

In the Beginning

In the beginning is the darkening. Indiscernible. Drifting into twilight. Attention gets lost in the space. Darkness comes back through the depths. Shapes and boundaries blur. Inside and outside are indistinguishable. Desert, void, blind land between sundown and night. Like closing the eyes. Departing from oneself. Back to the beginning. And then radiating, shimmering, brightness, reflections, flickering. The trickling of light.

Effecting the passage into the darkness of the cinema in such a way that the spectator does not perceive it, this is the art of the film projector. The ritual is prescribed, the use of light and sound in temporal succession is fixed. First the footlights and the stage lights are dimmed, then the light in the audience is brought down and slowly the first curtain is opened – at the same time the projectionist in the booth gets the film rolling, turns on the lamps, opens the shutter, and turns on the sound, which fades in to replace the music in the theater. The projection beam shoots through the room, the studio credits become visible, which is synchronized to transition in the waves of the receding curtain. “The spectator should never see the bare screen. This is why the first decorative curtain, synchronized with the architecture of the space, only opens as the projection starts, revealing the action of the film.” (Hochmeister, *Handbuch für den Filmvorführer*) The technical instruction means that the picture in the cinema, the action, the projected emotions are not allowed any fixed location.

Part I

1. Cinema

The history of experimental research in technological devices and how these devices have transformed human perceptual structures provides a way to look at cinema as a laboratory for the feelings and sensations provoked by technology, which form the basis of all histories of the screen. Film critics, even without treating the apparatus as a fetish in their analyses, have examined the technical aspects of the cinema as objective and describable data striving to become a form of expression that can no longer, or not yet, be called language, and that can only manage to claim syntax and grammar for short historical episodes. But placing the cinema in the history of devices and technologies that were developed in psychological laboratories since the middle of the nineteenth century, devices that were used to measure and simulate mental functions and emotions, also means understanding cinema as an illustrative system that expresses and alters perception and the corresponding nerve-psychological relations in bodies as it transmits its impulses. Viewed from this perspective, the various faculties of cinematic technology – recording, editing, and projection – can also be seen in a different and unfamiliar light: as opportunities to place spectators, the subjects of perception, into new relations, in which they only consciously find themselves after they have already given themselves over to the transformation caused by this cinematically constructed perceptual relation.

Forms of space, time, and motion, the basic forms of perception, are just as relative in the technology of cinema as is subjectivity in the cinema, the self-perception through images. The cinematic apparatus produces a special kind of trance in which we are distracted, at least for the duration of a screening, from our own routines and in which all we can do is submissively follow our consciousness – or we have to leave the space of the cinema, but this goes far beyond what constantly appears in Godard as “Entrance”, “En trance.” Through the single images stored on celluloid, through the flickering between light and darkness in the projection, cinema is aligned with the nervous functions as a series of impulses. If we view cinema as a psycho-physical machine, this not only shows images to be rhythmic impulses, it also shows that certain brain functions can be triggered by means of cinematic tricks. All these reactions, which take place underneath the level of perception that is capable of conscious decision, can best be described, following Walter Benjamin, as reactions of the optical unconscious.

In a psychological history of cinema, reflexology appears as the first great vision of an external aggregate that neurophysiologically gathers and transmits human feelings. Reflexology thus becomes a vision of exchanging experience, collectively and reversibly – possibly also as collectively regulating human emotions, sensations, and experiences with apparatuses. In the cinema, at least as we know it, this vision appears under capitalist, hierarchical, monolithic, and fatuous conditions, and it is not possible to speak of a general and reciprocal exchange of forms of perception. Cinema production, aside from small islands of cultural sponsorship, video networks, and ecstatic collective super8 evenings, is subject to industrial systems of production and utilization. It is meant to make money and secure privileges, and so no one is surprised that almost all Hollywood films that thematize the recording and transfer of experience represent this technology – and thus in the end also their own – as a vision of horror. Even in Kathryn Bigelow's *Strange Days*, in which a cerebral "film" can even serve to explain away acts of violence, mental images are merely treated as a bad drug.

The history of chronometric psychology and psycho-motor activity as a history of bodily *dispositifs* developed in connection with the political strategies of the nineteenth century continues in the cinema with its fascination for all impulses and movements. In dance and as in trance, we are enthralled by the illusion of movement itself, which appears as an effect of on-screen technology, long before any concrete network of meaning has been construed. If the technology of cinema is examined under this aspect, then it is not as the simple paranoia of the moviegoer, but as a double one. In the cinema, in which our interiority is interconnected with an exterior apparatus, what we see is also our own shuddering and twitching, according to the set up, according to the film genre. What we call our own feelings can be objectified and adapted to the technological state of time in cinema. Camera and editing techniques accelerate our bodies' own frequencies of shivering, vibrating, and flickering. So a film like Jan de Bont's *Speed* can function as an update of the old, archaic desire for motion perception. Or a film like Lars von Trier's *Breaking the Waves* can create the most ancient, almost Augustinian desire to confront the Eternal Thou of God through optical traps by altering perspectives and viewpoints, even before the meaning and the motif of the victim have become established as the logic of the film narrative. And *Matrix* catapults us into non-human synchronies of new spatio-temporal coordinates, in which divine omni-vision is intertwined with the compound vision of insects. The monsters and the monstrosities in cinema are our own eyes.

If film were less of a plutocratic production form, nerves and film technology could enter into reciprocal communication, and what Vladimir Mikhailovich Bekhterev maintained for nervous activity in general could also be applied to the cinema: that not only does the human being have to adapt psycho-physically, but that there is “also a modification of the external conditions, that is, an ancillary adaptation of external conditions to internal conditions.”¹

With the technological unconscious, the condition of which is recording and projecting discrete single images on film, the gaze unconsciously moves in the pictures and the shots of the photographic surface. This is the beginning of film criticism. Siegfried Kracauer saw this photographic quality of images, which depict the external world in its unposed, random, fragmentary reality, as the very essence of cinema.² Hugo Münsterberg pointed out that this surface is not only exhibited in its melancholy, abstinent visual clarity, as Kracauer had envisioned for ideal photography, but that the photographic production of the film image also indicates a material, meaningless, but functional side, which in turn spurs on a dramaturgy and a way to draw the attention beneath the threshold of conscious perception: “The shading of the lights, the patches of dark shadows, the vagueness of some parts, the sharp outlines of others, the quietness of some parts of the picture as against the vehement movement of others all play on the keyboard of our mind...”³

All three basic functions of film technology, camerawork, editing, and projection, can thus also be seen as psycho-physical technologies, as consciously treating perception and reality at the same time, but which entirely evade conscious perception, “a conscious manipulation designed to create effect”, as Maya Deren put it.⁴ The basis of all film technology is cutting up, recording, and projecting single images. And this is the technological consequence from the old chronometry in physiology and psychology. After a unified time-frame was incorporated as the basis of all experiments in the laboratories of the nineteenth century, this led in the twentieth century to an interest in expanding, compressing, or accelerating this timeframe, or even in letting it run backwards and in loops, leading the spectator astray. But all the illusionary techniques of the cinema, which is also “the truth 24 times per second”, have to relate to the spatio-temporal parameters of basic neurophysiological research. The exceptions, construing reality in a different way and recording movement in time differently, may not be called cinema and cannot technically be screened in cinemas: such as focal-plane shutters which do not cut up the flow of time, but recording flowing colors and forms on a running track and representing the intensities of the world as rubber mat distortion.

Cinema belongs to the trance techniques of our culture because it systematically treats and shifts the normative and imaginary time frames, in which we remain subject to conscious daily production, in all the disciplines of our bodily knowledge.

Camerawork not only ensures discrete single images, which allow for the shaping of movements in the illusion of movement, but at the same time it treats – by means of various optical tricks and their combination, through focal lengths, depths of field, apertures, camera angles, camera speeds, and camera movements – space and, as a result, time. In extreme wide-angle lenses every movement comes to the camera unnaturally fast, while in telephoto lenses they hardly budge from their place. Through various camera tricks, as Münsterberg has synoptically described, various perceptual functions can be initiated. Cinema could thus be euphorically understood as an apparatus that technologically transmits experiences from one individual to the next.

The model of connecting and conveying psychic energies in all directions, which Bekhterev had proposed in Petersburg reflexology, allowed, even more than Münsterberg's American psycho-technology, for depictions to be understood as a complex of signals that, while running through the tracts of the central nervous system, can convey and associate feelings, allowing people to become energetic signal carriers, accumulators, and transformers. Dziga Vertov continued these Petersburg experiments in his cinema. There are echoes of many of Vertov's optical constructions in later experimental films. For instance, the abstraction and isolation of the illusion of movement. Detached from objects, figures, or identifiable persons, movements were conveyed as moments of motion assembled in the field of vision. There is an "across" to be seen on the screen, the bearer of which remains unclear or can be assembled from various objects. Human routines of movement, as they had advanced through cinematography in the medical clinic to scientific opinions, were reversed, distorted, fragmented, and doubled in experimental film with the same camera and editing techniques, so that the cultural meanings attached to them had to be exposed as constructions. In this sense, experimental filmmakers, by manipulating the manipulation of perception, also liberated the body from the webs of historical and political discourse.

The discrete quality of images on the filmstrip, which allows us to analyze and synthesize movement thanks to cinematography, is the prerequisite for placing the body in certain iconographic or symbolic orders. The prehistory of the cinema in psychological cinematography shows that cinema could be used for medical diagnoses and at the same time serve as a sign system for social relationships and political circumstances. Psychic qualities could

suddenly be read in recorded physical movements. But its usage in the relation between doctor and patient is only one particular case of cinema as social technology. Wherever a film is shown, perceptual structures are cross-linked over surfaces, and in the trance of non-perceivable functions, social conventions are forms that still have to be traced back again to their origins and their technological conditions.

The technology of montage lies at the border between conscious and unconscious transmission in cinema. This is why the weight of ideology critique was imposed on montage whenever it was necessary to differentiate the methods of a film either as methods of information or of propaganda. "Editing/montage forms the battlefield in the history of cinema on which the fight about the so-called filmic and its language was/is carried out."⁵ In fact, this opposition, which historically goes back to the Russian and American film pioneers, was for many years the ideological dividing point in film criticism. The debate about "editing" or "montage" is a relict of film theory from a very cold war, but is simple and sustainable like all products from this time.

"Montage is noticeable as montage, editing tries not to be noticed", is how Harun Farocki summarized the east-west formula for (at that time still West) Berlin students.⁶ In the case of montage, as in the case of the illusion of movement in cinema, the differentiation, being between conscious and unconscious technologies, does not concern the problem of cinema's allure. The level of the technological trick, of the illusion of movement and of the rhythm of montage, and on the other hand the level of images, their modeling of light, and their iconography are complementarily taken into account in montage, supplementing or contrasting. Roughly speaking, Farocki's formula means that the Americans, starting with Porter's *Great Train Robbery* and Griffith's *Birth of a Nation*, tried to unite heterogeneous elements as unnoticeably as possible into an omni-visionary perspective. The spectator is meant to be stimulated, but not to notice the technological circumstances under which a big "US" can be seen as a matter of course on the belts of the soldiers or the sheriff whenever death is not far off. (It is this "US", which Thomas Pynchon responds to with the paranoid "THEM", that became all of our YOU THERE under the conditions of cinema). In the American model of "editing", psycho-technological rhythm and photographic surfaces produce the sensations, tensions, and moods of a perception into which logics of meaning and signification are introduced as messages, and through which they can be reinforced. Whether the will of the producers is guided by market forces, production codes, national interests, or other possible missions is a question for the second step of film

analysis. The means to get there, however, are set up beneath the threshold of consciousness and have no actual intention to rise above it.

The avant-garde films from the Soviet Union, called “Russian films” in the twenties, dialectically produced a conscious clash of different images, from which some third thing was meant to emerge and which was conceived as a substitute for thinking. Of course Eisenstein, Dovzhenko, and Pudovkin realized that film had to avoid conscious perception in order to be film, but they nonetheless claimed that their montage was a method by which relations could become deliberate in their dialectic, since they provided their own expression. The cinema was meant to be a mirror in which ideological, false, bourgeois thinking encountered and corrected itself as other. In this respect, even the optical metaphysics of Tarkovsky or Kieślowski belong to this tradition. In the term dialectic images, as Walter Benjamin coined it, this concept even applies beyond any film theories as a historico-philosophical attempt to prop up the hegemonic intellectual movement on the foundation of its technological pre-conditions. Thinking could thus not only be moved from an initially external principle, but also sedated or exploded.⁷ The actual optical unconscious in cinema, however, the deception and intoxication of perception as principle, which Vertov had his sights on, was also suspect in Soviet cinema, for most directors as well as for the state agencies that scrutinized and censored every film project in writing.

The difference between the Russian and American techniques, between montage and editing, are not entirely subsumed in the opposition between the conscious and unconscious manipulation of perception. In both East and West, rules were provided that were meant to teach correct montage, and all these rules served the goal of not tearing the spectator out of his or her film trance. Whether it was supposed to be teaching an “I SEE”, the “US”, or dialectical thinking in this trance was the subordinate problem for those working at the editing table on both sides of the Curtain. It is certainly true that over the course of time those techniques that are conspicuous as changes in the field of vision – and that interrupt the trance – disappeared from the repertoires of the editors: multi-screen, split-screen and different dimensions for the screen, such as Eisenstein had wanted,⁸ iris wipes, but also time lapse, black frames, and all the operations that the spectator is aware of as intrusions into perception. By contrast, technologies that simulate and stimulate involuntary activity in the brain, as Münsterberg described, for instance light slow motion, lighting effects, certain estrangement effects through graininess or layering, split focus shots, the use of different focal lengths, etc., belong to the standard repertoire of tricks for all camera operators and editors.

Specifications for rules, however, have always been contested. Karel Reisz, whose basic historical handbook *The Technique of Film Editing* first appeared in the fifties and in many languages, on both sides of the border that was still considered “iron”, served as an introduction for students, editors, directors, and theorists, but initially had to admit that anarchy in editing was completely feasible in early silent cinema:

The only thing which decided the order of shots was the desire to achieve the most satisfactory results. [...] The medium was extremely flexible in that there was no physical reason why one should not cut from practically anything to anything else.⁹

The experimental phase, in which everything could be edited anywhere if there was only time to tinker with it, was then standardized, above all due to economic restraints. At the end of the twenties Reisz established national conventions for how to manipulate attention:

In many of Griffith's films one is aware of the constant changing camera angles and it requires a certain amount of practice and adjustment to accept the jerkiness of the continuity without irritation. Eisenstein, far from wanting a smoothly flowing series of images, deliberately set out to exploit the conflict implied at the junction of any two shots. Against this it must be said that the German film-makers of the late twenties, using a much more fluid camera technique, often made deliberate attempts to achieve a smooth-flowing continuity.¹⁰

Continuity and connection, heavily loaded terms anyway, to this day have to serve in editing technique for something that is constantly changing. If the first spectators were shocked by close-ups being edited in, because they thought they were looking at limbs that had been cut off, by the end of the twenties discontinuous scenes, edited like jazz music, in which musicians and instruments elided into one another – like in Murnau's *Sunrise* – were no longer disturbing, but were the necessary variety that promised to be entertaining. At the beginning of the thirties people were astounded by sync sound, and the graphic dance montages of Berkeley, in which bodies were arranged serially according to their limbs, were already a part of mass entertainment. Changing montage rhythms made Jules Dassin's *Naked City* in 1948 the forerunner of films that relied less on story than on the rhythmic montage of urban landscapes and movements. In 1960 Hitchcock accelerated the performance of reception with the 70 cuts of the shower curtain in

Psycho, setting new standards for the stimulation that was expected in movies. The West was discovering the montage techniques from the twenties in the East, material time-space montage, which had disappeared there due to the demands of Stalinism. The “visible cut”, montage that was introduced against the cultural imperialism of Hollywood, could only elucidate until it itself became invisible from habit. Who was still disturbed by the “wrong” cuts in *Breathless*, who even noticed them anymore? Even Lars von Trier’s cubist montage in *The Kingdom*, of shots that are incompatible according to traditional spaces in time, and which showed that even at the beginning of the nineties, in the age of MTV, there were still conventions that could still be shockingly transgressed, has already become standard in commercial film production. And also a standard of what we have been trained to expect – and demand – in terms of speed in the cinematic experience. The only thing that is still disturbing is anything that does not make use of the acceleration of stimulation: Straub/Huillet and all those whose films we no longer see in the cinemas for just that reason.

Even montage that tried to be conscious as an operation remains unnoticed as a technique. Often the effect on the spectator from the screen is no longer a feeling of surprise, without her immediately becoming aware of the breach in the conventions of perception as a breach against technological conventions. This montage shows that genres are combinations of technical rules, which produce certain combinations of feelings. If these genres are mixed, they therefore also produce new, literally artificial mixtures of feelings in the cinema, which have caused people to be surprised at themselves, but also disturbed, and which have not always immediately been so well received.

Speaking about *Une Femme est une Femme*, Godard says:

Les comédies sont jamais filmées en gros plan, elles sont toujours filmées en plan général. Et alors là, quand elles sont filmées en gros plan, elles deviennent pathétiques. Alors, il exprime des sentiments dans une situation comique, c’est le beau dans le film. Mais, pour ça, le film n’a pas marché.¹¹

Genre means that space and time in film unconsciously guide the “mood” in the sense of the old psychology of Wilhelm Wundt.

The attempt to describe the cinema as the extension of a *dispositif* that usurped human minds and psyches as movement-chronograph and at the same time as a rhythm machine is supposed to replace the dichotomy between the conscious and the unconscious manipulation of perception.

Cinema is always manipulation beneath the level of conscious perception, otherwise no motion would be possible in the 24 still images per second. But cinema is also conscious manipulation and the conscious desire to be manipulated of our senses, in order to adapt to external circumstances and to relativize and change external circumstances through film. Films can be analyzed consciously, perhaps not right in the cinema, but afterwards, when we, to quote Thomas Mann, “have dried off” – not only ideologically and iconographically, but also physiologically and emotionally.

Cinema is what it is, a message that can be consciously perceived by anyone who wants to receive it.

A message received by whoever it comes to:

“To Whom It May Concern.”

2. Cybernetics

... nor can we be sure that a considerable part of what we observe is not an artifact of our own creation. An investigation of the stock market is likely to upset the stock market.
– Norbert Wiener , 1963

At the beginning was the question of the particular reality of the cinema and the question of the subject and its transformation through the links between perception and technology in the cinema. At the end a variety of networks have been extended in which historical cinematic perception can be seen as psycho-physical training and the as implementing social technologies by using devices. The history of cybernetics as the science of multifaceted, regulating, balancing, and communicative processes can be used – and not only because it historically crisscrosses the history of cinema – to theorize communication as automatic and automating, a communication that, in the cinema, cannot be understood as the experience of the senses alone. This may come back to haunt us.

The cybernetic process in the cinema would then be a matter of changing perception in the cinema and regulating this perception through the effects of film, even before the meanings of these effects are even formed. The cinema is thus a good place to examine cybernetic processes, since the links between nervous systems and apparatuses have constantly been synchronized, aligned, and optimized in its history. This means that a feedback process had already emerged in the research, before any film screening, as a gradual refinement of the trance in the act of seeing movement.

The cinema is also a good object for examining cybernetic processes since the work of every filmmaker consists in using time manipulation and other cinematic techniques to re-apply a recorded series of events back to that series of events itself, and through such operations to bring the future of the messages into the imagination of the dreaming spectator. The spectator's trance attests to loops of self-adaptation where the perception in the cinema is located.

On the other hand, the cinema is a highly inappropriate object for a cybernetic hypothesis because it neither has any clear signal, nor is it one. In order for cinema as cinema to become a signal in statistical mechanics, and thus for it to be predictable, it must also be reduced to the flickering and fluttering of light and darkness, such as occurred in laboratories and

as it became a highly and potentially also dangerously stimulating art form in the flicker films. For cinema to be a signal, it must distance itself from the photographic reality that makes it possible to see movement in the cinema as "human" movement in the sense of the old technological media.

From the history of neurological cinematography we can learn which interfaces between human being and apparatus were developed and industrialized in the nineteenth century, and which were therefore deserted, became a wasteland. But the boundaries of the cinema apparatus that would allow us to designate a circuit diagram or a neurological network in the first place are not clear. So the great aspirations of a cybernetic examination of the cinema run the risk of methodologically appearing as a bluff or as pure metaphor. Back to the beginning.

The issue that gets everything going was that of unconsciously changing our own movements, and thus of externally transforming our own person by means of an apparatus. The amazement that accompanies this issue was the great pleasure we take in such bad stories, if they were worked well as cinema. The interest in examining this ultimately industrial way of getting our minds to dance arose from the parallel between these techniques and the ritual trance techniques from other cultures, which promised a less convoluted way of encountering the gods in this engrossed state.

At the beginning was a methodological comparison between watching movies and the physiological proprioception in dancing. In dance a body perceives itself as other, and at the same time external stimuli are perceived as one's own. In dancing the various, fragmented components of the body are connected through sensors in the muscles and joints into a whole, which regulates itself in complicated balancing acts. In certain situations this self-regulation can get out of control, ending up completely under orders from outside: in the tarantella, in Saint Vitus dance, in possession. Then proprioception becomes someone else's perception taken as one's own. The boundaries between these states cannot be defined, they are gradations of shifts between I and the other, between I as another, which constantly take place in every social relationship, in every space of rhythmic and structured order. In the cinema the exposure of the body, the mutual metaphorizing of internal perception and external perception, is all the more intense since it can be introduced, as the result of a hundreds years of research on nerves, reactions, and reflexes, in a quite targeted way.

Looking to the prehistory of cinema in the psycho-physiological laboratories we can see that models developed in the laboratory of how the mind and the psychology of the senses works exactly corresponded to the structure of cinematic perception. The chronometric apparatuses in the laboratories,

which sought to measure mental accomplishments and even their dysfunctions as a function of time intervals, were continued in structurally similar ways in the chronophotographs and the cinematographs, as if the devices had only been temporarily readjusted. The neurological models of nerve impulses themselves, which in turn were intermittent, were also the result of the experiments in the realm of chronoscopy. According to these models, ideas arose in the brain through the perception and association of single impulses, just as illusions in the cinema were produced by intermittent images. The neuronal models of perception and the practical neurology of the cinema apparatus had the same historical origin in the laboratory.

The question of the equipment and apparatuses that were used to examine, localize, and even artificially simulate and regulate mental functions thus became an essential way to approach this entire work. The strategies of the researchers were manifest in the technical equipment, and the interests of the individual researchers and institutes remain in them. In the devices themselves, as Londe's various photo cameras show, the possibility of manipulating time and perception is manifest, whether as an implement or as interconnectibility. And the polymorphy of the human body is also reduced in these devices to particular interfaces and modes of transmission, to particular tracks and experiences. This is a reduction not only in a negative sense, but also as concentrating, intensifying, and strengthening, for beautiful and high-frequency sensations can be played out on these interfaces that otherwise do not exist in the landscape.

The history of laboratories is at the same time a history of sustained intervention in bodies that, fragmented and subjected to rhythm, were themselves altered in the course of the research. This began in experimental medicine by brutally wiring up organs and apparatuses, nerves and recording technologies, in which frogs and rabbits and dogs were wired into death dances. With time and in compensating for the injuries the connections became finer, more distanced, retreating to the surface of bodies, on which the effects and symptoms of even nervous disturbances were supposed to be read. The devices conveyed the functions of the old ideas of the mind in the old apparatuses from the laboratories – including in the apparatuses from the photo labs. Using new procedures, nerves were tested for the qualities of their circuits, their priming, and their chemical and mechanical transmission methods, their interconnectibility, and for the symptoms of their activity on the body's surface. Bodies were no longer material protective covers for the the soul, but were themselves states shot through with nerves, in which the mental activity of a human being and the reality of the world entered into a neuronal and energetic metabolism.

The experiments in neurophysiology and perception psychology in the nineteenth century had showed that perception could be explained and controlled physically, not mentally, even completely so, as the *trio infernale* Du Bois-Reymond, Helmholtz, and Brücke swore that they could prove. In physiology, devices were developed in turn with which bodily movements could be perceived, recorded, and controlled more precisely, and it was at exactly this crossroads of the research that the cinema emerged in the Parc des Princes of the Bois de Boulogne as the unconscious of a wired-up landscape, which could look at human beings from everywhere. And if people now looked at pictures of landscapes from this crossroads, then they saw their unconscious hidden in them.

But right from the beginning, what the observation of perception was registering was not only the disturbance of the observed, but also disturbances of the observer. Gustav Theodor Fechner's trance was one of the first modern feedback trances, described as riding and being ridden, by devils, by gods, by rays that he had looked at too long during his optical experiments. Occasionally the feedbacks of perception in the experiment separate into two complementary delusional orders: in the neurologist Flechsig and the patient Schreber, who saw himself as watched by sun rays while at the same time the nervous system was being cartographed in Flechsig's clinic as a centralized system. Or Bekhterev's neuromedial utopia in which all bodies united into one decentralized messaging network that was taken for a real possibility by Stalin's paranoia, a possibility that made him quite unnecessary as general secretary.

The routine studies of perception on the one hand and the experiences from the disturbances, from the perceptions that had gone wild on the other, can be measured by means of devices, scales, and regular stimuli to the nerves, regulated in a neurological noise reduction and combined into inductions of sensations and feelings. These elements are the building blocks of cinema perception, in which the artificial seeing of movement and rhythmic exchange of images and shots control the attitudes of expectation and attentiveness in reception. The history of these trance states produced in the experiment finally ends in Rouch's obsession with the camera and Deren's cinematic experience of voodoo possession, both of which were not entropic states, but states in which the cinematic regulation of social behavior was shown to be psycho-physical.

Filmed dances and danced cinematography apply the *dispositif* of cinema to itself time and again, which means to the events recorded, and they also link the two sides of experimental psychology from which cinematography can be assembled. On the one hand the movement of perception

was researched in the history of science and its artificial regulation was improved upon – one highpoint of this development was the symposium “Feelings and Emotions” in Ohio, at which this research, mediated by Bekhterev and Cannon, who could not be mediated there, reached back into the early history of cybernetics.

On the other hand, the movement of the body was itself examined in just the same tradition. Using instantaneous photography and cinematography, human movements and expressions were depicted so that they could be further processed, treated, and most likely would have been endlessly projected on one another in the primal scene of Salpêtrière if the female and male hysterics had not finally refused to play along. Medical diagnoses as well as artistic depictions of certain states were the result of the recording technologies that transform time and that could thus dissect the individual in order to subject this depiction, and thus the subject itself, to new and immemorial causal relations.

On the one hand perception of the human body was made alien to the human mind with cinematography, on the other hand human vision was itself transformed by cinematography. Two sides of a process that made it impossible to distinguish any more between, for instance, the representation of cinematically depicted bodies on the screen on the one hand and the cinematic perception of these bodies in the space of the move theater on the other. Even without producing clear emotional attributions, the representation of a body in slow motion shows both certain unforeseen qualities of the body depicted and certain unforeseen possibilities for the spectator’s perception. The *bon mot* that a cinematic image is created by fusing retina and screen – in the cinema, in the head, or in the body – now had to be extended.

Bodily movements and emotions fuse like dancers and the dance in or through the image. At any rate, this takes place somewhere that is not supposed to exist according to the instructions given to the projection. They fuse with technical effects, with other, now divided individuals, or with themselves as others.

It is astonishing that, in a system that complies to a certain degree out of paranoia, differences can still be shown at the structural level. In neurology, in cybernetics, and in the cinema there are quite different basic models of the mind and the bio-socius, or rather, of how cinematic technology is applied: a hierarchical model of self-control on the one hand, and operative, reversible, feedbacking connections on the other, in which an exchange of experiences could be organized and at the same time technologically put together and newly put to use. A vision that constructs a genealogy of

experience, from Fechner, through Helmholtz and Bekhterev up to Cannon and Wiener, that have designated such processes within the body as homeostatic, and referred to similar processes in connection with other bodies or other aggregates as feedback. The anarchic film people, misusers of apparatuses, experimental filmmakers like Vertov or Rouch sought, by linking the depiction of ritual with a ritual of depiction, to turn the medium as a homeostatic world process into a remedy. Maya Deren, her films, and her theories of rituals have shown that cinema technology must be used in its genuinely technological sense in order to reshape the function of the absolute control of the cinematic into a homeostatic “beyond” of cinema. The alternatives are not quite so banal, of course. An inventive genius like Albert Londe had on the one hand fixed a clinical order in psychiatry with his apparatuses that was as rigorous as it was artificial, and on the other hand had used his time-tricks in serial photography to cause the glamorous actresses of Paris to jump even higher and even more weightlessly.

Cybernetics in the cinema is thus a process that cannot be fixed. Fortunately it is only used – unlike the first cybernetic steering machines, regulated by centrifugal force, which were supposed to bring ships safely across the sea – to navigate the ocean of feelings and sensations. Fortunately? Only? Ocean?

The cybernetic cinematic process has its relay in the Darkness of Projection. This will be thoroughly discussed, the situation will get brighter, and the cinematic circles will withdraw back into the subroutines of the mind, of the apparatus, and of the industry.

Back to the beginning.

3. Knots

In the beginning is the darkness of the projection. Early film theorists, for instance Münsterberg, Mauerhofer, Kracauer, or Arnheim,¹ analyzed the strange state that spectators indulge in as part of film perception. Since the shutter strobes the projected beam in an established rhythm while the Geneva drive intermittently transmits individual frames, moviegoers are sitting in darkness for nearly half of the projection time, while their optical nerves are stimulated to the beat of these mechanics. Hugo Münsterberg was the first to draw the parallels between film perception and experiments of isolated acts of perception in psychological laboratories. Hugo Mauerhofer, a psychologist, biographer of Hesse, and emigré in exile in Britain, analyzed the transformation in psychic reception behavior of moviegoers in four phases, diagnosing a state similar to that of daydreaming. According to Mauerhofer, the only proper object of scientific film theory is the psyche itself, since every film critique, due to unconscious perception in the cinema, is nothing more than a more or less inept report about individual fantasies.²

Films are not simply seen. They transform the subject in the cinema. The consciousness that, according to Kracauer, withdraws from the scene in the cinema³ itself appears to the film critic as one that is under the influence of a technologically evoked lull. Under the spell of early German experimental psychology, represented in the *Major Film Theories* by the persons of Hugo Münsterberg and Rudolf Arnheim, students of Wundt and Wertheimer respectively,⁴ examining the technologies that manipulate perception made up a large part of American film theory. References to historical trance techniques came from French film theory. Raymond Bellour was the first to systematically equate film perception with hypnosis.⁵ But as a relation of domination, that is, as gaze, seeing can only be classified and criticized once the physiological conditions of its movement are discovered as technologies, technologies that establish social orders while themselves remaining invisible. Films are not simply seen, they allow for seeing.

Seeing or being seen: blind spots and blackouts from the very beginning. Joseph Plateau, who carried out the first experiments on stroboscopic seeing, long before there even was film or cinema, went blind after experimenting on himself to study retinal afterimages. The experiment was not differentiated enough: his phenakistiscope, literally eye-deceiver, had actually already showed him that it was not positive afterimages, but successive, albeit discrete single images that were the necessary condition

for seeing stroboscopic movement. But he wanted to know more precisely, so he used his own retina. For too long.⁶

Plateau, however, was not the only one not to see that it was not after-images that were the reason for seeing motion. Some of the classic film theorists wanted nothing of it either: Eisenstein and even Bazin considered film viewing as a question of positive afterimages on the retina. The film theory of the psychologists knew better. Watching a film taps into functions in the brain. What was and remains contested is how. Recent research has explained seeing oscillopsia as an abbreviation system in cortical "image processing", a model in which old ideas of reflex arcs meets newer ideas from data processing.⁷ For virtual reality researchers, who are simply interested in the connections between humans and machines, the frequency of 24 frames per second is just a symbiosis that works well.⁸ How these mechanical hallucinations work would first have to be investigated in a long series of experiments.

At the beginning of the century there were two competing theses to explain seeing motion: one that was based on Talbot's Law and unnoticed phase failure, and one based on "identity deception." The protagonists of this were Carl Marbe and the Wundt student Paul Linke, who shot experimental films as proof of his hypotheses, films that could be considered the predecessors of the works of Otto Fischer or Hans Richter. Linke's films, however, were only screened at medical and psychological congresses.

Max Wertheimer had published the first complex experiments on seeing motion in 1912, showing that this is an independent and direct experience like seeing luminosity or color. He reported on one of his experiments with oscillopsia in which he wanted to test the pure viewing of motion, and describes the physical reactions of the test subjects, who designated what they saw as "across", although at the same time they saw that nothing was moving across. "The exact facts of the case are: the crossing, the insistent movement from a to b is clear and unambiguous, forcefully there and thoroughly continuous, yet nothing went across the white and nothing went across the stripe."⁹ The more precisely perception was experimentally examined in the subjective, the more objective the optical phenomena appeared, which had no object whatsoever. The experience of cinematic vision was only a further development of the psychological experiments with the tachistoscope.

Münsterberg, in his 1916 film book *The Photoplay*, had declared the circuits and accomplishments of the brain responsible for cinematic perception. A film theory can be derived from this tradition that bases its cultural critical or psychoanalytical interpretations of films on examining

the psycho-physical effects of cinema as an apparatus. The relationship between the experience of reality and the production of reality can be re-defined according to the results of experimental psychology, and contains, at least as far as concerns the phenomenon of “movement”, a calming effect that is not restricted to the movie theater. Experience can be had artificially and it is indistinguishable from non-artificial experience. In the experiment it was even possible to show that form and movement in seeing are not separable perceptions, that luminosity (and not form) carries the perception of motion, or also that the physiological processes in the brain that process the seeing of movement in the cinema are oscillopsia, that is, the same as it is in natural seeing of motion.¹⁰ So something is indeed moving, even if it is only the brain that is affected.

Since the experience of movement in the cinema can thus not be distinguished from the experience of real movement – while the depiction of spaces, forms, or shapes, as Arnheim has suggested, can be distinguished from their physical reality without any trouble – then seeing in the cinema is a more complex perceptual experience than can be grasped by the concept of representation. While light, spaces, perspectives in film can be analyzed as representations as they can in painting, movement belongs to a different order of perception. In the cinema movement is not represented, but presented, the artificially produced experience of seeing motion is thus authentic, “not the re-experience, but the experience of motion.”¹¹

This magic of the cinema, which Wertheimer’s student Rudolf Arnheim pointed out in 1933, is based on a technical decision, not on a technical necessity, for ultimately the movements of acoustic phenomena can be directly recorded as movements.¹² The cinema by contrast produces by storing a further illusion of perception in discrete single images:

[Film] does not render motion by motion but gives an illusion of it by means of immobile images shown in sequence – a procedure that is possible because of the way our eyes work, a magnificent substitute, but something fundamentally different from the rendering of motion by motion. Why, then, did we have to resort to illusory movement?¹³

The historical answer to Arnheim’s question first comes out of the laboratories: since cinematography was invented to analyze movement by taking apart a temporal continuum by means of a variety of procedures, every new development of the apparatuses was initially done in this tradition: practical human decisions. It first became uncanny in the history of science when the models of human perceptual psychology evidenced similarities

with these mechanisms: the special synthesis of cinematic data would correspond, it turned out, to particular achievements of the brain when seeing motion. In other words: If god didn't play dice, he had been playing with the stroboscope from the very beginning. In the 1970s Arnheim would expand on his early essays on cinematic technology in the light of new research, with the astounding discovery that all seeing of motion, even observing birds in the field with the naked eye, was in principle like that in the cinema:

All motion perception is basically stroboscopic.[...] When a bird flies through my field of vision, its physical displacement is continuous. What I see of the flight, however, derives from a series of recordings by the individual receptors or 'receptive fields,' in the retina.¹⁴

This made the artificiality of viewing cinema even more complex. The functions of the apparatuses assume an alliance with the functions of the nervous system. But the spectator needn't know anything about this to see motion in the cinema.

Cinema from the viewpoints of psycho-technology, as Münsterberg had named his applied psychology, had to be examined precisely as a social technology when its tricks were unconscious, such as in the transformation of single images into a flow of moving images. Or the perception of motion independent from the perception of a form: Wertheimer's *phi* phenomenon. Already in 1913 experiments in which white stripes were edited in between film images showed that, despite the frequency of 24 images per second, as is common in film projection, no flow of motion emerged as a cinematic illusion, since the light impulse of the light fields suppressed the perception of the previous images.¹⁵ The darkness in the cinema is initially neither the metaphorical re-staging of Plato's Cave,¹⁶ nor a mere refuge for lovers without a room. The darkness in the cinema is above all a perception-physiological necessity for viewing films. And for just that reason, as Benn describes it, it is intoxicating. Just as Kracauer had suspected, darkness dismisses consciousness from film perception.¹⁷ A phase of nerve stimuli slips in between film projection and reception that only a visitor from the Gutenberg Galaxy like Walter Benjamin could affably call it "distraction."¹⁸ Since control by the apperceiving consciousness is systematically undermined in cinema by the technical equipment, it would be more precise to call this distraction trance.

Trance, as a dissolution or diversion of the consciousness under the impact of certain technologies, is the gap in film theory. Here physiology enters the humanities, challenging the idea of the subject to its very

limits. At this point physiological sensibility comes back into aesthetic theory, from which philosophy had separated it and held it at bay. Trance emerges from the connection between the intoxication of the senses and technological noise. Cinema addresses the bodies that the spirit has left.¹⁹

But it also trains them. Precisely because once new media like photography, film, or the gramophone had differentiated bodies into every more specific identity forms, the old philosophical order of the mind, which could not be imagined as anything other than male and somehow pasty, did not simply dissolve into pleasurable intoxication. The new media brought with it new orders of bodies, wishes, and desires. As soon as voice, faces, movements, the gentlest trembling and the faintest coughing could be stored in media archives and thus examined and classified as bodily signs, that was the end of simply subverting the order through sensuality. The most sensual disturbances were themselves indicators from which the orders of illnesses, of the genders, then also of classes, cultures, or subcultures could be constituted.

The only way left to subvert the imaginary and the symbolic orders, the imagination and representation, is to experiment with media transformability itself. To transform oneself through technological tricks. Transformation in the Occident, however, was reserved for either the Orphics²⁰ or the lords at the Last Supper. The transformation of women, other than from virgin to divine bride, induced by the tongues of angels, belongs to the uncanny in occidental discourse.²¹ Technological brides betray their secrets especially when they do not present themselves as natural, mythical, or esoteric, but when the technical procedures with which they are produced are clearly shown to be part of the production of art. When the flecks of oil are still sticking to the machinists' work coats. When the girls are maculata. From Germaine Dulac, the first female avant-gardist in 1920, up to Pipilotti Rist and her digital expositions in 2001, anyone who does her own projecting with technical devices and technological savvy has been considered objectionable. Ultimately they are airing the dirty little secret that the formation of identities presumes quite a bit of work and technical know-how. So the dark side of cultural technologies as transformational technologies comes to light. That the subject in ecstasy can experience its own self-dissolution, its depersonalization, or, painfully as in the case of Marina Abramovic, its dismemberment, does not simply mean that cultural boundaries are thus violated and cultural laws have been breached. The fundamental functions of cultural technologies are also confirmed by this. They are danced into the physiological real, domesticated in the symbolic realm of the production

of reality. Cultural technologies are mediations of the law, but they only work when they can promise the subject – fragile, divided, powerless – a new integrity for its submission. When it experiences *itself* in the joy of the dance and the trance, it doesn't notice anything of cultural technologies; when it notices the cultural technologies, it experiences itself as other and falls apart. In between the two is where female scholars and machinists experiment.

The fact that the machinists' effect is at the same time affect, the consequence and the pursuit of their artistic methods, is one of the oldest insights of experimental culture. In his text on the Marionette Theater, Heinrich von Kleist described the relationship between cultural technologies and souls as being dance-like, at any rate not as directly mechanical, but as a relationship between various transformations: "Somewhat artificial" is the relationship between puppeteers and the dancing puppets, says the leading dancer of the opera, explaining this as an engineer: like that of numbers to their logarithms. The path taken by emphasizing the puppet in the intermedial relationship between machine, puppeteer and puppet is not only the effect of the technical construction, but of the whole spiritual complication, of psycho-physical *dispositifs avant la lettre*, in which the functions of perception, of consciousness, and of the soul appear as a parable, the ends of which – author, narrator, subject – disappear in the endlessness of the function "making dance." A secretive line is the trace of this interference:

It is nothing other than the path to the soul of the dancer, and Herr C. doubted that it could be proven otherwise that through this line the puppeteer placed himself in the center of gravity of the marionette; that is to say, in other words, that the puppeteer danced.²²

Ego and consciousness pursue one another hyperbolically in the tracks and loops, the meshes and circles of medial constructions, and so the trance can merge with the knowledge of how it came to be.

The film avant-gardists of the twentieth century let themselves become fascinated by archaic trance techniques and transgressions time and time again. African, Pacific, Caribbean cults became visible for the first time outside their ritual spaces on 16mm film. The information that this "*visibilité*" could deliver into the heart of the colonial powers thus suddenly appeared as the dark collaboration of filming ethnologists. In the trance films of Jean Rouch and Maya Deren techniques become visible that seek to surrender knowledge not to power, but to powerlessness. Such trance

films experiment with feedback that no longer allows for any distinction between puppeteer and puppet, between dance and dancer: cinematically initiated entropy. "Going native" as fading out the messages of indigenous informants – through feedback, through joining the ritual and ruthless integrity of the technical medium. But the subversive usage of technology does not automatically guarantee this entropy. The relationship between the decomposing strategies of the avant-gardes and the mapping administrations is shockingly parasitical.

The American experimental films of the 1940s examine the emotional effects of cinematic processes. But precisely the 16mm technology to which they owe their art had only been developed and refined because of the Second World War. Not only were 16mm film cameras and material easier to get after being discarded by the Office of War Information, new film forms were being invented in the field at lightening speed. Almost all of the big Hollywood directors had worked making newsreels in the army. John Ford, for instance, was shooting *The Battle of Midway* when an explosion ripped the filmstrip from the sprockets, producing a skewed exposure of the material. This new form of newsreel realism was legitimated in that it made the technical device itself visible. What experimental film theorists called for years later as a strategy against Hollywood fiction had already been realized by chance in the field under fire.²³ The intoxication is the effect, was the message of the medium. Effects of apparatuses and not of meaning stood at the beginning of all experiments in cinematic space. In 1964 Marshall McLuhan would explain this as a characteristic of the electronic age: "Concern with effect rather than with meaning is a basic change of our electric time, for effect involved the total situation and not a single level of information movement."²⁴

So if the effects of the electronic age place us in the synthetic totality of a dance, we must first stumble into the process in order to be able to get any insight into the foundations and chasms of subjectivity. A disturbing experience. Subject and apparatus are reciprocal perturbations in the sense of neurobiology. Changes in the structure of one's own system, which is not caused, but is provoked by another system or the surroundings – cinema is not always and everywhere, but wherever the work of filmmakers encounter the functions of the apparatus and the perception of the spectator, unsettling one another in the process. According to the findings of neurobiology, the human being should be seen as a being that not only operates a complicated communication system directed outward, but also directed inward, proprioception.²⁵ The body moves, and from

this movement emerge systematic procedures that can be understood as involuntary activity. The body keeps its various functions in a labile equilibrium, when the individual cells and nerves precisely communicate with one another. Every movement is an expression that is fed back in order to coordinate new movements. "A ballet dancer is a virtuoso of proprioception."²⁶ If this inner communication goes well, a human being moves elegantly and dancingly. Speaking in terms of neurobiology one might say, if it goes well a human being is danced by her self. Maya Deren described it in 1948 for the voodoo dancers using the metaphor of the marionette:

They danced as if they were marionettes tied to the drums by invisible strings of sound. They are not dancing with one another, nor are they dancing to the drums, nor do the drums accompany them. Their movements are sound made visible and their voices are, in turn, the transfiguration of their movements back into human sound.²⁷

If it goes well, what gets developed and enhanced in the cinema is our own thinking in the rhythm of images and films. But it is also clear that this kind of message transmission does not stop at the limits of the body or the sense organs, and that the quality of transmission can be improved or inhibited by various external circumstances. Designating it as psychic only means reducing long processes and complex relationships to a single switchpoint. The machinists in art have a more wide-ranging approach. They also attempt to switch themselves in to the self-guidance of inner messaging systems in order to mobilize proprioceptors and effectors, curves and arabesques, emotions and feelings, thus disturbing an inner system so that its vibrations react to this in their own way. Examining the cinema cybernetically therefore does not simply mean writing the history of controlling and steering sense perception and unconscious structures of watching under the conditions of cinematography. Rather, cinema should be pursued in the sense of the perturbation of Walter Benjamin's wish: "The most important social function of film is to establish equilibrium between human beings and the apparatus."²⁸ There are describable and historical relationships and interactions between the technology of cinema and human perceptual functions. But this is not simply as rhizomatic as Deleuze and Guattari wanted to claim when they wrote that the marionettes strings are attached "to a multiplicity of nerve fibers."²⁹ Strings and knots do not simply grow like mushrooms. A proper knot is a science of its own.

4. To Whom it May Concern

The sciences are novels about heroes such as Hegel, Freud, Lacan.

The authors are the titles.

– Hubert Fichte, 1980

“We have decided to call the entire field of control and communication theory, whether in the machine or in the animal, by the name *Cybernetics*, which we form from the Greek κυβερνήτης or *steersman*”, wrote Norbert Wiener when he was reporting on the creation of this epistemological program in 1947.¹ At the time it was assumed in the military that forming a theory of communication would need precise neurological and mathematical research, which was supposed to be able to prognosticate reactions and future developments in a system. During the Second World War Wiener had not only worked on the project of an electric calculator as a “form of communication apparatus concerned more with messages than with power.” Kept awake with massive doses of Benzedrine, which, as he reported it, caused him to tremble, since he was afraid of blabbering about war secrets, he had calculated the predictability of the trajectories of fighter planes. While at first the human element, the seemingly incalculable reactions and emotions of pilots and shooters, was supposed to be excluded from technological warfare, later the human being and the machine were merged into a joint venture of medicine and electronics. Wiener, along with Arturo Rosenblueth, had shown that nerves and electronic machines were compatible, and if they were wired together they could cause messages to be transmitted.² The goal of navigation, however, was not sure. Guilbaud, a thoughtful historian of cybernetics, added:

...les machines supérieures, les plus évoluées, les plus récentes, celles qui jouissent de la remarquable propriété d’adapter leur fonctionnement aux variations du monde extérieur, les machines ‘réflexes’ ont leurs constructeurs mais non leurs architectes.³

When Wiener spoke of communication, it was about how information could be optimally codifying and transmitted, whether that be by means of technological devices or by impulses within the nervous system. For cyberneticists – and the ethnologists not get around to this until later

– cultural modification or cultural transformation is dependent on the cultural technologies that carried the information. For Wiener it had to do with the hardware of social relations, and he wrote straight out: “Communication is the cement of society.” Nonetheless, cybernetics in Wiener’s sense is always a science of culture and indeed one of conjecture, for the messages that are saved, processed, and sent are collective; they go beyond the individual and his capacities, though they still guide his path:

Society has a memory of its own, far more durable and far more varied than the memory of any individual belonging to it. In those societies which are fortunate enough to possess a good script, a large part of this communal tradition is in the writing, but there are societies which, without writing, have preserved a whole tradition in the form of a technique of ritual memorization of tribal chants and histories.⁴

It is called “script” in order to emphasize the functional unit of technology, protocol, and provision in the historical media of storage and transmission, which must be true of “writing” as well as for archaic and future social techniques.

In 1947 Norbert Wiener wrote: “The world may be viewed as a myriad of To Whom It May Concern messages.”⁵ They only need to be transmitted. The question was, in which form. 1947 is the year in which the technological analog media that had started displacing the monopoly of writing around 1880 are definitively obsolete, and the first digital apparatuses are making new paradigms in art and science overdue.

The film research on behavior, as anthropology or as documentary films, was lagging behind the avant-garde after the war in the laboratories of MIT and the Harvard Medical School, for the research on interlinking humans and machines, in addition to visible patterns of behavior, had also brought to light what was calculable in human bodies as trembling and jerking. After cinematography had made nervous twitching visible for the first time in the 1880s, the program at MIT examined the pattern of these human tremolos. After the war, examining human behavior no longer meant studying the norms of practice, but the involuntary nervous reactions, the trances and the staggering, in their regularity and their recurrence.⁶ This also concerned the ethnologists.

To whom it may concern. This research was the requirement for the many trance experiments and media rituals that young men and women from good homes had carried out as romantic escapes into the exoticism of what would later be called the Third World. What they sought as indigenous,

original, and authentic in the rituals of the colonies and the bodies of the colonized, the involuntary intoxication, was precisely the object of the avant-garde research into their own cultures. Western science and medicine mapped the body anew according to a logic of contact noise and of intoxication, and bodies were wired up to new apparatuses, creating new entities.

In the fall of 1947 Artaud declared war on the organs. Deleuze and Guattari, who continued working on this reorganization, invoke Gregory Bateson when they use the term “*plateau* for continuous regions of intensity.”⁷ For Artaud, organs create the connection between divine will and the capitalist abuse of bodies.⁸ At the end of 1947 many young French people also flee from this abuse. Alfred Métraux and Michel Leiris also travel to Haiti, with the desire “to take one’s revenge on a life with which one was not satisfied.”⁹ (Traveling the other way around, André Breton had been stationed in Haiti on his way back to Paris in 1945, had been feted by the revolutionary youth, and was expelled after the fall of the country’s government.) The young engineer Jean Rouch goes back to Africa, where he had already studied and filmed rituals of possession during the war. The experimental filmmaker Maya Deren, when she travels to Haiti in 1947, senses the flip side her own culture on her own body. Her film study of minoritarian cultures ends for her part in becoming-minoritarian, albeit minoritarian like a goddess. Madonna-minority.

All of them described their travels as crises provoked in their own identity, as desired transformation. Heiner Müller, who designated people like John Cage and himself as the “revenge of dead Indians”, much later pointed out the difficulties of producing art looming in the power imbalance between cultures and subcultures. The technologies of production have already attached themselves to the body before the artist even chooses his weapon: “I didn’t know then, but already foresaw that one cannot remain an Indian if one wants to do something with art. We all shoot from the hip, and in art doing something means doing away with something, beginning with oneself.”¹⁰ This goes for everyone, researchers or artists, who work with technological images.

In a sciences’ history of the cinema, which examines the preliminary neurological works on cinematic perception, parallels to pre-cybernetic research and researchers quickly appears of its own accord. The artistic induction of feelings and emotions that takes place in the cinema and the technical motion of gazes are cybernetic regulations of an apparatus that links living beings with machines. The name of this apparatus is cinema in the broadest sense, from the moment in which it is technologically

realized in the shoot, to the emergence of a new space in projection and the transmission of this space to the spectator's perception.

What remains as a larger problem in the hypothesis of a cybernetics in the cinema is, first, to establish the character of the goal at which something should be directed in the first place. A physiologist noted that the aims of technical control systems are evident, while those of biological systems are metaphysical.¹¹ The cinema is somewhere in between. The subject and object of control cannot be distinguished. Technologically, self-perception in the social is in control, stabilizing or destabilizing according to the film. The goal can be refined in each case only if we see the history of cinema as the invention of devices. A remark by the early film theory Hugo Münsterberg gave direction to the many vectors of cybernetic processes between spectators, the image, the apparatus, and the film artists: "To picture emotions must be the central aim of the photoplay."¹² For all its ambiguity, this means that feelings should be presented and depicted, at any rate expressed: put into the image.

A second problem that the hypothesis of a cybernetics of the cinema repeatedly led to the edge of a breakdown consists in the fact that images, even technical images, are not simply signals. Film images especially mix all kinds of other signal-like qualities – such as luminosity, contrast, depth of field, or movement – into every shot as the material and technical parameters of the image's effect, alongside the trance-producing rhythm of intermittent projection. Only then is the motif of a depiction emotionally modified. The film images are thus multilayered complexes made up of technical, iconological, historical, and sensual components. How they can only be forcibly placed into an epistemological feedback process of illustration, and how they make amends for this, is the subject of the first chapter.

The question of "film and possession" was the starting point for this research. The meaning of nerve agitation in various cultural trance techniques leads to examining the cinema in this neurological context as well. This can be assembled into a history that was directed, more than intended, toward a cybernetic film theory – in a literal sense. At the same time, however, this book forcefully documents how this cybernetics constantly breaks away from all theories and systematics that can be described in film history.

The chapter "Discretions" examines depiction as a social technique using the example of Gregory Bateson's pre-cybernetic speculations about constructing images and meanings in anthropological films by means of his footage of trance dances in Bali. Not only Bateson, with whom Deren

proposed a joint film project in Haiti, but also Norbert Wiener himself, who asked the research couple Mead-Bateson to comment on the sociological uses of cybernetics models during the Macy conferences, drew connections between the question of social technologies, which was so virulent in the 1940s, and a theory of communication.

Against this historical backdrop, Maya Deren proposes the practice of a technology of depiction that is simultaneously an artistic and a social process. Film can become ritual technology if the rules of transformation are set.

In the second chapter, "Depersonalizations", possession is placed in a diachronic context. Deren's comparison of hysteria and possession in Haitian voodoo is placed into relation with her film theory and her practical film transformations of the coordinates of space, time, and perception. The precondition of all of her art is that Deren is familiar with the essence of technical procedures. For all her discretion, what she nonetheless forgot is: Knowledge about the rules of transformation do not necessarily protect the subject from being infected itself, in other words, from becoming possessed.

One of Deren's more fortunate doppelgängers is Jean Rouch, an engineer in street and bridge building, who developed the method of ciné-trance in Africa, the technological correspondence between film and possession. Using the example of his film *Les maîtres fous*, "the mad masters", about the cult of the Haouka in Accra, I will present Rouch's reflections of "film feedback as anthropological return gift", and his practice of using film footage as an art of transformation: "Deviations."

It is not by chance that the threads of research about possession and suggestions coincide at a place that also forms one of the primal scenes of film: Salpêtrière, where Albert Londe developed new cameras with which doctors like Charcot could bring some order into the confusion of hysterical gestures. With these cameras, they could then present themselves as the masters of madness. Not only Sigmund Freud, but also Vladimir Mikhailovich Bekhterev was a spectator at these stagings, the mastery of which was based on a technology: "Compressions."

The second part of the book looks into the prerequisites for all these cultural technologies of trance in the history of sciences. The cinema appears there as part of the history of psychology and its experiments, localizing the soul in the nervous system and establishing the connection between human beings and machines, as it also defined art for the electronic age: the birth of cinema from the laboratories of the neurophysiologists. The apparatus of the cinema appears in the line of medical

apparatuses that standardized rhythm and movement as indexes for human mental life and, the other way around, could induce human mental life artificially. This is the German pre-history of cinematic perception: "Mental Apparatuses."

Because the mind was by now accessible in the form of physiological data, the physiometers, their psychically labile patients, clients, customers began to make new bodies and body movements to measure for the impacted people or the audience. This is the French pre-history of cinema: "Psycho-Motor Activity."

From the institutes of the psycho-physiologists come the first professionals to use film to derive diagnoses from the body movements depicted there: "Psycho-Drama." Their most loyal spectators were the Surrealists, while their most merciless perfectionists were the doctors in the Third Reich.

Among the classic film theorists, at least two come directly from the psychological laboratories: Hugo Münsterberg and Rudolf Arnheim. With his book *The Photoplay*, Münsterberg wrote the first American film theory. In contrast to German and French film theory, the American theory can be described as one that complies with the wish of everyone to be connected: "Psycho-Technology."

Another figure had only indirect influence on film history: Vladimir Mikhailovich Bekhterev, Münsterberg's colleague in St. Petersburg/Leningrad. In Deren's works he turns up mediated by her father's psychological advisor, Salomon Derenkovsky. Bekhterev developed the theory and practice of a "collective reflexology" from his areas of specialty – hypnosis, possession, and suggestion – in which the circumstances of transmission can be imagined as an ideal and within society as a whole: a first visionary neurological media theory: "Psycho-Reflexology." His research at the Psychoneurological Institute also shows him to be the man behind Dziga Vertov's man with a movie camera. Translated more precisely, the title of his film sounds like an experiment at the Psychoneurological Institute: The man observed by the cinematic apparatus.

The final chapter uses Vertov to sketch out the possibilities for a collective human knowledge through cinema; "The truth gained by means of film."

Correspondences, coincidences, and good spirits that always turned up when doubt took the upper hand kept the gaps and chasms in the history of science together as a novel. Walter B. Cannon was at first only conceived as a supporting character, as the medical mentor and colleague of Norbert Wiener, and therefore belonged in the introduction. But then

he also turned out to be a researcher in comparative neurology of voodoo, and thus turns up in the chapter "Trance-Technology." Finally, according to the congress protocol from a 1927 symposium in Ohio, he posed two questions to the speaker Vladimir Bekhterev, thus playing a significant role in the chapter "Psycho-Technology." As an avant-gardist in the area of medical illustrative techniques, he developed new radiological procedures. Cannon died later from an excess of radiation from the laboratory, just like a certain Blanche Wittman, the very first star, inaccessible, an "astre" in the cinematic sky.

To Whom It May Concern.