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Motion Perception in Movies and Painting: Towards a New Kinetic Art

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Julian Hochberg and Virginia Brooks argue in "Movies in the Mind's Eye" that the apparent movement of motion pictures should be understood as a mental process described by cognitive theory and gestalt psychology. This argument is a reconfiguration of the traditional, physiological model that makes the motion an effect of ocular physiology. In place of this model, they propose that the movement we see when watching a movie -- whether in the form of a film or a video tape -- is more than simply the illusion of motion: it is perceptually as *real* as any other visual motion we perceive. The difference between this motion and other motion resides in its empirical status independent of observation, not in our subjective perception. Their transformation of the conceptualization of "motion pictures" has implications for our understanding of motion in painting. So-called "painterly motion" is historically one of the most important effects employed in old master paintings (and developed in the Modernist period by Cubism and some of its derivatives). Hochberg and Brook's theory about a cognitive basis for film motion is applicable to any form of virtual movement. It provides an account of why we can see "painterly motion." This theory implies a connection between painterly motion and movies that has implications for understanding "avant-garde" film and video. It also suggests a type of kinetic art heretofore unknown.

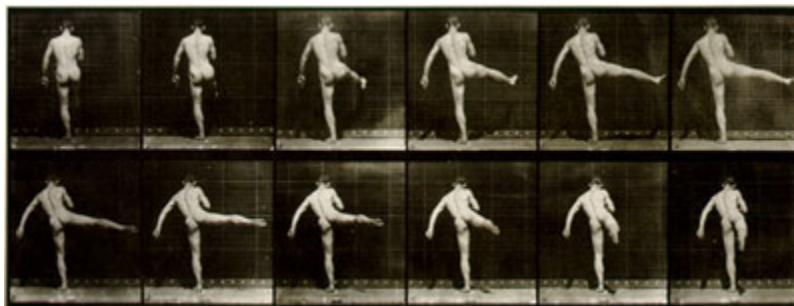
Julian Hochberg and Virginia Brooks' discussion of Gestalt theory and the perception of motion in movies begins with a simple observation about the nature of the medium. Their description is the empirical stillness at the foundation of the virtual motion created by movies. This motion is fundamentally different (when considered as a still image) from that of the old master painting. However, it is not the means-to-motion but the cognitive process of human interpretation that Hochberg and Brooks believe is the important factor:

A continuous motion in the world is, of course, captured by successive displayed images on film (or their video equivalent). For most events, these displacements are small, and within the range of the low-level sensory receptors of the visual system; these respond identically to the visual displacements on the screen and to the differences provided from one moment to the next by smooth physical motion in the world. [1]

Gestalt theory claims human perception treats all visual phenomena encountered in the same way. Those visual displacements which we see in film are interpreted without distinguishing their empirical causes. This approach to movies emphasizes the linkages between motion pictures and optical illusions: both are a result of our perceptions incorrectly interpreting their sense-data. The "principle" created by Gestalt psychologist Helmholtz to describe this interpretative tendency is the *likelihood principle*. It is a description that implies a perceptual commonality at the heart of all perceptual interpretations:

we perceive that which would in our normal life most likely have produced the effective stimulation we have received. [2]

Unlike motion in the real world which is physically emmanent, the motion of movies and in the technique of painterly motion is entirely a result of a human perception. The motion we see does not exist except within our perception. The 'likelihood principle' is an explanation of how we interpret. What we see results from an internal comparison between immediate sense experience and prior knowledge. We see motion in both these cases because we understand what we see in terms of encounters with real, empirically emmanent motion. Our perceptual understanding of virtual motion derives from encounters with reality, thus Hochberg and Brooks' argue, it is real in *perceptual* terms. The motion we see exists in the same way as any other visible motion. This essay will develop the connection between painterly motion and perception before examining some implications of this relationship. The overlap between the motion of movies and the motion of painting is necessary for this theory to be logically consistent.



[Eadweard Muybridge, *Animal Locomotion*]

Painterly motion as a technical phenomenon requires some explanation. The painted image has possibilities that photography lacks. The photograph is static, as Eadweard Muybridge's photographic motion studies demonstrate by isolating motion into a series of stills where we can see the component adjustments of a figure. Each person or an animal shows us the increments of motion as units in themselves. These pictures "arrest" the figure imaged, presenting a single moment from all possible moments of the subject in motion. The motion, however, is absent, in the form of possible not-yet-visible action. Taken as a whole, they present us with an idea of the motion; when shown quickly and in proper sequence, the motion becomes apparent rather than potential. The relationship between the motion of movies and the *likelihood principle* is obvious: the movement created by showing the sequence of photographs imitates our normal experience of the world well enough that we interpret it in the same fashion as our normal experience. This is "photographic motion."



[Rubens, *Helene Fourment in a Fur Coat*]

By contrast, "painterly motion," which is a technical effect common to "old master" paintings of the European painterly tradition, presents a single image that incorporates some of the same characteristics as the entire series of photographs employed in "photographic motion." The movement we see in Peter Paul Rubens' portrait of his wife wearing a fur wrap is a example of this effect made famous by critic John Berger's commentary in *Ways of Seeing*:

[Helene Fourment's] appearance has been literally recast by the painter's subjectivity. Beneath the fur that she holds across herself, the upper part of her body and her legs can never meet. There is a displacement sideways of about nine inches: her thighs, in order to join onto her are at least nine inches too far to the left. [3]

Displacement causes Helene to appear (depending on the interpretation) to be turning away from or towards the viewer. The apparent motion of her upper body is caused by a specific distortion: as the eye moves across this image the human mind fits the different positions of her body together to form a coherent whole. This process creates the impression she is moving. Her motion is caused by the series of different views showing distinct physical positions. Because we see her from a single vantage-point our minds combine them to form a single body. This effect is identified by Helmholtz as the *likelihood principle*. In order for us, as viewers, to make sense of the image as a whole body -- a "good gestalt" -- we interpret Helene's displacements and distortion as motion.

This appearance of motion is an intentional construction, created by a specific technical process that Rubens (and other old masters) learned. It is not a mistake. The "stillness" which this painting presents is a lively one, completely different from the static, arrested movement of the photograph. This is a complex technical development that evolves from life-drawing and work from living models. It must be planned and built-in to the picture and could not happen accidentally or unconsciously. Yet, Berger makes the assumption that this effect was not intentional:

Rubens probably did not plan this: the spectator may not consciously notice it. [4]

To assume that a master painter with several decades of experience painting the human form is unaware of a discrepancy in a painting of his *wife* is difficult to believe. The reason that many viewers may not consciously notice it is they are not supposed to notice it. The fur wrap which covers her body also hides the displacement from immediate observation. Her movement and what it means is the focus of the painting: Helene, teasingly, turns towards and away from the viewer; the possible revelation of her whole body is the subject of the painting. The displacement is what produces the force of the movement, a dynamism that Berger notes [5] even as he denies the artist's knowledge of what, how, and why Rubens may have produced this image. To deny the intentionality of this movement is to deny the humanity of the artist, his interest in the subject of his painting, and the relationship that picture proposes for the viewer. It dehumanizes and formalizes what is not a formalist painting.

Berger's assumption also reduces the importance of Rubens' training and the European tradition to mere accident. It repeats the popular assumption that artists are unintellectual actors who perform and produce in an unconscious manner. Critics are more than simply the explicators of art in this formulation. They are the conscious observers of those things of which the artist is unaware. This case is an ironic situation because Berger is unaware or ignores his knowledge of the process involved in producing a painting of this type: the number of studies, drawings and the amount of work required to make the painting itself. Nothing in such a painting should be regarded as accidental or unplanned. Her movement is a technical effect that must remain technically invisible. It is the difference between a painting of Rubens' period and a Modernist painting where the technical devices and effects tend to be readily apparent. Viewers and critics shouldn't notice *how* the effects are produced in art of this type. To do so breaks the illusion that the painting's meaning depends upon.

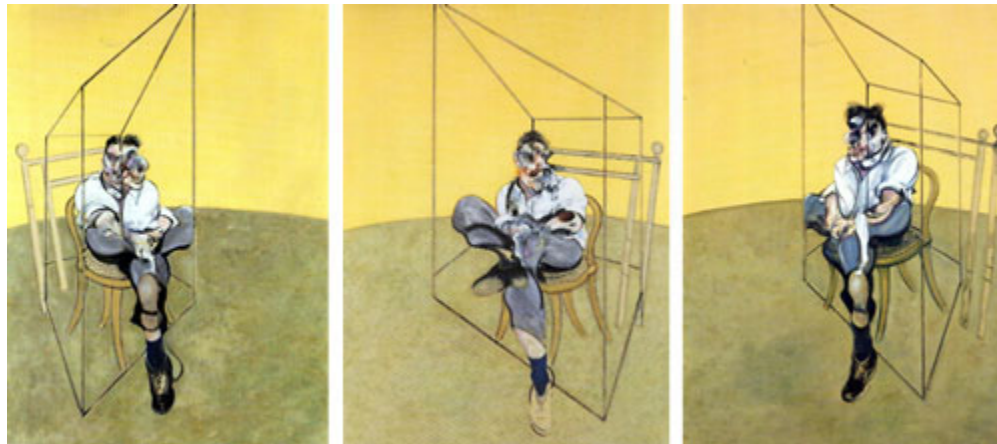
The appearance of motion within this image is a result of the viewer interpreting the different positions of Helene's body to be markers of movement through time. This perception follows from the likelihood principle. The movements are interpreted from "signs" she has *moved* slightly while the spectator was looking. This is what makes painting active in a way that never "happens" in (normal) photography. The different and incompatible body positions are treated as motion and appear to be movement because our interpretations work to maintain a coherent gestalt. Art historian and gestalt psychologist Rudolph Arnheim explains this effect in greater detail:

Happenings enter experience only when the passing of clock time is accompanied by the perception of change. Change presupposes that the differential of clock time encompasses more than one location in space. [6]

Arnheim suggests that our normal perceptions present things to us as "events"—actions, movement—only when what we are looking at involves changes over time. Otherwise, we believe what we see is a static reverie. Photographs "arrest" motion in a single consistent and complete "frame." This is why photographs are completely (and fundamentally) different than our perceptions. Arnheim's observation is not simply a commonplace: it states that our perceptions have developed to involve our memory as part of the perceptual process. The likelihood principle suggests we understand the contorted (in fact, distorted) bodies of "classical" realist paintings as bodies in limited motion.

A more contemporary version of painterly motion is the work of Francis Bacon. Here the

distortions of painterly motion are taken to an extreme and revealed to the spectator in a distinctly Modernist fashion. These paintings explicitly develop the dislocated bodies and the fragmentation of Cubism. The simplification of space in *Three Studies of Lucien Freud*, (1969) is a necessary and typical element of all his images. With a more complex elaborated environment, the bodies would become more specifically disfigured rather than contorted by painterly motion being stretched towards its limit.



[Francis Bacon *Three Studies of Lucien Freud*, 1969]
[permission to reproduce granted by the Estate of Francis Bacon]

These three panels all depict the same figure; Lucien, sitting on a stool in an undefined yellow room. In each panel he is crossing or uncrossing his legs, but the motion presented here is abrupt, even startling. The movements in the central panel are typical of all three: Lucien's hands are folded in his lap, but the left forearm pulls both up and down; his face is both full frontal (the right eye and forehead) and turned to the left, giving a profile while his head is moving to the right. In the case of his legs, the right leg shows us the sole of the shoe, but the pants leg is painted from a vertical point of view, while the knee presents a view looking up. It is an awkward movement that cannot reach a position of rest. Lucien's left leg points straight down, but the angle is impossible vertical (almost as if seen from a position parallel to the shin) while the thigh is seen almost from below. The torso is positioned as it normally would be seated in a straight-back chair, allowing the legs and head to rotate around it as limbs on a stationary pillar. This series of views when taken *in toto* present a vision of the sitter squirming in his chair, unable to rest or remain in a position for more than a moment. It is precisely this sense of movement that this painting portrays in each of the three panels. One can almost hear Lucien complaining about how long it's taking and how uncomfortable the chair is.

Francis Bacon creates this painterly motion through extreme deformations not only of body position (no one could physically hold the position Lucien is in) but also of the spectator's viewing angle. Both the subject Lucien and the observer must be in motion to produce this kind of effect in reality: it is as if a series of different positions were used to produce a single image. These changes are so extreme that the viewer cannot ignore the "montaging" of different views of this body. This is an exaggeration and emphatic reiteration of the distortion employed by Rubens. It is our interpretation of this sequence of forms as being "a body" which creates the effect of motion. If the audience fails to make this interpretation of the elements, they will fail to see the movement.

In considering Bacon's *oeuvre*, we only encounter images with this level of physical distortion

in paintings which are very simplified. It allows the complexity of the deformations to take center "stage" in his canvas. The simplification also improves the ability to recognize the body qua body. This relationship is a visualization of Arnheim's definition of gestalt:

The structure of the whole, certainly of dominant importance, is influenced by the parts, which in turn depend on the whole as to their shapes and interrelations. Neither the whole nor the parts are primary constants, primordial executives of influence. Rather, all components from the whole to the smallest detail exert their modifying effect, while they are being modified. [7]

Our process of recognition of the forms in these paintings and their motions proceed according to an interpretation based on the "field" we encounter, in this case the panels of the triptych. Each represents a variation on the same view of the same subject; taken as a group we can understand what Arnheim is describing here: each panel is a self-contained unit which includes a series of components that individually *and* taken as a single unit take the form of a body in extreme motion: Lucien. Each panel when viewed individually as separate images and together as a single unit provides a summary of the motions of this subject while sitting for the painting we see. In this regard, it is not improbable to think about these panels as separate "frames" from a series showing Lucien shifting and squirming in the chair. Such an interpretation is reasonable; Bacon used photographs as reference material:

[The photographs of Eadweard Muybridge] showing the elements of motion. They really did interest me greatly.

[interviewer] *As evidence of the distortion of bodies in motion?*

Oh no. I do that myself. That's not taken from photographs. [8]

The distortion of bodies in motion is not possible in conventional photography without significant modification of this image. Photographs present single moments. It is this "freeze-frame" quality which gives scientific studies such as Muybridge's their value as science. His photographs present a single moment of the motion, rather than a successive series of different moments within the same image. This isolation of movement allows the study of the action as a sequence of individual phases each separated by a specific interval. Unlike movement in reality, this fragmenting enables the specific consideration and examination of motion as a combination of discrete states proceeding one after another. Bacon's version of painterly motion makes use of these photographic studies as a way to enable greater deformations while still avoiding the static effect of photography.

The differences between painterly and photographic motion become significant when considered in relation to one another. While the painterly motion requires the movement of the spectator's eyes through the image to create the effect of bodies in motion—a static image of motion—photographic motion does not require movement by the viewer per se because the succession of images provide the necessary shifts in relationship are combined perceptually into motion. The encounter with painterly motion is fundamentally a more active process than that of photographic motion. Both proceed from an interpretative process, but the actual motion of the spectator is irrelevant to photographic motion. However, both types of motion can be understood through the same interpretative strategy, the likelihood principle. The same *biological* perception is employed in different ways but to the same effect: the creation of visual motion.

Our sensory experience not only determines the meaning of the work but also provides the vehicle for that meaning. Depending on how the viewer approaches interpreting the image, where the emphasis is laid, what details are considered important, determines not only the form of the work, but also its significance. While this is true in a general sense, it is literally true only in those instances where the actual perceived form requires multiple perceptual approaches to establish its contents.

A kinetic art of the type proposed by this discussion relies upon the human interpreting consciousness for its existence. What this essay has attempted to show is the applicability of the cognitive view of film motion to painterly motion. By providing an account of how we can interpret both film and painting as developing from a common basis, we have also addressed the ontological question of their relationship as different or related media. This connection implies that it may be more appropriate to consider art based on its *apparent* motion, a division built from perceptual experience rather than one of physical materials. Such a view elides the interpretative difference between painting and film.

The cognitive-perceptual model of media encountered could be described as the opposition between "movies" and "statics." This division is based upon our perception of its motion. By adopting it, the ontological relationship between painting and film suggest some novel potentials for further exploration in art. In the case of "avant-garde" film, a form which uses the aesthetic and visual codes of painting instead of dramatic cinema, this ontological relationship justifies artists' deployment of painterly structures and forms within motion pictures. Linking the visual motion in film with painterly motion creates a historical foundation for a kinetic visual art specifically derived from the issues of painting but using the technology of movies. The historical appearance of such an art is a logical extension of concepts and issues already existing within the Euro-American fine art tradition and has arguably been developing in parallel to that of dramatic film.

The possibility of a cognitive link in our interpretation of movement in both painting and movies also proposes the possibility for hybrid works that employ aspects of both art forms. One such potential is the flickering shutter (literally a strobe or flickering light) used to illuminate and create motion in what are otherwise completely static images. In effect this places the movies' content literally on "screen." Such a kinetic painting is a logical potential that resides within this conceptualization. To even consider it a possibility requires that the basis for motion in film and painting be examined with the framework described in this paper.

Notes:

[1] Hochberg, Julian and Virginia Brooks, "Movies in the Mind's Eye" in *Post Theory*, ed. David Bordwell and Noel Carroll, (Madison: University of Wisconsin Press, 1996) pp. 368-369.

[2] Ibid., p. 373.

[3] Berger, John. *Ways of Seeing*, (New York: Penguin, 1972), p. 61.

[4] Ibid., p. 61.

[5] Ibid., p. 61.

[6] Arnheim, Rudolf. *To The Rescue of Art: Twenty-Six Essays*, (Berkeley: University of California Press, 1992), p. 36.

[7] Ibid. p. 205.

[8] Archimbaud, Michael. *Francis Bacon*, (London: Phaidon, 1993), pp. 14-15.

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