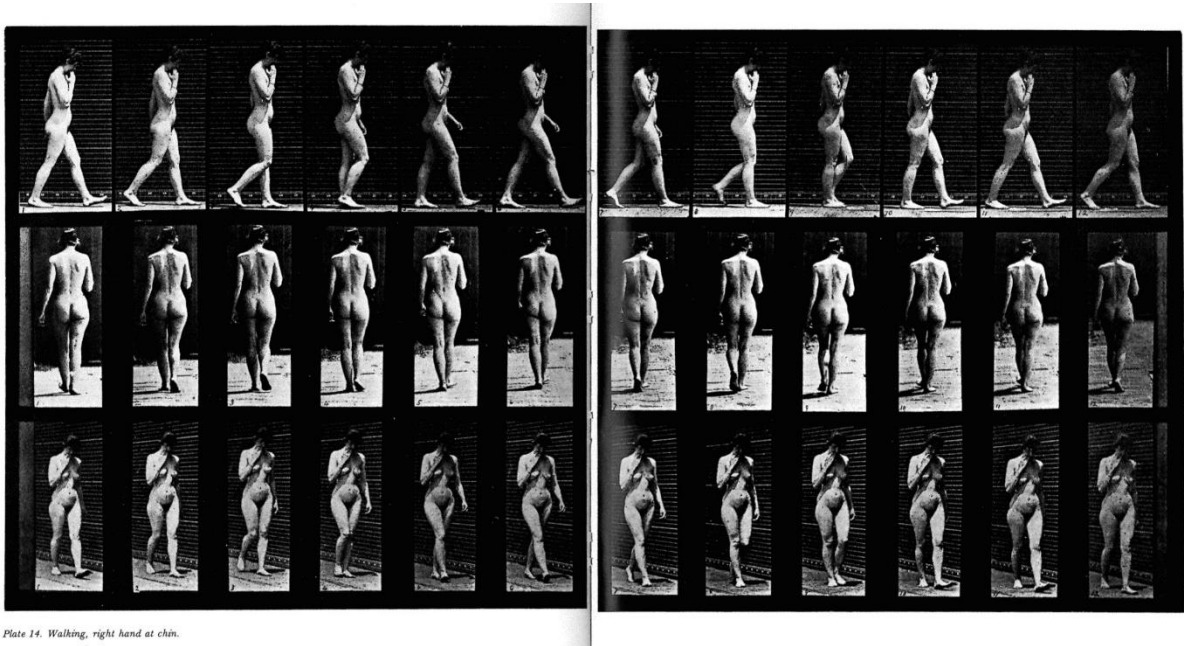


Plate 14. Walking, right hand at chin.

Figure 1. Muybridge, *Plate 14, Walking*, 1884-1887.

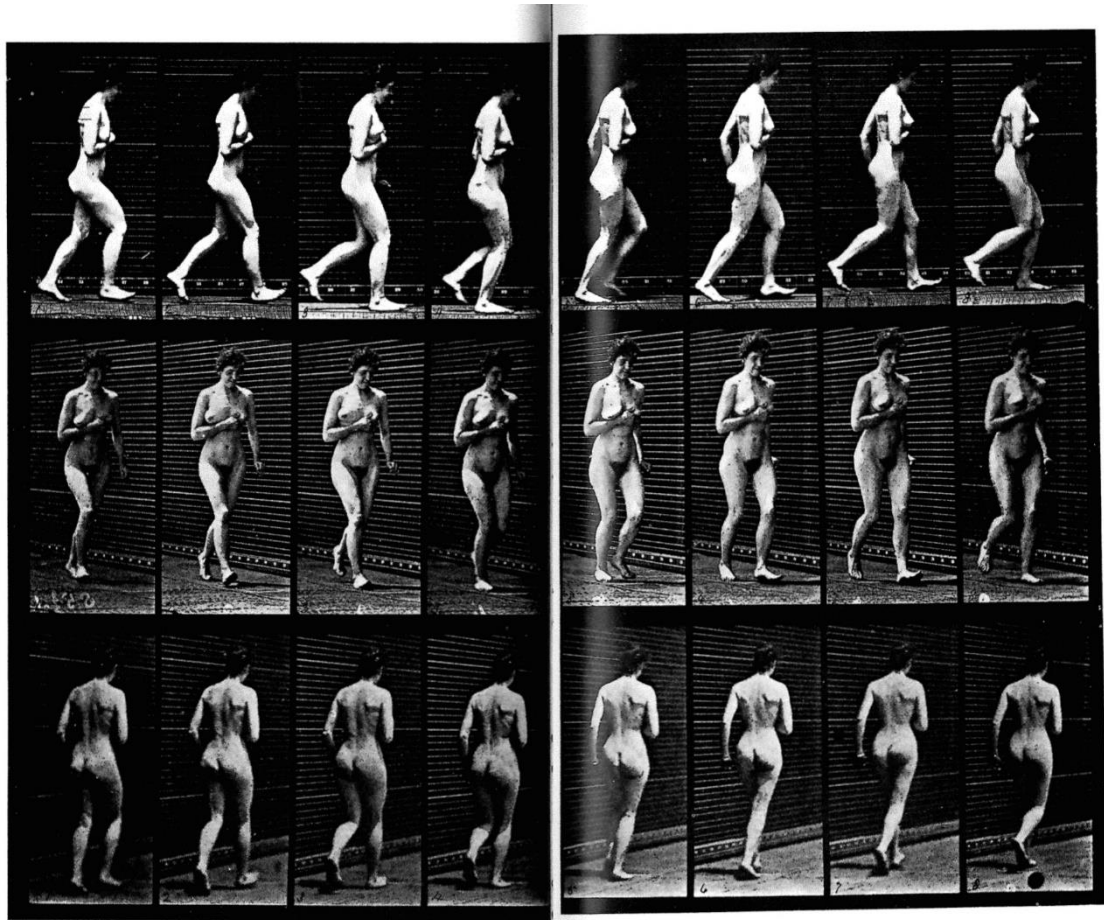
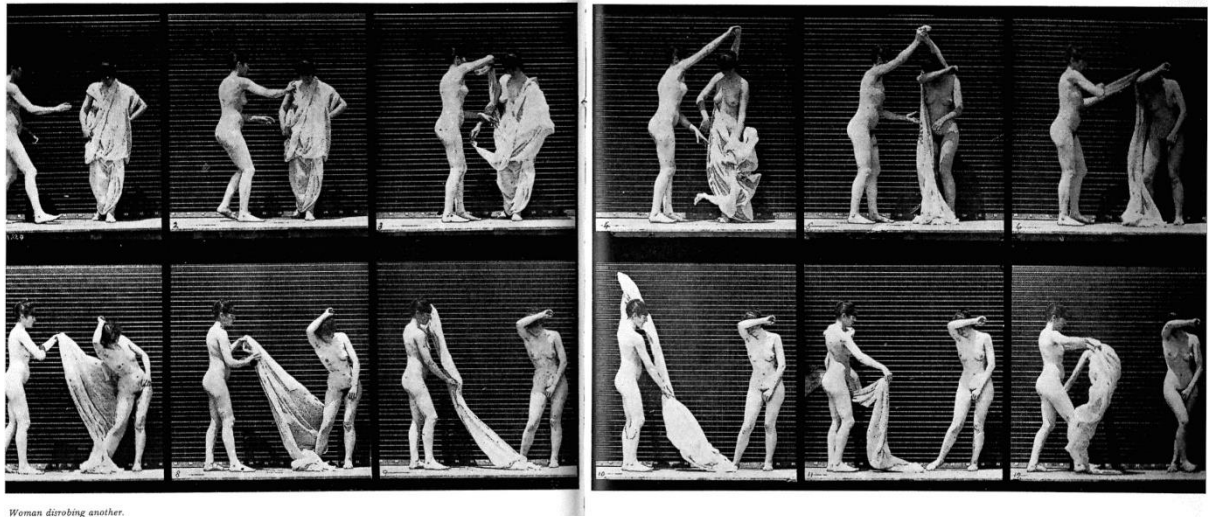


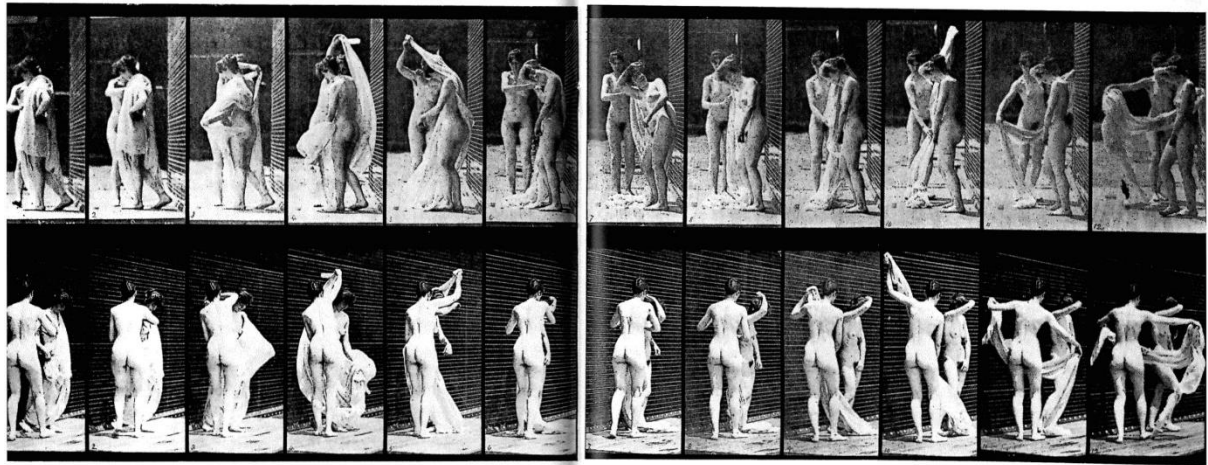
Plate 70. Running.

Figure 2. Muybridge, *Plate 70, Running*, 1884-1887.



Woman disrobing another.

Figure 3. Muybridge, *Plate 427, Woman Disrobing Another*, 1884-1887.



428. Woman disrobing another.

Figure 4. Muybridge, *Plate 428, Woman Disrobing Another*, 1884-1887.

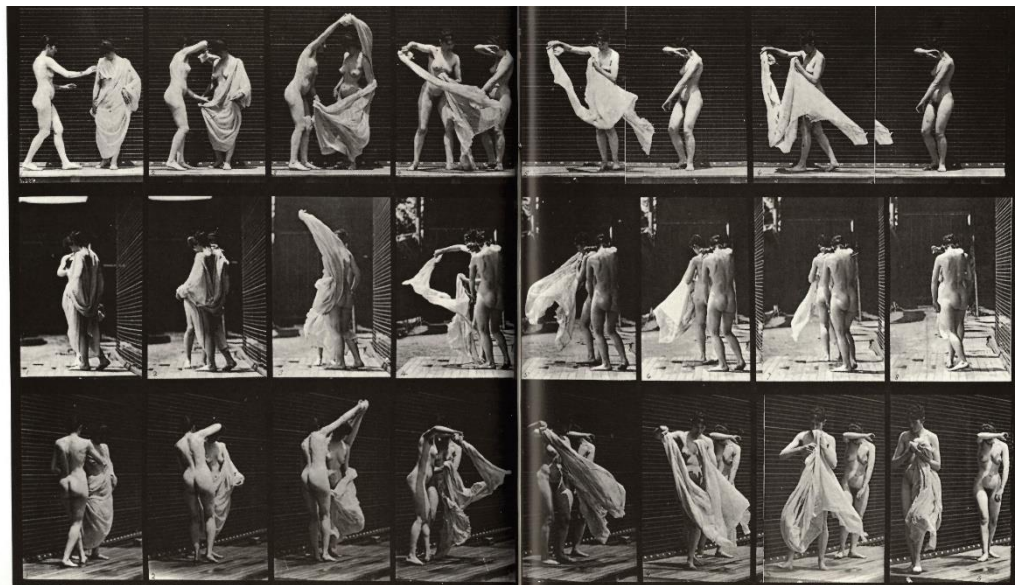


Plate 429. Woman disrobing another.

Figure 5. Muybridge, *Plate 429, Woman Disrobing Another*, 1884-1887.



Figure 6. Gérôme, *Phryne before the Areopagus*, 1861



Plate 493. Miscellaneous phases of the toilet.

Figure 7. Muybridge, *Plate 493, Miscellaneous Phases of the Toilet*, 1884-1887.

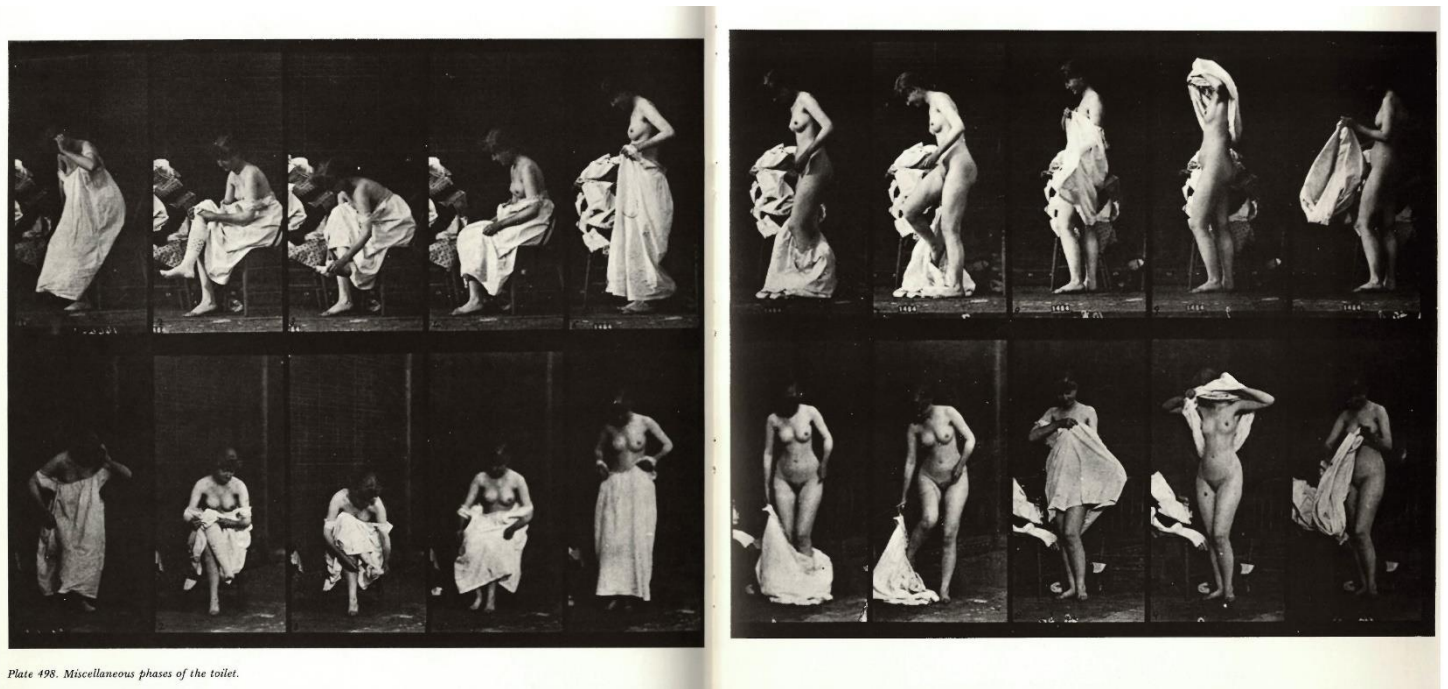


Plate 498. Miscellaneous phases of the toilet.

Figure 8. Muybridge, *Plate 498, Miscellaneous Phases of the Toilet*, 1884-1887



Figure 9. Eakins, *William Rush Carving His Allegorical Figure of the Schuylkill River* (1877)

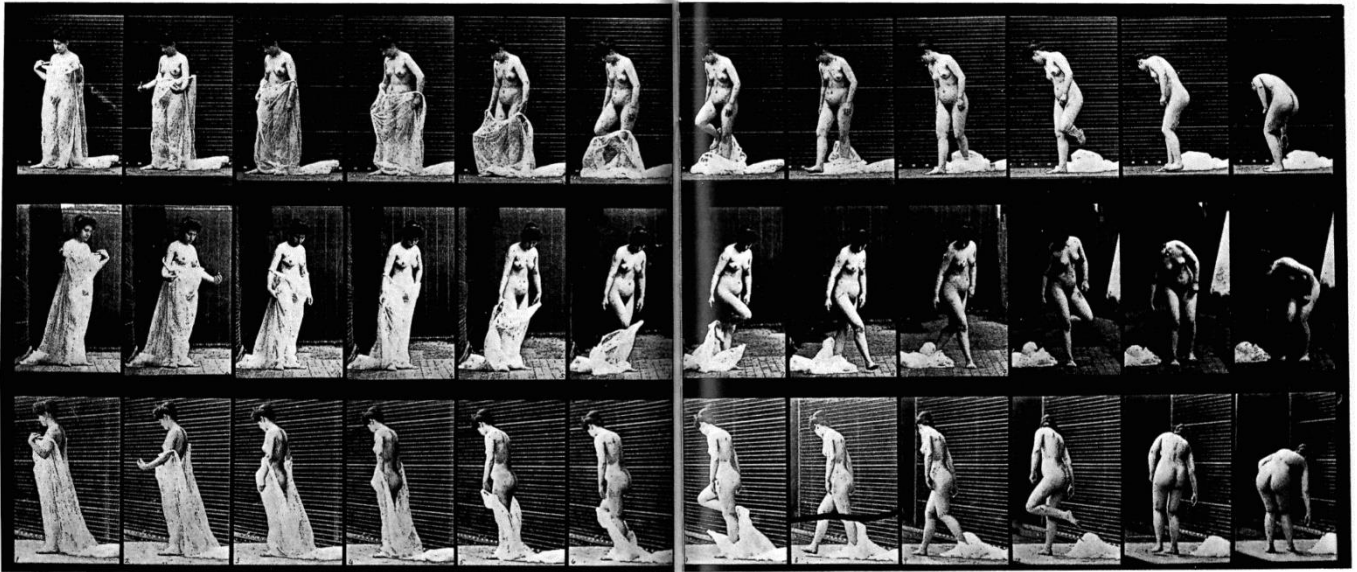


Plate 430. Taking off clothing.

Figure 10. Muybridge, *Plate 430, Taking Off Clothing*, 1884-1887



Plate 431. Taking off clothing.

Figure 11. Muybridge, *Plate 431, Taking Off Clothing*, 1884-1887

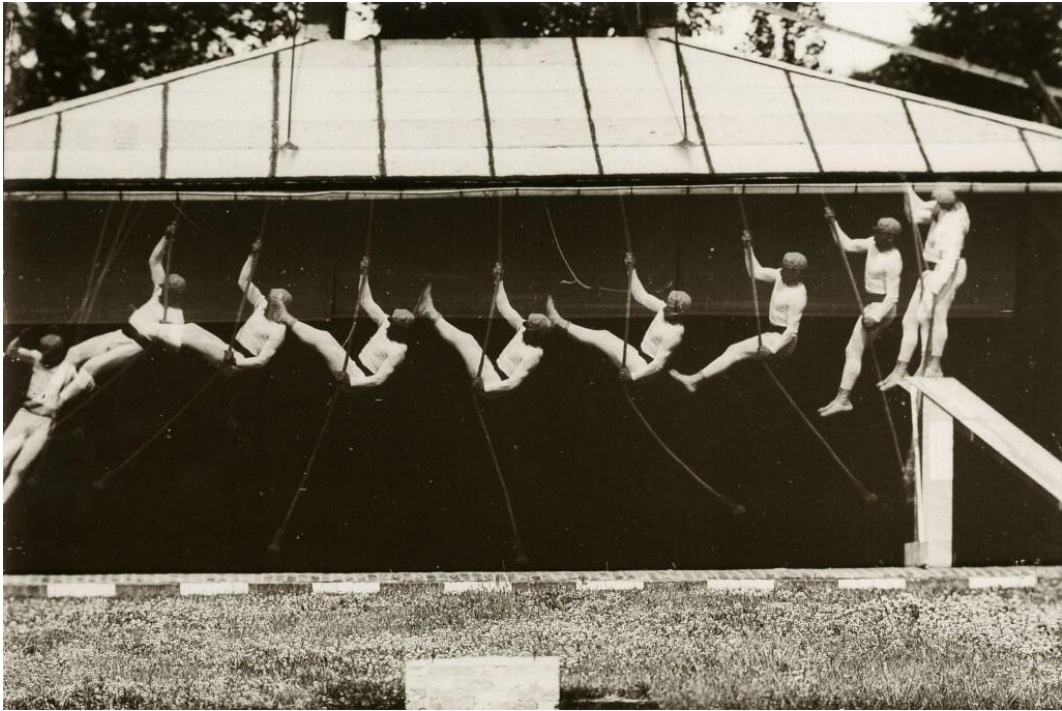


Figure 12. Marey, *Water Jump*, 1890.



Figure 13. Duchamp, *Nude Descending a Staircase*, 1912

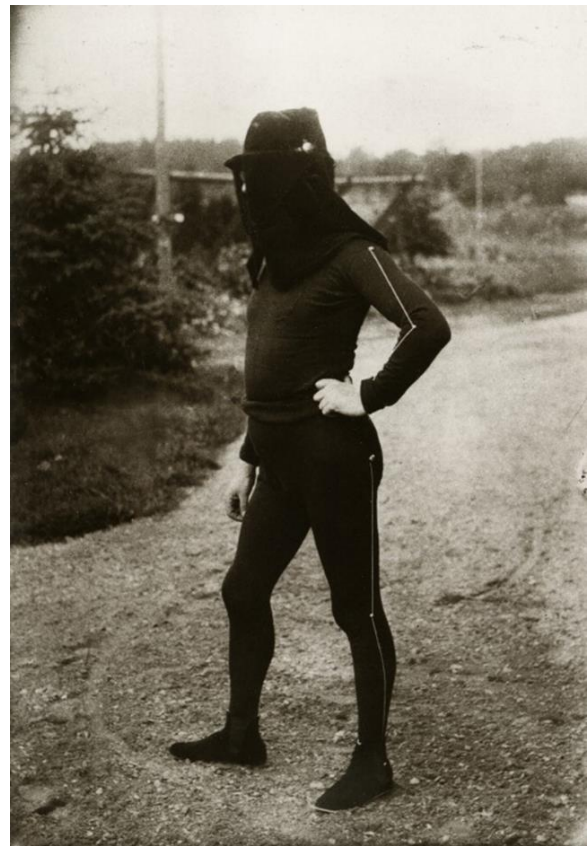


Figure 15. Marey, *Subject dressed in black with white lines and dots for chronophotography*, c. 1883.

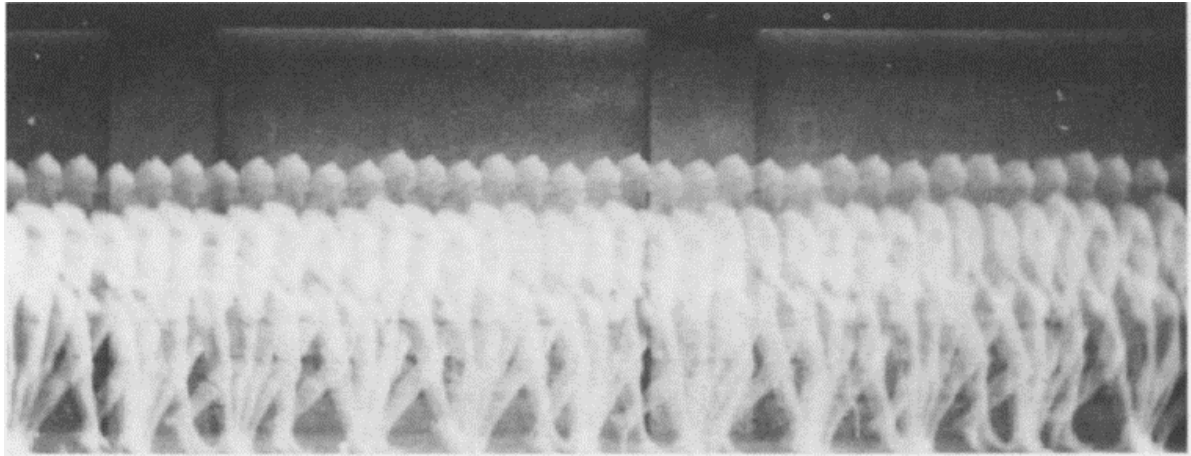


Figure 14. Marey, *Demeny Walking*, 1883

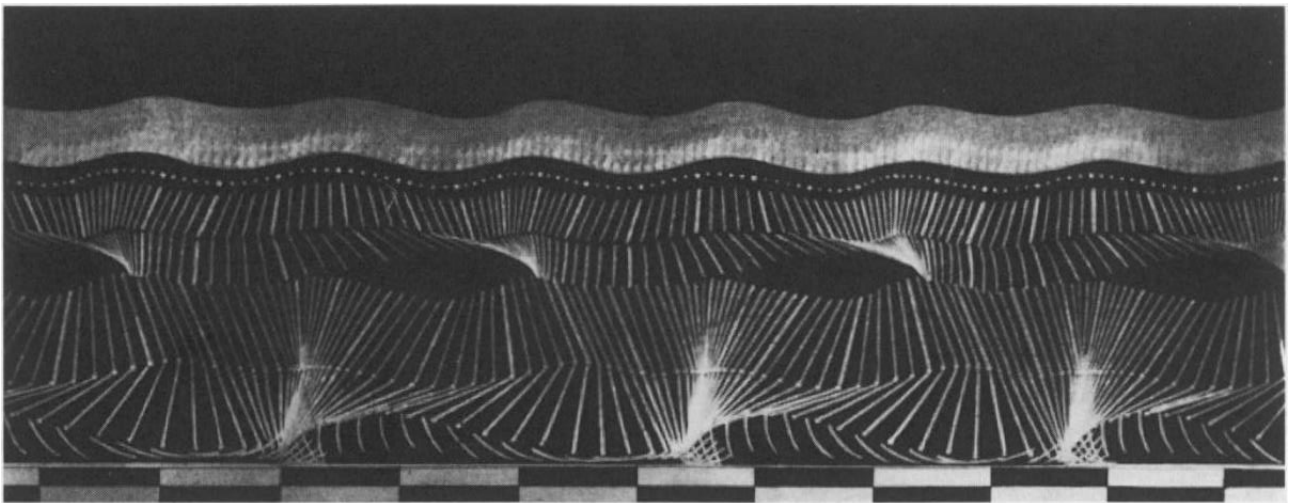


Figure 16. Marey, *Joinville Soldier Walking*, 1883

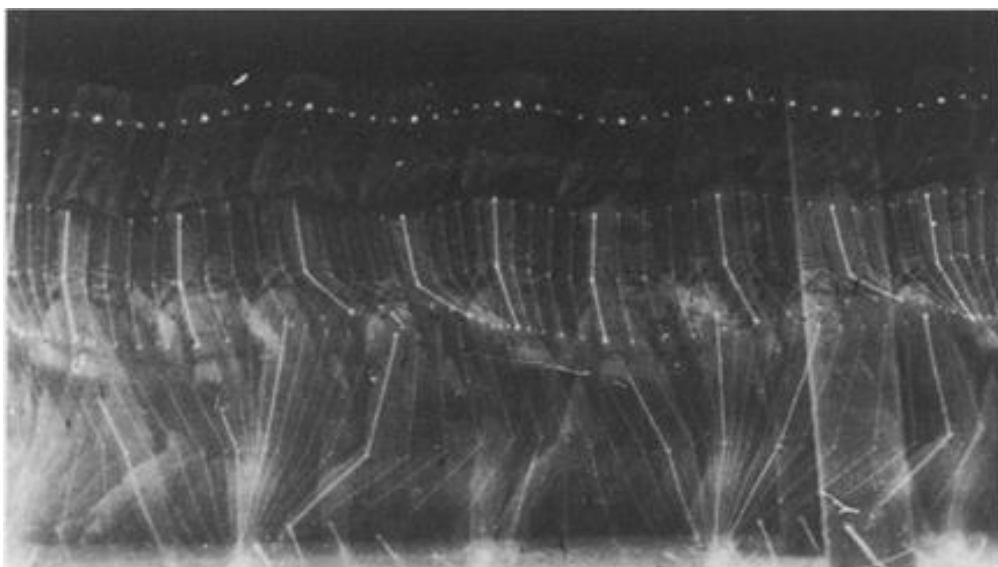


Figure 17. Marey, *Morin, Walk*, 1886

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