

Ute Holl

Cinema, trance and cybernetics

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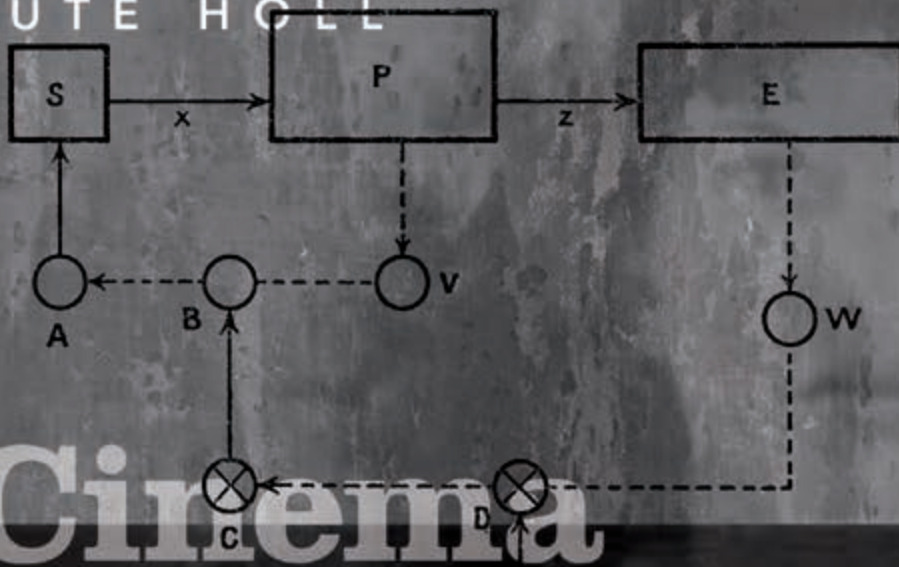
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UTE HOLL



Cinema

Trance &

Cybernetics

Amsterdam
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RECURSIONS

Cinema, Trance and Cybernetics

The book series **RECURSIONS: THEORIES OF MEDIA, MATERIALITY, AND CULTURAL TECHNIQUES** provides a platform for cuttingedge research in the field of media culture studies with a particular focus on the cultural impact of media technology and the materialities of communication. The series aims to be an internationally significant and exciting opening into emerging ideas in media theory ranging from media materialism and hardware-oriented studies to ecology, the post-human, the study of cultural techniques, and recent contributions to media archaeology. The series revolves around key themes:

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Cinema, Trance and Cybernetics

Ute Holl

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Foreword

Fade into Black

Pasi Valiaho

Goldsmiths, University of London

Cinema, Trance and Cybernetics is driven by a refrain. The paths and forks of the book's reflections always return to a primal scene, a "ritual", as Ute Holl calls it, which keeps appearing in different guises: the "passage into the darkness of the cinema" that begins as soon as the lights of the movie theatre are turned off. This primal scene retains its familiarity to us. Despite the fact that televisual screens have rendered their occurrence as virtually superfluous, we can still remember and experience those anticipatory moments of becoming enveloped into the movie theatre's artificial blackness before the film projector begins its duty of casting movements of light and shadow on the screen's blank surface. *Cinema, Trance and Cybernetics* reminds us how this "passage" bears particular anthropological significance. The movie theatre's darkness is one in which the faces of our loved ones become covered with the strangest masks, and we grow either closer or more alien to ourselves.

Cinema, Trance and Cybernetics can be read as a detective story: Who turned off the lights? What happened when the darkness fell for the first time? The book engages a range of actors from the later 19th century and the first part of the 20th to divulge the necessary clues. Readers should be notified, however, that its protagonists are not the usual (male) figures of early cinema and the Hollywood movie industry but instead scientists as well as scientific and experimental filmmakers. Rather than the Lumière brothers, Alfred Hitchcock, Steven Spielberg, the Wachowskis, etc., the *dramatis personae* that for the most part populate the following pages include Maya Deren, Jean Painlevé, Jean Rouch and Dziga Vertov, in addition to numerous (more or less well-known) figures from the history of the life sciences as well as anthropology, including Margaret Mead and Gregory Bateson, Etienne-Jules Marey, Gustav Fechner, Hermann von Helmholtz, Vladimir Bekhterev, and the Harvard psychologist of German origin, Hugo Münsterberg, who published one of the first theoretical studies on the "photoplay" in 1917. *Cinema, Trance and Cybernetics* takes the reader to a journey that spans a range of different sets (seen as if from a bird's eye view, through a virtual camera flying over different locations): Bali (where

Mead and Bateson did their fieldwork with film cameras and typewriters), Albert Londe's photographic studio at the Salpêtrière in Paris, Marey's physiological station in Bois de Boulogne, the international symposium of neuroscientists and psychologists at Wittenberg College, Ohio, in 1927, Deren's house in Los Angeles where *Meshes of the Afternoon* (1943) was filmed...

Cinema, Trance and Cybernetics in a sense rewrites film history. Its stakes are nothing less. But instead of debating the historical record (who did what when), the book's implicit concern is on how these questions should be posed. Rather than merely telling stories about how cinema was conceived by various inventors and has been used by artists and entrepreneurs, *Cinema, Trance and Cybernetics* is preoccupied by what the medium of film has done to us, how the cinema has changed us. That is what the mystery of darkness is about. The book thus refocuses the lens through which we look at the past; it adjusts our conceptual understandings and approaches. Under Holl's scrutiny, cinema doesn't appear as a medium of mass entertainment, not even as a particular aesthetic form per se, but above all as an "anthropological machine" the stakes of which involve articulations between human and animal, conscious and unconscious, or speaking being and living being.¹ Above all, *Cinema, Trance and Cybernetics* explores the film medium's place and meaning in the scientific and technological upheavals of the twentieth century that came to radically reshape our composition.

A key thread of the book's narrative fabric is to show how cinema was born out of the spirit of the experimental scientific laboratories developed in the nineteenth century. "The unknown avant-gardists of film history", Holl's cogent observation goes, were in fact "natural scientists". It was the forerunners of modern neurology, physiology and psychology that first came up with techniques of probing perception and consciousness, and above all the "limen" that separates conscious mental states from non-conscious ones. After initial experimentations in the lab, commercial and artistic applications, which capitalized on cinema's liminal psychology, followed. Jean-Martin Charcot's and Albert Londe's visualizations of the movements of so-called hysterical female bodies at the Salpêtrière in Paris, for instance, provided the breeding ground for Lillian Gish's performances in David Griffith's films. Gustav Fechner's three-year state of trance, which the founder of psychophysics induced himself into with excessive experiments on afterimage effects, amongst other things, might just as well describe the somnambulists flocking to watch Griffith's dramas, or alternatively today's video game players.

Throughout *Cinema, Trance and Cybernetics* one can hear the echo of Friedrich Kittler writing in *Gramophone, Film, Typewriter* (originally

published in 1986 in Germany): “Since its inception, cinema has been the manipulation of optic nerves and their time”.² Kittler’s insight was to show how technological recordings and reproductions of acoustic and optical “data” have critically changed the “state of reality.”³ For Holl, likewise, cinema performs an experiment on our being; on what can be sensed, imagined and dreamt. Conceptually, *Cinema, Trance and Cybernetics* is firmly grounded in the German-speaking tradition of media and film theory, and proves what this tradition of scholarship is capable of doing with its vigorous mixing of philosophical thought with a sustained inquiry into and critique of cinematic (and other medial) modes of being and thinking. Film comes here across as a cultural technique the research of which, to borrow Bernhard Siegert’s words, “amounts to an epistemological engagement with the medial conditions of whatever lays claim to reality.”⁴

Cinema had its throne as *the* medium of the 20th century capable of dictating how we are able to perceive and conceptualize the world. Cinema had the power, to paraphrase Kittler’s words, to “define what really is.”⁵ Holl investigates this power by deftly drawing conceptual parallels between cinema and cybernetics, parallels that have largely remained to be explored, one might surmise, simply because they perhaps aren’t the most obvious. Whilst cinema, at first sight at least, comes across as a technology of the industrial era, belonging to the family of mechanical apparatuses that includes the steam engine, the bicycle, the train, and the clock, cybernetics is an invention of the Second World War, of (electronic) signals and computation. Whilst cinema was originally conceived by the Scientist and then quickly appropriated by the Capitalist, cybernetics belonged in its very beginnings to the General, that is to say, to the military-industrial complex. Norbert Wiener’s “anti-aircraft predictor” (built in 1948) was one of the first incorporations of the cybernetic idea of modeling and controlling a system’s behavior and particularly its future states. How does this compare with film, a technology we normally associate with storage rather than anticipation, pure recording rather than feedback? The common denominator can be found in the etymology of “cybernetics”, that is to say, governance and control. Both cinematic and cybernetic systems link living beings with machines and in so doing administer and regulate human cognition and behavior, or in other words, the movements of bodies and souls. Both “feedback” into our nervous systems and brains. “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”, Holl writes. Synchronization and optimization of the senses and psychic life coupled with the mechanics of the film apparatus

– this is the operating function of the feedback loop between the spectator and the screen that is established in the dark of the movie theatre.

Cinema's power, then, is not merely located in the contents of its imagery, however moving, luring or explicit, but in the exchanges, repetitions and relays that take place between the movie machine and our nervous systems and brains. Cinema is a machine for controlling and regulating our impulses, sensations and emotions. But above all – and this is the point that recurs in *Cinema, Trance and Cybernetics* like Karl Marx's ghost in our neoliberal nightmares – cinema is a machine for shifting and displacing the consciousness, and for “inducing trance”. Combining film experience with the trance state is the second key innovation of the book, in addition to refocusing on cinema through the lens of cybernetics.

“Trance”, Holl writes, “as a dissolution or diversion of the consciousness under the impact of certain technologies, is the gap in film theory.” Much ink has indeed been spilled on the unconscious mechanisms of film spectatorship; on the dream state induced by film viewing, on the mirrorings, misrecognitions and identifications that arguably take place in the movie theatre's darkness. In the film theory of the 1970s, the moviegoer was even reduced to an infantile of sorts. *Cinema, Trance and Cybernetics* does point towards a similar kind of loss of control in the spectator's position as soon as the lights in the movie theatre are turned off. But rather than mere regression, the idea of trance designates here how the spectator's self-regulatory system yields control to external forces – the sheer force of movement, light and shadow on the silver screen taking charge of inner physiological and mental events. This means the emergence of alternative bodily and psychic states, affective and emotional conditions, within the individual. In this respect, Holl's analysis can be seen to converge with recent attempts at re-conceptualizing cinematic subjectivity, which seek analogies between the filmic apparatus and hypnosis in particular.⁶ Here, the power of cinema is considered in terms of suggestion, even possession, which opens our minds, not simply to external control and machination, but also to new dispositions and capacities.

In this respect, trance indeed appears in what follows as an ambiguous concept, a concept with at least two faces. On one side, it is a question of “command and control” – the movie machine's steering of our nerves and psyches like the God sending orders by means of rays of light to Daniel Paul Schreber (the [in]famous case of paranoia “treated” by the psychiatrist Paul Flechsig and theorized by Sigmund Freud, and later Gilles Deleuze and Félix Guattari). But on the other side, trance gestures towards ruptures, erratic tics and fits within the dominant order of things.

We might get a better grasp of this ambiguity by taking a brief look at the Hauka movement, which began among the Songhay people in Niger in 1925 and was popularized for the Western audience in Jean Rouch's ethnographic film *The Mad Masters* (*Les Maîtres fous*, 1955). Rouch's cinematic works play a key role in *Cinema, Trance and Cybernetics*, as they, according to Holl, tinker "with the technology until new imaginary spaces start to emerge, in which mental states are realized that are non-integrated." The Hauka is a famous example of such "non-integrated" as well as ambivalent states. The participants would dance and become possessed by the spirits of their European colonizers – military officers, administrators, governors, and so on. The proceedings would be physically intense, as Paul Stoller describes:

The pulsations ripple like waves through Istambula's [a Hauka medium's] body. He extends his arms and spins around like a top. He grunts and howls. Saliva flows like lava from his mouth. Barbara Mossi and the general join him. The tempo is quite fast; the beat is intense. One by one the Hauka throw their bodies in the air, landing on their backs with thumps.⁷

Possession means here complex acts of mimicry whereby Hauka mediums would not only imitate the gestures, fashions and manners of their "civilized" colonizers, but also the ways in which the colonizers aped the "savage" colonized. It means dialectical play with identities at an uncertain threshold between them and us, self and other. Michael Taussig calls this kind of performance "mimetic excess" – excess whereby the hegemonies of domination can at least momentarily be suspended, perhaps even annulled, and which provides "opportunity to live subjunctively as neither subject nor object of history but as both, at one and the same time."⁸

Could cinema be capable of holding such subjunctive and excessive powers? Can it give rise to spectators who are "possessed" instead of being "possessive"? *Cinema, Trance and Cybernetics* will not give readers any definitive answers; who could? But by probing into the cinema's and our psyche's liminal states, the book makes a strong case for reconceptualizing what the politics of cinema can mean. This is a gesture that several of the book's German companions have shunned – their inquiries into how differentiations and separations are brought about often forgets the question as to how orders of things could be changed, that is to say, the question of political agency. Simultaneously, it avoids reiterating the well-rehearsed critiques of "ideologies" and "representations" so dear to Anglo-American scholarship. Liminal states hold the germ of excess and transgression – this

is how we might encapsulate the “surrealist” politics of cinema that *Cinema, Trance and Cybernetics* outlines.

Cinema, Trance and Cybernetics shows that the passage into the darkness of the movies definitely compels us to let foreigners in. When the film ends, the lights are turned on, and we hurry towards the exit, the spirits of the silver screen gradually leave us, dissipating into the air. But during those 90 minutes or so, we have, potentially at least, been possessed to mime ourselves and the world around us differently. Thanks to the movies, the spirits will always be here, with us, in us.

Notes

1. I borrow the notion of “anthropological machine” from Giorgio Agamben; see especially Agamben, *The Open: Man and Animal*, trans. Kevin Attell (Stanford: Stanford University Press, 2004), 33-38.
2. Friedrich Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999), 115.
3. Kittler, *Gramophone, Film, Typewriter*, 3.
4. Bernhard Siegert, *Cultural Techniques: Grids, Filters, Doors, and Other Articulations of the Real*, trans. Geoffrey Winthrop-Young (New York: Fordham University Press, 2015), 14. See also the “Cultural Techniques” special issue of *Theory, Culture & Society*, ed. Geoffrey Winthrop-Young, Ilinca Iurascu & Jussi Parikka, vol. 30, no. 6 (2013).
5. Kittler, *Gramophone, Film, Typewriter*, 3.
6. See Raymond Bellour, *Le Corps du cinéma: Hypnoses, émotions, animalités* (Paris: P.O.L., 2009); Stefan Andriopoulos, *Possessed: Hypnotics Crimes, Corporate Fiction, and the Invention of Cinema* (Chicago: University of Chicago Press, 2008).
7. Paul Stoller, “Embodying Colonial Memories”, *American Anthropologist* 96, no. 3 (1994): 634-648, quotation on 635.
8. Michael Taussig, *Mimesis and Alterity: A Particular History of the Senses* (New York: Routledge, 1993), 255.

Preface to the English Translation of *Cinema, Trance and Cybernetics*

Returning to *Cinema, Trance and Cybernetics*, my study on cinema as a cultural technique of trance and transformation, on the occasion of its translation into English some fifteen years after the German edition, I was surprised to discover that the book exposed new and unexpected impacts in a fundamentally changed media environment. Under the new circumstance it has, as it were, become a new book. The study's research into historical relations of anthropology, psycho-physiological studies and experimental film culture produces unforeseen ramifications in the light of recent developments in media technology and media practices. Therefore it will definitely contribute to the fields of media theory and specifically cinema studies, albeit differently than when it was first published.

Cinematic perception, in fusing single frames into an imaginary continuity of moving images had, according to Marshall McLuhan's diagnosis, been a useful vehicle to travel from the mechanical Gutenberg Galaxy into the 20th century's Turing Universe of an electronically composed perceptive continuum. In the current condition of digital data processing, cinematic perception might turn out to be even more indispensable in the attempt to come to terms with the reorganisation of our senses under a 21th century's regime of electronic media. The algorithms that organize data for moving images cannot be perceived for themselves, but only in what we perceive as effects, which appear due to transformations of streams of data between electronic devices. Since cinema itself has once and for all left its classical setting in movie theatres to spread across electronic meshes and across individual or shared screens, its specific entanglement of physical cultures and wishful hallucination returns as an issue with ever more insistence. Former meshes of the afternoon have turned into omnipresent meshes, into a permanent mode of trance, as it were, disorganizing and disturbing what we perceive as presence or absence.

It is only now, since technical devices, cultural bodies and physical behaviour have progressively merged, that my book's basic argument has become common experience: The act of cinematic perception connects a whole set of elements, technical as well as cultural, topological as well as historical orders, so that the filmic image can never be located as such but only considered in its effects, on different screens, in different viewing cultures. The book *Cinema, Trance and Cybernetics* proposes a genealogy

of cinematic experience which, as I see it, turns out to explain even more of the ambivalences of communication and control in social and personal media today than it had done for the critique of the old mass medium which was still the dominant type of viewing film's when the book was written. Rereading my study I was astonished to find that in the light of the latest developments of technical devices its assumption that technical media carry the threat of social trance and oblivion, while also providing perspectives of cultural transgression and the transformation of alterities proved sustainable. Or rather, it seems much clearer today than when Hollywood's model of the cinema was considered classical, its apparatus homogeneous and its impact compulsory. In today's cinematic devices from personal pads to gigantic screens on urban architecture, the issue of feed-back, of senso-motoric integration or disintegration of bodies and screens – or cameras for that matter – is obvious to every user. The history of the cinema as an interface is a central thread in the book.

Venturing back into the psycho-physiological experiments of the 19th century, I set out to discover a common history of technique, laboratory studies of behaviour and desire. In this sense, the book seemed risky in a methodological perspective. In a fortuitous encounter of luck and serendipity I found these fields connected in the work of experimental filmmaker Maya Deren. Following her biographical cues, I traced the genealogy of cinematic experiments into the psycho-physiological laboratories of the 19th century and discovered close bonds between scientific experiments of psychologists and scientists on the one hand and the studies of trance, possession and altered states on the other. At their interface, major and resilient filmic topoi emerged, the mad scientist as well as the hysteric clairvoyant. Cinema's history in the field between avant-garde film, 19th century experimental psychology and anthropology had been discussed before. But a study on trance and feed-back in cinematic perception also shows that not only plots and content derive from cinema's prehistory, but also their technical adaptations to the minds of the 20th and now, differently, to the minds of the 21st century.

Maya Deren's work does not only link the fields of psychology, anthropology and experimental cultures, she was also acquainted with a concealed network of counter-psychological thought. Through her personal relations to Soviet Psychology I discovered the strange networks of knowledge established by Vladimir Bekhterev, who turned out to link experimental practices connected to names like Paul Flechsig, Jean-Martin Charcot, Dziga Vertov, Walter Cannon and finally Jean Rouch and Gregory Bateson. Cybernetics as historically established feed-back relations or interfaces

between the nerves, the senses and the minds on the one hand and technical devices on the other – a context concisely called cinema-eye, *kino glaz* by Vertov –, relations that at the same time escape the conscious perception of users seems to be a very old project, which is taking possession of newer cultures of seeing and listening only now, in the presence of personal and personalized screens.

Maya Deren's invitation to follow the Voudoun divinity Legba into the darkness and towards the cross-roads of cultures and ecstatic practices also led my studies. The path of research has thus lead from cinema's darkness into the flicker-lit set-ups of laboratories and to utopian and dystopian models of technical devices connecting instruments and physical bodies. To day, the darkness of the movie houses is only a memory of a trance technique which is about to disappear. When writing the book, gramophone, film and typewriter had just been replaced by Walkman, digital video formats and personal computers. The culture of I-pods, smart phones and pads as well as of streamed data which form into personal audio-visual viewing dispositives was just on the verge of breakthrough. Once they reached their subjects, they increasingly reduced them to consumers. Deren's call for appropriating technical skills and devices in the service of revolutionary and ritual cultural forms seems to be right on time now. Gregory Bateson had hoped that the notion of gods meant nothing far out but the implementation of ecological thought against the competition of capitalist society. I kept returning to this hope in the presence of ever more drastic exploitation of people and continents. What sort of hybrids we have become under the rule of the new and colder race of gods – as William James had predicted – will have to be inferred as extension of the book at hand.

As opposed to the studies of the Canadian School of media theory, contemporaries of Maya Deren she had not really taken notice of, Deren's thinking was concerned with syncretistic and unknown cultures rather than with the decline of a Western world of literacy. And compared to the Canadian School her work was inspired by feminist attitudes. Film studies, and specifically in Germany, insisted that cinema is a form of thinking liberated from the obligation of assuming philosophy's single and disembodied spirit – *Geist* – in favour of the multiplicity of heterogeneous forms combining different views, gazes, bodies and minds. In this feminist culture of film studies to which my research owes its foundations, Deren's work provided crucial forms of knowledge. This farewell to the formation of a singular form of mind will also have to be reconsidered in the presence of cinemas on multiple screens.

Now that feed-back loops between technical devices, cultural and physical bodies have merged as an every day experience, the book's basic assumption does not seem as risky as it used to: The film's images are not projected elsewhere, but come into effect in the cultural conduct of societies as well as of single subjects. The ontology of the filmic image has to be studied in our own forms of behaviour. As subjects, we prove to be interfaces of historical and cultural techniques as well as of discourses of sanity and legality as they are modified by the historical modes of cinema's aesthetic procedures. But even in the presence electronic data processing, cinematic experience will allow us to reflect, perceive and negotiate our culturally hybrid status. In terms of media theory this implies that it is not the search for simple materiality which will prevent us from following endless routines of hermeneutic odysseys, but the perception of historical relations between material and cultural techniques, conscious or unconscious.

Apart from all such new and unforeseen impacts, rereading *Cinema, Trance and Cybernetics* now had another effect which might qualify as a central concern of media studies' methodology: Wistfully I remember the audacious research and writing in the wake of Friedrich Kittler's provocations, with or against the vortex of his own work. This is true for interdisciplinary conjunctions and conjectures as well as for political conclusions related to strategies of subjectivation in technical environments. These approaches once were alien to academic studies. Even if I thought of my research as proceeding in a strictly discourse-analytically structured manner, it was at the time considered risky and rejected by classical German film studies. Today, this work is read as basic research into cinema's aesthetic history. If nothing else then, the book is a good example of the pleasure that is connected to venturing into a field that is not academically established, or the excitement of inventing a new set of questions. Thus, the forms of research which are now called New German Media Theory were mostly establish at the crossroads of existing discourse networks and mostly at night. It was about exposing interrelations of disciplines and cultural practices, deliberately without being caught in the trap of technical determinism. This might, after all, qualify as the central concern of media studies' methodology.

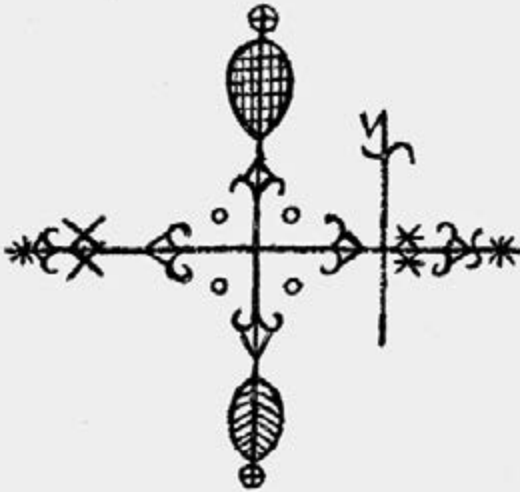
If there was an initial goal of the text at all it would have been to describe cinema as an experience of producing new perceptual forms and habits, new forms of conduct and behaviour which would allow for social homeostasis – call it peace or not – to be realized beyond disciplinary means. While German media theory seems to be inevitably linked to technologies of war and disciplinary data processing, my studies were at the time very much

motivated by the will to find inventive and emancipative forms of media practices, to discover new forms of communication capable of resisting the regimes of control, and to reconstruct a discourse history of the unconscious in cinema, which would expose the tiny messianic force of an equilibrium between human beings and apparatus. It is here that the book seems have developed its most antiquated facet.

The book is itself a node in a larger network of studies, and while it is impossible to name all the names necessary to explain its edges, there are some that have specifically formed its meshes: the feminist film theory of Heide Schlüpmann, and Friedrich Kittler's media theory, two antagonistic positions which become really explosive if their forces are joint. Jutta Hercher introduced me to Maya Deren's cinema work. Bernhard Siegert rescued the research project early on dropping terms like cultural techniques. That the book exists at all is owed to Rike Felka and Erich Brinkmann who took the risk of publishing it in the first place, and to the editors of the New German Media Theory who chose it to become part of a great series. That the English version exists at all is owed to the brilliance and elegance of Daniel Hendrickson, himself a man at the cross-roads of the arts.

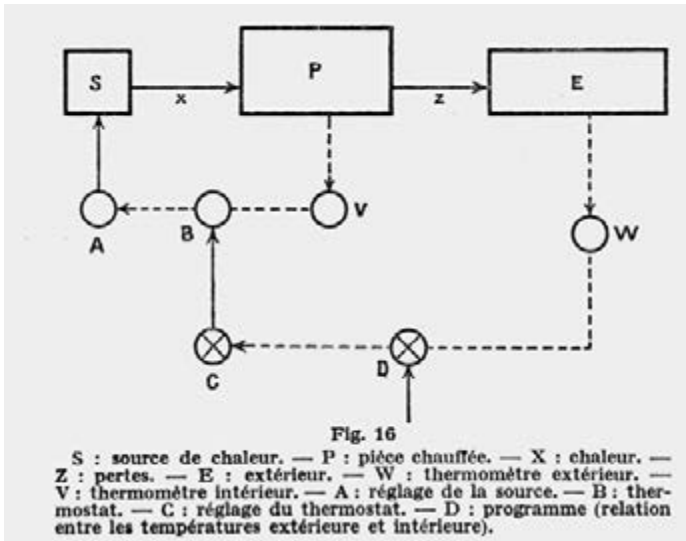
I am extremely happy that the book will be published towards the 100th anniversary of Maya Deren who was born on April 29th, 1917.

Legba—The Old Man at the Gate



VEVER FOR LEGBA

Legba – life – is the link between the visible mortal world and the invisible immortal realms. He is the means and avenue of communication between them. (...) Since he stands at the cross-roads, he has access to the worlds on either side, as if he were on both sides of the mirror surface which separates them. – Maya Deren, 1953. In: *Divine Horsemen. The Living Gods of Haiti*, New York 1973. p. 97.



La Cybernétique n'est pas une Super-Science, le cybernéticien n'est pas un Super-Savant: ce sera bientôt un spécialiste comme les autres, installé en un carrefour, mais non pas pour faire la loi. – G.Th. Guilbaud 1957. In: *What is Cybernetics?*, London 1959. p. 28.

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 neuro-physiologists. 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.



Jean Rouch, *Shooting from the Wheelbarrow*. Private Collection.



Maya Deren, *Glas*. Photo: Alexander Hammid. Mugar Library, Boston, NY.

Part II

1. Discretions

Gregory Bateson, Margaret Mead: Bali, New York

Gregory Bateson: "Norbert Wiener, when he had a problem, used to sit with the
wind blowing on a curtain."

Margaret Mead: "I thought that was von Neumann."

Most ethnological research trips ended quite literally at the knowledge of the gods. Not only those of writers like Leiris and Artaud, but also the anthropological journeys of Gregory Bateson and Margaret Mead to Bali and that of Maya Deren to Haiti. Film footage of rites and rituals was supposed to be made at a distance, in the field. Nevertheless, an unexpected interference of cultural effects appears between the ones filming and the objects of their anthropological investigations. Although the research reports were only meant to convey information about the foreigners, they are also always protocols about un hoped for and unexpected experiences with one's own culture and with its technological conditions, with the boundaries and consequences of one's own knowledge.

Over the course of their cinematographic research about trances and dances, both Bateson and Mead, as well as Maya Deren, suddenly see themselves exposed to a magic, the origin of which they do not know how to interpret, but which can be explained as a result of their own misjudgment of western cultural technologies. Looking for coherent cultural patterns, such as those Margaret Mead sought to take as the basis for a new anthropology starting in the forties,¹ the researchers, with their image of the other, saw themselves directly with the conditions of their own subjectivity. Those who did not keep a sharp eye out for the difference between mirror and image in their observations, between technological image and cultural imagination, could easily believe themselves to be wrapped up in the business of spirits and gods.

Transformations in a cultural space that the anthropologists call "integrated"² – whether ritual or simply cinematographic – are never missed by their subjects, even if they can sometimes come into effect with astounding time shifts. Students at Brown University experienced this during a lecture about ethnographic film. Their professor, the anthropologist and documentary filmmaker Karl Heider, was screening Margaret Mead and Gregory Bateson's Balinese film material when he suddenly reduced the projection speed from 24 to 16 frames per second. The still twitchy movements of young

dancers and young women in trance were expanded into long undulations on the screen. At the same time Margaret Mead's commenting voice dropped an octave, as if she were trying to prove the thesis that all cultural coding is also always a transformation, carried out on her own body and using the example of the most significant ethnological binary. The "grande dame" of American anthropology, who had written her most important books about the cultural differentiation of gender, sounded like a man. What was thus shown in the "acoustic mirror"³ was a distorted acoustic image of Margaret Mead, unclear in the cultural context but nonetheless identifiable. A real fake.

Karl Heider justified his harsh manipulation of the playback speed in the name of texts that Mead and Bateson themselves had written about the conspicuous calm and even, slow rhythm of Balinese culture. Rituals, ceremonies, and educational methods on Bali, as the two anthropologists had shown, were all aimed at interrupting emotionally cumulative, that is, increasingly sensational processes in social relations, and at regulating emotional states in terms of uniform stability and non-competitive behavior.

What Heider provided for his students to see, manipulated in this way, in fact matched the normal speed of Balinese dancers and rituals, since Bateson, in order to economize on the expensive film material, had shot certain parts of his footage at 16 frames per second. Margaret Mead had simply edited these in between the remaining material later. In a regular projection, the presumably calm dancers hysterically floundered around on the screen during these sequences. The regularity of the film projector could only present either the cultural integrity of the anthropologist or that of the Balinese, and when Heider pulled back the tempo of the mechanism, thus violating the correct cultural identity of the anthropologist, he put the film apparatus at the service of Balinese culture. Its transformation in the cinema occurred consciously and for pedagogical reasons. As a good reader of Mead, the speed was significant for him, and not just the schema of the course of movement: "Mead's voice drops an octave or so but it is still understandable, and the Balinese pace can be appreciated."⁴ Now it was exactly the goal of Mead and Bateson's research trip to use new inscription methods to transform themselves in the field of Balinese culture. Their goal caught up with them in the end, but only belatedly, involuntarily, and with Heider's technological help.

Ethnographic films for the purposes of research had already existed in the prehistory of cinema. In 1895 the doctor and anthropologist Félix-Louis Regnault, together with the cameraman Charles Comte, prepared chrono

photographic recordings of people walking, attributing their walks and gaits to different races: a running African, three striding Arabs, an African woman with her child tied on her back, a person from the South Sea islands climbing a tree – in comparison with a French soldier incidentally, who manages it just as quickly without any help. Regnault's recordings of a Wolof woman making pots are considered the beginnings of ethnographic film. Based on these images, which were photographed in the middle of Paris at the "Exposition Ethnographique de l'Afrique Occidentale", he wrote a revised cultural history of pottery making. Shortly thereafter, in 1898, Alfred Cort Haddon recorded images, films, and sound on wax cylinders in the service of the Cambridge Expedition to the islands of the Torres Strait which were meant to document the psychological, social, and religious particularities in the islanders' behavior. In 1901 Baldwin Spencer recorded a kangaroo dance by the Aboriginals in Australia and is thus considered a pioneer among anthropological filmmakers. Films were also made by physiologists, psychologists, and even commercial travelers and merchants such as Augustin Krämer from Hamburg and adventurers such as Hans Schomburgk, in order to gather data and information on film about the cultures and colonies to be developed, but until the forties of the twentieth century it was the portable typewriter that remained the scientifically recognized instrument of all anthropologists working in the field. The camera was relegated to illustrating the theses put down in writing. As late as 1974, Margaret Mead expressed regret in her manifesto-like *Visual Anthropology in a Discipline of Words*⁵ that whole cultures were disappearing without ever being recorded and documented. Ethnologists, according to Mead, in contrast to all the other disciplines in the natural sciences, would not adopt the most advanced research technologies, thus allowing the whole realm of visual anthropology to come under the influence of film artists, whose recordings were in no way in the service of science.⁶ Margaret Mead had good reason to criticize this development, since it was she, along with Gregory Bateson, who had once initiated a film revolution in ethnography. On a legendary trip to Bali, Bateson and Mead attempted to displace the monopoly of the written word in ethnography with photography and film as recording technologies in their own right: "We tried to use the still and moving-picture cameras to get a record of Balinese behavior.[...] We treated the cameras in the field as recording instruments, not as devices for illustrating our theses."⁷ Film illustration itself was meant to be a method of scientific knowledge, in order to get around the subordination of foreign societies to the conceptualizations of western paradigms. Registering on film was meant to store "behavior" as physical action and reaction among

people, beyond all linguistic valuation, before the second step of analyzing certain patterns and then discovering anthropological and cultural typologies in the images.

The film material that Gregory Bateson and Margaret Mead brought back from Indonesia at the beginning of the forties does in fact represent a milestone in the history of anthropology. Since the two anthropologists claimed to have discovered a model of non-aggressive social dynamics on Bali and – anachronistic to all geopolitical escalation – a model of non-competitive social behavior, the trip could very much have been understood as a peace mission in dark times. The Balinese footage, however, caused such a stir above all because it represented the basis for a future dynamic anthropology. Already in the thirties, as part of their research in New Guinea, Bateson and Mead had observed behavioral patterns among young villagers on the Sepik river that they described as “schismogenetic”, meaning a process of progressive cultural differentiation that was increased and extended through symmetrical or complementary intersubjective feedback. Examples of this are male and female behavior in everyday life in the play between voyeurism and exhibitionism, in the back and forth of relationships and gazes. Cultural identity, the two anthropologists could demonstrate, could be understood as inter-relation, as interplay.

Since that time, anthropology no longer simply focuses on exploring an unfamiliar society, but on discovering what recursive processes are used to differentiate human behavior in a society into particular cultural or even moral types. The goal of anthropological examinations was not simply customs, rites, rituals, and relational forms, but the model that is visible behind all variable behavior: the rules of transformation. The charm in the heart of darkness.⁸

Due to his research in New Guinea, Bateson received a Guggenheim grant to explore a theory of social transformation. The wording is as follows: “A formulation of a nucleus of theory relating to concepts of culture, personality and character formation and the extension of this nucleus to cover the phenomenon of cultural change.”⁹ Due to their research, Mead and Bateson were invited, anthropologists among physicists, mathematicians, and neurologists, to the exclusive Macy conferences to investigate “feedback mechanisms and circular causal systems in biological and social systems”, which launched both the term and the epistemology of cybernetics. Questions of how social relationships and social transformation are modeled and regulated were at the core of this important American research program for a (post-)war world that had got out of hand, the predictability of which was supposed to be restored with the aid of electronic machines.

The possibility of understanding and modeling cultural behavior in cybernetic terms, that is, in loops made up of “feed-backs” or “feed-forwards”, was directly linked to the first Macy conferences and the effect that they had on contemporary epistemological reflections. It was only against the backdrop of the Macy conferences on cybernetics that Mead and Bateson could turn a cultural anthropology of characters and temperaments into an anthropology of socially differentiating behavior. Systematically surveying the foreign was turned into interpreting by means of systems theory. Mead, who examined mother-child relationships in particular in the light of this dynamic, recalls in a conversation:

There had been too much emphasis that there were temperamental differences among children, so that you responded differently to a hyperactive baby than you did to a quiet baby. But the extent to which there was a system in which the mother was dependent on what the child had learned as the stimulus for the next position wasn't well articulated until we got the cybernetics-conferences going.¹⁰

Cybernetics was therefore – much like navigating the sea, this master pattern of cyberneticists and helmsmen – to be understood as a consequence of situational assessments and the corresponding corrections for readjustment. Observing this behavior would then also have to be kept to a consecutiveness of actions in hierarchies of logical and temporal arrangements that were only realized over the course of time.

Cinematography, with its temporal organization of events, thus initially promised to provide the ideal recording instrument for ethnologists. Nevertheless, Bateson and Mead's efforts in Bali to use film to raise the scientific methods of anthropology to new heights of data processing¹¹ initially proved to be only an unexpected “quantum leap.”¹² From their stay between 1936 and 1939, Mead and Bateson brought back 25,000 photographs and roughly 22,000 feet of 16mm film material, that is, more than 12 hours worth, which they wanted to evaluate as the basis for their studies of trances and dances in Balinese rituals. What was missing was the corresponding leap in methodology. Only when viewing the material after their return to New York did it become clear to the two researchers that the footage was only the necessary preliminary work for a medial revolution in anthropological paradigms. Editing the films, which required a structural organizational principle, emerged as an unresolved problem. What was lacking in the editing room was any convention that would have scanned the significant moments and events in the uniform calm of Balinese images, given visibility to relations

and behavior, and thus suggested some sort of editing principle. In the images of scenes from everyday life, rituals, and trance dances, which were recorded in all kinds of lighting, from various perspectives, and with different speeds, one cannot initially spot any coherent units or elements that might have organized the material. But this is precisely what would have been necessary for any scientific systematization in structural anthropology. At the beginning of his universal ethnological examination apparatus, Claude Lévi-Strauss made the following remark: "In any field a system of significances can be constructed only on the basis of discrete quantities."³

Bateson and Mead had selected an analog recording medium right at the point in time when the avant-garde of anthropologists were working on formalizing reality in the direction of a strict binary. Claude Lévi-Strauss, who was teaching at the New School for Social Research in Manhattan at the beginning of the forties, where Bateson was also lecturing, developed his methods of structural anthropology in analogy with linguistics, which, as Lévi-Strauss observed with "some, let us say, melancholy, and a great deal of envy",⁴ precisely involved a technological collaboration with the engineers of that new science called cybernetics. Just as linguists differentiated phenomena in language, Lévi-Strauss discovered "distinct entities" and "pairs of oppositions" in ethnological analysis, for example of kinship relations, which could be ascribed to certain ways of behaving. So, just as Freud had called for deciphering the contents of dreams not according to their value as image, but according to relations of signification, Lévi-Strauss noted that "the error of traditional sociology, like that of traditional linguistics, was to consider the terms, and not the relations between the terms."⁵ Lévi-Strauss formalized these relations to make them available in an almost exemplary way for further extrapolation by the "great modern electronic machines."⁶ The relations that Lévi-Strauss had discovered as cultural forms in societies could all be notated and systematized as "+" or "-" so that "each culture is a unique situation",⁷ while remaining part of a general law. Following this system, one could write an algorithm for each culture, which would illustrate its patterns, processes, communications, and transformations – the dream of every computer administration.

Binary coding for Lévi-Strauss, as an anthropologically constant fundamental law – and this is the surprising turn in his argument – is a formalization due to the unconscious activity of the mind.

If, as we believe to be the case, the unconscious activity of the mind consists in imposing forms upon content, and if these forms are fundamentally the same for all minds – ancient and modern, primitive and

civilized [...] – it is necessary and sufficient to grasp the unconscious structure underlying each institution and each custom, in order to obtain a principle of interpretation valid for other institutions and other customs.¹⁸

The activities of the mind that humans beings are unaware of is not only appropriate for Turing's universal machine, it can also realize and integrate all cultures in world history with their institutions and customs as a Hegelian universal machine.

Unlike Lévi-Strauss, Gregory Bateson, who never tired of emphasizing the value of "loose thinking"¹⁹ in scientific processes, deliberately kept the relationship between linguistic and ethnological order casual and porous from the very beginning in order to avoid some as yet undiscovered universality of human forms of relationship turning out to be a self-fulfilling prophecy of a European, Cartesian mind. He systematically jeopardized his own intentionality when speaking and naming. In contrast to the elegant and elementary systematics of structuralism, he deployed Anglo-Saxon "trial and error":

When I am faced with a vague concept and feel that the time is not yet ripe to bring that concept into strict expression, I coin some loose expression for referring to this concept and do not want to prejudge the issue by giving the concept too meaningful a term... I can go on using the vague concept in the valuable process of loose thinking – still continually reminded that my thoughts are loose.²⁰

Bateson thus casts out his ever-refining net of signifiers, which is meant to catch unfamiliar wild thinking and acting, while he remains categorically camouflaged like a hunter. Like the entrapped Narcissus, however, he himself becomes the first victim of this strategy.

Initially, however, Bateson wanted to transfer this method to film in order to counter the French universalism of the mind with a psychosomatic ecology, which was to be viewed in Norbert Wiener's sense as the circulation of the whole ecosystem, of the "organism-plus-environment."²¹ Correspondingly, the researcher couple got down to the task in a holistic way, albeit always maintaining a division of labor. Margaret Mead recorded the course of events in written form, while Gregory Bateson photographed and filmed at the same time – sometimes assisted by anthropologist Jane Belo. In one photo book, which the New York Academy for Science published in a special edition, almost 800 photos are combined into thematic tableaux

of five to ten pictures, each of which are extensively annotated *en face*, representing a fascinating typology of the image of the Balinese body in a hundred chapters. Bateson specifically describes which cameras, which lenses, which film, and even which development chemicals he used, and yet at no point does he announce which concepts of space and time – neither anthropological, filmic, nor cultural – he used to determine whether to use a telephoto or wide-angle lens, when and according to what model to take series, when portraits, and when wide shots. Since he started using a rapid-winder starting in 1937, the tableaux in the book look much like sequences of single frames in a film, although they do not mark the courses of movement systematically, for instance regularly on a timeline. The images determine the aesthetic of the book to a great degree. They are not, as announced, introduced as a media revolution in the scientific gaze, for they function precisely not as photography and especially serial photography as a scientific method would have required. Chrono photographic processes were developed in the nineteenth century in order to fix traces in which “behavior” is placed in a clear relation to temporal-spatial systems of coordinates as a visible surface of psycho-physical interaction.

One distinction, at least, was made during the process of filming. Since there was very little film material available, it was the “more active and interesting moments” that were shot, everything else being recorded with a still camera.²² At no point does Bateson indicate when he chose to expose the 16mm film at 16 frames per second, and when 24, nor in which situations he switched to slow motion. We read merely that “we were compelled to economize on motion-picture film.”²³

Contrary to all epistemological declarations of intent, what is lacking is any rule of transformation for the footage from Bali. The method behind Bateson’s film anthropology can at best be described as an attempt to leave the principle of recording to chance as much as possible:

[...] it is so hard to predict behavior, that it was scarcely possible to select particular postures or gestures for photographic recording. In general, we found that any attempt to select for special details was fatal, and that the best results were obtained when the photography was most rapid and almost random.²⁴

It is not difficult to rediscover here the methods of epistemological hunting taken from written ethnography. With “random” photography, Bateson sought to deactivate the literary order of anthropology and, even more, the interest from his own anthropologist’s gaze. The Anglo-Saxon legacy,

which Bateson brought to the cybernetically constituted anthropological method was to refrain from all teleology. Later, he would explain this experimental phase of his research to a student: "One of the essentials [...] for understanding it, was to have been brought up in the age when [...] purpose was a total mystery."²⁵ Approximating chance as an illustrative principle completely suited the paradoxical intention of recording the Balinese in their own spaces and temporalities without intention or psychological or ethnological purpose. The anthropologist man-with-a-camera had his eyes on the complex, candid reality of human interaction: "[...] we tried to shoot what happened normally and spontaneously, rather than to decide on the norms and then get the Balinese to go through these behaviors in suitable lighting."²⁶

What they sought to register was what was not "predictable", for which there was no term, everything that was not entangled in the nets of symbolic designations, because it fell through the cracks of the order of anthropologists who used writing. This was meant to expand and restructure the field of anthropology in terms of media. Using film, human behavior could finally be recorded beyond "postures and gestures", in all physical reality and the uniqueness of random correspondences, in all its peculiar movements, speeds, and irregularities, in all the indescribable surfaces of the body and the unpredictable effects of exotic lighting conditions that once again transformed the dancers' movements.

While Gregory Bateson devoted himself to the lack of intentionality of his recordings, he lost sight of the other side of the chance-coin: the inauguration of order presumed to exist in every coincidence, as a moment of conjuncture. Only where there are borders, margins, and paths can there also be crossings and intersections where accidents, chance, and incursions can occur. "What do we mean when we say that something happens *by chance*? We may mean one of two things, which may be very different – either that there is no intention, or that there is a law."²⁷ Bateson assumes that in doing away with intention he was also doing away with the law, and in his epistemological anarchy he sought to pit *random* against *accident*, *hazard* against *chance*, coincidence against probability. But not everything falls so easily into place with the cybernetic anthropologists. God may not play dice, but he did turn the dice's structure into a kind of trophy. Bateson attempted to shed all awareness of what he was doing and to show that it was not only the photographed persons, but also the researcher who could forget what had happened: "The photographer himself ceased to be camera conscious."²⁸ All this making one forget and making oneself forget, however, did not change the fact that photography and film

irrevocably brought symbolic conventions into the field of the Balinese and even Balinese culture. What Bateson had ignored was that photography and film, with their mechanical equipment, optical devices, and chemical processes, were just as historically determined, and were just as foreign to the Balinese as the typewriter had been. Bateson had ignored that he, with Heiner Müller, was always already shooting from the hip.

The film material initially remained unedited. Instead, Bateson began to organize all the open questions of social and cultural patterns in terms of system theory at the New School for Social Research. In this context he developed a graphic solution – halfway between writing and image – to the problem of anthropological illustration. Typical Balinese behavior, which consisted in systematically interrupting the “perhaps basically human tendency towards cumulative personal interaction”²⁹ and in it as duration without escalation, becomes manifest, in its ordinate pattern of “cumulative action” to the abscissa of time, in the form of a plateau. It is just this plateau that would later come to prominence in the history of philosophy with Deleuze and Guattari. Bateson was thus proposing one of the most important lines of flight out of the limitations of western thought:

“Some sort of continuing plateau of intensity is substituted for [sexual] climax”, war, or a culmination point. It is a regrettable characteristic of the Western mind to relate expressions and actions to exterior or transcendent ends, instead of evaluating them on a plane of consistency on the basis of their intrinsic value.³⁰

Teleology, a total mystery. It is no coincidence that it was a filmmaker, Maya Deren, who pointed out to Bateson that the form and course of his plateau were solely due to the structure of his system of illustrating. In his schema, Balinese feelings only appear as a break in an increasing, cumulating line because he systematically does not mark a persistence in time as an increase in intensity. This could also be conceived differently. Deren pointed Bateson to an obvious counter example: “The duration in time [...] applied to sexual activity even in occidental cultures is not considered a negation but, on the contrary, valued as a considerable achievement.”³¹ Duration itself could therefore be denoted as an analemma curve in the sky. In other words, Bateson’s graphic contains more information about Bateson than about Bali, as soon as the graphic is not read in its value as an image, but according to the relationships that it creates.

Deren’s discomfort with cultural theory was justified. What Bateson had sought as behavior in the film images were not simply reactions in time, shapes in space, and forms of typical patterns of movement, but socially

pre-evaluated behavior such as dominance and submission. In a letter to Maya Deren from December 12, 1946, in which Bateson prophesied difficulties for her own film project, he explains to her the problems of his theory of binary and complementary elements, with which he constructed relations of social and familial relationships or national characters as a system of regulation or control, warning:

The trouble is that these paired adjectives are very inadequate descriptions of human relationships, that in fact, to make a pair, the dominance and the submission have to be of such special sorts that the submission is the sort of submission which is appropriate to that particular sort of dominance... Dominance may be linked with spectatorship, and submission may be linked with exhibitionism, or the pair of polarities may be reversed – dominance being linked with exhibitionism etc. The important thing is that there shall be an ethological system of some sort underlying the relationship between the two contrasting elements. Beyond this is it probably necessary for the two elements to be talking about the same thing – e.g. sex, or drawing a hopscotch line, or whatever.³²

Maya Deren distrusts any relationship categories constructed as binary, with which Bateson sought to make “behavior” calculable as information in social regulatory cycles. Her objection can be summarized as indicating precisely the error that Bateson takes for the most common one in the argumentation of systems theory: the confusion of “territorium and map.” Deren’s sharp camera-gaze maintains that Bateson is always dealing with illustrative functions in his material, whether these observations be written, photographed, or filmed. She finds the constructions of his ethnological as-signations to be “orders” in the double sense of arrangement and command, and she criticizes the blending of the levels of depiction. After a lecture by Bateson on February 22, 1947 she notes:

Last night the Bateson theory lecture and the mix up about Balinese ‘startle.’³³ I suspect it doesn’t sit in there right, because it is a ‘symptom’ of something which is an order, and it is not itself an order in the sense that the ‘other feedbacks’ are orders. Anyway, that dominance-submission business feels very wrong somehow but I don’t dare speak as strongly as I should like to because I’d have not the right thing to offer instead. At least if he would use arrows of dynamic movement (what the hell is the name of them?) rather than make those directional signposts! Time Time Time – not Space. Energy – not matter.³⁴

Deren's critique of Bateson strikes at the core of all communications theory: the functional distinction (in representation) and operational equation (as circuit) of "order" as arrangement and command. Behavior should be understood much more as a symptom of a certain social order than as a classificatory system in its own right. In the Anglo-Saxon tradition behavior is not only conduct, but also manners, and it is not for nothing that Bateson, much later, will invent the theory of the double bind precisely through the example of the parental imperative – "behave!", while Bateson, in his depiction, pursues the signifying pair "dominance and submission", which he himself introduced as a cornerstone of a "Balinese ethos", Deren insists that one can observe a movement in in which "orders" develop as interaction and in which interferences, differentiations, and feedbacks are revealed to be variable. While Bateson – as was the implicit rule of digital research – introduced binaries into the social field in order to be able to recognize algorithms as patterns in anthropology, he ignored the fact that film itself introduces an order. Movements are chopped up into discrete units and can be combined through this formalization into an illusion of movement and animated into illusionary movements. The cinematographic order scientifically dictates that reactions and behavioral modes are only grasped over time, and they alter with time and temporality. In his film depictions of the Balinese character, Bateson disregarded the time factor, thus documenting his indifference in relation to the technical process of the recording medium. His films, however, were objects, not simply of "involuntary"³⁵ even random manipulations of the timeline, but of manipulations justified purely by economic concerns, and thus provide a good example of the colonial gaze, which can notoriously remain innocent because it has implemented its operations and optical distortions, or more precisely: the optical instruments.

Relativizing time in a very practical sense is one of the elementary operations of all film artists and researchers when they carry out experiments in experience on screen. The temporal structure is the moment of the filmic in every screening, which, by transforming discrete single frames into a perception of motion, creates an imaginary that cannot consciously bring its origins in its own technological realization into the present. Film perception is principally illusionary, and technological manipulations are not seen as such, but only in their aesthetic effects. Slow motion and time lapse take on particular emotional values as the expression of a context of motion, and are not simply their decelerated or accelerated variants. Rudolf Arnheim confirmed this in the terminology of the experimental psychologists when he was researching in the Frankfurt School of Gestalt: "The expressive

quality of any movement is dependent on its speed, and by changing the speed of natural movements film can modify their character.”³⁶ This is why we attribute the charm of the movements at 18 frames per second, which Chaplin also maintained in his sound films, to the little man with the cane and the melons, and not to the film apparatus that creates it. This is why Ninja and Wu Tang fighters appear so externally concentrated when their on-screen movements just before the decisive stroke pass by in slow motion. Maya Deren also made a film about the movements of shadowboxing in Wu Tang and Shao Lin: *Meditation on Violence*. The film pits camera and body movements against one another and as is therefore a study of the cinema and the philosophy of Wu Tang at the same time, which is derived from the *Book of Changes* and which views life as permanent metamorphosis.

A filmmaker’s indiscretions do not point back to the filmmaker him or herself. Since film perception is illusionary, we sense a time-lapse recording of Balinese dances as something nervous or hectic in the movement of the dancers, and not as the economical or even stingy decision of the cameraman. Slow motion, which also exists in Bateson and Mead’s Balinese films, is understood as expressing an intensity in the trance, a heightened physical control on the part of the dancers, and not as evidence of an increased analytical interest, which both led to these recordings and then edited them into the film without consideration for any ritual integrity. What is intended as neutral instrumental editing in the name of research develops, despite Mead’s off-screen commentary, into a willful emotional effect.

The duration of a jump, which is artificially extended in the montage and can be combined from different sequences and perspectives, is exactly not meant to neutralize excitement and tension – if it’s edited well – but to increase it enormously. In this way, temporality in film is transformed into intensity and finally into emotion. Since Dziga Vertov’s stunning analysis and synthesis of movement in *Man with a Movie Camera*, and also in America at least since Panofsky drew attention to the fact that “these unique and specific possibilities [of film] can be defined as *dynamization of space* and, accordingly, *spatialization of time*”,³⁷ it should have been clear that every relativization of temporal conventions in film is a significant transformation of everything that an ethnologist can record as cultural information. It is the transformatory tool with which filmmakers can produce emotions in the space of the cinema, quite independently of the emotional states of their actors or their art of method-acting. But there is no other way for anthropologists in the field to shoot film.

Margaret Mead, however, would adhere to this literal filmic illusion of pure visual anthropology her whole life. “If tape recorder, camera or video is

set up and left in the same place, large batches of material can be collected without the intervention of the film-maker or ethnographer and without the continuous self-consciousness of those who are being observed.”³⁸ In misrecognizing the degree to which the usage of cultural recording technologies is conditioned and marked by tradition, she summarily threatens those who put up resistance to their filming of her behavior with definitively losing their history:

[...] the isolated group or emerging new nation that forbids filmmaking for fear of disapproved emphases will lose far more than it gains.[...] they will rob of their rightful heritage their descendants, who [...] may wish to claim once more the rhythms and handicrafts of their own people.³⁹

Film archives or institutions in which the young and by now urbanized and electrified indigenous population might once again take possession of its legacy of ritual and handwork with the aid of anthropology have not prevailed. In contrast, the subcultural use of electronic instruments in various musical styles like the blues of the Delta, certain jazz music, or Hendrix’s pop music might suggest an immediate and physical link to ritual techniques.⁴⁰ Margaret Mead’s well-meaning colonialism, which also ignored the role of technology, was avenged not by the descendants of the dead Indians, but, as her Brown students heard, by the projecting institution itself.

Parallel to the ongoing debate with Gregory Bateson, Maya Deren wrote an article about montage, *Creative Cutting*, in which she sees through the anthropologists’ game with film technology: “It is the phenomenon of duration as tension which explains why slow motion – which may have in it very little activity – often makes for greater tension than normal or rapid motion for the tension consists in our desire to have our anticipation satisfied.”⁴¹ It is this transformation of “duration” into “tension” that creates emotionality in film. The intensity that appears in film as certain editing sequences or in anthropological depictions of interactions that do not provoke a differentiation between groups as a continual, sustained curve, is created from elements that had previously been made discrete. If editing technique remains in common conventions, it remains unnoticed as a function of illustrative technology and thus unaware of the transformation. If it appears, as it did at the beginning of film art, when there were barely any film conventions, or later in the montage of *cinéma vérité*, in Jean Rouch, or in Jean-Luc Godard’s “wrong”, visible cuts, it troubles the field of vision, thus instigating a disturbance to culture, its technologies of storing and recording, and thus the very conditions of subjectivity.

The relation to the apparatus is supposed to be forgotten twice: first when shooting in the field, and a second time in the cinema. If the technical feedback of film movement disappears when a spectator looks at the electronic artifice of the projection apparatus, the transformation does not return as an effect of the filming direction and intervention of an observer, but as an imaginary essence of what is depicted, thus provoking the spectator's emotional reaction. When Bateson cannot manage to edit the images into any systematic scientific sense, what he experiences as the methodological failure of his ethno-cinematography returns as an emotional effect at a quite different spot. Maya Deren, to whom Mead and Bateson had initially loaned their Bali film footage for her own film project *A Fugue of Cultures*, had new and ecstatic experiences when watching the footage on her manual home viewer: "The minute I began to put the Balinese film through the viewer, the fever began. It is a feeling one cannot remember from before, but can only have in an immediate sense."⁴² Deren's ecstasy on viewing the footage can also be described as transformation, in which a return of the cinematic unconscious in Walter Benjamin's sense does not simply depict the "concept of culture, personality and character formation" that Bateson was looking for, but produces it in the first place. Emotional ramifications develop in projecting the material that in the long run even form emotional relations. Nonetheless, Deren notes that it is precisely the manipulation of the film speed that represents a reason for the artificial ecstasy that has little to do with the Balinese trance technique, but is due above all to the feedbacking connection between the New York woman's body with the New York film apparatus.

The immediate physical contact with the film, the nearness of the image, the automatic muscular control of its speed – the fact that as I wound – my impulses and reactions toward the film translated themselves into muscular impulses and so to the film directly with no machine – buttons, switches, etc. – between me and the film[...]. Later of course, I shall use the projector to get proper speed, etc. But first this intimate copulation between me and the film must take place...⁴³

While Bateson had just given up hope that film might be a medium to depict circular-causal and feedback mechanisms in social systems, he had created all the necessary conditions to put such mechanisms in gear. The cinematic feedback that the anthropologists had presumably sought in the field occurred in the cinema. Only during projection could and must Margaret Mead and Gregory Bateson be confronted with their cinematically

construed Balinese selves, and only then could they see the transformation of the stranger as their own. Heider's students were plied and flattened by the same transformation, by an endless, and in McLuhan's sense, medial extension, which is echoed by itself over and over again, and which can be described as a baker's transformation, to use Deleuze's terminology. At the same time this medial extension is further processed further into a multifarious "mille feuille". It is the processing of one's own sensibility, of one's own trance, which would not be induced by Indonesian drums and dancers, but by the small Trojan horse of a 16mm projector in the lecture hall. Heider's dauntless speed switching constantly kept this processing from becoming the usual procession of institutional anthropology.

In their model of the thousand-fold plateau, Deleuze and Guattari merged the double sense of the anthropology-order into a direction for philosophy to move. With regard to the subject, they turned out to be film philosophers:

Starting from the forms one has, the subject one is, the organs one has, or the functions one fulfills, becoming is to extract particles between which one establishes the relations of movement and rest, speed and slowness that are closest to what one is *becoming*, and through which one becomes. This is the sense in which becoming is the process of desire.⁴⁴

Deleuze and Guattari selected duration from Bateson's plateau – unlike Bateson himself – and therefore recognized the perception of intensities of relation. The history of evaluating the Balinese ethos shows that Bateson's plateau is due to the experiments in film depiction anyway, and in no way due to Balinese culture.

At the latest in 1951 Bateson will have integrated Deren's objection, that he was transferring his own order into foreign systems and cultures through his system of notation, into his communications theory. This theory was published as a study of psychiatric reform. Along with a research group, Bateson had placed psychiatry in a completely new light by simultaneously examining physical illnesses under neurophysiological, linguist, and behavioral psychology aspects as abortive or ambivalent communication. Now his sights are set precisely on the illustrative system: the book about the new methodology bears the title *Matrix*. He had taken Deren's critique of his transferal of western forms of subject formation to the rest of the world seriously. In the sixties, Bateson combined all his reflections on cybernetics and cinema with an emancipatory theory of subjectivity according to which personalities and characters can be formed, broken down, or even healed in the context of collective forms of relations with time and in duration. In

the foreword to a new edition 16 years later, he would add parenthetically: "At the time this book was written, it became abundantly clear that the age of the individual had passed."⁴⁵

At the beginning of these new research projects, Bateson placed Norbert Wiener's thesis that the concepts of "information" and "negative entropy" are synonymous and develop simply and elegantly the connection between the knowledge (or non-knowledge) of an observer about the state of a system on the one hand, and the order or entropy that he or she can attach or attribute to this system. Every speaker is entangled in the continuous process of coding, evaluating, and transforming with his or her "information and evaluation system." The premises of the book, in which Maya Deren is only faintly and fragmentarily perceptible, like an echo to Narcissus, are first of all that codification and evaluation are two sides of the same operation, as Deren had noted in relation to coordinate systems for the Balinese plateau, and second, that the simultaneous definition and evaluation that someone makes, from which their behavior can be inferred, presumes that the observer progressively revises his or her assumptions, consequently learning from his or her mistakes. Bateson's clear thesis on meta-communication can be read as a commentary on previous indiscretions. Bali, as it were, is a network of gazes, recorded in discrete image by the camera, projected in front of an audience, which relates to these images...

As a theorist and the great practitioner of a "learning to learn", which can mean both "learning to deal with and expect a given kind of context for adaptive action" as well as "character change due to experience",⁴⁶ Gregory Bateson integrated the lesson of doubled film-time into his communications theory. Starting from psychiatric studies he took a social matrix above all as the basis of human behavior, relativized the observer's standpoint, and recognized every codification, every mode of illustration as evaluation.⁴⁷ Bateson had experienced the cinema as a dynamic relational trap. His film experiment had not simply displaced the sad typology of the anthropologist in the field, powerless in speech but powerful in writing, not simply made it possible to see the structure of social feedback mechanisms among strangers, but shown that films implied a fundamental relativizing of behavior. The ethnographer must thus know that he is at best a cybernetic catalyst in his work. Norbert Wiener formulated it to his Macy colleagues with a malicious undertone:

With all respect to the intelligence, skill and honesty of purpose of my anthropological friends, I cannot think that any community which they have investigated will ever be quite the same afterward.[...] There is

much in the social habits of a people which is dispersed and distorted by the mere act of making inquiries about it. In another sense from that in which it is usually stated, *traduttore traditore*.⁴⁸ Bateson becomes “trasformatore.” Ultimately he will simply call for: art.

Years later – and much to Margaret Mead’s annoyance – Bateson, thinking back on the shifts of the time axis in the Balinese film work, said: “I think the photographic record should be an art form.”⁴⁹ Mead, on the other hand, who later edited the Bali material after all, remained true to the time of the anthropologist, subsuming the Balinese footage in all speeds, regardless of her off-screen commentary, to 24 pictures per second. She also did not refrain from showing the long thin figure of Gregory Bateson himself with the camera at his eye at the end of the film *Trance and Dance in Bali*, as if she wanted to present the erratic and flickering film views as the mimesis into the obsessive and causal-circular exuberance. As late as 1976, in a conversation with Stewart Brand, the two – who were both well over seventy – could still reactivate their old argument about “behavior” at a single mention. Mead immediately pointed out the weak blind spot of the cameraman, the persistence:

Mead: [...] he’s a good filmmaker, and Balinese can pose nicely, but his effort was to hold the camera steady enough long enough to get a sequence of behavior.

Bateson: To find out what’s happening.

Mead: When you’re jumping around taking pictures ...

Bateson: Nobody’s talking about that, Margaret, for God’s sake.

Mead: Well.

Bateson: I’m talking about having control of a camera. You’re talking about putting a dead camera on top of a bloody tripod. It sees nothing.⁵⁰

Whether cameras can see, whether the control or steering of the gaze can be placed or even concealed in the detail of the apparatus, whether human being and machine develop symbiotic or parasitical relationships in the matrix of cybernetic artificiality – in the 1940s these were not just questions for anthropologists with movie cameras. In the Second World War, camera and radar eyes on airplanes and machine guns could not only record and transmit visual material, they could also calculate trajectories and guide projectiles. But while the devices learned to behave more precisely, human behavior under the conditions of war had turned out to be highly unreliable and uncontrollable. People who were just supposed to shoot could suddenly

no longer trust their own senses and nerves, their muscles, and their self-assurance, entrapped in irresolvable sensory-motor convolutions. They started to tremble, to stutter, to stagger, and, at best, simply to collapse. The mathematician Norbert Wiener, who was familiar with all these states, tried to find a remedy to these break-downs while working for the US Air Force. He discovered a new principle of integrated control: "This method of control appeared to us not unlike a method already known in electric circuits and now being applied in servomechanisms, or systems by which we switch in an outside source of power for control purposes.[...] We call this negative feedback."⁵¹

It was this method of negative feedback that Bateson was looking for when he sought to achieve control over the camera, which would see in his place so that he could finally get the goal of his gaze in the viewer – a constant feedback between technology and the gaze, which rather precisely describes the difficult to achieve balance between self-control and absent-mindedness that is necessary for all artistic production. Bateson became increasingly interested in his own cultural transformation, which obviously included the world around him as an ecosystem. By this time, ethnologists had been able to further deconstruct the image of the stranger – if necessary, in a brutal and liberating way, such as Karl Heider had done when he showed his students that sometimes all that is needed to get the genie in the anthropological bottle to appear is a valiant grip into the apparatus.

In a letter from December 20, 1967 to the neurophysiologist Warren McCulloch, one of the pioneers of the mathematical calculation of neuronal network processes and one of the founders of the Macy conferences, Bates writes about the knowledge of the gods, which appears at the end of this lifelong research report that meanders through the sciences:

I suggest that one of the things that man has done through the ages to correct for his short-sighted purposiveness is to imagine personified entities with various sorts of supernatural powers, i.e., *gods*. These entities, being fictitious persons, are more or less endowed with cybernetic and circuit characteristics.⁵²

Gods regulate and rescue the world's equilibrium by maintaining homeostatic processes beyond all individual human interest. Maya Deren had also regretted that no human society had integrated this divine self-regulating dynamic into its social system: "But there is no society or organization designed to change itself and this is what the whole hitch is",⁵³

she noted on March 16, 1947. Shortly thereafter, however, she encountered the gods in Haiti, who appeared on the scene in such transformations, who seized bodies and intervened in human relationships. This case makes clear how such good gods form an alliance with the media of storage and transmission.

2. Depersonalizations

Maya Deren: Hollywood, Haiti

Magic cannot be explained. Magic can only
be practiced, as you all well know.

– Heinz von Foerster, 1990

Body Balance

While Gregory Bateson's oblivious use of film technology was making him the object of cinema-trance unwillingly, Maya Deren, a pioneer of American experimental film, is going the opposite way: as a levelheaded machinist, she first appropriates the technological functions of film, only to take her leave as often as possible in a kind of cinema-sleep. "[...]you may find me many evenings in the motion-picture theater, sharing with the other sleepers [...] the selected dream without responsibilities." While the British Bateson dragged visions of analytical symmetry to the USA modeled after his great role model William Blake, Deren smuggled an unusual legacy of Russian knowledge in among the American filmmakers. Her father had studied reflexology in St. Petersburg with Bekhterev, and had worked at his Psychoneurological Research Institute in the 1910s, a time when experiments were being done on methods of group therapy, methods of collective suggestions and mutual psycho-physical equilibration, methods that were unknown in the USA. Only in the 1960s were similar forms of systematic therapy developed there for schizophrenia patients: by a research group surrounding Gregory Bateson.

Maya Deren will come close to circular-causal thinking, as she newly discovered it in Bateson's lectures at the New School for Social Research in New York, when she begins systematically reflecting on the cinema. Her most important text about cinema, *Cinema as an Artform*, in which she produces the relativity of spatio-temporal perception and historical technology, begins with the dedication: "To my father, who, when I was a child, once spoke to me of life as an unstable equilibrium." Her theory of cinema examines just such an unstable equilibrium as a microstructure of a web of relations, not only between subjects, but especially between people and apparatuses.

Cinema, like dance, is about movements that produce an equilibrium of moments which are unstable in themselves. This is why Deren constantly

pursues the interferences of historical technologies and social relations in her texts on cinema. When technological developments encroach on the parameters of time and space, it relativizes everything, even the conditions of subjectivity. The indivisible ego no longer stands squarely on the ground of reality, but gets displaced into new parameters:

Today the airplane and the radio have created, in fact, a relativistic reality of time and space. They have introduced to our immediate reality a dimension which functions not as an added spacial location but which, being both temporal and spacial, relates to all other dimensions with which we are familiar. There is not an object that does not require relocation in terms of this new frame of reference, and not least among these is the individual.³

For Deren, “relativistic” reality not only refers to the theory of a once new scientific way of thinking, but also to complexity and ambiguity, asynchronicity, blurriness, and imbalances in human perception, which have become scientifically competent. With analogue media it was not reality, but movements and relationship between realities that became the object of research. For Deren, parameters like time and space are subject to historical and technological developments – as is shown by the fact that she insistently and repeatedly pointed out the simultaneous development of cinema, radio, and rocket technologies since 1945. But cinema itself has a part in this transformation of times and spaces. In the comprehensive sense that Deren gives to it, cinema, by drawing technology and perception, machines and human bodies, images and gazes together in its rhythm, can itself create reality: “Cinema – and by this is understood the entire body of techniques, including camera, lighting, acting, editing, etc. – is a time-space art with a unique capacity for creating new temporal-spatial relationships and projecting them with an incontrovertible impact of reality[...].”⁴

Against the magic of film projection, the human head is powerless. Deren examines the two operations of film production, technological storage and the technological assembling of stored data into a new reality, in its effect on subjectivity on both sides of the screen. “...filmmaking consists of two distinct but interrelated processes: photography – by which actuality is recorded and revealed [...] in its own terms; and editing, by which those elements of actuality proper may be re-related on an imaginative level to create a new reality.”⁵ In photography every object portrays its own illustration onto light-sensitive surfaces or filmstrips, at any rate, as Deren repeats,

not before it has passed the analysis of recording technology: “the refined optics of the lens, the slow-motion analysis of the movement, etc.”⁶

Only after being treated technologically does reality become visible, open to experience and communicable, and thus reality is always a historical one. From the very beginning Deren examines the quality of an image not for its possible similarities with what is depicted, but for the effect of this image on thinking and the imagination, for the medial effect as a mental effect: “...the term ‘image’[...] presumes a mental activity.”⁷ The form of reality that is photography marks its place value in a series of transmissions that encounter and alter perception. This is why the photomechanical means of illustrating, which can be relayed as the impression of light itself, constitutes the form of reality that is every photograph:

The photograph not only testifies to the existence of that reality [...] but is, to all intents and purposes, its equivalent. This equivalence is not at all a matter of fidelity but is of a different order altogether. If realism is the term for a graphic image which precisely simulates some real object, then a photograph must be differentiated from it as *a form of reality itself*.⁸

While Rudolf Arnheim thought that photography had “raised our demands: we like reproductions not only to be faithful to the object but also to guarantee their faithfulness by being mechanical manifestations of the reproduced object itself”,⁹ for Deren photography is the tool that provides art with reality.

After 1945, however, it was precisely technological devices that threatened to replace human senses and possibly also human thinking. Every connection to machines played with the inevitable self-dissolution of human sensibility, and not only in art. The early researchers in cybernetics feared that the individual as an active agent in the world was being reduced to the minimum in the world of digital machines. In the opening speech of the Macy conferences it is stated: “Wiener in his introduction in ‘Cybernetics’ points out [...] that the complexity of the computing machine type of mechanism is so great and can be pushed so far now that it potentially threatens individual decision.”¹⁰ This is the disappointing way that the integration of the human into the digital human-machine was being presented.

At the same time, Maya Deren was experimenting on analogue film with the effects of technological images on human seeing, seeking to establish a new reality assembled out of horizontal, reticulate, multiple functionalities and relationships for the purpose of rescuing human sensibility.¹¹ She was simultaneously attempting to replace the idea of the individual with a

system of interfering human relations. This is the context in which she developed her concept of the ritual: "In its method – a conscious manipulation designed to create effect, in contrast to the spontaneous compulsions of expression [...] – the ritualistic form is much more the art equivalent of modern science than the naturalism which claims to be so based."¹² In one of her film projects, she proposes progressively deconstructing the identifiable agents of action in her films as "Rituals Involving Minimization of Personal Identity." The smallest units of ritual activity – hand motions, eye motions, chalk marks on the ground, round or oblong forms – are meant to become recognizable as discrete elements, as "dis-associated",¹³ and at the same time to be assembled into a joint in which a cultural system would find its expression. The interconnection between technological and social relations in the cinema is the prerequisite for its "incontrovertible impact of reality."¹⁴

As a complement to this "incontrovertible impact of reality", Deren develops the term "experience" in her texts on cinema. At first glance it not only bridges the epistemological gap between the production side of a cinema image and its reception. Still, this reception leaves traces and changes once and for all how space and time are perceived. Experience would be a first circular-causal mechanism in the cinema. Watching films in the cinematic space alters perception, this sleepy dream-watching in the cinema. The new perception in turn determines new forms of watching film, which in turn shifts perception, etc. It is precisely with the term experience that Deren distinguishes the work of experimental filmmakers who are seeking to realize genuine visual effects from the reality and effect of Hollywood cinema, which does not function at all as film, but combines the literary metaphorically into a system of fatuous transcriptions. In Deren's strict sense, Hollywood is not cinema at all, because it neither affects nor alters visual perception:

...the Hollywood fiction film has created a kind of visual shorthand of clichés with which we have become so familiar that we are not even aware of the effort of transcription.[...] Actually, this has nothing in common with the directness with which we would experience a truly visual reality, such as falling [...].¹⁵

Falling, tumbling, stumbling, these powerless movements of the body in space are a good example of the experiences that Deren wants to make filmic, because she assumes a strict composition in artificial, constructed spaces and times, and because she takes and reflects the moment of the involuntary in cinematic perception. Even how one's attention is drawn,

how one's thinking it directed in the cinema, or the shock of a cut can be experienced as mental falling and tumbling. Incursions and consternation. In Deren's films, however, it is above all bodies themselves that are freed from the preconfigured gaze by which they are shackled and held fast in symbolic poses and gestures. She takes up the unpredictable and uncontrollable in movements, but not simply as letting-oneself-go or as relaxation, not as coincidence nor as an accidental shot, neither random nor chance. In order to create sequences of falling, spinning, jumping, or tumbling, Deren demands enormous discipline from the dancers that she works with, for what is supposed to emerge as feeling in the cinema must be assembled technologically from precisely calculated fragments into a new film reality. "Film-Spontaneity' is impossible",¹⁶ she writes succinctly and in a snipe to the surrealists with the pig's eye under the razor blade.

In order to have an experience in art or in the cinema, one has to grasp the essence of the production-device, not the essence of an object depicted by them: "...that experience would be created out of the nature of the art instrument by which it was, in fact, realized."¹⁷ Deren's note is much more significant for film theory than for the visual arts. From the beginning, examinations of film perception such as Arnheim's or Panofsky's have insisted that we can no longer speak of representation in the cinema, since in particular the perception of movement in cinema is a completely distinct and singular form of perception, "not the re-experience, but the experience of motion."¹⁸ In her films, Maya Deren will show that the same is true for perception of film spaces and times.

In all of Deren's films, from *Meshes of the Afternoon* to the raw material that she shot about voodoo rituals in the Caribbean, the shifting and interlocking of relations of time and space is not only a film process, but also determines what could be designated as action or rather "incident." The protagonists, dancers, lose themselves in spatio-temporal labyrinths and encounter themselves again, this time as others on their way through the foreign spaces. These odysseys are not to be seen as the progressive formational journeys of heroes, but as circular movements in spaces that displace any unambiguous gaze. Spaces reflect and refract gazes and raise questions about how the ego is optically involved in the relation to others.

Meshes, Tresses, Networks

The film *Meshes of the Afternoon*, which was shot, according to Hammid, as a "home movie" at 1466 Kings Road in Los Angeles, a few blocks north of

Sunset Boulevard, combined everything that the Bolex – this Swiss precision clockwork among 16mm cameras – allowed for, including changing film speeds, fades, and focal lengths, and equipped with its frame counter to precisely calculate multiple exposures. The film became a labyrinth of perception, which in film history has turned out to be a labyrinth of self-perception. The gaze in this film is led into all the paradoxes provided by the functions of seeing. *Meshes of the Afternoon* realizes what Lacan designated as the prison-house of desire in an image: “In this matter of the visible, everything is a trap, and in a strange way [...] *entrelacs* (interlacing, intertwining). There is not a single one of the divisions, a single one of the double sides that the function of vision presents that is not manifested to us as a labyrinth.”¹⁹ The interlacing of *Meshes of the Afternoon* is also about the seeing of seeing itself, and how the subject is displaced and shifted in the process. What does not stop shifting the subjects into meshworks of space-time would then be the uncanniness of the home movie. The means are banal and yet fundamental, as Panofsky succinctly pointed out for cinema: “These unique and specific possibilities can be defined as dynamization of space and, accordingly, spatialization of time. This statement is self-evident to the point of triviality but it belongs to that kind of truth which, just because of its triviality, is easily forgotten or neglected.”²⁰

Using simple tricks, the little house in Kings Road becomes a villa with endless staircases and interlocking rooms. While for example in one wide-angle shot (Nr. 6) the protagonist climbs a couple of steps to the front door of the house, these very same steps will seem to have been transformed right afterwards into an infinitely long staircase by editing together several close-ups of the key falling down the many steps in slow motion (Nr. 9-12). The literary “...it would seem that...” becomes being in the film by manipulating time. Right at the beginning of the film then, after the protagonist has approached the front door of her lover’s house with decisive steps, she loses control over herself along with the key – as is conveyed by the slow motion – and her perception of her surroundings. The slowed-down movements of the key appear to the identified and infected perception of the spectators as a paralysis of their own deciding power, their own ability to intervene. The suddenly transformed steps defy any perceptual intentions, or to put it the other way around, they no longer have control over the temporal spaces of the world. The problem of any interpretation of this film remains that the intensity of a feeling produced by compressing time – of paralysis, of resistance, or of heaviness – always leaves open various other justifications at the same time, or, to use the terms of objective psychology, it links together different relations. With this first use of slow

motion, spectators are seized by the same disturbance of perception that the protagonist is experiencing.

The steps inside the home are slowed down using the same trick. Frustration, in the literal sense of deception, is conveyed to the spectator as a technological trick. Deren passes the instructions for producing this effect on to amateur filmmakers:

... to achieve on film the sense of an endless frustrating flight of stairs, the great Hollywood studios would probably spend hundreds on the building of a set. You, however, can do it for just the price of the film required to photograph any ordinary stairway three times – the first angle shows all but the top landing, the second angle shows the flight without any landings included, and the third angle shows the flight with the top landing. If the actor climbs the visible portion of the stairs three times at a consistent rhythm, you will succeed in having created a stairway three times as long as the real one.²¹

Film reality is not created from existing relations, but from optically constructed ones. Exertion, fear, and the feeling of futility that befall the protagonist are not mimicked, but simulated in film perception.

A further trick to manipulate spatial feeling is to link spaces by linking two flash pans. A long and constantly accelerating pan (Nr. 16) through a room is edited during the blurriness of motion together with a pan that constantly decelerates and ends in a completely different room (Nr. 17). Later in the film (Nr. 42) there is a pan away from these same rooms without a cut, and a staircase that was not there before becomes visible in the center. This gives rise to a new topological context of a space that seems to be familiar. An interlacing space that conceals its knots in the editing. The discomfort in this constellation appears not only as a serious doubt in the protagonist's perceptive capacities, but also as a slight doubt in one's own ability to remember. Such paradoxical spaces appear complex, but they are the result of simple editing tricks, which, due to their speed, fall below the threshold of conscious perception and intertwine feelings of time and space. *Meshes*, used as a technical term, not only means a network, but also feedback loops, that is, a term that meant more than handwork and handcraft in 1942. These feedbacks of perception, which are due to non-perceptible manipulations, the cinematic tricks of single frames, are what induces one into a cinematic trance. The discreet charm of the Maltese cross. Since he overlooked this systematic dismantling of duration in time done by recording technology, Gregory Bateson could not analyze trance – at least not in film.

Hamid and Deren also create illusionary continuity by using the flash pan to compress time. In a chase sequence between the protagonist and a figure dressed in black, flash pans link up not only different spaces, but also different recording speeds. The figure in black walks up the street in slow motion, the camera follows her, then pans very quickly back. In the blurriness of the motion the next shot is edited in, which begins with a flash pan that slows down, and then ends on the young woman who, in normal speed, takes up the chase (Nr. 32-38). Thus arises the paradoxical time structure that the person walking away moves extremely slowly while the chaser is walking very quickly and yet cannot catch up with the other. To conscious perception, however, they are in the same space and thus in the same time continuum. The paradox that the quick walker cannot catch up with the slower woman is resolved by the visual perceptual logic that knows nothing of technological tricks in that it draws compensatory "conclusions" that here could be called "unconscious conclusions", to borrow a term from Helmholtz. Because the spaces cannot be differentiated optically, the different movement qualities of the two figures get attributed to these figures themselves as emotional qualities. The woman in black appears "uncanny" and "threatening" in her movements, the woman being chased "desperate" or "frustrated."

The exact reversal of this construction, in which the change in time takes place over the course of the pan or as the scene goes on, is seen at the end of the film *Ritual in Transfigured Time*, in which a woman, who is fleeing in normal time, cannot escape her pursuer, who chases her in slow motion. Here as well, the uncanniness of the spatio-temporal situation created by film gets attributed to the man as an omnipotent fiend.

This transposition of the quality of a movement, which gets recorded technologically and thus produced and defined cinematically, to the character of a person who moves is fundamental to watching cinema. It is a cultural means of perception, and it repeats the tactical history of the *dispositif*: the way from physiologically measuring a person to psychologically assessing him, which masks the operation of measuring. According to the cinema-convention we spectators attribute cinematically produced variations of speed and movement to the actors' bodies, not to the film technologies that actually create them. But even if Deren initially only sees her tricks as the poetry of the medium, the paradoxical structures simultaneously expose the functions of the medium. The simplest manipulations of the time structure can make two different characters out of the same actress – in *Meshees of the Afternoon* it is always Maya Deren herself. Rudolf Arnheim described this logic in the sense of the experiments from Gestalt theory:

“The change of speed not only served to adapt visual movement to the range of human perception, but also changed the expressive qualities of an action.”²²

Deren and Hammid have strategically reversed here what turns up again in the discussion with Bateson about recording and assessment in the documentary material from Bali. The parameters of illustration allow what is filmed to appear in a particular and preconfigured system that has already structured and shaped the innocent observation of the senses, be it those of the ethnologist or the spectator in the cinema. While it is also not possible to perceive at all except through such a matrix, the gaze should nonetheless – and this is the point of *Meshes* – be drawn to the meshes of the film.

Another trick for interweaving chronology is the repetition of certain shots that are edited with different connections over the course of the film, that is, into a different temporal context. Shot Nr. 21 for example shows a close-up of a pillow, then follows with a pan right to a record player where a record is spinning; the woman's hand picks up the needle and pauses the record player. The shot fades out into blurriness after another pan to the left. Much later, shot Nr. 61 begins with a medium shot from below of the woman, looking down and holding out her hand. Shot Nr. 62 is a medium close-up of the record player, the woman's hand comes into the picture as the camera zooms in on the record player. When the framing is almost identical with that of Nr. 21, she lifts the needle up again, once again pausing the recording player... This repetition of the action appears in a new spatio-temporal context, thus disturbing the logic of the story. Once again the paradoxical structure actuates the circuits of logical attribution. Our perception in the cinema tends to adjust what it sees to the usual experiences of time and space, thus falling into paradoxical loops of causality. If the same action is shown twice, then it will be a memory of the protagonist. If, however, as its introduction suggests, it is a second, identical action, then there must be something from outside that deceives the protagonist. What is specific to film in this structure is that spaces and chronologies, but also identities and movements are first identified and organized in an automatism of reception, and are always only perceived as contradictory after the fact. Optical illusions in painting can be distinguished from those in film in that the latter occur in linear time and cannot be verified over the course of projection. The constant belatedness with which consciousness recognizes the steps of perception as missteps thus becomes a disturbance of perception and of consciousness itself. All these dissociations, which are called “dreamlike” in interpretations, arise from simple technological

manipulations, which can be achieved with a Bolex or with simple edits made at the film viewer. In *Meshes of the Afternoon* the dream of a romantic relationship becomes a somnambulistic pursuit and failure of two people to meet. They wander, deferred in time, through spaces and when they finally meet, the young woman has already lost herself in her doppelgänger, her depictions on film. If desire, running up and down stairs, is represented as a nightmare of desire structured by others and many other little things, this other is absolutely cinematic.

Through *Meshes of the Afternoon* Deren came to understand two things, as she wrote to the jury for a Guggenheim grant: "First, that a creative work of art implied the creation of an imaginative experience or reality rather than a reproduction of one already existent; and second, that that experience would be created out of the nature of the art instrument by which it was, in fact, realized."²³ Film is no longer about representation, but about constructing experiences that are even more real when they reveal historicity and relativity in the technologies of depiction themselves. In her second film, *At Land*, which was shot in New York and on Long Island in 1944, illusionary compressions of space and time become so much the object of the film that Deren can summarize her long literary scenario in a single sentence, which for its part brings together perception, time, space and history: "*At Land* is concerned with 20th century-minded time and space."²⁴

This film begins with a radical manipulation of time. Scenes are edited in backwards. At first we see the entire screen filled with breaking waves. A woman's body shows up lying in the spray and is bathed, white on black, by the water. When the shot comes closer to the woman, the film material is edited in from front to back and in reverse – and thus, due to the technology of projection, it is also turned on its head.²⁵ The waves pull back from the woman to the sea in a strange and peculiar way, while the woman at first lies there unmoved. Her physical and sensual presence thus seems to follow a simple duration in progressive time, for there is no indication of any backward direction in her own physical chronology. This gives force to two temporal movements of the gaze. One part of the image seems to run backwards, an equally strong part of the image, or even stronger through the sensual presence of the beautiful protagonist, seems to run forwards in time. This gives rise to a dissociation in the perception of time, a schizoization of time. The drifting apart of two parallel sensations of time produces a circumstance in which a permanent psychic or perceptual-physiological compensation in the spectator attempts to adjust to the paradoxical processes and regresses on screen. Strictly speaking, this self-correcting self-reflection of perception, regulated by external impulses, is already

trance. The time of perception and the perceived time periods displace one another without there being any absolute time of consciousness as a holding point. When a close-up of the woman's eye movements follows the scene of the sea in the film, which ultimately allows for no conclusions whatsoever to be drawn as to whether the material is running backwards or once again forwards, seeing has to be let go. Perception is squarely placed under the regime of film movement. The following movements by the protagonist are then set apart from all reality of the beach with a hyperreality. Her movements make her appear as a stranger in her surroundings. At the same time her sensual presence challenges the photographic realism of the sea waves.

Deren not only employs inversions of chronology, but also slow motion and time lapse in a way that disturbs the perception of speed and reflects on their determination from outside. When, for example, some of an actor's movements are executed very quickly, but recorded in slow motion, the movement is seen in projection at a "normal" speed, albeit with qualities that only slow motion produces. The impression of emotional closeness that slow motion can produce is therefore also seen in normal time. In *At Land* there is an example of this in a scene in which the actor's head movements seem to be a continuation of the previous scene in normal speed, but the delayed speed of her hair in the wind show this movement to be accelerated movement shot in slow motion. So this illusion makes it clear that any so-called normality of movement is no longer a matter of normal speed or of the normal course of movement, but a matter of a movement-combination achieved through a camera technique.

For Deren, as for the directors of the French Nouvelle Vague twenty years later, it is about mixing emotional affects against conventions, genres, and topoi. In this sequence as well, two different feelings of time are aroused in parallel, and a feedback loop of the senses produces a kind of visual echo in the brain. The different movements on screen place the spectator in particular but contradictory positions in relation to the image. We are temporarily displaced. By cutting things up into single frames, the physiology of the actor's movements can be reassembled in any number of ways. "(Slow motion) can create movements which are deceptively normal", wrote Deren.²⁶ In the natural and idyllic surroundings of the beach everything seems calm and unthreatening when suddenly there is the movement of the girl out of the water itself. But the sensual quality of her movements, the innocence of her appearance, and the fact that we are not immediately aware of the technical manipulation shift the uncanny quality back – in the spectator's perception – to the carefree paradisiacal beach. Emotions in the cinema are thus constantly compressed and shifted further.

When the woman from the sea finally goes onto shore, there comes another spatial trick, which is an extension of the scene with the steps from *Meshes of the Afternoon*. The protagonist draws up from the beach and onto a tree stump. This is recorded from three different camera angles – from above against the backdrop of the sand, horizontally, and from below against the backdrop of the sky – so that the way to get there seems insurmountably long. The impression is made even stronger by the use of barely perceptible slow motion. Furthermore, her climbing is interwoven with another scene edited in parallel, in which the protagonist scales the table at a dinner party (Nr. 20-29). Maya Deren had hoped and claimed that the identification effect of photography – “the compulsive reality of photography” – that is, the identification of the woman on the beach with the woman at the dinner table, would link the scenes into a continuity. “There is a central personage who is identifiable in *At Land*: and whose *identity* serves as a continuity method.”²⁷ In fact, however, the perceived continuity, which connects the obvious difference between the locations, is made even stronger as the protagonist’s movements are slowed down over the course of the edit and are executed more intensely as she feels her way. Physical movements, time, and space are connected in the film in contrast to the various conventions that the protagonist is working against. What is fascinating in Deren’s spectacle is how easily she adapts, bodily and sensually, to the artificial times and spaces. Like a cat she feels her way through the film spaces, in springy, dancing movements, which in front of the camera must in part have been completely artificial, slowed down, sped up, or fragmented. Complementary to this, the woman at the camera is also meant to adapt herself to the apparatus in order to make moving images: “[...] the body with its complex combinations of joints, swivels, etc., mounted on very adequate legs, can put, at the service of the camera, a variety and combination of movements which even the most elaborate tripod could not begin to offer.”²⁸ The film *At Land* has been described as a process of a woman growing up and becoming an artist,²⁹ but this transition can be seen as more than becoming a camerawoman in a doubled sense. A connection emerges between body and apparatus, which appears as a new being in the movements on screen.

There is a preliminary form in *Meshes of the Afternoon* to the editing through continuous motion, which Deren herself would describe in retrospect as the prototype for all her successive works. At the end of this film (Nr. 131-136) one of the many Deren doppelgänger strides through the world with a knife in her hand in order to cut her own throat when she’s arrived at the other end. We see her feet in close-up as she walks in a continual path over

the beach, over grass, over a street, and finally stepping up onto a staircase. "What I meant when I planned that four stride sequence was that you have to come a long way to kill yourself, like the first life emerging from primeval waters", she wrote to James Card. "Those four strides, in my intention, span all time.[...] As I used to sit there and watch the film when it was projected for friends in those early days, that one short sequence always rang a bell or buzzed a buzzer in my head. It was like a crack letting light of another world gleam through."³⁰ Indeed, the film does have a different, earlier ending in which the protagonist escapes the trap of self-perception, but the quasi last ending, which is a murder of the *self* among *doppelgängers*, contains yet another peculiar twist. Among the doubled women, the one who dies is the one who was always alone in the picture, who never let herself be copied or simulated, who could not move through the artificial cinematic spaces and therefore could not merge with them. Those *doppelgängers* that gather around the table in their multiplicity, chat, and finally pass a death sentence on the one – who is presented as the original – thus turn out to be resistant to romance love, to the deceptions of technical apparatuses and to the threats raised by the transforming mirror images. They stay cool, they are twentieth-century-minded or even cinematomorphic. *Meshes of the Afternoon* marks the beginning of the evolution of a cinema-being in Deren's films, a being for whom going through technical processes and images possibly means intensifying relations to the world. An intensifying that becomes perceptible to sleepers in the cinema as an emotionalization.

At Land does not yet signify the arrival into the new world that Deren had referred to in the letter to James Card, but is a search for forms of new, technologically manipulated relations to time and space. Stop trick sequences and illusionary connections between movements are deployed in ever new variations and combinations in order to push perception to the limits of its capacity to integrate. But wherever clear-cut self-consciousness, which is supposed to go along with clear-cut perception, has to be abandoned, the emotional side effects continue on unbroken. For Deren this test was a way of trying out the technical effectivity of film methods: "This concern with time and space is not purely technical and one is not aware of the devices of the cinema because of the emotional ramifications of this concern."³¹

The odyssey through time frames in film tests the relativizing of one's own body in space and time through sensual impulses – and not only on the protagonist, but also on the spectator in the cinema. The difficulty of building up a stable relationship to the fragmented and contradictory elements of new time-spaces is not only the topic of the film, it is at the same time adapted and altered for viewing cinema. The adjustment of the individual

to cinematic circumstances takes place through a cybernetic link between perception and the cinematic apparatus. A gradual stabilization of subjects examined by historical technologies is possible due to the interventions and encroachments of cinema technology into the structures of perception. Cinema creates artistic continuity where physical relativity rules.

Deren's films enmesh gazes into images. Rudolf Arnheim's remembrance of Deren's films shows that the transformation of technology into mental states has succeeded as seduction: "What we can assert is that the sequences of her images are logical. They are never arbitrary or absurd. They follow the letter of a law we never studied on paper; but guided by our eyes, our minds conform willingly."³² The film critic finds himself and describes himself in complete trance. The dancer had enchanted him as a technician and as a scholar. The film maintains the "incontrovertible impact of reality" that Deren claims for photographic images by immediately joining the spectator's perception and power of imagination with the artificially construed worlds. Screen fuses with retina. Attention willingly subjects itself to optics and montage. *Sujet supposé voir*.

This is also the context in which Deren disrupts the understanding of identification from the theoretical calcification that it had been allowed to become, at the latest during the forties, a calcification made up of an act of idealization and subjugation to a higher principle, both in a psychological and a political sense. Identification, such as Deren needs for her cinema, is merely a process of transformation: "Identification – the idea of becoming something else – is a democratic, not a hierarchical concept."³³

In the short film *A Study in Choreography for the Camera*, which Deren shot in 1945, this identification is relinquished entirely to the analysis and synthesis of movements. Here it is no longer the identity of the dancer, but the continuity of the dance that produces connections in the film.³⁴ Film has altered the parameters of what is worthy of being recorded of people, and the short film demonstrates the indistinguishability of dancer and dance on the field of the social, in which technical penetration places the subject.

In the barely two minutes that the film lasts, seven optical time-space constructions create a dance in twenty shots that is due to the film choreography and that could not be achieved anywhere else but in the cinema. The dance that the camera choreographs is a symbiotic function of man and machine: "Moreover, (the dancer) shares with the camera, a collaborative responsibility for the movements themselves. This is, in other words, a dance which can exist only on film."³⁵ But it is not only in the recording process, but also in the projection that this dance is a web that emerges when the spectator surrenders herself to the technological time frame in the cinema.

The first camera construction in the film is a very long pan in which the dancer Talley Beatty shows up at four spots between the trees of a wooded area. This pan is assembled from four shorter, very even pans, shot from a tripod. The second construction is a variation on movement continuity across spatial distances. The dancer stretches out in long circular movements, the first part of which is still in the wooded area, while the following parts take place in a variety of interior spaces, and the extension of the time of certain phases of movement is repeated and overlap. Over the course of this dance sequence the dancer – this would be the third purely optical choreography – ends up in front of a mirror, and the moving figure is doubled in the image: a *pas de deux* through the mirror. The fourth and fifth tricks are accelerations of the movement by means of spatial or temporal contraction. In the shot in the Egyptian Court at the Metropolitan Museum a sequence of jumps on the diagonals toward the rear corner of the room, and then back to the camera, seems uncannily accelerated because the use of a wide angle lens compresses the spatial relations. The reduced focal length functions as a mental time lapse. The space gets a dynamism which then creates artificial emotions. The same can be said of the treatment of time. When the dancer spins in front of a four-headed Buddha, Deren accelerates the pirouette by turning the film speed down in the Bolex from its maximum 64 frames per second to 8 frames per second, thus achieving an extreme fast motion – while an assistant closes the aperture so that the lighting conditions remain stable. The manipulation of the camera appears as art and skill, as a quality of the dancer.

When Beatty eventually advances to one last great cinematically constructed leap, so that his head, torso, legs, and finally even his heels fly up and out of the image on the screen, the spectators are already deceived by this first phase of movement, since his jump is a landing cut in reverse into the film, a fall edited in reverse. But since the jump continues, all that remains from the beginning is the impression of a particularly buoyant take off. In the end the various phases of movement of a jump that is shot in silhouette against the sky are edited together into almost 30 seconds of floating in space before the dancer finally lands. The camera constructs the reality of an artificially cinematic dance.

Beatty's jump, which, as one critic noted, was actually Deren's jump,³⁶ displays the marionette figures whose movements are the movements that we see on screen. Three of the dance tricks described here are not even due to the editing, but merely to the recording technique. This makes it clear that every movement on screen is the event of a technical construction done by those holding the camera. By selecting the lens, the framing, the speed,

and the spatial perspective, they create movements and times that only exist through the film. "Certainly the camera is unique, among art instruments, in its ability to itself create time – not merely a sense of it – abut an actual period. It can create time which is accelerated, attenuated or arrested."³⁷ It is such camera and cinematic constructions that Deren wanted to draw attention to, and that exceed ordinary entanglements of time in the cinema:

By a manipulation of time and space I do not mean such established filmic techniques as flash-backs, parallel actions, etc. Parallel actions for instance – as in a sequence that we see, alternatingly, the hero who rushes to the rescue and the heroine, whose situation becomes increasingly critical – is an omnipresence on the part of the camera as a witness of action, not as a creator of it.³⁸

In her last film *The Very Eye of Night* the dancers' movements finally become composed of camera movements in such a way that the dancers are floatingly danced through the cinematic space in a quiet ballet. Body and movement meet each other in ever more abstract relations.

In her experiments with time and space, Deren was initially working with dance movements because they can be more easily edited, since they have their own rhythm. In the film *Ritual in Transfigured Time*, however, she transforms ordinary movements into dance movements. Once again, this is due to the choreography of the camera: "...first I should state, for the benefit and ease of anyone overawed by the film's title, that the transfigurations of time are, on one level, just technical devices..." wrote the critic Ken Kelman.³⁹ In the film's most famous choreographic moment, gestures of greeting were assembled from numerous encounters into a social ritual, although the course of movement during the repeated shootings was already so heavily ritualized that the movements recorded cannot be called either voluntary or involuntary. In a variety of sequences in which there are various degrees of slow motion, Deren organized the rhythm of the movements with a metronome, the basic instrument of all psycho-laboratories.

In a further development of the examples from *Meshes of the Afternoon*, in the film *Ritual in Transfigured Time* various recording speeds are also assembled into a space that had been established in the film as continuous. The experiment is carried out in mathematical regularity. In one sequence at the beginning of the film (Nr. 11-23) the two protagonists meet, played by Maya Deren and the dancer Rita Christiani. Maya Deren allows woolen yarn to unwind from her outstretched arms with great, even rocking movements, and Rita Christiani then winds it into a ball either in countershot

or “over-shoulder.” While Rita Christiani is consistently shot in 24 frames per second, Deren slows down her own movements in the countercuts by increasing the slow motion from 48 to 64 and finally to 128 frames per second, which means that even the possibilities of the Bolex here are much exceeded and Deren has to resort to copying and doubling single frames.⁴⁰ The person whose movements are slowed down is imbued with a psychological unreality that can once again be described as dreamlike. In the context of this sequence, however, she appears as the film echo to the movement of the other, who had entered the room with outstretched arms and eyes wide open, like the cliché of a sleepwalker. The cinematic entrancement is an extension of the symbolic-iconographic one.

In the ritual of greeting, the already ritualized movement sequences are eventually assembled from copies of the partial movements duplicated in the lab (Nr. 60-66), where the beginning and end of the sequence varies, bringing in a dancelike effect once again: the same old pattern in ever different performance. From this montage, which increasingly concentrates on detail, the dance and the dancers lose their center until the couple's encounter develops from the dissolution of bodies.

The protagonists' dance sequences in the park are also constructed by copying in doubled sequences (Nr. 71-73) and structured by different speeds of slow motion (Nr. 73 ff.). While the naturalistic parts of the dance, filmed without any particular manipulation, seem somewhat inappropriately pathos-laden, all the dance sequences that were actually produced artificially get all the attention and sympathy. Involuntarily we follow a jump in which a body successfully fights against gravity, tensed up in all its physical detail until the very end.

Certain phases of movement in this sequence are held for seconds at a time in frozen images, and exuberance turns to horror when the dancers are solidified into a depiction of a demonic figure somewhere between the god Pan and a Golem. Displaced from his solidification into slow-motion, he will be able to catch up with those who are hurriedly fleeing with his slow jumps. Tension, danger, and fear are not developed through mimicry in the scene, but through the gradual manipulation of time. In this scene Deren simulates and stimulates feelings and sensations in mathematical precision by means of gradations of the camera, and she controls the connections between nervous and mechanical impulses precisely not “by feeling”, but by producing feeling.

In the film *Ritual in Transfigured Time* the transmission of the calculated feelings runs in different directions. “*Ritual* is about the nature and process of change”, explained Deren in a letter to James Card.⁴¹ The narrative of

Ritual in Transfigured Time can be described as the cinematic transformation of a widow into a bride. The inspiration for this film was Marcel Duchamp's "Le Passage de la vierge à la mariée." Like "La Mariée mise à nu par les célibataires", "Le Roi et la reine entourés de nus rapides", and finally the famous "Nu descendant un escalier", it is part of his series of stop-motion pictures that are all re-workings of the series by Étienne-Jules Marey.⁴² In "Le Passage de la vierge à la mariée", the rest of a triptych is still recognizable, but unlike in the case of Holbein's "The Ambassadors" the viewer does not need to move in order to see it. Instead, he or she is visually moved. Duchamp's passage from virgin to bride is no longer meant to show a Marian mystery, but technological transformation. Like all his stop-motion pictures, this passage is also an image that thematizes and re-stages the modification of the body by means of the illustrative techniques. He repeats the temporal segmentation that made what was illustrated in chronophotography into an object of study for physiologists, but also to supra-individuals that unfold out in their own traces: omnipresent and not contained in any body. On the other hand, Duchamp transposes the perception of visually stuttering movement from chronophotography into painting in such a way that the spectator literally becomes an involuntary voyeur of a wedding night, because and while all the trembling, fidgeting, slipping, and turning is conjured up before our eyes. Duchamp also found it amusing here to put the fixed gaze of the voyeur itself into motion, and in doing so to make the viewer the subject and object of the transformative illustration.

The different slow motions that Deren deploys as a procedure of analyzing and synthesizing reality are also always a reference to and a reverence for the first studies of motion in chronophotography. "Slow-motion is the microscope of time. One of the most lyric sequences I have ever seen was the slow-motion footage of the flight of birds photographed by an ornithologist interested in their varied aerodynamics."⁴³ Deren herself follows the analyses of psychologists and behavioral researchers who found the truth of basic emotional movements in dissecting visual and perceptible surfaces. Deren dissects the party scene in *Ritual in Transfigured Time* into emotional elements from which the dynamic and the impression of a society in society can be transformed into a ritual:

But apart from such scientific uses, slow-motion can be brought to the most casual activities to reveal in them a texture of emotional and psychological complexes. For example, the course of a conversation is normally characterized by indecisions, defiances, hesitation, distractions,

anxieties, and other emotional undertones. In reality these are so fugitive as to be invisible. But the explorations by slow-motion photography, the agony of its analysis, reveals, in such an ostensible casual situation, a profound human complex.⁴⁴

Therefore, what is human in these movements is discovered through technical film analysis. This discovery is then absolutely consequential, and is taken as a re-definition of what counts as human in the history of device-based psychology at the end of the nineteenth century.

The cinematic dissection of reality is therefore and at the same time an analysis of what is hidden behind the perceived temporal flow of everyday life, and on the other hand, the spectator's own perception is plainly shown by synthesizing movements in the cinema, by repeating and arranging sequences. Perception of movement becomes the experience of cinema, movement becomes artwork, integrating the machine operator, the spectator, and even the non-professional actor:

The reprinting of scenes of a casual situation involving several persons may be used either in a prophetic context, as a *déjà-vu*; or, again, precise reiteration, by intercutting reprints, if those spontaneous movements, expressions, and exchanges, can change the quality of the scene from one of informality to that of a stylization akin to dance; in so doing it confers dance upon non dancers, by shifting emphasis from the purpose of the movement to the movement itself.⁴⁵

As Poincaré stated in 1895, the same year as the so-called invention of cinema, movement is necessary in order to get information about the psychical nature of stimuli from the information of neurons, all of which can only convey different degrees of stimulus, since it is from movement that an epistemology of learning through action emerges.⁴⁶ Proprioception. Methods of the dancers. Forming a network of bodies. Cinema, although it only affects visual perception and in sound film also acoustic perception, is a complementary epistemological structure. It itself induces motion perception and therefore conveys new spatiotemporal contexts as experience. Deren was always attempting to get at such an epistemology of the cinema by combining photographic realism and motion perception. Using the example of slow motion, she describes the manipulation of perception, of the "mind", as an extension of experience: "Yes, slow-motion is not simply slowness of speed. It is, in fact, something which exists in our minds, not on the screen, and can be created only in conjunction with the identifiable

reality of the photographic image.⁴⁷ Cinema appears as a technology of calling on, synthesizing, and forming certain psychic states.

Guilbaud pointed out, in his principles of cybernetics, that it is first and foremost the connection of time and space that forms meshes, nets, webs, networks, “réseaux” in the cybernetic sense.

Les thèmes, très variés de la cybernétique se laissent assez facilement grouper autour de deux thèmes majeurs: l'un est spatial et l'autre temporel. Le premier, que nous avons suivi pour commencer, est celui d'une structure des relations, c'est le thème du réseau: asservissements circuits ou boucles de réaction (feedback).[...] Aux connexions spatiales, il faut donc joindre les connexions temporelles: le future *dépend* du passé. Or, les connexions spatiales et les connexions temporelles ne sont en fait, que deux points de vue sur une même réalité.⁴⁸

Even if the mathematization of these networks, which Guilbaud has to require,⁴⁹ are not conceivable at all levels for the cinema; the meshes of time and space that Maya Deren forms through discretions of elements, through their iteration and recombination can be completely understood as feedback in perceptual logic. As the meshes and matrices of watching movies, in which the individual must let herself be caught up and transformed at the very least.

Doubling, Identification, Becoming Other

Since Maya Deren did not wish to understand identification as establishing a consistent personality, but as a process of change (“Identification – the idea of becoming something else”⁵⁰), the motif of the doppelgänger in her films can be described as experiments using medial transformations. In *Meshes of the Afternoon* the depersonalizations and re-identifications of the protagonist are staged as encounters, as collisions with reality as it is constructed in film. The first tricks by means of which the protagonist is doubled are entanglements of time and space in the montage. A first doppelgänger appears after the woman has fallen asleep in the armchair (Nr. 9), then repeating her arrival at the entrance to the house. After the shot with the record player has been repeated (Nr. 21 and 62), there is a cut from the protagonist lifting up the needle to the same character sleeping in the armchair. The appearance of further doppelgängers, all following in the time-labyrinths that are invisibly entangled through the editing

technique, becomes even more ominous because they are appearances in temporal consecutiveness, self-pursuit, a self-“chase”, which consequently ends in a battle with the self and with killing the self. As in romantic stories of people selling eyes, shadows, and souls, the protagonist is killed by a self that foils her desire as a stranger. This other, however, as has turned out in the examination of artificial time frames, is the film experience itself in *Meshes of the Afternoon*.

In his essay on the uncanny, Freud pointed out the distinction “between the uncanny that we actually experience and the uncanny that we merely picture or read about”⁵¹ in order to show that illusion of identification is necessary for the feeling to overtake one. In the older neuro-psychological economy, Freud explains that “every affect belonging to an emotional impulse, whatever its kind, is transformed, if it is repressed, into anxiety” and that there must therefore be a group of anxious states that can be explained as the return of the repressed. This also includes the uncanny as the “secretly familiar” that returns from repression.⁵² When a doppelgänger’s appearance becomes uncanny in the film, this is because it proves that the copy leads a highly autonomous existence. In its various presentations it shows the prototype, the non-filmed original, that being captured in photography, for all its identifiability, can make an individual’s data official and public, its beauty and horror, old age or youth, tension or relaxation, qualities about which one can know nothing as *corps propre*, on in oneself. The doppelgänger demystifies the technological divisibility of the individual. With the new media of the nineteenth century, identification and identity became a matter of technological recording, and eliminated all forms of self-assurance that was imagined in a space outside this frame of reference with the help of instantaneous photo-processing.

Moving about in the cinematic space in doubles and triples, the multiple doppelgängers in *Meshes of the Afternoon* compete with the romantic lone woman, modelled after literary predecessors, who is always trying to see herself through the windowpane and who, romantic all the while, must die from this. It is she who want to be the ego at all costs. And so she brings the uncanny into play. Deren’s later films only contain cinematic doppelgängers, ready for serial production, no longer uncanny and ominous. Instead they are multiplications and facets of a person who does not want to let herself get defined by the gaze of a great Other, but who herself uses the possibilities of reproduction to become other, and who subverts, multiplies, and recombines all the attributions in the image. The fact that the image cannot be controlled by the ego in the field of the strange arrangements makes no difference to these roaming collectors and dancers, who constantly change

shape. All attributions are dissolved over time in the multiple reflections of the gazes. In the cinema, as Deren's films were able to show despite all apparatus theory, it is not the confirmation of an original ego function that is repeated, such as takes place in the mirror stage. Rather, the whole allure of secondary narcissistic identifications is placed into the work, in which everyone is constantly changing, or desperately wishes to change, into a different futurist ego.

To this end, Deren uses the photographic image on screen, edited into the film, which is capable of deceiving the others, all the more so when it lets down its own self-perception, time and time again. As a good player Deren puts herself completely into the task, allowing herself to be optically fragmented, putting her own involuntary, unconscious movements of the camera's illustration on display and merging them in such a way that the spectators see the Other of the others, the depersonalization in every film shoot, causing them to be deceived about their own conscious self in the cinema as well. The doublings, depersonalizations, and extensions on screen are experiments with the self, in which perception and self-perception are constantly and mutually modified: proprioception in the technologies of perception. This auspicious fusion with the camera, however, only works if no identities, truths, or diagnoses are attached to it. Seeing in the cinema is the deceptive illusion under which a subject is constituted, and possible meshes and impossible rituals are transformed in these deceptions.

In the film *At Land* there is an episode that at first seems to belong in the repertoire of slapstick. The protagonist, who had already gone through various stations of going on land as an experience of civilization, encounters a cinematically multiplied personality in the man. While walking along a country lane she is shown to be in dialogue with a man who is always a different one (Nr. 56-64). The counterpart to this changing identity is her own constitution, but not as identity, but as continuity, that is, as an artificial duration of a sequence of time:

In one sequence of my film, *At Land*, I wished to establish the continuity of a girl walking down the road, and at the same time her relationship to a person walking with her, to her right, while the identity of that person remained fluid and uncertain. It is really a 'change of identity' scene similar to the common dream in which one person's identity changes to another's before our eyes.⁵³

This trick, that a new man jumps into the image behind the back of the camera as it pans back and forth with the dialogue, is so unspectacular

that the small adjustments in perception provoked by the scene are barely noticeable. It is not the *similarity* of the men that poses the question of identity. Rather, it is the establishment of a continual timeframe in the film, in which the four men appear in the same spot, walking in the same direction and taking part in the same conversation, which seeks to force cinematic understanding to identify in the first place.⁵⁴ By means of this trick, identity is presented without mediation as intersubjective, as interrelational and techno-social determination, in which the subjects, the man and woman in the film, exactly like actors in the studio or on screen and the spectators in the cinema, are subjected to one another in their temporal-spatial relations. All desire that arises between them is shown to be the waste product of an optical construction. This waste product, however, is the actual pleasure in films, as it is in every relationship.

Pasolini staged quite similar sequences in *Mamma Roma*. While Anna Magnani walks in long takes along the bleak whoring streets on the outskirts of the city, she is accompanied time and again by single men or groups of boys who engage in her monologue, answer her, calling in commentary and jokes. For all their differences, these men also possess a single timeless identity. *Mamma Roma*'s monologue could in turn be spoken in first person by two and a half thousand years of Roman history. What she has to say is defined by her relation as a whore to the men and to friends, and by the dilapidated roads of the outskirts. The men, however, also appear on the world's stage only because they are allowed to be in relation to Roma – and in the mirror reverse at the intersection, to amoR.

The sequence in Deren's *At Land* unfolds its meanings only in the context of the entire film, which is crisscrossed by a symbolic play by and with chess pieces. At the beginning, animated chess pieces move before a single chess player at the end of a dinner party. Over the course of this party the black queen captures a white pawn which is dragged from the field, falls over, tumbles off the board and – in a movement continued past the cut – tumbles outside through meadows and into the sea, where it begins an odyssey through natural landscapes. The chess game relativizes all other actions in the film, albeit not through the strategic moves on the board, but through the relation of the characters to the rules of the game. Animated by the film's tricks, the chess pieces leave the space and the patterns of movement through which they are defined in their possible opposing power relations. Away from the board they can no longer meet according to the old rules of art, but are exposed to new laws of motion from bubbling brooks, breaking waves, or blowing winds. In the space of the chess board or of geometral optics, as Lacan calls it in a language game, we are “in space *partes extra*

partes, which always provides such an objection to the apprehension to the object",⁵⁵ because the relations are prescribed. Outside this space, as the parable of sea to sea shows in *At Land*, there will always be disturbances in a logic of gazes and movements that alter the possibilities for movement, unlike in a chess game, not only in their combinatorics, but in the very structure of their rules, or, to speak in human terms, in their identity. Which means: a queen only remains a queen while on the chess board.

The movements that the characters resort to in the water, waves, and wind cause a change of register achieved for the individual by entering into the cinematic space. In the cinema there are "*moti inter motos*", which are recognized and misrecognized as they transform. But what appears to be the great freedom of the white queen is at the same time also her entrance into a new *dispositif*, new rules, new traps. Fixed identity, which quickly and early on was transferred to body movements in a symbolic order in film history, is dependent on the parameters under which these movements are measured. They vary from medium to medium. In film they are parameters of movement, and only by manipulating times and spaces can they in turn be liberated cinematically.

In *At Land* Deren develops constructions of identity that differ from literary procedures, and simultaneously liberates them through deconstructions such as the multiple man as a film trick. This is the ruse of this anti-odyssey. And the end of *At Land* is also cunning. The protagonist liberates the white queen from her chess board and thus from the coordinates of her symbolically established forms of movement. If the protagonist stole the queen from the board, she walks through the spaces of her odyssey backwards: reversed, to see herself seeing once again in all the stations. The film ends with a thirty-second-long shot in which the protagonist walks along the beach, her beautiful naked feet in beautiful indescribable movements, holding the white queen up in her hand. She leaves traces that, like all tracks in the sand, look archaically old and archaeologically ephemeral, and that can hardly provide any information about the people who were walking there, but for all that much more about the sorry state of sand on the seashore as a way to preserve human faces and stories. This "back-to-nature" will, even if this trace disappears after thirty seconds in the darkness of the projection space, turn out to be a "back-to-the-temporal-spatial-nature" of the Paillard-Bolex from Sainte-Croix in landlocked Switzerland.

Another trick to create doppelgängers in film is the use of doppelgänger maskings, which cover a part of the lens. The film is precisely rewound and then exposed numerous times. The company Paillard-Bolex made them to order, but a cameraman like Alexander Hammid would make them himself

at any rate, if only to be able not only to double the single figures, but to multiply them even more. In *Meshes of the Afternoon* three doppelgängers come together for a round table discussion about the fate of the first, three Maya Derens sit in judgment over themselves at the same time (Nr. 115), much like how a photo from 1917 shows five Marcel Duchamps pondering themselves.

Ever since Otto Rank declared the doppelgänger as an anthropological mental constant in 1914, the prototype for creating doppelgängers in film has been *The Student of Prague*, as it was brought to screen by Stellan Rye's cameraman Guido Seeber. Seeber, who was responsible for all the technical tricks at German Bioscop from 1908 to 1914 (and who later shot *The Joyless Street* and *Secrets of a Soul* for Pabst), used this trick of masking in his film from 1913 in order to transfer the old fable of the selling one's mirror image to film. In his images, Rank first observed that representation in film "in numerous ways reminds us of dream-work."⁵⁶ This was, as Friedrich Kittler showed,⁵⁷ already a misrepresentation and supersession of the history of psychoanalytic knowledge, since it was not film that imitated the dream. On the contrary, film, as Freud had previously seen it, as a chronophotographic dissection of bodies and a way to store symptoms at Salpêtrière, was the technical prerequisite for psychological and dream analysis. Before one could find symptoms in the body, before the ego could be confronted with a symptomatic Other, the body as body had to be able to be recorded and stored with all its marks and defects.

The doppelgänger in Deren's films are reworkings of human subjectivity in the age of the time machines, among which the camera, alongside the radio, the airplane, and concepts of relativity, is one of the most important.⁵⁸ Doppelgängers do not have a psychic or psychological origin, but come from the history of cinema itself, and take possession of realistic bodies. Since it became possible to indicate identity as the information of technological media by bertillonage, doppelgängers have been a problem of lighting. The relevant originary *dispositif* in film history of all later double and triple exposures, long before the cameraman Guido Seeber's tricks were constructed, was indeed Étienne-Jules Marey's multiple exposures of a single photographic plate on which he recorded the course of motion. One and the same soldier jumped, fought, and ran in the depiction, vainly competing with himself, but since he was a being synthesized out of his own jumps in the stop-motion images, he could also float above all reality like the dancers in Deren's film.

Time and again, Deren's delight in mobilizing doppelgängers generates the constellations in which the characters "see themselves seeing themselves"

through the countershot logic of gazes. In the repertoire of experimental film this is a trick that is almost as old as doppelgänger masking, and Luis Buñuel deployed it extensively in *Un Chien Andalou*, that classic about the abysses and the traps of the gaze, in the sadomasochistic conversation of the protagonist with himself (partly using a stand-in, who was filmed from behind). In *Meshes of the Afternoon* the protagonist sees herself walking (65ff). And she sees her doppelgängers looking at themselves (121 ff.). In *At Land* the protagonist sees herself in the end with the looted or liberated white queen running through all seven of the previous stations (133 ff.): “The impression is that she is running backward through time, through all the action which she herself has carried out, and which she can see herself still carrying out, and that she, who is carrying them out, can also see the one who runs by.”⁵⁹ Lacan called the illusion that the “ego” could see itself seeing itself “an avoidance of the function of the gaze” because no ego will get to see itself as what it had taken itself for. Due to the symbolic network of the rules of illustration or the symbolic orders, the ego will get to see what it did not want to see. Over the course of a film, however, a new experience emerges when the movement of the symbolic and the dynamic of the imaginary, which always wish to be seen as others or another, are linked: “Those elements of actuality proper may be re-related on an imaginative level to create a new reality.”⁶⁰ If, writing about Paul Valéry’s *The Young Fate*, Lacan characterizes structure as a feminine trick to undermine the symbolic order, in Deren’s films it can be seen as a trick of feeding back the order by manipulating the time axes of the film, as fates do, in loops, chains, and punctures in order to let deceptive moirés appear, under foreign Greek names, where there should be patterns. Incidentally, Valéry used a similar procedure with text in his poem. “It is not... necessary altogether to understand it as its exquisite musical monotonies induce a trance”, wrote one critic.⁶¹

Since gazes in the cinema, like reflexes and reflections of the ego, are not only cast as merely constructive and productive of relations, but also as malevolent, competitive, and destructive, one last duel of gazes is staged in a shot-countershot in *Meshes of the Afternoon* between the protagonist and her lover, played by Alexander Hammid. At the same time the motif of the mirror as illusionary form of identification gets fragmented here. One of the two endings of the film finishes with the – in the spectator’s view – long-awaited meeting of man and woman. In the last constellation we see a close-up of a woman lying on the bed. We can see her face on the pillow, next to which is lying the flower from the film’s first shot. In countershot the man is sitting upright on the bed, looking at her, and when he leans over to her he is undecided as to whether it is to embrace her or to take

possession of the flower, which has turned into a knife at just this moment. The protagonists' gazes – and with them the spectators' gazes – shift in both directions between love and aggression and are also crisscrossed by side views of the reflective knife. Once again, spectators presume the mutual assumptions running between the protagonists' gazes. Although the woman, quite in keeping with classical dramaturgy, lies submissively on the bed, and in one shot we see only her mouth, which opens slightly, while the man sits upright, coolly and anxiously looking down, this does not add up to any clear order of emotions. The spectators will attempt to recognize clear reactions in the protagonists' facial expressions, but devotion, concern, lust, fear, betrayal, and revenge are interpretations that can be seen one after the other in the ever constant faces, or better, can be presumed. In the duel of gazes the woman suddenly grabs the knife and throws it in the direction of the man. This signifies a change in the optical conditions as a whole. The sharp cut to the next shot shows that the image of the man must have been a mirror image, which has now been shattered. A large hole is now gaping where his eyes once were, providing a view to the sea.

Throwing the knife opens the gaze up to that optical space that surrounds the space of the duel and had obviously surrounded it the whole time. What is uncanny about this scene is that underneath, in the mirror's blurriness, which supplants the space "opposite", despite its shattered surface, the remaining partial portrait of the man, his face now without eyes and gaze, continues, speaking, to move. What is uncanny is that he is not simply dead, but has been displaced into a different, unknown, optically real but not logical space, in which he can no longer give any response to the woman's inquisitive gaze, although he continues to have an influence on her reality. This image is once again reminiscent of the other images in the film in which the medial voices from other spaces are silenced. The telephone receiver that is put back on the cradle over and over again, the record player that is stopped time and again. What is uncanny in *Meshes of the Afternoon* is that the connections to the absent and to the apparatuses, the talking and the reflection of others, which structures the ego's desire, cannot be turned off. "It" keeps going. The second, less uncanny turn taken in *Meshes of the Afternoon* with this break in the optics is that the man's gaze is cleared away as the sole answer to the woman's desire, and not as killing the consciousness of the other, but as an optical switch. In the following shot we see the seashore with its beach and waves, blinking shards of mirror floating in the water reflecting patches of the sky. A re-relativized space has emerged by optically frustrating the structure of the gaze. Hard linear gazes turn into waves that play with and wash around the mirror images.

This ending of *Meshes of the Afternoon*, in which the mirror flies to the beach as shards, is the first ending, the “happy ending” of the film. It replaces imaginary and eerie identification in the couple’s relationship with a multiplication of spaces. It is likely that this is the ending that Deren wanted, since it is a female gaze that no longer wishes to be required to look someone else in the eyes in order to be recognized. And yet it does not heroically look away, but invents new optical illusions that serve as a strategic eye-catcher: becoming subject with one’s own devices. It is at any rate the film ending that Deren chose as her own, for the film *At Land* will start a couple of years later with almost the very same shot at the beach that *Meshes of the Afternoon* ends with, but instead of shards of mirror there are eyes, bodies, and the crests of waves in the image.

The mirrors that have played a central role in *Meshes of the Afternoon* as a cinematic function of optical reflection and as a functional metaphor of the gaze will no longer turn up in Deren’s later films – except for the one mirror in *Choreography for the Camera*, in front of which the dancer briefly dances a *pas de deux* with his doppelgänger. The function of the gaze will be absorbed completely in the optical operations of the camera and the film. Reflection becomes refraction. The tricks and techniques of the camera itself provoke the feedback of perception about the technical conditions that effect the reactions and emotions through projection.

The question of identity in the film will increasingly get shifted from imagination to production. In *At Land* it was experiments with the gaze, as experiments with editing together times and spaces, through which the protagonist was meant to be put into a relation to a universe relative to herself: “The problem of that individual, as the sole continuous element, is to relate herself to a fluid, apparently incoherent, universe.”⁶² In *Choreography for the Camera* the film replaces the logic of a person with the logic of a movement: “Here the identity which unites space and time is not the personalized identity of a given, individual character, for there is no effort to treat the dancer in these terms; rather, it is the identifiable nature of his movement which constitutes the compulsive continuity.”⁶³ In *Ritual in Transfigured Time* these two forms of identification, which after all are necessary for “continuity” in the montage, are, as perception itself infers from a pattern of movement or a photographic shape, supplemented by a third mode:

There is a long sequence held together almost exclusively by the consistent mode of movement common to a variety of individuals who are identified as singular and are used as interchangeable variables within a consistent pattern created by the film instrument.⁶⁴

Ritual in Transfigured Time shows illusive movements that lead to illusive identities. The artificial movements of those acting and dancing, particularly in one sequence, in which the images are frozen and then re-awoken to artificial life, are always presented as movements that were created by the camera in the first place. But the camera was only able to capture them because they had already been formalized in social or choreographed reality. The film *Ritual in Transfigured Time* brings together film and social technology to regulate real involuntary bodily movements. This regulation has its technological prehistory in serial photography and in neuro-physiological research into perception. In Deren's films the regulations and the social codification of images are dismantled again, not in their presumed original elements, but in their variability on screen: allowing for dance through photography and editing and by deploying all the chemical and mechanical qualities of film. In the end this is achieved by cutting in the image of the widow going into the water as a negative. This inversion of the material suddenly causes the bride to appear in white. Virgin, bride, widow. Significations are social technologies like every individual film trick of the cinematic apparatus to change the woman any way one likes or desires. For Maya Deren this means ritualistically. This optimistic vision of being able to encounter oneself more precisely outside the body is also something that Deren shares with objective psychology.

Storing, Transferring, Transforming

In *Cinema as an Art Form*, Deren discusses Hollywood productions, distinguishing between horror films, which position the origin of the uncanny in the external world, and psycho films, which place it in the interiority of the protagonist. In her own films the cinematic reality connects external and internal, objective and subjective, collective and individual movement in order to initiate perception itself as an interference between internal and external impulses. Even if Deren excludes the unconscious in the sense structuring individual wishes or drives as a productive power for art, the transformations that she describes for the cinema require at the very least assuming non-conscious processes. In Deren's film theory the difference between conscious and unconscious processes of perception is nullified in the theory of the ritual, which sees any transgression of the boundaries of the personality as technologically induced or technologically modified: "Above all, the ritualistic form treats the human being not as the source of the dramatic action, but as the somewhat depersonalized element in a

dramatic whole.”⁶⁵ Watching movies is a transformative process that can be conceived of as circulating between depersonalization and identification. All manipulations of the perception of time, space, and movement are physically converted and psychologically something under the threshold of frequencies that are still consciously perceptible. Like in trance.

The theory of depersonalization has a long tradition in Deren's works. At the beginning of the forties, when she was a 24-year-old journalist, Deren had written a paper about trance and dance, in which she made a comparison between archaic forms of possession and modern forms of hysteria, a work that made an impression on the great anthropologist and Haiti researcher Alfred Métraux:

When I did that paper on Haitian possession, I had no idea of making films.[...] And then I went on to make films and it lay all this while in my files – since 1942 – and was forgotten until now.[...] Now in 1947 I dig it out and Métraux says it is one of the best things he has ever read on possession.⁶⁶

Deren describes both states, possession and hysteria, as social phenomena. This focus of this work, which originally appeared as an article in the journal “Educational Dancing”, is an intercultural comparison of extraordinary states that are considered trances, absences, attacks, or possession, their social significance, and the technological means that induce these states: “If one compares hysteria with possession in terms of the individual, the similarities become so striking as to tempt one to combine the two phenomena into a single category.”⁶⁷ What is decisive in the context of her film theory is that the induction of states of hysteria or possession comes from outside as an artificial agitation of the sense nerves. Rhythmic inductions are divine invocations: “...just as various mechanical devices such as crystals and light are employed in hypnotism, so, I believe, drum rhythms and are extremely important in inducing possession.”⁶⁸ All states of possession are preceded by some artificial agitation of the nervous system.

What characterizes the term hysteria in European medicine, according to Deren, is that the sick women are pathologized to the degree that their symptoms are seen as the symptoms of individual conflict, while possession in African or Caribbean society is recognized as the expression of critical, or better, crisis-laden collective processes, in which possible solutions can even become obvious and public. To view it in analytical terms, the states are viewed as a sickness, either of the imaginary – in Europe – or the

symbolic – in Africa and the Caribbean – and correspondingly it is always only the one or the other that gets treated.

In order to compare Caribbean knowledge of the gods with European descriptions of hysteria, Deren takes Eugen Bleuler's no longer quite new but in fact groundbreaking *Textbook of Psychiatry* from 1916 as the basis for the state of the research in European medicine, which she cites in the American edition from 1924. The Swiss professor, director of Burghölzli, and teacher of C.G. Jung had published a standard work in which he, as a student of Charcot, both surveyed and critiqued the classical tradition of European medical knowledge on the field of possession and hysteria. Bleuler had revolutionized the discourse among professionals in psychiatry. He wrote one of the first and most systematic protocols for hypnosis from the point of view of the hypnotized person, thus judging hypnosis not only for its effectiveness in medical practice, but also for its effect on the patient's psyche.⁶⁹ Furthermore, Bleuler, who came from Zollikon, a town near Zürich, was able to understand patients when they spoke Swiss German or the malapropisms of Swiss French, which was incomprehensible to the ears of German professors with positions at Zurich universities. Unheard messages became the object of science for the first time. Bleuler lived with patients day and night for 12 years at the psychiatric institution Rheinau in Zurich as a kind of socio-ethno-psychiatrist, "in great seclusion from the rest of the world."⁷⁰ He created an "affective rapport" with each patient, researching and gradually systematizing the rules of a disorientation that he called schizophrenia. Another reason that he wanted to replace the old term "Dementia praecox" was that "it can only describe the illness but not the afflicted person."⁷¹ Bleuler thus took the first steps toward a systemic examination of schizophrenia, which would become so significant for critical psychiatry in the twentieth century. The persons afflicted with their multilayered speech, their inappropriate laughter, and their constant shifting between linguistic levels of meaning determine what schizophrenia is, according to Bleuler. Only after carefully listening to his patients did he published his famous study in 1911.⁷² Only when he had grasped all the "nonsense" was he able to develop a coherent picture of the illness from the incoherent ramblings. Furthermore, Bleuler illustrated his textbook with photographs, which means, he also drew on then new analogue recording technologies, which could document the unutterable disturbances and spasms, data for the novel amnesia.

Bleuler's systematics of psychotic processes turned sensations into primary psychic functions, and perceptions into groups of sensations that reanimate and link the physical traces of the memory of earlier sensations.

Associations, or, since it is the same thing for Bleuler, the thinking that follows these traces according to fixed rules, “can best be understood by comparing it with the switches in an electrical plant. These switches may connect different machines with one another or let them run independently of each other; they can switch them on or off.”⁷³ Bleuler’s theory of switching on and off in the nervous system is not only one of the clearest example of what, as Kittler noted, “every psychology or anthropology only subsequently spells out which functions of the general data processing are controlled by machines, that is, implemented in the real.”⁷⁴ It justifies a functional theory of the unconscious, which Bleuler only distinguished from the then competing system of reflexes because he was examining reactions that did not run by subcortical means, but by nerve tracts and cerebral cortices. Such unconscious processes can also help explain perceptions that do not arise from stimuli or sensations.

The comparison with electrical switches also makes it possible for us to understand a number of other phenomena, such as flight of ideas, schizophrenic disturbance of association, hypnotic phenomena, the existence of different personalities in the same psyche either simultaneously or side by side, the phenomena of the unconscious, and a number of pathological symptoms which are either denied or reluctantly admitted.⁷⁵

Deren also assumes unconscious structures in Bleuler’s sense of generating “extra-sensory” perceptions when she examines phenomena of voodoo, although she immediately connects this unconscious with the cultural traditions that determine their structures.

The accepted explanation of such modes of thought is that past experiences, which may not be consciously and individually recollected but which are permanently preserved in the sub-conscious, amalgamate under certain stimuli in terms of our mores and traditional value patterns, and form ‘a conclusion’ as it were, independent of the exercise of conscious reason.⁷⁶

The study of unconscious phenomena and hysterical symptomatology or ritual possession is therefore, in both Bleuler and Deren, always already cultural studies. Their archives are indeed not libraries, but also the bodies themselves, in which involuntary forms of movement and patterns of behavior are stored, which are constantly reproduced unconsciously and in the case of western cultures are too rarely subjected to feedback and

modification. In this sense one can object, in contrast to Parin's ethnopsychiatry, that it is not that white people think too much, it's that they dance too little.

At the end of the nineteenth century and as if in preparation for the events of the twentieth, there was an increase within psychology of examining trances, states of ecstasy, and mass suggestion. In the psychologists' laboratories suggestibility was researched as a prerequisite for any attack, as a question of the transmission of unconscious psychic mechanisms. Bleuler had examined suggestibility as a special case of the formation of affectivity, that is, as a form of transmission that forms complexes of associations beyond language through "accompanying affective tones." His psychological experiments are the exact reverse of the film experiments being carried out at the same time. The Soviet director Kuleshov, for instance, was conducting his famous series tests at the time in order to show that film functioned like a language because the meaning of images was altered by the syntactic permutation of shots: the Kuleshov effect. Bleuler was experimenting with the transmission of feelings that were supposed to be transmitted purely by affect.

This affective suggestibility is still fully present also in man, in spite of his language which has been more and more developed for intellectual needs.[...] Because of the close connection between the affect and the ideas to which it belongs and because of the influence of the affect upon logic, it is self-evident that the ideas are very easily suggested along with the affect...⁷⁷

The unconscious affective transmission through links in the nervous system enters into competition with the conscious, intellectual transmission of language. The idea that the bearer or transmitter of a message is the affect, and not the meaning in a syntactic network, distinguishes Deren's film experiments in principle from those of the Russian avant-garde.

Maya Deren's position, which was therefore also avant-garde in theory, consists in having examined the connections between cultural techniques and psychic processes from the very beginning. Already in the early paper on possession she concluded that it might be the emptiness between the drum beats or the images, the intervals, that hold the secret to all unknown or unconscious mental functions:

Drum rhythm consists in the regularity of the interval between sounds. Once this interval has been established, our sense-perceptions are geared

to an expectation of its reoccurrence. This means that expectant attention [...] is being deliberately and directly brought into play.[...] Even more important, sustained rhythmic regularity and the fact that the source of it is outside the individual rather than within, means that consciousness is unnecessary, as it were, in the maintenance of this concentration.⁷⁸

The attention turned on by repeating stimuli is also a quality of film perception as trance technique. The study of archaic trances provides Deren with a way to see her own culture, alienated and cleared of all habit and custom. She seeks out the rhythms established by cultural techniques that form the bases of the rites and rituals of western culture and works with them. So when she analyzes a party scene using slow motion in *Ritual in Transfigured Time*, in which the guests always greet each other in the same poses and with the same gestures, she discovers a further layer of social interaction, invisible to the naked eye, internal to the conventions of movement: the hesitation, wavering, and trembling that goes along with all encounters: "...the course of a conversation is normally characterized by indecisions, defiances, hesitations, distractions, anxieties, and other emotional undertones."⁷⁹ The gaze in and through the cinema is dissected as one that is at the mercy of technical manipulation and human relationality. Deren takes the emotional elements from which the dynamic of a society within society is transformed into a ritual and dissects them in a cinematic psychoanalysis of everyday life.

Poetically, the film *Ritual in Transfigured Time*, since it compresses the moments analyzed into something new, is not simply satisfied with analyzing wavering, but constructs from this a joint of ritual actions. The emotional reality of the social event itself is placed into the work quite unrelated to the case of a single fearful individual. But just as the paradoxical structure of the gaze in her films only unfolds in relation to the conventions of shot-countershot, and just as the labyrinthine spatial and temporal constructions only function as a way of subverting habits of seeing in linear perspectives, so do the choreographies of Deren's trance and dance films only take their effect against the backdrop of standardized body movements, such as they were systematized at the end of the nineteenth century. Seen against the backdrop of the history of cinema, in which the body was increasingly standardized and shots were codified, the American experimental films of the forties and fifties, in which one could see bodies in erratic movements, unpredictable perspectives, and incredible transformations, represent a political provocation. In these films, the movements of the actors became dances that turned the culturally grounded bodily order, along with its presumably objective order or the characteristics of race, class, and gender,

into a farce. It is only against the backdrop of normative movement of cinema that the many levels of Deren's films develop, all of which tend to be supported more by choreography than by narrative – choreographies that use the technical means of the cinematic apparatus to put social conventions up for negotiation and in which normative reality becomes relative. The chronometry of the apparatus remains as a reference rhythm by which the deviations, the irregularities are chanted and syncopated, and new perceptual connections are made.

Learning by Feeling

It is not fixed designs made up of optical machines and human bodies, but vectors of permanently shifting force fields that would be the right model for Deren's film theory. Her films present feedback mechanisms and circular-causal processes as they were being researched in the US during the forties by anthropologists, psychiatrists, computer specialists, and engineers. The cinema was to be conceived as an apparatus that linked individual perception and sensibility with times and spaces formed by technology. Technological images would form emotions that were nonetheless due to an exact experience of reality. What is always "recorded subjectively as emotion", as Norbert Wiener conjectured, "may not merely be a useless epiphenomenon of nervous action, but may control some essential stage in learning, and in other similar processes."⁸⁰ Like affectivity for Bleuler. The nervous system stores our experiences and models the perception accordingly.

Gregory Bateson had underestimated the intrusions that filming released in the plateaus of Balinese culture, and its transformation by its connection with the apparatus was surprising to him. Deren as well will be surprised by an odd connection between human bodies and apparatuses in Haiti. But not like Bateson. In Haiti, Deren encountered the archaic techniques of voodoo rituals that she had previously studied and from which she had developed a radical critique of her own culture and its techniques. But while the term ritual had previously granted her a way to see the transcendences of western cultures as equally producing and projecting in its cultural technologies, a few years later she uses the eye of the cinema to look at the techniques with which the Haitian gods can artificially be called into action. Like in the cinema, manipulations of time are introduced into the rituals as gateways to different perceptual levels, as "doors of perception". "There are even ritual details in which inversion and reversal suggest a mirror held to to time.[...] It is like a motion-picture projected in reverse, a diver shooting back up out of

the water on to the springboard.”⁸¹ Times, spaces, and movements are linked in certain cultures according to particular laws initiated, altered, and formed by the perception of those living in this culture. The integration of these forms can be understood in the service of gods or of media, the decisive factor is that this cultural aspect does not represent any law or fixed schema, but a rule of transformation that has to be realized, embodied in constant performance.

When Maya Deren lands in Port-au-Prince in the autumn of 1947, she brings along two cameras, tripods, and material for 16mm film footage, a 6 x 6 still camera and equipment to record sound on magnetic wire. In Haiti she records optical and acoustic signals separately, not at random, as Bateson had attempted on Bali, but following an integrity that she had recognized as the rule of transformation both of ritual and of the cinema as well. In rhythms and light effects, in temporal and spatial compressions, in fragmentations and compositions of collective body movements she assembles a reality of gods and devices. Afterwards she thinks she was able to differentiate manipulating and recording in ritual procedures:

I had begun as an artist, as one who would manipulate the elements of a reality into a work of art in the image of my creative integrity; I end by recording, as humbly and accurately as I can, the logics of a reality which had forced me to recognize its integrity...⁸²

Deren experiences Haiti as a culture standing in transition between old and new gods, between old and new technical rituals. When she researches rituals and music, she herself becomes a “serviteuse”, the servant of the cult. Maya Deren lets herself be caught up in voodoo while recording the techniques of voodoo “humbly and accurately.” This is why she has become a model of anthropological cinematography in film history.⁸³ Even ethnographic filmmakers sometimes get confused about which god they serve. In her book about Haitian gods, Deren describes her own possession by the goddess Erzvlie, a complicated, scandalous, and ultimately one might say hysterical goddess who is the patron of dreams, love, and the muse of beauty.⁸⁴ It is a story of relentless identification in the sense of “becoming something else”, in which the dreamlike imaginary love of the ego is abruptly interrupted by the arrival of a new order. Deren’s protocol describes dissociated perception in a cinematic space as a space of western mirror-ego identification. Trance and possession are described in the parameters or metaphors of the cinema; presumably unconsciously. This description is thus paradigmatic for ethnological self-misrecognition in the foreigner. And for the universalization of the cinematic space through the avant-garde of ethnologists.

To quote Deren's protocol verbatim:

As sometimes in dreams, so here I can observe myself, can note with pleasure how the white skirt plays with the rhythms, can watch, as if in a mirror, how the smile begins with a softening of the lips, spreads imperceptibly into a radiance which, surely, is lovelier than any I have ever seen. It is when I turn, as if to a neighbor, to say 'Look! See how lovely that is!' and see that the others are removed to a distance, withdrawn to a circle which is already watching, that I realize, like a shaft of terror struck through me, that it is no longer myself whom I watch. Yet it is myself, for as that terror strikes, we two are made one again, joined by and upon the point of the left leg which is as if rooted to the earth.⁸⁵

In ritual, the rhythm of the drumming reassembles the ego, which had fallen apart. The dance and the dance are indistinguishable, linked through the acoustic "order", arrangement and command, that structures time. The next division takes places in the visual aspects of the mirror, which simultaneously constructs and divides the ego, demonstrating its interconnectedness with the *doppelgänger*. At this moment the gaze of the dance becomes the eye of cinema, which sees stroboscopically, shifting into slow motion, as if an imaginary projection speed were being reduced. A flicker starts, black holes emerge between the single frames, and the cinematographer loses herself not between the ego and the mirror image, but in the nothingness between image and image, which is never perceived in the cinema but nonetheless governs cinematic perception:

(I) pick up the dancing rhythm of the drums as something to grasp at, something to keep my feet from resting upon the dangerous earth. No sooner do I settle into the succor of this support than my sense of self doubles again, as in a mirror, separates to both sides of an invisible threshold, except that now the vision of the one who watches flickers, the lids flutter, the gaps between moments of sight growing greater, wider. I see the dancing one here, and yet in a different place, facing another direction, and whatever lay between these moments is lost, utterly lost. I feel the gaps will spread and widen and that I will, myself, be altogether lost in that dead space and that dead time.⁸⁶

The film breaks in the projection room. What lies between image and image as trance remains unconscious. It nonetheless turns up in the protocol precisely as the technology of cinema. The fact that Deren no longer wants to

edit her own material after this coinciding of film image and identification is everything but the rejection of the medium of film. It is much more about promoting it into the pantheon of recording technologies that have formed souls, spirits, and memories. The great alliance of cinema and anthropology has brought the gods down from heaven in order once again to connect them to the bodies of human beings. They are meant to change the world. But the stories that they tell the anthropologists are stories of media that have been changing people, their societies, and their histories from time immemorial. Sometimes we forget that, sometimes we are reminded, for instance by Godard when in *Le Mépris* he shows that Fritz Lang knew it.

Bateson had observed that people in occidental cultures still speak and act as if dissecting and codifying reality on the one hand and subjectively evaluating this reality on the other were processes that were mutually separable, while in fact every visual perception of another person and every physical reaction can only register the combined process of codifying and evaluating, that is, behavior.⁸⁷ This indicates the emergence of a new concept of the human being, which has its preconditions in the cinematic recording of human characteristics. But only in the fifties of the twentieth century did “l’homme imaginaire”, whose behavior always had to be accompanied by a double, get established in everyday life as well. Edgar Morin examined the imaginary man in an ethnological study of his own society in its dependence on the technology of cinema: “J’ai fait en même temps de l’anthropologie du cinéma et de la cinématographologie de l’anthropos, selon le mouvement en boucle: l’esprit humain – éclaire le cinéma – qui éclaire – l’esprit humain etc.”⁸⁸ Working with Jean Rouch in the summer of 1960, Morin also turned his diagram of the flow between the functions of anthropology and the function of the cinema, which projects all behavior onto the surfaces of the body, into movements and voices beyond the symbolic, into a film experiment. The reactions by various inhabitants of Paris to the questions “Are you happy?” was combined into a kaleidoscope of French society: *Chronique d’un Été*, a film commissioned by the Musée de l’Homme. A film about film and anthropology, in which Batesonian binaries such as man/woman, dominance/submission, strange/familiar are relativized into a historical image of post-war society, where taboos suddenly push their way back into the light and onto the big screen.

Bateson himself abandons cinematography and takes up circular-causal processes in neurology and psychiatry. This is exactly the reason he remains an anthropologist. His studies on homeostatic processes in schizophrenia research examine group processes in which they attempt to understand “the use of relations”, as Lacan says, the usage of relationships between all

the members of a group, from outside, from the behavior and strategies of talking. Bateson's research has affiliations with Vladimir Bekhterev's studies, which he had carried out in St. Petersburg a half century earlier. These two strands of the history of psychiatry, which are separated from one another by all the systematic, ideological, and institutional borders in the world, can – and not by *chance* – be linked by the name Maya Deren.⁸⁹ Par hasard the history of sciences as novel.

3. Deviations

Jean Rouch: Accra, Paris

The heart of the Corybantes has transformed today into the heart of a filmmaker
with and camera and a Nagra.

– Jean Rouch, 1977

In a modern industrial society, the artists consistute, in fact,
an “ethnic group”, subject to the full “native” treatment.

– Maya Deren, 1953

Following the end of the war, poets, painters, and ethnologists were traveling out of the ruins of Europe and into Africa, the South Seas, or the Caribbean to research occultism, mysticism, ritual practices and possession, and, as Michel Leiris wrote, “to forget their mediocre little ‘white man’s manias’ (as certain blacks say), and also to lose what they conceived of as their identity as intellectuals.” They dragged along their own cultural technologies with them, subjecting the objects of their research to the very same literary, iconological, or medial orders that they were hoping to escape, a fact that they remained oblivious to, and at any rate did not make their readers aware of – with very few exceptions, who tended to be engineers rather than humanities scholars. Jean Rouch, for example, “Ingénieur des Ponts et Chaussées”, had already signed up to go to Africa at the beginning of the Second World War, since the only thing left for him to do in France was to blow up bridges before the enemy could get to them. He wanted to use his knowledge constructively in Africa and what interested him as an engineer were how things worked, or how they had to be built so that they worked. Coming from a family of Parisian artists and adventurers, having observed the surrealist scene in Paris in his youth, and having been a regular visitor at Café Flore, he was also interested in how things become dysfunctional, how they produce erratic effects, and how they took place on the bridges of unforeseen encounters between cultures. Rouch was a cartographer of *dépaysement*.

In 1941 Rouch was deployed to the area around Niamey in Niger. His predecessor gave him some advice: “Just don’t go native! Keep away from those niggers! After all, you’re representing French culture!” Many years later, in a conversation with Hanns Zischler, he would add: “I did not take his advice.”² Rouch represents his life as a clear case of “going native”, which,

in the colonial history of the nineteenth century, could only be imagined as a vision of horror. With Rouch, however, it was a fortunate and also always absurdly comical transition into the heart of darkness. At second glance, it may be more exact to see Rouch's "going native" as the "going cinematographic" of the people in Niger.

As a thirty-year-old in 1947, Jean Rouch went back to places where he had overseen the building of streets and bridges during the war, and where he, with the mediation of his friend Damouré Zika, had learned about the rituals of possession of the Songhay. He had already shot some footage in Niger at the time, but it was all destroyed by heat and sand during transport. Unlike Leiris, however, Rouch did not fancy himself as being able to leave behind his own culture on his way through Africa. On the contrary: In Africa this culture confronted him once again with the indestructibility of all the doppelgängers that are all the more durable in being safely stored phantom versions of the originals: "Vichy survives in the colonies", he asserted.³ At the margins there was not only resistance to the authority in the center, but also the curious suspension of centralized power and its instruments in the form of conscious and unconscious memories, which were at any rate very physiological. The bearers of these memories, how they worked, and the odd collectivity that they could claim, however, would first have to be determined.

In his history of cinema, Gilles Deleuze writes that the directors of *cinéma vérité*, and particularly Jean Rouch, had followed in the footsteps of Rimbaud by becoming black. This would not mean becoming part of the native people, but of allowing the missing people to appear again against the nations in the first place.⁴ Deleuze uses the term people (the German equivalent *Volk* can no longer be used in a simple, functional way) to designate the deterritorializing and reterritorializing relation of people to the land on which and with which they organize themselves. He therefore describes a colonial post-war development at the end of the fifties that leads to a multiplicity of liberation armies and fronts called "populaire" or "the people's", and in which new approaches to the land were organized. The colonial frontiers ran straight as an arrow, and had imposed administrative violence across all the mountains, rivers, and climatic zones. The reappropriation of the land by the people could therefore always proceed against colonial authority and with a sensual appropriation of the landscape at the same time. The people's traffic routes, therefore, were always taken imbued with the senses, in Africa as in Cuba and Latin America: bridges, streets, cameras, radio stations; what revolutionary film would not have made them the focus.⁵

Rouch's films are reflections of various imaginary histories, driven by a search for post-colonial identities, which we encounter as much in Leiris's poetry as we do in Fanon's manifestos or in the films by the crazed camera teams in the Sierra Maestra. The opposition between "US" and "THEM" defined the battle of the people's revolutionaries: No pasaran. Rouch's films, however, put the imaginary and complicit relation between "I" and "me" into the image as the prerequisite of all questions of power. This not only goes for the film *Moi, un Noir* from 1957, which Rouch shot with young migrants who had emigrated from the northern provinces in Niger to Abidjan in order, as we hear in the commentary, to enter the modern world. Rouch presents the street kids, "les voyous d'Abidjan", as Sapho would later commemorate them in her songs, as people who find themselves in transit, between two worlds, "caught between tradition and the machine world, between Islam and alcohol", young people who "have not renounce their old beliefs but who are devoted to the modern idols of boxing and the movies."⁶ Correspondingly, "I" in the film means Eddie Constantine, Edward G. Robinson, Tarzan, or Dorothy Lamour. What appears as a curiosity to the spectators is of ethnological consequence for Rouch. Under Muslim rule, which had become firmly established in Niger during the seventeenth century, every Songhay child, in addition to their "ma kayna", the smaller name takes from Songhay tradition, received a bigger name, "maberi", which the marabout selected from the Quran at the child's birth.⁷ The identity of the Songhay was a combination of the two names in which the imaginary imperialism of Hollywood was specifically inscribed in the case of the young migrant workers.

It is these identities in transition, the states between "I" and "me", existences between culture, that interest Rouch. As such he is not tempted to present his protagonists as being on the hunt for authentic moments. He uses the means of film to help them get to a space in which they can become "themselves", ritually and cinematically. And in which they can represent themselves: Eddi Constantine, fabric brokers at the market in Treichville/Abidjan, everyone gets the close-up that he needs to get his female customers to look him in the eyes according to the rules of Hollywood. Tarzan gets the microphone when he provides the voice for an American singer on the radio. All the protagonists delivered their monologues and dialogues as interventions, as art, and lion-maned presentations in the studio, or cut in later along with atmospheric sounds. Rouch's commentary is not privileged among these voices. He also subjected himself to the cinema and its rules when he stayed on the young people's trail all through Abidjan for six months, running across the traces and rituals of his own culture all

the while. When he films them all traveling to the beach together, Rouch comments on his view, the images, and glamorous Abidajni stars at the same time: “Voici enfin l’Afrique en vacances.” *Moi, un Noir* examines what images an “I” would produce if it had the cinema.

“For Rouch, it is a matter of getting out of his dominant civilization and reaching the premises of another identity.”⁸ Rouch’s strategy was every bit as careful as Deleuze presents it to be. Because he was aware that he was not only the symbolic representative of French culture, as it was called during the war, but that he was also the engineer that had seen to creating the conditions for traffic and mobility in Niger, he also wanted only to use film technology to set up constructions on which identities could be positioned, according to their usage, with or against cultural conventions. Rouch examined how people learned to move, identify, and differentiate on the bridges and streets and on other symbolic orders that the colonial masters had saddled the country with. This is why he does not merely film indigenous dances and music, but wild speech, the art of fabulating, which explodes the masters’ discourse through speech acts that have gone mad. “I is another’ is the formation of a story which simulates, of a simulation of a story or a story of simulation which deposes the form of truthful story.”⁹ Cinéma vérité is a truth of the cinema that differs from other truths due to its technological processes of production, but that no longer needs to claim to be absolute. Films are a productive force that builds new bridges and connections, on which syncretized forms of transitioning beyond established forms of consciousness can be cultivated:

The trance, the putting into trances, are a transition, a passage, or a becoming; it is the trance which makes the speech-act possible, through the ideology of the colonizer, the myths of the colonized and the discourse of the intellectual.¹⁰

While Deleuze emphasizes the imaginary and ideological requirements of trance, Rouch first and foremost had its technical aspects in view, which could steer or divert the paths of the imaginary. One of the most well-known scenes from his films is the shot in *Cocorico, Monsieur Poulet*, in which a Deux Chevaux makes it way along the Niger not far from a long bridge, given additional paddling and pulling by the chauffeurs. The 2 CV can swim, the people on the Niger knew this, as did the entity that signed off as director with “DaLaRou”: a combination of Damouré ZIka, Lam Ibrahim Dia, and Jean Rouch, the longstanding shooting unit made up of old wartime friends and colleagues. An entity that has completely “gone native”, embodied,

wired, and fraternized by means of film technology, and which appropriates the cinema, despite all of Metz's misgivings, as "corps propre": "Voici enfin l'Afrique en cinema!"

The 2 CV shot has nothing to do with the randomness that Bateson aspired to, but everything to do with "errandum": the prefabricated must absolutely be abandoned. In order to do so, it is not so important to know oneself than to allow for technical possibilities, for movements and mobilities. The little floating 2 CV with its increasingly naked chassis is a nice African answer to the occidental call for disclosure. In the river, hidden paths are technologically uncovered. And in the cinema.

At any rate, for Rouch the cinema is by no means a technological cure-all for constructing or reconstructing cultural constellations. In his ethnological studies of the fifties, with which he was one of the first, after Griaule, Leroi-Gourhan, Lévi-Strauss, and Germaine Dieterlen, to get a doctoral degree in anthropology, he proves to be a careful and almost fastidious philologist of Songhay culture. In his *Contribution à l'histoire des Songhay*, which was published in 1954, he reconstructs their history by comparing the official chronicles, in particular the texts of Mahmoud Kati (Tarikh al Fattach) and Abdoulrahamane es-Saadi (Tarikh es-Soudan), as they had been preserved since the seventeenth century in Timbuktu, with the oral traditions in epics and songs that had been passed down. In a critical analysis of the Muslim historiography, which had been considered the officially legitimate history of the Songhay to that point, he reconstructs another history, in which written and oral records correct one another. By doing so he develops, for instance, the thesis that the "actual" Songhay were no longer to be found in Timbuktu or Gao after the seventeenth century, but in the south and near Anzuru, on the islands between the rapids of Niger, where in fact the centers of Songhay magic and ritual still lie today.¹¹ The new historiography thus already produces new categories for African origins or identities without judging the political value of particularization. It is a simple matter of discovering stories of cultural interferences, even in the historical tradition. Such a reconstruction of history, however, assumes that ethnography, as Rouch practiced it in his field research, can advance to become verifiable historiography. Historically, this step is due to the recording technologies of audiotape and cinematography, which turn songs and dances, voices and gestures into data in the first place. How these new data should be treated methodologically was still open to debate in the fifties.

Rouch's other major ethnographic studies, *Migrations au Ghana*, which appeared in 1956, and *La religion et la magie Songhay*, which was published in 1960 as Rouch's "doctorat d'état",¹² served as both the foundational

research and starting point for his films. His data and depictions, all of which – except for those that stem from chronicles in the name of and in the archives of the Muslim rulers – were the result of empirical investigations in the field, could be supplemented by the African spectators in the projections on the village square. His justification for him viewing writing as inadequate for his purposes of transitory and reciprocal anthropology was that the Songhay had torn only the photos out of the dissertation that he had written about them and hung them up in their huts because they could not read. Because the interventions of the African spectators in the film work had proven to be a helpful corrective, however, Rouch began to propose ethnology methodologically as a self-correcting scientific system. Here as well, he made a detour around the institutional ways. Only after the fact does pragmatism turn out to have been an epistemological leap:

I was convinced that using the means of film one could contribute substantially more to the research of foreign cultures than a scientific discourse can, however thorough it might be. When, for example, one witnesses and records an initiation, one is struck with how the individuals being initiated react (this is most obvious with circumcision): classical anthropology doesn't even take note of this at first, it reduces the suffering or jovial person to a fresco, an overall tableau. It takes itself out of the reality that it itself has seen like a mask.¹³

As an engineer, Rouch can position a simple “more”, even if, as shown by Bateson's experience, recording with a different medium than presumably Eurocentric writing is no less alienating and distorting. There are certainly more and other data that differentiate behavior as the faculty and interaction of bodies. In principle, however, cinematography is nothing other than a new form of registering bodies, which could be applied, exactly like writing, in the sense of colonial administration. In fact, the first anthropological films were perhaps Félix Regnault's simple surveys of the gaits of the various “races.” Rouch was also aware of this, but in contrast to Bateson he nonetheless did not believe that the master discourse of ethnology could be toppled by a simple change in media. For Rouch, film was a direct advance in ethnology as the exchange between two cultures, in as much as those filmed could understand the film images, albeit not in the same way as the European researchers. The people in Rouch's film speak about these differences. This was the differentiating feedback that he was seeking. Africans should comment on his films so that he, Rouch, could react again, recording the commentary and putting it on the soundtrack... or correct the soundtrack

like in the film *Bataille sur le grand fleuve*, a film about the hippopotamus hunt, which spectators in Niamey criticized after it was completed because Rouch put hunting melodies – played on authentic string instruments! – on the soundtrack. Moi, Rouch, later admits what he was trying to do: “I wanted to ‘make movies.’”¹⁴ Moi, un cinéaste! The Africans, however, let him know that hippopotamus hunting required silence, a different nervous tension than that provoked by the music in the prepared dance ceremonies. They made their arguments ritually, cinematographically, and as hunters all at once. Voici l’Afrique.

Damouré Zika, who had seen himself on screen for the first time in *Bataille sur le grand fleuve*, then wanted to appear as an actor in future films: “on va jouer!” And so it was in many other films, and the so-called ethno-fiction film was invented. In turn, other spectators of *Bataille sur le grand fleuve* suggested that Rouch make a film about their lion hunt. This led to the film *La Chasse au lion à l’arc*. The new cinema that Rouch initiated in Africa developed at the level of these expressed wishes.

Rouch’s specific methods also consisted in using cinematography not only as a recording process, but as a potential and transcultural feedback procedure.

This extraordinary technique of ‘feedback’ (which I would translate as ‘audiovisual reciprocity’) has certainly not yet revealed all of its possibilities. But already, thanks to it, the anthropologist has ceased to be a sort of entomologist observing others as if they were insects (thus putting them down) and has become a stimulator of mutual awareness (hence dignity).¹⁵

And a mutual transformer. After his dissertation, which he viewed as a “visa for the irrational”,¹⁶ Rouch did not write much more. Instead he almost exclusively only gave interviews in front of television cameras or tape recorders, which were then edited, treated, broadcast, and printed in transcript: Jean Rouch tells... Jean Rouch reports... Jean Rouch continues...

For audiovisual technology to work the contacts that were made have to be right. Communication is then a question of correct wiring. Any intentions that one had in mind become worthless in the field if the contacts are loose. What Rouch intends with his procedure is more than simple dialoguing between cultures. Connections are to be set up as flow functions that use technical mechanisms to dismantle hierarchy. Petit à petit. The feedback in Rouch’s film speech is meant to strengthen the disintegration of retracted conventions, albeit not as a way of avoiding a clash of cultures,

but in order to make it loud and clearly audible. In the porcelain shop of the fine information society you have to shatter the old connections, “casser les vitres” in a double sense:

Le monde est en train d'évoluer justement par suite de ces moyens d'information.[...] Si j'ai un rôle à jouer dedans, c'est de casser des vitres. Quand les vitres sont cassées, on est forcé de les remplacer. Même si on les casse pour des mauvais motifs, il faut mieux le faire.¹⁷

Rouch sees his films as mediating between strangers, but neither as diplomacy nor as interpretation. In the network system made up of human beings and the camera, the gazes of third parties, others, and other authorities are switched on, and they jostle, disturb, or increase what gets transferred. Rouch tinkers with the technology until new imaginary spaces start to emerge, in which mental states are realized that are non-integrated, nor can they be integrated into respectable civil society. While western psychoanalysis reconstructs how the subject has to be positioned in the symbolic realm of language in order to integrate longing and desires consciously into a personality, Rouch attempts to open up a space in which the non-integrated parts of the personality can be seen in the first place: as in trance, as in possession. In this cinematically constructed topology of the savage, all sorts of intersubjective, transsubjective, and social communication becomes visible, but not “white” or “black” neuroses. This is why Rouch's technical “depersonalization” in Africa is the opposite of Parin's and Morgenthauer's ethno-psychoanalysis. Only in 1969, in *Petit à petit*, does the drama of the ethnologist become an intercultural comedy. Damouré Zika and Lam Ibrahim Dia trail through Paris in order to survey the passersby as ethnologists, noting down their ancestry, cranial circumference, and dental structure and examining the costumes of men and woman. Taxi drivers, police officers, and businesspeople become informants. “Parisians are ugly, too thin or too fat, very ugly. They are also very sad. Without a doubt they suffer from a terminal illness, and they know it”, notes Damouré Zika. When the sad passersby express their surprise and do not open their mouths, not wanting to show their teeth, the ethnologist merely explains that the film is for television, and the Paris natives immediately show what they've got. Even in Paris, an artificial, technically constructed, and imaginarily structured space of higher authority can be exposed.

In 1960, in preparation for the film *Chronique d'un été*, Rouch and Edgar Morin had begun working with the cameraman Michel Brault and the manufacturer Coutand to design a new, more mobile camera outfit.

“Coutand was prepared to develop the super light Éclair, which he had built for satellites, for civilian use as well.”¹⁸ He tested the new technology on colleagues in Paris:

The participating camera of Nanook has become a moving camera, a contact-camera. The mobility and this closeness triggers, I believe, a new form of dialogue, for the questioned/observed person no longer has to distinguish between ‘me’ and ‘camera,’ he addresses a system that is self-contained and interconnected.¹⁹

An Éclair-centaur, a camera-man.

The improved optical network system shifts and displaces the identity positions of its participants to the point that they do not recognize themselves.

Just like the first people I attempted to interview, I was highly surprised by the provocative strength caused by this contact. It was a conversation with Paul Lévi, a student of Marcel Mauss, with whom I carried out a highly intense conversation, the camera always at my eye. I posed questions and got responses that I (and as he himself told me afterwards, also he) had never expecteded.[...] I call this state “ciné-trance.” This expression plays with the Vertov’s coining of the term “kino pravda” (“cinéma vérité”).²⁰

Ciné-trance did not emerge in Africa. It is a technological invention from Paris, with feedback from speech and other reactions. It provided access to hidden, repressed, denied layers of history. In *Chronique d'un été* this occurs quite simply through the fact that a young woman with a microphone asks people if they are happy. Not much later she dissects the Great Nation in its bleak historical sections, which its subjects, colonial or European, cannot elude. If Rouch’s films are about the cybernetic linkage between gazes and reactions, then technology is just as important as the discourses behind the speech act distinguished by Deleuze.

Using a 16mm Bell & Howell from the flea market, Rouch began, shortly after the war, to shoot films about rituals and possession. He was “in charge of research for the Musée de l’homme”, which, as Godard noted, was the best definition of filmmaker. He described the permanent feedback of the film experience as a series of transformations behind, in front of, and by means of the camera. Some elements of this series are enumerated in the title of one of his first texts: “On the Vicissitudes of the Self: The Possessed

Dancer, the Magician, the Sorcerer, the Filmmaker, and the Ethnographer.”²¹ Spectators in the cinema can add themselves to this list. From the beginning, possession has been a state that occurs not only in the ritual space of the ceremony, but in the cinematic space that reaches far beyond the optical field of the camera (or the projection space of the cinema).

In his description of possession, Rouch relativizes the distinction between dance acts and speech acts emphasized by Deleuze. In the time travel that is one of the elements of dances of possession, language and movement both become messages sent from the beyond. In possession (as in all ritual processes) both the dance act and the speech act get their rhythm from the outside. This is familiar to Europeans in dancing, but uncanny in speaking. “The gods speak through the dancer, his body, and his mouth. When people dance, they dance their history; history appears as they know it from the continual narrative.”²²

The messages are brought from the beyond with the aid of the camera, which at the time was not even a satellite camera. Just as Deren surmised in her examination of phenomena of possession, the power of the imaginary established in rituals is dependent on the use of the symbolic and is thus provoked and intensified by recording technology. The truth that emerges is due on the hand quite simply to the cinematic restructuring of a space. Because behavior itself, that is, the transforming interaction between subjects, is made visible, *cinéma vérité* can register the precise truth of lies. Rouch explains this with an example of a particular encounter, over the course of which notions of center and periphery, of power and submission, got inverted and twisted in a dual back-and-forth of presumptions. In the Comédie Française Rouch saw De Gaulle talking with the Moroccan ambassador during the intermission of a performance of Racine’s *Andromaque*. Rouch recounts:

I got within a few centimeters of de Gaulle and he, when he realized the camera was rolling, turned to to the ambassador and asked: ‘Excellence, who do you prefer, Andromaque or Hermione?’ ‘Hermione, mon Général!’ ‘How right you are!’ And I am quite certain that this dialogue would never have existed in this form without the camera.²³

If Rouch’s claim can be taken as more than speculation, it is because he had the experience of imaginary and reciprocal presumption being immediately crystallized in the space of the cinema according to the rules of the symbolic and its representations: supra-individual and precise. The general poses the question of the stance vis-à-vis the tyrants, and the man from Morocco

takes sides with the one who renounces her own origins. Of course, since the camera's rolling, this could all be a matter of displacements, deferrals, false statements, which is what produces *cinéma vérité* in this feedback. Trojan horses for General de Gaulle. The camera instigates a show in which everything is off-center – even if the center and the power located there have not yet been abolished. Rouch studied this in turn with his footage of possession rituals: “It’s a short step to fiction, for what occurs in these dances is in principle nothing other than the birth of tragedy. Dionysus is always passing by. The heart of the Corybantes is transformed into the hears of a filmmaker with a camera and a Nagra.”²⁴ It is not a matter of authentic culture, but rather of people and gods in cultural transit.

Before the classics can appear in film with symbolic shifts, however, and even before the imaginary can extend its wings in the cinema, Rouch describes the simplest alliance of film with possession, one located at the most elementary level of the camera's technology. The process of rhythmically chopping up, with which the camera dissects the imaginary identity of bodies into individual frames, can be connected in its rhythmic regularity to the technique of inducing trance. Like drum rhythms, the intermittent scansions of the camera throw consciousness out of sync with the self-referential consciousness. The noise of the camera indicates that it allows an Other from outside to take the place of the ego. Maya Deren explained this process in terms of the physical properties of the nervous system: “Sustained rhythmic regularity and the fact that the source of it is outside the individual rather than within, means that consciousness is unnecessary, as it were, in the maintenance of this concentration.”²⁵ Rouch provides a technical description based on footage shot for a film from 1971 about two particular drummers, *Tourou et Bitti*, and about the music and the states of possession that they create. When he comes to the village with the soundman Moussa Hamidou, the musicians are already playing, but nothing has yet happened among the dancers:

I wanted to come into the village with the camera rolling. The problem for Moussa, who was coming with me, was to choose the best of the various sounds, the best of many things said, which of course did not always happen identically with the image. We reached the dance square, where an old dancer, old Albeydou, Sambou Albeydou, was just then approaching the orchestra. I also went to the orchestra and then – suddenly – the orchestra paused. Normally I would have had to stop, but I left the camera running, I squinted over at Moussa, he nodded to me, we kept shooting, and the people around us sensed or knew that the camera

was still running and at that moment possession took over.[...] The priests and the dancers went along, they knew that their dance and their music were now being recorded, which stimulated them greatly.²⁶

Here the camera replaces the function that has to precede all trance and suggestion, as Deren had described for the leveling of the stimulus frequency in acoustically inducing trance. An expectant attitude has to be introduced, in which sense data are processed differently:

As we know, rhythm consists in the regularity of the interval between sounds. Once this interval has been established, our sense-perceptions are geared to an expectation of its reoccurrence. This means that expectant attention, which I have previously spoken of as an important element in suggestibility and concentration is being deliberately and directly brought into play.²⁷

Only when the confusing, noisy, and cacophonous flow of data has been artificially chopped apart and systematized and a certain artistic space has been established – in the acoustics of the archaic drum rhythms or in the visual aspects of the cinematically rhythmized space – can the imaginary and symbolic relations be connected to it. This is the physiological prerequisite of possession. Rouch, however, does not so much stress the process of rhythmically dissecting the movement, but the reverse of the process, the continuity of the uniformly formalized elements, such as the 24 frames per second in the projector, the cinema-trance, which continues even when a black frame appears on the screen. Both sides of this process, the dissection and the imaginary synthesis, form the social technique that combines the peculiarities of the gods into the body images of the dancers. In order to preserve the integrity of the ritual, intervening subjective decisions have to be reduced. This is why Rouch insists on long takes, on shooting with the camera without interruption as long as there is material.

To emphasize it once again, what was significant was the long take, the continuity of filming during the ritual. My efforts went to shooting even longer, substantially longer takes – an exclusively technical problem, which, as I hoped, could be solved by Jean-Pierre Beauviala, the camera engineer and inventor from Grenoble.²⁸

Engineers regulate the appearance of the gods technologically and amongst themselves. Bridges and streets, “Ponts et Chaussées”, are applied in the

realness of the cinematic space that unlock the dark continent of the psyche in possession, creating new insights and new overviews and allowing for journeys into the heart of darkness. Psychic space is differentiated by the technology of the camera. A new topology emerges, which stands completely within the logic of European, western technology, but which also provides an image of how a *Deux Chevaux* makes its way down the river along the bridge African-style. As long as the engineers manipulate the technology, they definitely maintain an awareness of the fact that the paths that they are plotting are also those that they have to “get over.” They can and must also know that they themselves are transformed by this technology:

Vertov said that the eye of the camera is a mechanical eye, the microphone is a mechanical ear or sense of hearing (so-called radio hearing), this mechanical anatomy is characterized by a certain variability in the optical (lenses, apertures, focusses) and in the acoustic (axial registration with directional microphones). If I, equipped with these instruments, make a film, I myself am a ciné-observateur and find myself in a state of ciné-trance. In other words: I, Rouch, get up, move, and do something that I otherwise would never do.²⁹

In one of Rouch's films the historically altered cultural technologies are combined with the camera technologies into a spectacular cinema-ritual, which turned into a scandal. The film *Les Maîtres fous*, which he shot in 1954, was considered horrible, malicious, and racist by both French anthropologists and cinéastes and African spectators.³⁰ The film interweaves cinematic and ritual space. It does this in a surgically precise and absolutely ruthless way and is an example of Rouch's technical and unflinching art of “becoming black.” The complexity of the staging begins with Rouch inviting the priests of the Haouka cult themselves to shoot a film about their rituals. They are the rituals of the Songhay cult practiced by the “Gold Coastiers”, the migrant workers from Niger in Ghana, in which the representatives of the French and British colonial authority have replaced the spirits of the bush, of the water, or of the air. In the film commentary these are referred to as “les dieux de la ville, les dieux de la technique, les dieux de la force.” It was thus a conscious step by the priests to extend the service to include cinematography, which represents a kind of African mnemosyne in the pantheon of the Haouka – or, as Rouch applies it – as troops of Corybantes who can totally destabilize memory as the central power. Because the priests themselves appeared as the commissioners of the filming, that it, of the technical surveying of the gods, they already subjected the anthropologists

to their cult, and precisely not as persons of authority from the colonial powers, but as servants: “à la bonne.” In addition, a camera, which is called Bell & Howell, must have appeared to these Haouka priests as a convenient omen for the change of “his master’s voice.”

The title already announces yet another application of the film. On the one hand the “maîtres fous” are traditionally “the masters of the wind that brings madness in its wake”, that is, the priests who have overcome madness. At the same time, “maîtres fous” is the name of the mad masters, the colonialists with their cultural and symbolic orders, their science, their traffic systems, and their military parades. The syncretic sect of the Haouka, beginning with the order that they gave to start shooting, provided the occasion for a film of reciprocal anthropology. *Les Maîtres fous* is, according to Rouch, “in the first place a film about us, the whites, about the image that Africans make of us.”³¹

Rouch’s camera had to be rewound after 45 seconds. The “mise-en-scène”, the dramaturgy, arose during shooting, in the seconds necessary to rewind the spring mechanism again. Since Rouch was shooting in long takes, as always – that is, making no interruptions and no cuts as long as the camera ran in the space of the ritual activities, but only movements – he had placed himself under the periodic standards of the camera and thus in a ritual space. What caught his attention as he was rewinding the camera determined the next take. This was, according to Rouch, the thinking in the film, that had got lost with the incorporation of motors into cameras. The gods of technology rule the parameters of cinema-thinking.

The sound, on the other hand, could be recorded continuously for 30 minutes. In order to apply it later, the editor listened to the whirring of the camera, which was heard scene for scene in the original sound of the ritual in the Ghanaian bush. Editing the film followed the chronology of its recording.³² The shots, their beginnings and ends, are so haphazard and noticeable due to the camera’s limitations that there’s no way to claim any overview, any overall perspective. In the dramaturgy on the ritual stage, which is extremely difficult to comprehend, the cameraman is optically and firmly integrated in the events, in one role among many, subject to the direction of the gods.

The techniques used to induce trance in the ritual are not separately described in the film. What can be recognized is that rhythms are created by pounding wooden guns and that large amounts of gin have been poured out on the central sites of the scene. The first signs of possession are shot from various camera angles, almost textbook cases from a catalog of convulsions: first in the left foot, then in the right, in the leg, through the back, to the

shoulders, to the head. Rouch captures the eyes askew, the contorted joints. The degree to which the camera, the appointed cameraman, and the shoot are stimulating the Haouka cannot be determined. The first possessed person to get up, “Kaporal Gardi”, the corporal of the guard, does so in fact directly in front of and looking at the camera. Over the course of the ritual various other gods appear without being filmed from the beginning. The trance as *ciné-trance* is evidently only one among many in this ritual. At any rate, everything, let’s not forget, that we see of possession is cinema.

Among the gods that appear after the corporal of the guard, there are the locomotive driver, Captain Malta of the Red Sea, the General Secretary Gomno, the Major Commandant Mugu, Samkaki the truck driver, and Chemoko, the son of the corporal. They are recognizable through their movements, but additionally for the spectator by the fact that a running commentary paraphrases what is said by the *other* participants, sometimes also already gods, sometimes still human beings, as they greet the new gods, test them, and adorn them with the appropriate accessories. The perversions of colonial history are presented in many small details. Even more than the ridiculed medals, helmets, suits, and flowery phrases, small shifts in the relations show that the gods know what is driving them on. For instance, in *Les Maîtres fous* it is the wife of the doctor, “Madame Lokotoro”, who appears, not the doctor himself, whose figure also appears in Foucault as the “master of madness”, the one “who makes it appear in its truth and [...] dominates it, pacifies it, and gradually makes it disappear after having artfully unleashed it.”³³ In the ritual, the doctor’s Other appears, what moves and controls him: Madame.

Much more than any symbolic staging, however, it is in the embodiment of movements that the Haouka gods make themselves known. The corporal, the captain, the locomotive driver are distinguishable through their gaits, in which man and corresponding machine are partially fused, whistling and fizzling, into a single way of moving. The gods therefore also appear as a farce in the official history of anthropological film, which constantly disavows its ergonomic beginnings and its initial regulation of bodies. Cinematography is supposed to differentiate racially. Here, however, all the movements of the *maîtres fous* appear as awkward, synchronized, stiff convulsions set to a militarily strict pre-established rhythm: “In all the other films that I shot on dances of possession the gestures of the dancers are rounded out, soft, themselves dissolved in the greatest turmoil, while in *Les Maîtres fous* they are angular, coarse, and ludicrous.”³⁴ But they are precise in a double sense. In the middle of the footage of the possessed, Rouch inserts an old film document of a British military parade in order to be able

to show how the cult dancers simulate or distort these odd movements and accessories. Through this material, however, it becomes clear that our gaze among *les maîtres fous* has already begun to differentiate, and we become attentive to differences between the gestures and movements of the British and French occupiers. Under the gaze of the Africans, the Blacks, as they could proudly be called in the *négritude* of the fifties, it becomes visible how colonization had also subjected European bodies to a manifest violence. The ritual in the film becomes a lesson in reciprocal anthropology. In this regard the possession dances of the *maîtres fous* are unequivocal. They show how domination does not remain on an administrative level, but how it, unconscious and supra-personal, takes power through bodies. This magic was first applied in Europe during the nineteenth century under no less brutal rituals and then, through physical drill and psycho-physical identification, transferred to the bodies of the colonized. The divine appearances of the Haouka reproduce and disfigure the technologies precisely to the degree that power has made itself subjects through drill and stereotypes in Africa. The transfer in the film works so well because chronophotography had been the most important tool in establishing new bodily regimes in the nineteenth century. This is repeated here in reverse. In the commentary we hear a comparison between ritual and real colonial administration: "Ici, l'ordre est différent, ici et là, le protocole est bien le même." The order that the ritual dictates is the order (and the command) of the Haouka gods. The protocol that governs how subjects (like the British subjects in the film) should behave has the same prehistory. It is due to the *dispositif* by which movements can be stored, controlled, and reproduced in the first place: the protocol of cinematography.

Because Rouch subjected himself to the recording rhythm of the camera – the micro-rhythm of 24 frames per second (here, unlike Bateson, he was accurate) and the macro-rhythm of the 45-second takes – and because he allowed the persons to depersonalize strictly according to the rules of the Haouka in his montage, which maintained the continuity of the movements, of the torches, of the colors, and of the relationships, he accomplished his task. The terror that seized the audience at the screening of *Les Maîtres fous* at the Musée de l'homme and that made the film unforgettable repeated and distorted one of the strategies of possession itself: that of tying memory unconsciously to the body by means of affects. "For it is the defeated who know best which of the opposing tactics were irresistible", wrote Maya Deren. In Rouch's film as well, the subordinated can indicate the tactics with which they were codified to become part of a powerful empire, in order then, as dispossessed, to flail on the fishhooks of power. The possessed persons first

of all incorporate the “corporal”, the one who holds the corporeal body, then the officers, the administration, the traffic system, and the “forbidden” other sex, namely the wives of two dignitaries. Freedom, equality, civic fraternity, identity, and happiness are all promised by power, capturing their subjects with tricks that, if all goes well, leave behind weapons, quick jobs, old cars, and sex. The Haouka ritual and the film give it a name: violence.

What shocked spectators when the film was shown for the first time in 1955 at the Musée de l'homme was the violence with which possession usurped the participants' bodies: the screams, the cramps, the shaking, the wide-open, rolling eyes, the foaming mouths, and the staggering, buckling extremities. In the film, as Rouch shot it, the real of the bodies is made painfully present in the imaginary of the appearance of the Haouka gods. The gods “de la ville, de la technique, de la force” demonstrate how they physically displace the whole person, leaving nothing left of the old remains of the soul, which might still indicate a consciousness that accompanies these transformations. No “je-sais-mais-quand-même”, as Leiris has seen or only hoped for in Haiti, suggests that the possession might be simulation or theater. The camera shows an absolute power takeover of civilization in the interior of the nervous control function, and shows itself to be part of the technology of civilization. The spectators were appalled, the majority left the room in protest, but obviously not many of them were ready to realize what was being presented: the mercilessness and horror with which cultural technologies penetrate the body. Perhaps this is also exactly why they fled. To a much smaller degree, but perhaps even more uncannily, this process is repeated in the cinema. Rouch was reviled by Europeans and by Africans, by whites and blacks, accused of having gone too far. Obviously, however, none of the critics heard any message in this presentation of the ritual that might have conveyed the takeover by power as a takeover of bodies. Not consciously at least, for the message is crystal clear: “to whom it may concern.”

What had been particularly shocking to the spectators was the depiction of a dog sacrifice. In order to show that they are Haouka and thus not subject to the order of human beings, the possessed persons eat of the dog, which had previously been killed by the priest. Rouch did not shy away from showing how the animal was torn apart and dog's blood dripped out of foaming mouths. The gods made fun of any attempt to rationalize the horror. In one scene of anticipatory anthropology “the captain” has a conference convened in order to pose the decisive question of whether the dog should be eaten “raw or cooked”. In the meantime the dog is lacerated further by the gods and swallowed up in large pieces. Rouch makes

no attempt to rationalize. The little dog in the film cannot even stand in metaphorically for the allegiance with which it obeys the master's voice, archaically and technically. Bell and Howell. The master eats it up. When the technology provides the rhythm, there is no more faithful allegiance, but only involuntary loyalty. The violence is the intrusion of the real, not as the making visible of the apparatus on the screen, as Baudry had imagined, but as the twitching of the bodies, the real of which sweeps up once again against colonial codification in the technically controlled space. Rouch cinematically doubles the space of symbolic violence, thus bringing it into the screening room. That was unbearable. It is said that Lacan left the room without a word along with all the others.

The demented paths of the gods provided the film's appeal to psychologists, anthropologists, and cinéastes. It was well received in these circles, where the last trance left to central Europeans was being organized in the fifties: the mass mobilization on the streets and the air with the goal of forgetting oneself for a couple of days. "Ici, l'ordre est différent, ici et là, le protocole est bien le même." The film, which the gods of the cities, of technology, and of violence had commissioned and in which the gods bloodthirstily show that they recognize no taboos, received the first prize in Venice in 1957 in the popular category of ethnography, geography, tourism, and folklore. "Voici enfin l'Afrique en vacances."

An almost uninterrupted commentary runs on the soundtrack through the entire film, which is normally an effective method of establishing distance between the images and a secure order outside the film. For instance, we have confidently watched lambs die in dozens of films about Jesus. Rouch's commentary, however, is unsettling even at the level of language. It emerges, like the images, in the mutual displacement of the participants and repeats the African fabulation. Rouch reports that the speech of the possessed was a speaking in tongues: "Une langue, qu'on peut interpréter mais qu'on ne peut pas traduire mot à mot."³⁵ At first he has the speeches translated into into an African language and then conveyed in French afterwards. The commentary that is added in the final version was spoken by Rouch in a crazed state that he himself calls glossolalia, and that ordered him in the darkness of the projection to the microphone in the recording studio. In the studio Rouch repeats what befalls the good workers at Accra when they are seized in the ritual of the gods. In the space of the recording studio, in which the projected images set the rhythm of the speech, in which the foreign speech of the gods is taped as the movements of one's own tongue, in which one's own voice returns distorted and alienated as the carrier of technically processed, foreign speech, consciousness takes leave, a consciousness that

might have been able to imagine where the ego might be. The physical is left to the laws of technology. It carries the mental functions in place of a feedbacking consciousness. The glossolalia that Rouch reports seems only to have an anecdotal character. Technically it corresponds exactly to the experiences of our present culture: Gods only come into the studio.³⁶

The god that we are presumably waiting for in the film is the incarnation of the camera-man: the figure that inevitably belongs to the personnel of a colonial troupe. This even seems to be signaled when above the “general secretary, at the termite hill-royal palace” an old cinema program is filmed, *Le Signe du Zorro*, the film about the revenge of the disinherited. Only when the locomotive driver blows through the image, and the governor berates those present in French, when Captain Malia from the Red Sea stumbles through the scene like Groucho Marx in the British “slow march”, Madame Lokotoro inaugurates and desecrates statues while wearing an elegant summer dress, and the priest Mountyeba chats at the alter like a radio reporter, do we notice that the camera-man is also on the scene and is shooting as the kino-eye. We as spectators suddenly notice that we do not comprehend the gaze that rips us out of our anchoring by seeing; only afterwards can be reconstruct it. The camera is our consciousness on the scene. By technically implementing the gaze on oneself, Rouch repairs to the level and the program of the gods. He transforms himself by filming. What our gaze identifies on the scene is a technically equipped white man, and thus, like all the other gods present, a Black, a Negro, a Noir, who understands his ego as other through the many interconnections and relations. What we ourselves see are the pictures of a cameraman who has linked himself and the camera to a cinematic occupation of the world. *A maître fou*. In Vertov's tradition Rouch has linked himself to the *maîtres fous*. In Vertov's tradition he has become a black: “In many of my films I freed the camera from its prescribed usage, “converted” it. In today's capitalist-industrial-socialist world there is no other way to make films – you have to use the camera in ways that were not intended or prescribed.”³⁷

At the end of the film Rouch's commentary speaks of the fact that possession might be a cure for some people, with which the Africans might be able to integrate into the system of normality. At the end, this sentence is introduced somewhat rhetorically: Has the camera not already shown how its remedy works? Isn't the film about how to use media in a way that they become remedies? The gods of the city, of technology, and of violence have shown us this unambiguously.

Much like Deren in her comparison with hysteria, Rouch also designates possession as a way of dealing with states that are merely considered

symptoms of abnormality in our society and are not perceived as social processes, which show how dropping out, whether desired or undesired, can be integrated by the norm. "For me this film is of utmost significance because it represents something like a key, and this key can help us to recognize the social character of mental illnesses and the social, the public form of alleviation and cure."³⁸ In western medicine, by contrast, it is not hysteria itself, but only its expulsion, that amounts to a cure. Historically media in western societies initially serve to justify mental illnesses, because what escapes the text based medicinal discourse can only be physiologically grasped and systematized by using the images of technology. Another brilliant camera builder, Albert Londe, had turned hysteria into a fact by working with the consciousness of male and female patients. The former chemist was thus promoted to being a god in white. He could not cure anything, all he could do is provide rules for justifying selection, hospitalization, isolation. A half century later Jean Rouch will describe how the "griots" in Africa work when they are able simultaneously to protect tradition and to cure. A griot, for instance, is responsible for providing encouragement in the case of catastrophes and overpowering enemies:

En recourant à la musique, aux phrases rythmées des devises, en rappelant les haut fait des ancêtres, il parvient à créer une seconde personnalité à 'lever le cœur' du guerrier au combat, du chasseur de lion, du pêcheur d'hippopotame, du 'Gold Coastier' défaillant et souffrant du mal du pays. Ce courage sera évidemment éphémère mais il suffit en général à triompher de l'épreuve.³⁹

Consciously or not, among these examples Rouch always names examples from his own film work: *La chasse au lion*, *Bataille sur le grand fleuve*, *Le Maître fous*, and he also names his own process, using rhythmic phrases like in his commentary produced in the studio, of subjecting himself to ritual rules in order to remember the past and the ancestors, thus producing a doppelgänger that can behave appropriately in light of the threat. A fleeting but absolutely useful doppelgänger that can be projected in the cinematic field.

Rouch became a griot. As a master of the black magic of images he continues to work on developing medial deviations, making visible the processes of transformation and of intercultural mirror inversions, and analyzing the imaginary security of our white personalities. "*Maîtres fous* is, the voice of Dionysus speaks out of *Maîtres fous*, the voice of the imaginary in our society. And in the future I will continue in this direction with cameras that have yet to be built."⁴⁰

4. Compressions

Albert Londe: Paris, Paris

Quand le corps en mouvement est inaccessible comme un astre dont on veut suivre le déplacement [...] la photographie supplée aux procédés mécaniques avec une très grande facilité.

– Étienne-Jules Marey, 1885

One of the genres in anti-monarchist group pictures in Dutch painting, in which early bourgeois male societies claimed their own hierarchical order, is that of the anatomy lesson. The surgeon, who occupied the greatest knowledge and the power in the guild, was made the focus by using structures of light and gaze, the other doctors were placed in the hierarchy correspondingly: in the foreground, middle, or background, in portrait or full-length, closer or further away from the corpse, with or without surgical tools.¹ One picture in this tradition of anatomy lessons is a canvas by the painter André Brouillet, which was exhibited in the the Paris Salon of 1887. It depicts a lecture by the neurologist Jean-Martin Charcot as a medical attraction of the time: “Une leçon clinique à la Salpêtrière.” This painting has been presented as emblematic by both male and female historians of hysteria because an engraving based on Brouillet’s model hung in the iconic corner of psychology itself, in Freud’s study at Berggasse 19 in Vienna.

Instead of looking at a corpse, as is the case with historical anatomy pictures, here the doctors and assistants are looking at a woman who has fainted and collapsed into the arms of a young man, while an older and a younger nurse stand in attendance, following the process like chambermaids in a *Trauerspiel*. An older gentleman is standing next to them. He is addressing the audience, but in his iconography he belongs on the stage of the dramatic events. Charcot, the “Napoleon of Neuroses”,² is, like his military model, both the worst enemy of the old regime and its heir. His lectures, where clinical cases were presented every Tuesday, were scientific revolutions and social rituals at the same time. Charcot is considered the inventor of the systematic clinical pattern of hysteria, which he had proposed in the 1870s by schematizing hundreds of photographs of his patients at Salpêtrière. Only through this schematicization, which had been clearly laid out for other doctors in a synopsis drawn by Paul Richer, the head of the laboratory for pathological anatomy, could the ranting and raving of the patients be organized into a complex of symptoms. What had previously

been distorted in all medical or theological orders as mad femininity was researched, systematized, regulated, and controlled at Salpêtrière.

The experiments with hysterics already represented a second career for the neurologist Charcot. In the wake of the war in 1870-71, which had brought many dead persons with bullets in the head into the clinic and onto the dissecting table, he had already excelled with a completely new medical cartography of the human body. Due to his research in nerve physiology, he was able to redefine connections between symptom and cause. In his studies on tropical disturbances he shows, through the example of a German soldier, that injuries to the brain can lead to rashes on the buttocks, a bold thesis, unheard of even among privates.³ Disturbances to the nervous system and especially the cerebrospinal axis, as Charcot demonstrated in the cases of shootings, allowed for a completely new view of how the inner physiology of human beings is connected by the nerve tracts. The "Napoleon" of neurologists could also be considered the "Columbus" of illnesses to the spinal system, precisely because he had no orientation over the systemic state of the new land he had discovered.

In 1887, however, when Brouillet's picture was exhibited at the Salon, Charcot's scientific reputation in Paris had become obscured. Research and publications by the medical school of Nancy were casting doubt on the general validity of his iconographic understanding of the course of hysterical states, insinuating that they were effects of the examination methods at Salpêtrière itself. The demonstration was raised to the level of diagnosis, it was claimed, and Michel Foucault will claim that this is exactly what was really new about the lessons in Salpêtrière, illustrating Charcot's art of crisis control with an example of an unpublished handwritten document from the archive: "The subject exhibits hysterical spasms; Charcot suspends an attack by placing first his hand, then the end of a baton, on the woman's ovaries. He withdraws the baton, and there is a fresh attack, which he accelerates by administering inhalations of amyl nitrate."⁴ Sigmund Freud attended Charcot's lectures when he was staying in Paris from October 13, 1885, to February 28, 1886. In his obituary for Charcot in the "Wiener Medizinischer Wochenschrift" he also emphasizes reproducibility as the high point of the methodology:

While he was engaged in the study of hysterical paralyses arising after traumas, he had the idea of artificially reproducing those paralyses, which he had earlier differentiated with care from organic ones. For this purpose he made use of hysterical patients whom he put into a state of somnambulism by hypnotizing them.⁵

Diagnosis had slid into functionality; whoever could set it in motion had explained it.

Raising reproduction to the level of explanation initially meant that the goal of treatment was no longer therapy, but controlling the illness. Freud will not follow his teacher in this. Charcot's oracle, that no theory would prohibit what happened in the clinic from existing – “ça n'empêche pas d'exister” – is something that Freud only pointed out in response to the search for an “it” in the hysterics' spells, an untouched “ça” that had a mysterious, disturbing, and modifying influence on consciousness, which Freud wished to examine. Freud praise of his teacher, however, was a paraphrase of Charcot's sentence:

We can artificially produce it under certain circumstances; this is the sublimity of a genre and, in fact, the ideal of pathological physiology. The ability to reproduce a pathological state partakes of perfection, for it seems that one possesses the theory when one has the means of reproducing the morbid phenomena at one's fingertips.⁶

For Charcot, theory was first and foremost the “known like” of clinical practice, which made hysterics publicly mad time and again, and especially Tuesday for Tuesday. The transfer of the symptomatic order to the bodies of the patients was the ideal of the diagnostics, although what was missing in Charcot's methodology was exactly any description of the “means of reproduction” that he claimed to have at hand.

How the transfer of signs to the bodies takes place, how the oddly reciprocal interferences of desire were performed as regular mechanics or dramaturgies between body and soul, was something that Charcot did not want to know anything more about – in contrast to Freud, who will later get his first indications toward a theory of the unconscious from this relationship. Charcot only submitted evidence that “it” did not let itself be disturbed.

According to Foucault, the technological and discursive apparatus that the various scientific and related services at Salpêtrière made available belongs to a third epoch of truth production, which became established at the end of the eighteenth century. Truth is generated in the experiment, and thus must be repeatable. In the laboratory that was Salpêtrière, the techniques of hypnosis and suggestion were refined to the point that the ill persons obviously did what they assumed to be the demands of the doctors without resistance. The hysteric, according to Foucault, “herself retranscribed the effects of medical power in forms that the doctor could describe in terms

of a scientifically acceptable discourse.”⁷ For Foucault sexuality was the bait in the net of discourse in which the fugitive souls of the nineteenth century were caught. “They constructed around and apropos of sex an immense apparatus for producing truth, even if this truth was to be masked at the last moment.[...] sex was constituted as a problem of truth.”⁸ It is a problem that is at the same time a ruthless power play, and Foucault’s designation of the doctors is the exact opposite of the designation with which the Haouka priests simulated the sick power of the white colonialists. “All the techniques and procedures put to work in the nineteenth century asylum – ...the function of all of this was to make the medical figure the ‘master of madness.’”⁹

As variable as the interpretations of the “Leçons clinique à la Salpêtrière” were, their methods were persistently viewed as the invention and implementation of a semiological order of the female body. Involuntarily in accordance with Charcot’s demands, hysteria was read as an iconography and a staged event.

Charcot’s own dramaturgy was as aesthetic as it was useful, for instance when, in order to illustrate a lecture on various forms of tremors, he had women brought in wearing hats with long feathers so that the specific characteristics of each tremor in their trembling could be distinguished down to the last row of the lecture hall.¹⁰ This was clinical practice with style and strategy, and the dilettantish cynicism of this kind of staging had a long tradition at Salpêtrière. Charcot’s predecessor, Duchenne de Boulogne, had researched the *Mécanismes de la physiognomie humaine*, as his publication from 1862 is called, by electrically stimulating the face muscles of both male and female patients. In doing so he went so far as to ascribe to their bodies roles from classical dramas: certain probes and certain muscles caused Lady Macbeth to appear in a fury of rage. Charcot’s colleague Paul Richer, in turn, more vulgar in every respect, saw dogs, cats, and ordinary people represented.¹¹ The pleasure of the doctors was visible, masked as the patients’ wishes, incarnated on the stage of the medical theater. Both male and female patients, as mad as they may have previously been, surrendered themselves to the intellectual madness of the masters. One of the psychoanalytic primal scenes at Salpêtrière was also the presentation of the obscene to open view. It documents the banality of early psycho-physiological power fantasies, but also the efficiency of a relay that continuously shackles all research to the system of meaning. At the same time, the direction, regulation, and supervision of the researching gaze is hidden away in the order and structure of the archive itself. This is also not new for hysteria. Already in the seventeenth century hysteria had been designated as an epistemological sickness of physicians themselves.

Any one who has studied hysteria as an epistemological effect since then has had to be prepared for feedback mechanisms with one's own scientific work.

During the 1980s, when the first effects of new electronic developments were breaking into ordinary life, coinciding with a crisis in theoretical feminism and instigating a discussion about femininity and representation, a renaissance in the historiography of hysteria began in which the visual presentation of hysterics, as Brouillet's picture shows, was examined as a staging of gender difference. Hysteria was declared the hospitalization of a desire that, following the dictates of the individual hysteria researcher's discipline, could be analyzed as relations of media, power, and gender.

Once Charcot's reorganization of the body had been established, it was seen that his experiments had not only been affairs between doctors and patients, but manifestations of a new science of the body. This presumed the development of new optical devices that got their finishing touches in the laboratories of physiologists and replaced a geometric optics with a psychological one. The technical developments appeared to the tableau painter André Brouillet as a crisis of his own profession at the sector of imaging, and he had treated them in his picture of Charcot's lesson. Alongside the first staging to show the construction of typical femininity in the male space of medicine, a second staging lies hidden in the image, one about seeing and being seen, about becoming-visible and remaining-hidden: about the chemical-physical machinery behind the stage that allows for the staging and makes the truth from Salpêtrière available to science.

Charcot, the director on the small stage of hysteria, is himself only a bit player in a much more broadly encompassing reform of the medicinal gaze. Brouillet's picture shows that Charcot is also only another person to look at in this play, exactly like the helpless patient and the heroically composed assistant. Behind the doctors' heads, that is, at a site that the three women in the picture could see if they had not lowered their heads or had not shut their eyes in helplessness, hangs a picture, painted after a photo from the photography archive at Salpêtrière: it is the picture of a woman whose body forms an arc stretched out backwards from her head to the tips of her toes. In the synopsis of the hysterical poses that Richer had prepared as drawings based on the photographic models of the doctor Paul Regnard, this is the "arc de cercle", the "great hysterical arc" or "*das Gewölbe*" ["the arch"], as Sigmund Freud translated more beautifully because more Kleistian. This arc represents the highpoint in the course of the hysterical attack in the order of Salpêtrière. Better yet, it presents it. In the hall of the clinical presentations the "great hysterical arc" counters that all the patients are only doppelgängers of the recorded originals, in which poses and bodies coincide,

of which there are registries, photographs, and medical knowledge, and which can thus be brought into play by power, truth, or gender differences. The development at Salpêtrière during the 1880s consisted in allowing the illustrational apparatus to disappear from the consciousness of the male and female patients and in presenting the technological images of the body to them as their own.

As a professional, Brouillet shows in his picture how he is part of the cover-up of the technological intervention. He worked out the “arc” in all the lighting effects of the drapery under aesthetic aspects, not under systematic or medicinal ones. From the picture-in-a-picture it is not possible to tell whether his model was a photograph or a drawing, even if the motif can be identified as one from Régnard’s collection. Because it deliberately blurs the traces of its origin, Brouillet’s picture remains a variation on the fundamental question of Salpêtrière: “Is hysteria original or copy?”¹² But while this question refers in the research to the appearances of patients, their poses and gestures, Brouillet integrated it into his picture as a question of media: as a question of the procedure of illustration.

Brouillet goes even further in his composition. On the right side of the picture the assistant Joseph Babinski – who would later become a famous specialist in hypnosis – catches the patient Blanche Wittman – one of the star hysterics of Salpêtrière and also of the history of hysteria – in her fall, while on the left Charcot’s colleagues Paul Richer, Charles Féré, Alfred Binet, and Gilles de la Tourette sit at a table observing the master. Charcot, who had described himself as an artist and director of hysteria, was shifted from the center of the picture to the right side by Brouillet, and so a table is visible at this spot with measuring instruments and devices for electronically stimulating the patients. The chair in the geometrical middle of the picture, a splendid leather armchair in comparison to the bare wooden chairs in the auditorium, the scholar’s seat, *la chaire*, the chair in the academic sense, remains empty. This could be an homage to Charcot as a clinician. Brouillet, however, has placed a figure in the image that relativizes the arrangement of those present. On the left margin in the foreground, at the position where the commissioner is often found observing, checking, and confirming events in classical painting, sits the photographer Albert Londe. In 1884, the year of a cholera outbreak, Londe was named director of photographic services at Salpêtrière. It was Londe who had provided Brouillet with photographic prints of the doctors and assistants, which he then used as his models. Londe himself, on the other hand, was not painted according to any photographic model, but had personally sat for the painter in his studio. Londe is one of the few people in the picture to be seen in

full, in a white apron tied at the waist and a black silk cap: the traditional garb of an assistant doctor. This was simply presumptuous, since Londe was not a physician, he was a trained chemist and amateur photographer and earned, at the time the picture was painted, 1200 francs a year, roughly the equivalent of an office boy's salary.¹³ Thus while the facial expression of most of the audience and even of Charcot were due to an instantaneous photograph taken with a quick camera, which Londe had developed, Londe's portrait is the result of hours of sitting in the studio: a character study in the manner of the old painters. This difference is as difficult to make out in Brouillet's illustration as is the reproduction of the "arc de cercle" on the wall as being the result of photographic recording technology. Nonetheless, Brouillet placed the destitute Londe in the position of the benefactor, for the painter knew better than anyone that without Londe's photographic constructions, not only would this picture not have been possible, but there also could not have been any "Leçon clinique à la Salpêtrière" in the 1880s. Londe's techniques had completely restructured the medicinal gaze. Brouillet's picture is secretly an homage to the new era of recording and depiction, which had become established at Salpêtrière since 1884.

Brouillet and Londe knew from their own experience that the disparate eras of recording that were hidden in the picture were the key to mastering madness. The mastery of the neurologists was due to the technologies and procedures of depicting an illness, which showed no visible physical lesions, it was "sine material." Charcot had prided himself in being able to direct a gaze that visually defined the forms of nervousness. His methodological problem consisted in being able to document this gaze. Charcot's clinical practice can be distinguished from the experimental medicine of Claude Bernard's school, the famous vivisector, in that the patients were monitored and observed, their symptoms catalogued and systematized in order for the data recorded to be compared posthumously in the autopsy with the nervous-physiological findings *in vivo*. According to Charcot, the clinical rooms at Salpêtrière were not laboratories, but a

sort of living pathological museum whose resources are almost inexhaustible. It is true that we sometimes miss the beginnings of disease; but, on the other hand, we gain by being enabled to investigate after death the lesions which correspond to the symptoms studied minutely, and over a long period of time, during life.¹⁴

Usually, however, to no avail: the whole thing, as a museum disguised as a charitable enterprise – Freud called it an "the institution for the care of

women”¹⁵ for poor people were treated free of charge at Salpêtrière provided they committed every part of themselves, including their nervous systems, to the institution – functioned as a hysteria exhibition only so long as the exhibited objects were still alive. In the pathology in which Freud had worked, neither lesions nor forms of trembling could be discerned. Although Charcot had stylized himself as a seeing, as “*visuel*”, he could not provide any proof for his unerring diagnostic gaze to the patients. This is why the throne of science remains empty in Brouillet’s painting. In place of a scientist there is the technology that makes the new knowledge possible in the first place.

In 1882, when the parliament approved the budget for a new professorship in neurology under Gambetta, the chemist Albert Londe was originally hired as *préparateur* for the museum. When he started he found a photo lab there, which he called “prehistoric”,¹⁶ and promptly set about renovating it and equipping it with new machinery. Stages and mounting devices for lighting patients were brought to his light-workshop, and the darkroom was brought up to the latest standards. Londe developed a half dozen camera prototypes, and in 1893, when Charcot was already dead, the (in)famous “Piste de la Salpêtrière” was installed outside, on which the patients had to complete long courses of movement in front of a serial photographer and even later in front of a film camera.

With this “photographic service”, as his division was officially called, Londe had greater visions than simply the task of depicting patients. Ultimately it was not Londe that had introduced photography to Salpêtrière. Long before he started his photographic service the famous volumes of photographs made by his predecessors, the *Iconographie photographique de la Salpêtrière*, were already in the laboratory. The three volumes had been brought out between 1876-1879 by the neurologists Bourneville and Régnaud. But these photographs were, as Bourneville wrote in the foreword to the first volume, merely illustrations of the medical gaze, and had only been printed because “our excellent master Monsieur Charcot” encouraged doctors “to publish the observations gathered by us in his halls, illustrating them with photographs taken by Monsieur Régnaud.”¹⁷

Londe, on the other hand, did not wish to illustrate the medical gaze, but to thoroughly modify it. In “prehistoric” research, photography itself played no scientific role. Londe, however, envisioned an epistemological function for the new technology. The photograph itself was supposed to be the test case, the proof, in the sense of evidence and of the artistic copy, “*épreuve*”, of the illness hysteria, because it discovered things that the naked eye could not discern. Just as the photographer Londe is asserted to be a physician in

Brouillet's painting, the value of the photo lab is also meant to be raised to being a scientific laboratory.

The moment of Londe's attempt at a power grab was opportune. In the 1870s Jean-Martin Charcot had worked on localizing various nervous illnesses in the brain. Since 1878 he had examined and systematized hypnotic states, eventually presenting his research at the Académie des sciences in 1882, thus achieving scientific recognition for hypnosis. In his opening lecture of a series in the winter of 1885, at which Sigmund Freud most likely also participated, Charcot confronted his listeners with a new, unresolved medical problem:

But you are aware, gentlemen, that there still exists at the present time a great number of morbid states, evidently having their seat in the nervous system, which leave in the dead body no material trace that can be discovered. Epilepsy, hysteria, even the most inveterate cases, chorea, and many other morbid states which it would take us too long to enumerate, come to us like so many sphinx, which deny the most penetrating anatomical investigations. These symptomatic combinations deprived of anatomical substratum, do not present themselves to the mind of the physician with that appearance of solidity, of objectivity, which belong to affections connected with an appreciable organic lesion.¹⁸

Only Londe was able to provide the “material trace that can be discovered” of hysterical illnesses, as the material trace on a photographic plate, thus advancing both hysteria to an illness with verifiable and reproducible symptoms, and photography to a scientific method at the same time. Londe's technical invention made the epistemological revolution possible. The material trace that he sought was not to be found under the surface of the body, but in the folds of the temporal extension of its process. Time had to be manipulated, enlarged, taken under the magnifying glass, in order to get to the bottom of hysteria. The decisive shift in Londe's methodology, as opposed to the old shots by Régnard, was the drastic shortening of exposure times. In the 1870s, that is, at the time when the first *Iconographie photographique de la Salpêtrière* had been photographed, the usual exposure time in interior spaces lasted between 15 and 30 minutes. In 1880 Londe's exposure of an external shot with 45 seconds got a great deal of recognition, around 1884 “temps de pose”, as they were called in French from the perspective of those photographed, under one second were still quite rare.¹⁹ Only in 1886 did Londe define the snapshot as a photograph that was exposed for less than ¼ of a second. Most of his spectacular inventions and improvements in photographic technology – a

new coating for the plates, new circular shutter techniques, the chronophoto apparatus, and ever the improvement of his lenses – served to reduce the exposure time for the purpose of instantaneous photography.

Londe's technical inventions were the requirement to open up a new field of research at Salpêtrière with the objectivity of scientific methods: the logic of the involuntary and the unconscious in human movements. The short exposure times and intervals with which Londe's camera depicted moments of movement could no longer be consciously perceived. This altered the diagnostics of hysteria absolutely. The "system of relations" [*"réseau"*]²⁰ between the various discursive, institutional, or iconographic elements, which could only be created thanks to instantaneous photography, captures the unconscious as a "mental trace that can be discovered" by scientists for the first time. This was something that Régnard's "prehistoric" photographs with their long exposure times could neither hope for, nor could they technically achieve it.

In a certain respect, what happened in Londe's studio was nothing more than in the "composite portraiture" of Francis Galton or of *bertillonage*, the facial photography developed by the director of the photographic service of the prefecture of Paris, Alphonse Bertillon, which quickly became mandatory for European police departments.²¹ A person was photographically reduced to a portrait view and a brief moment of posing in the simplest time-space coordinates. Such shots were made in series with multiple exposures of individuals, and then assembled by the eugenicist Galton as familial groups or by Bertillon as criminal groups, so that types began to emerge with characteristic deviances, visible at first glance. These could then be determined, numbered, and transmitted by telegraph to aid in manhunts.²² Londe showed how something similar could also be made visible in neurology, something that only existed in the series of photographs: the facies, typical expressions of an illness that could not otherwise be materially detected.

Dans un autre ordre d'idées, le chirurgien, le médecin constatent au moyen de la photographie l'étendue des lésions, leur aspect; ils en notent les modifications et complètent ainsi de la manière la plus claire leurs observations. Il est même certaines affections qui donnent au malade une physionomie toute spéciale, qui ne frappe pas l'observateur dans un cas isolé, mais qui devient typique si on la retrouve chez d'autres personnes atteintes de la même maladie.²³

The trick images are engraved into the physician's memory, the picture of the illness emerges in the photo lab: "C'est ainsi, en particulier, que dans les maladies du système nerveux, on a pu établir des types rigoureusement

définis qui correspondent à des affections déterminées. Ces types restent gravés dans la mémoire du médecin...”²⁴ Londe wrests power from the engineers. His process of fragmenting the old pictures of bodies into the realm of the millisecond and of reassembling them into new types is the prerequisite for any and all psychology of the unconscious. It would be wrong to describe Londe’s work as bureaucratic identification photography. For him it was more about mobility during the shots, about the shots of movement, about the variability of the illustrative system of photography.²⁵ Londe was considered to be an excellent photographer, both inside and outside of Salpêtrière, because he did not adhere to reproducing particularly prominent characteristics, but depicted bodies, just as he did landscapes or his many shots of the sea, as light, surface, and movement. Instantaneous photographs were meant to fix the unfamiliar and unpredictable.

Even his first amateur experiments to improve the layers of the photographic plates with a dry emulsion, silver bromide gelatin, significantly extended the horizon of movement in photography. Using the new plates (which incidentally laid the foundation for the financial empire of the Lumières), preparing, shooting, and developing a photograph could occur far apart in time. For the first time the photographer could leave his studio with the plates under his arm and take pictures when and where he liked, then develop, enlarge, or process them later in the darkroom.

Following the same intention, of extending photography’s mobility, Londe took a decisive stand against the mechanical hangings that were used in Salpêtrière to sedate the patients in the frame of the picture. For certain shots Londe did admit the use of apparatuses like “head rests”, but he wanted to assemble and illustrate what was characteristic, not to set up a typical scenario by force:

Il faut s’en servir lorsque le malade ne peut garder l’immobilité et que le manque de lumière ne permet pas de faire une épreuve instantanée. Il en sera de même lorsque l’on opérera de très près et que l’on voudra faire à grande échelle la tête ou quelques parties de celle-ci... les yeux, la bouche, le nez ou les oreilles. La grande dimension de l’image dans ces cas particuliers nécessite des poses plus longues que d’habitude et d’autre part l’immobilité complète du sujet est encore plus indispensable: cependant toutes les fois que la position, l’attitude du malade seront caractéristiques, il faudra proscrire d’une manière absolue l’emploi de l’appui-tête.²⁶

The only way out of this practice based on devices, which Londe called “mauvais à priori”,²⁷ was to develop mechanisms and equipment that

allowed for ever shorter exposure times in instantaneous photography. Londe replaced the “guillotine” shutter of the old cameras, in which a piece of cardboard whizzed down from a wooden bar, with circular shutters. In 1881 he constructed the prototype of a camera with variable sector apertures made of copper, fixed to steel plates. The apertures were controlled by a gear mechanism, and the time of the aperture was regulated by a spring mechanism. Using a dial on the outside of the camera one could set different exposure times. With these apertures Londe could expose for 1/10 or 1/15 of a second if he used additional lighting. This prototype was built by the watchmaker Dessoudeix, with whom Londe would collaborate again and again: a small heart valve of darkness.

Londe had his apparatuses built as small as possible, light, but also robust, to the point that he could recommend the use of the hand camera in 1893 in order to follow the patient and to capture a tremor or an attack at just the right moment: “Il ne saurait être question de vouloir amener la malade dans cet état devant l’objectif, il faut que ce soit l’opérateur qui la suive avec un appareil à main, pour la saisir au moment favorable.”²⁸ All of Londe’s developments attempt to render the rigid structures of the studio superfluous. He sought out a method of depicting the moving, living bodies of the hysterics, and he wanted to give these movements of involuntariness free reign.

At this point it is clear why it is so perspicuous to use Foucault’s term *dispositif* in relation to Salpêtrière. If at first it was the mechanical and architectural devices of the photo studio, in the concrete and simplest sense of the French “*dispositif*”, in which patients in the 1870s were sat, arranged, turned, and fixed, with Londe’s inventions these adjustments become functions of the recording apparatus, which allow for a medical view of the body outside the studio. The new freedom of movement that was granted to the patients’ bodies in the 1880s corresponded precisely to the forms of time and space Londe’s new cameras were able to penetrate.

Neurology needed to analyze the ever faster movements, the trembling, twitches, and ticks that had perhaps already been somehow perceived by the physician’s gaze, but had never been seen or observed. Photography, as Londe constantly stressed, discovers what remains hidden to the eye: “Il est absolument certain que l’objectif photographique peut révéler des choses que l’œil le plus exercé ne savait pas percevoir.”²⁹ In this context Londe borrows a formulation from the famous astronomer Jules Janssen, who had described the photographic plate as “rétine du savant”, as the scientist’s retina,³⁰ after he had recorded Venus passing before the sun, only analyzing it afterwards. Photography allowed one to temporally isolate the depiction

from the object being observed, and to value depiction over observation. To photograph meant to store and process an event for science.

Hysteria is therefore rightly called a sickness of representation.³¹ Physicians at Salpêtrière had turned the iconography of hysteria into an object without reflecting on the separation of their object of examination from the patients. As long as they might stare at them, they could only learn as much about them as an astronomer who stares into the sun and only sees the flickering of his own eyes. The work of the photographer consisted in inventing techniques that necessarily resolved the transferal of the moving body to the image so true to nature and so scientifically that, on the one hand, clear information could be gained from raving and trembling bodies, and on the other hand, nothing of the bodies was missing in the images. The technical service is the condition for the discursive order that Charcot was able to set up in “all the wilderness of paralyses, spasms and convulsions.”³² Even in Salpêtrière, the Masters of Madness could only appear and keep the protocol because the Master of Technology gave the “ordre” of the course.

By means of the instantaneous photograph, the meshes of the networks, the physical and the sensual can be captured as signs and organized, decidedly finer. No longer just poses and gestures, but also involuntary movements and also a frothing and vibrating can thus be fixed and systematized in order to render a diagnostic judgment about the unconscious. A realm of raving and mad movements beyond scientific ascertainability, in which both male and female hysterics could send rebellious messages and cries for help to all concerned through their attacks and behavior. While exposure times of ½ hour or even ½ minute can still be described as an authentic personal statement, self-showing, self-expressing, quick photography in milliseconds seizes evidence from movements in moments that are so brief that the patients do not notice, much less have the chance to react. Since Londe the drama of hysteria is that utterly everything has been requisitioned for the processing of signs with the new medical camera gaze. Even the mad productivity of the hysterics’ parodies, acting, and performances, like Charcot’s stage work, has to let itself be synchronized and processed by the new cameras. What we see, read, and know about hysteria emerges in photographic networks. What can be captured as the message of male and female hysterics had previously passed through the processes of technical storage, as they can graph and corresponding dramatize physical expressions in the realm of the millisecond in the case of instantaneous photography.

In his 1976 study, psychoanalyst Lucien Israel examined hysterical symptoms “dans la ‘pathologie’ relationnelle de l’hystérie”,³³ stressing the difficulty of separating message and medium in hysteria:

The symptom is the entirety of hysteria, bearer of a message, of a sometimes awkward, often disturbing message, but one that always takes its toll on the bearer. This automatic message, coming from the unconscious, only becomes meaningful when deciphered. The difficulty in deciphering it comes from the fact that the addressee is caught in the same net and by the same system of attitudes, customs, and thoughts as those who have compelled the hysteric to take to this encrypted message of symptoms.³⁴

The hysterical message can only be deciphered by someone who allows him or herself to be touched by it, who is “concerned”, and who restores to it the language with which it can procure being right and healed in the social. Israel as well understood hysterical messages as being directed “at everyone”,³⁵ as messages that have to be conveyed. This is why this decoding also and fundamentally includes the examination of technical patterns and registers to which the male and female hysterics react or, when it is simply too fast for human perception, to which hysteria itself responds with twitching, speaking in tongues, or even with “*sécrétions abondantes*.”³⁶

The power of the doctors existed, not because of or despite the rebellious desire of the patients, but because there were technologies available to them “to produce illness in its truth”,³⁷ that is, to translate desire into medical discourse and to exclude everything else through technical evidence. Every psychological logic presumes a technological logic. Any critique that would liberate female and also male patients from the discourse of the Masters of Madness must apply itself to the arbitrariness of these technologies and the symbolic orders inaugurated by them. Only then do the messages break down in their translation, and it could be shown that not only hysterics, but all of us are simulators when faced with the technical medium of photography. And that a snapshot will always prove each of us to have been dissimulating.

In December of 1882 Londe presented his stereoscopic camera for relief photography to the Société française de photographie, which was meant to be used to document experiments on faradic stimulation of face muscles. The principle behind this camera consisted in fixing two lenses on a plate behind which a complex clockwork could be used to move an aluminum panel, rather than a simple gear mechanism. The exposure times could vary between $1/33$ and $1/200$ of a second with this camera. The star model for one of the first series of images that Londe took with this construction was Blanche Wittman, who will faint before all the doctors’ eyes in Brouillet’s tableau. 16 round photos glued next to one another showed how, in a state of hypnotic catalepsy, a certain cramped attitude could be transferred from

the right to the left arm by using a magnet: “Mlle Wittman, transfer d’une attitude au moyen de l’aimant.”

What was already presented as a chronophotographic series, as a continual depiction of a course of movement, however, in reality still belongs to the era of the pose. Londe later admitted that the individual exposure time amounted to a second in each case, that the suspension of movements therefore lay with Mlle Wittman, and was not any chopping up of fluid motion by the camera. But on whichever side of the lens the intermittent twitches were made: the photographic preparation of reality by means of photography is entropic, no event can be reconstructed from the photographic manipulations. This is something that photographers know as well as painters do, when they offer themselves as chroniclers.

It was only the next camera that Londe built that finally allowed for technical chronophotography strictly speaking, that is, serial shots in which the individual photo is taken independently of particular and regular time intervals. Instead of two lenses, nine lenses were arranged in a circle on a plate, “qui nous permet de faire neuf épreuves successives à des intervalles de temps rapprochés.”³⁸ Nine times, one after the other, the photographic plate captured a snapshot of the patient as she turned in new steps behind the lens: the real Revolution Nr. 9 of the history of the sciences. These new recordings of hysterical attacks took place in fractions of seconds, in periods of time in which patients could no longer simulate because the short intervals allowed for no conscious reactions, in the realm of the technological unconscious. That means that male and female hysterics, even if they were familiar with photographic services, could not turn the attack of illustrative technology to their self-image. The random shots caught something real, which could not merge itself with any imaginary image. The doctors of the Salpêtrière could organize what became visible on the photos as they saw fit.

In the nine-lens camera a battery provided an electrical impulse to the mechanism that controlled the shutters, while the impulse in turn was kept in rhythm by a metronome. Thus, the moments of movement that were photographed were initially determined by a unified division of time. This meant that a technology was implemented in the “appareil photo-électrique” that had otherwise been the domain of the doctor during inducing hypnotic or hysterical attacks: the induction of trance by a rhythmic pattern. In this case, it belonged to the mechanism of the apparatus itself. The tick-tock of the metronome set the rhythm that set the pace for the patients’ nervous crises while at the same time setting the rhythm by which the crisis would be recorded. Subjective and objective in the recording shifted positions with every stroke.

The time in which Londe was taking his first series with this “appareil photo-électrique à neuf objectifs” corresponded exactly with the shift in Charcot’s research from localizing nervous source of the disease in the brain to the study of illness as “sine materia.” In the foreword to his translation of Charcot’s lectures, Freud, observing that Charcot had left the research into the organic studies of neural diseases, wrote: “At about the same time at which Breuer was carrying on the ‘talking cure’ with his patient, the great Charcot in Paris had begun the researches into hysterical patients at the Salpêtrière which were to lead to a new understanding of the disease.”³⁹ It was this camera that made it possible to store the neuroses – at any rate it also made it irrelevant to have the cooperation of the male and female hysterics, and had made an allegory of the rapport between doctor and patient. As such it was examined further in the iconographic research into hysteria. The engineer in doctor’s clothing, who refined the power over madness, remained unobserved as an assistant.

Because the single frames of the camera with nine lenses on the 13 x 18 cm photographic plate were tiny, Londe was developing a prototype for another camera at the beginning of the 1880s. Its twelve lenses would be overlapped so that the square images would almost entirely fill up the wide format of the photographic plate. With this prototype Londe delivered his medical masterpiece in 1884: He photographed the patient Rosa Guillot, whose unusually fast attacks, lasting for only seconds, could not be identified by any of the resident doctors at Salpêtrière. With his chronophotographic series Londe showed that the crises could indeed be classified as epileptoid hysterical in the synoptic pattern of Salpêtrière. When, a few weeks later, the crises slowed down and Rosa Guillot’s neurosis could be identified by the naked eyes of the doctors, Londe was shown to be correct with his photographic slow-motion diagnosis, and he was credited with the first application of photography that was not merely for depiction, but could aid in diagnosis.⁴⁰ Did he feel vindicated after this triumph for appearing in the garb of the assistant doctor when he sat for the painting in the artist’s studio?

The serial camera with twelve lenses also chopped up the image of the body, which might still have been a draft of the hysterics’ “ego”, into a clinical picture that consists of sections of twitching that cannot be consciously controlled, and that had appeared indistinguishable to the naked eye of the doctors and students. In the 1870s, when “walking through our halls” with his students and assistants, Charcot, the physician, had incited this in order to sharpen the medical gaze in the muddle of the body:

At first glance one might well think that a monotonous spectacle of its gazes was present. In fact, if one is satisfied with a superficial look, the symptom of trembling seems to be identical or nearly the same in all the women. Only one factor is remarkable, namely the changing intensity and distribution that the rhythmic vibrations presenting by their members.⁴¹

After processing with the photographs, after 1885, Charcot was able, according to Freud's own memories of the "rounds with his senior in one of the departments of the Salpêtrière", to bring some order to "all the wilderness of paralyses, spasms and convulsions for which forty years ago there was neither name nor understanding",⁴² or simply no recording technology.

A short time later, Londe's works was also publicly recognized: At the beginning of 1885 Charcot illustrated his depiction of the case of Guinin, a male hysteric, with a 12-part chronophotographic series of Londe's. Charcot presents himself here as quite as aesthete of hysteria and he underscores its beauty precisely through the illustrated example of a male body:

Toute cette partie de l'attaque est, chez G(uinin), parfaitement belle, si je puis m'exprimer ainsi, et chacun de ces détails méritait d'être fixé par les procédés de la photographie instantanée. Je fais passer sous vos yeux les figures qui ont été ainsi obtenues par M. Londe. Vous voyez qu'au point de vue de l'art, elles ne laissent rien à désirer; mais de plus elles sont pour nous très instructives.⁴³

Charcot is methodologically dependent on photography, but he does not wish to understand or name it itself as a medical implement, and even in his books he shows hardly any prints of photographs, which were supposed to have become so famous for the lessons at Salpêtrière. Londe is only mentioned three times in his entire *Œuvres Complètes*. Charcot denies the significance of the technicians and their instruments for research and quickly incarnates even the technical service. "But to tell the truth, in this I am nothing more than a photographer; I inscribe what I see."⁴⁴ It was the photographer Londe's intention, however, to give visibility to what a naked eye and even also the naked eye of a physician could not see.

Charcot's obeisance to Londe's work at this rare spot in his writings does not only have aesthetic reasons. In 1884 Hippolyte Bernheim published the first of his works about suggestibility in hypnotic and waking states, from which his vehement attacks of Charcot's representation of the typical forms of hysterical fits is meant to have come.⁴⁵

Against these attacks on his scientific standards, Charcot publicly engages photography to emphasize the objectivity of his research. But he is wary of acknowledging the mechanist as clinician. At the same time he co-writes the book *Les démoniaques dans l'art* with Paul Richer.⁴⁶ Charcot's evocation of the documents of painting in this volume is a manifestation not only of his claim of the timeless truth of his its iconography, but it is at the same time a concealment of the technology that his analysis cannot do without. At the same time Richer, Gilles de la Tourette, and Londe were planning the publication of a *Nouvelle Iconographie de la Salpêtrière* on the basis of instantaneous photography. When this appeared in 1888, the foreword contains the following text:

Avec l'aide de la photographie instantanée, on arrive à fixer, à décomposer sur le papier sensible des mouvements anormaux.[...] qu'il eût été impossible d'analyser avec toute précision souhaitée à l'aide du simple examen clinique.[...] La photographie d'un paralysé agitant ou d'une hystérique en attaques n'en dit-elle pas plus long à l'esprit qu'une description, si analytique qu'elle soit?⁴⁷

This elevation of photographic methods over clinical ones must have been irksome to Charcot, and he took his revenge by relegating photography to the second tier of aesthetics in relation to clinical work. In a counter move, Londe had representatively enhanced his own value through painting and might have been relieved that his methods did not have to withstand any serious scientific controls, for he had readily delivered illustrations that did not serve the cause of science, but the power plays of the physicians. The photo series of Guinin's attack in twelve images, arranged as if they were taken from a single plate, was just as manipulated in time as the series of Blanche Wittman had been. Londe had compiled it in the photo lab from two different series of twelve in order better to simulate the aesthetics of the attack. Charcot's verdict, that hysterics "simulate without any particular intention.[...] and cultivate the art for their own sake",⁴⁸ goes for both the medial staff as well as the photographic personnel. Simulation is the method per se at Salpêtrière. And Londe's time compression, achieved through the technology of photography, successfully replaced all the physiotherapeutic compressions, braces, and brackets with which the hysterics' bodies had previously been fixed in the clinic.

Unperturbed by all of this, Londe pursued his wish to perfect the photography of the involuntary and the unconscious as a scientific method vis-à-vis medical practice. For example, he exposed some patients for so long that

their trembling members disappeared in blurriness, while the rest of the body, which was still, remained quite sharp. In this way “hysterical” body parts could be photographically isolated. This shows that chronophotography and thus also the pre-filmic chopping up of the patients at Salpêtrière was only one of many different illustrative procedures with which Londe experimented. The series of instantaneous photographs, however, proved to be the most effective. For Londe, scientific photography becomes equivalent to chronophotography as defined by Étienne-Jules Marey in 1882 as serial shots of moving objects in relation to defined temporal intervals. Londe developed certain tricks to undermine this mathematical scientific basis of the method. In 1893 he presented his camera with twelve lenses to the Société française de photographie. And once again it turned out that Londe’s variant, unlike the competing procedures, had liberated the *dispositif* of the limits of time and space. While Eadweard Muybridge’s serial photography was installed permanently at the racing track at Palo Alto, and Marey’s camera was a permanent fixture in the Parc des Princes in the Bois du Boulogne, Londe built a mobile and variable camera unit. He exposed the plates with five variable shutter times. The mechanism of the twelve-picture camera was completely unlike the nine-picture camera, for the photo plate no longer turned along with it. This meant that the entire apparatus was more stable and allowed for significantly shorter exposure times. Each of the twelve lenses in the camera had its own shutter, which was triggered by a remote electric allocator. This theoretically allowed Londe – and this was also an option that he wanted to keep open for scientific recording – to overlap the end of one shot with the beginning of the next by using longer exposure times. One incidence could, if necessary, be recorded without any temporal interruption. Marey’s gun, by contrast, could take twelve pictures a second at $1/700$ of a second, meaning that more than 98 percent of what happened before the camera in this second was not captured.

There was yet another change with respect to camera with nine pictures, controlled by a metronome, one that would also necessitate a change in how the new pictures of hysteria were decoded. On the camera with twelve lenses, each individual lens could be set to five different exposure times and various intervals: long and short exposures, long and short intervals, according to the theme that was to be recorded. Furthermore, the lenses could be triggered to go off in any order. The camera therefore allowed for any combination of times and intervals, and even for the coupling and reciprocal time lag of two different lenses. In his book *Photographie médicale: Application aux sciences médicales et physiologiques*, Londe provides technical instructions for setting up the camera for every phase of the

so-called “great, complete, and regular hysterical attack.”⁴⁹ The twelve-picture camera could capture particular phases in a certain way by using a variety of time settings and of “editing together” an “ideal” of the process already in the camera, to use film terminology. Time is edited, movements are scanned, no matter how strong and long the hysteria rants and raves. To this degree, Londe’s chronophotography is not just cinematography, but already animation *avant la lettre*. Londe specifies how to regulate the camera-*dispositif* for photographing in the clinic with the goal of systematically producing clinic pictures:

Premier cas: *Temps de pose courts, intervalles rapprochés*. – On opérera ainsi pour les études ayant trait à la locomotion animale, aux attaques d’hystérie et d’épilepsie, aux tremblements, à la chorée, etc.

Deuxième cas: *Temps de pose courts, intervalles plus prolongés*. – Marches pathologiques qui durent plus longtemps que la marche normale, mais où, dans certaines périodes, on trouve des mouvements très rapides.

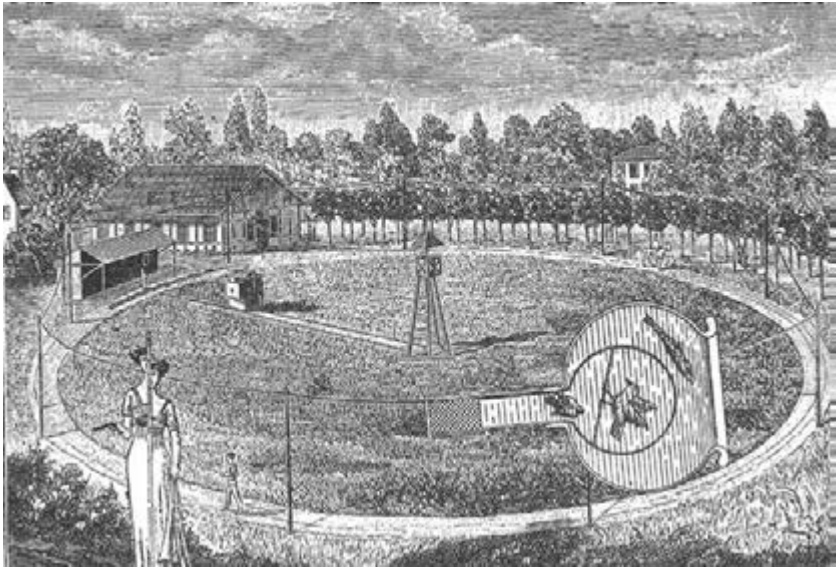
Troisième cas: *Petites vitesses, intervalles courts*. – Reproduction de certains tics à courte distance: les mouvements du sujet peuvent n’être pas très rapides, mais être effectués dans un temps relativement court. Bâillement hystérique, torticolis spasmodiques, etc.

Quatrième cas: *Petites vitesses, intervalles plus ou moins prolongés*. – Enregistrement des transferts de contractures ou d’attitudes passionnelles, des modifications d’attitudes obtenues pendant l’état cataleptique sous l’influence de l’augmentation progressive du courant faradique.⁵⁰

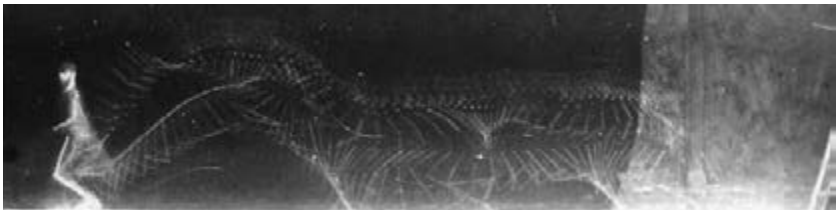
The technical instructions regulate the classical course of the attacks, which can be seen in the photo series; they are the result of a particular dramaturgy of time. The seemingly regular and continuous course of movement that can be seen in the pictures is already carried over into compressed and expanded time periods. The schematic attacks of the series, which mark the medical gaze, are compiled from chronophotographic slow-motion and time lapse. Unlike the series by Marey and Muybridge, Londe’s series allow for no inferences about the temporal course of the patients’ movements, because each shutter can be set differently. On the other hand, the attack of Guinin, simulated in the photographic sense, is the best example of this. Of the twelve photos on the print, those with the quickest course of movement (pictures 3, 5, 12) are shot with the shortest exposure and the shorted intervals, while the pictures of the “arc de cercle” (pictures 6, 7) are taken in extremely large intervals, for the poses lasted from five to ten minutes. These temporal distinctions can no longer be extracted from the sequences of images.

The options of the twelve-pictures camera bring Londe's photography into a new phase. He disassembled attacks into their instantaneous moments of unconsciousness and synthesized them in a hysterical dramaturgy into ideal arcs. The complicated and fascinating movements of the patients are technologically dressed up. Their oppositional scanning and rhythmization gets lost in the new artistic era of instantaneous storage and archiving. Around this time the great and regular attacks start disappearing from Salpêtrière. The old stars among the hysterics of Regnardian iconography lost their imaginary pleasure in the photographic service, which had betrayed them. They disappeared. And where to?

The patient Blanche Wittman, who lay in Babinski's arms, the focus of all the medical gazes, had already been the model of numerous photographs in the collection *Iconographie photographique de la Salpêtrière*, which had appeared in the 1870s. She was called "la reine des hystériques", a star model that was supposed to be "authoritarian, capricious, and unpleasant toward the other patients as well as the personnel."⁵¹ After being treated by Jules Janet at the Hôtel-Dieu she developed a new, balanced personality, "Blanche II", who conveyed that she had always been present as well at Salpêtrière, when "Blanche I" was apparently unconsciously acting out the three stages of hypnosis. Brouillet had recorded this double personality when he put Blanche into the picture twice: once in the "hysterical arc" of the painting at the wall, the model for which is taken from the old photograph, and once in the hysterical crisis in Babinski's arms, a crisis that had already played out under the auspices of the Londe era, in which the change in personality, that play with the imaginary, the tricks of the hysterics, no longer counted. With Londe the tricks of instantaneous photography formed the arsenal of power and the matrix of aesthetics, and women's bodies had to compete with the rolling waves before La Rochelle. By 1887, when Brouillet's picture was exhibited at the Paris Salon, Blanche Wittman had already returned to Salpêtrière. She wanted to take part in those experiments where the self could become other. She became an assistant in Londe's photo lab and later in the x-ray department. Blanche Wittman died, just like Walter Cannon, as a result of high exposure to radiation in the laboratory while seeking for the truth of communication of social bodies.⁵² "Quand le corps en mouvement est inaccessible comme un astre dont on veut suivre le déplacement.[...] la photographie supplée aux procédés mécaniques avec une très grande facilité",⁵³ writes Étienne-Jules Marey, Londe's good friend, who knew the beautiful "Blanche" only from photos.



Max Ernst, "The unconscious of the landscape becomes complete", in: M.E., *La femme 100 têtes*. Berlin. No year, no pagination.



Jules Etienne Marey, *Movements of a tightrope walker taken by Londe with his twelve lense camera*, 1893 Société de Photographie. In: Marta Braun, p. 88.

Part III

1. Mental Apparatuses

Least interesting of these shivers are the ones with a perfectly steady frequency, no variation to them at all. The next-to-least interesting are the frequency-modulated kind, now faster now slower depending on information put in at the other end, wherever that might be. Then you have the irregular waveforms that change both in frequency and in amplitude. They have to be Fourier-analyzed into their harmonics, which is a little tougher. There is often coding involved, certain subfrequencies, certain power-levels-you have to be pretty good to get the hang of these.

– Thomas Pynchon, 1973

Experimenting

The Benzedrine-guzzling Pfc. Eddie Pensiero in Pynchon's *Gravity's Rainbow* can "read" various forms of shivering at first glance, that is, he can analyze, differentiate, and allocate them to the mental states of his fellow human beings. What the normal human eye cannot perceive at all gets mixed together in his amphetamine quickened mind, dissected into slow-motion and still frames of involuntary movements, or dissolved into sinusoidal waves. The series of shivers enumerated by Pensiero corresponds to a tour de force through the history of the psychophysiological sciences of the nineteenth century. It is the history of researching and charting human physiology in the neurological sciences, which not only signifies a refinement in the technologies of measuring physiological functions, but at the same time constructs new bodies by developing new apparatuses for testing.

When the nervous functions were discovered and exposed, the old body with its soul gave way, leaving the field free for new concepts of the human. Over the course of the nineteenth century these became the basis for transforming medical, moral, and political discourses. Those wishing to have power and rule over others no longer had to manage people's minds, but to control their nervous functions. In the physiology of the nineteenth century there arose a coherence to the body with its nerves, still in effect to this day, which could be altered by medicine and pharmacology and could be broadcast by technical media. In the illustrative technologies founded by the new knowledge, however, it becomes clear that the "new" human being is formed by very few paradigms, while other faculties of feeling, wanting, and thinking fall by the wayside. The lack of these others, of the

rejects of research, remains unnoticed unless it comes stubbornly back in odd, abnormal states.

In order to explain how perception works, whether it is an activity of the immaterial mind or of the chemical-physical body, devices were developed over the course of the nineteenth century and laboratories were set up that were meant to amplify, record, and analyze the involuntary and invisible movements of people. The experiments began with simple recordings of a living body wired with the device, later individual nerves were connected measuring devices, and finally complex trembling states could be artificially, or to be more precise, electronically induced, which in turn were technically retained, measured, and “read.” The complexity of scientifically ascertainable human feelings did not, however, as was the case for *Pensiero*, depend on the intuition of a brain under the influence of drugs, but on the improvement of the test devices.

The shivers named by *Pensiero* can be counted among the most important inventions of experimental physiology and psychology. They correspond to the classics among laboratory instruments that define the logic of the body in the nineteenth century. The physiologist Carl Ludwig constructed the kymograph, with which simple frequencies of nerve impulses could be measured. Wilhelm Wundt built his complication-clock, on which an oscillation amplitude could be set, which first shifted the test person's perception into rhythmic oscillations in order then to examine their reaction in relation to this first oscillation. The advantage of this device was that the oscillations could be set by non-professionals or even the test person him or herself. “Information put in.[...] wherever that might be”, as *Pensiero* thinks. Hermann von Helmholtz tried to analyze the physiology of perception in its smallest physical functions, for instance with his resonators, which represent a kind of Fourier analysis. Differently sized glass spheres or metal probes began to tremble when they met their own frequency in a complex acoustic signal. Helmholtz explained how the device worked by “breaking it down” in its “fundamental harmonic vibrations.” Later there would be experiments with influencing the nervous functions through chemical changes of the carrier substance. An area that was examined by behaviorists and reflexologists, but also by biologists (for example the adrenaline researcher Walter Bradford Cannon). This was the extent to which nerves could be analyzed in the nineteenth century. The similarity of amphetamine to the hormone adrenaline was recognized in 1910, and in 1930 Benzedrine was developed and introduced in the Second World War.¹ The analysis of the kinds of shivering involved with coding and subfrequencies, mentioned by *Pensiero*, like Benzedrine and the computer, which could

analyze this shivering with no problem, belong to the 1940s. This is when reflexology, chemistry, and electronics formed the unholy alliance to which Pynchon dedicates his novel.

During the forties experimental artists in the USA – including Sydney Peterson and James Broughton, Marie Menken and Willard Maas, Kenneth Anger and Norman MacLaren – began making films about the sensations and feelings that occur when human bodies are confronted with non-human technologies. In the forties Maya Deren wrote articles about film art for a living, working day and night with the help of Benzedrine proscribe by Max “Dr. Feelgood” Jacobson, the side effects of which would eventually kill her. Norbert Wiener, also on Benzedrine, calculated how airplane trajectories could be predictable for human brains, commissioned by the Army.

Technologically recording and systematizing “feelings and emotions” and then inducing them again in the nervous system in order to control and manipulate them: this was a focal point of the research on human beings as it was being carried out by the military-medical complex of the nineteenth century in preparation for the twentieth. The idea of a freely mobile spirit on the one hand and the simple reach of the technically or chemically manipulated nervous system on the other are ultimately only still linked by historical-critical paranoia, by a thought: *pensiero*. Eddie Pensiero, whose Benzedrine perception is therefore brought up to speed by all available means, reports the history of his own nervous condition with the novel’s catalog of shivers, shortly before his visual center becomes so quick that it can decode the stroboscopic messages of Byron the Bulb: ... you pretty much have to be on speed to get the hand of these. The bulb in turn can only express itself because it is has entered into a nervous-electrical-circuit feedback with a human being who engages its electrical generator. Its flickering therefore not only simulates the heart of all cinema projections, in which devices and nerves also have to be interconnected in intermittent movements so that film stories can be told. Its flickering also tells the newer story of the human body, which has become wired with medical test devices and is in a feedback loop to the prurient bundle of nerves when it is either analyzed or – in the experiment – depersonalized.

At the end of the nineteenth century the cinema as an entertainment apparatus declined in physiological research. At the beginning of the history of cinema, not only are there the optical devices that had been improved in the nineteenth century, which could be manufactured in mass with more precise lenses.³ At the beginning of the history of cinema there are also devices that had been developed in the fields of physiology and psychology in order to examine perception itself as a way of treating impulses in the

nerves. The goal of all the inventions of the technicians in the laboratory was to record bodily functions through observation as much as possible without blurriness and to store the data for later objective analysis. Over the course of the medical attempts to investigate the functions of the mind and perception, bodies were newly organized according to the findings of nerve physiology, charted, interpreted, and in the process they changed perception itself. Recording devices were at one and the same time also machines for staging. This side of experimental physiology and psychology is also part of the history of cinema.

The technical prehistory of cinema, the history of cinematic perception, and finally the change to the body itself through the recording systems are three different aspects of the same process: apparatuses, nerves, and their physiological interfaces are linked into media. The individual has to enter into relations of perception that can no longer be consciously controlled. In the 1940s experimental films from the USA are putting just these three components of media communication – technology, perception, and corporality – up for negotiation. They experiment with the feedback between bodies and devices, with the limits of the body that are meant to separate internal from external and that had become permeable in the impulse-reaction circulation of the nerves. Experimental films thus always introduce fragments of a psycho-physiological or psycho-technological history of cinematography. This is why the simple history of cinema by military devices, as Virilio wrote, should be compared with, or better yet, included in a medical one.³ It will be able to show that the term experimental in the genre definition of many films can be correctly related to the methods of physiology and psychology in the nineteenth century.

Shocking

In his essay about Baudelaire, Walter Benjamin describes the “shock” of the photographic process as a technical realization of the power of destruction, which it would be remembering under the conditions of modernity, because there would no longer be any experience to be had in it. The human being is aligned to the machine and, as Benjamin writes with horrible precision in 1939, it is “part of society’s preparation for total war that training is shifting from techniques of production to techniques of destruction.”⁴ These preparations for war had already been in progress for a long time. In the nineteenth century “technology[...] subjected the human sensorium to a complex kind of training. There came a day when a new and urgent need

for stimuli was met by film. In a film, perception conditioned by shock [*chockförmige Wahrnehmung*] was established as a formal principle. What determines the rhythm of production on a conveyor belt is the same thing that underlies the rhythm of reception in the film.⁵

Before any contents lies what the film viewer is not allowed to see: the rhythm of the intermittent images that stimulate the brain to react, to have to go along, to “see” continuous movement. Karl Marx had designated the reduction of the industrial worker’s experience to a very few movements as mere training [*Dressur*]. What was also being trained were the perceptual capacities and the instructions to the animal and human test subjects in the laboratory. Calling the scientific coordination of perception “training” sounds euphemistic to our contemporary ears, but the term indeed has its origins in training horses for racing – and thus even has a connection to the first chronophotographic tests in Palo Alto. Training is also there at the beginnings of illustrative technology, which later, with Frank Gilbreth, would serve the ergonomic perfection of human working motions.

Benjamin went to great efforts to show that the term experience, which for him designates unconscious forms of remembering a self-conscious society both independently and separately in reciprocal and collective forms of production, has been historically surpassed. But the term, just at the moment that it should have been dismissed from art criticism, turns out to be highly applicable or at least adaptable for a critique of industrial forms of producing art and art reception. It undergoes a renaissance by means of physiology and psychology, while elevate experience to a matter of the nerves.

As a physiological method the new experience comes from France. “L’expérience n’est au fond qu’une observation provoquée”,⁶ writes Claude Bernard in his introduction to experimental medicine, adding “provoquée dans le but de faire une idée.”⁷ The equivalency of experience and “*expérience*” is permissible because the unconscious quality of the knowledge that Benjamin had laid such value on has also been maintained in medical usage. The physician has experiences in the experiment, controls the external, from which his “internal” thought process is defined, thus linking his own perception with the experimental set-up. He becomes part of the experiment.

The scientists of the nineteenth century researched nerves physiologically and psychologically in Bernard’s sense, synchronizing them with technical devices, and trained test subjects in stimulus and reaction experiments to make their mental and psychic activities retrievable. Even Pavlov, in 1899, formulated his methodological reflections like an invocation of Bernard’s:

“The more complicated a phenomenon is (and what is more complicated than life?) the greater is the need of experiment.[...] The experiment, however, takes the phenomenon to hand in a sense, setting sometimes the one and sometimes the other in motion, thus determining the real context of the phenomenon among artificial, simplified conditions. In other words: Observation collects that which nature has to offer, whereas experiment takes from her that which it desires.”⁸

While it was François Magendie who had founded the first laboratory for experimental physiology, Bernard was the first to put the various bodily functions into mutual relation and to verify the interconnections with experiments. He was also the first to methodologically justify the experimental intervention in the interior of the body with apparatuses, medical invasion. “L’homme ne peut observer les phénomènes qui l’entourent que dans des limites très restreintes; le plus grand nombre échappe naturellement à ses sens, et l’observation simple ne lui suffit pas. Pour étendre ses connaissances, il a dû amplifier, à l’aide d’appareils spéciaux, la puissance de ces organes, en même temps qu’il s’est armé d’instruments divers qui lui ont servi à pénétrer dans l’intérieur des corps pour les décomposer et en étudier les parties cachées.”⁹ The founder of experimental methods in medicine defended vivisection,¹⁰ although his most famous theorem is that of the stabilizing the “milieu intérieur”, which keeps all relations within the body in harmonic exchange and balance, a balance that is more unstable the higher the creatures are organized.¹¹ “D’un autre côté, tous les phénomènes d’un corps vivant sont dans une harmonie réciproque telle, qu’il paraît impossible de séparer une partie de l’organisme, sans amener immédiatement un trouble dans tout l’ensemble. Chez les animaux supérieurs en particulier, la sensibilité plus exquise amène des réactions et des perturbations encore plus considérables.”¹² Consequentially, his experiments could only demonstrate disturbances in the living body, although Bernard sees the key to knowledge precisely in disturbance as destruction: “pour apprendre comment l’homme et les animaux vivent, il est indispensable d’en voir mourir un grand nombre, parce que les mécanismes de la vie ne peuvent se dévoiler et se prouver que par la connaissance des mécanismes de la mort.”¹³ Bernard conducted his most famous experiments with secretory functions of the body and with various vasomotor mechanisms with Curare, the arrow poison of South American Indians, which Alexander von Humboldt had been the first to describe for western medicine, a strong mix of alkaloids and menispermaceae, which relaxes all the muscles.[...] and brings all trembling to the zero point.

Over the course of the century the methods of getting experience went under the skin and perforated the body. The first film experiments that physiologists created at the end of the nineteenth century are simple continuations of those experiments with cut-up body parts in the laboratories, and they served the same purpose: to reanimate what had previously been destroyed for the sake of the experiment. This includes 35mm films that Ludwig Braun made in Vienna, first on artificially animated dog's hearts and then, in 1898, on "live, exposed human hearts",¹⁴ just like Charles François-Franck's films about artificially induced reflexes on the leg of an anaesthetized dog.¹⁵

In the clinical practice of the eighteenth century, as Michel Foucault has demonstrated, the "first scientific discourse concerning the individual had to pass through the stage of death."¹⁶ The triumph of physiology in the nineteenth century can thus be described as a renewed interconnection of dead or dissected body parts and as the successful reanimation of a harmonic and balanced body. But the bodies, according to the experimental experience in the laboratory, are not the same ones as before. The experimental set-ups left behind traces, which became part of the body that they were examining. Without the media that extended these apparatuses into our bodies and – as Marshall McLuhan more positively observed – that extended our bodies into the apparatuses, no experience would have been possible in the twentieth century. Pynchon lets Pensiero think that only a brain on speed can create the connections between laboratory experience and shivering. There is, however, a bit of data on this paranoia in the history of science that might also illuminate brains that run somewhat slower.

Registering

Although Claude Bernard's methods determined research all over Europe, because almost all influential physiologists had worked in his laboratory at one time or another, the direction of the experiments in Germany initially differed significantly from the French. The search for the physiological functions of thinking, wanting, and feeling there became a battle over the mind or a mental organ, and an argument about national and ethical values. In Germany the question of devices became the crucial question.¹⁷

It was not until the 1860s that the scientific disciplines responsible for the mind started to differentiate, as did the laboratories and experiments, and thus the complexity of mental functions. In the 1870s psychology was separated from physiology and finally established as a distinct discipline by

Wilhelm Wundt in 1879 in Leipzig. The question of the mind was no longer a big issue, but it also no longer had much to do with what physiologists had previously picked apart in the experiment. In 1874 Wundt explained that, under the term mind, psychology had made “the whole realm of inner experience” their object. This inner experience, however, as Claude Bernard had claimed, had been “provoked” by “external” experiments. Wundt had to and could demonstrate his elaboration of the life of the mind with 400 pages of fundamental physiological research.¹⁸ Henceforth the mind was seen as a complex of individual psychic functions, which were disclosed to each apparatus used to test them in the laboratory.

The analysis of the mind continued as nerve studies. Even philosophical institutes used technical devices to speculate. Johann Friedrich Herbart, Kant’s successor in Königsberg in the professorship that Hugo Münsterberg is supposed to have turned down later in favor of Harvard, proposed an order of concepts and connections between concepts already in 1824 according to the laws of statics and mechanics. Around 1830 microscope technologies were significantly improved and found a process of cutting nerve tissues from the brain in thin slices and chemically hardening them. Augustus Volney Waller, who in 1851 had demonstrated that every nerve fiber is linked to a nerve cell, invented a method of damaging nerves in such a way that their channels could be traced through the brain and spinal cord due to secondary degeneration. The functions of the mind and its paths were suddenly revealed to be nerves.¹⁹ When Fritsch and Hitzig announced the localization of motor functions in the cerebrums of dogs, they also noticed that the methods produced the following result: The smaller the damage to the brain, the more differentiated the mental functions appeared. The thought that the “mind is a kind of overall function”, they scoffed, can only still be accepted due to all too “colossal mutilations of the brain” in the experiments.²⁰ Total damage equals total mind.

Technologies and devices decide the question of the mind, and so it is no wonder that the expert that was called from Zürich to Göttingen for arbitration was precisely an inventor of physiological devices for researching mental activity: Carl Ludwig, founder of “quantifying experimental physiology.”²¹ The list of students that studied with him in Zürich, Vienna, and Leipzig shows what influence his work had on the development of experimental psychology in the second half of the nineteenth century: Granville Stanley Hall, who later founded the first laboratory for psychology at Johns-Hopkins University in the US, Ivan Mikhaylovich Sechenov, founder of Russian reflexology, Ilya Fadeyevich Tsion, or Élie de Dyon, as he was called in Paris, and Ivan Petrovich Pavlov as well as Ernst Mach and Paul

Emil Flechsig, who dedicated his famous inaugural speech as rector to Carl Ludwig.²² In psychological laboratories the world over experiments were being carried out with devices built by Ludwig. American psycho-technology and Russian psychoreflexology are indebted to Ludwig for their methods of interconnecting nerves and apparatuses to apply isolated stimuli in order to read and systematize result by means of the apparatuses.

Ludwig's most important invention was the kymograph in 1846, a registration device that "set the course of all further physiological research more than any previous observations of physiological findings."²³ As was common at the time for physiologists, Ludwig assembled the device, which recorded the pressure fluctuation in the central arteries and simultaneously in the rib cage and thoracic cavity himself according to the needs of the experiment. In the place of an observing physician, the body attached to the apparatus could record its functions and its circumstances itself. The body no longer had to be destroyed and killed in order to get the measurements, but it still was injured, drilled into for the interconnection. Only then did the immediate representation of the body appear as a graphic curve, as can be seen beating even faster today on electrocardiographs: the rationale for a method that "means something similar for biological research as the alphabet for human culture."²⁴ If history "runs parallel with the development of its methods of registration"²⁵ is as true for physiology and it is for modern biology, this is the founding act.

Defining, separating, and recording the functions were considered the basic operations of the physiological method. With scrawlings similar to the attempts of a first-grader to write, the bodily functions reported with black "rubber-based ink" on a white piece of vellum paper. Samples of this are still stored today at the Physiological Institute at the University of Turin. Ludwig would later inscribe the back of this to his student and biographer Angelo Mosso, who noted that the paper "designated the origins of the graphic method in the history of science", writing: "These first stammerings of the heart and breast are donated to the collection of my friend Mosso. C. Ludwig, Leipzig, August 15, 1874." In turn, it was Mosso who designed the ergograph in Ludwig's tradition, with which work and exhaustion could be measured.²⁶ Ludwig's change in methodology was in fact revolutionary. If the mind could no longer speak, the body could now write. Initially it was not possible to get anything from its scribblings without having to drill into it. The segmentation of the functions and the organs is suspended in the fluid script of the heart.

Étienne-Jules Marey, who had introduced graphic methods into physiology in France, would dissect his studies of movement into individual

images with a photographic gun, which he also built himself. Just as script can be cut out of discrete heartbeats, continuous movement can also be fragmented, and with other apparatuses the horses and soldiers concerned can learn to run again as images. Indeed, Marey is considered one of the inventors of cinematic projection, but for him it was much more a matter of measuring bodily movements, and he did not take the illusion of movement on screen for the reality of the gait. Marey paid his respects to Ludwig's inventions in 1895, the year of the so-called birth of the cinema, when he had to announce his death as president of the Parisian Académie des sciences: "On lui doit l'introduction en physiologie de méthodes précises et fécondes en progrès. Ludwig créa le premier des instruments enregistreurs aujourd'hui si nombreux dans les laboratoires de physiologie."²⁷ Marey's own invention from 1860, the spymograph, with which he had the rhythm of the human pulse recorded on a sooty cylinder, was a further development of the kymograph, this simple device that nonetheless set up a prototypical register for mental functions and thus established the parameters for all future programs of measurement and training.

Going Wild

While mental activities were being tested for their chemical and physical foundations in the laboratories, states of exception of the sense and perception organs cropped as night views of this research at the same time: trances and raptures, erratic attacks, fits and ticks, which should precisely have been excluded by research. It seemed as if the concentrated investigation of a certain mental accomplishment set other nerve connections in motion as well, letting the body become confusingly muddled. New apparatuses were constructed to determine the laws of these states of confusion, in turn calling up other odd effects. So, right around 1848, in the years of the great expulsion of spirits, ever new unknown phenomena were turning up.

The appearance of feedback effects in the laboratories, when observing nerves and observing perception were interconnected, was first seen in the middle of the century in a famous case. In 1840, after experimenting on himself with disturbances in seeing color and afterimage effects, Gustav Theodor Fechner lapsed into a three-year-long trance, from he he only awoke through a kind of self-healing that he described as rebirth, such as it known in shamanism. A metamorphosis took place that marks every shamanistic journey. During his illness, the physician transformed into the

natural philosopher Fechner. He wrote an illness or travel report about his self-perception using the metaphoric language of the shamans, in which rider and ridden, movement and moved could no longer be separated:

One main symptom of my mental feebleness consisted namely in the fact that the course of my thoughts eluded my own will. It split my insides equally into two parts, into my ego and into thought. The two battled each other; the thoughts attempted to overwhelm my ego and and to take a self-empowered course, destroying its freedom and health, while my ego in turn strained all the power of its will to become master of my thoughts, and, when a thought sought to take hold and continue, to dispel it and to pull in another one from further away. My mental pursuits thus consisted, rather than in thinking, in a constant warding off and reining in of thoughts. I sometimes seemed like a rider attempting the subdue a steed that had gone wild and bolted with him[...]²⁸

The artificial, experimental separation between thoughts and consciousness, which according to Kant must be able to accompany any ideas, had become an experience for Fechner and was close to destroying his ego. No term for such a disorder could be expected from the humanities. A philosopher like Hegel had subjected phenomena like those that confused Fechner to the adventurous process of the spirit itself, which had sublated the natural sciences in itself: “This dialectic process which consciousness executes on itself – on its knowledge as well as on its object – in the sense that out of it the new and true object arises, is precisely, what is termed Experience.”²⁹ The self-consciousness that befell such an odyssey of the movements of thinking he called “unhappy”. Fechner, however, as a good natural scientist, made his anarchic experiences the basis of his new research. The loss of consciousness also incited him to examine what was not conscious in perception. After his illness he researched the physical laws of psychic activity as a relationship between the strength of the impulse and the strength of the sensation by differentiating sensations in their physiological threshold values. Sensations and feelings had to be made calculable, every thing else was the madness of wild steeds. In 1860 Fechner published the “The Measurement of Sensation” in his *Elements of Psychophysics*, as a conveyance and (negative) enhancement formula of physics in the psyche: $\gamma = k \log \beta/b$: “The magnitude of the sensation (γ) is not proportional to the absolute value of the stimulus (β), but rather to the logarithm of the magnitude of the stimulus, when this last is expressed in terms of its threshold value (β), i.e. that magnitude considered as unit at

which the sensation begins and disappears. In short, it is proportional to the logarithm of the fundamental stimulus value."³⁰

Like the relationship between machinists and dancing puppets in the marionette theater, namely as a relationship of numbers to their logarithm, the psycho-physicist calculates stimulus and sensation in relation to one another, in short: $S = k \log R$, the "Weber-Fechner Law." Walter B. Cannon declared the law, which was drawn up unaware of all the ways the nerve connections react chemo-physically, to be responsible for the most and the greatest detours and derailments in psycho-physiology.³¹ Fechner's research, however, is also responsible for the royal roads to knowledge in psycho-physiology. Precisely the fact that he relied on the experience of his derangement helped him to develop the basis for a psychic model that split mental life into daytime work and nighttime work, which could, however, exist together. He thus created the foundation for the largest competitive project on the universal spirit. In *The Interpretation of Dreams*, Sigmund Freud thus called him the "great Fechner", and precisely because he developed the model of an optical apparatus for the psyche:

As the starting-point for our enquiry, I should like to pick out one from among many remarks made upon the theory of dreaming by those who have written on the subject. In the course of a short discussion on the topic of dreams, the great Fechner puts forward the idea that *the scene of action of dreams is different from that of waking ideational life*. This is the only hypothesis that makes the special peculiarities of dream-life intelligible. What is presented to us in these words is the idea of *psychical locality*. I shall entirely disregard the fact that the mental apparatus with which we are here concerned is also known to us in the form of an anatomical preparation, and I shall carefully avoid the temptation to determine psychical locality in any anatomical fashion. I shall remain upon psychological ground, and I propose simply to follow the suggestion that we should picture the instrument which carries out our mental functions as resembling a compound microscope or a photographic apparatus, or something of the kind. On that basis, psychical locality will correspond to a point inside the apparatus at which one of the preliminary stages of an image comes into being. In the microscope and telescope, as we know, these occur in part at ideal points, regions in which no tangible component of the apparatus is situated.³²

Freud, unlike the biologist Cannon, had not checked Fechner's calculations and detected mistakes his formulas, but, after previously having thought up

a complex neuron apparatus for psychologists in his sketches on Wilhelm Fliess, he finally constructed an imaginary apparatus in *The Interpretation of Dreams* that split up Fechner's measured experiences into functional systems: an "the mental apparatus as a compound instrument."³³ This apparatus is meant to demonstrate how internal and external impulses are received as sensations, transformed as agitations to the nerve impulse, and can be stored in different layers – or as Freud formulated using media technical terms, "permanent records"³⁴ – before they trigger a motor reaction. This system φ is Freud's model of the psychic apparatus, which has to work like a "reflex apparatus", albeit one that treats, connects, or constrains the stimulus impulse, before it is diverted at the motor end, according to certain criteria – including the strength of the impulse. Freud's examples are meant to make it possible to see how the mental functions are cut up. In an optics of the photo apparatus, the impulses are turned into impressions, virtually depicted and possibly even stored on another level. With this model Freud can also show that traces of memory can also be regressively activated and can simulate uncensored sense perceptions that nonetheless remain innocuous for all their shamelessness, because they can never bolt through to the motor end of the reflex apparatus. It is this model of regression that is called up in various theories of cinema, including for instance Godard's, in order to show how memory and association can become sense perception in quiet cinema perception.

Freud constructed the apparatus, which had actually been induced by Fechner's traces, exactly into the "idea" that Fechner provided for him – with the difference that Fechner's color optics, with which he had looked at the sun, did not store impressions like a camera, instead concentrating the light rays directly on his eyes, his visual center. Using experimental optical apparatuses, Fechner varied the effect of external impulses on his perception – and experienced how the agitation caused sustained disturbances in his interior, leaving behind traces on which his thoughts went off on their own wild rides. Freud, much later, will conceive of an internal counterpart to Fechner's test device, an imaginary camera that first fixes the agitations in order then to work through them in layers, without exposing itself to the agitations. The experimental installations from the laboratory gradually become internalized.

By analyzing his own experiences, Fechner opened up the area of the involuntary, of the unconscious, and of trances to science in the long term. Freud's apparatus provided a psychotherapy for psychophysicists. Trances, this feedback of the trembling nerves, can only be controlled if they are first recorded and then analyzed. His predecessor on the path had been

the French astronomer Pierre-César Jules Janssen from the observatory in Meudon, who had captured the passage of Venus in front of the sun on December 9, 1874 with his photographic gun. He could then calmly observe the seventeen phases later on a photographic plate – which he therefore called the “retina of the scientist”³⁵ – without having to turn his gaze toward the sun. Scientific objectivity was thus taken out of the flickering realm of the observing scientist, vulnerable to trance, and became a simple matter of recording. Janssen’s camera was the predecessor of Marey’s photographic gun. In the history of a technology of cinema, experiments in technology and in perception physiology converge. Imaginary psychic apparatuses were proposed as a complement to real physical ones, in order to systematize disorders and to balance out stimulus energies, which had previsions kept a professor constrained to a bed for years. The psyche was qualified and quantified as what a psycho-physician can regulate.

Ultimately, also in the optical apparatus of the cinema, the “scene of action of dreams” is artificially interconnected with that of “waking ideational life”, without the trances that it induces becoming physical impositions or mental disorder. The use of apparatuses and technical equipment to induce mental and nervous reactions in psychological laboratories was the prerequisite of cinema-viewing.

Resonating

In addition, it was also necessary to understand the physiology of the nerves to which the apparatuses were specifically meant to be joined. In 1847, when Carl Ludwig was graphing out the sputtering of the heart, Helmholtz published his thesis about conserving energy and undertook the first measurements in the speed of motor nerves in frogs using the Galvanometer. In 1850 he established the exact rate of speed in nerve conduction. Once again, the discovery was preceded by the development of an apparatus: the carriage inductor, constructed by Du Bois-Reymond, with which modifiable streams of induction could be applied to different spots of the nerve. Two muscle spasms that were produced with it served as marks to measure time.³⁶ Helmholtz found devices for highly exact time measurement with the military, where Siemens was improving conventional methods of recording by “the fortunate idea of eliminating all mechanical mediators and letting the electricity itself make the mark.”³⁷ The rotating cylinders from Siemens, which he took as the basis for his myograph, could be run at a speed of 60 rotations per second and allowed for measuring time down to the 40,000th

of a second. Compared to the measurements of light velocity made with Foucault's pendulum, which is exact to the 77 millionth of a second, this is not much, but Helmholtz nonetheless gave his listeners something to think about: "You see that the microscopy of time has far outflanked that of space."³⁸ Helmholtz was able to give the propagation velocity for impulses in frog nerves at 27.25 meters per second. The microscopic analysis of nerve movements in time and space showed that a movement goes through the body that the body knows nothing about and that it itself did not sense.

With his new construction, Helmholtz had raised Ludwig's kymograph to the highest possible mechanical velocity through a significantly higher rotation speed and through a more uniform course of the barrel. This was the prerequisite for being able to make assertions about human self-awareness and its perceptual times.

Fortunately the distances that our sense perception has to go through before they get to the brain are short, otherwise we would be far behind the present with our self-awareness and would even lag behind the perceptions of sound waves; that is, fortunately they are so short that we do not notice it, and we are not touched in our practical interest. For an ordinary whale it is perhaps worse; for in all probability he perhaps experiences an injury to his tail only after a second, and needs another second to command his tail to defend itself.³⁹

But even for an ordinary professor, it can become bad, as Fechner noted, when the connections in the brain are so multifaceted that perception impulses are impeded, displaced, duplicated, and a series of asynchronous thoughts ends up in a mad dash. Helmholtz was able to show how self-awareness functions under normal circumstances, and he also provided possible physiological explanations for confusions and trances. "My most significant result was that the sensations of the senses are only signs to configure the outside world, and the interpretations of them can only be learned through experience."⁴⁰ His explanations of the physiology of perception and the achievements of the brain come ever closer, thanks to Werner von Siemens, to communications technology. In the physiology of nerves it had been assumed that a specific sense energy and a correspondingly specific nerve energy determined the various perceptions of the senses. In his *On the Sensations of Tone* Helmholtz showed that there were indeed various sense organs and nerve conducts, for example, for optical or acoustic signals, but that each individual nerve fiber can only establish different impulse strengths. He illustrated his model with the comparison, which

became well known in cybernetics, between nerve systems and telegraph systems: "Nerves have been often and not unsuitably compared to telegraph wires. Such a wire conducts one kind of electric current and no other; it may be stronger, it may be weaker, it may move in either direction; it has no other qualitative differences. Nevertheless, according to the different kinds of apparatus with which we provide its terminations, we can send telegraphic despatches, ring bells, explode mines, decompose water, move magnets, magnetise iron, develop light, and so on. So with the nerves. The condition of excitement which can be produced in them, and is conducted by them, is, so far as it can be recognised in isolated fibres of a nerve, everywhere the same, but when it is brought to various parts of the brain, or the body, it produces motion, secretions of glands, increase and decrease of the quantity of blood, of redness and of warmth of individual organs, and also sensations of light, of hearing, and so forth."⁴¹

Perception is also similar to the telegraph system in that it need not know the functions in order to transmit signals; that it need know nothing of its functions in order to transmit them promptly. Consciousness can become a dangerous millstone on the neck of life. He first developed his theory of "unconscious inferences" in a lecture entitled *On Human Vision*, which Helmholtz held in Königsberg in memory of Kant on February 27, 1855. Using the phenomena of apparent color and apparent motion he explains how "a change in the practice of interpretation in sense perceptions can occur", which goes unnoticed by consciousness. Explaining this phenomenon, according to Helmholtz, would be the task of psychology, which at the time was incapable of complying because the unconscious in the sense of psychic circuits that do not function consciously was not its object, but only introspection. For help in explaining apparent phenomena "we find no help among the psychologists, because for psychology self-observation has so far been the only way to cognition, but here we have a mental activity that our self-observation can give no account of; we can only infer its existence from physiologically examining the tools of the senses."⁴²

His research led him to the objective science of unconscious nerve activities in the old mental functions of thinking, feeling, and wanting. The results also raised a question that for philosophy could only be explained by consciousness: namely, how to ensure that perception accords with the world. Helmholtz solves this by internally relativizing the sense organs, which signal all the changes between consciousness and the outside world. For vision, he explained: "The agreement between facial perception and the outside world also completely or at least mainly has the same basis as all our knowledge of the real world, namely the experience and continual

verification of its correctness by means of the experiments that we conduct with every movement of our bodies.⁷⁴³

The methods of dancers. Years before Poincaré showed that all sense perception is only possible through correlations of sense perceptions and bodily movement, in order to make sense data out of the data of the sense organs, Helmholtz had already described this experience for vision. This dance-like experimental physiology consistently leads to declaring all of life to be a permanent experiment. Experience is provoked, had, and modified with every movement. The individual bodily processes are held together in constant dependence and thus in balance. Under the conditions of communications technologies, however, Claude Bernard's theory of "milieu intérieur" had been transformed into milieu altogether, to "milieu général", which must also be able to balance inside and outside through signals. The idea that follows from Helmholtz's fine description of methodology is his groundwork for a theory of media. Technology, perception, and corporality are connected in a physical and homeostatic way: pre-cybernetic.

In order to show how hearing works, Helmholtz had resonators constructed, "hollow spheres of glass or metal, or tubes",⁴⁴ which, when put on the ears, filter out all of the sounds from the outside world that correspond to the oscillations of the resonator: a practical, sensual Fourier analysis. Tones, overtones, and undertones could thus be differentiated when they occurred in "the sighing, howling, and whistling of the wind, the splashing of water, the rolling and rumbling of carriages." The resonators were simply models for how the ear works, which can analyze "the sound of a string into precisely the same constituents as are found by sympathetic resonance."⁴⁵ Helmholtz amplified his resonators electromagnetically. Analysis and induction function as the same interconnection between sense organ and apparatus. Inside and outside the same Fourier analyzer. In his research on the physiology of the senses, Helmholtz presents the internal functions as the counterparts of the devices with which he had conducted the experiments, or modified the devices according to his findings about nerve functions.

Helmholtz became an avant-gardist of all experimental art, not only as a teacher at Berlin's Art Academy in the winter semester of 1848/49, but through his later research on acoustics and optics. He analyzed sensations and built devices that synthesize them again. But it was not artists that he wanted to teach about the microscopic mechanics of sensations and feelings, who already knew anyway, consciously or unconsciously, but critics. "In my somewhat unusual attempt to pass from natural philosophy into

the theory of the arts, I hope that I have kept the regions of physiology and esthetics sufficiently distinct. But I can scarcely disguise from myself, that although my researches are confined to the lowest grade of musical grammar, they may probably appear too mechanical and unworthy of the dignity of art, to those theoreticians who are accustomed to summon the enthusiastic feelings called forth by the highest works of art to the scientific investigation of its basis.⁷⁶

Helmholtz lets the art theorists know that enthusiastic feelings are only effects and are not themselves open to scientific inquiry, and that the physical “and that this analysis of the sensations would suffice to furnish all the results required for musical theory.”⁷⁷ No special mental activity is needed in order to appreciate art. Helmholtz, who was passionate about all the arts all his life had no need for any extra illusions: all that resonates in perception are the oscillations of the world, which is something that any dancer can verify.

Rhythmizing

The history of cinematography as media history, that is, as the interweaving of technology, perception, and corporality, can be more easily reconstructed from the laboratories of the physiologists than from the experiments of the psychologists. In psychology the devices that were used as aids to examine perception were dismissed, and thus the technological part that turns the study of the mind into media research in the first place was shut out. For instance by Helmholtz’s former Heidelberg assistant Wilhelm Wundt, with whom he competed for having invented the term “unconscious inferences” and for how they work.⁴⁸ In 1902 Wundt wrote that “as long as one applies the physical aids merely to the purposes of examining psychic appearances and their contexts, the actual character of of these also remains psychological, just as the electric, thermal, and other physical effects that one makes use of for chemical examinations doesn’t turn them into physical phenomena.”⁴⁹ There he recaptured the science of perception once again for the humanities. It is thanks to Wundt’s biography that psychological laboratories in Germany and the US were not joined to medical professorships, but to philosophical ones, for the physiologist Wundt was appointed Professor of Philosophy in Leipzig in 1875 and founded the first institute for experimental psychology there in 1879, which became a model of institution building in the whole world through the activities of his students. His career is also due to the construction of a device.

Wundt's appointment in Leipzig was promoted by the astronomer Zöllner, not quite without self-interest, for the astronomers had a perception problem, which they hoped to solve with Wundt's aid. In astronomy certain deviations in the measurement of time, which had been undertaken by a variety of scientists, had become apparent. In order to read time – for instance at the Royal Observatory in Greenwich, where it was authoritatively determined for the entire empire to a tenth of a second – astronomers had to coordinate two rhythmic series in perception: one acoustic and the other optical. Through a telescope with a built-in wire grid, they observed the passage of a star through the field of vision. When the star appeared in the wire coordinate field of the telescope, the astronomer looked at the clock, noted down the time exactly to the second, then counted the second with the ticks of the clock, which he could hear, at the same time observing the path of the star through the grid. He noted the position of the star with the beating of the seconds “in his mind's eye” before the star crossed the decisive mark, and also the position at the stroke after it had crossed the mark. Then he estimated the placement of the mark between the two star positions that he had noted “in his mind's eye” in tenths of the whole distance and added these tenths of a second to the number of seconds that he had counted until the stroke before the passage of the star through the grid.⁵⁰ And just like *Pensiero*, “you had to be pretty good to get the hang of it.”

The astronomers work proved to be a permanent set-up for psychological experimentation. It turned out that their results varied. After Helmholtz had proven that one could in fact measure the time of conveying messages in the nerves, and Christian Wolf had presented his studies about absolute personal equations in perception, the differing reaction times of astronomers' observations were determined. But it was only Johannes Hartmann's experiments that showed that expectation would be a significant determinant in the personal, specific time lags in perception.

Hartmann's experiments were carried out with apparatuses that belong in turn to the technical forerunners of the cinema: the stroboscopic cylinders of the Vitascope. Simulating the passage of stars he had points of light appear in equal intervals by means of a rotating disk. At the same time he had a clock ticking and marking the rhythm of the test subject's perception. This person was supposed to give a sign when the optical and acoustic signals were perceived to be simultaneous. He thus discovered that there were deviations in observation from person to person, but with each individual person they were fairly stable. Some test persons noted the coincidence of acoustic and optical signals before the actual moment of concurrence, others afterwards. Hartmann concluded from this that the

reaction of the observer in this experiment was determined by his or her own expectations as induced by the rhythmic return of the impulse, not by the occurrence itself. He was able to show that the occurrence was even perceived by some observers when it had not happened at all, when the series of impulses was interrupted shortly before the decisive moment. The observer was therefore reacting to his or her own subjective disposition as it was induced by the intermittent stimulation in the experimental set-up.

This information turned a question of astronomy into one of psychophysics. The experiments no longer had to examine only the transfer time of the impulses, but the reaction times, which was obviously contingent on complex processes in the nervous system and brain. In order to measure the times that played a role in reactions and associations, Wundt constructed an apparatus in 1863 that simplified the observatory situation, that is, the intermingling of regular acoustic and optical impulses, and made it possible to simulate it in a variety of ways: "Wundt's Complication Clock." With the stipulation that one should proceed in self-experiments "as inattentively as possible", Wundt stipulated that in using the complication clock, psychological practice should isolate intellectual faculties as much as possible from one another. The unconscious of this psychology lies in the practical dissociation of mental functions.

This clock qualified Wundt for his post in Leipzig. Only a few years after Helmholtz had proven, against all assumptions, that the impulse in the nerve needs time to proceed, psychologists were now agreed that the time needed to process stimuli was extremely variable. An impulse could work its way around in the brain without triggering a reaction until a suitable attention predisposition made it receptive for an association, thus provoking an idea and its reaction. Wundt tested the physiological agitation of various sense organs and traced shifts in the reaction times back to combinations and complications of conceptual links. He examined perception and apperception, attentiveness, involuntary memory, association, in short, all the processes that were considered mental activities, therefore opening up the research field of "mental chronometry." Only Pensiero's paranoia will show that the chronometric apparatuses that could define the duration, frequency, and amplitude of trembling, or shivers in his case, measure their own paradigms. The psyche is tested "subject to information[...] that is fed in at the other end." What is important for film perception as a stroboscopic stimulus of the optical nerves is above all the experiments carried out on "attitudes of expectation." The rhythmizing of the stimulus impulse, which had already driven the astronomers mad, becomes the norm in the laboratory through chronometry. It is the prerequisite for all forms of ciné-trance.

Now it can be seen that even Wundt, over the course of his publications, constructed the model of a psychic apparatus according to the prototype of his experimental set-up. The devices from the laboratory were tacitly projected into the interior of people. In the fifth edition of his *Physiological Psychology* from 1902, in which Wundt summarized his research in Leipzig, the technical requirements of psychological measuring, the chronoscope and the complication clock, were relegated to the third volume. The experiences were supposed to no longer know anything about their prerequisites in the set-up of the experiments. The body, moved in regular rhythms, as it had been synchronized by the clockwork over the course of research, seems to Wundt to represent in part the nature of the body and of consciousness. In one of his final works, the *Introduction to Psychology*, which was consistently reprinted up to 1922, rhythm seems to be a quality of the organism, and thus a quality of perception itself: "Our consciousness is rhythmically disposed. The reason of this scarcely lies in a specific quality, peculiar to consciousness along, but it clearly stands in the closest relationship to our whole psycho-physical organization. Consciousness is rhythmically disposed, because the whole organism is rhythmically disposed."⁵¹

This idea would be nice and easy if weren't for the fact that the rhythm that is meant to dominate here is always based on the regular ticking of a clock as the norm. When Wundt wrote the *Introduction to Psychology* as a book of popular science, he replaced the complication clock with a simple device that was available in every modest home with a piano: the metronome. Using this device, anyone could conduct psychological tests in self-experiments. Experiments with one's own perception as "the entrance of some content into consciousness – an entrance that can be in fact proved" and with one's own apperception as "the grasping of this by the attention"⁵² thus became a kind of parlor game. When the self-experimenter gets going, that is, comes into "attitudes of expectation", he or she has the experience of a psychic (personal) achievement, which appears involuntarily. Simple, uniform ticks become a series of strokes in which various emphases can be perceived. From the pure ticking, a "content" suddenly enters "into consciousness" through perception. The perception itself undergoes a marvelous metamorphosis and transforms the world according to the rhythm of the organs.

Now our means of locomotion are in a certain sense natural pendulums, the movements of which generally follow with a certain regularity, as with the pendulum of the metronome. Therefore whenever we receive impressions in consciousness at similar stated intervals, we arrange them

in a rhythmical form similar to that of our own outward movements. The special form of rhythm, ascending or descending, is within certain limits left to our own free choice, just as with the movements of locomotion, which may take the form of walking, of running, of jumping, and lastly of all different kinds of dances.⁵³

What arrives in consciousness is always already physical for Wundt, and thus unconsciously processed into intervals and aligned to the rhythm of the body. The physiologist with the clock has become a philosopher. The attitude of expectation that has been observed in earlier experiments with rhythm as the consequence of the ticking of the clockwork now appears as a subjective achievement that brings the uniform signals of the world into a certain order. Wundt had forgotten that it was not “we” who aligned the intervals of external impressions to our internal ones, but that at the beginning – and this had been the reason for his appointment at Leipzig after all – the problem consists in the fact that unconscious achievements of perception have been manipulated by external influences.

Psychologists have attempted ever since to alter body rhythm by means of devices, to reduce or to lengthen intervals of its pulse in order to see how perception reacts. Nerves are connected in order to measure their specific contributions, forgetting that the nerves can only give the rhythm of their impulse when they have already been connected, that is, when the ticking of the clock has already put its own movements into an attitude of expectation fairly artificially. But there is no great shamanistic Fechner of chronometry, who would have told of the efforts to restrain the trembling of the nerves in the manifold forms of dance. Perhaps it could have been Nietzsche, or Senate President Schreber, who wrote down a shamanistic tale for brain physiology. But the idea that rhythm might be stuck “inside” the body itself was the absurd core of occidental madness for both of them, a core that precisely cannot recognize that every rhythm always takes possession from “outside” the body: from history, from sounds, or from rays of light.

Wundt’s tests recall all kinds of achievements by literate individuals, and appear on the surface of unconscious psychic achievements to gratify the contents of bourgeois inner life. In tests to determine the threshold of perception, Wundt used a tachistoscope, a quick viewer that was able precisely to determine between 0.05 and 0.20 seconds in presentation times.⁵⁴ Experiments with unconnected elements (letters) and connected elements (strokes) were supposed to show how consciousness was capable or arranging its contents in phrases and rhythms. If six different elements can normally be perceived at one glance, the consciousness can grasp signs

in the order of language even faster, that is, it can read. Within a familiar word in a familiar language, consciousness can grasp as many as 20 elements at a time. Wundt's example of this is "*Wahlverwandtschaften*" ["elective affinities"], which can keep together even if it is not spelled correctly.

For acoustic stimuli as well, the maximum number of events that can be grasped is six. But integrated into a regular rhythm with three different beats, six units of combinations can also be noted. Classical spelling literacy and two-beat variations of a metronome ticker are appropriate to the nature of the psyche, polyrhythms such as those in jazz or in the complicated rhythms of voodoo rituals⁵⁵ cannot be grasped by it. Central Europeans no longer notice anything when Africans or Haitians know that the gods are among them.

If, according to Wundt, "our means of locomotion are in a certain sense natural pendulums", as regular as those of the metronome, all that is lacking is the methodology of the Kleistian puppeteers to make the connection and provide the beat to appear as the inspiration for the gracefulness of dance. "The limbs, which were no more than pendula, following along mechanically, without any extra help, of their own accord", as is described in the marionette theater. Because the puppeteer and his mechanics cannot be seen, what appears is the artistic and mysterious "path of the dancer's soul." Wundt also staged the grace of rhythmic perception as path of the soul simply by forgetting that the art of the movement of the soul is a trick that allows the machinery to disappear into the wings. This as well is an important preliminary step to staging perception in the cinema.

Wundt is also responsible for the insight that in cinema all meaning is preceded by a physiological rhythmic structure that regulates what provides that meaning:

In ordinary life we generally speak of the phenomena, that are observed in such cases, as a change from "expectation" to "realisation." If we follow these phenomena a little more closely, we notice that in our case the process of expectation is a continuous and regularly varying one. At the moment immediately following one beat, expectation strains itself to catch the next one, and this straining increases until this beat really occurs. At the same moment the strain is suddenly relieved by the realisation of the expected, when the new beat comes. Then the same process is repeated during the next interval.⁵⁶

If this beat takes place in intervals of up to 0.05 seconds, the sequence of tension and release moved around the threshold of conscious perception.

Wundt positions it beneath this; for him expectant nervous twitching is an emotional state:

It is at once obvious that these states, which we shall call for shortness the contrasts of strain and relaxation, have the very same right to be called feelings. For feelings, wherever they arise, accompany, as subjective reactions of consciousness, sensations and ideas, but are never identical with them.⁵⁷

Ideas, following Wundt's definition, are the contents of consciousness, which are related to the objects of the outside world, and sensations are the corresponding psychic experiences from which they are composed. Feelings, by contrast, are elements of subjective "emotions", of internal impulses and moods that are independent of objective objects. Warm, cold, red, white, and, like in *Kieślowski*, blue, are sensations, while there is a feeling for space and time. While physiological experiments treated feeling and sensations as essentially the same thing, psychology differentiates precisely here.⁵⁸ Wundt put feelings to test into the laboratory as subjective states: the rhythmic sequence of the stimuli were altered. An increase in tension was indeed observed with an increase in intervals, but the perception of release also became clearer, and the pleasurable sensation that was introduced in expectation of this release flipped over into a unpleasurable sensation. If the intervals were decreased, thus raising the frequency of the stimuli, singular feelings of tension and release disappeared in favor of a general excitement, a state of trembling, which was also unpleasant. Set back to a moderate speed the rhythm had a calming effect.

The analysis of feelings in the experiment thus became an induction of synthetic feelings. The experiments with metronomes allowed Wundt to produce complex and even conflicting atmospheres, without these being linked to any particular idea. Since in Wundt's theory all feelings: joy, pleasure, cheerfulness, anger, worry, fear, etc. are dissected into the three basic emotional pairs: delight and aversion, tension and release, excitement and pacification, they can be artificially produced in the dramaturgy of intervals. They are accompanied by the corresponding somatic changes, for instance the expanding and contracting of the blood vessels, of glandular functions. Many experimental filmmakers will continue working on exactly these efforts from experimental psychology. They will examine perception in the cinema by creating feelings cinematically, with or without the associated idea.

In the laboratory, Wundt collected evidence that there is indeed a subjective steering function for all sensations and ideas, a mind, but a multiple one: "It is not as simple being but as the evolved product of countless elements that the human mind is what Leibniz called it, *a mirror of the universe*."⁵⁹ Other psychologists preferred to think of the mind not as a mirror of the universe, but to treat it as a mirror of the laboratory. Eugen Bleuler carried out a connection between the laboratory apparatuses and psychic reactions when he proposed his therapy with "*Gelegenheitsapparaten*" ["opportune apparatuses"] in 1922. What Wundt had dissected into single elements and subroutines in the laboratory is later combined again, for instance by Bleuler, as a physiological function, the conscious and unconscious, the light and the dark sides of the human mind function next to one another as little apparatuses without disturbance.

The cinema as an apparatus linking technology, perception, and corporality lies in the continuity of psycho-physical apparatuses. Film dramaturgy consciously introduces the unconscious effects of a circuit. A systematic insecurity of self-consciousness and a deception of perception is recognized, analyzed, and consciously built into the devices as *expectation* in order to shift and displace consciousness and to induce trance. Cine-trance. But very few have understood as well as Maya Deren, who had read Bleuler, that these psychological effects were always about historical technologies. She can write about voodoo rhythms and at the same time say the following about cinematic psycho-technology: "Once this interval has been established, our sense-perceptions are geared to an expectation of its reoccurrence."⁶⁰ From the archaic trance techniques to the new media is theoretically just one small step, but it took almost 50 years to implement it in practice and in perception psychology. The new medial trances can be joined up specifically with particular rhythms at particular receptors. This altered corporality itself in communication. New bodies were formed, old body parts and body images dissipated. Whatever a body could still be and become: We, as those sensing and feeling, like Eddie Pensiero, are at the disposal of the media as bundles of nerves and nail biters, the technologists and lab workers have seen to that. However we turn and shift in the dance of the correlation functions of our senses and our brains: Before all subversion, refractoriness, and anarchy, before all the intoxication of the senses, the interconnection of nerves lies beneath conscious perception as a social technology.

The sources of affections that lie outside also belong to the history of the cinema as a registration of physical corporality. It is the French history of the measurements made in the nineteenth century.

2. Psycho-Motor Activity

≈ La femme sans tête

Highway sign on the A31 to Beaune

While the Germans came to the cinema attempting to optimize the mind's functions, the French invented it to take care of their bodies, and it is believed that one can still recognize this difference in national film productions to this day. In 1872, after France had lost the war against Prussia and the good citizens were shocked by the vitality, energy, and mobility of the communards on the barricades in Paris, a patriotic movement was formed in France that traced the catastrophic outcome of the war back to "decadence", to the soldiers' instability and their weak wills. A gymnastics movement was instigated to restore elegance and more stamina to the French. One of its leaders was Georges Demeny, who had founded a "cercle de gymastique" in Paris to develop and train new bodies, which were not meant to be drilled in any authoritarian Prussian sense, but trained in an economic French style to optimize energy use, avoid fatigue, and learn sequences of movement in which the organism functioned without resistance, in short, to introduce grace in the Kleistian sense as an artificial paradise. Demeny made great efforts to ground the new forms of movement in science and registered as an assistant to the physiologist Étienne-Jules Marey.

After his medical practice had failed, Marey studied the physiology of movement as an independent researcher in his own laboratory and developed his own methods to read these movements from the living body. He wanted to liberate physiology from the anatomy that it had always been subordinated to. While still as assistant doctor in 1859, Marey had developed the sphygmograph, a machine to read the pulse, which became so popular in medical practices that Marey could live off the royalties from the patent.¹ The sphygmograph differed from Ludwig's Kymograph in that it was applied on the outside, on the skin, and did not have to be inserted under the skin. It was made of aluminum and wood, which made it very light, and instead of working with weights, it worked with a spring that pressed the apparatus onto the artery. Instead of using a steel pin, Marey's sphygmograph used a spring to write down what the change in the receptacle dictated. But although Marey's technologies sought to record inconspicuous movements like the beat of a butterfly's wings, his most spectacular and bloodiest experiment in these years was a cardiograph

of the heart of a living horse, which he carried out together with Auguste Chauveau, the laboratory director of the veterinary clinic in Lyon. A rubber plunger was inserted into the cardiac chamber of a horse and transmitted its contractions as neat three-track notations. Blood pressure in both cardiac chambers and the beats of the heart were recorded in an "indirect" method. The graphic notations only translated: "Nos courbes n'exprimaient donc pas les mouvements du cœur à proprement parler; mais elles permettaient cependant de déduire des changements de pression qu'elles traduisaient..."²

If Carl Ludwig is considered the inventor of the recording system where bodily states leave their traces on soot or papered cylinders without the aid of a physician, Marey was the theorist of the graphic methods of notating body movement. Perceiving and representing motor phenomena coincided in the body's self-transmission mounted in the inscription machines. Marey proposed devices and built models that allowed all possible movements to be brought into the one-dimensionality of a single line. In the 1860s he examined human and animal motor activity and made notations according to intensity, duration, and form. In addition he constructed the thermograph, the cardiograph, the pneumograph, and the myograph, which he also built in a lighter version than Helmholtz's prototype so as to be able to record the fine movements of muscular tremors. Marey's apparatuses, however, did have the disadvantage that they limited freedom of movement when they were used, that is, they altered the movements that they were meant to measure. Only in 1878, when he saw Muybridge's photo series in the journal *La Nature*, did Marey invent mechanisms to record living creatures in presumably free movement.

Following Jules Janssen's model he constructed a photographic revolver, which he tested in the summer of 1882 with his assistant Otto Lund in the radiant light of Naples. 12 pictures could be taken on a rotating photographic plate at $1/720$ of a second, and Marey brought another 25 photographic plates in a dark bag so he could reload his photographic gun at the beach.³ The images made on the plates, however, were as small as postage stamps, and a series of 12 pictures was too few to be able to determine the exact trajectory of the bird they had photographed in its speed and direction. So Marey altered the parameters. He built a camera with a fixed photographic plate. Several phases of a movement were exposed over one another on the same plate by rotating slots at $1/1000$ of a second in intervals of $1/10$ of a second. In contrast to Galton, who standardized the traces of many bodies in the contracted space of double exposure, he envisioned analyzing a body's course of motion in its graphic-spatial expansion.⁴

Marey used these multiple exposures to create his pictures in phases, which went against all western conventions of representation and which

immediately unleashed a wave of experiments in the visual arts. Since the Renaissance the picture frame had established a clear unity of space and time. Marey's pictures, which showed a course of time, could not be read in this sense. They thus inspired avant-garde artists to depict the course of movement on the tableau. Impressionists such as Edgar Degas in his friezes of dancers, František Kupka or Jacques Villon, futurists like Giacomo Balla or Luigi Russolo, even later Suprematists like Kazimir Malevich and Natalia Goncharova and, super-pradigmatically, Marcel Duchamp's *Nude Descending a Staircase* introduced images of phases to the canvas, a new feeling of the body transformed in time as a counter to identifying central perspective.

Marey, however, was not interested in the aesthetic value of the depictions, but in their documentary value, and this was flawed. If the person being depicted moved too slowly, the phases of movement got entangled, and the photo print showed a muddle of limbs. Marey solved this problem by fragmenting and reducing the persons with lighting techniques. While at first he had recorded figures dressed entirely in white against a black background, he then had his models dressed in white only on one side, or only with one white leg, and then finally in black leotards marked at the joints with shiny buttons connected with metal bands. Time and space were economized in the depiction: "Dans l'épure que l'on obtient ainsi, le nombre des images peut être considérable et la notion de temps très complète, tandis que celle d'espace a été volontairement restreinte au strict nécessaire."⁷⁵ The photographs that he got from this approximated graphic illustrations. The image of pure movement in compressed time had been liberated from the body. In a very few attempts Marey had tested more or less all of the options for illustrating bodies according to different criteria, creating a repertoire that not only offered the necessary foundations for physiologists, but also for all future film directors. With light and costumes he made it easy to control the relationship between movement and the body, making it possible to separate movement optically from even larger bodies.

Using this method, which emptied the body of all flesh and blood, the first calculations of physiological pivot points were carried out by lever principles and swing axles. After Demeny and Marey had provided the first measurements, the city of Paris made the Parc des Princes in the Bois de Boulogne available as a station for physiological experiments, initially patterning their equipment after Muybridge's model in California. Marey and Demeny worked in a hangar equipped with black felt, and starting in 1883 they used a camera with the new shutter technology that was mounted on tracks according to the model of Edison's "Black Maria" as a large darkroom.

Later a pole was installed from which views could be recorded from a bird's eye perspective. In comparison to the equipment that two German physiologists put on a "test individual" in order to measure the "gait of the human being", Marey's installation was very free. Wilhelm Braune and Otto Fischer attached small discharges – although not until 1891 – and later Geissler tubes to the test subjects, which were charged by a Rühmkorff inductor coil. With this equipment the measurements documented nothing but the gait that the subject could take under such cumbersome circumstances and the difficulties of the experimental conditions. In contrast the conditions of the light French runners could be seen as natural, although they also restricted the illustrative apparatus of body movements from a distance.

In contrast to the moving camera work, which Londe, for instance, was developing at the same time, every stretch in the Parc de Princes was supplied with scales, measuring rods, and chronometric gauges so that temporal and spatial parameters could be meticulously documented on the photographs, that is, in fraction of seconds. The objects on the runway were no longer bird and insects, as had been the case with Marey, but human beings, who followed a course once it was set up and could carry out particular movements. Together with Demeny, Marey tested gymnastics students and soldiers from the military school at Joinville. Walking, running, jumping, fencing, riding, waving flags, carrying backpacks.[...] The military disciplines were examined, with the support of the ministry of war, for their trajectories, their energy consumption, and training programs.

It immediately became clear in the Parc des Princes that mechanical discipline was required for all the measurement. In cinematic tests, for instance, a runner on the level circuit of exactly 500 meters had to interrupt the contacts of a telegraph circuit, which were installed along the track every 50 meters, as he passed them. Inside the laboratory an odograph wrote down these interruptions, and thus the speed of the runner, in corresponding zigzagging lines. The speed could only be related to the steps of the runner because he was synchronized by a bell in the middle of the race track. Rhythmized from a distance, the runner ran his rounds. "Cette sonnerie peut prendre toutes les fréquences possibles depuis 40 jusqu'à 120 coups à la minute."⁶ Truffaut's first film, about the dark side of post-war education, was called *Les Quatre Cent Coups*. In the film, rhythms and strokes characterize the authorities that structure the individual's life from outside. The history of discipline and the history of cinema and the history of French society. In France, the idea that the cinema realizes its culturalization beneath conscious perception and catches up with it again at the level of the narrative, is always present.

In dynamic tests the soldiers in the Parc des Princes were laden down with different weights in order to calculate the relations of weight and speed, pressure and mobility, exertion and achievement in phases of movement. What had previously been treated as a question of character – stamina, resolution, deportment – was, in the new French body politics, divided “dans la marche ou dans la course” into individual physical sizes, transferred into graphic grids, and made calculable. This in fact allowed for the creation of guidelines for gymnastics lessons, which would be whipping people into shape throughout the twentieth century all over Europe: “Il y a donc, pour chaque allure, une cadence optimum: celle où la vitesse croît plus vite que la dépense du travail.”⁷⁷ There is an optimal rhythm at which achievement increases faster than effort is made. What immediately appeared to the Germans, following Wundt, as a natural component of their organism, was first worked out as a scientific special form by the French, who also let themselves go, but then was trained into the body with tambourines and bells. A certain rhythm that makes patriots mobile: “Les premiers résultats que nous avons obtenus ont fait l’objet d’un rapport au Ministre de la Guerre.”⁷⁸

On October 15, 1888 Marey presented the first long filmstrips that he had shot with Demeny to the Académie des sciences. They were approximately 50 centimeters long and – in order to comply with copyright – were made of paper. What could be seen was the flight of a pigeon: Land in sight! And a hand opening and closing. The films had to be run through the camera between two sockets on the shutter, and held still in each case in order to expose 20 images per second with 1/500 of a second. In 1889 in Paris one could get films coated with a gelatin-collodion layer from the Lumière company, while the photographer Nadar bought nitrogen films from the American competitor Eastman. But neither the filmstrips nor the machinery worked quite right. The strips became charged with static, were too short and the coatings were too irregular, the strips did not run evenly. The pioneers of cinematography, Marey, Reynaud, and Edison did indeed exchange notes at the World’s Fair in 1889, but Marey had little interest in perfecting the illusion of motion, for the apparatuses that he manufactured were meant to serve the purpose of analysis. Nonetheless, although he was merely a technical agent in the history of cinema, he had made the decisive step toward filming human beings: namely, qualities that had previously been considered mental were physiologically analyzed and then recombined. Inner values were measured as external. The movement of the soul from the outside, as is common in archaic and shamanistic trance techniques, could now also be realized in the heart of Europe through cinematography. While

neurophysiologists had established that the nervous system could use body movement to transform data from the surroundings into information, while physiologists measured movement in anatomy in order to gain information from it about the body and character, while soldiers ran their exhausting laps for the text on the drum of the sphygmographs, what appears at the interface of these undirected, but every finer data nets is the cinema, which can turn movements and the transmission of stimuli into psychological stories. What becomes clear on Marey's testing grounds is that, since 1871, the "armament of the souls" is a complex that combines apparatuses, bodies, nature, and technology into a new aggregate. This is why Marey is the model for all media theory that sees running such machines as the process that makes it impossible to distinguish our physical and psychic breathlessness.

Even Max Ernst, who assembled the Parc des Princes into a landscape of souls in his cycle "La Femme 100 têtes", discovered the way that the psyche could go crazy around 1900 in the apparatuses with which it was measured. He showed that lost souls could be found again outside in nature, which, itself integrated into the culture machine as a technical auxiliary construction, regulated movements and forms of human bodies. He gave the subtitle "die landschaft wird im höchsten grade unbewußt" ["the unconsciousness of the landscape becomes complete"] to one of his pictures from 1929, in which Marey's track is supplemented by trap-like devices and by the vertically split and displaced body of a woman. Female bodies, the woman, as Bresson then finds, were completely missing in the measuring being done at the historical Bois de Boulogne. Ernst imported them from other research stations and among other parameters and, foreign and anachronistic, placed them in the paths of the male soldiers in order to transform desire into pure escalation of energy... while the gait at 40 and 120 beats per minute remained constant. "Cette sonnerie..." Heralded gender difference. Hammered gender difference. The secrets of the new souls lie outside the body, where the naked eye sees nothing, just as on the highway to Beaune, on the way into the Musée Marey, there is suddenly a sign with three waves signaling that in the invisible landscape beyond the street there should be a river, called "La femme sans tête." A hundred years later, what Marey had recorded conforms to every serial human being as an image of the soul, even more, it is enough for an optical bundling of desire, as Max Ernst prophesied in his pictures. Documents of biometry become sentimental views. The curators of the Musée Marey in Beaune ensure that the soul has changed under the measurement into beautiful, cryptic affectivity, unconsciously of course: "L'homme de Marey est repéré, mesuré, millimétré, cadré [...] au risque de perdre son âme: Il préfigure les images du corps numérisées, obtenues

depuis quelques années grâce aux ordinateurs. Il reste cependant chargé de mystère et d'émotion."⁹ If the mystery designates the transformation of the image of the body around 1900, after the psychic qualities become visible on millimeter paper, then emotions are simply the physiological reactions that the soldiers register on themselves: expanded blood vessels, heightened glandular activity, increased heartbeat. Even patriotic sweating. The fact that these reactions can be introduced even more strategically, in more variety, with more entertainment, more narrative, and more commercially will then be shown by the cinema.

Marey did not lose his soul to the new medium, but his assistant. After Demeny had been commissioned to produce film footage for deaf children in 1891, he patented a phenakistoscope for reproducing these series of images under his own name as a "phonoscope." Under duress, in the light of a giant concave mirror, which focused the sun directly on his somewhat pinched face, Demeny said to the camera what lay heavy on his heart: "Je vous aime" and "Vive la France." He glued 24 single images onto a metal plate, which was illuminated from inside, while a shutter restrained the light while transporting the images. At the international photo exhibition in 1892 in Paris Demeny thus became the first film star. Love in the age of technological reproducibility: "Je vous aime" unflinchingly ran its laps, addressing both amateur and professionals personally.

Marey replaced Demeny's assistance with that of Albert Londe. This collaboration not only fuses the latest visual technology and the most tested methods of illustration, but also the most advance tricks for capturing the nervous functions by chronophotography with the most modern equipment for illustrating body movements. Parallel controls and communication of physique and psyche. With Londe and Marey the faculties of knowledge come together, which finally provide the conditions for cinema.

In the experimental station at the Parc des Princes and in Marey's "Villa Maria" near Naples with its permanently installed underwater camera, a group of capable young physiologists, biologists, and neurologists were trained as film artists. For the former Charcot employee Paul Richer and the young Lucien Bull, the Olympic Games of 1900 in Paris became a film academy where they recorded the athletes, along with Marey, first to measure them and then for pleasure. Lucien Bull, who would later be the director of the Marey Institute in Beaune, developed radio cinematography, with which he shot footage stereoscopically at more than 2000 frames per second of the flight of insects and ballistic footage – his most famous film being that of a bullet going through a soap bubble, in which one can see that the surface of the bubble closes up again after

the entry of the bullet before exploding completely as the bullet exits the other side. Another well-known filmmaker was the medical student Jean Comandon, whose films were purchased as educational films by the UFA. In 1909 he shot a film about microbes in mouse intestines with dark field illumination and in the same year a film about the syphilis virus, films show cells dancing with great tenderness. The most famous of Marey's successors, however, must be Charles Emile François-Franck, Marey's assistant at the pathological physiology department at the Collège de France. Under Charcot at Salpêtrière in the 1880s François-Franck had investigated circulation and localization in the brain, and had published a book about the motor brain functions, for which Charcot wrote the foreword. This work included film footage that, unlike with Londe, was no longer meant to show the external movements or symptomatic expressions of emotional stimulations, but the inner paths of transmitting stimuli. François-Franck's experiments are complementary to Londe's illusionary and imaginary images, which abstracted fragments from the living appearance of the body. François-Franck electrically anesthetized, dissected, and reanimated animal bodies for cinematic recordings. His films are the missing link between the experiments of Duchenne de Boulogne and the first close-ups by D.W. Griffith and the sine qua non of all Frankenstein movies.

Although Méliès and the Lumière Brothers are considered the actual pioneers of film, the natural scientists, the unknown avant-gardists of film history, developed a wealth of styles and techniques that slowly paved the way for film into art. These include slow motion and time lapse, which make it possible to see the movements of plants, animals, and cells, underwater photography and the microscope, the x-ray and radio cinematography. It is in biology films that the first artificial worlds emerge that only exist through the fusion of camera and human perception. Among natural scientists film was used in a filmic sense from the very beginning, and not as a replacement for vaudeville, theater, or literature. Feelings that arise while watching the staging of microbes in mouse intestines are undoubtedly artificial and undoubtedly genuine.

The first artists' films in came into being among the cinéastes in the laboratories in France. Jean Rouch recalls how his uncle, a professor at the medical university, regretted that in 1920 he had to fail his most talented student in physics, chemistry, and biology. This was Jean Painlevé, the son of the mathematician, two-time Minister of Defense, and Minister President Paul Painlevé. Since 1924 Jean had been publishing *Neo-Zoologisms* in the journal "Surréalism", which he had founded as a

counter to Bresson's projects with Ivan Goll, Appolinaire, and Delaunay. In 1925 he passed the exams at the Académie des sciences after all with a film about stickleback eggs, one of the first films to question structural gender difference, in which he edited in a sequence in reverse at the onset: the heart of a stickleback embryo repels a red blood cell! When the commission wanted to check the film again the next day, Painlevé had re-edited the filmstrips and has since been considered a master filmmaker of biological works, with cameras that he himself built with the participation of the cameraman André Raymond. All of his films calculate the doubled reality of the trick shot, both strictly satisfying the criteria of scientific observation and at the same time being the result of highly complicated manipulation. "La science est une fiction", wrote Painlevé as well.¹⁰ His films show everything exactly as it is and at the same time let us see that everything visible here can in no way be seen in any reality outside the cinema. They are therefore surrealist on the technical level and, through their montage, which makes use of similarities, mimics, and deceptions of movement identification, they are also political manifestos. The film *Le Vampire* from 1939, about a type of bat that carries diseases and that has its front paw quivering upward at an angle, features music by Duke Ellington and a commentary by Painlevé. It ran in Copenhagen for two years during German occupation at the train station cinema.¹¹

In 1924 in the Paris avant-garde cinema "Vieux Colombier" there was a screening of medical and natural science films by Lucien Bull and Jean Comandon, which was attended by the group of artists and filmmakers surrounding the Surrealists.¹² Traces of all these manipulations of time, bodies, and movements are obvious in films like Germain Dulac's *La coquille et le clergyman* (1926), Buñuel's *Chien Andalou* (1928), or Man Ray's *Étoile de mer* (1928). It is less useful to trace the surrealist tradition of cinema at the level of the motif than at the level of the systematic inversion of times, spaces, and movements, through which a "total transmutation" was effectuated at the editing table – "the fortuitous encounter upon a non-suitable plane of two mutually distant realities."¹³ To illustrate this aesthetic, Max Ernst introduced Lautréamont's example of an encounter between a sewing machine and an umbrella on a dissecting table. At this point in time the perception apparatus itself is among the things that can be met on the editing or the dissecting table, and its sensors and cycles are already fed back with its mechanisms.

The surrealists, however, did not obtain just the formal manipulations of the film recording and transmission technologies from the medical

tradition, but also the structure of shooting and the gaze, which turns floating seahorses, disoriented dogs, and sick girls into stars.

In his brilliant outline of film history, Dalí wrote:

Following the dull years during which the technique is improved the cinema [...] suddenly reaches its true golden age in the achievement of the first materialist films of the Italian school (prewar and the beginning of the war). I am referring here to the grandiose period of hysterical cinema...¹⁴

3. Psycho-Drama

The films of Painlevé, Buñuel, or Dalí make it easy to forget the murderous legacy of Marey's inventions. Following the model of Londe, who had provided an iconography for unconscious poses and developed *dispositifs* of the female or male unconscious, film became the model and then also the substitute for conventional medial diagnoses. "Film reproduces" was plainly stated in the protocols, and one enthusiastic researcher among the clinicians, Emil Kraepelin, who had completed his education with Wundt, would turn to the cinema in relief in his Munich psychiatric practice. The cinematogram archive would spare him the confusion and madness of the patients at his station:¹

In order to demonstrate the meaning of the cinematograms that Weiler has been taking for years at the psychiatric clinic in Munich for clinical teaching purposes, selected pictures were presented. Since the main advantage of cinematography for teaching is that it visually reproduces the attacks, it was initially paralytic, epileptic, and hysterical attacks that were presented.²

The physicians, especially the neurologists, were strangely easygoing in how they dealt with the new medium, and the technological conditions of the medical assessments they made using it often remained concealed in the darkness of the laboratory. What they all saw projected before their eyes was seen as a valid case and attack, as complete and self-sufficient reality, not as a recorded trace, which, as is common with other optical examination devices such as the microscope or the x-ray, can only become scientific data by first specifying the adjustment coordinates, exposure times, or focal lengths. Mere cinematography becomes fiction film – as science.

Already in 1898 the Romanian neurologist Georges Marinescu, another one of Marey's students, carried out the first systematic film recordings of paralytics. His films turned cinematography into a neurological measuring instrument meant to distinguish "normal" and "abnormal" movements. Cinematography was the diagnostic basis for differentiating health and illness by means of analyzing movement. Anyone who limped, staggered, stammered, or doddered was registered in the image as "pathological": the drama of being presented, which does not stop in the cinematic mythology of Frankenstein's monster.

In Marinescu's footage patients of a hospital in Bucharest are presented sequentially by the nurses. From left to right, from right to left, toward the

camera and away from it, clothed at first, then with bare legs, presumably better to see the play of the muscles, and then finally nude. After a group of adults, children are presented as well. They hobble, buckle, have trouble moving forwards and getting through the area captured by the frame. Their movements look even more awkward due to the *mise-en-scène* of their skinny little bodies in the completely empty space of the picture.³

Marinescu's camera stands fixed to one spot. Only the reactions of a few patients who laugh or wave when they go to the camera draws attention to the fact that there is someone behind the controlling gaze that the spectator is positioned in, someone who is directing this. With the children, who obviously attempt to evade the direction not to make eye contact with the camera-eye, the sequence in which they walk towards the camera is edited down to a few seconds. By using looks and gestures to point out what surrounds the area where they are being judged, the children break through the formal objectivity of the visual structure, and exactly this moment is edited out in the name of science. Shortly before the cut, however, we see them laugh briefly, presumably because they recognized someone behind the camera. Only the cuts point to a different space, to the off-screen space of the shot, and thus to the fragile masks of scientificity. If we watch the images without the commentary that was added later on, the cinematic strategy of eradicating those recorded becomes even clearer. We see nameless, stumbling bodies shot from the side in wide-shots, largely without faces. The young men have shaven heads. All personal characteristics that could be manifest in clothing have been taken away from the children, with the exception of a couple or social, or rather asocial, markings: the girls have disheveled braids, are unkempt, their stocking hanging down. Nudity, which is meant to reinforce the impression of physical health in Marey's hopping soldiers, and which by now looks a little ridiculous, reinforces the impression of helplessness in the small patients in Bucharest, robbing them of any human characteristic. Around 1900 medical exams were already being used to slate children for treatment like the one that would lead millions of so-called abnormal or pathological persons to their deaths over the course of the century by more or less totalitarian regimes.

The iconography of annihilation in these first films by Marinescu can be seen in all further films about ataxia or catatonia. It is correct that the titles of films were only the names of the illness involved, for what is being portrayed is the image of the illness with all its specific symptoms and particularities, an image that was meant to train less experienced neurologists in diagnosis. In line with to the fact that it was not the person in need of help, who was suffering under seizures or manifestations of paralysis,

and whose appearance might cause fear or pity, that was represented, but only a body befallen with symptoms, the extermination of just this body appears as a *coup de libération*, which would no longer take any account of anything human behind it or in it – a logic that is repeated in horror films as valiant impalement and, incidentally, often as burning by body snatchers and the living dead. Unlike in German fairy tales, it seems that no good and enchanted soul will be able to work its way out of these film bodies possessed by evil.

In the same year that Marinescu was shooting his first psychiatry films, Albert Londe was carrying out a series of experiments with chronoparatuses. Some of the ones that survived show male and female patients on the “Piste de la Salpêtrière”, series recorded with the camera with twelve lenses. At the end of the twentieth century, film scholars edited these images into short 35mm films to show early examples of movement analysis. To give their film students the most authentic illusion possible of the medical position on the “Piste de la Salpêtrière”, they even compensated for the parallel shifts that had come about through the distances between the twelve lenses. Didactically and artificially they attempted to create a central perspective of unified space after the fact, which would allow for only a single and continuous ideal gaze, whereas previously a series of views and vantage points had only allowed for interpolating the patients’ movements. But despite the best efforts of the film scholars to create an absolute and – as it was implemented in the history of perspective from the beginning – self-denying gaze in a homogenous optical space, the clips jerk and jump a little, just enough to make every student aware that these images and these historical medical views are a carefully arranged optical construction, exactly like every cinematic space. But it is precisely the difference between these awkwardly reconstructed not-yet-films by Londe on the one hand and the films by Marinescu, staged in the coherent space of the film camera, on the other, that makes it possible to trace the new sovereign power of the camera’s gaze as visual diagnostics in medicine. The dysfunctional aspects of watching movies also provide some elucidation here. If the film historians had wanted to analyze the power, the source of which had been concealed in the construction of the apparatuses, they would have been better served if they had exposed the technical parameters of working on film rather than continuing to conceal it with further manipulations. When Londe himself later shot some footage with a film camera, he seems to have implicitly taken the role of cinematography into account. In 1999 three of Londe’s films were restored by the Archives des films of the CNC for an exhibition in Paris. The first showed a *Cheval entraînant un moulin*,

the second the *Abbatage d'un bœuf*, and finally the third was a cinematic *Démarche pathologique de la Salpêtrière*. Training, fragmenting, staging: there could be no more precise summary of the cinematic body politics that reworked Marey's measurements into dramas.

One example that shows that cinematic recordings around 1900 was already no longer serving to analyze movement, but had become quixotic evidence for medical diagnoses, is the film *Neuropatologia* by Camillo Negri from 1908, and it can be taken as representative for the cinema that Salvador Dalí had in mind when he rhapsodized about the "grandiose period of hysterical cinema."

In his clinic in Turin, Negri had himself and his assistant filmed as they treated a woman having a nervous attack. The woman was wearing a mask, presumably to protect her identity. Already because of this, the sequence has an undertone of a Sadistic boudoir play, and is reminiscent of the stagings done at Salpêtrière in which hysterics had to incarnate classic theatrical roles or zoological forms. After the woman has been brought into the picture she gives a brief explanation, which is of course kept from the spectator, and its wording clearly belongs to the medical protocol. Immediately following this she falls into a state of twitching. Negri, who is bent over her busily and business-like, communicates during the whole shoot with the cameraman or the technical personnel behind the camera, obviously to check whether everything happening can be seen in the image, and what instructions to give to get the spectacle to run its course. Toward the end of the film, when the patient is already giving the impression of being completely exhausted, Negri once again gives a sign to shoot and then begins to press the woman's abdomen against the mattress. A new attack begins. From the point of view of the film, there is no way to tell if the woman moved on her own accord or whether the professor's strong push and the feathers of the bed started up the whole movement. One might say that hysteria itself thus appears in front of the running camera. The subject and object of the hysterical movement are indistinguishable. Just as the title says, neuropathology appears in the image as a malaise of representation, as a trick of the neurologists, as a *mise-en-scène* of the cameraman, as a reaction of a female body to diverse psychic and physical factors. Because the identity of the woman on the screen behind the masks of the "great universal matrix", the "Caput mortuum" of the female, as Michel Leiris called the practice in the case of his research in Africa, has disappeared, it is no longer her twitching and trembling that appears on the screen, but an attack, under the guidance of the professor. What the film shows cannot give any information about the physiological course of the attack. Recording it on film is no longer

measuring it for the camera, but staging it for the camera. The complicitous looks that Negri gives over and over again to the camera confirm how sure he can be of getting the applause of his colleagues. The scientific demonstration merges with its interpretation by the operating specialist. At the end of the film the two men in the laboratory are presented like actors at the final curtain, holding up a woman between them: the weak sex, patient, diva, object of scientific ambition, whether she shares this now or not.⁴ Staging and diagnosis run in parallel and are demonstrated with shots that are not relativized by any accountability beyond the technical aspects of filming the experiment. Hysteria once again appears as the overwhelming corporality of a symbolic order. Structures that supply meaning get into the image by means of technical workmanship. Only when the attention is shifted to cuts, dissolves, zooms, and pans does it become clear how film and medical orders are dramatized into social contents. *L'âge d'or du cinéma hystérique*.

How to distract attention away from technical workmanship was taught by a German assistant doctor, Hans Hennes. Like Charcot, what he cherished about cinematography was that it could reliably store and differentiate where human objects of view behaved erratically. "Once the footage is shot, the picture is available for reproduction at any time, the film is always 'in the mood,' there are no misfires."⁵ Only with time will it turn out that "reproduction" is a euphemism for dressing. The degree to which cinematography in Germany found its way into medical diagnostics is documented in the thorough overview published by the medical officer and radiologist Dr. Martin Weiser, a student of Ewald Hering's, just after the war in 1919. His book *Medizinische Kinematographie* is both a film handbook and a scientific report, revealing a number of inventions, techniques, and tricks that were being used by physicians with the camera. Already in 1911 one Dr. Summer had emphasized "the value of cinematography for the differential diagnosis of epileptic seizures against hysteria and organic diseases of the brain."⁶ The great model of all neurologist-filmmakers, however, was the Italian brain physiologist and cinema pioneer Osvaldo Polimanti, who had taken it on to supplement his written protocols about neurological deficits after extirpations of certain brain areas with "successful cinematic records."⁷ Weiser emphasized – and almost in the same words that Londe had used to formulate his visions – that doctors should make use of the cinematic impression of the medical gaze as a "natural" perceptual method, in distinction from writing:

From early childhood on we are used to grasping processes of motion not through description, but through direct perception, and we understand

them in nature and in cinematic representation much quicker and more thoroughly than when reading a description, no matter how exhaustive it is, during which we must reconstruct the process of motion in our imaginations.⁸

As long as the connection between medical diagnostics, technology, and body politics remained concealed under the assumption of the naturalness of cinematic perception, the imaginary and hallucinatory practice continued in neurology, throughout all political and ideological periods. It was always the Golden Age for neuropathology. For a 16-minute film series that presented 'catatonia' in seven cases, German filmmakers compiled silent film footage from 1925-1943. Intertitles direct the spectator's attention. In this film there is no recognizable continuity or logic of the shots that might make it possible to have a scientific comparison or a systematization of the material. The persons in the image are shown in wide shots, sometimes in medium shots or close-ups, without any comprehensible criteria for the decision. They stand there in their underwear, draped in black camisoles, or shot in everyday clothing. Following inaudible commands they carry out certain movements. In contrast to the expressionless people in Marinescu's films, now "types" are developed, pathological roles that the sick persons are supposed to merge into. This becomes most clear through the example of a "catatonia picture", that simply indicates "affected clothing and posturing" as a symptom and shows a man in a cape with a hat and scarf looking off into the distance. A picture of illness that would have done for any actor's head shot; the records department of psychology would finally get its *carte blanche* as coming to itself.

Finally, the medical film work of Dr. Johannes K.J. Kirchhof should be mentioned. In 1940 and 1941 he shot the film *Ataktische Störungen bei einem Geschwisterpaar* [*Atactic Disturbances in Siblings*]. The siblings, a man and a woman, both around fifty years old, are required, one by one, to walk around naked in a room fitted with grey cloth and to demonstrate a particular twitching in their movements. The camera sometimes gets quite close to the bodies, mercilessly panning from top to bottom over and over again. Shots of the patients looking into the camera are edited in. The doctor (presumably Kirchhof himself) enters the picture in a white lab coat with a tie and collar to demonstrate an announced kinetic tremor, namely the increasing trembling of the man when he attempts to grasp the doctor's hand. In response to the joy that the naked man shows in seeing the doctor again, whom he clearly knows well, the doctor responds with a faint, embarrassed smile, which points the gaze not back at the patient, but

to the camera. The staging reduces the madness of the patient to his illusion in thinking that he is a human being just like the doctor and he could enter into eye-contact with him at will. But the naked man does not have his gaze in the space of the camera and is thus no longer the subject. Beyond the implied diagnostic level – the analysis of nervous twitching – there is a second level of the feud of gazes, which only one of them, technologically equipped, knows about and survives: the medical gaze that is reinforced by the camera. If we think that a certain horror has got a name and a face in Dr. Kirchof's appearance, it soon becomes clear that the technology of filming also seeks to subordinate the gaze of the spectator to this logic of annihilation. The staging consequently ends in a sequence that shows the patient writing his name. We see the trembling hand, then the patient holds up the paper and his name, now visible in full on the piece of paper, is illegible. Even on the symbolic level, the identity of the patient is thus definitively negated. Even more: the film suggests that the patient has forfeited his humanity himself through his uncontrollable movements. The film always only seems to show what is, but shots, gaze manipulation, and montage constantly generate meaning. Given the euthanasia campaigns during the Third Reich, the sequence, in which the man's trembling results in his failure to write his name, means that there is no identity here anyway. In this discrete film sense, annihilation would only be the completion of a process that, as the film seeks to establish in all objectivity, has long been the patient's destiny.⁹

In view of such obvious efforts at staging in medical films, it is astounding that the scientific claim of "medical cinematography" (Weiser), that is, the legitimacy of recording and registering bodily functions by simply storing them on film, could hold for so long. Certainly the fact that cinematography lies in the direct tradition of inventing methods to record physiological movement meant that systematizing movement, and thus also formalizing and pathologizing it, seemed to be guaranteed by film. But even if cinematic methods of measuring by analyzing single images and sequences can become an artificial synthesis of movements, various levels of staging come forth in projection, on the screen, and the findings turn out to be imaginary anyway. Interventions by a cinematically examining doctor can only be reconstructed in the case of the basic stroboscopic illusion of movement if slow motion and time lapse can be sensed or even noticed as "significant." All variations beneath this perceptible threshold, be they due to conscious manipulation or to the contingent dysfunction of the apparatuses, remain unnoticed. In contrast to the failed comparison of parallel axes mentioned above, which made the reformation of chronophotographic analysis visible

as the projected illusion of movement, the space constructed by the camera will also simulate homogeneity and wholeness, even in moving shots, due to the angle of the shot and to editing, which will cause the perception of the body and the gazes to appear as natural. In all cinematic “neuropatologia” illusionary perception perceives the staged illusion of movement. Film and neurology appear as historically connected, seeking to bring the truth of neurological diseases to light as feedback of data that is always only neurological. It is a system that can be manipulated without challenge as long as both sides of the attack are filed away. For instance, Polimanti conscientiously filed film footage of a disoriented dog running in circles in the surgical protocol of extirpation.

4. Psycho-Technology

If the neo-impressionist is convinced, for instance, that the pleasurable impression of a landscape that his picture is meant to induce only comes about if a certain flickering emanates from the entire image, he then stands like a psycho-technologist before the totally rational and not at all aesthetic question of how the psychological effect of the flickering impression can be achieved.

– Hugo Münsterberg, 1914

It was not fables, forms, or colors that were raised to the quality of artworks at the end of the last century, but excitation frequencies. Inasmuch as perception had been dissected in the laboratory and examined for its individual functions, art was no longer examined as an aesthetic phenomenon, but also for the way it affected the nerves. Physiologists had previously analyzed body movements and then, from outside, neurologically identified the qualities of character. Psychologists had established the effect of images and rhythms on the psyche. In psycho-physiological analysis art once again became physical: a mental reaction to nerve stimuli.

One of Wundt's students, Paul Linke, continued his experiments as studies in cinema perception. In March 1916 he reported in Dresden on his attempts to induce seeing motion artificially. "Dr. Paul Linke/Jena [...] breaks with the old, purely physiological views, which sought to explain the problem of movement merely through the phenomenon of the afterimage and amalgamation. According to Paul Linke, seeing motion in cinematography is an illusion of identification", was written in 1917 in *Photographische Korrespondenz*.¹ Linke provided the technological basis for a psychological explanation of Wertheimer and Köhler's experiments. Working in Wundt's laboratory, he had tested how many images in a series were necessary to create the illusion of a course of movement. "What emerges from his work is that our psyche possesses a quite astounding and previously unknown capacity to reproduce a course of movement out of two different single images."²

As proof Linke had built "the tautoscope for the psychological cinematographs" which put two different images from a series on screen, "two perceptions of a face [...] that have so little spatial difference from each other that they can be identified, that is, can be referred to one and the same object." The two elements had to be perceived separately, but "be simultaneously present in the consciousness, indeed, simultaneous, for

instance, like the sound of a spoken word or the rhythmic beat of the notes of a melody.⁷³ Linke shows his audience that two visual impression can be separated from one another by dark phases for so long that an afterimage effect could no longer be considered a connector between the two images. Stroboscopy, he demonstrated, calls on a capacity of the brain itself, so that, as one spectator reported, “a clear impression of motion (emerges) in that the psyche automatically supplements the phases in between.”⁷⁴

Martin Weiser, who had written the first handbook for filmmaking physicians, initially considered Linke's studies to be psychological suprematism: it only worked for points, lines, circles in black-and-white. But Linke was also able to delude him with transformation effects: apples into pears. Weiser remarked that Linke's trick of affecting the brain was a typical trick from Wundt's laboratory: “In Linke's experiments we must still bear in mind that a quite specific rhythm is maintained, to which the psyche adapts.”⁷⁵ Rhythm is the missing link between film and medical diagnosis, between Ewald Hering's panmnemism as a “surrogate science of the soul”,⁶ Bleuler's mental apparatuses, which could replace broken nerve functions, and the stroboscopic affection of the psyche. Rhythm creates the tension in which we are prepared to let signals in the nerves become data: expectation in Wundt's complex sense. Or in the sense of a certain drum rhythm, which calls to action a certain dance in the limbs and a certain god.

Also in 1916, when the German Friends of Photography and Film were rubbing their eyes after Linke's screenings, in the USA the first psycho-technical film theory was being written, *The Photoplay: A Psychological Study*, and by one of Wundt's students, Hugo Münsterberg. Historical and practically, Münsterberg described the compatibility between psyche and cinematic apparatus. In his film theory, which was one of the first film theories at all, he reversed the relationship between subject and object, familiar from art reception, when it came to watching movies. “In the photoplay our imagination is projected on the screen”;⁷ wrote Münsterberg, and by “imagination” he did not mean fantasy, but the imaginative power of the mind. “The mental function involved is that of expectation or, when the expectation is controlled by our feelings, we may class it under the mental function of imagination.”⁸ Results and terminology from years of research in the laboratory in Leipzig, starting with the first complicated expectations of astronomers up to systematic differentiations and interferences of feelings and sensations, turn out to be perfectly suited to the experience of the cinema. Perception studied by nerve physiologists as transferring and processing impulses, can easily be extended into the apparatus of the cinema. Münsterberg could easily demonstrate that, “for the first time in the

history of art, feature films are capable of implementing the neurological flow of data itself”, as Friedrich Kittler summarized the bold new theory.⁹

Münsterberg, was a philosophy professor in Freiburg, where, with the help of his technician, Herr Elb, he had amassed an extensive collection of devices for experimental psychology, including a complication clock. From there he went twice to Harvard: the first time from 1892 to 1895, to work on his book *Die Grundzüge der Psychotechnik*, the second time in 1897, when he was appointed as the youngest chairman of the Philosophical Department. What the American psychologists – especially William James, his colleague and boss, who was one of the few “great” psychologists of the nineteenth century who had *not* studied with Wundt – found highly convincing in the work of the 34-year-old German was how he answered classic philosophical questions with answers tested by concrete experimental psychology: “Consciousness of the self does not exist at all; if the ego, the only function of which is consciousness, is to be directly known, it is then condemned to be in the role of the Baron Münchhausen, who had pulled himself up by his own hair”, wrote Münsterberg in his *Beiträge zur experimentellen Psychologie* in Freiburg.¹⁰ He researched logic, ethics, and aesthetics with the help of Elb’s laboratory technology: “Philosophy never has to do with the problems of special experiences, but always has to ask how and in what sense such experience is possible.”¹¹ He transformed Wilhelm Wundt’s systematics of feelings – pleasure and displeasure, tension and release, agitation and pacification – into an economy of experiences that, in their dynamics, as Helmholtz and Poincaré had claimed for the physiology of perception, can produce identity and non-identity from the dynamic processing of stimuli and reactions. This subjectivity from Leipzig-Heidelberg-Freiburg, with its neo-Kantian turn, asserts itself as a practical self-actualization in the New World:

We say our will is fulfilled when the idea we try to maintain becomes realized. What does realization mean? [...] It means the identity of content between the preceding and the resulting experience.¹²

Already in his *Eternal Values*, which first appeared in English in Boston, Hugo Münsterberg had integrated the economy of nervous energy and the perception of the world into a neuro-philosophy. Based on his studies of mental experiences Münsterberg developed a complex system of “eternal values”, which provide access to the world in four categories, as logical, aesthetic, ethical, and metaphysical. Or, to put it the other way around, they provided the world access to the mental processes, for values form the

relations that form human beings: "The world of values is the only true world, and for every one who wants to have a world at all, all the relations which result from the self-assertion of the experiences must be acknowledged as absolutely valid for the true world."¹³

Since they psycho-physically dissolve into single mental functions, values are the contemporary replacement for old categories. They are the tools with which the internal, external, and social worlds are linked by neurological interconnections and flows of data. With these "eternal values" Münsterberg can remain both moral philosopher *and* technician of brain functions at the same time. In 1914 he published the first version of his popular scientific work *Die Grundzüge der Psychotechnik*, a discipline that he had founded, and which was meant "to be an application of psychology in the service of cultural tasks",¹⁴ a science that relates to psychology like "the engineering sciences do to physics or the agricultural sciences do to botany."¹⁵ In a more efficient American sense, culture simply meant ergonomics, optimizing performance, social hygiene. Here Münsterberg once again goes after psychological methods and an overly hasty invocation of consciousness:

Physiological psychology links the sensation of consciousness by means of processes in the brain, while anti-physiological psychology joins the very same conscious processes through a psychic entity. This may be called the unconscious or the subconscious or the soul, but in any case it remains an unknown, which cannot be found in any experience.¹⁶

Incidentally, Münsterberg excludes Freud's psychoanalytical concept of the unconscious from his verdict on the unconscious since it is also based on neurological impulses that "were repressed and, after they had long vanished from consciousness, remained in effect indirectly in the unconscious."¹⁷ As long as the phenomena observed by Freud can even be verified "galvanometrically" they belonged exactly to Münsterberg's area of research. In his psychological laboratories reflex-like reactions and their non-conscious effectivity and duration were tested as mental automatism.

One experiment at the Harvard Psychological Laboratories that has since become one of the most famous occurred during the period of Münsterberg's first tenure. Leon M. Solomons, together with his assistant, test person, and colleague Gertrude Stein, attempted to track down the mechanism that conjured up the appearance of a second personality during hysterical trances. To achieve this, they ran tests on motor performances that could be carried out without any conscious aid: automatic writing combined with automatic dictation. In order to simulate this state, which, according

to Solomons, became pathological in hysterics, he trained Gertrude Stein to systematically distract her attention and to sever sensory-motor connections in the brain. "Real automatism", wrote Solomons in his report, "that is, dropping out of consciousness [...] comes only at intervals and for short periods at a time. But it comes *whenever the attention is sufficiently distracted*."¹⁸

The trance that Gertrude Stein had to exercise in order to simulate the motor reactions of hysterics, unconscious in the automatic sense, is thus negative attentiveness training. Neurologically channeled habits were to be interrupted, de-conventionalized. The tests did not work when the attention could not be distracted by self-observation, for instance by reading a novel. "Our trouble never came from a failure of recognition, but from a *functioning of attention*."¹⁹ Over the course of the test and training units, Gertrude Stein developed a sure trick to separate motor and sensory skills, as well as aural and linguistic ones, and to cause them to disintegrate into an artificial trance of intellectual dissociation. "Miss Stein found it sufficient distraction often to simply read what her arm wrote, but following three or four words behind her pencil."²⁰ In so doing, she had also shown that the classical training methods of the eighteenth century, in which the synchronization of writing, reading, and comprehending was exercised in schools, is what creates the context for a soul in the first place. Stein deconstruct this through intrapsychic time manipulation as inducing trance and personality doubling.

Later Gertrude Stein claimed that these dissociation exercises were merely memory training in the laboratory, and ultimately not so different from the other memory training, the intellectual training associated with schooling to which all students are subjected. Already in 1935, while on a lecture trip through the USA, she had explained to students, practically inside the "laboratory", that the experiments on automatic writing in the Harvard laboratories had *not* formed the methods of her own literary production, or should we read: had not *formed* it. Educational formation, she writes, is always imitation, and therefore anyone can know what he is doing within the university:

I did not think that we either of us had been doing automatic writing, we always knew what we were doing how could we not when every minute in the laboratory we were doing what we were watching ourselves doing, that was our training, but as he wrote the article after all I was an undergraduate and not a professional and I am always very docile, and all the ideas had been his all that had been mine were the definitions

of the characters of the men and women I had seen naturally it was as if I had written that I did that automatic writing. I did not think it was automatic I do not think so now, I do not think any university student is likely certainly not under observation is likely to be able to do genuinely automatic writing.²¹

Automatic writing would have assumed a machine-like circuitry at the basis of human nerve physiology, and if Gertrude Stein had any ambition, it was that of wiring up her own brain, cabling herself, even if she had to descend to the bottom of the Atlantic to do so. For Stein, it was not a matter of automatic writing on an anthropological search for the rules of authentic human logics of letters of signifiers at the basis of consciousness, nor was it about simply becoming a typewriter. She experimented with the quick interferences between the inscription machines of physical perception, between literal and corporal conventions as issues of the nerves. Naming generations of small white poodles "Basket" and then notating the feeling for a dog named Basket... or writing oneself as a character in the autobiography of a loved one, these were the media circuits in which Stein produced herself and sought to recast the tracks of reaction from the outside. In her literary texts Gertrude Stein constantly translated back and forth between the flow of nerve data and media and between the flow of media data and nerves. What is understood as human in various cultures and institutions is constituted historically from these connections. From certain circuitries, for instance, Americans are made, with "minds" that are radically different than the old European souls. Whoever newly associates inside and outside, as Gertrude Stein does in her texts, creates, as Münsterberg showed neurophysiologically, logical, aesthetic, ethical, and metaphysical surpluses: The making of... Americans. "No, writing should be very exact and one must realize what there is inside in one and then in some way it comes into words and the more exactly the words fit the emotion the more beautiful the words."²²

Solomons's experiments might have been the preliminary studies to establish new circumstances and new images of the human by studying and establishing new sensory-motor reflex arcs. Sensual-nervous reflex tracks. If it had gone according to Stein, it presumably would have been like the ones developed while driving. Shift, accelerate, shift. Solomons's and Stein's experiments might also have been the beginning for an artificial regulation of social life from the psychological laboratory, as the Russian reflexologists later planned, but they did not get so far at Harvard. The connections between nerves and apparatuses, which had become established everywhere in normal life, worked so efficiently and produced such incomprehensible

states that even Solomons and Stein rested on the relay that gave the states a convention. At the end of their research they stated that hysteria is “a *disease of the attention*”,²³ although they might have understood attention to mean the neurological, sensory-motor interconnection and feedback of intellectual subroutines, which could be experimentally altered. It is notable throughout that over the course of training, the subroutines of “minds” could be more reliably switched on and off with books, images, or apparatuses than with “one’s own” central consciousness. Münsterberg had arrived at Harvard.

Just as he had had the connections between dissociated mental functions and apparatuses tested in the Psychological Laboratories, Hugo Münsterberg examined the psycho-physiology of cinematic perception in 1916. His theory of cinema is, like the *Eternal Values*, divided into “outer” and “inner” “Development of the Moving Picture”, that is, into routines of technological devices and those of the mind. As such, the Cinematic Apparatus is being designated, already in 1916, as something that goes straight through all the old corporal boundaries, part apparatus and part perception. “Our imagination is projected on the screen!”

As a first indication of the fact that watching movies is a special internal labor of the brain, Münsterberg also presents seeing motion as a *phi* phenomenon, using examples from the museum of stroboscopic apparatuses, and in doing so offers a list of all Wundt’s fellow students and colleagues, who had discovered the cinema through their psychological experiments: Stricker, Exner, James, Fischer, Marbe, Wertheimer, Korte, and Linke. They had all done away with the illusion of the afterimage effect as the basis for seeing motion: “The apparent movement is in no way the mere result of an afterimage [...]. The movement is in these cases not really seen from without, but is superadded, by the action of the mind, to motionless pictures.”²⁴

Just as seeing motion is a mental act that is initiated by the apparatuses, seeing depth in the cinema is a function of the brain induced from outside. The experienced psyche combines perspectival relations, shadowing, and various level of movement into plasticity where there is only a flat screen. In the studios of the “Vitagraph Company”, which were first set up on Nassau Street in New York, high above on the roof of the Morse Building, and later were moved to Brooklyn, Münsterberg adopted, alongside directors and actors, directorial tricks as one of the physiological justifications: “For instance, by a well-known optical illusion the feeling of depth is strengthened if the foreground is at rest and the background is moving.”²⁵ This is the neuronal depth and melancholy of road movies.

The impression of depth and seeing motion are only two of the perception forms that can automatically be instigated in the cinema by technical tricks as an artificial analysis and synthesis of elementary brain functions. All cinema dramaturgy is fundamentally based on this mixture and consolidation of such routines, and Rudolf Arnheim, in his film theory grounded in Gestalt psychology 16 years later, at any rate without previously having taken note of Münsterberg, will then extend his fundamentals of perception elements in the cinema. Münsterberg, however, emphasized what Arnheim would notice only much later, in relation to the films of Maya Deren, namely the psychological trance in the cinema, which emerges from the complexity and complication of neuronal entanglements: "It brings our minds into a peculiar complex state; and we shall see that this plays a not unimportant part in the mental make-up of the whole photoplay."²⁶

Attention, and its possible dissociation from the familiar conventionalized sensory-motor context that Solomons and Stein had trained, represents the pivot point in Münsterberg's theory of the cinema. With his psycho-technical analyses of both theater and cinema reception as a dynamic of attention, Münsterberg disappointed all the ideals of the educated class. It was not only true for the cinema, ostracized by the pedagogues anyway, but also for the stage, that the attention is involuntarily drawn toward what is loud, shiny, and unusual, or what blinks and flickers. While the staging in the theatre has to make efforts to direct the attention consciously, the cinema is nothing other than the guiding and misguiding of involuntary attention itself, by means of the various techniques of the camera and of montage: "...there is surely no lack of means by which our mind can be influenced and directed in the rapid play of the pictures."²⁷

Münsterberg enumerates these means better than any handbook of directing film, indeed, as a cineaste-purist, not even dealing with text or music as aids to distracting attention. Camera angles and focal lengths, sets and framing enhance the movements and relations that distract attention. If it wants to be more than filmed theater, cinema must assert itself as direct and unconscious distraction and affection of the nerves.

And Münsterberg was American enough not to view the reality of the cinema, which corresponds to real mental experience, as secondary, but as reality with its own rules, which can also stand up to the scientific scrutiny. The fact that in 1916 there were still numerous technical shortcomings that distorted these mental mechanisms does not alter the fundamental autonomy of experience: "It is a unique inner experience, which is characteristic of the perception of the photoplays."²⁸

The experiments in the psychological laboratories had shown that all impressions and impulses could be linked, processed, and made present in the brain by associations with past and remembered events. The work in the studios corresponds to this exactly. Cinema, unlike theater, can also make a web of temporal and spatial associations directly present to perception. "In our minds past and future becomes intertwined with the present. The photoplay obeys the laws of the mind rather than those of the outer world."²⁹ When Münsterberg establishes that in the cinema, in contrast to the theater, where the spectator remains left to her own thought process, the power of the imagination is projected on the screen, this not only means that it is manipulated from the outside, but also that the unconscious actions of the brain are made visible in how they work in the optical elongation outward, and are made objective, as in the laboratory. In this way, Münsterberg is one of the theorists of the artistic idea that, while it cannot yet be called artistic intelligence, certainly can be called artistic power of the imagination. The cinema initiates physiological automatisms, and the feelings and reactions produced by them cannot be distinguished from those that appear outside the cinema.

Münsterberg certainly distinguishes this artistic induction of inner states from suggestion, which is always only a coercion to think and feel what comes from the outside. How unstable this distinction is can be read in Münsterberg in the formulation that the suggested idea "is not felt as our creation." In the cinema, however, the suggestion must appear as one's own imagination, "*our* imagination projected on the screen", and may not be sensed as coercion. The suggestive power of the cinema must therefore consist in putting our imagination into a state in which the processes on the screen are still sensed as our own creation and as real feelings or associations, but at the same time the transmission has to work with all the tricks of trance so that thoughts are subordinated to the associations from the screen. "The whole technique of the rapid changes of scenes which we have recognized as so characteristic of the photoplay involves at every end point elements of suggestion which to a certain degree link the separate scenes."³⁰

Münsterberg also gives an example of suggestion in the cinema that is meant to show that the technique must not become conscious. In an adaptation of *Carmen* with the anagrammatic vamp Theda Bara ("Arab Death"), Münsterberg counts 170 cuts in ten minutes, "an average of a little more than three seconds for each scene."³¹ All that emerges from this montage is a feeling of "nervousness";³² which means that film technology is detectable as feedback on the nerves. This interconnection of technology and perception, a certain vibration, these flickering images must directly strike emotions, if

cinema is to be art and not simply a psycho-physiological experiment. "To picture emotions must be the central aim of the photoplay."³³

While at the theater it is essentially the duty of the actor to evoke feelings and emotions, in the cinema is the technology, which the performers must and may yield to. Unlike on stage, their reactions must be able to be trained involuntary ones. The difficult task of the film actor consists in introducing automatic or reflex movements: the movement of glands, vessels, and involuntary muscles; the have to weep, sweat, let their pupils dilate... Unlike in the theater, however, film directors can compensate for the naturalism of physiological reactions with bodily street credibility. Since film direction can dissect any body into fragments, even non-professionals without any trained feeling for the whole body can be cast for the production of feelings and emotions: "If he needs the fat bartender with his smug smile, or the humble Jewish peddler, or the Italian organ grinder, he does not rely on wigs and paint; he finds them all ready-made on the East Side."³⁴ The fact that "method acting", an acting style that activated emotional eruptions through biographical memory, would become established later in the USA, does not contradict this. Even in method acting, it is a matter of activating involuntary affects, which can then be introduced ad libitum for the widest variety of historical dramas. In this regard, the memory only clears the way to the emotional storage repository.

Since film technology is not dependent on the "whole" body or images of the body, the body politics of film can start beneath consciousness: with automatisms. These can be physically conveyed in such a way that even induce involuntary physical reactions from the spectators, much like Gertrude Stein in the laboratory: "we always knew what we were doing how could we not when every minute in the laboratory we were doing what we were watching ourselves doing, that was our training."

Feelings and sensations in the cinema run on a Mobius strip between inside and outside, body and technology, which only need remain wired through the nervous systems of the actors, spectators, and technicians in order to induce trembling, gasping, or blushing in the most unbelievable of scenes. What is transmitted is first the motor and then the sensory reflexes, which then become sensed emotions.

The horror which we see makes us really shrink, the happiness which we witness makes us relax, the pain which we observe brings contractions in our muscles; and all the resulting sensations from muscles, joints and tendons, from skin and viscera, from blood circulation and breathing, give the color of living experience to the emotional reflection in our mind.³⁵

In Wundt's terminology, what we find in these examples from Münsterberg is a beautiful transformation of sensations into feelings.

Real film art, however, consists in emotionalizing the world so that the spectator's feelings emerge independently and also in contrast to the emotions being played out. So just as perception psycho-physically distorts and modifies what it sees, film must also introduce the nervous functions to the spectator's power of imagination: "The whole keyboard of the imagination may be used to serve this emotionalizing of nature."³⁶ The keyboard of the imagination is a technological one. From this simply realization, Münsterberg comes up with examples that belong to the refined technology of filmmaking. In chapter 6, "Emotions", he proposes producing a certain trembling, which is not specified as an emotional value, but initially only describes a heightened state of tension, like "a certain vibration", which creates the images of a neo-impressionist:

Take the case that we want to produce an effect of trembling. We might use the pictures as the camera has taken them, sixteen in a second. But in reproducing them on the screen we change their order. After giving the first four pictures, we go back to picture 3, then give 4,5,6, and return to 5, then 6,7,8 and go back to 7, and so on. Any other rhythm of course is equally possible. The effect is one which never occurs in nature and which could not be produced on stage. The events for a moment go backward. A certain vibration goes through the world like the tremolo of the orchestra.³⁷

Even at this early stage, Münsterberg was coming up with recipes for experimental films. At any rate his suggestions were not appreciated. On the contrary, film criticism, including Kracauer's "psychological history of film", represented such tricks and uses of the material as superficial. Kracauer, for instance, considered "one-turn-one-pictures", with which Fritz Arno Wagner created the jerky movements of the vampire's coach in Murnau's *Nosferatu*, a frivolous effect: "It is noteworthy that such an amount of picture sense and technical ingenuity served the sole purpose of rendering horrors."³⁸ For Münsterberg, in the specific case of film it was not about mirroring emotions, but of transmitting them.

In experimental films, manipulating material is the prerequisite for experimenting with transmitting states or feelings. The question of the conditions of human seeing always arises, but so does the question of the possibilities of extending or destroying human emotionality through new experiences of seeing. In the fiction film these technological tricks are indeed more or less subsumed under the course of a narratable story and a surface

iconography, but they nonetheless always have a decisive effect on the style and effect of a film in the cinema. It would seem that the most reliable people to be able to analyze films as films would be trance specialists and test subjects from the psycho-technological laboratories. Like Münsterberg, Maya Deren, in her examinations of suggestibility and possession, also studied the basics of film technology, which lie outside sociology, in the textbooks of psychiatrists, formulating her film theses as a psycho-physicist: "Ideas without an accompanying affect do not act suggestively; or, one might put it this way – the greater the emotional value of an idea, the more contagious or suggestive it is..."³⁹ ...and the better the transmission.

Deren's most important reference, Eugen Bleuler, also described, in his natural history of the soul, how important affect is as a medium for transmitting an idea.

The adult cannot remain cheerful among mourners, not because of the ideas underlying mourning, but because of the perceived expressions of affect. The fact that related ideas might also be suggested along with the affect is self-evident in the close connection between the two and in the influence on logic by affect, quite unrelated to the fact that it may well be the goal of the mechanism to transmit ideas as well.⁴⁰

The alliance between the technology of experimental psychology and that of emotionalizing film, which is described in both historical and practical terms in Münsterberg's book, is part of a larger context of a revolution in perception, which began with the investigation of the nervous functions. Cinema is only one kind of relativized experience in this context, one for the poor, or for everyone. Münsterberg reverts back to the terminology of the neo-Kantian in order for the extension of the world in the cinema not to appear as a confusion of consciousness:

But the richest source of the unique satisfaction in the photoplay is probably that esthetic feeling which is significant for the new art and which we have understood from its psychological conditions. The massive outer world has lost its weight, it has been freed from space, time, and causality, and it has been clothed in the forms of our own consciousness. The mind has triumphed over matter and the pictures roll on with the ease of musical tones.⁴¹

While Münsterberg found himself under political fire in real life, because he opposed the American entry into war and intervened for a "Nordic alliance",

he remained a scientific servant of the state in his media analysis. Instead of giving reasons to consider the susceptibility of the masses to suggestion in the darkness of projection and agreeing with the chorus of critics of the new medium, he felt competent enough as a lab director, in the joy of discovering that the soul is as cinematomorphic as its depiction, to tackle the question of how to channel national feelings.

The fact that millions are daily under the spell of the performances on the screen is established. The high degree of their suggestibility during those hours in the dark may be taken for granted. Hence any wholesome influence emanating from the photoplay must have an incomparable power for the remolding and upbuilding of the national soul. [...] The people still has to learn the great difference between true enjoyment and fleeting pleasure, between real beauty and the mere tickling of the senses.⁴²

Certainly Münsterberg himself firmly believed that national feelings would some day be a matter of media and the psycho-technicians. The Americans did not appreciate him for having described for them the knowledge and the fundamental techniques of forming a national soul that he, as a proper American, carefully distinguished from the spirit of a people and the mass tickling of the sense organs. The course of national cinema in America in fact ran quite differently than Münsterberg had envisioned it, and the necessary nationalism was prescribed more by the Production Code of 1930 than by aesthetic training in Münsterberg's sense. All over the world, however, psychologists, physiologists, and soon even chemists at all the most important conferences would take up the technological reproducibility of sensations and feelings as the order of business. For Münsterberg this all came too late. He did not survive the attacks on his person, his research, and his lab work, and he died in December 1916, at least without having to witness the US entry into the war personally.

5. Psycho-Reflexology

We sometimes cry when we catch sight of an object, not because this object generates a sad feeling in and of itself, but because it reminds us of a dead friend through an association.
– Vladimir Bekhterev, 1913

Feelings and Emotions

In October 1927 at Wittenberg College in Springfield, Ohio a symposium was held under the title “Feelings and Emotions.” The occasion was the inauguration of a new psychological laboratory, which, as a brand new institution, was being housed together in one building with the chemists. The lists of those lecturing was impressive. In the volume that was published shortly thereafter of the lectures, all the great men – and Margaret Washburn as the only woman – of experimental psychology were represented, including Pierre Janet from Paris, Alfred Adler from Vienna, Edouard Claparède from Geneva, the Hamburg institutional director William Stern, the physiologist Walter Bradford Cannon from the Harvard University Medical School, and from Leningrad the old reflexologist Vladimir Makhailovich Bekhterev.¹ On the program were 34 lectures by scientists who belonged to the avant-garde of psychology and who represented the second generation of the classic school: Karl Bühler as a student of Ebbinghaus, David Katz as a student of Georg Elias Müller, Adler as the fallen student of Freud. The whole was under the auspices of James McKeen Cattell, Wilhelm Wundt’s very first assistant in Leipzig.²

Barely 50 years after setting up Wundt’s first psychological laboratory, a time when psychology schools and methods differentiated themselves, specialized, and fought with and against Wundt, the enemy factions reconciled in late autumn in Ohio. But what seems to be ripe for filming in this scenery, the strolls through the autumn foliage, an international exchange between scientists, the reconciliation of the different schools, is science fiction. First of all there are contradictory reports of who exactly was in Ohio. William Stern merely sent an article from Hamburg, and all that is known about Pierre Janet is that he had spoken in Princeton, Philadelphia, and at Columbia University a year earlier as he was on his way back from a series of guest lectures in Mexico about the “Psicología de los sentimientos.” Bekhterev, whose visit Ellenberger seeks to authenticate,³ was in the process

of being politically sidelined at the time, and in 1927 in the Soviet Union this meant much more than a travel ban.

What is certain is that the Wittenberg Symposium in 1927 was one of the last great international psychological congresses before the Second World War. It is also clear that the topic "Feelings and Emotions" was so explosive that the National Research Council in Washington supported the symposium. The invitations and the interest of the speakers show that the problem of feelings and sensations was the focus of neurological and psychological research all over the world. What we can see from the contributions is that the theories of how to explain, measure, control, and regulate emotions were still quite diffuse. It is clear that there were certain convergences in the discussions in Ohio. It is also clear that one person was definitively not invited: the inconvenient Sigmund Freud. "Feelings and emotions" were no longer available to simple therapeutic or cultural critical work. At the time, Freud was writing *Civilization and its Discontents*, expressing doubt that a strictly physiological description could do justice to the historical and cultural networks in which emotions are differentiated. For this reason he advises starting from associations, images, and representations in order to infer from this the hidden, underground world of feelings.

It is not easy to deal scientifically with feelings. One can attempt to describe their physiological signs. Where this is not possible – and I am afraid that the oceanic feeling too will defy this kind of characterization – nothing remains but to fall back on the ideational content which is most readily associated with the feeling.⁴

In Ohio it was exactly the ideational content that was suppressed. Shortly before the lights had gone out in Europe – to borrow a documentary film title from Alexander Hammid – before the various fascist systems could practically demonstrate that they could stabilize their power in a targeted manner through mass mobilization of certain feelings, the scientists were attempting to find their way in the darkness of "feelings and emotions." They wanted to get from describing and systematizing feelings and sensations in the laboratory to inducing and regulating these feelings. The symposium at Wittenberg College represented an international brainstorm, in which psychology gathered together its practical clout in order to be able to promise that they could direct emotionalized bodies in the future, physiologically, pedagogically, and even aesthetically. The alliance with chemistry expressed in the new architecture of Wittenberg College would in fact determine the immediate future of psychology and psychiatry.

In 1927, however, there were still quite different concepts of artificial emotionalization.

It is possible that Bekhterev was not in Ohio in October, 1927, but his lecture was definitely given. In it he presented a proposal for a linked system in which nerves and apparatuses, metabolism and chemistry would be amalgamated beyond the individual body. Feelings are the measurable signs of this interconnection. Bekhterev's proposal, which he had worked out in parallel to the first effective mass use of the press in the second half of the nineteenth century and the significant use of the press and film in the First World War, marked the aesthetic concepts of many avant-garde artists in Russia, then in the Soviet Union, during the tens and twenties. Meyerhold's theater of biomechanics, in which bodily expression simulated and induced mental activities as the primacy of the "external", Eisenstein's montage of attractions, Kuleshov's coordinate system of feelings for film, or Vertov's *kinoki* concept are directly or indirectly based on Bekhterev's research and are inconceivable without his medial turn in reflexology. With his lecture in Ohio Bekhterev was attempting to establish transatlantic contact. He directed his message at those to whom it would concern, due to their own research: the physicians surrounding Walter B. Cannon from Harvard, this "shadow community" who had also begun to examine not only individual organs, but connections and relations between physiological circumstances and homeostasis within complex physiological systems.⁵ Emotions, which had always been considered an infraction into the controlled experiment in laboratory medicine, were now to be seen as signs and signals of an affective interaction, as information about the states of the body! Bekhterev wanted to place his biomedical vision in the context of this research. It came, like Münsterberg's proposal ten years earlier, too early for science and too late for the author.

The Ends of Paranoia

Whoever experiments must also take into consideration that his hypothesis might get confirmed. Vladimir Mikhailovich's death becomes a legend, like in a Kleistian biography, at the moment that his life comes to its heroic highpoint, and at the same time it falls into the grotesque. In December 1927, when the great old man of Russian hypnosis and reflexology, who was now over seventy, was being celebrated in Moscow at the First All-Union Congress of Neuropathologists and Psychiatrists, he unexpectedly got a summons from Stalin to pay him a medical visit. Bekhterev diagnosed him:

paranoia. Following this Stalin had him poisoned on the very same night with two specially prepared ice cream desserts.⁶ Daniil Kharms made the story famous in Soviet literature:

So the professor's wife was sitting drinking coffee. Suddenly a ring. What's that? – A parcel for you.

The professor's wife was really pleased; smiling all over her face, she thrust a tip into the postman's hand and was soon unwrapping the parcel. She looked in the parcel and saw an urn of ashes, with a message: 'Here-with all that remains of you spouse.'⁷

Bekhterev, who added a "von" to his last name in German, was a celebrity in international psychiatry⁸ until he was murdered, and the memory of his name for the western world became reduced to a disease of the bone marrow, which results in a stiffening of the spine. In the east his name remained current because one of the most experimental clinics for nervous diseases is named after him, which is familiarly referred to as "the Bekhterev" to this day.⁹ Alongside Ivan Mikhailovich Sechenov, his teacher, and Ivan Petrovich Pavlov, his lifelong rival, Bekhterev is considered the founder of Russian reflexology. The comparison with Pavlov's working method, strictly concentrated on the physiology of the nerves, does not quite do justice to the grandiose vision of a unity of all sciences of the human being and its multiple relationships that Bekhterev wanted to realize in his Psychoneurological Institute. Because Bekhterev's experiments and proposals are almost completely unknown, at least in West Germany, but nonetheless represent the missing link in a neurological media history, because they so decidedly influenced the arts and artists in the Soviet Union and then also in the western world, and because they unexpectedly link the experiments of the tens and twenties to the later cybernetic experiments of the sixties, I will present them here, at least to the degree that they affect an archaeology of the cinema.

Bekhterev had studied neurophysiology in Paris with Charcot, experimental psychology with Wundt in Leipzig, brain anatomy with Paul Emil Flechsig, and, like Sechenov and Pavlov, had worked in the psychological laboratory of Carl Ludwig before becoming professor of psychiatry in Kazan in 1885.¹⁰ The condition that he took on for his appointment at Kazan was to set up a psycho-physiological laboratory in the classical Leipzig style: with a pneumograph, a reflexograph, a reflexometer, an apparatus for measuring brain volume, and a Hipp's chronograph for measuring psychic processes. This equipment was standard in the laboratories that

were founded all over the world by Wundt students toward the end of the nineteenth century.¹¹

In 1884, when Bekhterev was Flechsig's associate at the University Nerve Clinic, the lawyer Dr. Daniel Paul Schreber had just been admitted, whose *Memoirs of My Nervous Illness* appeared in German in 1906, which formed the basis for Freud's *Psychoanalytic Comments on an Autobiographical Account of a Case of Paranoia (Dementia paranoides)*.¹² Schreber's memoirs as "iatrogenic (i.e., professional) psychosis"¹³ made it possible to see the mirror inversion, the feedback between the systematic delusions of psychiatrists and patients, and Bekhterev's later misjudgment of this is thought to have laid the groundwork for his abrupt end. Schreber's memoirs, as a view to the dark side, or better yet, the inner side of brain anatomy, would serve to set the protocol for what was researched in Leipzig under Flechsig.

God to start with is only nerve, not body, and akin therefore to the human soul. But unlike the human body, where nerves are present only in limited numbers, the nerves of God [...] have in particular the faculty of transforming themselves into all things of the created world; in this capacity they are called rays.¹⁴

Bekhterev's system of neuroscience forms an odd counterpart to Schreber's madness, it is also based on assuming a ubiquity conveyed by nerves, in the space and intoxication of which trans-personal forms of communication and transmission occur.

Schreber's and Bekhterev's constructions are both the flip side of the new psychological and neurological sciences, which had taken it upon themselves in the second half of the nineteenth century to experimentally fragment the human body. Anyone combining what they analyzed in interdisciplinary paranoia could recognize the vision of a technically guided, emotionalized, and rhythmically moved human-machine corpus. Among the scientific parallel worlds that dissected these bodies in a sensory and motor sense and – as can be seen then in 1895 – made them cinematomorphic, is the brain research that Bekhterev did with Flechsig in Leipzig in 1884 as well as Wundt's experimental examination of the processes of attention and memory and of "sensations, (of the question of 'psychophysics' strictly speaking)", which was the majority of his work in the laboratory.¹⁵ At the same time, Londe was refining chronophotography in Paris in order to systematize neurology according to the traces found on the body's surface, and in the Bois de Boulogne Demeny was putting on a suit with metal strips on the side in order to record movement as ergonomic

data. The transformation of the body in the signal system was in full gear everywhere, which would lend itself well to broadcast news technology.

Ever since there have been methods of brain anatomy “to take apart the organ with its billions of ganglion cells and nerve conductors, mechanical observations of mental appearances have been recognized by science.”¹⁶ They are supposed to serve to direct the tributaries in their ever more mobile existence and also to guide them morally. Brain specialists hoped “to provide a physiological foundation for ethics [...] in order to be able to base law on this whenever possible”, as Flechsig suggested in his rector’s speech in 1894.¹⁷ At the end of the nineteenth century neurology was asserting itself directly as a science of power.

Bekhterev, who had studied at all of the centers of this European neuropower, began to link hysteria, hypnosis, and suggestibility research on the one hand with nerve-physiology and brain-anatomy on the other. He examined unconscious mental activity with laboratory apparatuses, with which he undertook to check and regulate crazy thoughts. And like Bleuler, Bateson, Deren, or Rouch, he examined hypnosis and suggestibility as historical and social phenomena.

One of the Bekhterev’s first great cases was that of the sect founder Kondrat Malyovany, whom he had described in the study *Suggestion and its Role in Social Life*. In this encyclopedic examination of historical mass illusions, mass hallucinations, and mass possessions, in which Bekhterev investigated the psychopathological background of religious and political group dynamics, Malyovanism stands in a long series of psychopathologies between medieval demon possession and modern mass panic. Bekhterev did not settle for any psychiatric judgment “of primary madness or of paranoia”,¹⁸ but reconstructions, in “numerous examinations” with Malyovany, the system of mad perception, although he was less interested in a clear diagnosis than in the way to stimulate and convey Malyovany’s thoughts, with which he wanted to account for the relations between consciousness, nerves, and their collective interconnection.

Not only in his perception, but also in Malyovany’s movements, in his “decisive gestures”, his “restless speech”, the “trembling” of his hands, Bekhterev discovered affective feedback that extended beyond the person of the sect leader. His attacks “of trembling or shaking” while preaching led to “some of those present, namely the women, also coming down with convulsions or cramps.”¹⁹ Bekhterev judged the different expressions of Malyovanian possession according to Charcot’s system of hysteria.²⁰ Unlike at Salpêtrière, however, and similar to how Deren will describe Haitian possession in contrast to clinical hysteria, Bekhterev diagnoses the states not as a sign

of individual psychopathology, but describes them as symptoms of social states and social networks.

Like Bleuler, Bateson, Deren, or Rouch, Bekhterev was also a commuter between two worlds: the world of the European natural sciences and the East European world with its multi-spiritualist cultures and states of consciousness, which he was also familiar with from his medical practice. Although he had studied trance techniques, hypnosis, and the lessons of systematizing them at Salpêtrière, in Russia Bekhterev drew a theoretical *cordon sanitaire* around his research on hypnosis by precisely demarcating it against the traditional shamanistic cures that are so similar to hypnosis. As an *inorodčy*, a non-Russian in the intelligentsia, he had good reason not to dare to go near the fringes of science. Possession and shamanism, which were epidemic in the Russian past and present as Bekhterev described them in 1905, were supposed to be cured by the systematic medical form of suggestion.²¹ Only by institutionally differentiating suggestion from clinically induced hypnosis and the practices of shamanism could there be a clean division between spirits and spirit, between madness and science, between what was examined as “mental over-inoculation” in archaic mass hysteria and the technological news systems, which would soon be called media and mass media.

Hypnosis as a therapeutic technique belongs to the clinical focal points of Bekhterev’s work. His therapy program for alcoholics, whom he treated with hypnosis, were internationally recognized innovations.²² Since 1893 he had been teaching hypnotic procedures at the Psychoneurological Institute. Like Charcot’s lessons, Bekhterev’s hypnosis lectures were not only attended by students and doctors, but also by the local public in St. Petersburg. At this time Bekhterev developed the foundations of a new and universal theory of the human mind. At least by 1902, due to the results of his research on “conductors in the brain and the marrow”, Bekhterev was opposing the various psycho-physiological theories with his new concept of a “biopsychology”, which outlines the most important strategy of his research and therapies.

The error of all [...] teachers consists in the attempt to fathom the *essence* of things speculatively, while the task of true science does not lie in investigating the essence of things itself, but is geared toward pursuing the mutual relationships between appearances.²³

Making relations, rather than essence, the object of science was the epistemological turn from which Bekhterev formed the basis of an avant-garde science of the human being.

Everything visionary, however, first had to hold up to psychological experimentation. Bekhterev solved the problem of mental relations in the light of cellular physiology and impulse transmission by assuming a universal energy that represents a medium of general influence in and between all things and living beings:

... that the world surrounding us therefore presents itself to a certain degree as active medium filled with energy, that furthermore the medium, in whatever form we might want to conceive of it, can be modified under the influence of the active principles of energy, and that in this way the entire visible exterior world owes its emergence to the effectivity of energy within a medium, which is as unfamiliar to us in its essence as energy is itself.²⁴

Bekhterev could infer this energy based on experiments in artificial growth, in which dissimilar substances entered into mutual effect. Furthermore, he had discovered “action streams” in the peripheral and central nerves, which also pointed to a general energy. Incidentally, due to the same experiments Bekhterev held the view that evolution was not driven by selection, but by the polymorphous creative powers in organisms to form something new and to learn.²⁵ Only eighty years later will neurobiologists again introduce an epistemological turn with similar theses.²⁶

Bekhterev examined the circumstances and functions of transmission of this world energy, the carrier and director of which would be the central nervous system in higher organisms. In contrast, for example, to Dubois-Reymond, who attempted to prove that the flow of nerves was “animal electricity”, Bekhterev describes energy as a principle, which equally encompasses material, electro-chemical changes and the “subjective states that are commonly designated as mental appearances or inner appearances.”²⁷

Here, however, it must be emphasized that in our use of the term ‘energy’ we are in no way associating this with the common usage of ‘physical energy,’ as is currently assumed. In our view, the energy or force for the being is nothing other than an active principle disseminated in the nature of the universe. We know nothing more of the essence of this active principle, which appears as the milieu of the global aether, but we see the expressions themselves in the constant conversion of substance all around us.²⁸

This theory of a universal transformability of the world was Bekhterev’s answer to Herbert Spencer as well, whose theses were being fiercely debated

in Russia around the turn of the century.²⁹ Bekhterev extended Spencer's neo-Darwinian thesis, that the activity of the nervous system was an adjustment of internal circumstances to external ones, by inverting it. "This definition, which has nearly become accepted, forgets that there is also a modification of external conditions, that is, an accompanying adjustment of external circumstances to internal circumstances."³⁰ This thesis of the reciprocal effect of nerve impulses set a precedent for the orientation of Petersburg artists toward reception physiology. The concept of "extensions of man", as McLuhan designated the electronic media as an extension of the nervous system into the surroundings, has one of its most radical origins in Russian psycho-reflexology.

In his book about suggestion, Bekhterev distinguishes between an accessible consciousness and an inaccessible one, which he assumed to be collective. Although the technical terminology of contemporary psychology suggested it differently, Bekhterev did not allow himself to designate this inaccessible thing as the "unconscious", since it remained unconscious only for the subject itself, but not for objective psychology with its apparatuses, measuring devices, and observations. Objective psychology can show that an object of perception does not land in the "personal" consciousness in the state of suggestion, "but in other areas of our psyche [...], which can be called the collective consciousness."³¹ The concept "collective consciousness" is the basis for a psychological model that assumes a connection among subjects in which, alongside pure language and conscious communication – as is evident in the model of the telephone – all sorts of roaring is transmitted that no one understands. These transmissions connect every individual personally and directly with the "collective consciousness." The individual is distracted and scattered by it, but also socialized and cultivated or subjected to suggestions:

In such cases the external impression passes by our personal consciousness, thus managing to reach the sphere of the psyche without our 'ego.' In this case it is not through the main entrance, but through the backdoor, so to speak, that it lands directly in the inner chambers of the mind. [...] Suggestion is thus the direct over-inoculation of certain mental states from person to person.³²

If Bekhterev's examination of the paranoia of Malyonvanism ends with the conclusion that mass suggestion has its origin in masses of suggestions, this is only seemingly a tautology. In fact he founded the first mass psychology that attempts to show that the reason for mass hysteria is not a single mad leader, but physiological and cultural structures that provide the means for

psychic mechanisms to run according to laws that can be studied objectively, structures that make the “over-inoculation” of ideas possible. In 1905 this did not result in discounting madness or possession as religious deviances, but in studying them as a social phenomenon. At the time Bekhterev’s diagnosis was enacted as an anti-tsarist demand to enlighten the Russian people, who were drowning in misery and alcohol. In 1927, when Stalin showed that he thought he had conquered the political-bureaucratic apparatus of the Soviet Union as a single leader, the diagnosis of the intrepid psychiatrist was: Even Stalin is just part of the apparatus, despite all despotism he is just its secretary. The diagnosis of paranoia was thus not at all meant personally, but was a subjective slight for Stalin, even if in the name of objective psychology.

In the 1970s a manuscript turned up in Leningrad, long believed to have been lost, of Bekhterev’s report that he had presented as a lecture to the All-Union Congress “32 Hours before His Death.” In it Bekhterev presents his “psychotherapeutic triad”: “explanatory lectures in the groups, group hypnosis, and treatment by auto-suggestion.”³³ Fifty years after his death, Bekhterev was rediscovered in the socialist countries as the one who had invented group therapy, before any American or French researcher. The jubilation was mixed with slightly revanchist undertones in the Cold War competition between psychiatric technicians, and it was affirmed, against all the anarchy of group formation, that Bekhterev had laid the foundations “for our psychotherapy, which respects the social determinacy of human beings”, and therefore he was on the side of order.³⁴ But it was not quite so simple. Bekhterev viewed a person’s health as a question of the functioning exchange between people and their surroundings. Reflexology is fundamentally an ecology of relations.³⁵

The honor given to Bekhterev in the German east could be traced back above all to his attempts to provide therapy to alcoholics. His systematic proposals and his neurologically based vision of collective processes, however, remain without comment. The mixture of nerve physiology and research on possession, which was only socially acceptable under the term “psychic infection”,³⁶ the numerous transdisciplinary and interdisciplinary experiments, and also the medical self-reflection of reflexology seem to have made Bekhterev suspect for all time and under all regimes.

Personality Changes

By the turn of the century, in order to create a secure basis for his research and his researchers, Bekhterev had already planned for a private institute

“with a whole series of scientific disciplines for general research on the personality, the training and hygiene of the mental sphere, and also to set up courses to study the prophylaxis and cure of nervous and mental diseases.”³⁷ The institute had to attend to a serious lack in tsarist society. “Due to the enormous number of attendees, it was necessary after a few years to transform the courses of the Psychoneurological Institute into a large private university (the first in Russia at the time), already accredited, which comprised up to 8,000 students and was not inferior in either the quantity nor the quality of the teaching staff to any Russian state university. Here many people received their education who would not be accepted into a state university under the current circumstances, which naturally provoked the reluctance of the state professors and the government.”³⁸

Those excluded from universities in the current circumstances in St. Petersburg were, for example, women, who were already working in Bekhterev’s laboratories as researchers and experiment leaders before the turn of the century. Also excluded or subjected to strict quotas were Jews, for instance one Solomon Derenkovsky, Maya Deren’s father, or one Denis Kaufmann, who later became the film director Dziga Vertov. Bekhterev’s private initiative was necessary to constitute critical research and academic public life in St. Petersburg: a legal space for minorities, which was also open to artists, writers, and musicians. Under the tsar the Psychoneurological Institute became a center of political critique and student unrest. Bekhterev had defended civil liberties from the position of a nerve physiologist and in 1906 (in contrast to Pavlov) advocated for academic autonomy without compromise against the threat that the minister of defense would appoint positions in the medical academy. In 1905 he wrote a general assessment of living conditions in Russia from a psychiatric point of view as a manifesto against suppression in schools, in the family and military, against prohibition through legal practices, against the political police and the death penalty. What he made available was the *Personality and the Social Conditions of its Development and Health*, but no longer in the sense of a bourgeois individual, but as part of a larger context of stimulus and reaction.

The term personality thus contains, in addition to inner unity and coordination, a certain activity in relation to the outer world, which is grounded in the individual processing of external stimuli. [...] Mental life is not only the sum of subjective experiences, but always also gives expression to a certain group of objective appearances. It is these objective appearances around which the personality enriches its external social surroundings.³⁹

Bekhterev read the whole manifesto at the congress of psychiatrists and neurologists, which had only been permitted by the Minister for Interior Affairs on the condition that no topics outside the field be addressed. Political movements, however, were not outside the professional concerns of Bekhterev. The intentions of Vladimir Mikhailovich, who also wrote plays, were exalted beyond any doubt: "...in Russia, in a country that is backward and uncultivated in many respects, a man of science cannot get around [...] having to provide answers to various questions of the sick social entity."⁴⁰ 160 million people lived in Imperial Russia, for whom there were 350 psychiatrists and neurologists. Bekhterev demanded what was not self-evident: health care for the mentally ill. In 1905, when "enormous violence rolled over the whole empire as a reaction to the existing order of things, the unsustainability of which [...] was imposing itself on the population",⁴¹ reflexology showed itself as a mass psychology of the Napoleonic spirit:

Why do the masses move inexorably at a mere wave of the leader [...], why does everything strive toward the same goal as if on command? [...] However one might think about this, and whether or not one wishes to accept special 'psychic waves' that simultaneously extend over great masses of people and are even supposed to be capable of a moving backwards under certain circumstances, what cannot be doubted as the bases of the whole appearance are the powerful effects of reciprocal suggestion in masses of people. [...] Such mutual suggestion leads to a kind of 'electrical charge' of singular individuals, whose sensations now increase into extraordinary tension.⁴²

In the "psychic waves" and "electrical charges" are the electrified media nets without which the leaders of the uprisings of 1905 and 1917 could not have brought their commands to the masses, presented as an ideal revolutionary model from the control room of brain physiology. Bekhterev's scientifically defined agitation lends the artistic and dramaturgical metaphors of the revolution a neurological foundation. The "shock theater"⁴³ of Meyerhold and Eisenstein invoked this research and the concept of a personality that enters into contact and exchange with its social surroundings when something is communicated. This concept could only be conveyed with great effort or incompletely without the corresponding reflex "social theory." Some German revolutionary theater artists were indignant. Piscator wrote:

In an article published in the German press by Potemkin director S.M. Eisenstein, he explained that he saw the task of the 'Potemkin' film as

electrifying, jolting the spectator. If that really were the task of revolutionary drama, the effect could be just as easily achieved by putting on a boxing match.⁴⁴

Brecht in fact adopted boxing as a dramaturgical model, and Vertov will show how a boxing match would have to be presented in a cinematically revolutionary way so that it took apart bourgeois consciousness in the process of reception. Piscator was simply lacking psycho-physical insights. In the Soviet Union, however, they varied as well. Eisenstein's idea of a reflex structure differs from that of Vertov's as a central nerve system does from one that is mapped in a net-like way.

The methodology of the general, which Bekhterev really was, might even have helped the tsar prolong his rule, quite in the sense of "sympathy for the devil." For Bekhterev added to his analysis of power in the age of mass movements an instruction manual of collective unconscious electrification. Far from idealistically dreaming up the liberation of the people as enlightenment and maturity, Bekhterev published power-bestowing knowledge beyond good and evil, to whom it may concern:

Anyone who spends a lot of time with the people and has his own experiences knows what the value of logical persuasion is. In the best case it only has a very slow effect, while suggestion through encouragement or command almost always leads quickly and surely to the goal.⁴⁵

The tsar did not wish to hear anything about experimentally tested propaganda. In 1917 the Psychoneurological Institute was once again the center of the uprisings. First the new rulers appreciated the research: under the Bolsheviks the institute was indeed dependent on state subsidies, but was developed further. On 32½ dessiatines of land within the city of Leningrad, ten more buildings were constructed. Bekhterev published journals and organized congresses on special psycho-neurological topics such as developing personality, criminology, the psycho-physiology and reflexology of work, which are very similar to Münsterberg's psycho-technology. For the third edition of his *General Principles of Human Reflexology* in 1925, the "second after the Revolution", Bekhterev's work is officially recognized in the foreword as the consummation of the history of psychology. Bekhterev's teaching on associative reflexes "paves the way to constructing an objective teaching of the human personality."⁴⁶ The Bolsheviks, inspired by thoughts of a mass empire that could be uniformly governed by general electrification, welcomed the attempt to research the nervous system as the state basis

in regulatable personality. In the model of the neurologists who conceived the nervous circuitry according to the idea of the telegraph system, they saw their own strategies in good hands.

Ways of Behaving

The significance of Bekhterev's collective reflexology for an early history of film, however, is not only based on the idea of a general medium of transmission that affectively links the body beyond its boundaries.⁴⁷ What is more important in terms of methodology is the reflexological principle that the entire human being in its social multiplicity only gets access to observations from outside. Processes "that we have always called 'mental'"⁴⁸ are only recognized correctly through objective scientific observations "with their strict methods, with their exact apparatuses and measurements."⁴⁹

In critical comparing the psychological schools and laboratories, Bekhterev regrets that "self-observation is the reigning, if not the only method of research",⁵⁰ and that even Münsterberg and Ebbinghaus ultimately had prescribed introspection. If he differentiates precisely in this respect between memory and remembrance, Bekhterev finds himself surprisingly closer to psychoanalytic methods than to psychological ones: "Experience shows [...] that self-observation is not even sufficient to recognize one's own psychic life."⁵¹ It was appropriate, then, to draw conclusions from experimental observations regardless of how test subjects found or sensed their states. "Free from efforts and attempts to intrude into the subjective world of dreams and fantasy, psycho-reflexology gives us prose in place of poetry, for it observes the neuro-physiological functions exclusively from the outside."⁵² For ethical and presumably political reasons, Bekhterev also criticizes conclusions by analogy in subjective psychology, with which conclusions are drawn in the introspection of a subject about another and thus about general experiences. This methodology precisely takes for granted a general human consciousness, which does not exist all according to the findings of objective psychologists: "We deny the right of subjectivist psychologists indiscriminately to extend, by using analogy with themselves, the conclusion of their self-observation to the subjective world of others and particularly to the subjective world of children, of psychopaths, and of animals."⁵³

In protest, therefore, against a psychological truth that had already been elevated to a dogma of a general human psyche before all research and experimentation, and that already acclaimed to know how a subject had

to be attuned, Bekhterev had founded reflexology – the science that, due to its history in the twentieth century, became a synonym for fantasies of programming and consolidation: in behaviorism as a science of social techniques of adjustment and in the adaptation of Pavlov’s theories of conditions reflexes for a totalitarian reason of state. Psycho-reflexology in the sense of its initial founder, however, would have been concerned with the differences of individual experience, with measurable personality rather than the measure of the human being, because it examined not the essence, but the conditions of its emergence, unfolding, and development on the basis of a general principle of transmission. And a principle of transmission is general if it is binding not only beyond philosophical frameworks, but also beyond anthropomorphic ones, for human and animal, sane and insane, protists, starfish, and voiceless infants. Psycho-reflexology is thus capable of scientifically demonstrating, in the middle of Communism, the inequality and incomparability of human being and pig.

The subject can only recognize its conditionality or damage when it is observed by an outside, an other, or by apparatuses that depict the states of the self as estranged and reflected. The reflexological method analyzes emotions as paths in the nervous circuit and in the general transfer of impulses, discovering intersubjective relationships there. In contrast to traditional psychology, in which “the goal of examining objective appearances was to recognize the human soul”, reflexology explains “the raw relationships to external influences or stimuli.”⁵⁴ After the Revolution Bekhterev even subsumed Marxism into reflexological knowledge: “Existence which determines consciousness” is the activity of associative reflexes that can become visible as “(in reflexological terminology) human behavior.”⁵⁵

Behavior is thus to be understood as the complex reactions of psychophysiological bodies to one another; reactions that the trembling, blushing, or gasping individuals do not perceive in themselves, nor do they want to perceive them from themselves. Reproduced technologically, however, they can behave in relation to themselves.

Nerve Priming

In contrast to Freud, who, in order to found psychoanalysis, stopped looking at hysterics and began listening to them, Bekhterev learned to draw conclusions from observing patients in terms of the state of their nerve conduction at the Salpêtrière. Even while still in Paris he began to develop the foundations for a theory of personality as reflex science

from the correlations between disturbances of the nervous system and the motor expressions observed. "The first attempts to approach the study of personality objectively were made by me as early as 1885, when I was studying traumatic psychoneuroses and hysteria."⁵⁶ In his assessment of hysteria as the constriction of the field of consciousness, Bekhterev was following Pierre Janet and finding himself not so far from Leon Solomons's and Gertrude Stein's conclusion that hysteria is "a disease of attention." If in doing so Bekhterev was invoking Radin's theory of hysteria as the disintegration of personality, then this was not in the sense of a pathological exceptional case, but as an appearance of collective, social lack. The objective examination of hysterical symptoms only led to few, disturbed, or wrongly connected nerve conductors.⁵⁷

The study of nerve conduction was Bekhterev's main focus during his time in Leipzig. His handbook *Conductors in the Brain and Marrow*, published in 1896, became a classic in the field, used as the basis for neurophysiology even beyond the borders of German clinics. Bekhterev had written the first edition in German, but already in 1899 the "second, completely revised, and significantly expanded version"⁵⁸ appeared, translated back into German from the Russian and enhanced by the experiences had at the new laboratory in Kazan, but still paying its respects to Paul Emil Flechsig as teacher and advisor for the work.

Wilhelm Wundt had also examined localizations of mental activity in the cortex and described functional neuro-anatomical connections. His theory that brain functions are different reactions to stimuli could also have been considered the inspiration and initiation of Bekhterev's concept of association reflexes if Wundt had not made the jump from physiological laws into mental ones in synthesizing the basic elements of neurology. Wundt insisted that the individual components that could be examined physiologically combined into complexes that represented more than the sum of individual reactions, and out of which were formed the psychic complexes, "consciousness" and "ego." It was precisely this conclusion, however, that Bekhterev would consider hasty, dismantling it on the editing table of neuroanatomy.

Flechsig, who was only ten years older than Bekhterev, was the more important teacher⁵⁹ for him in Leipzig, and during his short stay there the two of them carried out a formidable and certainly merciless series of experiments together, especially on the brains of human embryos and newborns, which they got from God knows where. By means of successive myelinogenesis of the nerve cords they represented the development stages of the brain – Flechsig's "myelinogenetic methods" – and localized the

“associative areas” in the nerves, which grow up in the end to be the organs of mental activity.⁶⁰ To this day, the representation of corporal sensation is localized in the areas designated by Flechsig.⁶¹ Flechsig had outlined certain areas in the brain as “spheres of bodily feeling”, in which the shape of the body was illustrated. As an inner mirror relationship, this constituted the “consciousness” in physiological reflexivity, in which the system of inner perception is the first area that develops and with the the self-feeling of every small child is more developed than motor self-control.⁶² Bekhterev adopts this concept and its topology. From the correspondences he draws the conclusion that all behavior is not simply the expression of mental activity, but much more the mirror of all neurophysiological processes of stimulus and reaction. Nonetheless, the idea that he has of the structure of the conductors in the brain and marrow can be distinguished significantly from that of Flechsig. Flechsig’s topography was passionately against the democratization of the model of nerves in early research, which sought to replace the idea of a hegemonic soul. “It is not the republic, but the monarchy that is realized in the organization of the mental organs”, thought Flechsig.⁶³ He had presented the coordination through associative centers as “command hierarchies of the fabric of the nerves.”⁶⁴

Bekhterev’s studies, on the other hand, especially concentrate on those tracts that run between the various nerve centers, convolutions, cores, functional joints, as if the hierarchical, monarchic structure from Flechsig’s model of the brain wanted to be rhizomatically undermined by new conductors. At any rate, determining some order in the nervous system, in which “the individual fiber tracts in the marrow and the brain lie in close contiguity without perceptible boundaries, often even commingling [...] or form meshworks, even sometimes intersections”,⁶⁵ is not an easy task. Bekhterev viewed the “associative tracts” as “intrinsic fibers” that internally interconnected the cells of the cerebellum or the cerebral cortex like a “functional collectivization of its various fiber systems.”⁶⁶ Bekhterev structures the topology and functions of the brain as anarchy, against the position of his teacher, until he, much later, can describe the “function of the brain” as “the most important apparatus of relating in communication with the outside world.”⁶⁷

As a last relay in the communication between inner and outer, nerves and surroundings, the question of transmission or contact between the nervous tracts had to be explained. Around the turn of the century there were two competing hypotheses: one that assumed the continuity of the nervous networks as a fibrous mesh and the other being neuron theory, which, following the research of Forel, His, and Ramón y Cajal, assumed discrete

singular cells between which an impulse was transmitted. Bekhterev defended the neuron model for the brain. The nervous current, the quality of which he could never explain, was to be understood as a series of successive, discrete signals:

I consider it much more correct to conceive of the nervous current as if it were composed of a series of successive stimuli that each land in the individually following members of a nervous tract for development.⁶⁸

When Bekhterev began to develop a psychology on the basis of reflex, the discovery of each new nerve connection, each new cervical area was undiscovered territory in the topography of the body. Where before one had assumed the amorphous soul, now there were functioning structures. And so, as Bekhterev was assembling the reflexes, he was opening up new opportunities to produce, manipulate, regulate, or destroy sensations and relations. In this light it is possible to understand why Bekhterev's concept of personality as a connection of reflex complexes was such a productive shock for the avant-garde of artists. The fact that the physical body and its movements could be seen as material disclosure of the subtlest movements and relations of nerves not only revolutionized the practice of acting, but the entire apparatus of theater and the emerging cinema.

Reflex Arcs

Unlike Pavlov, who reduced the processes of perception to a pattern of stimulus and reaction, Bekhterev researched the combinations of neuronal microprocesses in order also to be able to understand thinking, speaking, and remembering using the methodology of objective psychology. In the last book that appeared during his lifetime, he designates reflexes as the "correlative activity of individuals" in order to free them finally from the connotation of passive interconnection.⁶⁹ Acting is the traversing of reflex arcs, and reflexology is meant to become a universal science, in which "the social interrelations between human beings" would be analyzed.⁷⁰

As an homage to Flechsig, Bekhterev called the combined nerve priming "associative", which includes "all our gestures, such as laughing, crying, and other physical movements." Association was also conceived in the logics of neuronal priming: "Every impression, no matter how it is called up, leaves a certain trace in the nerve centers that can be reanimated, then appearing as as associative or psycho-reflex."⁷¹ The topography of these traces is

personal experience, life experience, on whose traces, which determine and therefore alter the following reactions of the organism as external stimuli, new experience are laid down as new physiological nerve tracts. So every personality develops a unique combination of nerves according to the experiences that it has.

Bekhterev considers the experiences inscribed in the body to be socially transferable as well, for a tradition to be reproduced without the consciousness of the carrier. The science of physiologically stored stimulus receptions and their processing by experiences thus becomes cultural theory:

Here it is about a particular way of inheriting, to be called psychic inheritance, which in any case contributes more to fixing psychic acquisition in posterity than does the factor of physical heredity. The descendants of a genius can die out, but his mental creations are taken up by many and become fixed through psychic inheritance in those who come after him, thus becoming the possession of a whole series of generations.⁷²

Here at the very latest Bekhterev goes beyond what can be considered a reflex arc in science today, which only inherited Pavlov's coup from reflexology. In nerve interconnections communication with the surroundings is opened up as complex behavior, extended, and – this links Bekhterev with the biologists and neurologists at Harvard – fed back: “the cortex of the cerebrum, in association with lower centres, establishing a correlation of the organism with the environment on the basis of individual experience.”⁷³

Reflex tracts function through a physiological constraint as a storage space. Thinking and remembering fall under these processes of correlation that are interpreted and postponed with time. “The associative processes influenced by operations of constraint often demand a significant time interval until the reaction is triggered, so that in certain cases the reaction can appear to be an independent appearance.”⁷⁴ So what can be considered a motor reflex is not only the act of speaking, but also complex operations like giving speeches, reading letters, writing books, or earning money. This expansion of the understanding of reflex was of course contested.⁷⁵ Bekhterev's hypothesis that “consciousness”, “ego”, and all personal activity were made up of reflex combinations, which could be completely explained through biochemical processes, was not entirely original. Bekhterev would have been able to draw on, for example, the teachers of Freud as predecessors of reflexology: even Brücke, Meynert, and Exner had seen the foundations of the ego as a thinking subject in the reflexes and their connections in a system of cortical tracts.

What was new in Bekhterev's proposal was that he followed the path of stimuli and reactions beyond any anthropomorphic framework. Thanks to objective examination aided by apparatuses, a complex view of reflex interactions in living creatures was opened up. In this case the cinematograph is the aid to the objective psychologist. By enlarging motion, the camera can make visible that the operations at the basis of nerve transmission are the same in all living creatures:

Cinematic representation of the movements of plants produces, as is well known, the impression of quick animal movements. [...] we should see, if our eye were constructed like a microscope, that growing stems and roots execute groping movements, and, in any case, we should discover prompt reactions as results of stimulation.⁷⁶

Quite in the sense of Londe, the camera shows what the naked eye cannot recognize. In the series of these tropisms, reflexology finally also places the behavior of human beings in those "complicated forms that are conventionally described as acts." These series of reflexes, which are guided by a goal, "that is, by a stimulus", can be traced back to "offense, defense, concentration, and in certain cases to imitation and symbolism." Neurological modal and cinematic illustration prove in turn to be complementary. They provide, if they transcend the unity of the single individual, the same discrete basic signals, from which the movement of life itself is composed.

"Feelings and emotions" are good examples of such reflex complexes. Movements of an "emotional character" are called mimic reflexes in Bekhterev's systematics. They are only partly observable: for instance as facial gesture, breaking out in a sweat, blushing, or speeding up the rate of breath. Mimicry is "obviously a very complicated and peculiar association of the motor, secretory, and blood vessel reactions of the organism, which can be distinguished in their complexity from simple reflex movements. Nonetheless, these appearances run exactly as mechanically as do ordinary reflexes";⁷⁷ wrote Bekhterev in 1913, when he formulated psycho-reflexology for the first time as a "teaching." Psycho-reflexological methods show exactly which physiological processes belong to an emotional complex. The analysis of mimic movements is more complicated if the organic-reflex movements appear as components of associated movements. The various organic reactions were measured in Bekhterev's laboratory according to time, intensity, and in their phylogenetic and individual emergence, and reflex mimicry was physiologically classified according to the perceiving

surfaces that they originated from.⁷⁸ More complex associative reactions come into being through the fact that an external impulse, for instance a message arriving, is linked to life experience, to the traces of experience in the brain. In every laugh and in every cry can be seen a mimic dissolve of our biography as bodily experience.

Obviously Bekhterev used photography at the Psychoneurological Institute, but not serial photography or cinematography, which by then was widely used in neurology. It is, however, possible that there are archives in Bekhterev's institute that have not yet been viewed. Unlike Münsterberg, Bekhterev, who could have been an eyewitness to one of the creative phases of cinema, was obviously not interested. But the theory of technological illustration as reflex analysis or psycho-analysis can be rediscovered in the works and *kinoki* manifestos of Dziga Vertov. Vertov transformed Bekhterev's thesis – that associated reflex movements are supra-individual, non-anthropomorphic, and can be bridged and linked by means of technological apparatuses – into film technique. In his *Man with a Movie Camera* collective reflexology is realized in film.

Media or Homeostatic Processes

After Bekhterev had disassembled the personality into the discrete single parts of its basic neuronal functions, he finally attempted to construct a theory of relativity of the psychic process.

But if matter is a fiction, and only energy is real, there is no ground for the contraposition of the psychic to the material, and *vice versa*, and we have ask ourselves: Is it not possible to reduce psychic activity, too, to physical energy?⁷⁹

Only after he had taken the analysis of nerve connectors as far as the methods of natural science allowed, and after he had reconstructed the transmission qualities of the nerve tracts in the laboratory and clinical practice and newly integrated them into his therapeutic forms did Bekhterev publish his global theory of relations of a worldwide network of nervous current, which might appear a metaphysical paranoia, but he could actually prove the functions of all the individual connectors in experiments. Bekhterev's anarchism included the idea that vision was not conceived as the world on a wire, but as a multiplicity of relations, which animate reality as a flow of energy between parts, which are smaller than

electrons, and between complexes that are larger than the planetary system.

In this way, also, the external world – of course, not that which we perceive and imagine, but that which exists in reality – is subject to the law of causality or, more accurately, to the laws of relations. And when we prosecute our analysis to the end, we must acknowledge one fundamental and first principle of all being, and this we call energy. In the concept of energy we have the idea of various manifestations of movement under the form of great masses [...]. To the basis of this movement, a basis which must be common to all phenomena of nature, including ourselves as a part of the universe, we give the name universal energy.⁸⁰

In this universality energy is reminiscent of Schreber's rays. Paranoia and science always lay side by side.

Assuming a universal form of energy was nothing extraordinary at the turn of the century. There were numerous models of nervous energy, which were analogous to physical models and theories and were only provisionally proposed in order to link up organic functions and mental phenomena. Extending from Bergson's philosophy of life, Pierre Janet had proposed the "function de réel" as an effect of nervous energy on external objects. Freud's first neuron-machine model for the psyche, as he describes it in *Project for a Scientific Psychology*, also runs with an energy that he initially calls "quantity." C.G. Jung's somewhat later reform of the libido as a form of energy also belong to these models.⁸¹ Bekhterev's variant is distinguished by letting the bodies simply become energy-transformers, despite any Wagnerian tonic notes. When energy penetrates bodies, follows reflex arcs, establishes new connections, and then moves on, it leaves behind experiences as the relay of energy. "But people are, i.e., they must be regarded as energy accumulators resulting from their past individual experience and hereditary influences",⁸² is written in *Collective Reflexology*, the book that, as the second volume in the series "Contributions to Mass Psychology" posthumously sent Bekhterev's outrageous message into the middle of Europe, to Halle. With his relativizing system of a world energy, which is propagated by discrete impulses, as he had studied in nerve stimuli, Bekhterev proposes a universal medium of transmission, which at the same time conveys messages and links relations, which forms personalities and at the same time turns them into the batteries for the whole system. Neuronal circuits are linked to bio-social networks by

apparatuses. Every transmission alters both the experiential structure of the body and the energy structure of the surroundings. The nerve impulses therefore meet the definition of signals, and the world-energy that Bekhterev imagines is a network of messages that is far superior to Siemens's telegraph system, because it will one day process the structure of the network itself. Bekhterev's mass psychology is a very early project for a theory of technological media. Since there is a link between organs of sense perception and expression by apparatuses, they also alter the subjects of experience.

In 1927 in Ohio Bekhterev's lecture on feelings and emotions begins surprisingly dramatically. Suddenly and without warning, opium and hashish clearly showed how emotional states can be influenced by external means. These drugs produce euphoria, just as adrenaline can trigger fears or other poisons can precipitate depression. Just as abruptly, Bekhterev raises the next topic: *krov*, blood. "Thus we see that the basis of these states designated as feelings and emotions is alterations in the composition of the blood."⁸³ This opening is more than a simple nod to the institutional reorganization of psychological research at Wittenberg College in its merger with chemistry. Bekhterev had also emphasized the role of metabolism as part of the universal energetic system in a variety of passages in his *General Principles of Human Reflexology*. Not only is the human being nourished through metabolism, but it is also connected to the universal energy through the sense organs and the nerves. The biochemical side of Bekhterev's research, however, has always only been a subordinate part, and the fact that he opened his lecture this way gives an indication of the actual addressee of the message. If Bekhterev makes controlling somatic-mimetic reflexes by controlling blood composition the secret topic of his lecture, extending the neuronal reflexology to include chemical reflexology, it is clear that he, whether present or not, was speaking to Walter Cannon, and that he was trying to position his bio-social studies in the context of the biochemical experiments by the physiologists at Harvard Medical School. In his lecture, Bekhterev continues:

The glands can, and undoubtedly do, react to the chemical composition of the blood (chemical reflexes). Thus there is established a sort of equilibrium between the various glands, due to the direct effect of the chemical composition of the blood upon the chemical elements of the glands themselves.⁸⁴

Using the word “equilibrium”, Bekhterev was speaking to what interested him in Cannon’s research. Cannon had advanced the first thesis on homeostatic processes in the human body and experimentally verified them. Even the term homeostasis was his. Cannon was, on the one hand due to his own research, which regarded the body as an ecological interactive environment, and on the other as the teacher of the Mexican Arturo Rosenblueth, with whom Norbert Wiener collaborated, the pioneer of cybernetics on both the medical and biological side. In 1956 Wiener wrote in his autobiography:

Walter Cannon, going back to Claude Bernard, emphasized that the health and even the very existence of the body depends on what are called homeostatic processes. [...] That is, the apparent equilibrium of life is an active equilibrium, in which each deviation from the norm brings on a reaction in the opposite direction, which is of the nature of what we call negative feedback.⁸⁵

The first experiments on physiological feedback, which brought together the physician Rosenblueth, the physiologist Cannon, and the mathematician Wiener, were, incidentally, those on the impressions of muscular joints, body specific responses to the state of the organs in movement, the old dancer problem, which Bekhterev had also and independently researched and had described in his *Objective Psychology*.⁸⁶ According to his own statements he had been dealing with this topic for some time already. “Since the beginning of the eighties, my attention has been focused on the functions of equilibrium or of the organs serving static coordination, which at the time was a question that had not been examined much.”⁸⁷ The nerve physiologist wanted to find this principle of equilibrium and balance in the body for all bodily processes. Both Rosenblueth’s American experiments and Bekhterev’s were aimed at researching nerves as control systems, in order then to find out that they could be affected and, according to their physiological surroundings, also modeled. From this developed the concept of a neurology that would at the same time be social technology. Cannon had examined the biochemical side of these processes and his studies on voodoo death were meant to show what happens when homeostatic systems are taken out of equilibrium by purely social actions, a curse in this case.

In his lecture Bekhterev also explained that affective and emotional reactions that were seemingly outdated phylogenetically, such as threatening gestures, or even blushing or sweating, are also completely sensible

reflexes since transmitting impulses between individuals were encouraged or obstructed by this. Even in social situation, intra-physiological or inner-physiological control systems communicate with one another in order to instigate the optimal exchange of energies. “Feelings and emotions”, or “somatic-mimic reflexes” as they are called in *Objective Psychology*, represent a complicated and delicate corporal system of communication, and the individual need not know anything about in order for it to work. In this context Bekhterev had advanced the thesis that the corresponding reflex tracts or channels are not only so for biological impulses and signals, but also social ones. “In the case of man the sources of excitation are to be found not only in biological, but in the social environment, especially the latter. It is these social excitations that make man a bio-social being.”⁸⁸

In the twenties this research was still “questions that had not been examined much”, and there were not many centers in the world where they were so intensively examined than at the Medical School at Harvard or at MIT. And there was hardly anywhere that this research was so systematically pursued in clinical practice than at the Psychoneurological Institute in Leningrad. Alongside a few attempts with psycho-pharmaceuticals Bekhterev’s practice primarily focused on hypnotic group therapy, which was meant to initiate intersubjective homeostasis – similar forms of therapy, following systematic, cybernetic models, were developed for schizophrenia patients in the USA only in the sixties by Gregory Bateson and his colleagues.⁸⁹

Bekhterev was very familiar with Cannon’s research, including his most recent experiments on altering the concentration of adrenalin in the blood, and he was obviously attempting to create a connection to his own experiments. In Ohio in 1927 Bekhterev wanted to make contact with those whose research was the most advanced at the time, and to speak about the science that – as the significance of the Macy Conferences would show in the forties – was to be the science of the future. His lecture in Ohio was obviously an attempt to consolidate neuronal and biochemical homeostasis into a theory of the biosocial – or at least to discuss the possibility of such a “fundamental basis for everything that exists.” World energy, according to Bekhterev’s wish, was meant to be a scientific fusion of east and west, a homeostatic force.

Cannon took the call from the Soviet Union seriously and posed two questions following Bekhterev’s lecture that show that he had clearly carried out similar experiments with different results. In his own lecture *Neural Organization for Emotional Expression*, a short history of the uses and abuses

of fits of rage, he had only cited Bekhterev from very old experiments from his time with Flechsig. He seemed not to be familiar with the new developments from Leningrad or, worse, they did not interest him. The historical encounter between the two proto-cyberneticists ends in the darkness of the protocol: “Dr. Walter B. Cannon requested that the following question may be submitted to Dr. Bekhterev”, we read, then the daily minutes end. And while in Ohio chemistry and psychology were being fused, in the name of hormones and vitamins, into a single science that was meant to control feelings in a more contemporary way than opium and hashish, in Moscow power was being seized in the old style.

Bekhterev’s last work, *Collective Psychology*, is an elegant synthesis of all his research, at once mass psychology, war psychology, psycho-history, political theory, and – social critique from the perspective of objective psychology. What Bekhterev opposes to Flechsig’s “ethics grounded in physiology”⁹⁰ as the coming project of a biosocial society are accumulator-bodies, linked to one another but at the same time freely developing, which learn and learn to learn in exchange with their surroundings, much like anti-authoritarian cyberneticists like Bateson and von Foerster will imagine and try out much later. If we take Cannon’s and Bekhterev’s research seriously, feelings would be chemo-neurological complexes that guide social life, an “autopoietic” variant of reflexology according to Maturana and Varela. In 1913 Bekhterev had imagined that

the organism, due to its neuropsychic activity, represents a machine that is in a certain sense self-determinant and self-actuating. This is why its outward reactions are not only determined by the external qualities of the source of the stimulus, but also by its relations to the organism, which has been shaped under the effect of inherited and acquired conditions.⁹¹

The utopia of a society mediated by feelings and emotions remained Bekhterev’s dream: “Like a living organism, society represents a dynamic equilibrium rather than something static.”⁹²

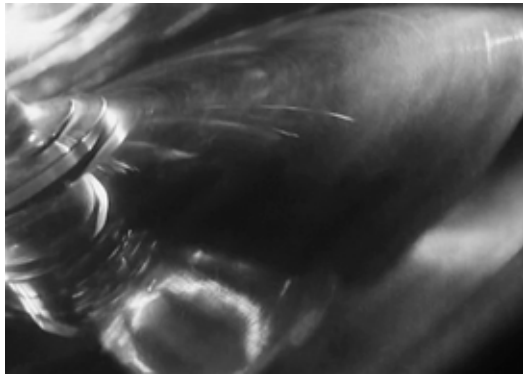
No one wanted to know anything about any good-natured application of multifaceted feelings, about any collective dance of the spheres of bodily feeling. Much less about their abrupt mass feelings. In the Soviet Union this ended after Bekhterev’s death in quite coarse propaganda assaults on the people. In the USA the results of research were refined. Emotions were simply supposed to be what cannot be decoded in the media transmissions of the enemy. At the beginning of the Second World War the Office of War Information provided its directors with the following:

‘How to arouse emotions of the apathetic, and direct the energies of the frustrated into the war effort, is the informational Challenge.’ That was domestic information from the OWI, with an emphasis on emotion and not intelligence or education which its Soviet or Nazi counterparts could have easily understood.⁹³

Not much was left of all the research, all the high-ranking symposia, all the publications. All that “feelings and emotions” attested to now were the remaining traces of the human in the function of the medial. And yet, cinema people turn up over and over again that bring the dream of the unknown Bekhterev to the screen.



Dziga Vertov, *Jumping Top*. Private Collection.



Eisenstein, Still from the Film *The General Line* (USSR 1920).

Part IV

1. The Truth Won by Means of Film

Everyone who cares for his art seeks the essence of his own technique.

– Dziga Vertov, 1922

Signals

Many of Bekhterev's students were artists, including the writer Isaac Babel, the directors Grigori Boltanski and Abram Room and, one of the most famous, Dziga Vertov.¹ This has been pointed out by Herbert Marshall, who had worked as Joris Ivens's assistant in the Soviet Union and who had been personally acquainted with Vertov since his visit to Germany in 1929. Marshall was in fact surprised that many artists had studied at the Psychoneurological Institute with no intention of becoming physicians, but then maintains Viktor Shklovsky's claim that the institute was the only place that had not restricted access to Jews through quotas, thus providing an opportunity to assimilate into Russian society by means of an academic degree.² This explanation established the connection for film history between Vertov's theory of the kino-eye and the experiments that Bekhterev was conducting in his laboratories. In Vertov's journals and workbooks, however, there are a handful of revealing comments about how much his films and his theories are indebted to the methods of objective psychology. When he began working at the Moscow Film Ministry immediately after the October Revolution, Vertov noted in the third person – observing himself:

He went there after having a few experiences in the areas of language and sound. From the artistic recording 'The Sawmill,' to montages of stenograms and audio recordings and the creative workshop 'Laboratory of Hearing'; from the recordings of various 'chastushki'³ to stenographed confessions; from primitive interceptions of truth to attempts at mind reading; from self-experiments at the Leningrad Psychoneurological Institute (recordings of thoughts, reactions, forms of behavior) to reflections about surprise recordings for attaining truth; from observing the Pathé newsreels at the cinema to thinking about visually recording the visible world, about the visual shape of the world, about the truth to be won by means of film.⁴

This list is Vertov's biography as a series of recording experiments and consequently a very brief media history of a Kinopravda. As a student he

had experimented with using letters to write down the sound of a sawmill and sounds of nature. The outcome of these attempts to depict reality in a symbolic order had above all clarified for him the limits of writing as a recording technology, which could only manage more or less successful reductions in the realm of acoustic events with its possible combinations of 32 Cyrillic, preordained individual elements. Vertov then bought an old phonograph, with which he could record, store, and manipulate the vibrations of the noises of the world on cylinders, still without a microphone, according to frequency and amplitude.⁵ In this continuous analogue recording Vertov made his own cuts and edited the noises and voices into audio plays. Initially he recorded human language in traditional literary form and then as free speaking. Liberated by phonographic recording from the compulsion of rhyme or rhythm, the old mnemonics, language could then become voices, breathing, faltering, or hoarsely croaking like a sawmill in the distance.

The experiments at the Psychoneurological Institute ultimately led to Vertov's theory of documentary film. Just as the reflexologists turned thoughts – which, according to Sechenov and Bekhterev, are inhibited reflexes – reactions, and behaviors into objects of objective psychological examination as processes that can be observed, measured and stored by means of apparatuses, Vertov replaced the old recording technology of writing, which had implemented its transformative rule as a spirit in things and people, with technical media that could work without introspective additions, without the poetry of self-perception, because they stored acoustic and optical reality in their physical qualities. Using experimental and applied psychology, the human being – just like things and animals – was transformed into the events and dimensions of data, which were transformed according to the corresponding new rules. A new image of people could only be realized through this transformation, and Vertov was one of the most careful of its engineers.

Vertov's study of psychic reactions and reflexes in his self-experiments, that is, his attempts at self-portrayal with the camera, make it possible to calculate the "ego" on film and to "relate it to the machine." Thus arose an ego-kino-eye or a kino-eye-ego, which could move through the world beyond the limits of the old consciousness. A kino-eye that speaks from the manifestos in the first person, like in the text entitled "Kinoks-A Revolution":

Now I, a camera, fling myself along their resultant, maneuvering in the chaos of movement, recording movement, starting with movements composed of the most complex combinations. Freed from the rule of

sixteen-seventeen frames per second, free of the limits of time and space, I put together any given points in the universe, no matter where I've recorded them. My path leads to the creation of a fresh perception of the world. I decipher in a new way a world unknown to you.⁶

Human being and machine form a new optics, which dismantles the staged presentation of the world into the individual parts of its movement, thus discovering and displaying how the historical treatment of reality-data at the basis of human perception works. Vertov transfers the signal character from his experiments with acoustic recordings to film. The "*zhizn' vrasplokh*", the life caught unawares, or, to go back to Walter Benjamin's anti-bourgeois methodology of observing history, life viewed as "non-intentional", shows the historical reality by technical means. Sophie Küppers, the wife of El Lisitzky, translated the texts for Vertov's trip to Europe in 1929 and introduced once and for all the term "*überraumpeltes Leben*" ["life caught unawares"] into German literature for Vertov's technique of documentary film.⁷

From the beginning Vertov's technique was not only seen as an attack on bourgeois conventions and tragedies [*Trauerspiele*], but on the bourgeois subject of seeing. The truth exposed by the "life caught unawares" are the multiple, universal reactions and relations that remain unconscious – although still visible and measureable – when staging the everyday. The truth of this "*zhizn' vrasplokh*", of the life unconsciously caught unawares, means that all seeing and measuring of social relationships is based on historical technologies. The truth of depiction cannot be other than an analysis of the character of the technology through which it is produced. That this is no tautology in the practical work with apparatuses, but becomes epistemology, was repeated by Godard when he calls film *truth 24 times per second* in *Le Petit Soldat*. Vertov experienced this with own body.

Vertov described his first foray into film history as a self-experiment in the terms of objective psychology. In 1918 he jumped from a height of one and a half stories behind the film committee's palace, while a cameraman filmed the jump in slow motion. Vertov's different emotional states on the way down could then be analyzed using this film. While in real time all that could be seen was him bowing, smiling, and jumping, the slow motion of the film established the physical sequence of fear and indecisiveness, embarrassment, growing conviction, and so on. These were basic organic-reflex types that the associative-reflex physicality of the heroic could be traced back to, according to the experiments at Bekhterev's institute. Manipulating the time axis allowed for about 18 truths per second in 1918. The time became relative, so that even the terms "time lapse" and "slow motion" were

exchangeable depending on the standpoint taken. Vertov analyzed his fall, which can be considered the origin of a Kinopravda, in 1935:

From the viewpoint of the ordinary eye you see untruth. From the viewpoint of the cinematic eye (aided by special cinematic means, in this case, accelerated shooting) you see the truth. If it's a questions of reading someone's thoughts at a distance (and often what matters to us is not to hear a person's words but to read his thoughts), then you have that opportunity right here. It has been revealed by the kino-eye. It is possible, by means of the kino-eye to remove a man's mask...⁸

When Vertov jumped, the truth of observation was still invoked against the culture of writing from the old bureaucracy, which sought to grasp and censor the spirit of artworks and artists. Storing human data on film was established precisely in opposition to the bureaucratic version. In 1935, when Vertov wrote down his memories of the jump, and when his film *Three Songs about Lenin* was not explicitly censored, but was put aside by the distribution offices, it had thus already become a bureaucratic technique to censor without words and writing. There was plenty of opportunity "not to hear a person's words but to read his thoughts."⁹ What is essential about Vertov's discovery, however, is that the truth of film does not lie on its visual surface, but in the processing of discrete individual images, through which new qualities of reality appear that are invisible without film. Vertov's experiments situate film exactly between its signal character, which allows for manipulating the time axis, and the visual character, which causes all kinds of shapes to appear on the surface.

In the tradition of the experiments at the Psychoneurological Institute, in which Vertov placed his film experiments, the self-experiment corresponds to an experiment from the series of "physical reflexes", with which movements and reactions could be tested "that characterize the inner state under certain conditions."¹⁰ It strictly adheres to the psycho-reflex method of rejecting introspection, but giving free reign to subjective processes in order to compare them with the results of simultaneous objective observation. Bekhterev had written:

It is thus clear that the method of reflexology maintains the possibility not only of studying the processes of human association-reflex from the objective side, but also to explain the relationship of subjective processes to them. Such a research method is very valuable when conducted on one's own person, particularly with regard to the mimic-somatic processes...¹¹

The ideal of psycho-reflexology research is to combine subjective and objective protocols of experimentation: such as a written working journal and a simultaneous film recording, or even better, the “journal of a cameraman”, which itself is filmed at the same time, a journal with “impressions on celluloid in six rolls” attached, as is stated precisely in the intertitle of the famous *Chelovek's kinoapparatom* from 1929. In early film theory, not only in Vertov, the cinematic apparatus was advanced to an epistemological device. The special consequence that Vertov draws from this is that the cinematic apparatus is thus no longer any kind of representational apparatus, but, as a visual medium of storage and transfer, is an instrument for analyzing and synthesizing, producing a new reality of perception. The enduring debate about whether Vertov's films are documentary or fiction films comes unraveled if we understand them as universalizing labor conditions. Filming becomes an experimental construction for directors, camera operators, editors, and – as Rouch and Morin would later claim for French cinema as well, in Vertov's name – it changes them as well.

Despite the critique of the film bureaucracy, Vertov holds fast to the scientific character of the *kinoglaz* research. In his notes for a conversation from July 28, 1935, presumably with the photo correspondent from the newspaper “Prozhektor”, he writes: “I work like Pavlov's laboratory and not like a department at the film chronicle...”¹² At the main building of Pavlov's Biological Station in Koltushi near Leningrad, one can read, chiseled in stone: “Observation and observation.” This was only the half-truth of the laboratories, the other half was produced previously by the experimental set-up and the apparatuses. Bekhterev had also called his own ability to observe into question, more methodically than Pavlov had, in his *Objective Psychology*, and then again in relation to the observation instruments. Vertov, who also did not want to rely on his own eyes, thus is methodologically closer to him than to Pavlov. But in 1935 it was still permitted to name the Nobel Prize winner to describe his own working method as methods from reflexology. Bekhterev, on the other hand, who preferred to leave what the essence of the human being is and could be up to the essence of the apparatus and to the essence of relationship produced by them, had been deemed unutterable since 1927.

Agitations

Although the whole arsenal of optical illusions, animations, and manipulations were played out in the films of the *Kinoki*, although Vertov considered

animation filming one of the “chief positions”¹³ in the *Kinoki*’s work, he views his method as a way to explain reality. He harshly criticizes practices that obfuscate the consciousness of the population. He thus vilifies, moralizingly and unexpectedly misogynistically, the hypnosis so valued by Bekhterev in therapy by calling it an infamous trick from the arsenal of the feature film and all other art forms that constrict consciousness. In the manifesto *Kinoglaz* he writes of the film drama:

Stupefaction and suggestion – the art-drama’s basic means of influence – relate to that of a religion and enable it for a time to maintain a man in an excited unconscious state. We are familiar with examples of direct suggestion (hypnosis), with examples of sexual suggestion, when a woman in exciting her husband or lover can suggest any thoughts or acts to him.¹⁴

Just as Bekhterev had drawn the public’s attention to the infirmity of their consciousness under neuro-physiological points of view in his Petersburg lectures, Vertov also showed the audience how consciousness can be deceived in the cinema, and self-awareness can also be disappointed. Vertov’s films, above all *Man with a Movie Camera*, present cinematography as a technology in all its manipulative possibilities in order then to raise awareness of the “magic” of everyday life.

Only consciousness can fight the sway of magic in all its forms.
 Only consciousness can form a man of firm opinion, firm conviction.
 We need conscious men, not an unconscious mass submissive to any passing suggestion.
 Long live the class consciousness of the healthy with eyes and ears to see and hear with!
 Away with the fragrant veil of kisses, murders, doves, and slight-of-hand!
 Long live the class vision!
 Long live kino-eye!¹⁵

Both figures, Bekhterev and Vertov, battle with the paradox of recognizing media technologies as not enabling conscious choices, but as having to use it nonetheless to fulfill their mission to enlighten. What is common to both is the attempt to make consciousness itself to appear as foreign and different by means of the outside of the apparatus, and thus to be able to judge oneself as different. This is also why the title *Celovek s kinoapparatom* should be translated quite literally not as *Cameraman* nor as *Man with a Movie Camera*, but more exactly as *Person through the Cinematic Apparatus*,

who then turns up as a kind of *causa formalis*. What is shown is the person produced according to objective psychology through the cinematic apparatus in his or her objective truth.

The paradox of wanting to produce a self-awareness from unconscious, that is, by means of film tricks or hypnosis not accessible due to the technical bases of conscious perception, from which a “man of firm opinion, firm conviction” can be formed, persists at any rate as an ambiguity of technical suggestion and enchantment. Over and over again, the montage sequences of the *Kinoki* films intoxicatingly circle around the topic of ecstasy, of shamanistic practices, of stirring rhythm, of madness, and of the dance, like around the blind spot of their own theory. An example is the beginning of the first *Kinoglaz* film: One sequence is called “Kino-Eye, At the Church Holiday, “or”, The Effect of Homemade Vodka on the Village Women”, and all the opium of the masses is vilified in images of women dancing madly. Until it becomes clear that, for the spectator, the village women’s frenzy is solely due to the frenzy of the editing and thus to the cinema as a Platonic opium den. The succession of the first 58 short shots shows that they are enhanced by a pattern of constantly accelerating repetitions into a rhythmic crescendo of their own.¹⁶

What the art drama is meant to display as religious madness, “*stupefaction and suggestion*”, is here conducted by the anti-drug agitation itself by means of the technology of cinema. The women’s stupefaction, which is announced in the caption as an example of misdirected ecstasy, has too much momentum for an anti-alcohol campaign – or, as it is called in more technical terms in the *Kinoki* manifestos, “rhythm of movement, slowed and accelerated” – indeed, precisely that momentum that, from so-called gypsy music to the music of Kusturica’s mad Balkanites, has time and again been considered corrupting by orderly states and has thus been banned. Just as the limbs of marionettes sway logorhythmically to the mental lines of dancers, bottles sway in the hands of intoxicated female dancers, and their bodies in turn sway logorhythmically to the gazes that go into the camera-eye, constant and unflinchingly direct, like a steadfast axis. The vilification of the dancing women turns into a sermon straight from the mouth of a preacher that is itself intoxicated and intoxicating: the cinematic apparatus. The question is whether, with so much movement and excitement, for agitation is nothing other than that, it is ultimately only rhythmic interference patterns that arise in the spectator’s perception in place of a healthy class consciousness, and whether it is even possible to speak of objectively analyzing reality anymore. In fact, the goal of analyzing reality seems to have yielded once and for all to synthesis. In the *Provisional Instructions to Kino-Eye Groups* from 1926 we read:

I can point to the dancing of the drunken peasant women in the first section of *Kinoglaz* as an example of a montage moment not limited by time and space. They were filmed at different times, in different villages, and edited together into a single whole. The beer house and the market, actually all the rest[...] were also done through montage.¹⁷

The truth of reality can therefore be experienced less by consciously reproducing events than by exposing the recording and editing techniques, that is, the *conditio humana* in the age of its film reproducibility.¹⁸ And here it is not only about presenting the bare functionality of the device, but about the effects of its functioning, the way that it conceals connections or brings them to the light of sense. The condition of this awareness, however, is that the agitating attraction, the “*Verblüffen*” [“mystifications”], as Sophie Küppers described it, is followed by an external view of one’s own perception. The class morale of the sequence is meant to disappear behind the question of “seeing class”, which means that the circumstances that relativize all perception are brought to the screen in their interferences. That these functionalities produce new technical intoxications is something that Dziga Vertov the enlightener would not wish to deny, Dziga Vertov the director would be delighted, and Dziga Vertov the cultural revolutionary would have known it already anyway. It was presumably not a transcendental human being that Vertov wanted to bring to life, but one that could enter into a new relationship to itself and the world by means of the new technologies. At the Psychoneurological Institute Vertov had been interested in “apparatus medicine” as a contemporary technology of neurologists. For him the essence of reality cannot be separated from the essence of the technology that places it into a constellation, thus creating it in the first place.

Vertov did not assume, just as Bekhterev had not, that there was such a thing as a stable, identical self-consciousness from which knowledge could be set. The truth is that human beings are in constant exchange with the molecular movements of their surroundings, which carry them along in the form of symphonies or drinking women. Spectators are supposed to learn not with their own eyes, but with kino-eyes, and thus also learn to see themselves. They themselves can therefore be physiologically intoxicated before they learn how the circumstances are constructed from the relations of montage. For Vertov this is no support for conventional objectivity, but is a violent split from an imagined subjectivity. In “*Kinoki – A Revolution*” from 1923 the kino-eye, speaking in the first person again, explains how the spectator’s attention is guided through space and time.

I make the viewer see in the manner best suited to my presentation of this or that visual phenomenon. The eye submits to the will of the camera and is directed by it to those successive points of the action that, most succinctly and vividly, bring the film phrase to the height or depth of resolution.

Example; shooting a boxing match, not from the point of view of a spectator present, but shooting the successive movements (the blows) of the contenders.

Example: the filming of a group of dancers, not from the point of view of a spectator sitting in the auditorium with a ballet on the stage before him. After all, the spectator at a ballet follows, in confusion, now the combined group of dancers, now random individual figures, now someone's legs – a series of scattered perceptions, different for each spectator.

One can't present this to the film viewer. A system of successive movements requires the filming of dancers or boxers in the order of their actions, one after another... by forceful transfer of the viewer's eye to the successive details that must be seen.

The camera 'carries' the film viewer's eyes from arms to legs, from legs to eyes and so on, in the most advantageous sequence, and organizes the details into an orderly montage study.¹⁹

This montage study is not so much for editors as it is for spectator brains, which themselves are brought to dance. "For the first time, we feel that the obvious drawback of such a film screening can be found not on-screen but in the theater", was Rudolf Arnheim's attempt in 1929 to explain this odd state in Vertov's cinema.²⁰ The regularity of this exercise is one in which perception is imposed as something from outside, as a rule of movement-intervals, a synthetic manipulation of the brain. The kinoks manifesto continues: "The result of this concerted action of the liberated and perfected camera and the strategic brain of man directing, observing, and gauging – the presentation of even the most ordinary things will take on an exceptionally fresh and interesting aspect."²¹ The attempt to wire up apparatus and brain and therefore to use film tricks to get around consciousness, since it is moving on the familiar pathways of experience, was still an experiment for the kinoks themselves in 1923, and its outcome could only vaguely be prognosticated as "fresh and interesting."

Many years later Rudolf Arnheim, who himself had done his doctorate in Gestalt psychology on physiognomy and the problem of expression and its interpretation, could not make rhyme or reason out of the lack of any meaning on screen.²² Vertov's first sound film, which bears the

title *Enthusiasm*, which is significant for the ecstasy complex, was heavily criticized by Arnheim in the "Weltbühne" on September 29, 1931. It is not by chance that Kleist's formulation of marionette movements, "fairly artificial", is brought into the mix, and he is annoyed by the "flickering", which Münsterberg would have been particularly pleased about: "Montage alone is supposed to provide the film's structure, and this quite artificial, theoretically thought-out restriction results in an editing overload – a flickering of images, held only loosely together, which strongly taxes the viewer's nerves."²³ Using the puzzling formulation that the film *Enthusiasm* remains an "unmodified structure", perhaps Arnheim wished to aid Vertov's intention to assert its rights of not making reality available randomly, but to construct an optics in which reality becomes viewable in its various patterns. For Arnheim, however, all this was glowing splinters that showed the nerves all that remained as movement: an attitude toward life, the good "vibrations" of the Soviets, which Arnheim was justifiably calling into question in 1931. But in doing so the documentary quality of the *kinoks* operation was obscured. Vectors and power relations, movements and the method of results seemed only to be empty claims before a party hierarchy that had solidified into a block of matter. This caused what was new in Vertov's discovery, that the nerves could be moved without implying any statement or contents, to disappear behind the critical mistrust that he was trying to arouse enthusiasm for a corrupt system. In 1931 Soviet art was no longer the great hope it had once been.

At the same time, Vertov's aesthetic theory and practice, which he had essentially formulated at the beginning of the twenties, was still, or rather once again, far ahead of his contemporaries. The camera-eye shows a truth that also holds outside the cinema, namely that the human eye is disengaged from the position of power and control that the Renaissance was able to promise the bourgeois individual with *its* optical tricks. What is deceived in this case is a psychology that, despite all experimental research, holds onto the biographical concept of a coherent individual with a soul, and draws its conclusions from the introspective method. It is this subjective psychology from which Vertov also distances himself, as a result of his years of studying and experimenting at Bekhterev's Psychoneurological Institute. In the text "We: Variant of a Manifesto" from 1922 he writes: "The 'psychological' prevents man from being as precise as a stopwatch; it interferes with his desire for kinship with the machine."²⁴ In 1931 Arnheim was not the only one who refused to dignify the sensory-motor movements that Vertov's films spin and cast as collective, intersubjective, and metasubjective as a positive and productive step. "Vertov does away very radically with everything that

is individual – even with the human individual.”²⁵ He sees Vertov’s demand for kinship with the machine as above all a kind of technology fetishism, as the critic Lenoble had attested fairly paradigmatically as Vertov’s psycho-ideology already in 1929: “Vertov’s work comes very close to the perception of the world and the outlook on the world of the technical intelligentsia, who are characterized by precisely the anti-psychological and technical approach.”²⁶

An “anarcho-individualist”²⁷ who seeks to merge, not with power but in the new circumstances of time, space, matter, and movement, however, cannot balk at harmonizing the human mind with matter and its physical laws. It is the prerequisite for film epistemology, the “documentary cinematic decoding of both the visible world and that which is invisible to the naked eye”,²⁸ as he put it in the article “Kino-Eye to Radio-Eye”. Vertov follows Bekhterev’s principle that science “does not consist in exploring the essence of things themselves, but is aimed at pursuing the reciprocal relationships between appearances.”²⁹ In Bekhterev’s tradition, he had laid the foundations for a new understanding of the medial unconscious, which, at least in western film criticism, had not been pursued further. The relationship between the “conscious” and the “unconscious” in film operations is not only contested in Vertov, it is one of the most common causes for bewilderment in film theory. Vertov and his *kinoks* practice is only one fundamental example of film as a technology and film as a describable complex of signification coming into contradiction and conflict. But the debates in film studies about intoxication and enlightenment in what is called “Russian cinema”, which will repeat more or less similarly for the American film avant-garde of the forties, show that the most developed critics went mad due to the distinction between the medial consciousness and the media unconscious precisely because cinema works beyond conscious perception.

The open questions begin with what depiction means in the first place. Siegfried Kracauer, for instance, after he had seen *Man with a Movie Camera*, clearly before its German premiere, wrote in the *Frankfurter Zeitung* on May 19, 1929:

All is movement, a single powerful movement that encompasses the heretofore fragmented aspects, and all the elements [...] flow together and fuse so completely with each other that they enter into the rhythm of the whole.[...] There are, therefore, two principal actors in the film: the ensemble of things and people in the city, and the “man with a movie camera” who takes control of them all. The material world on the one hand, and on the other, the “cinema-eye.” The relationships between them

determine the content of the film. The results are utterly remarkable; in any case, the cameraman presents anything but mere copies of objects.³⁰

By describing *Man with a Movie Camera* as a film made up of movements and relationships, Kracauer very precisely described Vertov's procedure. In this first review Kracauer shows himself to be enthused, elevating Vertov's procedure above even that of Walter Ruttmann in *Berlin: Symphony of a Great City*: "While Ruttmann's associative linkages, however, are purely formal throughout[...] Vertov uses montage to extract a meaning from the connections between the fragments of reality."³¹ Once again, credit is given to sense. Kracauer, who would afterwards write his "psychological history of German film" in the tradition of a sociology founded in ideology critique, did not wish to have the psychological, social, and thus also political implications of the sense-less *kinoks* method overlooked, perceived, or disavowed. Over the course of time Kracauer's initial enthusiasm waned. By the time of his book *From Caligari to Hitler*, which he wrote in New York, Vertov is merely mentioned as a propagandist:

Vertov, infatuated with every expression of real life, produced weekly newsreels of a special kind from the close of the Civil War on, and in about 1926 began to make feature-length films which still preserved a definite newsreel character.[...] Like Ruttmann, he is interested not in divulging news items, but in composing 'optical music.'³²

Looking back, Kracauer is very reserved in his evaluation of Vertov. What he once considered enlightening now seemed to him as purely formal questions. In 1929 Vertov's discovery of circumstances by cinematographic means had still been illuminating: "Vertov interprets (the juxtaposition) through his presentation."³³ In the course of his writings in exile, in the course of the political developments of the forties, Kracauer's sympathetic understanding disappears. Kracauer's own critical theory posed the question of technology as only secondary. What he sought to explain in his analyses, namely "those deep layers of collective mentality which extend more or less below the dimension of consciousness,"³⁴ has nothing to do with what Vertov, in the tradition of the reflexologists, was presenting in the cinema as the unconscious mechanisms of human perception and making visible by reflecting on technology. Kracauer's examination of the unconscious in the cinema also does not require any technical precision in the apparatuses that was demanded by the objective psychologists in their experiments on the nervous system, and that the *kinoks* realized in their

experiments in cinema. In the US, Kracauer only mentions Vertov and the montage of the *kinoks* at all in a comparison with Ruttmann, as if his initial enthusiasm now only seemed to him to be an error and an infatuation at the urging of the communists: “Vertov’s continued survey of everyday life rests upon his unqualified acceptance of Soviet actuality.”³⁵

In 1947, however, in the middle of the discussion in New York about surrealism, avant-garde film, and the techniques of political propaganda, a critical examination by Siegfried Kracauer would surely have resulted in Vertov, who at the time was once again working under miserable conditions in Moscow for the weekly newsreels, being discovered as a precursor to a film practice that critically put the effect of the media itself to the test. Of course, immediately following the war propaganda that had precisely been so much about media in its planning, this topic would have been highly risky and awkward for an asylum seeker. Kracauer, however, never examined film technologies in relation to – and possibly as in contradistinction to – political topics, neither then nor later. Ideology critique was not supposed to be concerned with neuronal manipulations and flicker analysis, but with the part of the cinematic that was capable of making conscious choices. Nonetheless, as early as 1948 Kracauer displayed a fascination similar to the one he had once shown for Vertov when discussing the films of Maya Deren, who was interested in just those aspects of the cinema that could manipulate psychology and perception. Here as well, he qualifies his enthusiasm with the words “the problem is only what the meaning itself amounts to.”³⁶ Deren’s idea of the unconscious and here critique of psychoanalysis might also have helped him – or seduced him – to find a new way to approach the unconscious in and through cinema. But he remained steadfast. As he had already done with Vertov, he refused to view the media process itself as social or even political practice. For this reason, Kracauer has always been considered a steadfast antipode to all media theory, and not only in American film theory.³⁷

Explosions

Walter Benjamin, who was a Russia traveler for love, tried to make the phenomenon of the cinema understandable to the bookish set. In the first version of his work of art essay in 1935, Benjamin attempted, albeit without mentioning Vertov, the *Kinoglaz* films, or *Chelovek s kinoapparatom*, to negotiate between human and apparatus, between subjective and objective psychology, and between the the function of media and that of aesthetics.³⁸

Like Kracauer, he also takes issue with the distinction between conscious and unconscious, but whereas Kracauer restricts himself to a “more or less below”, Benjamin let the space of conscious and unconscious structures get permeated, almost in a kind of cubistic manner. The human being is – according to Benjamin in his preliminary work on a media theory, which he would only work out in its various successor texts – not called into question by the apparatus, but can extend his or her knowledge of the ego, of the self, by means of the new technological apparatus. The example that he uses for the optical unconscious is directly comparable to Vertov’s film jump. (And the reflexive “self” used by the later Frankfurt School social researchers is seen to be something more than the storing and collecting rear guard of the ego-function.):

The most important social function of film is to establish equilibrium between human beings and the apparatus. Film achieves this goal not only in terms of man’s presentation of himself to the camera but also in terms of his representation of his environment by means of this apparatus.[...]With the close-up, space expands; with slow motion, movement is extended.[...] Clearly it is another nature which speaks to the camera as compared to the eye. “Other” above all in the sense that a space informed by human consciousness gives way to a space informed by the unconscious. Whereas it is a commonplace that, for example, we have some idea what is involved in the act of walking (if only in general terms), we have no idea at all what happens during the split second when a person actually takes a step.[...] This is where the camera comes into play, with all its resources for swooping and rising, disrupting and isolating, stretching or compressing a sequence, enlarging or reducing an object. It is through the camera that we first discover the optical unconscious, just as we discover the instinctual unconscious through psychoanalysis.³⁹

It should be noted that in the second version of the essay, which Benjamin only finished after the start of the war in December 1939, there is a harsher syntax used to subject the human being as a subject to film. The corresponding section XIII about film and apparatus now begins with the formulation:

Film can be characterized not only in terms of man’s presentation of himself to the camera but also in terms of his representation of his environment by means of this apparatus. A glance at occupational psychology illustrates the testing capacity of the equipment.[...] A similar deepening

of apperception throughout the entire spectrum of optical – and now auditory – impressions has been accomplished by film.⁴⁰

The bookish soul cannot get back to the world of its own bookish sensation. The apparatuses have yanked apperception into depths from which it can only come back to its senses with the help of science and psychoanalysis. The following passage from the second version of the *Work of Art* essay justifies, quite differently from the first, above all the objectivity of film as a scientific instrument and, in parallel, the scientific quality of psychoanalysis as an objective system of storing traces. On the one hand this lends more weight to technology. “*Demonstrating that the artistic uses of photography are identical to its scientific uses – these two dimensions having usually been separated until now – will be one of the revolutionary functions of film.*”⁴¹ On the other hand, in this second version the possibilities of film is pointedly placed in light of a disillusionment with the emancipatory power of art. The enthusiastic experiences that Benjamin had described with the Russian, Nordic, and American cinema as avant-garde in anti-fascist art must have softened the insight that fascist artists knew how to use film just as well. Although he himself never wrote any further film criticism, and in particular despite never taking account of Vertov’s intentions, Benjamin had nonetheless laid the foundations of a media critique that had taken up a different “unconscious” than the individual-psychological one had been. The “unconsciously affected space” that is screened in the cinema with slow motion, time lapse, close-ups, fades, and cuts initially transcends the known and conscious human in this technological sense.

Benjamin’s most famous formulation, however, is found in both the 1935 and the 1939 versions: “Hopeless” is how Benjamin describes the familiar and common spaces, the bars, railroad stations, streets, offices, and factories that enclose human beings. “Then came film and exploded this prison-world with the dynamite of the split second, so that now we can set off calmly on journeys of adventure among its far-flung debris.”⁴² In this sentence he formulates the simultaneity of liberation and horror that affects anyone who allows the intervention of film into the basic structure of perception to become a conscious experience. In Benjamin’s formulation of calmly move through the wreckage of the world we might already see one source of McLuhan’s thesis that media might have anaesthetizing effects. At any rate, Benjamin’s analogy is about an exploding out of habit and certainty by the ego-feeling and its sensations, which had been raised by the new technology in its origins. This is why cinema is also always a confrontation with the fragments and the fragmentary in the world, even if involuntary

brain functions and imaginary energy force the split seconds into artificial contexts.

Writing about the explosive force of film, Benjamin provides a significant objection to that theory that sees cinema as a form of the Platonic cave, in which spectators feel suspended due to the structural “*sous-motricité*” and “*sur-perception*” in the movie seat, because in this mimicry of those bound in Plato’s cave the reminiscence of the blissful imaginary experience of the small child is actualized, the experiences of corporal unity are granted in the optical-visual realm, while every real experience and especially the violent breakthrough to reality is displaced by imaginary baggage.⁴³ For Benjamin, on the other hand, precise perception under cinematic circumstances signifies the expulsion from the familiar as a chance to discover the relations between consciousness and technology, between the unconscious and the technical basis for how it works. In contrast to later film theorists, Benjamin saw this attack on identity and the process of identification in the cinema spectator not only as disturbance, but also as a necessary, fragmenting analysis, which releases from the familiar and common educational processes of the subject.⁴⁴ Frighteningly, we can assert in the cinema that every identification has a technological and perception-psychological prelude, and that not only works of art, but also identities fundamentally change with forms of media depiction in the passage of time.

But Benjamin cannot maintain the confidence of this statement in the second version of his text. Under the impositions of history he had lost hope that film might establish “equilibrium between human beings and the apparatus”, this “equilibrium” that became the shibboleth of the anarchists among the cyberneticists, who still dreamed of a scientific and artistic extension and connection of human organisms with the world.

Intervals

Vertov’s montage theory of intervals is the production of relations between the smallest common units of the appearances of matter by the cinematic medium. While the debate about the alternative between music and mathematics has so far concerned Vertov’s interval theory,⁴⁵ here a physical option will be brought to play as well. Vertov’s intervals have a strong affinity to the Lebesgue integral, which revolutionized pre-war mathematics as much as Einstein’s theories of physics had – and which, in 1919 (when Vertov wrote the first version of his interval theory), led a young mathematician

daydreaming at the window at MIT to want to calculate the surface of the River Charles in its movements. The theory of the Lesbesque integral allows for calculating irregularly moving points on surfaces and bodies by combing the sequence of intervals.⁴⁶ One significant requirement among others for cybernetically determined prognoses: technology offered a view to the future that could be seen, computed from the relations, interferences, and sequencing of events in the past, in a surprisingly new quality: “*shins vrasploch.*”

It is only in this context that intervals not only describe and signify circumstances, but can become operators of a changeable world. The moving art of the cinema in meant to take apart the world into intervals, not in physiological movements, but in substructures of units of physical movement and their transitions. Vertov describes the transition from cinematography to edited film as a relation of intervals: “*Intervals* (the transitions from one movement to another) are the material, the elements of the art of movement, and by no means the movements themselves. It is they (the intervals) which draw the movement to a kinetic resolution.”⁴⁷

Unlike Eisenstein’s later interval montage, Vertov wanted to edit the elements of the world as the camera records them as unmoved elements of motion, and as the projector again turns them into moved images. Vertov proposed a montage of illustrations as derivations in the mathematical sense of movement. The relations of movements on the screen is meant to replace the systematic gap between the cinematic image and the film signal. Vertov’s procedure is a non-hierarchical montage, which initiates equal and reciprocal relations between the most heterogeneous elements. It does without any “dominant”, like the one Sergei Eisenstein wants and must maintain for his overtone montage in film. So, as Vertov breaks, but does not interrupt the intoxication of perception by reflecting on manipulating this perception through technology, he takes up the law of movements and follows it without letting it interrupt its path through the borders of anthropomorphic shapes.

This movement of movement is an exact continuation of the principle of transferal, which Bekhterev had examined for world energy. It was taken up again, much later, by Gilles Deleuze in his first cinema book *The Movement Image*, in which he initially gives an account of Henri Bergson’s reflections on movement from *Matière et mémoire*: “*Our error* lies in believing that it is any-element-whatevers, external to qualities that moves. But the qualities themselves are pure vibrations which change at the same time as the alleged elements move.”⁴⁸ Already in Bergson’s book from 1896 there is the idea of a movement that is realized through bodies and identities. In light of

this tradition Deleuze examines the structures of perception in Vertov's films, the relations of movement as interrelations and intervals of material perception itself:

In Vertov the interval of movement is perception, the glance, the eye. But the eye is not the too-immobile human eye; it is the eye of the camera, as it extends from a point where an action begins to the limit of the reaction, as it fills the interval between the two, crossing the universe and beating in time to its intervals.⁴⁹

The eye of matter thus functions like human vision in the cinema. It synthesizes impulses and connects action and reaction to a material reflex arc, albeit one that transcends the boundaries of the individual. If Deleuze distinguishes between camera-eye and human-eye in his description, then he only does so to mark the break at which human perception can become material, just as it had been imagined in reflexology. It is not the human eye, but the human gaze that can find itself cinematically interrelating to the world. At any rate, it gets lost, itself tossed about back and forth by the reciprocally affecting light and reflection punctures of the matter, so that there is no center any longer in which the old human being could maintain his position. It is only the multiple ways and movements of actions and reactions that become a recognizable model of a world in which everything possible can be conveyed. This would also be a correct description of the social circumstances in the relational logic of Bekhterevian collective reflexology.⁵⁰

Deleuze therefore points precisely to the sticks of Benjaminian dynamite in cinema, showing which films consciously dismiss an old view of the human being and which scientists and artists from the beginning of the twentieth century had already distanced themselves from the anthropology of the nineteenth century – which was often simply science in the service of colonial and imperial power. The new structure and communication of matter, which had made visible a “truth by means of film”, realized movements and connection beyond the shapes and boundaries of individual bodies:

We have seen that the gap, the interval between two movements sketches out an empty place which prefigures the human subject in so far as he appropriates perception to himself. But, for Vertov, the most important thing was to restore the intervals to matter. This is the meaning of montage, and of the ‘theory of intervals,’ which is more profound than that of movement. The interval is no longer that which separates a reaction

from the action experienced, but, on the contrary, that which – an action being given in a point of the universe – will find the appropriate reaction in some other point [*point quelconque*], however distant it is.⁵¹

This explains why Vertov, with his concept of universal and reciprocal matter-connections, of universal reflex-arcs, should be treated as a political outsider in the new Soviet state, which was then in the process of making the heterogeneous homogenous and hierarchical. But the interval theory is even more radical than what the film agencies understood by it. In the context of interval theory, Vertov's temporary exclusion of "man as a subject for film" because of "his inability to control his movements"⁵² is no mere anti-humanism.⁵³ It once again refers to an unconscious that has nothing to do with suppressed fantasies, but with the unconscious movement of perception and of desire – in the technology of the cinema and in the structure of the gaze, permeated with desire. This is why Vertov embraces the non-human as liberating from an oppressive, desireless human reality. This is also a lesson from Bekhterev's arsenal, which butted up against all acceptable conventions with its view of being good citizens with *Collective Reflexology*.⁵⁴ Vertov wanted to liberate the cinema from its anthropomorphism, constituted from the symbolic remains of the culture of writing, in order finally to let the dancer merge with the dance. If even he speaks of a "new man" who "will have the light, precise movements of machines, and ... will be the gratifying subject of our films."⁵⁵ Vertov's concept makes a distinction from the new man demanded by socialism. The model of this new man is Dziga Vertov, as artificial as the name referring to the man jumping from the heights. Instead of a hero, cinema shows someone hesitating, balking, wavering.⁵⁶ According to this model, the analysis-apparatus 'cinema' was an anti-heroic model, proposed as a universal transformation machine, just as the personality had also been conceived by Bekhterev as a transformation machine for global energy. From this perspective Deleuze defended the Vertovian truth of matter against the reproach of anti-humanism:

...each – even the most charming peasant woman or the most touching child – was presented as a material system in perpetual interaction. They were catalysts, converters, transformers, which received and re-emitted movements, whose speed, direction, order, they changed, making matter evolve towards less 'probable' states, bringing about changes out of all proportion to their own dimensions. It is not that Vertov considered beings to be machines, but rather machines which had a 'heart' and which 'revolved, trembled, jolted about and threw out flashes of lightning,' as

man could also do, using other movements and other conditions, but always in interaction with each other.⁵⁷

What the “life caught unawares” – the declared goal of the cinematic organization of the world in the *Provisional Instructions to Kino-Eye Groups* from 1926 – conveys in the facial expression and gestures of the physiological analysis to the cinema-lab worker corresponds to the truth of objective psychology. This is why Vertov so disdained the cinema under the direction of bourgeois psychology: “We consider the psychological Russo-German film-drama – weighed down with apparitions and childhood memories – an absurdity.”⁵⁸ It does not observe with analytical apparatuses, kino-eyes, but films what had been written, dramatized according to the logic of literary souls. It remains the cinematic illustration of a *Bildungsroman*. Vertov’s rage at fiction films can also be explained by the fact that in 1935 writing and text were still an unavoidable reference medium for film artists, and served as the basis for distributing production funds or imposing censorship. Only previously written-down observations were permitted, after approval, to be filmed. Any direct recording with the camera, however, was forbidden, since the bureaucracy of the time had no censorship laws for celluloid. The journal writer Vertov writes about the director Vertov: “To observe – all of Pavlov’s students are allowed to do it, even all scholars and writers, but he is not allowed. To him they say he has to write everything down in the script, the script is the primary thing.”⁵⁹

Experiences

Chelovek s kinoapparatom, proclaimed a “film without intertitles”, does not, however, manage to get by completely without some sort of written notice to the audience. But it is also possible that it was not permitted to appear without titles. The spectator’s attention is discretely drawn to her position as a test subject, as is always the case in the cinema. Later this is experienced with the spectator’s own body. In the opening credits *The Man with a Movie Camera* is called a “film experiment”, Dziga Vertov is introduced as the “author-supervisor of the experiment”, the goal of the experiment is “the cinematic transmission of visual phenomena” and indeed exclusively by means of cinema. The announcement continues its offensive not only against the competing arts, but against films that this one is indebted to.

This film is an experiment in cinematic communication of real events

Without the help of intertitles

(a film with no intertitles)

Without the help of a story

(a film with no story)

Without the help of theater

(a film with neither actors nor sets)

This experimental work aims at creating a truly international language of cinema based on its absolute separation from the language of theater and literature.⁶⁰

After the other film technicians have been introduced, there are in fact no more intertitles for the next 92 minutes. The reciprocal relationship between the images and the flickering, which now begin, are less anarchic than Deleuze's description would have them be. In one of the first sequences the projector is introduced in the film, and the sequence is edited with other shots into a motif of beginning. The film seeks to find the moment between motionlessness and the introduction of a movement, between rest and restlessness in the gears and the masses of people. Finally, there is a shot showing two carbon pencils concurring in the image, and the light of the arc lamp starts to shine, starting up the projection. This montage blends into moments of awakening, of rising, of the visual movement of opening and of the optical opening of perspectives and gazes. The motifs metaphorically repeat what the technology is realizing.

Just as the principle of the interval is introduced into the montage, one sequence shows – to put it into words after all – “traffic, movement, and seeing movement.” The cameraman presented in the film throws himself into the capital's traffic, and the “invisible”, filming camera follows him. Already at the beginning of the sequence unconscious perceptions and effects of cinema have appeared, effects which work beneath conscious perception in correspondence to one another, so that human vision itself, in a parallel to all the images, becomes the object of observation. A relativity of seeing movement is gradually built up in the cinema. While at first we only see simple movements in the image, these are then also taken up by a moving vehicle so that two movements become relativized on screen. Finally, the whole constellation itself is taken up in traveling, that is, jolting, so that what is actually invisible, namely the camera that is filming, becomes visible through its own movements. The brief cutaway to the locomotive wheels introduces a new kind of movement: the tracks that, in contrast to the carriage do not jolt, and thus also make it possible

for the camera to travel without drawing attention to itself. To this day, tracks allow for cameras to move unnoticed in the cinema as effects of the spectator's perception, as Münsterberg had described for artificial attention. In the last long wide shot the viewing of images gets entangled with the past impressions of the different movements produced by film. Every movement that is seen becomes relative to all others and is at the same time entangled with the new knowledge about how movements are produced. In part this is a conscious reflection, in part it remains an unremarked shift in perspective, which allows the spectator barely any conscious inferences about his or her own seeing. Any fixed spectatorial standpoint is dissolved in what optically comes from the screen. The spectator's gaze gets lost in the chaotic movements of the traffic.

- Close-up: Wheels of a locomotive slowing starting up (4")
- Wide shot of the filming camera in motion, from behind the staged cameraman, who turns the crank and records another carriage with people in it riding in parallel (or simulates this for the footage) (5")
- Close: the wheels of the locomotive in motion (6")
- Wide shot from the filming camera to the staged cameraman, who is filming the people in the carriage (4")
- Medium shot: Train from below, that accelerates and drives away (3")
- Medium shot: people in the carriage from the perspective of the staged cameraman (3")
- People from the perspective of a (second?) cameraman (5")
- Medium shot of the staged cameraman on the carriage (6")
- Medium shot to other people in carriages (6")
- Close-up: the staged cameraman as he is shooting (2")
- Close-up of two women in the carriage, one of them imitates the cranking motion of the staged cameraman (2")

Already the thematizing of traffic feeds back into the cinematic analysis of movement and the synthetic, illusionary perception of movement. "The essence of the cinematic movement-image lies in extracting from vehicles or moving bodies the movement which is their common substance, or extracting from movements the mobility which is their essence",⁶¹ noted Deleuze in a different context, but it shows how well armed the gaze is in the cinema and how it can recognize itself as so armed.

Over the course of the sequence the confusion of moving gazes is pushed even further. If at first the two perspectives of the cameramen were built up and differentiated, now they are intertwined, and the spectator's gaze can

no longer distinguish which camera-eye she is looking with or through. She can only know that she is seeing cinema. This is the aim of montage: The camera can assume any standpoint and simulate any gaze. It can take on any gaze and anyone can apprehend the standpoint of the camera from the screen. From the gesture of a passenger in the coach, however, who imitates a cranking motion with his own head, the gaze of the – or of a – cameraman becomes present on screen. In the movements of seeing the logic of the gaze is now also interlaced as that of the other. Always and still “caught unawares”, we are those who are being looked at in the traffic of the world. The film plays out in the intervals of the movements and gazes.

- Medium shot of the staged cameraman on the carriage, the filming camera lets him get closer. In the background the carriage with the people
- Close-up of the people in the carriage, children, in the wind of the ride (2”)
- Medium shot: the galloping carriage horse (3”)
- The staged cameraman on the carriage, cranking, driving in relation to the the filming camera through the image, forward and backwards (2”)
- Medium shot: The galloping horse as above... after 3 seconds “frozen” into a still picture (4”)

In the unconscious navigation of gazes in the cinema, and in the unconscious relation and reversal of human gazes in the street traffic, the unconscious deception of the senses then gets mixed in as a trick of the cinema itself, namely the artificial animation of spectator brains, which see movement in still images. In the image of the galloping horse, which is frozen on screen by a trick, the film leads back to the primal scene of film in the experiment at Palo Alto. Once again, everything is maintained in the staging of the cinema-eyes: illusion and disillusion. Frustrating the illusion of movement in the cinema by showing a still image, from which motion is created in the first place, is at the same time a double deception, for a still image on the screen can only be generated by showing a succession of identical images in the intermittent course of the projector. Any consciousness that tries to keep up with its own imaginative effects here will be lost. Only someone who allows herself to be deceived can be enlightened by the cinema-eye – about the fact that she herself is continually transformed in every inevitable identification and – consciously – cannot see herself seeing. The truth lies somewhere in between, around 20 times a second.

More still images follow, introducing us to the technology of the editing room:

- Still: Medium shot of the people in the carriage (4")
- Still: Wide shot of the avenue with passersby (3")
- Still: Medium shot of two women in the carriage (4")
- Still: Wide shot from above to a broad street, a market, or a large square full of people and traffic (4")
- Still: Portrait of a woman with a pitiful expression
- Still of frames from a filmstrip, on which is depicted the portrait of a young girl (5")
- Still: tight close-up of a young woman looking sternly into the distance (5")
- Still of frames from a filmstrip, on which is depicted the portrait of a different young girl (5")
- Medium shot: strips in front of a light box, 17 filmstrips are sorted and form patterns (5")
- Shelves with sorted film material (writing in Ukrainian) (2½")
- Close-up: the spool on an editing table, still (2½")
- Filmstrips, images of a girl, sideways, as they would be placed on the editing table (2½")
- Close-up: the spool on the editing table, now turning and winding a roll of film onto it (2½")
- Medium shot, from the side, of an editor at the editing table, she is cranking the machine (2½")
- Close-up: on the editing table above the light box runs a filmstrip without intermittent equipment, that is, no picture can be seen, only patterns that change with the speed. The strip is stopped, a pair of scissors appears and makes the... cut (6")

The elements of film technology appear in the image, and we see how necessary technology is to create a moving image in perception. Single images, strips, the nearly invisible difference between the pictures in succession, the various speeds on the editing table, the order of the film strips, the editing and the splicing make clear how much every depiction abstracts and has to be made open to montage in the individual frames before it can be turned into a moving form of reality in the cinema. What is demonstrated is that no image can be seen if the film runs continuously. The invisible intervals are necessary for an image to emerge. What is also demonstrated is that quite different images – as in the case of a cut – can be put together by the

brain, like the almost identical images of a still photo: only the movement pattern and the intervals have to be right.

- Medium shot, from the side the editor, Svilova, at the editing table, tapes two filmstrips together (3")
- Still: Portrait of a young girl (3")
- Medium shot of the editor from below, in the background are the strips in front of the light box, the editor is looking for a strip (3")
- Sequence of the young girl, who we have just seen as a still, in full motion: the girl starts to laugh (3")
- Medium close-up, the editor at the editing table cranks and looks at the strips (2")
- Still: film strip showing two boys in portrait (4")
- Sequence of the two boys running in full motion (4")
- Medium close-up, the editor at the editing table cranks and looks at the strips (2")
- Still of two other children as filmstrip (4")
- Sequence of them in full motion (4")
- Still of the portrait of the old woman who was already seen earlier (1")
- Still: Wide shot of the large square that was seen earlier (1")
- The two children just seen as a still, now in motion. They are watching something, half afraid, half laughing...
- Wide shot of the large square now in motion: Traffic and passersby (6")
- The old woman in the portrait now moving, arguing with a woman at the market (4")
- Medium shot, the editor at the editing table cranks and looks at the strips (1")
- Filmstrips run in a grey blur over the light box, stopping at... (2")
- Still: Medium shot of two women in a carriage (1")
- The two women in the carriage as a moving image (3")
- The young woman, seen previously in a still as portrait, now laughs, speaks to the filming camera, flirts, look into the camera...

In this last part of the sequence the analysis of watching cinema becomes an analysis of interpersonal perception, a psycho-analysis in the sense of objective psychology. It goes back to Vertov's origin, his jump. The still images, like that of the old woman, the young woman, or the various children with their particular facial expressions, with their "somatic-mimic reflexes", are shown first so as to communicate these reflexes as emotion and perception. As they get treated by film technology this impression is

frustrated, but also extended. If Bekhterev and Vertov had technologically held and disassembled the complex reflexes and emotional movements of expression in the early experiments, here they are presented as synthesis. Once again the technical intervention is a treatment of what the naked eye cannot see. The pitiable facial expressions of the old woman become, in motion, those of a haggling market woman, but the other way around, in the image of the unpleasant old woman there still exists what once had aroused pity. Likewise, after being re-animated by movement, the young woman, who seems dismissive in the still photo portrait, starts to speak and to flirt with the camera, while all the earlier and contradictory components of her expression are still maintained in this new movement. The children continue changing their facial expressions, but the in the still photos one could see that their exuberance also contained fear, surprise, amazement, or timidity.

The film in the cinema is always simultaneously an analyzing and synthesizing movement of a reality. It is never about how something would be, but about how it can be brought into a reflexive and reversible motion so that new relations are produced and the unknown in the world can be recognized. The *kinoki* had realized what Bekhterev had promised from reflexology: "The ultimate goal of psychoreflexology is thus to study the relation of the organism to the outside world in connection with existing experience, quite independently of subjective experiences that one might presume in the organism with external effects according to the analogy with oneself."⁶²

Centers or centrifuges

Somewhat puzzlingly, it is Vertov, with his montage theory, who is seen as an agitator in western, and in particular German film criticism.⁶³ In a constant confusion of messenger and message, the demonstration how power structures the gaze is taken for a power ploy itself. This is exactly why Vertov explicitly replaced the subjective human eye, whose logic cannot be seen objectively, with the mechanical kino-eye, whose movements in the cinema can be traced and whose traces can be ensured. This operation will be denounced as dogmatism in his successors, for instance Godard, who invoked Vertov in his own work.⁶⁴ The corrosive and calculating Vertov is constantly opposed to the dialectical, musical Sergei Eisenstein, whose work focuses on the human being as a hero figure corrected by historical materialism.

Eisenstein, on his search for a scientifically grounded effect aesthetics of film, had also thoroughly studied the works of the reflexologists and in particular of Bekhterev, as well as the writings of the most important psychological schools.⁶⁵ In 1924 Eisenstein defended his theater theses on the *Montage of Attractions*, which had appeared in 1923 in the same publication of the LEF – “Levy Front Iskusstv” – as Vertov’s manifesto *Kino-Eye*, and adapted it for the cinema. At the time Eisenstein held reflexology in high esteem: “The method of agitation through spectacle consists in the creation of a new chain of conditioned reflexes by associating selected phenomena with the unconditional reflexes they produce.”⁶⁶ While Bekhterev had sought to show how observing and analyzing using technology leads to different results in psychology than the subjective conclusions of analogy do, and thus had used, among other things, snapshots in order to correct subjective, pseudo-analogous, introspective psychology, Eisenstein orients himself to Theodor Lipps’s thesis that emotional experiences can be had and conveyed directly by the psyche, for instance “the emotional understanding of the alter ego through the imitation of the other.”⁶⁷ Furthermore, Eisenstein invokes Hermann Nothnagel’s physiological examinations of the brain, which had showed that different nerve tracts are used for imitation depending on whether the stimulus is voluntary or involuntary.⁶⁸ Only stimulation by affects reaches the thalamus in the brain directly, maintained Eisenstein, and this direct path to the brain of his spectators was the only thing that interested him. Later he turned, unlike Vertov, to classical psychology and psychoanalysis in order finally to orient himself to Piaget’s theory, which he knew from Lev Vigotsky.⁶⁹ For Eisenstein montage was not about psychological traditions, but simply about efficient dramaturgy. “Reforging someone else’s psyche is no less difficult and considerable a task than forging iron.”⁷⁰

Although Eisenstein’s experiments were no less inventive than Vertov’s, their film methods are completely different. Eisenstein was interested in techniques that might change people, and he must have presumed that the desired ideal, the goal of all education, which served as the basis for all artistic modelings, was already well established, for it is not what emerges in the course of the film process. The demand for the “model actor”, as he called actors, was “the healthy organic rhythm of normal physical functions”,⁷¹ so that the conveyance of feelings can run smoothly. It is hard to imagine two goals of processing human feelings on film being more different. Whereas Vertov begins to disassemble the great and heroic feelings cinematically and to cause the boundaries between normal and pathological to collapse

in the multiplicity of elements and movements that establish a bodily state, Eisenstein struggles with film to create a healthy social body.

For Eisenstein, film serves to convey affects through facial expression and gesture, not unlike in theater. The special technical aspects of the cinema that store and synthesize reality in images is not of particular concern to him. Movements interest him as the movement processes of human bodies and not – here he is following Meyerhold and biomechanics – as perceptual problems in the cinema. The cinematic method corresponds to biomechanics because human movements, which by this time had come under the influence of Taylorism, can be absorbed in cinema as ergonomic – refined and systematized by analyzing working processes historically and dialectically. Eisenstein relates all movements, even the eccentric movements of a jazz musician, to a virtual center and precisely to the “healthy organic rhythm of normal physical reactions.” Film is not, as Vertov had proposed in his manifestos, an opportunity to discover something new in the field of vision and to displace an “ego” and its identity within familiar spatio-temporal conventions, but only one among a variety of insufficient methods to depict, to regulate, and finally to sort out the human historically.

In 1929 Eisenstein refined his theory of montage according to the model of the kabuki theater, which does not simply stimulate the various sense organs with various impulses, but aims for “the final sum of stimulants to the brain.”⁷² Correspondingly, in his article “The Fourth Dimension in Cinema”, Eisenstein organizes his forms of montage into classes of impulses. He names the more complex of them after musical structures: tonic and dominant, major and minor, dissonance and consonance, without ever explaining the transfer of these acoustic relations into film technologies, for instance into focal lengths, field sizes, or editing rhythms. He sticks with illustrations using atmospheric images: so “major” is harvesting in the sunshine, “minor” harvesting in rain or the port in fog, etc. Like in acoustics, Eisenstein finds overtones and undertones in film as well, that is, visual “aberrations, distortions, and other defects”⁷³ that accompany a film sequence.⁷⁴ He then understands the optical impulses illustrated in musical metaphors as complex and reflex:

That distinctive montage complex within the shot that arises from the collisions and combinations of the individual stimulants inherent within it, of stimulants that vary according to the ‘external nature’ but are bound together in an iron unity through their reflex physiological essence.⁷⁵

This interpretation of reflexology assumes that nerves function in an analogous way to the physical qualities of the sense surroundings, meaning that, to stick with Eisenstein's examples, "a grey-haired old man, a grey-haired old woman, a white horse, and a snow-covered roof"⁷⁶ also exhibit constant similarities in nerve physiology. But the particular possibilities of film transmission, as Vertov had developed them from neurological research, precisely do not consist in banging out parallel visual qualities in the sense organs – to speak euphemistically, to use visual metaphors – but in activating brain functions through optical deception and in switching them on against viewing habits. Another possibility might be to directly introduce an impulse to the nerves through effects of movement and light in order to produce emotional values. This would be the flickering, shimmering, and jittering in the cinema, which transmits emotions that are neither coded nor decoded metaphorically, and that expose the visual value, the motif, or the symbol in their various possibilities of association or relation. Here it once again becomes clear why Vertov insists that the cinema must first abandon producing images based on the model of the human eye in order to experience its own traits and the particular effects of the medium and its technology.

When Eisenstein enumerates his four fundamental techniques of montage as the metric, the rhythmic, the tonal, and the overtone, he gets lost in analogies. Poetry, music, and painting provide the terms for naming film techniques, but once again the parallels are only vague at best. The precision of the meter "joins the 'pulse-beat' of the film and the 'pulse-beat' of the audience 'in unison.' Without this there can be no 'contact' between the two."⁷⁷ But Eisenstein does not introduce film montage as electro-technologically as it is formulated here. For all his seemingly psycho-physiological refinements, he always calculates the immediate effect on the spectator, not the mediated one.

Eisenstein's example for overtone montage is the "Gods" sequence in his film *October*. At the latest with this example, which is "assembled on a descending intellectual scale" and shows "the notion of god back to a block of wood", it can be seen that the efforts to bring reflexology and psychophysics into the field are completely unnecessary to explain Eisenstein's forms of montage, since it is precisely the "reaction of tissues" that require impulses that are encoded as streams. Eisenstein sticks to divine metaphors. His famous montage of the gods rhythmically places still photo depictions of religious artworks in succession. The accelerating editing of the series is conceived as a descending line, from the architectural example of a Russian Orthodox church to sculptures from the Far East and ritual African masks.⁷⁸ The theory of intellectual overtone montage, which is supposed to be carried

out as “attack into the very heart of objects and phenomena”,⁷⁹ merely illustrates a literal and highly museum-like arrangement of sacred objects.

The differences between Vertov’s and Eisenstein’s theories of montage lies above all in differing concepts of how human perception relates to its technological conditions. The “sorts of vibrations”⁸⁰ that Eisenstein’s cameraman Tissé put into the work as the true virtuosity of the medium by means of camera movements, fluctuations of light, various focal lengths, gradations, and motivic tensions must, under Eisenstein’s direction, always remain connected to fundamental dominants in terminology. Vibrating itself can no longer be a film effect, it must remain hidden, like the famous dwarf in his chess machine, and the truth of the cinema has to resign itself to the law of dialectical materialism. Eisenstein counters the skeptics of his montage theory with a striking argument from Lenin’s *Conspectus of Hegel’s Book “The Science of Logic”*.⁸¹ The new man need not be able to recognize the technical conditions of his own existence if only he understands the dialectic. Eisenstein does not explain film starting from film technology, but proposes it in networks of signification for persons of the Gutenberg galaxy. His films reenact this position. The well-known example of the three marble lions that rise up after one another in *Battleship Potemkin* is a “movement” that only stands metaphorically for cinematic perception. Unlike Vertov’s demonstration of watching movement in film, Eisenstein leaves his spectators with an indication of what has happened psycho-physically. Psychoanalysis and literature will lead Eisenstein ever closer to ecstasy than to a “certain flickering” in the image.⁸² But they also do not get him any closer to the conditions of his own perception.

While Eisenstein wanted to reforge the essence of the Soviet man, Vertov experimented with technology itself to experience the essence of the new man. But he had to run the risk that he, if he wanted to experience the essence of technology, would no longer be the one to have this experience. Anyone who goes so far into relativity can no longer ask what he has lost:

We fall, we rise... together with the rhythm of movements – slowed and accelerated,
 running from us, past us, toward us,
 in a circle, or straight line, or ellipse,
 to the right and left, with plus and minus signs;
 movements bend, straighten, divide, break apart,
 multiply, shooting noiselessly through space.⁸³

Part V

1. After All: Return to Receiver

Cybernetics is the art of creating equilibrium in a world
or possibilities and constraints. – And I would suggest
that this is also a viable definition of the art of living.

– Ernst von Glasersfeld, 1996

In the darkness of projection, in a state that, as Maya Deren wrote, so much resembles sleeping or perhaps dreaming, our lunatic eyes find themselves on the dark side of a cultural technology, on the far and weightless side of the optical doors of perception, and at the same time, as Deleuze stresses with Vertov, “the eye of matter, the eye in the matter”, that gaze which has – just barely – formed us. Just barely, for who knows, perhaps soon there will no longer be any imaginary people, Morin’s *hommes imaginaires*, because other machines will affiliate themselves with other types of egos in order to form people in their own image, getting them to dance. Until then, however, all endings, whether hallucinated, projected, described, or sung, will always also be visions and faces that are recorded in the form of darkness and light, movement and blur, projected on movie screens, subjected to our desires, spellbound beyond every ending. This is why these somewhat twisted shapes appear, waiting for summer rains in wild Italian landscapes, when *The End* is mentioned. Roman wilderness spreads out in cinema and pop music where in the Renaissance the first city was mapped, where mathematically and optically new knowledge, *nuova scienza*, is meant to relocate spaced out subjects back in space. Roma contra amor.

Until other machines affiliate themselves with other types of egos, we will continue to pose the question of cinema as a technique, we will question the fast, rhythmic, or logarithmic swinging movements it imposes on us, and we can ask whether cinema couldn’t be considered a ritual or trance technique, because with all its stories, dramaturgies, and dialogues, it always also cuts into accustomed motor-sensory circuits modifying behavior through more complex routines of relating to others and to new complexes of movement. At the beginning was the question of a particular, and in the sense of Fechner’s protocol, a fleeting historical subjectivity, its sensual entrapment and constitution under the conditions of the ecstatic technology of the cinema, as it was constituted in Paris, Leipzig, and Leningrad, the effects of which were later experienced in Bali and in New York, in Haiti, in Niger, and once

again in Paris, and were then deconstructed, depersonalized, and analyzed right away again thanks to image-producing apparatuses.

In the end it is about exposing the circular-causal qualities in cinematic perception in light of the early neurological and psycho-physical research that had always accompanied the invention of cinema. At the intersection of the disciplines, the knowledge of cybernetics and cinematography meshes up to networks in which a historical cultural technology appears as texture of power relations – sometimes murderous, but always also as the possibility of an improbable formation and encounter at the cross-roads: *“The most important social function of film is to establish equilibrium between human beings and the apparatus.”* Not as mediation, but as existential provocation. Both are challenged at the cross-roads: human beings and apparatus.

At the beginning was the question: To what end, for what possible goal, for what sense, telos, or state could cinema govern the behavior and interrelations of human beings and apparatuses? For this would be the prerequisite to assuming cybernetic processes. At the beginning of cybernetic history the first shadow community of the new science posed the question of possibly recognizing purpose or teleology in the behavior of animals, human beings, machines, or human-machines. The radicalism of this epistemological program was not immediately clear. *“One of the essentials for understanding it, was to have been brought up in the age when [...] purpose was a total mystery.”* It was still a mystery for the participants at the first Macy Conferences, who wanted to learn how to discover in expressions, as Rudolf Arnheim had expressed it, or in behavior, no matter how lunatic it seemed, an anticipatory and feedback relation of a particular individual to its surroundings. Every behavior brought past experience up to the present because these were reflected emotionally or humorally in a specific bodily form or communication, as Norbert Wiener had speculated: *“I have a strong suspicion [...] that there are two modes of communication in the human body, the one that belongs to the neuronal system strictly and the ‘to whom it may concern messages’. I suspect that the ‘to whom it may concern messages’ are a) closely associated with emotion and b) at least partly humorally carried.”* Especially if it is integrally guided by feelings and emotions, behavior cannot at all be described as simple, goal-oriented, greedy reaction, but as cultural reaction, supra-individual, as one that creates relations, one that is implemented into our bodies in an odd and, as we know from Kleist, dancing way, innocent, unaware, bear-bellied, puppet-like, or divine. In a similar way, older cultures of possession have incorporated historical and social knowledge, cultural relationships and behavioral forms according to divine models of behavior in a precision that is quite incomprehensible to us.

On the search for cybernetic forms of thinking which might save the planet, Gregory Bateson, high above the Pacific in Big Sur, believed that he could identify supra-individual and integrated models of behaving as functions of the gods: "*One of the things that man has done through the ages to correct for his short-sighted purposiveness is to imagine personified entities with various sorts of supernatural powers, i.e. gods. These entities, being fictitious persons, are more or less endowed with cybernetic and circuit characteristics.*" Bateson, we know, learned from cinema. His divine functions can be thought of as cinematic functions from beginning to end.

The fact that it was cinematography, and not the universal Turing machine that was the prerequisite for all behavioral research is of course not mentioned by the avant-gardes of cybernetic thinking, but it was cinematography that turned behavior into an object for science in the first place, placing even its interweaving of past and present into a measurable order. Cinematography could record, store, and analyze behavior as a complex interaction between arbitrary points in the universe, open it up to combination, to repetition, to restaging. In the cinema behavior became visible as a visible transformation of states, of circumstances, of sensations and reactions nascent on the axis of time.

Cinema would be the art of combining behavior, which had been turned into discrete data with the help of chronophotography, into new forms and formations. This happens all the more precisely and poetically, that is, counter to the cinema's history of control and discipline, the more exactly art moves in the matrices and registers of the medium. This is why in the end we have dealt with films that were about the historical *dispositif* cinema in the image, or at least of artists that went cinematic with the help of transformation processes of shooting and editing.

For cyberneticists, not supermen of science, as Guilbaud emphasizes, but simply people at the cross-roads of the disciplines, behavior, if it is cybernetic, will bring all the points of the universe into equilibrium. "*...for cybernetics is the art of creating equilibrium in a world of possibilities and constraints. – And I would suggest that this is also a variable definition of the art of living.*" There is nothing homely about this, no self-sufficiency and no getting comfortable in a safe spaces. Finding equilibrium, in a cybernetic as well as a cinematic sense, would mean entering into an extreme exchange with the surroundings or the universe, and one that is decentering for the individual. It is never a matter of binary relations, much less of exchange values. Rarely were the travelers to Africa, the explorers of possession techniques, the disturbers of behavior oriented as to where their journey was going. It was nonetheless clear that the violence that is still hidden in

the decolonialized body cannot become visible in any other way than by the means of those films which also decenter the observer. It was only the doppelgängers of trance and their blinking paraphernalia, allowing the light to flash and flicker in disturbing time periods, that were able to bring photographing strategies of identity formation to light. And only with the help of the movie camera those mechanical processes become visible in which men and cameramen turn into organless or multi-organic energetic complots and complexes, whether consciously or unconsciously.

The equilibrium in question demands of anyone looking to salvage it to put oneself in danger, to risk jumping into the unknown of a technologically manipulated time and its dark intervals, to risk crashing or overdosing, or pirouetting into the spirals of one's own ego, endlessly running around the tracks of the measuring stations in the Bois de Boulogne only to learn that the truth presented in statistical traces and recordings is a truth about absences. *"...in art doing something means doing away with something, beginning with oneself."*

In the decenteredness in which *"movements shoot noiselessly through the room"*, the meshes of the disintegrating or networking individual, its obsessive, neurotic, and nefarious mental statements may therefore be understood as a gift to the surroundings. *"Mental life is not only a sum of subjective experiences, but always also gives expression to a certain series of objective appearances. These objective experiences are what the personality uses to enrich its external social surroundings."* These objective appearances in the form of sheen, flecks of light and bright spots on the screen, create new kinds of homeostasis which connect us as spectators medially to a degenerated, exploited global village gone off balance, and they teach us to understand cinema as a production of perception, *"in matter, as it extends from the point where an action begins to the limit of the reaction, as it fills the interval between the two, crossing the universe and beating it time to its intervals."* This means we are summoned into the cinema in order to realize crises in our sensory-motor reactions, to incarnate crises and to enter into circumstances that connect us in ways that the ego had not previously imagined. The unpredictable and unimaginable states that arise in the cinema bring to the present exactly what was missing.

Notes

Part I

1. Cinema

1. Bechterelev (1908), 194.
2. Kracauer (1960), 14 ff.
3. Münsterberg (1970), 36.
4. Deren (1946 A), 20.
5. Kersting (1989), 265.
6. Farocki, (1981), 515.
7. Cf. also Krumme (1971), 72 ff.
8. Eisenstein (1998), 52.
9. Reisz/Millar (1968), 46.
10. Reisz/Millar (1968), 48.
11. Godard interview in Bazin/Labarthe (1995).

3. Knots

1. Münsterberg (1916/1970); Mauerhofer (1949); Kracauer (1960), 157-172; Arnheim (1957).
2. Mauerhofer (1949): "There is no doubt that the reason why film critics so often contradict one another is that the difference between their unconscious minds plays tricks on them. For no two people experience a film in the same way. The experience of film is probably the most highly individual of all experiences. Even the course of sexual experience, fundamentally speaking, seems more monotonous than the experience of film in half-light of imminent boredom, unconsciously fomented imagination at work and passivity in voluntary seclusion.", 106.
3. Kracauer (1960), 159.
4. Cf. Andrew (1976).
5. Bellour (1990): "The subject of hypnosis gives up his/her look under the domination of the double movement which grips it tightly: regression, idealization. The subject spectator is submitted to similar domination...", 107.
6. Farges (1975), 80 and Anderson/Anderson (1980), 87.
7. Klivington (1989): "When we watch a movie, we are experiencing apparent motion. Each image flashed on the screen is a motionless scene, but one follows another so fast with such a small change in the position of each image that our visual system tells us the images are moving.", 119.
8. Rheingold (1992), 600.
9. Wertheimer (1967), 65.

10. Wertheimer (1967): "The optical motion resulting from successive stimulation can be seen in reference to the movement as equal to the seeing of movement in the exposition of a corresponding object that is moving in reality, and is equally strong, under certain circumstances even more insistent.", 75 (underscoring in the original).
11. Anderson/Anderson (1980), 87.
12. Arnheim (1957): "Sound-recording devices make the sound vibrations impress their own path, either mechanically or upon wax, shellac, or plastic, or photoelectrically upon film by a beam of light.", 164.
13. Arnheim (1957), 162.
14. Arnheim (1974), 387.
15. Anderson/Anderson (1980), 88.
16. As Morin (1956/1977), IX and Baudry (1970) would like to see it.
17. Kracauer (1960): "[The consciousness's] withdrawal from the scene may be furthered by the darkness in moviehouses.", 159.
18. Benjamin (1937/2003), "Reception in distraction – the sort of reception which is increasingly noticeable in all areas of art and is a symptom of profound changes in apperception – finds in film its true training ground.", 269.
19. Schlüpmann (1995): Heide Schlüpmann, who consistently interwove film history and philosophy into a critical theory, wrote: "Film realizes the separation that in philosophy was always at the same time the repression of the body – and as a consequence of mimetic writing. It thus facilitates the suspension of repression and the development of the curiosity of looking in saving the power of intoxication. The cinema begins where philosophy ended in failure, at the perception of its peculiarity in the separation from the body but also in distinction to writing.", 57.
20. Cf. Theweleit (1988).
21. De Lauretis (1987): "Female is what is not susceptible to transformation, to life or death; she (it) is an element of plot-space, a topos, a resistance, matrix and matter.", 43.
22. Kleist (1972), 22-26.
23. Doherty (1993): "...the violation of normative cinematic grammar (the stationary horizontal plane, sharp focus, unobstructed vision) translated into heightened impact and added credence.", 253.
24. McLuhan (1964/1994), 26.
25. Rheingold (1992): "Human proprioception includes a system of internal sensors at joints and in muscles to detect changes in pressure and position. A higher-level processing system detects significant patterns among the messages from the body's proprioceptors (e.g., *this* pattern of messages from this particular set of sensors means that your body is going to topple forward if you don't do something about it; *that* pattern of messages means that you are pushing something heavy and polished across a low-friction surface). Proprioception's third information system consists of the effectors for transmitting commands from the sensing and sense-making system to the muscles – the microadjustments that keep us upright and guide our movements.", 27-28.

26. Rheingold (1992), 28.
27. Deren (1948), 116.
28. Benjamin (1935/2002), 117.
29. Deleuze/Guattari (1987), 8.

4. To Whom it May Concern

1. Wiener (1965), 11.
2. Wiener (1956): "However, my interest in the development of computing machines carried me far beyond those machines past, present, or to come, which are made of brass and copper, glass and steel. The brain, the nervous system also share in the main characteristics of computing machines. Parallel to the yes and no of a relay is the fact that a nervous fiber can exist in what are fundamentally only two states; the state of carrying a message and the state of not carrying a message." 267.
3. Guilbaud (1957), 13.
4. Wiener (1956), 327.
5. According to Paul Watzlawick in Ruesch/Bateson (1951), 3.
6. Wiener (1956): "We expected that if human control also were to depend on feedback, there would be certain pathological conditions of very great feedback, under which the human system, instead of acting effectively as a control system, would go into wilder and wilder oscillations until it should break down or at least until its fundamental method of behavior should be greatly changed." 253.
7. Bateson (1972/2000), 121 f. and Deleuze/Guattari (1987), 175.
8. Deleuze/Guattari (1987): "The organism is not at all the body, the BwO; rather, it is the stratum on the BwO, in other words, a phenomenon of accumulation, coagulation, and sedimentation that, in order to extract useful labor from the BwO, imposes upon it forms, functions, bonds, dominant and hierarchized organizations, organized transcendences." 176.
9. Leiris (1992), 3.
10. Müller (1990), 98.
11. Hans Schaefer in: Wiener (1963), 243.
12. Münsterberg (1916/1970), 48.

Part II

1. Discretions

1. Cf. Bateson/Mead/Brand (1976), 41.
2. Bateson/Mead/Brand (1976), 41.
3. To introduce a term here with which Kaja Silverman deconstructed the female voice and female subjectivity in the cinema: Silverman (1988).

4. Heider (1976), 30.
5. *Mead (1974)*, 3-10.
6. Mead (1974), 3-10. "...while whole cultures go unrecorded.", 6.
7. Bateson/Mead (1942), 49.
8. Margaret Mead described the process years later in an interview: "From a complex culture like Bali you take a lot of chunks – birthday ceremonies and funeral ceremonies, children's games and a whole series of things, and then you analyze them for the patterns that are there." in Bateson/Mead/Brand (1976), 37.
9. Cf. Neiman (1980), 12.
10. Bateson/Mead/Brand (1976), 35.
11. It was still too early to call the program cybernetics, for Norbert Wiener's book, which provided the name for the research on feedback systems at the Macy Conferences, only appeared in 1948. Cf. also Foerster (1993 K), 115.
12. Mead (1975), 243.
13. Lévi-Strauss (1969), 53.
14. Lévi-Strauss (1963), 69.
15. Lévi-Strauss (1963), 46.
16. Lévi-Strauss (1963), 55.
17. Lévi-Strauss (1985), 103.
18. Lévi-Strauss (1963), 21.
19. Bateson (1972/2000), 84.
20. Bateson (1972/2000), 83-84.
21. Bateson/Mead/Brand (1976): This was aimed against the model of black boxes and "input-output" that had been established in the sciences: "What Wiener says is that you work on the whole picture and its properties. Now, there may be boxes inside here, like this of all sorts, but essentially your ecosystem, your organism-plus-environment, is to be considered as a single circuit.", 35.
22. Bateson/Mead (1942), 50.
23. Bateson/Mead (1942), 50.
24. Bateson/Mead (1942), 50.
25. Bateson/Mead/Brand (1976), 34.
26. Bateson/Mead (1942), 49.
27. Lacan (1988), 295.
28. Bateson/Mead (1942), 49.
29. Bateson (1972/2000), 112-113.
30. Deleuze/Guattari (1987), 22.
31. Deren (1947 typescript).
32. Deren/Bateson (1980).
33. A strategy of frightening, a kind of Balinese distancing effect, by which a mother breaks her child's habit of looking for high points in human interaction by frustrating extreme increase in feelings, by, for instance, breast-feeding another child, making her own child "artificially" jealous until it tires of

- jealousy. Cf. Mead (1975), 261. The frightening would in fact not be an order, but a symptom of upbringing.
34. Deren (1947 Notebook), February 22, 1947.
 35. Cf. Kittler (1993), 190.
 36. Arnheim (1957), 184.
 37. Panofsky (1997), 96.
 38. Mead (1974), 9.
 39. Mead (1974), 7.
 40. Cf. especially Murray (1989) on the lines of tradition in voodoo from Delta blues to electronic pop and Jimi Hendrix's sound.
 41. Deren (1947 CC), 191.
 42. Deren (1947 notebook), February 16, 1947.
 43. Deren (1947 notebook), February 16, 1947.
 44. Deleuze/Guattari (1987), 300-301.
 45. Ruesch/Bateson (1951), Preface to the 1968 edition, VI.
 46. Bateson/Bateson (1987), 13.
 47. Ruesch/Bateson (1951), 168-227.
 48. Wiener (1965), 162.
 49. Bateson/Mead/Brand (1976), 37.
 50. Bateson/Mead/Brand (1976), 38.
 51. Wiener (1956), 252.
 52. Bateson (1982), 67.
 53. Deren (1947 typescript), March 16, 1947.

2. Depersonalizations

1. Deren (1946 A), 44.
2. Deren (1946 CA), 313.
3. Deren (1946 CA), 319.
4. Deren (1946 CA), 319.
5. Deren (1945-1947), 11.
6. Deren (1945-1947), 11.
7. Deren (1960), 157.
8. Deren (1960), 158. Italics in original.
9. Arnheim (1957), 163-164.
10. Foerster (1949), Macy Transactions, 7. Wiener responded carefully: "Brings it at low levels!" 7.
11. Cf. also the conversation with Arthur Miller, Dylan Thomas, Parker Tyler: "Poetry and the Film: A Symposium," in: Sitney (1970), 171-186.
12. Deren (1946 A), 20. Underscoring in the original.
13. Deren (1945-1947), 15.
14. Deren (1946 CA), 319.
15. Deren (1946 CA), 40.
16. Deren (1946 A), 38.

17. Deren (1945-1947), 319.
18. Anderson/Anderson (1980), 87.
19. Lacan (1981), 94.
20. Panofsky (1997), 96.
21. Deren in Clark et al. (1988), 310.
22. Arnheim (1974) 386.
23. Deren (1945-1947), 11.
24. Deren (1944 P), 2.
25. Deren (1946 A): "By simply holding the camera upside down (I cannot stop to explain the logic by which this occurs), one can photograph the waves of the ocean and they will, in projection, travel in reverse. Such film footage not only reveals a new quality in the motion of the waves, but creates, to put it mildly, a most revolutionary reality." 48.
26. Deren 1960, from "Adventures in Creative Filmmaking: Home Movie Making," quoted in: Clark et al. (1988), 186.
27. Deren (1945-1947), 12.
28. Deren (MM), 42.
29. Cf. Noll-Brinckmann (1984),
30. Deren (1955), 30.
31. Deren (1944 P), 2.
32. Arnheim (1979), 228.
33. Deren (1947 typescript) February 28, 1947.
34. Deren (1945-1947): "We are not so much concerned with who he is as with how he moves, and such a transfer of identification seems to me to constitute a progress away from the theater concept of personalized character, and towards a more cinematic concept, based on movement.", 12.
35. Deren (1945) to the Rockefeller Application in: Clark et al. (1988), 1.1, 262.
36. Sidney Peterson (1967) "Cine Dance" in: Clark et al. (1988), 1.2, 288.
37. Deren (1946 RO), 10.
38. Deren in: Clark et al. (1988), 320.
39. Kelman (1962), 20.
40. I was unable to find precise technical specifications for Deren's procedure in this shot.
41. Deren (1955), 451.
42. Cf. Braun (1992), 264-320.
43. Deren (1946 A), 47.
44. Deren (1946 A), 47.
45. Deren (1960), 164-169.
46. Cf. Foerster (1980), 23.
47. Deren (1960), 162.
48. Guilbaud (1957), 41 f.
49. Guilbaud (1957): «Les exigences de la mathématisation des réseaux font appel à l'algèbre des groupes des transformations dont on sait qu'elle a

- renouvelé la géométrie depuis un siècle et dont on n'ignore pas les ramifications jusqu'en psychologie (Gestalt)», 41.
50. Deren (1947 typescript) February 28, 1947.
 51. Freud (1919/1955), 3697.
 52. Freud (1919/1955), 3692.
 53. Deren in Clark et al. (1988), 614.
 54. The fact that this understanding of cinema governs us all once even led Arnheim, in an attack of heretical mischief, to use the example of the old stations of the cross to give up the identity of the Lord Jesus Christ: "Temporal sequence is translated into spatial sequence, the continuum of the story is divided up into phases, and the same figure returns in several representations, be it in several pictures or within the frame of one, thus splitting its identity" (Arnheim 1957, 169). But even the Christian God as a complete trinity only became identified in the framework of "once per time-space" with the panel painting of the Renaissance. In the cinema it is the other way around; identity, like its splitting, can only appear in connection with a cinematically delineated space.
 55. Lacan (1981), 98.
 56. Rank (1914), 97.
 57. Cf. Kittler (2013).
 58. Cf. Deren (1946 RO), 10.
 59. Deren (1947 CC), 621.
 60. Deren (1945-1947), 11.
 61. Conolly (1966), 31.
 62. Deren in Clark et al. (1988), 310.
 63. Deren (1945-1947), 11.
 64. Deren (1945-1947), 12.
 65. Deren (1946 A), 20.
 66. Deren (Deren 1947 notebook) February 23, 1947.
 67. Deren (1941), 8. (I am citing the text her not from the published article, but from the longer typescript, which is preserved in the Deren estate holdings at the Mugar Library in Boston.)
 68. Deren (1941), 10.
 69. Cf. Ellenberger (1973/1985), 170 f.
 70. Bleuler (1955), 111.
 71. Bleuler (1911).
 72. Bleuler (1911).
 73. Bleuler (1916), 16.
 74. Kittler (1984/1993), 132.
 75. Bleuler (1916), 16.
 76. Deren (1941), 13.
 77. Bleuler (1921), 256.
 78. Deren (1941), 10.
 79. Deren (1946 A), 47.

80. Wiener (1954), 72.
81. Deren (1953), 35.
82. Deren (1953), 6.
83. Cf. Oppitz (1981), 257ff.
84. Cf. also Métraux (1958), 121f.
85. Deren (1953), 258-259.
86. Deren (1953), 259.
87. Ruesch/Bateson (1951), 168ff.
88. Morin (1956/1977), X.
89. And they become linked once again through another name, that of a German professor: Caspar Kulenkampff, who wrote the foreword to Bateson's "Schizophrenie und Familie" in 1969, and who appreciated this book as a "beneficial disturbance" for "those administering psychology in German." Kulenkampff (1969), 10. In 1967 Kulenkampff reported on an educational trip to the Soviet Union, when he had also visited the Bekhterev institute, and compared the work there with the latest research "from the Anglo-American countries, from Scandinavia, Holland, and France." Kulenkampff (1967), 126.

3. Deviations

1. Leiris (1992), 34: "Pour oublier leurs médiocres petites 'manières de blancs' (ainsi qui disent certains négres) et ce qu'ils s'imaginent être leur personne d'intellectuels."
2. Rouch (1978), 5.
3. Rouch (1978), 6.
4. Deleuze (1989), 158.
5. In the pop culture of the eighties it would be "Phase, lock, loop!" *Electronic Front Populaire*.
6. Rouch's commentary in: *Moi, un Noir* (France, 1957).
7. Cf. Rouch (1954), 54f.
8. Deleuze (1989), 147.
9. Deleuze (1989), 148.
10. Deleuze (1989), 214.
11. Cf. Stoller (1992), 59.
12. Cf. Stoller (1992), 38.
13. Rouch (1978), 11.
14. Cf. Rouch (1978).
15. Rouch (2003b), 44.
16. Rouch (1978), 24
17. Interview with Rouch from the sixties, in Bazin/Labarthe (1995). Since this is not a dialogue where Rouch is touting some big program, it has often not been understood correctly by media studies scholars. "Certainly he wants to dialogue the research process, a call that he is not alone in making in

ethnology; he wants to understand a recognition of the equality among the differences of human cultures, and here as well he can count on the support of a good number of his colleagues. But that it is precisely the medium of film that ethnology is supposed to need so desperately to effect changes in this direction is something that can be doubted.” Hohenberger (1988), 251. Certainly it must be doubted that film is a means of dialoguing. Film is – and this would have been clear to Rouch, as a scrupulous reader of Lacan’s “Écrits techniques de Freud” – at least a trialoguing medium.

18. Rouch (1978), 25.
19. Rouch (1978), 25.
20. Rouch (1978), 25.
21. Rouch (2003a).
22. Rouch (1978), 28.
23. Rouch (1978), 25.
24. Rouch (1978), 28.
25. Deren (1941), 10.
26. Rouch (1978), 19.
27. Deren (1941), 10.
28. Rouch (1978), 20.
29. Rouch (1978), 25.
30. Rouch (1996) and Hohenberger (1988), 235, as well as Stoller (1992), 26ff., who in particular cites Sembène’s verdict that Rouch shows Africans as insects.
31. Rouch (1978), 31.
32. Rouch (1996).
33. Foucault (2006), 340.
34. Rouch (1978), 31.
35. Rouch (1996).
36. Cf. Kittler (2013), 67.
37. Rouch (1978), 31.
38. Rouch (1978), 31.
39. Rouch (1954), 51.
40. Rouch (1978), 31.

4. Compressions

1. Cf. Wolff-Heidegger/Cetto (1968), 111-114.
2. This nickname is circulated by Ellenberger (1973/1985), 151.
3. Charcot (1881), 97.
4. Quoted in Foucault (1978), 56.
5. Freud (1962), 284.
6. Charcot, quoted in Didi-Huberman (2004), 187.
7. Foucault (2006), 341.
8. Foucault (1978), 56.

9. Foucault (2006), 339-340.
10. Ellenberger (1973/1985), 152.
11. Richer, in the appendixes to Didi-Huberman (2003), 297-298.
12. Schneider (1988), 151.
13. Bernard/Gunthert (1993), 100.
14. Charcot (1991), 3.
15. Freud (1962), 276.
16. Cf. Londe (1899), 282.
17. Bourneville cited in the appendixes to Didi-Huberman (2003), 284.
18. Charcot (1991), 12.
19. Cf. Bernard/Gunthert (1993), 150.
20. Foucault (1980), 194.
21. Cf. Lorenz (1987), 108ff. and Didi-Huberman (2003): "For there was a remarkable complicity, tacit and impeccable, between the Salpêtrière and the Préfecture de police. Their photographic techniques were identical and sustained the same hopes. The techniques were equally implicated in an art.", 51.
22. Cf. Sekula (1986), 17.
23. Londe (1888), 23.
24. Londe (1893), 5.
25. Contrary to all insinuations and allusions of Didi-Huberman, who would prefer to see Londe characterized, along with Galton and Bertillon, as an administrative type.
26. Londe (1893), 15.
27. Londe (1893): "On pourrait, il est vrai, assurer leur position au moyen de l'appui-tête, comme on le fait fréquemment dans la pratique photographique, mais ce moyen nous paraît mauvais a priori. Il est indispensable de saisir le malade dans son attitude vraie et il ne faut pas immobiliser dans une position qui peut ne pas être naturelle.", 66.
28. Londe (1893), 98.
29. Londe (1893), 84.
30. Cf. Bernard/Gunthert (1993), 30.
31. An extensive discussion of this can be found in Bronfen (1982), 89ff.
32. Freud (1962), 276.
33. Israel (1976/1993), 25.
34. Israel (1976/1993), 118.
35. Israel (1976/1993), 270.
36. Israel (1976/1993), 29.
37. Foucault (2006).
38. Londe (1888), 3.
39. Freud (1957), 221.
40. Bernard/Gunthert (1993), 125.
41. Charcot (1874), 167.
42. Freud (1962), 276.

43. Charcot "Apropos de six cas de hystérie chez l'homme," quoted in: Bernard/Gunthert (1993), 127f.
44. Charcot, quoted in Didi-Huberman (2003), 29.
45. Cf. Ellenberger (1973/1985), 139ff.
46. Cf. Charcot/Richer (1887).
47. Foreword by Richer, Gilles de la Tourette, and Londe, quoted in: Bernard/Gunthert (1993), 129.
48. Charcot (1886), 39.
49. Londe (1893), 99
50. Londe (1893), 114.
51. Ellenberger (1981), 99.
52. Cf. Ellenberger (1973/1985), 157.
53. Marey (1885), 2.

Part III

1. Mental Apparatuses

1. Cf. Schäfer (1989), 160.
2. The two giants of the optics industry emerged in the middle of the nineteenth century: Carl Zeiss founded his factory in 1846 in Jena and Ernst Leitz formed his company in Wetzlar in 1849.
3. Virilio (1986) traced cinema technology back to its origins in the pool of military equipment. The practical alliance between military and medical research is evident. To this day advanced research in every scientific field are only permitted by military-industrial joint ventures.
4. Benjamin (2003), 350.
5. Benjamin (2003), 328.
6. Bernard (1865), 35.
7. Bernard (1865), 38.
8. Pavlov (1957), 488.
9. Bernard (1865), 11.
10. Bernard was one of the most notorious practitioners and defenders of vivisection. Public campaigns were led against him, which in part were financially supported with large sums of money by his own wife. Cf. Braun, (1992), 10.
11. Cf. also Bernard (1865): "Chez tous les êtres vivants le milieu intérieur, qui est un véritable *produit de l'organisme*, conserve des rapports nécessaires d'échanges et d'équilibres avec le milieu cosmique extérieur.", 10.
12. Bernard (1865), 102.
13. Bernard (1865), 173.
14. Braun (1898), 1, Foreword.
15. Cartwright (1995), 44.
16. Foucault (1975), 243.

17. In 1854 the debate about materialism in Göttingen was carried out with the belated verve of the political critique of 1848. Following a formulation of Carl Vogt's, according to which the brain did not exude its thoughts any differently than the liver did bile of the kidneys did urine, the alternative would be called "soul or secret." Cf. Vogt (1847) and (1855). Instead of scholars from the humanities, it was now physiologists, chemists, and physicists who were debating the idea of the soul, and all partisanship had political and institutional consequences. The physiologist Carl Ludwig, after traveling from Zürich to the meeting of German natural scientists and doctors in Göttingen, did not receive the appointment to a professorship in Bonn, which had been previously considered all but certain.
18. Wundt (1874), 10.
19. Cf. Boring (1950), 68ff.
20. Fritsch and Hitzig, quoted in: Roths Schuh (1964), 276.
21. Degen (1954), 271.
22. The complete list of Ludwig's famous students can be found in Schröer (1967), pp. 287-293. Joravsky (1989) also includes Vladimir M. Bekhterev among Ludwig's physiology students in Leipzig.
23. Bauereisen (1956/57), 104.
24. Schröer (1967), 107.
25. Schröer (1967), 107.
26. Cf. Braun (1992), 327.
27. Quoted in Schröer (1967), 110.
28. Quoted in Mattenklott (1984), 173.
29. Hegel (1807/1967), 142.
30. Fechner (1860), vol.2, 13.
31. Cannon (1945), 135.
32. Freud (1953), 969.
33. Freud (1953), 971.
34. Freud (1953), 973.
35. Bernard/Gunthert (1993), 30.
36. Helmholtz (1850), 14ff.
37. Helmholtz (1883), 867.
38. Helmholtz (1883), 870.
39. Helmholtz (1883), 880. Underscoring in the original.
40. Helmholtz (1891/1996), 29.
41. Helmholtz (1895), 149.
42. Helmholtz (1855/1896), 111.
43. Helmholtz (1868/1896), 365.
44. Helmholtz (1895), 43.
45. Helmholtz (1895), 7 and 53.
46. Helmholtz (1895), 6.
47. Helmholtz (1895), 6.
48. Helmholtz first describes it in his lecture "On Human Seeing," which he gave on February 27, 1855 in Königsberg; Wundt published it first in his "Lec-

tures on the Theory of Sense Perception" from 1858-1862, but had already formulated it previously. Cf. Boring (1950), 316ff. and 329ff.

49. Wundt (1902), 27.
50. Cf. Boring (1950), 145ff.
51. Wundt (1912), 5.
52. Wundt (1912), 34.
53. Wundt (1912), 5-6.
54. Thus it was also possible to demonstrate that cinematic projection, in the speed of the old projectors at 18 frames per second, would just be perceptible as a sequence of single images if the blade shutter did not subdivide it into two phases.
55. Cf. Deren (1953), 233-239.
56. Wundt (1912), 53.
57. Wundt (1912), 56.
58. Wundt (1902), 344-360.
59. Wundt (1874), 863.
60. Deren (1941), 10.

2. Psycho-Motor Activity

1. On Marey's biography and life work, cf. Braun (1992).
2. Marey (1894/1994), 277.
3. Marey (1885), 15.
4. Marey (1885), 4.
5. Marey (1894/1994), 78.
6. Marey (1894/1994), 147.
7. Marey (1894/1994), 181.
8. Marey (1894/1994), 182.
9. Leuba (1994), 15.
10. Cf. Berg (1995), 72.
11. Painlevé (1991), 73 and 85.
12. Cf. Kracauer (1960), 270 and Cartwright (1995), 40 and 178.
13. Ernst (1948), 21.
14. Dalí (1998), 134.

3. Psycho-Drama

1. In Leipzig Paul Flechsig had dismissed his assistant Kraepelin in part because he was neglecting his work at the station and spending too much time on the experiments at the laboratory, or even: at the neighboring institute with Wilhelm Wundt, with whom he eventually wrote his *Habilitation* thesis. Cf. Steinberg (2001), 252-256.
2. Kraepelin (1909), 689.

3. The negatives of Marinescu's film series on pathological ways of human movement were restored some years ago and clips from them were published in a historical collection, edited by the Italian film historian Virgilio Tosi. In co-production with the Centre National de la Recherche Scientifique in Meudon, the Istituto Luce, SpA. in Rome, and the Institut des Wissenschaftlichen Films in Göttingen, Tosi published Marinescu's images along with other examples in a series about early scientific cinematography. One of the disconcerting issues in this publication is Tosi's presumably scientific commentary, which does not delve into the staging of illness by film using camera and lighting technologies, but which simply repeats the diagnoses staged in this way nearly a hundred years later, when he announces "recordings to analyze abnormalities in movement, generated by advanced ataxia".
4. Camillio Negri's film is included in the IWF compilation Nr. 193 "The Origins of Scientific Cinematography – First Applications", and once again Virgilio Tosi's attention as a film historian is sympathetic to Negri's intention, not to the technological film tricks of the staging, when he comments: "Negri produced this film to give students the opportunity to learn by means of a documentation of unusual cases".
5. Hennes (1910), 2013.
6. Weiser (1919), 95.
7. Weiser (1919), 113.
8. Weiser (1919), 113-114.
9. Dr. Kirchhof is to the day the author with by far the most titles in the medical catalog of the Institut für Wissenschaftlichen Film in Göttingen. His works do in fact span the regimes. The work on his film "Peripher nervöse myopathische und strukturelle Störungen im Spiegel des Gesichtes" extends from 1939 to 1957. Since the early sixties Kirchhof films on toxicology, on diseases of the movement apparatus, on diseases of the brain, of the spinal cord, and of the nervous system have come to Göttingen, initially from Izmir in Turkey. These include footage from the Third Reich, which were compiled and published later in Izmir. During the seventies Dr. Kirchhof's productions were once again coming from Bonn and Berlin. The presumable innocence of the shooting process protected Kirchhof from ethical and medical judgments of his work. He is simply considered a good teacher of the medical gaze. For more on Kirchhof, cf. the recent book by Schmidt (2001).

4. Psycho-Technology

1. Lehmann (1917) quoted in Weiser (1919), 43.
2. Weiser (1919), 41.
3. Lehmann (1917) quoted in Weiser (1919), 43.
4. Lehmann (1917) quoted in Weiser (1919), 43.
5. Weiser (1919), 41.

6. Hacking (1995), 209.
7. Münsterberg (1916/1970), 41.
8. Münsterberg (1916/1970), 41.
9. Kittler (2013), 82.
10. Münsterberg (1889) Heft 1, 55.
11. Münsterberg (1909), 5.
12. Münsterberg (1909), 70.
13. Münsterberg (1909), 77-78.
14. Münsterberg (1914/1920), 14.
15. Münsterberg (1914/1920), 7.
16. Münsterberg (1914/1920), 159.
17. Münsterberg (1914/1920).
18. Solomons/Stein (1896), 499.
19. Solomons/Stein (1896), 502.
20. Solomons/Stein (1896), 506.
21. Stein (1937/1993), 274-275.
22. Stein (1937/1993), 275.
23. Solomons/Stein (1896), 507.
24. Münsterberg (1916/1970), 29.
25. Münsterberg (1916/1970), 22.
26. Münsterberg (1916/1970), 24.
27. Münsterberg (1916/1970), 33.
28. Münsterberg (1916/1970), 24.
29. Münsterberg (1916/1970), 41.
30. Münsterberg (1916/1970), 48.
31. Münsterberg (1916/1970), 45.
32. Münsterberg (1916/1970), 45.
33. Münsterberg (1916/1970), 48.
34. Münsterberg (1916/1970), 50.
35. Münsterberg (1916/1970), 53.
36. Münsterberg (1916/1970), 52.
37. Münsterberg (1916/1970), 55.
38. Kracauer (1947/1974), 79.
39. Deren (1941), 4.
40. Bleuler (1921), 256.
41. Münsterberg (1916/1970), 95.
42. Münsterberg (1916/1970), 96-99.

5. Psycho-Reflexology

1. Cf. Reymert (1928).
2. It had been Cattell who gave Wundt a typewriter, "one of the first in Germany". Avenarius had described this as a Trojan horse, since Wundt would have written twice as many books with it as without it.

3. Ellenberger (1973/1985), 1145.
4. Freud (1961), 4466.
5. "It was only during the 1910s and 1920s, with the important researches of Walter B. Cannon, that a shadow community of emotion-attentive physiologists began to congeal. Cannon's extensive investigations of emotions in different organ systems and functions put emotions themselves, rather than specific organs or functions, at the center of attention. [...] Instead of discussing emotions in the context of a particular organ, system or function, Cannon pursued the emotions in different organs, systems and functions of the body." Dror (1999), 218. In Dror's multifaceted studies of a science history of the emotions, Cannon's research is presented in great detail in the context of the transformation of the meaning and function of feeling in physiology.
6. Puente (1995), 510; Joravsky (1989) finds the source dubious: "the hearsay report." (314). Etkind (1996) pursued the legend further. In the period of glasnost, doctors and historians debated indirect clues that could support the hypothesis that Bekhterev was purposefully poisoned. Cf. *Literaturnaja Gazeta*, December 9, 1987 and September 28, 1988; *Ogonek* 1988, 11, 7; *Medicinskaja Gazeta*, November 11, 1988, 143.
7. Kharms (1936/1983), 5. Many thanks to Peter Urban for the reference.
8. Brozek/Diamond (1982), 125 and cf. also Ellenberger (1973), 1145.
9. Cf. Ponomareff (1986) and Ziferstein (1966).
10. Joravsky (1989), 83 and Bekhterev (1927).
11. It is indeed a bit paranoid how the science historian Alexandre Métraux insinuates dark scheming to Bekhterev: "It is known that, before taking up his position in Kazan, Bekhterev had traveled around outside of Russia for more than a year for the purpose of study. [...] Study travels also served the purposes of laboratory spying." Wundt, because his position as the founder of experimental psychology was only confirmed through the many successor institutions, had never applied for a patent on his laboratory. What is important about Métraux's comment, though, is that reflexology is not any Russian specialty, but has its origins in Central Europe and its, in Métraux words, "institutional platform" was also in the devices that could measure the mind as psyche. Métraux (1986), 91.
12. Freud (1958), 2386-2448.
13. Kittler (2013), 67.
14. Schreber (2000), 20-21.
15. Wundt (*Festschrift*), 15-16.
16. Flechsig (1896 R), 19 and 35.
17. Flechsig (1896 R), 34.
18. Bekhterev (1905), 90.
19. "The cramp-like movements observed in people appear in three forms. Relatively seldom they appear in screaming, laughing, sobbing, anguished emission of tears, swallowing, belching, and other convulsive symptoms of minor hysteria. Most commonly, however, cramps indicate the character of the rhythmic and imitative movements peculiar to major hysteria, which

- correspond to various progression and customary movements and which as a rule are marked by complete uniformity in one and the same individual.” Bechterev (1905), 81.
20. Bechterev (1905), 96.
 21. Bechterev (1905), 72.
 22. Cf. Gauld (1995), 420ff.; Kulenkampff (1967); Eichhorn/Stern (1977); Ponomareff (1986). And Bekhterev his autobiographical sketch: “I had already begun the scientific study of hypnosis and suggestion in 1892, when the subject was not yet being taken seriously in Russia, all the more so since the practical application of hypnosis was subject to certain restrictions by a provision of the medical board. These restrictions were only lifted at the turn of the 20th century at my request.” Bechterev (1927), 4.
 23. Bechterev (1902), 6.
 24. Bechterev (1902), 16ff.
 25. Bechterev (1905 A), 218.
 26. Cf. Maturana/Varela (1984/1987), 111.
 27. Bechterev (1902), 131.
 28. Bechterev (1902), 31.
 29. Cf. Urban (1997), 331.
 30. Bechterev (1908), 194.
 31. Bechterev (1905), 11.
 32. Bechterev (1905), 12.
 33. Libich (1947), who found the manuscript, quoted in Eichhorn/Stern (1977), 581.
 34. Eichhorn/Stern (1977), 579 and 584.
 35. But the clinical practice in Eastern Europe, which hardly anyone in the west is aware of, seems to have been relatively open. One visitor from the USA, Dr. Ponomareff, described psychiatry in the Soviet Union in the presumably dark eighties, emphasizing in particular the circumstances at the Bekhterev Institute: “[...] psychiatrists at the Bekhterev favor a more restrictive definition of schizophrenia and see mental illness as primarily a result of interpersonal stresses.” Cf. Ponomareff (1986), 282. Ponomareff especially stresses the good relationships of the patients to the doctors: “In general they were knowledgeable about their illness and seemed to view their relationships with their physicians as collaborative ones.” Ponomareff (1986), 285. Caspar Kulenkampff as well, then director of the psychiatric clinic in Düsseldorf, who later brought Bateson’s studies on schizophrenia to Germany, found the “therapeutic-rehabilitative” efforts and the clinic and the research at the Bekhterev Institute in Leningrad to be exemplary in 1967. Cf. Kulenkampff (1967), 127.
 36. Eichhorn/Stern (1997), 578.
 37. Bechterev (1927), 4.
 38. Bechterev (1927), 5.
 39. Bechterev (1906), 3.
 40. Bechterev (1927), 48.
 41. Bechterev (1906), 26.
 42. Bechterev (1906), 132ff.

43. Ditschek (1989), 153.
44. Ditschek (1989), 154.
45. Bechterev (1905), 18.
46. Foreword by the Russian state press in Bechterev (1926), xii.
47. When Bekhterev called his theory of reflexes "objective psychology," he wanted to underscore his distance to classical psychology on the one hand, and at the same time to distinguish his methodology from pure nerve physiology. Starting in 1912 he called his work psycho-reflexology, later human reflexology, and finally, in his posthumously published political master text it was called: *Collective Reflexology*.
48. Bechterev (1913), iv.
49. Bechterev (1913), 3.
50. Bechterev (1913), 6.
51. Bechterev (1913), 2.
52. Bechterev (1913), iii.
53. Bekhterev (1973), 380.
54. Bechterev (1912), 1486.
55. Bekhterev (1973), 20.
56. Bekhterev (1973), 19.
57. Bechterev (1906), 16.
58. Bechterev (1896/1899).
59. Cf. also Joravsky (1989), 497f.
60. Bechterev (1913), 25. Cf. Flechsig (1896), 26 and footnotes on 75ff. Here Flechsig localizes the the processes of consciousness and mental operations that illustrated the structure of the brain, and not the other way around. "In the construction of our spirits, in the great, persistent traits of its stratification, we can clearly see the architecture of our brains reflected." Flechsig (1896), 3.
61. Cf. Breidbach (1997), 225.
62. Flechsig (1896), 33f. Friedrich Kittler has pointed out that this is the anatomical anticipation of Lacan's description of the formation of an ego-function in the mirror stage. Kittler (1993), 70.
63. Flechsig (1896), 68.
64. Breidbach (1997), 224.
65. Bechterev (1896/1899), 2.
66. Bechterev (1896/1899), 421.
67. Bechterev (1926), 404. The fact that Bekhterev was interested in the relations, connections, and circuits of the microstructure in the brain additionally prevented him from adopting the biologicistic gender assessments of the time, which had their outgrowth in the secure macro area of phrenology. Nowhere in Bekhterev's work are there allusions to a physiological distinction in the intellectual achievements or the multiplicity of personality structures between men and women, and there were always many female researchers working in his laboratories.

68. Bekhterev (1896/1899), 616. Unfortunately, however, this discrete form of impulse transmission, with its nice reference to contemporary messaging technologies and which might have made it possible to seamlessly integrate Bekhterev's nerve theory into the apparatuses of cinematic perception, is oddly syncretically linked to other models. With the precision of discrete connection controls, the explanation of the transfer of the impulse itself involves a rather psychedelic idea: By virtue of the ability of the protoplasm to contract, the dendrites can be expanded or shortened and thus take up or break off contact, thought Bekhterev. The "amoeboid movement" provides the explanation for "the influence of habit and practice, the arousing or calming substances on the nervous system." Bekhterev (1896/1899), 618. In as much as these explanations are remote from the model of synapsis and its electrochemical transmission function, they still allow us to recognize the discrete elements of an impulse transmission for the nerve conduction of the paths and courses in the central nervous system.
69. Bekhterev (1973), 139.
70. Bekhterev (1973), 116.
71. Bekhterev (1913), 105.
72. Bekhterev (1908), 234.
73. Bekhterev (1973), 166.
74. Bekhterev (1913), 33.
75. Cf. Joravsky (1989).
76. Bekhterev (1973), 120.
77. Bekhterev (1913), 281.
78. Bekhterev (1913): "1. Organic (conditioned by inner stimuli), 2. Muscular, 3. Gender, 4. Touch, 5. Taste, 6. Smell, 7. hearing, and 8. Seeing mimic.", 289.
79. Bekhterev (1973), 98.
80. Bekhterev (1973), 98-99.
81. Cf. Ellenberger (1973), 515ff., 655ff., and 935.
82. Bekhterev (2001), 65.
83. Bekhterev (1928 E), 271.
84. Bekhterev (1928 E), 271.
85. Wiener (1956), 291.
86. Bekhterev (1913), 76.
87. Bekhterev (1926), 13.
88. Bekhterev (1928 E), 276.
89. In light of this bold and careful psychoneurological research from the beginning of the 20th century, all the current excitement that recent findings mean that the perceptual system may prove to be plastic, "to facilitate association, to be modulated by experience" seem somewhat belated. Cf. Breidbach (1997), 24.
90. Flechsig (1896 R), 34.
91. Bekhterev (1913), 86.
92. Bekhterev (2001), 93.
93. Short (1983), 4.

Part IV

1. The Truth Won by Means of Film

1. Cf. Marshall (1983), 64 and Tode/Gramatke (2000), 203. Jörg Bochow (1997), in his study on subject and religiosity in early Soviet film, for which he collected and translated many previously unknown documents, has pointed to the effects of objective psychology or reflexology, and in particular to Bekhterev's concept of mimic reflexes for Kuleshov's idea of a new actor, of the 'naturshik'. The chapter on Vertov and religious ecstasy presents the connections between Vertov's musical inspirations and film montage.
2. Marshall (1983), 236, cites Viktor Shklovsky, "Abram M. Room: Life and Work", Moscow 1929, 6.
3. Humorous folk songs consisting of four-line couplets.
4. Tode/Gramatke (2000), 162.
5. Cf. Sadoul (1971), 15-46.
6. Vertov, (1984), 17-18.
7. Cf. Tode (1995), 145. Sophie Küppers also linked this expression not to palpable circumventions, which might be suggested by the somewhat awkward phrase, but to the precisely planned work of the technician: "Vertov's tricks catch us unawares – if he has mystified us, so in the next moment he will laughingly explain his trick to us. Even as the wild chaos of the street is barely no longer whirring before us, he already shows us the assistant at her laborious editing work. [...] Through his instrument he has rhythmized seeing; seeing resounds; the theatre broke into pieces – what we experience through him is only – REALITY." Sophie Küppers cited in Tsivian (2005), 359-360.
8. Vertov, (1984), 124.
9. Cf. Annette Michelson's detailed analysis of the situation in 1935 using group photos of the *All-Union Creative Conference of Workers in Soviet Cinema*, an "icon of dialectics" from which Kuleshov and Vertov are "missing." "By 1935 [...] Vertov's situation within the film industry was [...] one of virtual expulsion." Michelson (1992), 1.
10. Bechterelev (1913), 278.
11. Bechterelev (1926), 402.
12. Vertov, in Tode/Gramatke (2000), 43.
13. Vertov, (1984), 77.
14. Vertov, (1984), 63.
15. Vertov, (1984), 66.
16. "The agitation against intoxication has itself been raised to the level of intoxication", wrote Jörg Bochow concisely (1997). He also added the precise editing sequence. Bochow (1997), 153f.
17. Vertov, (1984), 76.
18. In this representation and others, Jörg Bochow found the construction of a transcendental human being, complementary to the "homeless, mutilated, addicted, and mad" in Vertov's films, "as he has been thought and imagined

- in Russian culture since the turn of the century as a counter-term and counter-proposal to 'bourgeois individualism.'" Bochow (1997), 165.
19. Vertov, (1984), 16.
 20. Arnheim (1979), 169.
 21. Vertov, (1984), 19.
 22. In his dissertation about empirical examinations of graphic and physiognomic achievements Arnheim attempts, with numerous descriptions, protocols, and evaluations of experiments, to create correlations between data from perception physiology and meaning. At any rate he proceeds "differential-diagnostics" from the beginning, which means, he is not satisfied merely to interpret a particular handwriting or a particular facial expression, but confronts his test subject with the "most characteristically marked" examples (8) and has them ordered quantitatively: what looks "more energetic," "cleverer," "more poetic," "more mysterious"? The interferences of things, world, and perception that are experienced as confusing in Vertov are only introduced at the very end in the question, specific to Gestalt psychology, of the relationship between the part and the whole, after the meaningful shapes [*Gestalten*] have already stabilized against the molecular or signifying flickering. Cf. Arnheim (1928).
 23. Arnheim, (1979), 169.
 24. Vertov, (1984), 7.
 25. Arnheim, (1997), 170.
 26. Lenoble 1929 in Kino, nr. 17, cited in Tsivian (2005), 339. The entire passage reads: "Speaking of the absence of psychology and the technical approach to the perception of cinema as an end in itself, I was attempting to characterize not only *Man with a Movie Camera*, but also that psycho-ideology, the expression and a particular instance of which is provided by Vertov's film. In which class, in which social groupings, can this ideology be observed? It is obvious that this is not the ideology of the proletariat, which does not repudiate a psychological approach in film art, and which has absolutely no inclination to fetishize technique. Nor is it the ideology of the petit bourgeois strata of society, who go to the 'kinema' as a means of escape from reality and in search of 'beautiful life.' But Vertov's work comes very close to the perception of the world and the outlook on the world of the technical intelligentsia, who are characterized by precisely the anti-psychological and technical approach that I noted above."
 27. Vertov, in an official questionnaire sent to all employees by the All-Russia Central Executive Committee (VTSIK) on September 21, 1918, in response to the question: "What party to you belong to, or are you affiliated with any party?" stated: "I am not committed to any party, but I sympathize with the anarchist-individualists." The entire questionnaire can be found in Tode/Gramatke (2000), 200.
 28. Vertov, (1984), 87.
 29. Bechtereve (1902), 6.
 30. Kracauer, in Tsivian (2005), 356. The German premiere took place in Stuttgart on June 26, 1929 at the Film and Photo Exhibition (FIFO). The very first

- screening took place in Kiev on January 8, 1929 and the Moscow premiere occurred on April 9, 1929.
31. Kracauer, in Tsivian (2005), 358.
 32. Kracauer, (1947/1974), 185.
 33. Kracauer, in Tsivian (2005), 358.
 34. Kracauer, (1947/1974), 6.
 35. Kracauer, (1947/1974), 186.
 36. Kracauer, (2012), 58.
 37. Cf. Kracauer (1948).
 38. Benjamin's assessment of Vertov's film *A Sixth Part of the World* in his 1927 essay "On the Present Situation of Russian Film," however, was rather critical. Cf. Benjamin (1999), 13.
 39. Benjamin (2003), 117.
 40. Benjamin (2003), 265.
 41. Benjamin (2003), 265. Italics in original.
 42. Benjamin (2002), 117.
 43. Cf. Baudry (1970) and Metz (1975) and for a general description and critique of the apparatus discussion, cf. Winkler (1992).
 44. Precisely in Vertov's films Jean-Louis Baudry designates the appearance of optical tricks on screen as the uncanny return of the repressed of cinematic technology, which destabilizes the spectator's identity: "Thus disturbing cinematic elements – similar, precisely, to those elements indicating the return of the repressed – signify without fail the arrival of the instrument 'in flesh and blood' as in Vertov's *Man with the Movie Camera*. Both specular tranquility and the reassurance of one's own identity collapse simultaneously with the revealing of the mechanisms, that is, of the inscription of the filmwork" (45). What is correct in this is that the formation of identity is linked to images and the conscious disillusionment of this identity is linked to the revelation of the technical conditions of producing images. But knowledge about the conditions of one's own identity furthermore presumes a disturbing confrontation with technological, imaginary, and symbolic conditions of these artistic, or to be more precise, these media worlds. / As to the historical reception of Vertov's film, Annette Michelson, from a perspective of phenomenological film criticism, also emphasizes that simple and reassuring identity would be destroyed in the cinema. While Baudry argues that the cinema apparatus precisely blocks the path to knowledge, Michelson understands cinematic seeing as an epistemology of the 20th century, and thus she can appreciate any collapse in identifying reception in the shock as cultural critical knowledge: "It is the manner in which Vertov questions the most immediately powerful and sacred aspect of cinematic experience, disrupting systematically the process of identification and participation, generating at each moment of the film's experience, a crisis of belief." Michelson (1992), 65. / For Benjamin, this disruption is desirable. These techniques can calmly be observed in a cinema like Vertov's, since they introduce into their analysis of

- cinematic conditions film methods by which the conscious and the unconscious become intertwined in their relations and correspondences. The radical disappointment of the “ego” in the cinema is in fact not a false identification, lacking in experience, as it is criticized in the term “imaginary signifier,” but much more the liberating dis-illusionment of the idea of human identity beyond all technical or medial ages. Truth becomes results, knowledge of realities that are won with literal, cinematic, calculating means.
45. Cf. Hein/Herzogenrath (undated) 103f.; Michelson (1992), 67; Farges (1975), 94.
 46. Wiener (1956), 23.
 47. Vertov, (1984), 8.
 48. Deleuze, (1983), 8-9.
 49. Deleuze, (1983), 39-40.
 50. And for once refers the difference between eye and gaze to a proximity of the cinematically constituted anti-Oedipal subject to Lacan's analytical logic, in which the gaze is also set in motion by an interval, a gap, and departs from the subject in the endless tours and routines of desire.
 51. Deleuze, (1983), 81.
 52. Vertov, (1984), 7.
 53. Cf. Michelson, (1992): “... the Wings of Hypothesis”: “The resolutely anti-humanist context in which the interval appears in the very earliest of his important texts.” 71.
 54. Posthumously one can read which illusions about the enlightened self-consciousness in modern Soviet criticizes, but also in postmodern citizens of the world, Bekhterev would have indulged when he thought that subjectivism is anachronistic in a world that creates its relations and truths by means of technological devices. “All this subjectivism borrowed from psychology is in essence a remnant of the anthropomorphism that is being radically eliminated from the biological sciences. It should also be expelled from sociology, history and other humanities.” Bekhterev (2001), 20.
 55. Vertov, (1984), 8.
 56. Cf. Michelson (1972) about a photograph of Vertov in the air that re-stages his first jump. “It projects the preoccupation spelled out in the pseudonym, which replaced, at the very threshold of his working life, the family name of Denis Kaufman. Dziga Vertov, translated, is ‘Spinning Top.’” 62. And Georges Sadoul (1971): “Dziga, déformation de Denis, se réfère au mot ukrainien qui veut dire toupie, mais aussi Tzigane, peuple eternal errant. Vertov est dérivé du verbe russe *Vertet* qui signifie ‘tourner, pivoter, tourner.’ [...] le nouveau nom signifia un peu ‘mouvement perpétuel.’” 15.
 57. Deleuze, (1983), 39.
 58. Vertov, (1984), 5.
 59. Vertov, in Tode/Gramatke (2000), 85.
 60. Vertov, *The Man with a Movie Camera*, 1928, opening credits.
 61. Deleuze (1983), 27.
 62. Bechtereve (1913), 21.

63. Cf. Alf Bold "Experimental film und Politik" in: Petzke (1989), 193.
64. Even the underground encyclopedist Amos Vogel (2005) gets worked up about Godard's "Maoist" films, 130.
65. "While [Eisenstein] was under the influence of Bekhterev at the beginning of the twenties, when he was working on the montage of attractions, in the second half of the decade he familiarized himself with a wide variety of concepts: Gestalt psychology and psychoanalysis, behaviorism, and ethnic psychology. Eisenstein carefully studied the writings of Wilhelm Wundt, Sigmund Freud, Otto Rank, Ernst Kretschmer, James George Frazer, Lucien Lévy-Bruhl, and met with Wolfgang Köhler and Hanns Sachs." Bulgakova in: Eisenstein (1988), 356.
66. Eisenstein (1998), 40.
67. Eisenstein (1998), 43.
68. Eisenstein (1998), 47.
69. Cf. J. Dudley Andrew (1976), 55ff.
70. Eisenstein (1998), 44.
71. Eisenstein (1998), 50.
72. Eisenstein (1998), 111.
73. Eisenstein (1998), 112.
74. This analogy is also not technically precise, for it does not distinguish the technical distortion in acoustics, which takes place on the recorded sound material, from optical distortion, which is produced before recording takes place, through lenses or quick camera movements.
75. Eisenstein (1998), 113.
76. Eisenstein (1998), 112.
77. Eisenstein (1998), 116.
78. All that it does provide is information about Eisenstein's clearly ethnocentric understanding of religion. While the simplest minds among the spectators can clearly see, through the military meter of the sequence, that they are attending a deconstruction of the divine image, all differences between and reflections on what is seen here of the divine are subordinated to a single idea: that god is nothing more than a block of wood – and overtone montage is just as awkward and bulky as its best service.
79. Eisenstein (1998), 123.
80. Eisenstein (1998), 118.
81. Eisenstein (1998), 121-122.
82. Eisenstein (1995): "...Hanns Sachs, a shrewd old salamander with the horn-rimmed glasses, whose company I came to enjoy much later on my travels in Berlin. He had a terrifying African mask – 'a symbol of complexes' – which hung above his small, low, patient's couch. We became great friends. He gave me a most interesting book about psychoanalysis. *Essay in Genital Theory* by Sandor Ferenczi, which explained a great deal of things." (admittedly post factum!) which I had come across on my obsessive quest to penetrate the secrets of ecstasy." 161-162.
83. Vertov (1984), 9.

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