Audiovisions: cinema and television as entr'actes in history

Zielinski, Siegfried

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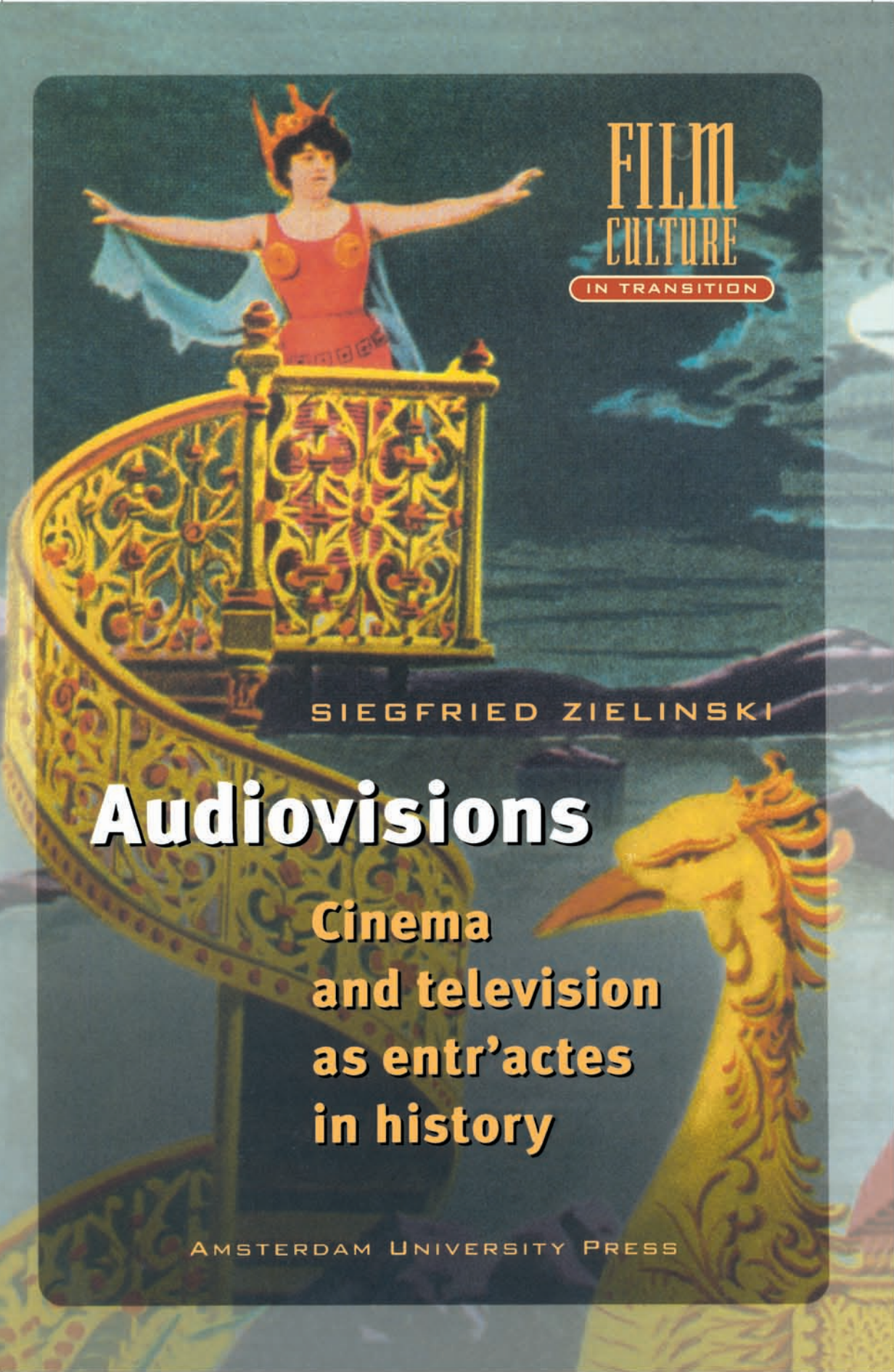
FILM CULTURE
IN TRANSITION
SIEGFRIED ZIELINSKI
Audiovisions
Cinema and television as entr'actes in history
AMSTERDAM UNIVERSITY PRESS

Audiovisions

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Audiovisions

Cinema and Television as Entr'Actes in History

Siegfried Zielinski

Translated by Gloria Custance

Amsterdam University Press

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Preface to the English Edition

I began writing the German original of *Audiovisions* in October 1988 and finished in January 1989. In 1994, a second edition appeared, but only a few typographical errors were corrected. When an English translation of the book was projected, I was very tempted to use the opportunity to rewrite the text completely. However, there were two good reasons for not doing so. After looking at it again closely, I realised that it was a lively reflection of the situation in which it had been written – the period of radical change that the media had been caught up in on the threshold to the 1990s. It was a quality that I wanted very much to preserve. In the intervening years, fragments of the German original have been translated into several languages and I have been urged many times by English-speaking colleagues to make the entire book available for international discussion. This is the other reason why I decided to leave the Orientation and the four major historical chapters in their original form; only a very few facets that I consider to be indispensable have been added.

Completely new, however, is the concluding chapter. For the decade that is now drawing to a close, I wanted to discuss some of the themes and texts pertaining to the reality of the audiovisual media with which I have engaged in the years since *Audiovisions* was written; shifts in the structure of the media themselves as well as in the way in which I think about them. In the 1990s, the sated and seemingly equilibrated centres of political and cultural geography, despite their inner contradictions, were stirred up by forces from their periphery and plunged into perturbation. The dismantling of Soviet hegemony in Eastern Europe, terrible wars over the re-distribution of newly emerged sovereignties and dependencies, particularly in the Balkans, the fall of the Wall in East Berlin, and a new attempt by the USA – this time in Iraq – to consolidate its international influence with military aggression, all deeply shook real world conditions. In such a momentously existential context, it is indeed a marginal point, but these events did in fact silence the heated discourses which would have stylised the increasingly busy traffic of signs into a reality that dominated everything (moreover, with their fashionable and catchy phrases, they were partly responsible for cynically consigning many young academics from cultural studies to unemployment).

New tensions arose between local interests, which demanded their rights, and global interests, which were pushing towards universalisation. The media space where this was fought out became known under the buzz-word of 'the Net'. These machines with their programmes from Silicon Graphics, Microsoft, Macintosh, or Compaq, proliferated rapidly, their

density increased apace, and soon reached the four corners of the Earth. They became the focus of the desires and activities of the most disparate social groupings: the Telecom-companies, by then almost completely privatised, finance and mercantile capital, scientists, artists, hackers, newly formed social action groups between East and West, intelligence agencies, which had to redefine their fields of operation to some extent, and – naturally – the military, who had originally commissioned the research that led to the development of the Internet.

The trend toward clustering media activities in a new centre and master medium, which was declared the paradigm of the fin de siècle, was accompanied by a simultaneous process of fanning out, in which the structure of the various audiovisual media were all caught up. The cinema, as the space of intimacy in public, was again attractive and received renewed attention. Not least due to Hollywood's digital production technologies, which allowed their users more independence, the national European production factories of film experienced a veritable boom. Television attempted to re-define itself between the poles of audiovisual department store and digital service industry. A broad variety of canned media, from the common video cassette and CD-ROM to the digital videodisc, vied with each other for the consumers' favour, who seemed to have ever greater difficulties coping with the allocation and use of their media time budgets.

During this period, the focus of my own work as a media historian and theoretician, as a collector and analyst of media curiosa and normalities, shifted considerably. What I had begun at the Technical University of Berlin during the 1980s, namely to facilitate, in parallel to a critique of established production, also a different kind of audiovisual praxis, became a greater priority – at first in Austria, then in Germany again at the Academy of Arts in Berlin, and since 1993, especially at the new Academy for Media Arts in Cologne. The more the entire complex of the media became the focus of society's attention and was at the mercy of economic and political/cultural power-brokers, the more imperative it became to set something against this in one's own teaching and research activities, or at least to attempt to do so.

One part of this response is the ongoing experiment to bring art, science, and technology into a relationship, alongside and meshing with each other, in order to challenge the rigid encapsulation of self-righteous specialists and counter the trend toward levelling and uniformity. Art, with and through media, is conceived of here as a possibility for realising heterologous processes and events, which can develop alongside the major institutions while engaging with them. The other part, pertaining to my

interest in history, is a shift from analysing hegemonial relations and conditions to the archaeology or, rather, to *anarchaeology** of audiovision. Analogous to the interest in creating new possibilities for future production, here my goal is to make accessible intellectually those great and multifarious riches of a history of technical hearing and seeing that may be able to escape monopolisation by the predominant media discourse. But enough – that will be the next book.

I should like to thank Gloria Custance for her excellent translation and all her work; Amsterdam University Press and Thomas Elsaesser for making this English edition possible, and Rowohlt Verlag, particularly Burghard König, for their generosity, also in connection with this project.

Siegfried Zielinski, June 1998

* See Zielinski 1997 (3) and http://www.ctheory.com/ga1.11-media archaeology.html (translated by G. Custance).

Orientation

At the End of the History of Cinema and Television Prolegomena to a History of Audiovision

The innovation of cinematography in the last decade of the nineteenth century was the expression and media vanishing point of technical, cultural, and social processes that are generally referred to as industrialisation. In the rhythmic projection of photographs arranged on perforated celluloid strips that outwitted human visual perception, in the anonymity of publicly accessible spaces vested with a highly intimate ambience, the human subjects who had been through industrialisation apparently discovered their appropriate and adequate communicative satisfaction. Reproducible dream worlds, staged for the eye and the ear, provided these subjects who had been rushed through the century of the steam engine, mechanisation, railways, and, lastly, electricity, with the material for satisfying their desires for rich sensory impressions, variety, diversions, escapism, but also for orientation.

Yet even before the first noisy and flickering celluloid projectors began to run, before cinema was actually institutionalised, theoretical work was already in progress to supersede this stage of achievement in audiovisual events – although, obviously, not at first with this express purpose in mind. Twenty years before the first cinematographic shows in Paris, Berlin, London and New York, models for 'seeing machines'[1] were designed, models for a medium where the production of visual reproductions and their reception would almost coincide in time even though transmitter and receiver were spatially far apart. Telegraphy and telephony, respectively, were the models with regard to the positioning of the users of this communications technology. They were to be owners of their own equipment.

In the first three decades of the twentieth century, electricity aided the progress of experimentation on this tele-vision in a number of countries and was even installed in a few as a mass medium on a trial basis – notions as to its use were still undecided and located somewhere between public and private event, between cinema and radio, as expressed in Germany, for example, in early terms such as 'Filmfunk' [film radio] or 'Fernkino' [telecinema] That which was a general characteristic of the technological change-over impacted communicative conditions in an exemplary and spectacular fashion: the transition from mechanical to electronic reproduction. After World War II, the televisual living room medium of familial privateness became established rapidly as the (mass) communicative vanishing point of a con-

siderably disillusioned modern age: after the experience of a public sphere that had been appropriated and perverted by fascism, this was a concomitant and result of people's retreat into the intimacy of their own four walls, and was flanked by the spread of individual mobility through the automobile, both developments being directed at the individual as a machine-owner and a machine-user.

This piece of domestic furniture with the electronic picture tube (which became progressively larger as time went on) in which staged and non-staged facets of the world were transformed into images at an incredible speed, pixel by pixel, and evaporated just as quickly once they had been visible, rose to become the projection space and the gravitational centre of communicative desires of people who were captives in satellite towns, public sector housing developments, and the homes they owned. There, it fostered their familial private sphere in the commodity paradise of advanced capitalism. This televisual process had already passed its peak by the mid-1970s. Since that time, production, distribution, and utilisation of technically mediated worlds of sound/images have all been caught up in a fundamental process of transformation:

The filmic has arrived at the age of its unlimited electronic reproduction and thus its unlimited exploitation as well. Cinema has essentially become degraded to a pressure cooker, a *Durchlauferhitzer* and promotion machine for about a dozen or so big international productions a year from the factories of the subsidiaries responsible for entertainment of finance and industrial consortia, like American Express, Coca-Cola, General Electric, Gulf & Western, Matsushita, Sony, or the new dynasties of Berlusconi, Bertelsmann, Kirch, Murdoch, and Turner. Their audiovisual exploitation interests lie in launching their products world-wide with a minimum of effort and expenditure, for example, via global direct-satellite networks, through which films can be sent *n* billion times for cash to private households or to the new film theatres of public intimateness. On the one hand, the conventional television set is now on its way to becoming electronic home cinema, with new techniques of visual reproduction, higher and faster definition of images as well as expanded possibilities of auditory perception. On the other, it is undergoing a permutation to an apparatus that can be deployed anywhere and everywhere as a companion of increasingly singularised individuals. At home, it is becoming the centre for conducting exchange transactions, including electronic choice of mate. Importantly, at the monitor – particularly when it is a component of a personal computer system – the tendency for work-time and rest-time to coincide is once again at work. However, the new networks and the end-apparatus of audiovisions are not only suitable as distributors of fictions and instructive

'I believe that television will help the film producer. Today, it takes a year before a film has run in all the cinemas; television makes it possible to show a film everywhere on the same evening. Films that are televised take a year to make and one evening to screen.' (Sam Goldwyn of MGM, 1935, cited in Blemmec 1935, p. 287)

Television set shown at the Radiolympia exhibition in London, 1936: Ekco-Scophony Model 202 (Price: £100).

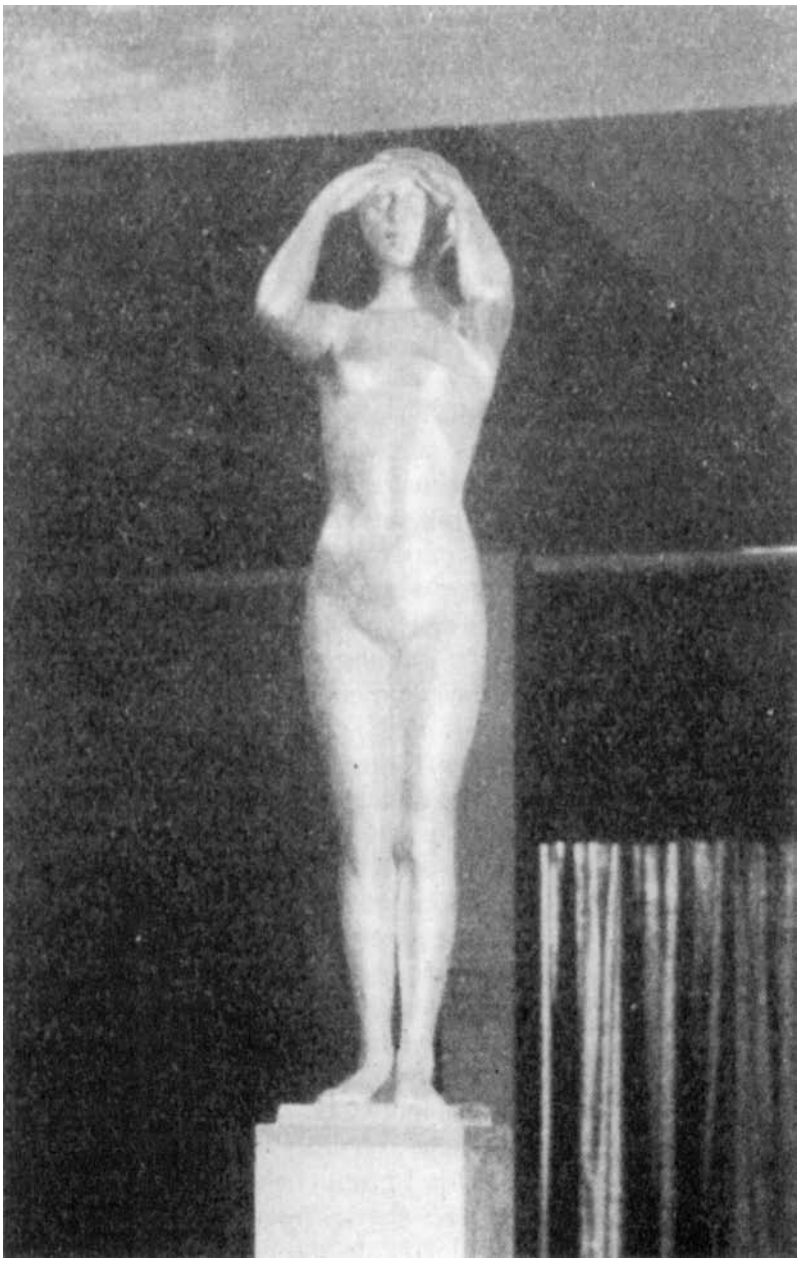
informations of all kinds, they are also 'dialogue-enabling'. In plain words, this actually means that they can also be used interactively in all kinds of work processes.

The 'classical' institution of mass communication, television as public broadcaster, is visibly being replaced by a gigantic audiovisual department store. Armed with a remote control, individual storage and playback devices for sounds and visions of all kinds as well as their own image-synthesisers, the actors of televisual leisure in front of the screens/monitors stroll through this electronic dreamland rather like the bourgeoisie once did through the arcades where capitalism put itself on display. Only the main difference is that, subjectively, they now appear to have even less time. They are exhausted from rushing from one everyday control panel to the next. What is delivered to them via satellite, copper or optical cable, from the videodisc, the CD-ROM, or the magnetic tape cassette, are rhythmised patterns and carpets of images, increasingly woven and programmed digitally: simulations of all kinds of surface phenomena resulting from highly complicated computation. Additionally, they are offered appropriately styled fragments from traditional spheres of culture, where both the new and the older audiovisual media behave as though they were in a rich quarry that has to be worked right down to the last scrap of ore. Merrily and seemingly unselectively they re-cite, re-edit, and re-collage the reality of media representations – representations that used to be obviously distinguishable as secondary, but now appear to be gradually promoted to primary or, at very least, seem to have equal rights in the competition with the other realities.

This process is not the expression of some fantastic discourse of disappearance, its core is quite concrete, still: the industrial culture . The method of audiovisual reprocessing is cheaper and faster than creating elaborate new constructions. It helps to manage a situation according to economic rationale where, on the one hand, creative resources are at best stagnating and/or artificially kept in short supply, and on the other, the multiple markets' voracious and insatiable appetite for material needs feeding.

Audiovision has become an amalgam of many media communication forms that used to be separate and is thus, for the interim, the fulfilment of that project to occupy the minds and hearts with culture-industrial commodities, which was begun in the nineteenth century.

When I speak of the end of cinema and television, I am not announcing the imminent departure of the two most important institutions of sound and image generation to date. Rather, I seek to define their historically delimited significance as specific cultural configurations within the wider framework of audiovisual praxis. It means that we are confronted with the subsumption of epoch-determining qualities of the filmic and its mediation



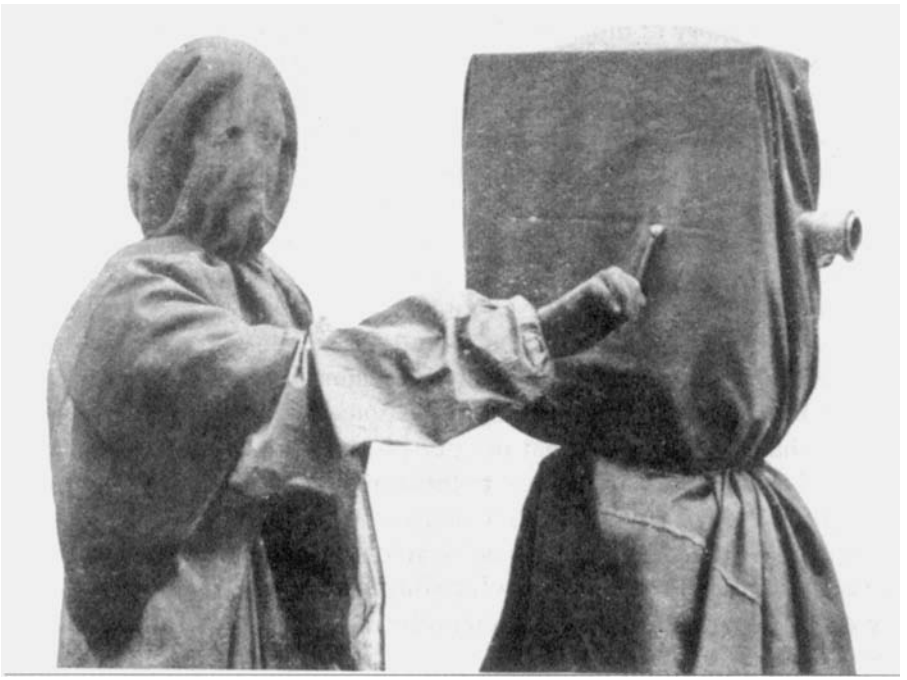
Allegorical portrayal of television by the Berlin sculptor August Kattentidt. The sculpture was created to decorate the entrance to the television section of the Berlin Radio Exhibition of 1930. (Source: Fernsehen, Vol. 1, No. 10, 1930.)

that were inextricably linked with its realisation in the context of cinema and television. In the historical perspective, when older constructions are subsumed into new ones, individual elements of the old are nearly always preserved in the new. Both forms of concretion for the realisation of illusions of motion will continue to be present for the foreseeable future, albeit within changed structures. However, they will be ousted from the centre of filmic everyday reality. Traditional television is fast losing its hegemonial function. Cinema relinquished its long ago, even though there are periodic eruptions of its enormous force as the sound and image medium that activates the human senses the most.

At this point of fracture in media history, which at the same time marks a fracture within the cultural process as a whole, it is both necessary and useful to undertake the task of (re)constructing. The technical systems and artefacts, which are currently proliferating and being marketed, plus the changes in aesthetics and modes of perception are, in many aspects, quite spectacular. However, this spectacle-quality is itself superficial to a great extent, often mere packaging and an element of the mise-en-scène of advertising. To expose the exaggerated promises of use-value in the advanced audiovision project, to trace its development, to disclose at least to some extent its context of relations, and to look for possible new qualities of use-value there, offers one vantage point for confronting the phenomena and for understanding them as historically mutable.

With its back to the wall and confronted with a massive surge of technology under the sign of the binary code, it is indeed imperative that new and/or further developments of concepts in historiography be developed. Apocalyptic visions have the same paralysing effect on thinking as a prerequisite for intervention* as mythologising ones do. Their epistemological essence is the same, anyway. Debates, that forecast the demise of Western civilisation due to the rise of new media, have been around since the first storage media for language intervened in the cultural process. Since the important semiological change from a more literary to a more visually characterised (mass) culture in the nineteenth century, and particularly since the beginning of the non-stop industrial production of pictures and images, such debates have emerged at ever shorter intervals. They have become more vitriolic but not more convincing. Including those waged under the sign of the new semiological change-over to the essentially text-based cultural technology of the computer.

* I refer here to Brecht's poetic concept of 'eingreifendes Denken', which he used to distinguish the kind of thinking that intervenes in historical processes to promote change.



Dr. Raymond Ditmars prepared for filming an aquarium subject. The scientist and camera are draped in black to prevent reflection. (Talbot 1923, p. 200)

The stylisation of cinema into a myth, its sanctification as the ritual space of filmic experience, its aureole in contradistinction to dissolute televisuals – which also dissociates cinema from its origins – is not just a progressive loss of the ability to relate to the structure and presence of what remains of itself in everyday reality. This fixation on the mythos of cinema, which goes hand in hand with a closer affinity to the classic bourgeois art tradition in the cinema, has itself played a considerable role in hastening the dismantling of the cultural significance of cinema. Moreover, it becomes fully anachronistic in view of the fact that the negative point of reference of such myth-making itself represents a form that is historically obsolete. This, in turn, has led to the defence of public broadcasting as the only proper place for televisual messages and to strange alliances, where cultural critics and makers of programmes and films for television all rally to its defence. In this constellation, those who up until now have tended to push traditional television entertainment aside as a cultural waste product, can at long last go on the offensive and enjoy consuming it. A further, revealing indicator is that television has now been promoted to a recognised subject for academic study.

The long history of illusions of motion by means of technical apparatus demands great stamina but the air is getting thin. At a time when academics and private researchers who professionally engage with the media are busily either providing policy- and/or technology-planners of the media future with studies to legitimate and orient the implementation of new techniques, affirming public acceptance of those already installed, or – if their interest is historical – writing chronologies of works, men, and institutions deemed to be great, my study insists unashamedly on being ambitious in a way that is almost a luxury: it is my interest and desire to proceed as far as some of the fundamental questions about the course of the media-historic process; at the very least, I aim to lay out material for this interrogation so that it is indeed possible to pose such questions. To illustrate this: in view of the fact that it is apparent that the perspectives are becoming ever more opaque, I shall embark on a quest to the drawing-board models which represent the bedrock of the topology of a section of the media map: models constructed by amateurs, technicians, researchers, industrialists, cultural planners, producers, and critics, which have so far only appeared peripherally and disconnectedly in historiography, and which should be decoded from the media material, also from the artefacts themselves, i.e., to discover the machine from the screw which may be a part of it. Yet reconstructions such as this are not only a luxury. They necessarily provide contentions. Models are offers to engage in debate.

In a condensed form and without evoking the intellectual ancestors that have all shared in influencing it, my conceptual starting point is: over the past hundred and fifty years, in the history of the industrially advanced countries, a specialised, tending to become ever more standardised, institutionalised area of expression and activity has become established. I call it the audiovisual discourse. It encompasses the entire range of praxes in which, with the aid of technical systems and artefacts, the illusion of the perception of movements – as a rule, accompanied by sound – is planned, produced, commented on, and appreciated. This special discourse is both embedded in and defined by the superordinate process of an ongoing *attempt* at culture-industrial modelling and subjugation of the subjects – those who are (supposed) to use the artefacts and the messages appropriated by these. This culture-industrial dimension thus has the character of a dispositif, in Foucault's sense of the term. For the purposes of analysis, its relevance is not that of an ominous superstructure, but rather as an identifiable historical concretion where the fractures and fissures are visible. Culture industry has reified the audiovisual discourse in a number of arrangements, which thus also possess the characteristic features of a dispositif. From a media studies perspective, these arrangements are better comprehensible and ex-

plain more than considering isolated types of apparatus and, moreover, in the wider sense as Jean-Louis Baudry has defined for cinema, for example: a construct with a complex structure in which the technical basis of the film equipment, the concrete conditions of projection in the cinema, the film itself, and the 'mental machinery' of the subject in the cinema auditorium all combine.[2]

In the historically different arrangements, the audiovisual overlaps with other specialist discourses and partial praxes of society, such as architecture, transport, science and technology, organisation of work and time, traditional plebeian and bourgeois culture, or the avant-garde. The particular constellations that arise in this way under the hegemony of the culture industry, structure the process historically. Four dispositif arrangements can be distinguished in the course of this history thus far:

- the production of illusions of motion in space and time with the aid of a heterogeneous ensemble of picture machines employing various techniques, where the rudimentary imaginings are produced using painted visual surfaces in combination with changes in light levels, movable elements of the original pictures themselves, or moving elements of the artefacts, whereby the level of technological development, physiological, and psychological research at the time did not permit the illusions produced to be brought into line with the perception of real movements. The culture industry already made its presence felt in various ways, but it was not very far developed within the relative anarchy of the forms of expression and the positioning of the subject;
- the cinema, where in effect the filmic discourse of perfect illusionisation of motion in space and time in the intimate-public sphere became concretised and where the culture-industrial element came to dominate;
- television as the institutionalisation of a broadcast flow of illusions of motion controlled from outside for a scattered audience in the private sphere; and, finally,
- advanced audiovision, as a complex construction kit of machines, storage devices, and programmes for the reproduction, simulation, and blending of what can be seen and heard, where the trend is toward their capability of being connected together in a network but which, for the time being, at a more advanced stage of development display a similar heterogeneity to that which was characteristic of a large part of the nineteenth century.

Although the temptation is great to reconstruct these four arrangements in a simple chronological order, it would be the wrong approach. In history, they interlock, overlap, and periodically attract and repel each other. To understand them as historically distinguishable dispositifs means, first and

foremost, to characterise the socio- and techno-culturally dominant arrangement of a particular time and, at the same time, to bring out the social and private relations which led to this type of hegemony, including how it came to establish itself.

Thematically, the chapters do not simply follow the four-part structure of the historical process either. They focus on the 'classic' dispositifs of cinema and television, their origins and origination, their contradictory constitution, as well as their gradual dismantling over time. The first chapter also refers back to the development of early machines for producing images, a field of study which, to date, has had only scant attention paid to it, and the fourth chapter already maps the most recent historical developments. The developed forms of cinematographic and televisual expression have been written about extensively elsewhere; here they are only dealt with marginally.

Even if one disagrees with the intellectual premises of this study, it is my hope that my work will benefit an integrated history of the media, in a two-fold sense: up to this point in time, study of the most important strands of culture-industrial development of the last hundred years, cinema and television, has artificially separated the two and investigated them in this configuration, whereas here the focus is an overall one. Aspects, which up to now have been excluded from historiography but which are essential socio-cultural mortar for audiovisual praxis, are expressly included here.

It is not to be denied that the text makes considerable demands on the reader. My focus is on the materiality of the media within the triadic relationship of technology – culture – subject. In view of the high standing that technology has acquired, not only as the means and object of cultural expression but also as the prerequisite and outstanding context of applications in cultural practice, this reference frame appears to be particularly suitable as a central point around which to group the analysis and description of media processes. Its most significant quality, which the historic phenomena do not simply reveal to us but which is, instead, an ongoing task to be always tackled afresh, is interdependence. To put it in the negative and in plain words: it did not happen that the artefacts and technical systems (for communication) were invented first, then they usurped culture, and in a further step, they brought their influence to bear on the subjects. Or conversely: technology is not an accidental outflow of cultural determinants, which on their part condition the existence, consciousness, and unconsciousness of the subjects in a one-dimensional way. Between the three terms of reference there is, however, a constant reciprocal relation, which is influenced by individual factors in different historical constellations to a greater or lesser extent.

The focus, in the sense of the triad mentioned above, corresponds to three more recent intellectual traditions, which have influenced the text in a more implicit than explicit way.[3] I am underlining them here because, in my opinion, they have quite wrongly been largely ignored by the modish media-theoretical and -historical models of the last decade, especially in Western Europe and the USA. First, there is the cultural studies approach of Marxist-oriented British cultural research and critique, as represented in exemplary fashion by the life's work of Raymond Williams.[4] Culture as a quality of a relationship between life activity, social living conditions, and actual development of the individual; culture as an expression of ways of life; a concept of media processes as a special social praxis – these are the essentials of this approach that interest us here. The second tradition is more recent historiography of technology and the more recent systems-theoretical approach to the subject; an outstanding exponent in Germany is Gunter Ropohl.[5] Here, the artefacts and their material individuality are not considered as isolated entities – this separation is only possible anyway through an intellectual act of force – but can only be fully understood as a unity of origination/production and utilisation. The third intellectual tradition, is the meta-psychological approach to the media discourse, as developed particularly by Jean-Louis Baudry, Jean-Louis Comolli, and Christian Metz[6] with reference to cinema, and its critique and further development by, for example, the British media theorist and critic Stephen Heath.[7] The friction between this approach and the first two is only superficial. They share a complex concept of apparatus; and the latter complements exceptionally well the other approaches which emphasise the social aspects, because it prioritises the position of the subject in the media discourse. The development of a concept of apparatus with cultural dimensions, a concept of culture where the technical is an essential component, and the integration and constraining of the subject within this complex of relations, roughly delineates my theoretical interest in this outline of a history of audiovision. It does not intend or seek to compete with other models that emphasise more strongly the techno-structure of media processes (like, for example, those of Friedrich Kittler and his pupils), but is to be understood as supplementary.

However, heuristic procedure needs to be put into practice with examples. Here, problems arose, the scope of which only became clear while I was actually writing. Many of the old bricks that I needed for building my construction proved to have been inadequately dug-up and treated by previous cinema and television archaeology. Others, particularly from the traditions of television, I had to excavate myself. This resulted in much more attention to the concrete details of the media material than I had originally planned for the text.

Re-constructing an integrated history of audiovision owes a great debt to the creative and emancipatory praxis of making films in conjunction with reflections on their foundations. Outstanding exponents are the exemplary directors, theorists, conceptualisers, and critics, like Alexander Kluge or Jean-Luc Godard, with their dogged persistence in exploring film history, their insistence on the relationship of tension that exists between filmic and non-filmic external reality, their constant interrogation of their own language, their resistant attitude toward the power of the culture-industrial dimension, and their productive undermining of the established arrangements' sense of security in both the cinema and television contexts. Other guarantors of this are those among the avant-garde of electronics in whose heads and hands the new techniques do not become independent ends in themselves, but are constantly irritated and reflected upon: artists like Valie Export, David Larcher, Nam June Paik, Steina and Woody Vasulka, or Peter Weibel. Further, publishing projects like the French *Cahiers du Cinéma* and *Screen* and *Afterimage* in the UK also stand for this. In Germany, for many years this tradition was at home in the journal and yearbooks of *Film* and, later, in *Filmkritik*. Their compendia, which represent a formidable archive, should not be left to the fast-growing museum and certainly not to the pile of rubble of media history. They are of no use as an index for a vanished culture of the cineastic. On their pages, much advanced thinking was published, particularly in highlighting discussions from the international forum, which is still waiting to be taken up, re-appropriated, and developed, in the context of the radical changes taking place in filmic culture. For example: Gideon Bachmann's often scathing and incisive questioning of the cinema apparatus in the late 1960s; Hartmut Bitomsky's brilliant collage, *Das Goldene Zeitalter der Kinematographie....*[8] [The Golden Age of Cinematography], written more than twenty years ago, or the first sketches of Godard's HISTOIRE(S) DU CINÉMA ET DE LA TÉLÉVISION.[9]

Histoire(s)

du Cinéma et de la Télévision

Vanishing Point – Cinema

The Founding Years of Audiovision

The location could not have been more appropriate for the event. Paris, symbol of metropolitan life and backdrop for the cultural dreams of the nations located between Asia and the Americas, hosted the most opulent World Exhibition at the transition from the nineteenth to the twentieth century. Never before held on such an imposing scale, Paris was the scene for staging the globally achieved standards of the means of production: technological, economical, cultural, and political power. Covering an area of some 1,080,000 square meters, magnificent cathedrals of high capitalism were erected along both banks of the Seine, architectural monuments to the civilising force of technical progress, palaces for art and consumerism, and grand machinery courts. Most of the pavilions – as though to confirm one of the fundamental laws of the system being celebrated – were demolished as soon as the exhibition was over. A few short months having sufficed to realise their use-value, they were relegated summarily to the gigantic scrap heap of history, these testimonies to the 'marvel ... that was presented to mankind at the turn of the century, like a fata morgana of its own cultural development',[1] as George Malkowsky, exhibition chronicler, expressed it with characteristic German pathos.

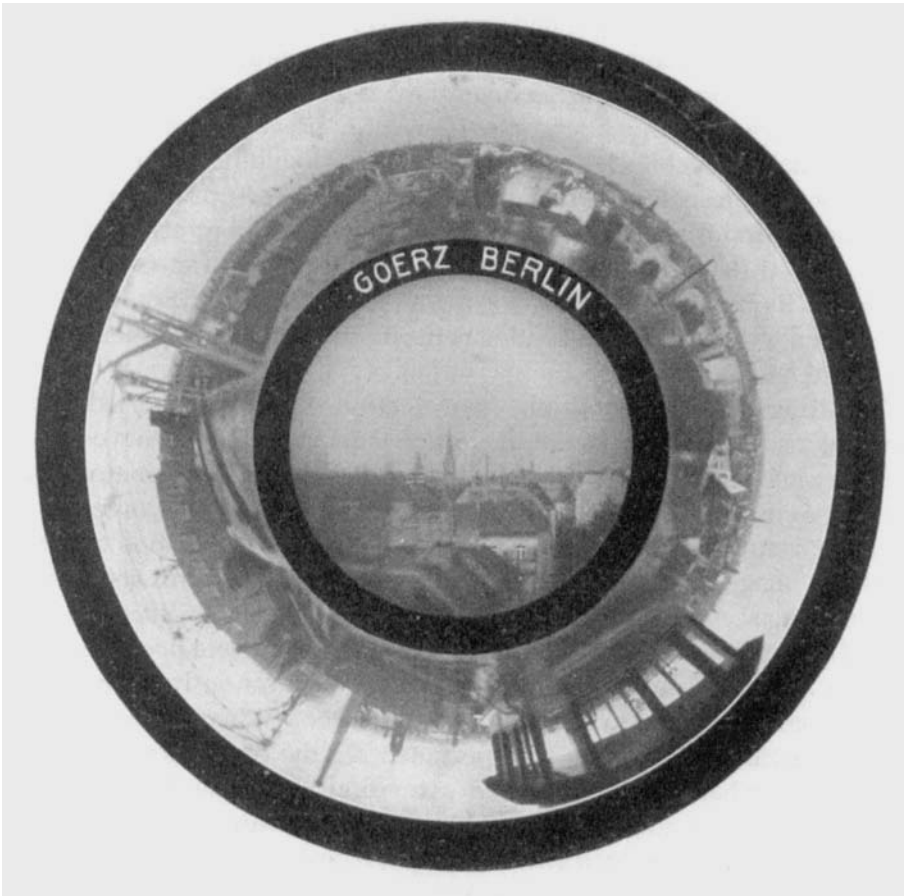
Among the greatest show attractions of Paris Exposition 1900 were the panoramas. With all technical means available, homage was paid to these large-format all-around visions, where, for a small fee, the city-dwellers of the last century loved to be captivated by illusions. Yet it would be for the last time on this scale, for the World Exhibition in the French capital represented the historical swan song of this medium of optical presentation (often with acoustic accompaniment as well) for larger audiences. '...especially in my later childhood', wrote Walter Benjamin who was a regular visitor to the Kaiserpanorama in Berlin, 'one got used to "travelling around" in a room that was half empty'.[2] Many foreign exhibitors featured simpler versions with panoramic views of their national cultures as additional free entertainment. However, others revelled in presentations of the superlative variety:

The panorama 'Le Tour du Monde', partly funded by the Compagnie des Messageries Maritimes, was housed in a splendid circular building. Inside, the spectators were able to imagine docking at various exotic ports of call, which in reality the Compagnie's ships did in fact put in at – an early form of the presentations familiar to us from contemporary international tourism

fairs. Of particular interest because of its aesthetics of presentation and typical for the golden age of colonialism, considerable attention was attracted by another panorama that attempted to combine pictorial representation with live performance: 'The architect of this panorama, M. Dumoulin, has brought small troupes of natives to Paris from all the countries (shown in the panorama). Dressed in their national costumes, these natives squat in front of the bit of screen that depicts their homeland. From time to time the Indians beat their drums of various shapes, and the Spanish ladies shake their tambourines and dance. The Chinese don't do anything at all.'[3]

The illusion of 'travelling along the north African coast between Oran and Bône in a steamship'[4] was offered to the visitors of the stereorama, 'Poetry of the Seas'. The scene was a large, curved horizon which was turned slowly and thus it afforded different views of the seas and landscapes travelled in the imagination. In front of it, waves made of sheet metal were made to move up and down. Although in this version of the panorama the spectator was not yet the observer set in motion, he/she was in fact an integral part of the mise-en-scène in the 'Mareorama'. The audience sat in a model of a passenger steamer, which was set in motion by means of a hydraulic system during the imaginary voyage. The land and seascapes passed by on both sides of the model ship; the pictures were painted on a movable screen which was 7,500 meters long and 12 meters high. The work process used in its creation was not dissimilar to the industrial method of production employed later in the cinema: for eight months, a great crew of painters had wielded their brushes, transferring designs by Hugo d'Alesis to the 'Marcorama'. A further example of this species of the pleorama, as this variant of the moving panorama was also known,[5] took as its theme the nineteenth century's most important technical system to be associated with new dimensions of perception: the railways. In the 'Trans-Siberian Express', built by the international Wagons-Lits company, the spectators sat in three luxurious compartments with original fittings and furnishings supplied by the tour operator. Several levels of movable pictures, passing by the windows in an endless loop, simulated the fleeting impressions of a train journey, using a highly sophisticated technique for the creation of illusion. The greater the distance of the pictorial scenes from the spectators in the carriages, that is, the wider the horizontal angle of vision would be in reality, the slower the corresponding layer of pictures was transported;[6] an impressive combination of the perceptual experience of a train journey with elements of its replacement by media-technical reproduction.

The vast amount of mechanical apparatus required, the enormous cost of materials, and the stationary and fixed character of such grand visual spectacles (often coupled with acoustic presentations) which this old medium



A further development of the Danzig astronomer Hevelin's Polemoskop (Feindseher [enemy watch]) described in 1647: The panoramic view for military purposes. During the First World War, Goerz & Co. built so-called panoramic or circular view periscopes which were mainly used for observing ships. In the centre is an enlarged section of the 'Ringbild'. (Source: Auerbach 1915 (2), p. 41.)

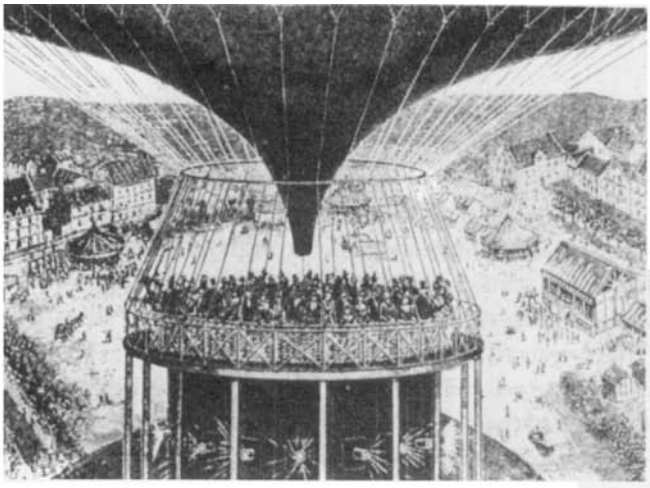
summoned up here for the last time to confront its new rivals of technical reproducibility, spurred Louis Lumière to experiment with another variant of the panorama which was also on show at the World Exhibition in Paris. In his photorama, he substituted the painted pictures with projected images. At this point in time, the two inventors of the Cinématographe, the Brothers Lumière, had ceased to be actively involved in the production of films. The reasons for working on the Paris project that Louis gave a few years later, reveal a deep dissatisfaction with the development of cinematography which was rapidly going in the direction of industrial narrative cinema: 'As its ap-

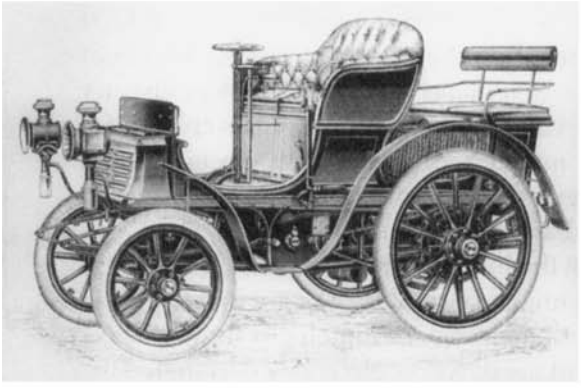
plications since the year 1900 had progressively developed in the direction of theatre and the main emphasis was now on staging, we saw ourselves compelled to close down these operations which we were not prepared for.'[7] There was a further attempt by Lumière to break free: every evening, in the spatial and architectonic heart of the World Exhibition – the *Galerie des Machines* – he presented fleeting cinematographic blow-ups for the *flâneurs* strolling around the heavy production machinery. On a screen measuring 24 x 30 meters (later reduced to 16 x 21 meters due to lack of space), Lumière projected 'living photographs'.[8] The mania for the huge and spectacular in the machines on show corresponded to the inordinately large dimensions of his visual imaginings.

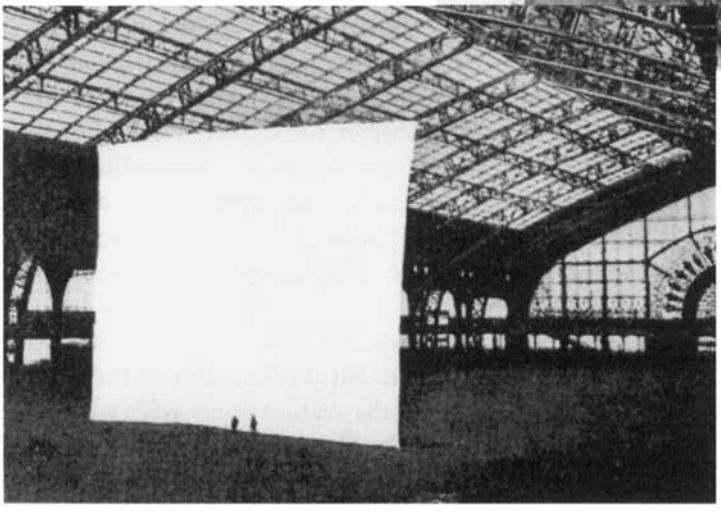
This tribute to the 'panoramic view' (Oettermann), co-organised by the innovations in means of mass transport on land and water, achieved a further dimension in *Paris 1900*, which was connected both to cinematography and to the emergent technology of aeronautics. The Cinéorama, invented by the French engineer Raoul Grimoin Sanson, invited the Exhibition's visitors to take an imaginary flight in a balloon. In order to take pictures of the entire surrounding scenery, a system was utilised that was rather difficult at that time. Ten cameras, weighing a total of 500 kilograms, were positioned in a circle in the car of a balloon and these filmed synchronously the balloon's ascent from the ground to an altitude of 500 meters. 'When these cinematographic pictures are shown, the spectators see the earth receding below them and they have the impression of ascending into the air. For the projection of this film, an auditorium was built which measured 30 meters in diameter with 10 screens, each 10 meters high, arranged in a circle. A concrete cylinder in the centre supports the audience stand which is designed like the car of a balloon. The bottom half of a balloon, fastened by ropes, floats above it and strengthens the impression of actually sitting in a free balloon. Projection is done from inside the concrete cylinder. It has 10 apertures through which the projectors protrude. Each projector is fitted with an electric arc lamp of 10 amperes.'[9] Before our own times, where the general trend is to simulate any and every visual surface structure, it took enormous efforts like these to amaze people optically. And it worked. Despite the severe flickering of the projectors, the Ballon Cinéorama with its views of Paris was one of the principal entertainment attractions at the World Exhibition.

The view on history that *Paris 1900* organised and facilitated was panoramic and retrospective. 'Examined closely, the entire history of mankind resolves into the history of the invention of ever-better tools.' The organisers and exhibitors went to great lengths to translate this motto of Ernst Kapp's, from his *Philosophy of Technology* (1877), into reality. The visitors who came to see these reifications of human work and new technological thinking

Paris 1900





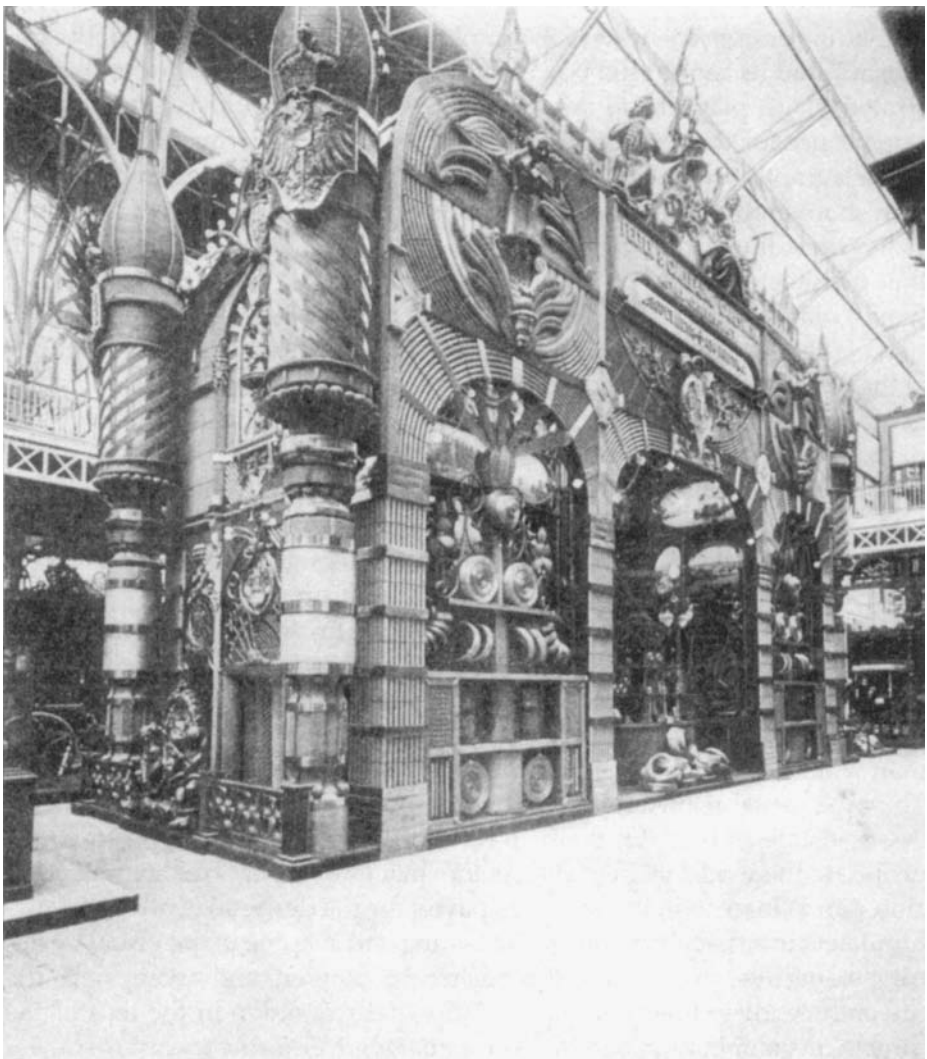


Cinematographic craze for the gigantean and artefacts for personal mobility: Ballon Cinéorama, Benz four-seater, Ernemann camera 'for hunters, cyclists, tourists', and Lumière's enormous screen in the Hall of Machines.

were presented again with an abundance of achievements from the outgoing century: artefacts from the fully mechanised and machine-centred production sphere; the development of motive power from stationary to mobile steam engines; the development of a modern chemical industry; the tremendous and violent transformations in transport through the advent of the railways, shipping, bridge and tunnel construction; the beginnings of private transport; the expansion of centralised infrastructures of utilities (gas and waterworks); the many recently established new branches of the textile industry, the metal industry, tool manufacture, the automated printing press, the various technologies of the synthesised branches of the photographic industry, and – first and foremost – electricity.[10] That the process of mechanisation and changeover to factory manufacture did not necessarily mean happiness and fulfilment to those obliged to work in it, did at least prompt the German chronicler to mention the 'excellent representation of *social policy* and the *workers' welfare organisations*' in his introductory chapter to the exhibition report, 'the safety valves, that our century has created for the unavoidable concomitants of mass production'.[11] The Social Palace, where the depiction of these 'achievements' took place, was hidden in an out-of-the-way corner on the right bank of the Seine.

Some years previously, in 1891 at the International Electrotechnical Exhibition in Frankfurt, early experts in image-promotion had got in some good practice at presentation with their 'unchaining of Prometheus through electricity'.[12] In 1900, the mise-en-scène of the power of electricity dominated the World Exhibition visually, reaching even mythical heights: 'The present day stands under the sign of the great central power stations, which turn the power of mighty waterfalls or great thousand-horsepower steam engines into electrical current and then deliver it to far-off districts many miles away. Coming from these power-houses, the current enters houses and factories via legions of thin wires and here it changes its travelling dress, obedient to the wishes of its master. As a shining god, we see him radiating light and lustre; in the electrolyte bath, he forces the elements to love or hate each other according to his will; or, as a faithful retainer, he keeps the machines turning.'[13]

Numerous exhibits were architectonic reifications of projections of this kind, for example, the illumination of the steel girders of the Eiffel Tower – itself a monument to the epoch of industrialisation – with a myriad of electric light bulbs, and, for Germany, the Palais des Câbles, which looks to us today like an allegory of the shackled cable projects of the Telecom International; and the ornate Art Nouveau pavilion of the Allgemeine Electricitäts-Gesellschaft (AEG), a 'fairy castle, a temple of light, consecrated to that ancient and eternal symbol of brightness and life'.[14] The lights from one



Totally wired – the Palais des Câbles, Paris 1900.

building in particular could be seen from far beyond the immediate area of the exhibition: the central environment of the new technological idol, the Palace of Electricity; by night, magnificently illuminated outside and bright as day inside from the light of thousands of bulbs of every variety. Under its roof was also housed AEG's Temple of Electrical Gifts. In this palace, the young electrical industry's capital celebrated not only the beginning electrification of the home and the production sphere, but also the second industrial revolution: its farewell to the self-sufficient energy supply of

individual entrepreneurs and their union with 'corporative monopoly capitalism'[15] and its centralised power supply. Here, components were demonstrated, as yet playful and unspectacular, that later would assume seminal importance for the revolution in communications: experiments with wireless telegraphy and telephony, for example, or with the Telegraphon of the Danish inventor, Waldemar Poulsen, the germ-cell apparatus of tape- and video-recording technology. It was also in connection with this exhibition that the most invasive of all the media received the name under which it would march triumphantly into the living rooms of the industrialised portion of the globe half a century later: *Television*. Constantin Perskyi, lecturer at the St. Petersburg artillery academy, gave a paper with this title on 25 August, 1900, in Paris in which he described an apparatus that utilised the magnetic properties of the chemical element selenium.[16] The German version of the term was already nearly ten years old by this time. In 1891, R. Ed. Liesegang had published the first volume of a series entitled *Probleme der Gegenwart* [Problems of the Present-day] (as though existential problems were about to be discussed) that dealt with an artefact he called the Phototel. The sub-title, 'Beiträge zum Problem des electrischen Fernsehens' [Contributions on the problem of electrical television], became the programmatic main title of the 1899 second edition of this little volume. An irony of history: Liesegang dedicated his pioneering work on television to a man who is celebrated as a pioneer of cinema – Thomas Alva Edison.
To make visual reality reproducible, to render natural and technical processes visible and display them, these are specific forms of the desire to appropriate the world inclusively. As the images of surface reality moved in closer and closer to it, the way was paved for the desire to control and manipulate it in a specific manner. The taming and shaping of the visual by linear perspective, practised and perfected by painters and artists since the fifteenth century, finally found its industrial reification in the lens of the camera, in combination with machines that were also able to capture movement and the passage of time.

This dialogic process of appropriation and shaping by machines, that runs through the age of industrialisation with a vehemence, climaxed in the Paris Exhibition in 1900. The panoramic presentation of the world in the reified forms of technology, industry, and culture corresponded to the cultural technique of the panorama as the most impressive system in audiovisual discourse at the level of the machines for producing images and constructing (audio)visual fantasies. Its significance for the spectators was described a few years later by Carlo Mierendorff thus: 'The swaying screens of the exhibition stands were guarantees for the imagination. It is here that our world-view is rounded off. Man, who only experiences himself

fragmentarily, feels an urge to bend the beginning and the end of existence together in the palm of his hand, to stand on the hub of the world.'[17]

In Lumière's Photorama and large-format cinematographic projection, extremer still in Grimoin Sanson's Ballon Cinéorama, this arrangement was expanded to its limits. The production of pictures had given way to visual re-production in the form of photographed and projected images, the static and the fixed yielded to the movement of the film, which had already made its large-format début in the moving Pleoramas. Underneath this spectacular surface, the exhibition was still completely trapped in the nineteenth century, both socio-technically and socio-culturally; however, it did also reflect the changeover to the perspective that would be decisive for many years of the twentieth century: the tele-visual perspective. In addition to Perskyi's suggestion, two others should be mentioned here: the model developed by the Austrians Jan Szcepanik and Ludwig Kleinberg, and Dussaud's Téléoscope. Vociferous advance notice of both machines was given; however, neither was ever built. Television, the medium that would both severely restrict the aesthetic perception of the panoramic view and infinitely expand it thematically, attracted considerable attention (initially, mainly from specialists) when it was at little more than the drawing-board stage. Electronic engineers and physicists loudly proclaimed that soon, people would also be able to see via electrical cables – at a time when people were only just beginning to get used to the possibility of overcoming space by media technology, through the transmission of sound via the telephone. This was a further attraction on show in the Paris exhibition halls that people had barely had time to come to terms with culturally, although as a media-technical project it had already reached advanced forms of development, for example, in the Telefon Hírmondó installed in Budapest in early 1893, which established a multi-media service and thus represents a kind of archaic Internet.[18]

Are these glaring contradictions? The Paris Exhibition took place under the influence of the 'great changes in the thinking of physicists and philosophers'.[19] Max Planck had just formulated quantum theory. In 1900, Albert Einstein received his degree from the Eidgenössische Technische Hochschule in Zurich. Just five years later, he published his paper 'Die Elektrodynamik bewegter Körper', his first work on the Special Theory of Relativity, the precisely formulated theory that overturned traditional notions and concepts of time and space. Motion became the new paradigm in physics and superseded Newton's theories of gravity and motion. Practical and theoretical experimentation with electrons began – elementary particles that were of seminal importance for later media technology. In 1902, the term 'electronic' appeared, probably for the first time, in a 'confidential pa-

per' by John Fleming;[20] in 1904 there was a German periodical with a wide circulation called *Year-book of Radioactivity and Electronics*. In 1900, J. Poljakow patented his Photophone; a device using an optical sound process which was conceived of as a substitute for gramophone records. Furthermore, the paper by Karl Ferdinand Braun, describing his highly sensitive instrument for experiments in physics and electronics in No. 60 of the *Annalen der Physik und Chemie*, was already three years old at this point in time; later, the Braun tube became the most important component of the television set.

Although the perspective of realising viable apparatuses that *Paris 1900* ventured to propose with regard to the theme of television was prospective, nevertheless, we see that it represented an advanced stage in model construction. The project of electrical tele-vision developed – as confirmed by tangible historical evidence – in the last three decades of the nineteenth century, admittedly within a different lineage, but parallel in time with the establishment of that phylum of cinematographic apparatus through which the genesis of the 'machines of the visible'[21] peaked for the interim.

However, the decisive factor is the historical difference between the levels: the nineteenth century brought forth the audiovisual medium of cinema, which was implemented both socio-technically and culturally. With these speculations, these theoretical and experimental building blocks for technically mediated seeing, where the reproduction of objects and the reception of the images happen simultaneously despite the spatial separation of both processes, it is apparent that its supersedure in history was thus heralded as well.

In the spaces and places where film material was shown it was never silent, neither with respect to the array of possibilities for its mise-en-scène. Indeed, the production and technical reproduction of sounds, music, and language has been an essential component of filmic discourse throughout its extensive history, which is why the term *audiovisual discourse* is more apt. From Daguerre's 'Mont Blanc' diorama of 1831, where a live goat was present at the performance to bleat, alpen horns sounded, and a Swiss choir sang folk-songs, to the rich acoustic environments of the magic lantern shows, for which the first sound effects specialists were trained, the reciters and story-tellers in front of and behind the screen, and the synchronous use of machines producing speech and music: the presentations of illusions of movement were loud and resounding, long before the introduction of synchronised sound in the talkies of the 1920s. Indeed, in certain variants of global cinematography what was heard even dominated what was seen, for example, the role and function of the *benshi* in early Japanese cinema – a story-teller and entertainer who was frequently a greater attraction for the audience at the film performance than the images shown. Historically, audi-

tory and visual elements have always stood in a close interrelationship, according to the particular circumstances, and have influenced each other in aesthetic impression and expression in many different ways. Further, the genesis of their respective apparatus exhibits a host of connections, overlaps, and tensions. However, until now the importance of the speakers and moderators, the sound effects people (to a lesser extent the musicians and composers), the talking machine/Sprechmaschine, the record-player, optical sound, and the tape recorder has hardly been recognised at all in historical reconstructions of cinematographic perception and production processes. My own focus on visuals reinforces this deficit. Future research in media archaeology will hopefully turn its attention to this field, for at present, it is a wasteland.[22]

Selected Data on the Technical Genealogy of the Projects of Cinema and Television in the Second Half of the Nineteenth Century

Cinema

1853

Franz von Uchatius describes his improved apparatus for showing moving pictures on a screen at the Academy of Sciences in Vienna (the first apparatus with this arrangement was probably developed around 1845).

1856

Alexander William Parkes patents the use of celluloid as a coating for photographs.

1860

Thomas Skaife builds the Pistolgraph, a mini-camera for taking instantaneous photographs which was held in the hand and pressed like a hand-gun.

1861

Coleman Sellers patents the Kinematoscope, a precursor of the Mutoscope, in which stereoscopic pairs of posed photographs were placed on six paddles equally spaced around a rotating shaft.

1864

Ducos du Hauron takes a patent for a camera and projection apparatus for motion photography. The patent was issued, but not published, so it remained unknown for a long time.

1866

In his projecting Wheel of Life, the Choreutoscope (first patented in 1862), which was an adaptation of von Uchatius' apparatus, L.S. Beale uses a shutter worked by gearing to illuminate intermittently a series of painted pictures.

1867

The amateur photographer Alfred A. Pollack develops proposals for series of photographs of objects in motion.

1869

In a patent issued to A.B. Brown, mention is made of a mechanism for fast-changing intermittent illumination using a rotating shutter and the likewise periodic movement of the 'videodisc' of a Wheel of Life.

James Clerk-Maxwell constructs a Zootrope that eliminates optical distortion of the images by substituting concave lenses for the slots.

Television

1851
A submarine cable under the English Channel is laid from Dover to Calais linking France and England.

1853
The French and Prussian telegraph lines (overland) are taken down.

1854
Charles Bourseul publishes an article describing the theoretical possibility of electric telephony.

1855
David Edward Hughes is issued a patent for his type-printing telegraph. Giovanni Caselli's Pan Telegraph, a telegraph for the transmission of pictures, is patented.

1861
Philipp Reis presents his research with an electric telephone.

1866
Work on the first permanent transatlantic cable between Europe and the USA is successfully completed.

1869
In Bern, Switzerland, a journal for the new communications technology, *Journal Télégraphique* starts publication.

1873
During work on the underwater cable, May, an assistant of Willoughby Smith, observes that light oscillations also produce changes in the electrical conducting properties of the chemical element selenium.

1875
John Kerr discovers the rotation of the plane of polarisation of polarised light and the electro-optical effect in liquids. Both discoveries are utilised in the television artefacts of Karolus in the 1920s.
Werner von Siemens constructs selenium cells.

1876
Elisha Gray and Alexander Graham Bell apply for their telephone patents.

1870

Henry R. Heyl invents the Phasmatrope, which projects photographs using Brown's process.

1872

Eadweard Muybridge begins his experiments on the photographic analysis of motion and corresponds with Jules Marey, who at this time was experimenting with the method of chronophotography (a type of graphic registration of time) of motion.

1874

Pierre Jules César Janssen utilises instantaneous photography to record the positions of the planet Venus during its transit across the sun using the Photographic Revolver he had invented (imperfectly constructed earlier by W. Campbell in 1861).

1877

Charles Emile Reynaud resolves the problem of image distortion in the Zootrope by adding a drum of mirrors (Praxinoscope).

Thomas Alva Edison constructs the Phonograph. Sound is now technically/mechanically reproducible.

1878

Reynaud develops a refined version of his optical device called the Praxinoscope Théâtre.

Muybridge publishes *The Horse in Motion*, documenting his experiments with series photographs of a galloping horse.

Wordsworth Denisthorpe describes in *Nature* the combination of his Kinesigraph (a simple device for projecting series of pictures) with the phonograph and thus the first audiovisual artefact.

1879

Muybridge develops the Zoopraxiscope, which enables him to project his series photographs on glass slides.

1882

Albert Londe, a medical researcher at La Salpêtrière, constructs a camera with nine lenses arranged in a circle.

Etienne Jules Marey gradually abandons chronostylography and constructs his own devices for chronophotography, including the Photographic Gun (fusil photographique).

1877

In *L'année Scientifique et Industrielle*, its editor L. Figuier reports on the Téléctroscope, an apparatus for visual transmission at a distance.

1878

Adriano de Paiva and Constantin Senlecq describe devices for electric Téléscopie or Téléctroscopie, the transmission of images at a distance, that utilise selenium-covered plates for the conversion of the light from the pictures into electricity.

A cartoon appears in the magazine *Punch* caricaturing a new 'invention' of Edison's, the Telephonoscope which shows two-way television: an electric camera obscura linked to a telephone.

1879

Further apparatus arrangements for the electric transmission of pictures at a distance are proposed by a number of others, including Denis Redmond, Carlo Perosino, and George R. Carey, which are adaptations of models already published.

1880

The rumour that Bell is working on a device for the electric telegraphy of pictures, his Photophone, sparks the publication of further models by John Perry and W.E. Ayrton, H. Middleton, and G.R. Carey. Actually, the Photophone was a telephone that used a light beam for communication.

In *La Lumière Electrique*, Maurice LeBlanc publishes a proposal for the systematic scanning of objects to transmit moving images over distances. The article already includes a discussion of possibilities for transmitting coloured pictures. De Paiva publishes *La Téléscopie Electrique*, the first monograph ever to appear on electric tele-vision.

1881

Senlecq describes a new version of his Téléctroscope. Shelford Bidwell gives a demonstration of a telephotograph which transmits stills.

Paul Nipkow's patent for an Electrical Telescope is registered at the Imperial Patents Office in Berlin. The elemental points of an image are scanned systematically by means of a rapidly rotating perforated disc.

1885

P.I. Bakmet'yev outlines several models for electrical tele-vision in the Russian journal *Elektrichestro*.

Bidwell publishes a modified version of Nipkow's patent.

Nipkow's patent expires because he is unable to pay the charges.

1885

Anschütz expands his work on instantaneous photography to include experiments with chronophotography.

1886

Louis-Aimé Augustine Le Prince patents a 16-lens-camera in the USA for the successive production of shots of an object or objects in motion.

1887

In Vienna, Anschütz demonstrates an invention with the original arrangement of the 'Elektrischer Schnellseher' and is able to show series of photographs (on glass slides) to a small audience.

Muybridge publishes *Animal Locomotion – An Electro-photographic Investigation of Consecutive Phases of Animal Movements*. The comprehensive edition of this work comprises 11 folio volumes with more than 20,000 pictures of single phases.

Hannibal Goodwin applies for a patent for celluloid film strips – also suitable for roll film (the patent was issued only in 1898 after a heated dispute over patents with George Eastman).

Commissioned by Edison, W.K. Laurie Dickson begins experiments for synchronising the phonograph, a sound recording apparatus, with a cylinder that stores images.

1888

Marey substitutes the glass plates in his Chronophotographe with sensitised paper film and begins to work with the basic components of the process on which cinematography is founded: while the camera shutter is open, the film strip is halted.

Louis-Aimé Augustine Le Prince registers a patent in England for a device for taking and projecting moving pictures and puts on first public performances in Leeds.

Emil Berliner demonstrates his record player in Philadelphia.

1889

The Eastman Company's celluloid roll film goes on the market.

William Friese-Greene and Mortimer Evans patent a camera for taking series of instantaneous photographs in quick succession using non-perforated film.

Dickson and Edison shoot the first pictures on Eastman film with their Kinetograph. Dickson demonstrates his Kinetoscope, a viewing device, to Edison.

1890

Friese-Greene publicly presents a film camera and also constructs a projector for his films.

Anschütz produces an improved version of his 'rapid viewer', the Electric Tachyscope.

1889

Lazare Weiller presents his Photoscope. It uses a revolving drum carrying tilted mirrors as a scanner (Weillersche Spiegelrad [Weiller Mirror Drum]).

1890

Henry Sutton from Australia describes his Telephane, a television device with an arrangement that also proposed to use Nipkow discs.

1891

George Johnston Stoney uses the term 'electron' for the first time for the unit of the smallest known electric charge. Electric currents must consist of individual electrical charges.

R.Ed. Liesegang publishes *Das Phototel*. In the sub-title of this monograph the term 'Fernsehen' (television) is used.

A. Blondel introduces the first Oscillograph.

Louis Marcel Brillouin publishes a proposal for television transmission of images, whereby two rotating lensed discs dissect and scan the image into points.

1893

Leon Le Pontois describes a further Téléctroscope, which also plans to employ Nipkow discs to scan the images.

1894

Quierno Majorana proposes a device arrangement using rotating discs with slots.

Charles Francis Jenkins publishes a design for the electrical transmission of pictures, which revives Carey's concept of 1880. Both this artefact and the film projector, that he develops at this time in collaboration with T. Armat, he names Phantascope.

1895

Carl Nystrom introduces the developed version of the Telephotograph.

1896

Guglielmo Marconi files for the first patent in radio telegraphy based on the use of electric waves, a complete system for transmitting and receiving wireless communications.

1897

Ferdinand Braun publishes his process for demonstrating and studying the action of electrical waveforms with the cathode-ray tube as its centrepiece in *Annalen der Physik und der Chemie*.

The Austrians Jan Szciepanik and Ludwig Kleinberg apply for a patent for a method and an apparatus for transmitting pictures which works with oscillating mirrors.

1891

The Kinetograph is patented (a camera using perforated film). Construction work begins on the Black Maria studio (finished in 1892).

1892

Reynaud opens his Optical Theatre in Paris.

1893

Georges Demenÿ, assistant to Marey until June 1893, constructs a projection apparatus for series photography featuring beater intermittent movement.
Edison and Dickson's Kinetoscope is advertised to prospective buyers as a personal device for viewing films.

1894

Acmé Le Roy and Eugène Lauste develop projection apparatus for exhibiting Edison's films that are on sale and stage the first semi-public film-showings.
Charles Francis Jenkins' projection apparatus, the Phantascope, becomes well known.
On Broadway in New York, the first Kinetoscope Parlour for the commercial exhibition of films opens.

1895

Many patents are filed for apparatus to shoot and project moving pictures, e.g., by Robert W. Paul, Birt Acres, Thomas Armat, Henry Joly, and Filoteo Alberini.
Frequent demonstrations of apparatus are given. Auguste and Louis Lumière patent their Cinématographe (on 13 February) and hold public film shows for a paying audience in Paris (beginning on 28 December).
Max Skladanowsky patents his double projector, the Bioskop, and gives public film exhibitions in the Berlin Wintergarten (1 November).

1896

In England, Robert W. Paul develops his projector, the Theatrograph, which is re-named the Animatograph when marketed commercially. Thomas Armat's Vitascope is marketed by Edison as the projector for his films.
The Biograph, developed by Lauste and Dickson, goes on the market.
Georges Méliès begins making films with apparatus provided by Paul.
Further versions of cameras and projectors are patented and marketed. Many technical details are improved, in particular for apparatus designed for the public exhibition of films (amongst others, the introduction of the Maltese cross for transport of the film).

1898

In his book, published in 1899, Henry V. Hopwood describes 60 different artefacts under the heading of 'Present-day Apparatus'. This represents only a small selection of the apparatus and apparatus-concepts actually in existence at the time.

1898

Dussaud's Téléoscope is published in a *Scientific American* supplement; a device that also uses Nipkow discs for scanning images.

M. Wolfke applies for the first Russian patent for electrically transmitting pictures at a distance. It is already based on wireless telegraphy and includes modified Nipkow discs for scanning.

1899

A.A. Polumordvinov applies for a further Russian patent that already includes a concept for tele-vision in colour.

Literature used to compile the above selection of data: Abramson 1987; Coe 1992; Dagognet 1992; Eder 1892 and 1932; Fielding 1967; Formann 1966; Frizot 1984; Gernsheim and Gernsheim 1969; Haberkorn 1981; Hopwood 1899 (1970); Jenkins 1898 (1970); Liesegang 1891 and 1926; Le Cinéma des Origines 1976; Neale 1985; Nekes 1992; Oberliesen 1982; Quigley 1948 (1969); Russell 1997; Sadoul 1957; Schulze 1956; Talbot 1912 (1923).

In the strict sense, apparatus for cinematographics is based on three elements: the photographic image, the dissection of movement and its reconstitution for visual perception, and the exhibition of this illusion by means of projection. Each of these elements has a lineage of traditions of knowledge, speculation, and experimentation, that can be traced far back into time. The stories of 'great men', the outstanding artefacts, and the historic record from the 'archaeology of cinema' (Ceram 1965) are brim-full with facts, anecdotes, and speculations. Depending on how wide the cognition level of a so-called prehistory of cinema is understood to be, if we trace each of the three elements back through time, with regard to reconstruction of the phases of motion, we will find ourselves back in the world of cave painting or ancient Chinese shadow theatre, as it spreads from its point of origin via the Near East to Europe; or, in connection with the first insights into precise re-visualisation of nature and architecture, we will encounter the Aristotelian observations of nature, the exotic world of the Arab scientist Ibn-al-Haitham on the threshold to the year 1000, or, of course, the theoretical and practical studies by Leonardo da Vinci; we will meet with research concerning the first apparatus for projection, commissioned by the Catholic church and carried out in monasteries in the seventeenth century.[23] However, the levels of development that were adequate for gradually bringing them together in the technical system of cinematography were only attained by all three elements in the second half of the nineteenth century and clustered in its last three decades.

The propagation of the new technique of photography, combined with a call to mass utilisation of the same, that Dominique François Arago delivered to the French Académie des Sciences in 1839, was only anticipatory at the time. Although the basic inventions for the creation of photographic images had been constructed during the course of the first half of the century – particularly by Niepce, Daguerre, and Talbot – it was not until the 1850s that the essential preconditions for photography as a mass medium were created by the work of Le Gray and Scott Archer in improving the positive/negative process. It became possible to reproduce the negatives of a picture as often as desired, on paper as well. It was in the 1860s that the new medium entered its first phase of diffusion. The apparatus became lighter, smaller, and easier to operate. Aerial views could be taken from balloons and the first portable cameras appeared; photography was declared to be fit for active service in war and duly incorporated into strategies of destruction. This was also the Golden Age of portrait photography. The social hierarchy of use began to widen out at the base. Both the photographers behind the camera and the subjects photographed in front of the 'camera lucida' [light chamber] – Roland Barthes' neat reversal of the camera obscura –

were increasingly of lower middle class origin. Further, the first ideas for series photography in order to dissect movement and moving objects originated at this time.[24]

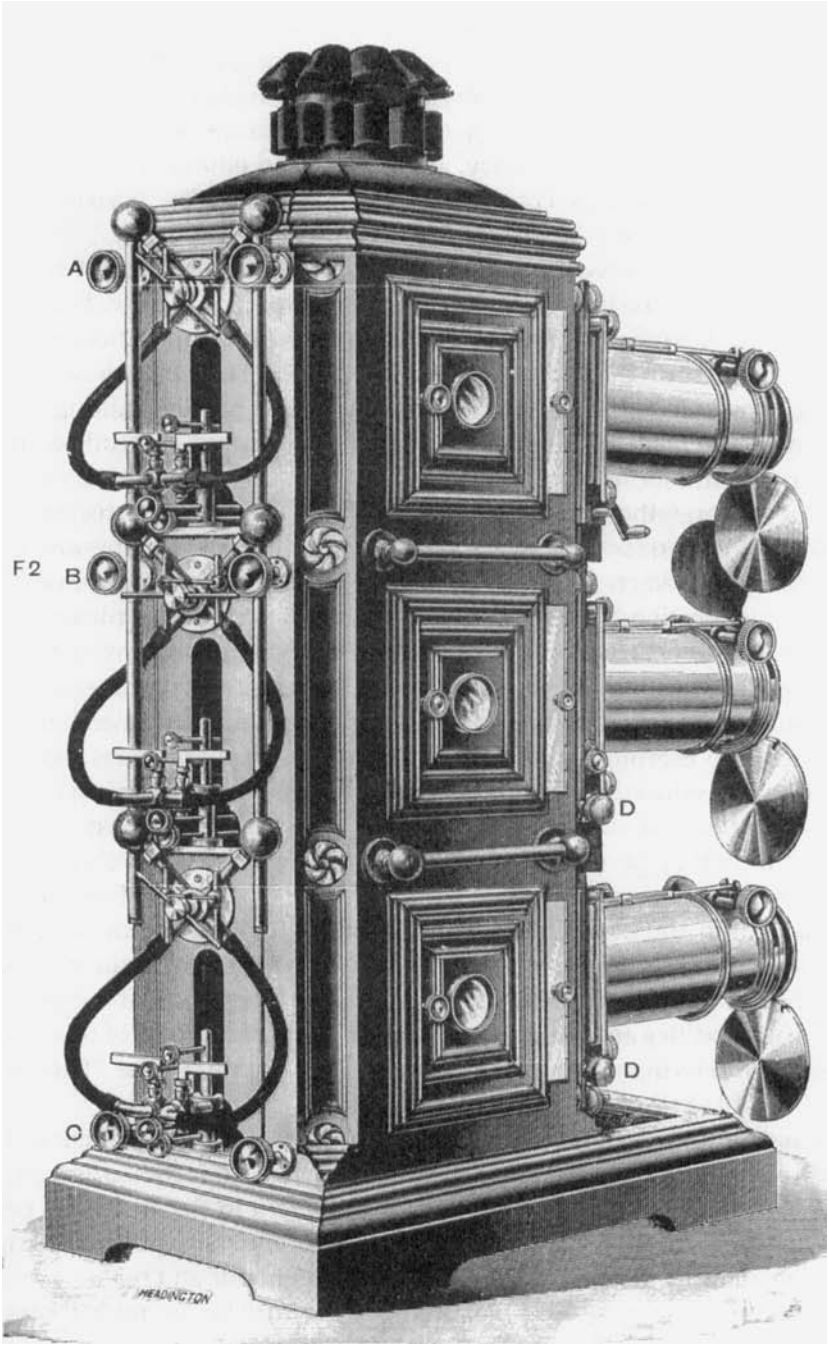
Studies on the perception of visual movement and their practical expression in experiments plus the production of objects for this type of perception have been known at least since the early 1820s. Yet even today, a completely satisfactory explanation of this extremely complex phenomenon – that 'film homo sapiens' is able to identify a series of separate static images, the frozen consecutive stages of an occurrence, as being a continuous flow – lags far behind the practical exploitation of this act of illusion. For the most part, film historians still bring in a mixture of persistence of vision (consequence of a property of the eye) and stroboscopic effect as the basic causal relation. However, beginning with the work of the famous Gestalt psychologists Max Wertheimer and Hugo Münsterberg, since the second decade of our century physiologists and psychologists have been engaged in efforts to penetrate analytically the complex web of relations between the physical configuration of an object and specific activities of the subject for the mental representations of illusions of movement.[25]

Peter Mark Roget, Michael Faraday, Charles Wheatstone, W.G. Horner, John Herschel, Simon von Stampfer, and Joseph Plateau were the leading exponents of specialist research. Within a very short space of time – this is also paradigmatic for the era of industrialisation – their findings were implemented in the construction of artefacts that could be purchased to satisfy the desire to observe and watch, amongst other things. The Thaumatrope has been known since 1824, a fascinating disc with painted pictures on both sides that complement one another, and when it is spun rapidly, the pictures merge in our perception (for example, a bird and a cage become a bird in a cage). Plateau wrote his dissertation on the persistence of vision in 1829. One year later, Faraday caused a sensation in the world of physics with his cogged Wheel. Then, in fast succession, 1833–34, Plateau's Phenakistoscope (also popularly known as Fantascope, Zoëtrope, Zootrope, or Wheel of Life), Horner's Daedalum, and von Stampfer's Stroboscope (a.k.a. Phänakistoskop or Phantasmascope) all appeared: the artefacts comprising discs with slots and pictures that very soon would triumph on the market for visual entertainment in middle class drawing rooms.

The lineage of projection was able to look back as far as the end of the eighteenth century at a rich praxis – also with regard to mise-en-scène. Its pinnacle was undoubtedly the phantasmagoric displays of Etienne Robertson in Paris, who projected pictures of ghosts onto smoke and translucent screens in dark rooms accompanied by acoustic orgies of his own devising, frightening the life out of his audience with these audiovisions of blood-

curdling entertainment. In the years leading up to the middle of the nineteenth century, precision engineers, opticians, and professional projectionists polished various technical parameters of the magic lantern to such a fine degree that it became a multifunctional and very variable image machine with multiple possible uses. Still in the tradition of producing phantasmagoric illusions, the 'aesthetics of the supernatural',[26] between 1807 and 1818 Henry Langdon Childe began to experiment with dissolving views, the gradual superimposing of one projected image upon another. However, it was not possible to use this technique at larger-scale public performances until the end of the 1930s, when the oil lamps that had been used until then were replaced by limelight, or oxyhydrogen light, which was stronger and easier to manipulate. Now it was possible to project the passage of time, and this came about almost parallel to the portrayal of time jumps in a rival medium, such as Daguerre's double effect Diorama, where the audience were illusioned with day/night effects, for example. As the light sources increased in strength, it became possible to place the projector farther away from screen; the projected images became larger and so, too, did the halls where these performances were held. The improved quality of the images opened up the 'serious' market sector for the magic lantern, which from then on was used at lectures in science and education. The dissolve techniques and the arrangements of apparatus (sometimes whole batteries of devices were used) became increasingly complicated and differentiated. The profession of the lanternist, an artist at projection, came into being. At the same time, demands on the quality of the images were growing continuously. With the trend toward ever more perfect approximations of real surface phenomena in the drawings and paintings on the slides, it was a natural consequence that, as of the end of the 1840s, the first photographic slides for the magic lantern came into use, shortly before electric light became available as a light source.

Beginning with the second half of the nineteenth century, the development of the magic lantern began to split off in different directions: aided by highly imaginative and cunning techniques, the development of the show business tradition became ever more lavish and appealing to the senses, reaching the very threshold of cinematography – with kaleidoscopes, revolving slides, pull-type moving slides, mask, toothed wheels, and lever systems, rough illusions of movement, and changes in time and place, were produced to opulent acoustic accompaniment. Finally, it ended as the reduced-size lantern and mass-produced transfer slides; an optical toy for bourgeois children. On the other hand, magic lantern projection went through a process of diffusion that we encounter time and again with media artefacts. High-quality apparatus was employed in various sectors of edu-



The Docwra Triple

The magic lantern at the pinnacle of its development: a triunial apparatus with dissolving view possibilities for opulent viewing pleasure.

cation, in science institutions and schools, but also in military training establishments and state intelligence agencies. In its heyday, the subjects and genres of the magic lantern encompassed all the areas that, later, became characteristic of audiovisual discourse in the cinema and in television: travelogues, courses in natural history, astronomy, and ethnology, military reports, serial battle scenes, coverage of royalty, fairy tales, horror stories, documentaries on everyday life, and short melodramas.[27]

That illusions of movement and projection were brought together at the apparatus level in the late 1840s originated from military usage. Franz von Uchatius, an Austrian artillery officer, developed his apparatus to depict movable pictures on the wall while he was a physics teacher with a bombardier regiment in Vienna. His aim was more effective soldier training. Later, his countryman Ludwig Döbler bought up the apparatus and utilised it for commercial exhibitions from the beginning of the 1850s, which earned him the name of 'forefather of the film industrialists'[28] from film historians.

Merely to understand the whole phylum of optical instruments and toys, the numerous artefacts for producing and exhibiting visual reproductions, from the perspective of a prehistory of cinema is neither meaningful with respect to the reconstruction of this extensive process of audiovisualisation nor for the explication of the media and cultural quality of cinema itself. This historical stage of optical and acoustical instruction and entertainment is too rich, too thoroughly differentiated, and in many respects too independent to be reduced merely to a prefix of the next technically and culturally more advanced stage of development. The first seventy years of the nineteenth century gave expression to the growing need and technical ability to grasp and appropriate the visible surface of the world through its re-visualisation and the ability to play around with it: the cinematisation of the eye and of perception as a counterpart and complement to the extensive acquisition of natural and technical processes for other areas of the production of commodities and meaning. Just one culminating point of this development was Hermann von Helmholtz's contribution to the 'Theory of Vision',[29] published at the end of the 1860s.

The optical devices and instruments that emerged in the course of this process were an expression of the general growth in importance that the visual was now accorded. They were one component in the change of paradigm from a literary-based everyday culture to one that was increasingly formed visually. A number of the varying arrangements and realised forms, from the Panorama encased in elaborate architecture for the middle classes to the mobile peep-show at the fairground for the people in the street, gradually, yet clearly and surely, were gravitating towards a point that ultimately became essential for the vanishing point of cinema: the preparation

GANGSTER PICTURE OF 1806

by Francisco Goya

1
The Friar held up by the bandit

2
He grips the gun

3
They struggle for it

4
The man of God prepares to stun the gangster

5
The gangster escapes but the worthy friar shoots him

6
He ties up the bleeding victim while peasants rush up

Francisco Goya's dynamic series of paintings 'The capture of the famous bandit El Margato by the lay brother Friar Pedro de Zaldivia on June 10th, 1806' as it appeared in 'worldFILMnews', June 1937. The cinema myth degrades everything portraying movement that appeared before 1895 to *pre-history* of cinema. This is nonsense unless, of course, one assumes that cinematographics is the superstructure that dominates everything audiovisual. It does make sense, though, just for the record, to state that telling a story with exciting pictures or a series of pictures has a very long tradition indeed, which in cinema, finally attained a form for industrial reproducibility, amongst other things. Compared to that which had gone before, this process was already one of deconstruction production – *Abbauproduktion* – a term used by Bertolt Brecht in his famous sociological experiment of the 'Dreigroschenprozeß'.

and reshaping of techniques at hand for the entertainment of a large number of people, the commercial exploitation in the public sphere of *Schaulust*, the desire to look. Other arrangements, the individual optical devices, stood for the ancient need to own visions, for example, in the form of transfers or holy pictures – to have them at one's private disposal. Only a fraction of the cornucopia of image machines underwent standardisation at the hands of the culture industry. And for those that did, it was at the time when the run-up to the development of the cinema dispositif was already under way.

Philosophers – like John Ayrton Paris, who put the Thaumatrope on the market –, artists, physiologists, chemists, showmen, mechanics, opticians, and physicists, were all responsible for initiating the process of innovation. For some, their theoretical and practical work was totally absorbed by the problems of reproducibility of the visual. (Plateau, for example, experimented so recklessly in this area, oblivious to his own welfare, that he lost his sight when he was just 39 years old. He was one of the first to fall victim to the direct force of the materiality of the media.) For others still, this was more an offshoot of their main activities in research and experimentation. Their focus lay in other technological projects, including work on the other lineages of tradition that helped to constitute television. For Faraday, chemist and physicist, work on the phenomenon of the cogged wheel and the construction of the wheel to demonstrate the stroboscopic effect that bears his name, belonged to the early part of his career when he was an instructor at the military academy in Woolwich and they only represented two small diversions from his life's work in electrical engineering. For the greater part of his professional life in research, the physicist Charles Wheatstone's main interest was telecommunications technology, particularly telegraphy, the development of which he influenced considerably with many inventions. When James Clerk Maxwell built a Zootrope (Wundertrommel) in 1869 that eliminated optical distortion of the image by using concave lenses instead of slots, he had already worked out the basic principles of electric light and was just about to publish the fundamental *Treatise on Electricity and Magnetism* (1873), his famous textbook.

Even at the stage of their cognition phases – the level at which knowledge and competence was assembled for their technical realisation and innovation – it is almost impossible to separate the two projects of cinema and television, although the two intrinsic targets of the projects were poles apart and seemed to run parallel to one another without direct contact. In contradistinction to the preservation of images for the purpose of processing and presenting them, the lineage of television is concerned essentially with overcoming spatial distance without any loss of time (as the tendency). The etymological relationship of tele-vision by means of electricity to *tele*graphy

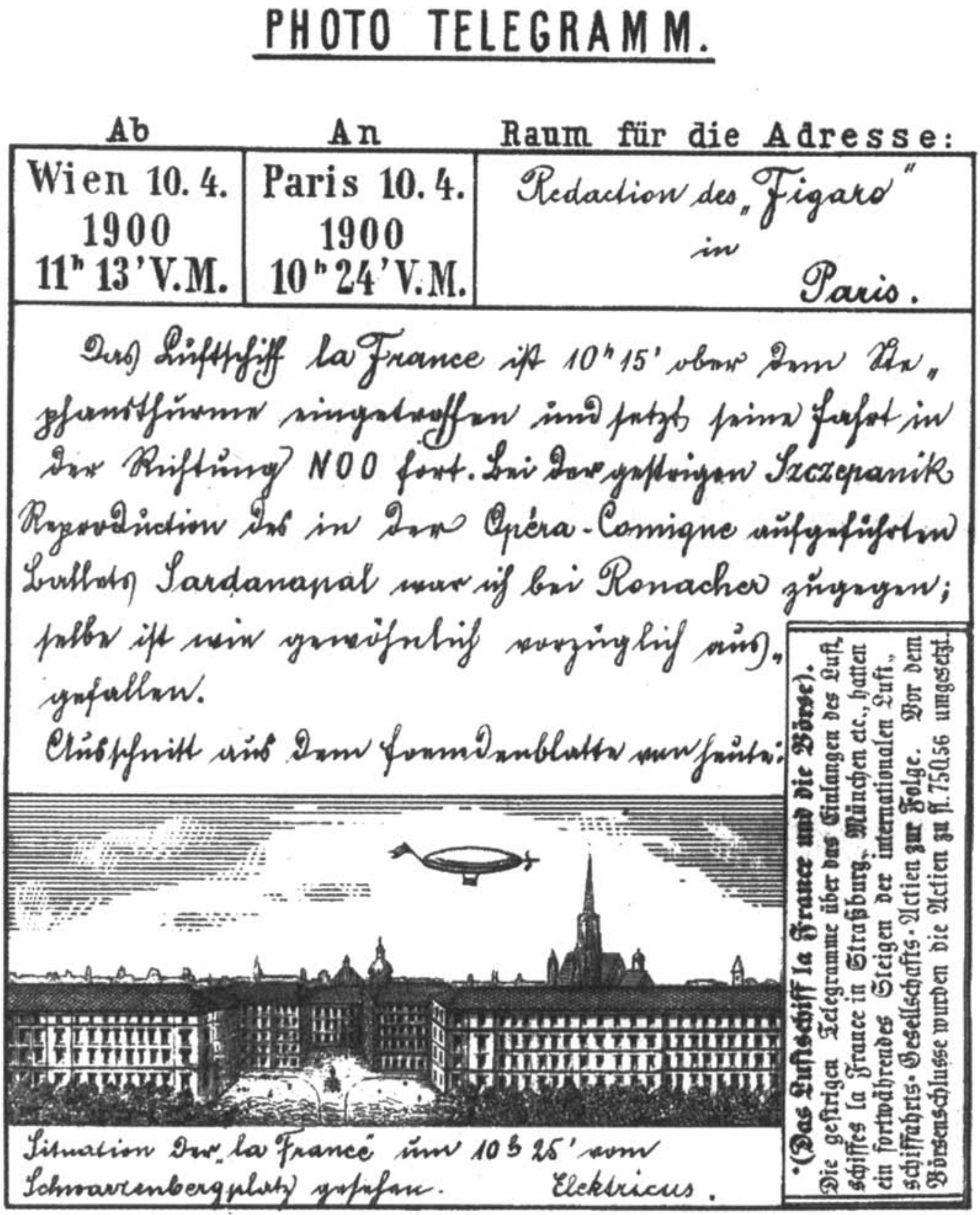


PHOTO TELEGRAMM.

Ab	An	Raum für die Adresse:
Wien 10. 4. 1900 11h 13' V.M.	Paris 10. 4. 1900 10h 24' V.M.	Redaction des „Figaro" in Paris.

Das Luftschiff la France ist 10h 15' über dem Ste-phansthurme eingetroffen und setzt seine Fahrt in der Richtung NOO fort. Bei der gestrigen Szczepanik Reproduction des in der Opéra-Comique aufgeführten Ballets Sardanapal war ich bei Ronacher zugegen; selbe ist wie gewöhnlich vorzüglich aus-gefallen.

Ausschnitt aus dem Fremdenblatte von heute:

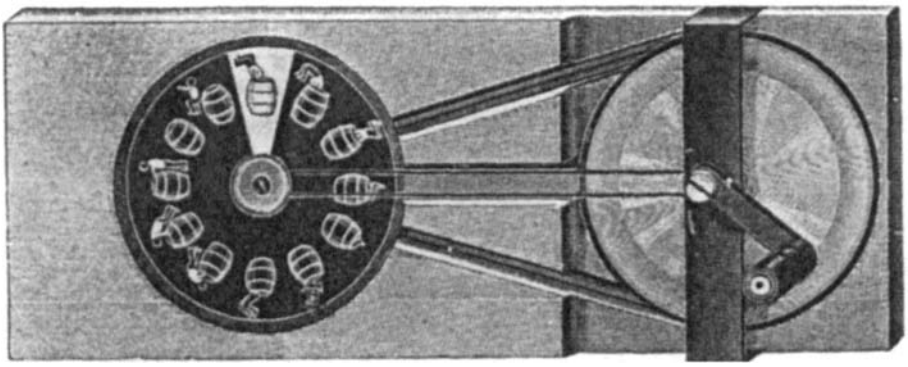
•(Das Luftschiff la France und die Börse). Die gestrigen Telegramme über das Einlangen des Luftschiffes la France in Straßburg, München etc., hatten ein fortwährendes Steigen der internationalen Luftschiffahrts-Gesellschafts-Actien zur Folge. Vor dem Börsenschlusse wurden die Actien zu fl. 750.56 umgesetzt.

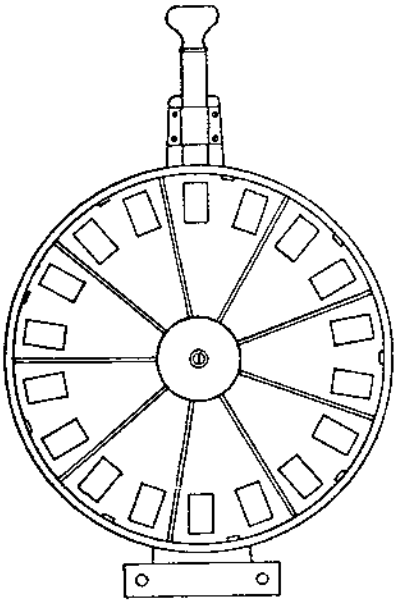
Situation der la France um 10h 25' vom Schwarzenbergplatz gesehen. Elektricus.

Tele-fax of 10 April 1900. It introduces Major *Benedict Schöffler*'s bizarre design of 1896 for 'phototelegraphy' and for 'electrical television'.

and *tele*phony is one expression of its home in the tradition of telecommunications technology from whence wireless and radio came. However, it should be noted that in the beginning, electrical vision over distances was not directed towards transporting illusions of motion but rather to receiving and transmitting static images. Phototelegraphy, video telephone, *Bildtelephonie*, telephotography, and, later, transmission of radiophotos, represented an important branch of the lineage of tele-vision genesis that reached into the 1920s and from whence the first innovations developed and the first apparatus arrangements were built. One example was a bizarre apparatus system that was patented in London on 1 December 1896. Under the general heading, 'Electrical Television', it consisted of a 'Depeschengeber' (telegram transmitter) and a 'Depeschenempfänger' (telegram receiver); thus it was a phototelegraphic system that operated with paper messages and was, in principle, the same as our present-day fax machine. A second version of this machine consisted of a system that worked with transitory messages at the receiving end: the characters and signs transmitted were supposed to appear rapidly (1/7 sec per page) on an opaque glass screen and then disappear again; it was envisaged that in this way, great quantities of data could be exchanged over distances in the quickest and most effective manner. The owner of the patent was one Benedict Schöffler, a major in the Imperial Austro-Hungarian Corps Artillery Regiment Luitpold Prinz-Regent von Bayern No. 10, and an instructor in ballistics for advanced artillery courses.[30]

Quite soon after Samuel B. Morse's first telegraph had started operations, – incidentally, Morse was a passionate Daguerrotypist – the first attempts were made to transmit pictures. Alexander Bain's specialist model of 1843 was never built but, nevertheless, it already included a proposal for scanning the original line-by-line and synchronous operation of 'transmitter' and 'receiver' – essential elements for television. In the mid-1850s – the first submarine cables had been laid, agencies trading in news commenced their activities, France and Prussia bade farewell to optical telegraphy that had been in operation for many decades – the Italian physicist Giovanni Caselli patented an invention for visual telegraphy. He gave his artefact the picturesque name of Pan Telegraph. It was built and operated in France between Lyon and Paris on a line constructed for Morse telegraphy. This was, of course in the 1860s, a decade replete with important and radical changes in transport systems. Starting with the construction of the London Underground, not only gigantic new urban connections were created but in this way capitalism implemented, also at an international level, its communications technology-based 'nervous system':[31] telegraph lines connecting continents came into service. The Old and the New World entered into technically mediated contact with each other via cables on the ocean floor of

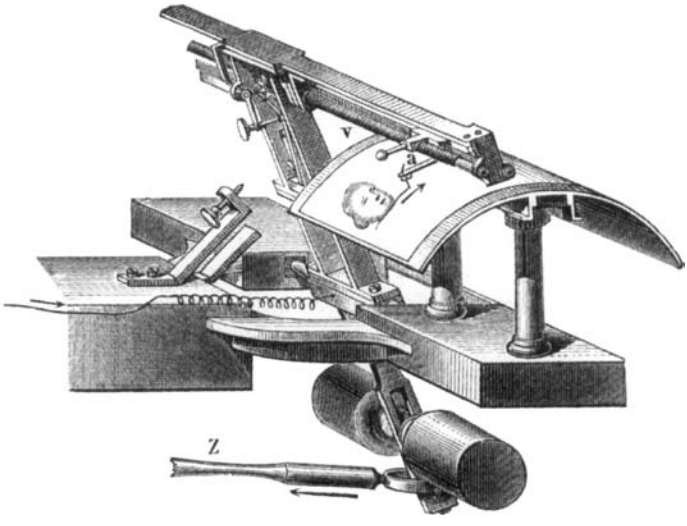




Archaic illusions of motion: picture disc turned by a handle invented by A.B. Brown in 1869 (above), and Henry Heyl's Phasmatrope of 1870

(right, Jenkins 1898, p. 6ff).

The first artefact for visual telegraphy that came into practical use: Caselli's Pan Telegraph, built 1855 in Florence and operated from 1865 on French long-distance telegraph lines, e.g., Paris– Amiens and Paris–Lyon; shortly afterwards, it also came into service in Russia (Pohl 1910, p. 2).

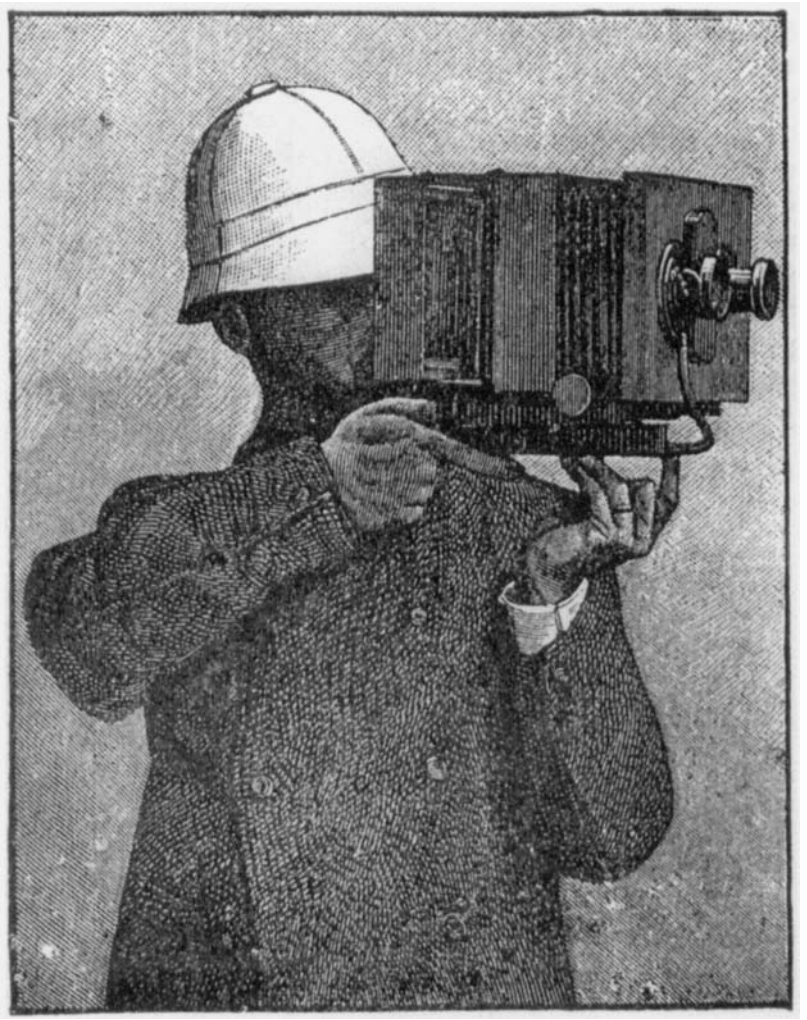


the Atlantic. Since then (1866), it has practically never been interrupted. At this time, Philipp Reis was already experimenting with electrical transmission of language. With the *Journal Télégraphique*, published in Bern, Switzerland, this aggressively expanding branch of communications received its first public forum.

The 1870s were scientifically and technically under the influence of the first comprehensive theory of electricity, burgeoning experiments with this 'invisible energy', the utilisation of its effects, and the invention of a multitude of artefacts that radically affected everyday life in industrialised countries. Not only was sound able to travel over long distances by means of the telephone (1876), it could now be stored in a re-recognisable form on the cylinders of Edison's Phonograph (1877). In Paris, electrical arc lamps transformed entire streets at night into islands of light, bright as day. In the Königsstraße in Berlin, arc light street lamps were installed in 1878. The first electric locomotive by Siemens – it had three-horsepower – commenced service. And towards the end of the decade, the electric carbon filament light bulb from Edison's company laboratory made the new, clean, odourless, and evenly burning light available to the small consumer, i.e., private household.[32] In the course of this electrified decade, both the project for the mechanical reproduction and exhibition of illusions of motion and the project for the transmission of visuals that would vanquish time and space made great leaps forward in their development.

In Maxwell's theory of electromagnetism, where for the first time electricity and magnetism were treated extensively together, it was shown that 'the whole of optics is but a special case: light is a wave form in an electromagnetic field'.[33] At the end of the 1870s, there appeared numerous publications in various countries describing apparatus for electrical tele-vision, e.g., Figuier and, particularly, Senlecq in France, de Paiva in Portugal, Perosino in Italy, and Redmond and Carey in the USA. International speculators, whose interests tended in the direction of media apparatus, became attentive to an important observation that had been made during the laying of the transatlantic cable: the discovery of the photosensitive properties of the chemical element selenium and the resultant changes in its resistance. The artificial forming of this element into the selenium cell – successfully produced in 1875 by Werner von Siemens – made it possible to register changes in ambient light levels as changes in electric current strength. This was more or less the nucleus for the best thought-out models ca. 1879: Adriano de Paiva's Téléscope Electrique and Constantin Senlecq's Téléctroscope.

For the mechanical reproducibility of images project, the 1870s marked the transition from hand-drawn or painted series of pictures for creating il-

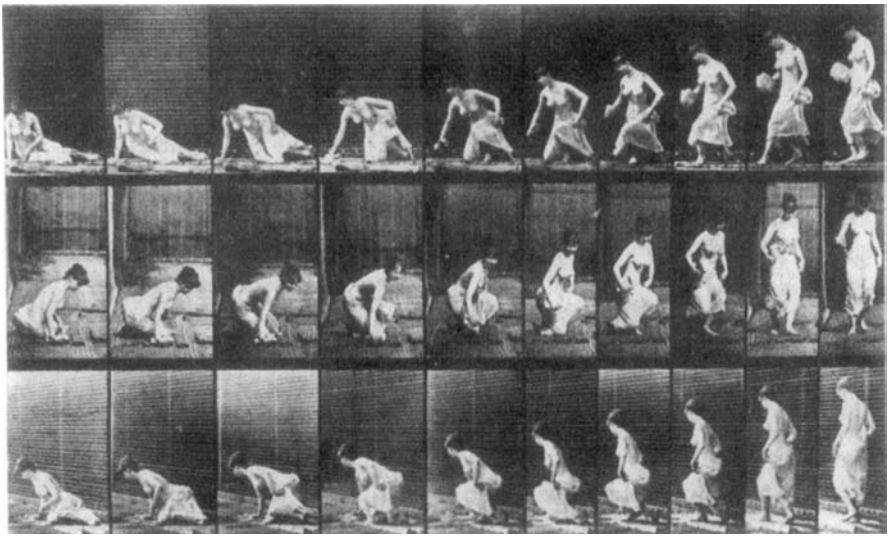


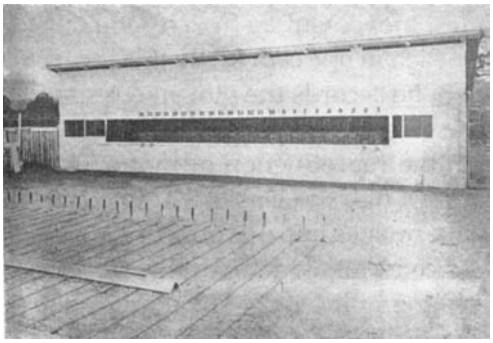
Dr. Fol's photographic shotgun, first presented in the Geneva journal *Archiv des sciences physiques et naturelles* in 1884. (Source: Eder 1892, p. 586.)

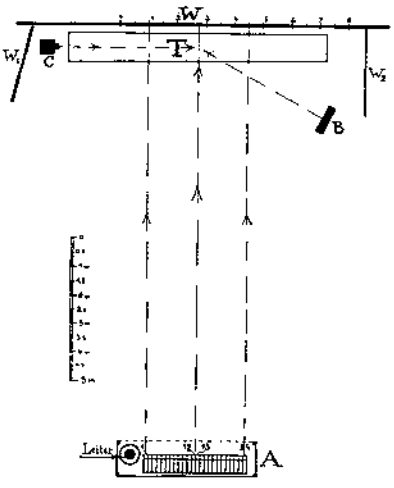
lusions of motion to photographically precise objectifications of the surfaces of reality. With the introduction in 1872 of the Sciopticon, an invention by Marcy, an American, a projector came into existence with special lenses and a strong light beam which had been developed especially for the projection of glass slides.[34] On the basis of exposure times that were getting progressively shorter, increasingly photographic techniques were improved and used to take pictures of the successive stages of rapid motion. The main protagonists of this both creative and technological progress were two French-

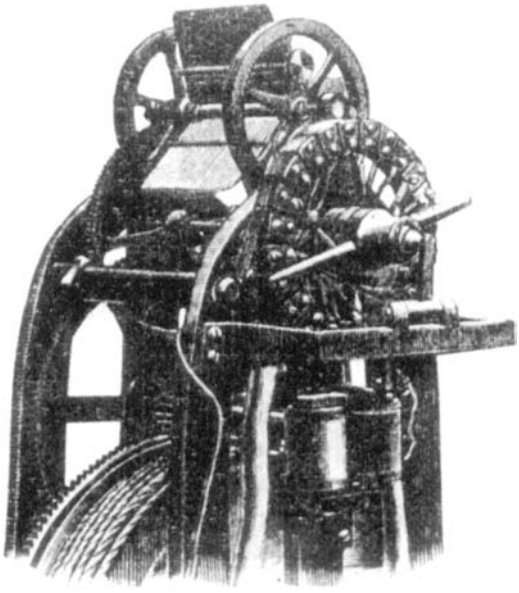
An indication of the impact of Muybridge's experiments: among the customers who ordered his book *Animal Locomotion* are the crème de la crème of late nineteenth century science: E. Mach, H. von Moltke, A. Menzel, M. Siemering, H. von Helmholtz, T.A. Edison, R. Virchow, L. Pasteur, W. Wundt, amongst others.
(*Filmtechnik* No. 15, 1928, p. 280)

men, Pierre Jules César Janssen and Jules Etienne Marey, and an Englishman who had emigrated to North America, Edward James (Eadweard) Muybridge. They carried forward the experiments that had been done in the 1860s, for example, by Skaife, Thomson, and Campbell, who had attempted to capture rapid movements of objects on instantaneous photographs using photographic pistols or guns, to the highest level of the times.[35] Above all it was Marey and Muybridge, – they showed each other the results of their experiments on a variety of occasions, competed with each other, and mutually influenced one another – with their perpetual new arrangements of experiments and apparatus who were the driving force behind series photography or serial photography or chronophotography – the terms for the different techniques are not uniform in the literature. Their influence on other areas of societal discourse, especially art, was and still is enormous. One example of immediate impact was the work of the natural-







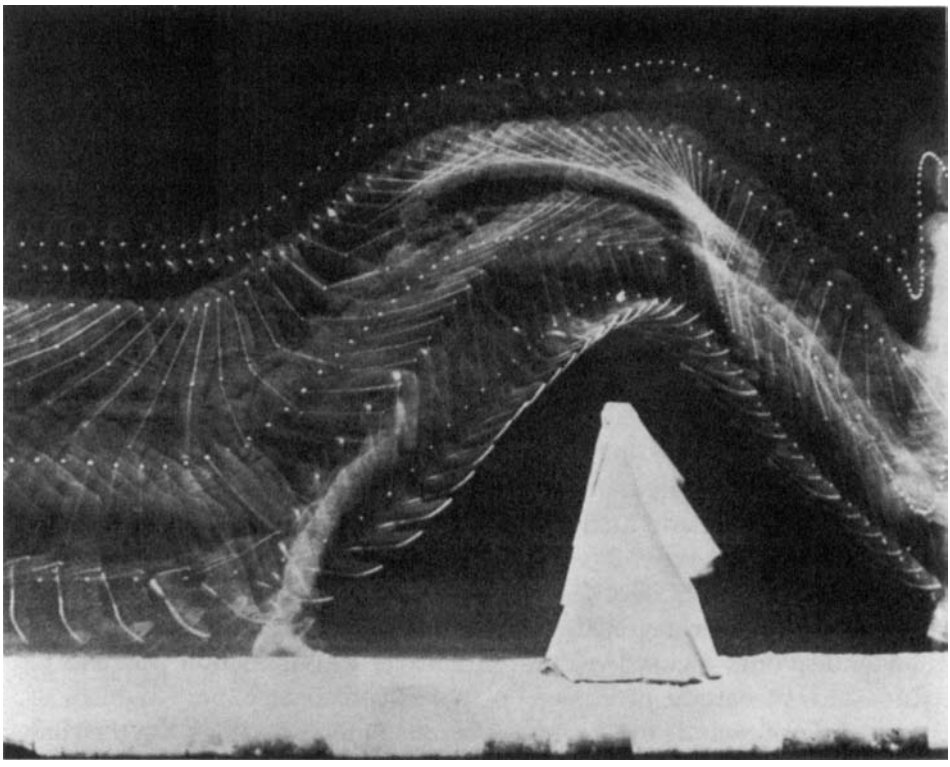


Top: A series of Muybridge's photographs with all three views; Bottom Left: the arrangement of his experiment in Pennsylvania 1884/85:A = battery of 24 'electro-photographic' cameras; B = portable battery of cameras arranged horizontally; C = battery with cameras arranged vertically; T = track laid with rubber matting; W = walls for the backdrops. Bottom Right: the current regulator (*Filmtechnik* No. 14, 1928, p. 258f.)

ist-oriented American painter Thomas Eakins; naturally, the full development of this potential was felt a generation later, in the avant-garde of Futurism, Cubo-Futurism, and Cubism, where the attempt was made to integrate the fourth dimension of time into spatial representations. Boccioni's *Archaic forms of movement in space*, Malevich's *Study of a dynamic figure*, and Duchamp's *Nude descending a staircase*, are only the most famous examples from art history of this epoch which can be interpreted as adapting and seriously engaging with the work of Marey and Muybridge.[36] In particular, the influence and fascination of Marey continues unbroken even today in contemporary art. Many paintings by Francis Bacon, for example, have photographs taken by Marey as their models.[37]

For any history of the technical re-production of motion, what divides the fundamental ideas and procedures of these two visionaries is both interesting and striking: Muybridge, with his complex batteries of cameras, obtained successive shots of the phases of a movement as frozen moments, each on a separate photographic plate or each in one cadre.[38] By this means, in the presentation and for the perception, he accords the movement spatiality through successive juxtapositions from different perspectives. Marey, on the other hand, was concerned with the reproduction of motion as a spatio-temporal continuum. Condensed through the lens of a single camera, he particularly liked to melt successive images into one on a single photographic plate or band of film. He thus compressed temporality into the confined surface of a photograph or a photographic strip. The decisive difference is apparent in the possible applications of the two processes. Marey's studies of motion remained statically fixed time. Their function for the perception did not go beyond the contemplation of a picture that included a temporal dimension. For as a physiologist and medical doctor, this was his prime interest. To produce illusions of motion did not mean much to him, for his focus was the functionality of the body over time. His chronophotography was simply not projectable in its original form. By contrast, right from the beginning Muybridge's method contained the possibility of transforming the single photographic images arranged spatially alongside one another into a temporal succession of images (and thus potentially the organisation of leaps in time/space). Early on, the Englishman even moved toward cinematographic innovation himself. Around 1879, he began to mount the exposures taken with his batteries of cameras onto a Wheel of Life to make them visible for others as a successive sequence of motion, more or less in real time.[39]

Thus, by the end of the decade, we have something like an apparatus sketch of cinema: Muybridge's Wheel of Life projector for glass slides and the Zoopraxiscope for the presentation of his studies of animal and human



Marey: Saut au-dessus d'un obstacle
[A jump over an obstacle] (1884).

Source: Talbot 1923, p. 12a

locomotion to a large audience, claimed by its inventor to be 'the first instrument ever invented or built to show movement by means of synthetic reconstruction which were photographed from real life'.[40] With amazing precision, Muybridge anticipated the rhythm with which filmic illusions are generally still produced in the cinema today. In the advanced phase of his experiments to analyse motion (ca. 1879), he worked with a speed of 24 images per second.

All three protagonists of the mechanical reproduction of visual motion were not primarily showmen or producers of entertainments. Janssen constructed his photographic revolver in order to show astronomical processes; he was an astrophysicist and director of the observatory in Paris for a time. Marey conducted his studies in physiology as a medical doctor and professor at the Collège de France, also in Paris. Only Muybridge did not belong to the respectable and well-paid club of academics. He was a professional photographer and carried out commissioned research on a commercial basis. His experiments were suggested by the affluent Californian industrialist Leland Stanford, who financed Muybridge for many years. However, all three protagonists did originally work with similar intentions. Their endeavours focused on the most exact reconstruction possible of nature and/or natural processes on two-dimensional paper – which, of course, did not exclude exhibiting the results of their findings. On the contrary: Marey and Muybridge, particularly, were diligent in the mediatisation of their experiments. They wanted to impress their lecture-hall audiences and invented artefacts suited to this purpose. That Muybridge lead the way with respect to public projection demonstrations cannot only be explained by external circumstances, i.e., that his client Stanford pushed him in this direction. It was an existential necessity for him to stage his work publicly, for he was not in a position to research and experiment in the financially secure environment of an institution, like his French colleagues. To present studies in natural science as a fascinating performance was part of his trade as a travelling lecturer. Without doubt, the spectators at his first public performances appreciated the entertainment value of his visually supported instruction and recognised the potential for a mass audience that lay in his presentations. Thus the San Francisco newspaper *Alta California* wrote: 'Mr. Muybridge has laid the foundation of a new method of entertaining people and we predict that this instantaneous photographic, magic lantern zoetrope will make the round of the civilised world.'[41]

From the outset, Charles Emile Reynaud's work in the late 1870s belonged firmly in the tradition of creating illusions. His Praxinoscope and its refined version, the Praxinoscope Théâtre, were apparatus designed for the express purpose of satisfying the visual curiosity of the onlooker, which,

however, still had to make do with painted images. The term 'theatre' for the first demonstrations of this artefact is something of a misnomer insofar as it suggests a collective of anonymous spectators watching the illusions of motion. In actual fact, it was a kind of peep-show arrangement with an aperture for individual viewing: from a socio-technical point of view, this apparatus was one of the numerous bastard forms that are found in the genesis of cinema and television.

In the decade and a half before 1895, it is apparent that there was a concentration of substantial efforts in both project lineages, of cinema and of television. In the most advanced industrialised countries, technical systems were installed which, structurally, already referred to future communications conditions where there would be centralised distribution for scattered individuals – in 1882, New York's first power station for central power supply went into operation, Berlin followed suit in 1885; the artificial 'nervous system' of electric cables began to spread through the capitals; Daimler's motor bicycle and Benz' three-wheeler car signalled the beginning of individualised transport. However, one of these projects remained at the stage of the essay and the drawing-board, while the other was rushing headlong towards installation on a mass-cultural scale.

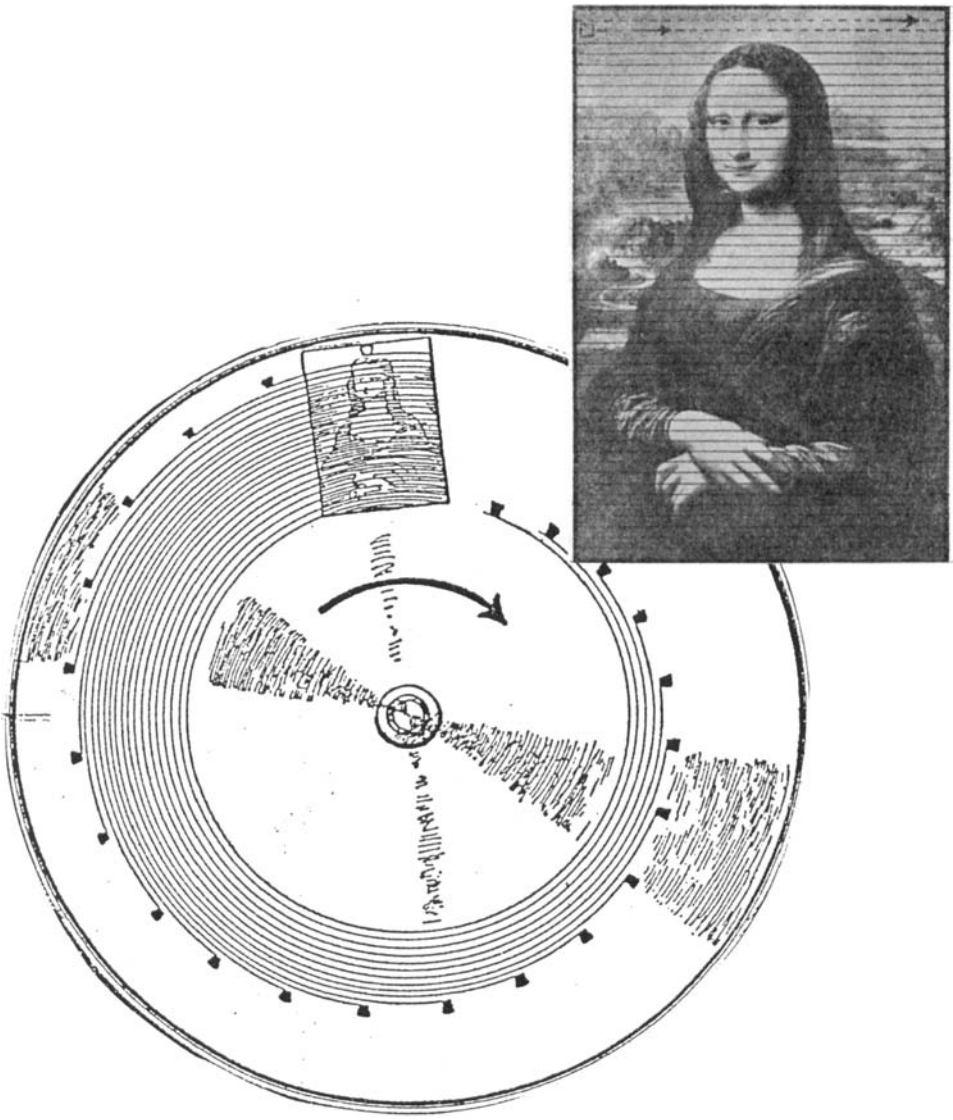
Although the possibility of television with the aid of electricity gradually took shape, it remained a theory, a model. A number of researchers and inventors from various countries came up with improved older and new apparatus at the beginning of the 1880s. Nipkow's patent for an electric telescope contained the most important functional principles: the dissection of visual objects into series of dots, the transmission of objects side by side in space through spatial succession, scanning line by line, dissection and reconstitution of events by rapid consecutive sequences of images. Several models that followed, e.g., from Russia and Australia, utilised the main technical building block of Nipkow's proposal – a rapidly rotating disc with perforations through which a beam of light scanned the image.[42] The original design of the second model for mechanically scanning images that found a practical application, Lazare Weiller's Mirror Drum, also dates from the 1880s.

In the same period the cinematographic project was being nudged towards the threshold of innovation. Various building blocks of the mechanical system for creating illusions of motion were refined. Ottomar Anschütz, who worked for the military like many of his colleagues, was a newcomer to the circle of inventor-protagonists. His introduction of the 'focal plane' shutter for cameras aroused the attention of the international photographic scene. Marey and his collaborators in their Paris laboratory considerably improved the technique of instantaneous serial photography. Flexible ma-

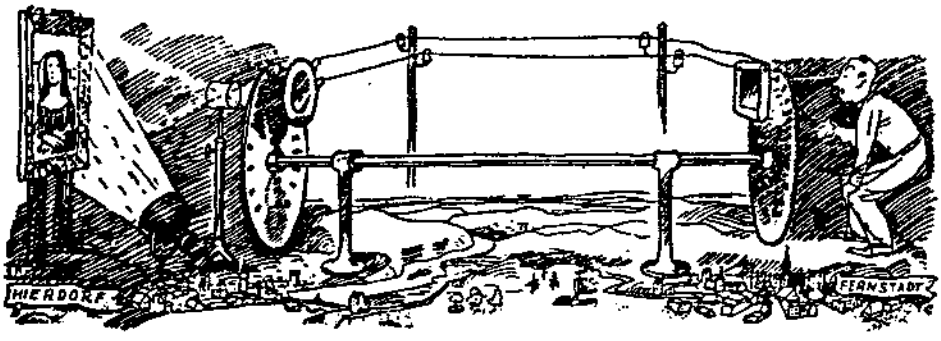
terial for photographic reproductions gradually replaced the rigid glass plate that had limited the exposures to just a few. In the USA, Goodwin registered the first patent for rolls of film using celluloid and thereby triggered a process that is typical for later cinema history: the individual experimenter as innovator collided with the interests of established and powerful corporations. At this time, the Eastman Company controlled 80–90 per cent of the world market for nitro-cellulose film. In 1888, it had brought out the first easy-to-use camera for amateurs under the name of Kodak ('You press the button – We do the rest') and thus consolidated its near-monopoly position. The Eastman company succeeded in delaying the registration of the Goodwin patent until it was able to launch its own rolls of celluloid film onto the market.[43]

In addition to various cameras, arrangements for projection were also proposed – by Le Prince and Friese-Greene/Evans. However, the audiences in attendance at the respective demonstrations were not overly impressed with the results and these artefacts were not mediatised. Anschütz's Elektrischer Schnellseher received a good deal more attention. Yet particularly its further development, his Electrotachyscope, cannot be classified as a direct ancestor in the genealogy of the cinematographic dispositif because of the way the perception of illusions was organised. The diapositives of the phases of a movement were illuminated by a Geissler tube, filtered through opal glass to reduce glare, but could only be viewed by a few spectators at a time because of the small size. Not only with respect to apparatus and perception did the lineage of television become involved with the Tachyscope but also economically. As of 1891, Siemens & Halske electrical company took over production and commercial exploitation of Anschütz's invention which was installed in public places as a slot machine.[44] Along with AEG, Siemens & Halske was the most important economic and technical driving force in the technology and media projects of radio and television.

Towards the end of the decade, Edison's innovation factory began to take a stronger interest in illusions of motion. The majority of experiments were carried out under the aegis of William Laurie Dickson, an Englishman whom Edison had brought in in 1882 to investigate the possibilities for practical applications of electricity. Some years later, in 1896, Dickson founded the American Mutoscope and Biograph Company (Biograph), together with Henry Norton Marvin and Herman Casler, an important rival of the Edison Trust. On the one side, the collaboration between Edison and Dickson represented a first high point in the development of apparatus for imaginings of movement. Apparently, they were the first to take pictures on Eastman's celluloid film in the late 1880s and they established the 35 mm standard that is still in use today. On the other side, their experiments were



The work of art in the epoch of its reduction to dots and lines. This is an example of how the use-value of Nipkow's television principle was depicted in popular illustrations (here montaged from Rhein 1935).



clearly guided by the notion of exploiting and utilising their films, and this aspect refers to the other project: the specific relationship of sound and visuals (the ideas were driven by the intention of creating an apparatus that would be an equivalent of the Phonograph sound machine) plus the socio-economic form in which it was envisaged that visual curiosity would be satisfied and, indeed, was satisfied by the first apparatus of this kind – the optical Phonograph, the Kineto-phonograph, and the Kinetoscope (that finally reached the market), were arrangements for individual reception. Edison hoped for optimal profits from selling as many machines as possible for viewing his films and not from as large an audience as possible in front of a single cinematographic apparatus; a principle that would later determine the practice of the radio industry after the introduction of entertaining and educational public broadcasts. 'I hope to be able by the invention to throw upon a canvas a perfect picture of anybody, and reproduce his words',[15] proclaimed Edison in 1891 and, together with Dickson, he developed a machine that could easily be integrated into the already very popular penny arcades. For the price of a penny in their slot machines, the individual viewer was offered illusions of motion. Thus, in fact the commercial exploitation of films began with a form of reception that was asocial.

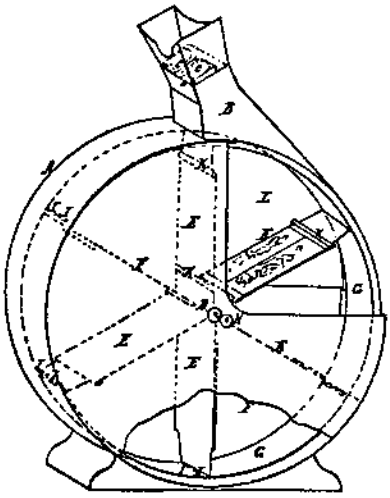
Nevertheless, the historical forces that would eventually break up this constricted form were stronger. Edison did his best to keep the exposure technique for his 'moving images' under wraps; the content of his patent for the exposure of 35 mm celluloid film using the Kinetograph, the 'camera', was not published until 1897. However, the films made in his Black Maria studios had to be marketed and were thus available to others. They could be used in other apparatus using a similar arrangement. Le Roy and Lauste took advantage of this and staged the first semi-public performances in the USA as early as 1894. Additionally, projection using a magic lantern had been refined technically by this time and was a very popular form of public visual entertainment. In France, Reynaud had developed his Praxinoscope further and, with the addition of a projection lantern, was now in possession of projection apparatus that, despite being limited to hand-painted serial pictures and backgrounds, nevertheless afforded rich visual pleasures. In 1892, he opened his Optical Theatre in the Musée Grevin in Paris, where he presented his beautiful picture strips to acoustic accompaniment. On the transparent strips, Reynaud painted as many as 700 single pictures of phases of motion and he succeeded in extending the projection time to 15 minutes,[16] whereas the first photographic film only ran for a few seconds. At Marey's research institute, Demenÿ was working on possible models for projecting chronophotographic exposures. The inventor Charles Frances Jenkins worked on both the cinematographic and the televisual project. Un-

der the same name, Phantascope, in 1894 Jenkins presented an idea for an apparatus for the electrical transmission of visuals at a distance and also for a projection apparatus for serial photographs. From a socio-technical point of view, the commercial form of the latter device stood exactly mid-way between the two projects. In his 'Slot-action Cabinet', opened in 1896 in Atlantic City, 'life-size' images were on view. However, these were only offered to the spectators in a kind of peep-show. If you put a coin into one of the 12 slot-machines in the cabinet, the viewing window would open automatically and, for 40 seconds, you could look at the projection screen. When the time was up, the window on the illusion closed again automatically.[47]

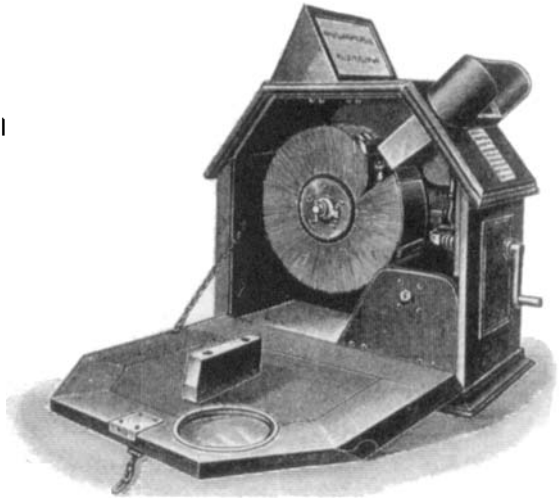
Yet even as the salon on New York's Broadway with its slot-machines from Edison's company opened its doors to the public, the project of cinema was on the brink of its explosive expansion phase. A prodigious number artefacts with the same use-value orientation, namely, to present photographic images in motion in front of an audience, crowded onto the market and into the public view. The first apparatus with sufficient potential for illusion that satisfied the demands made on projection for a crowd was, of course, that of the photo-specialist and precision engineer Louis Lumière. In 1895, he succeeded in mastering the process of analysis and synthesis, of dissecting and assembling, which are the fundamental operations of film production and perception. Technically, all the precursor models had attempted to outwit the visual perception of the cinematographic subject with the same strategy. Constructed on the principle of the Wheel of Life or Stroboscope, the moments of a process captured on photographs were passed in front of the eye of the observer at a constant speed. An illusion was created through the fact that the images were only illuminated, and thus visible, for an instant so that they seemed to stand still briefly. For arrangements designed more or less for close-up individual reception, this sufficed. For the projection of magnified images, where there was a corresponding loss of light intensity (i.e., weaker stimulation of the spectator's retina), it was necessary to find another solution. The individual photographs had to be stopped in the light cone thrown by the projector long enough for physiological and psychological reception. Lumière achieved this by constructing a mechanism whose principal components were a claw, a cam for transporting the film band, and an arm with two small pegs.[48] The last – decisive – step on the way to cinema illusion was a mechanical one. It was taken within the framework of an industrial base already in existence by this time: the Brothers Lumière owned Europe's most important photographic factory.

The sensational public acclaim that followed upon the first demonstration of Lumière's apparatus at the French Society for the Promotion of Na-

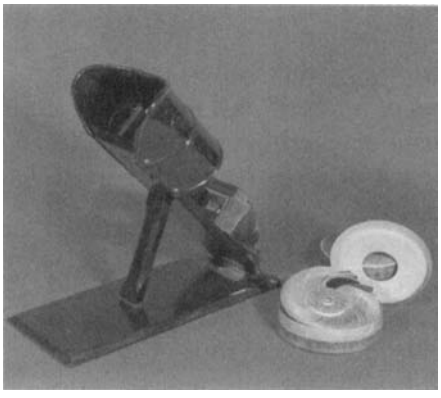
Leading artefacts for individual visual entertainment



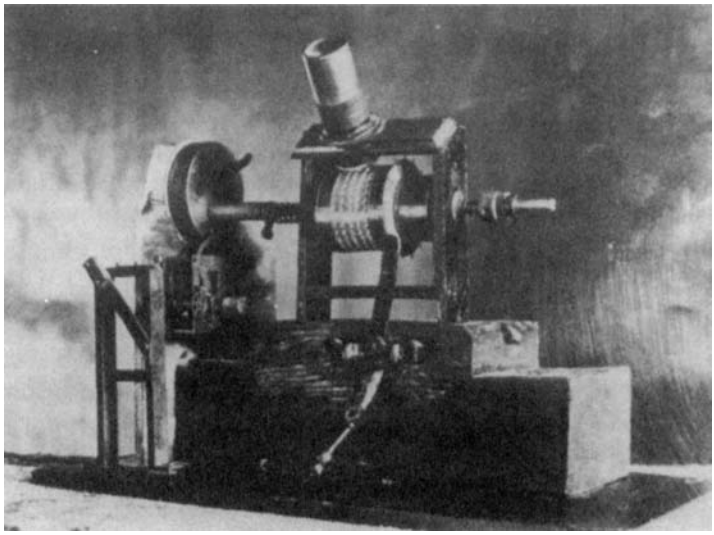
Sellers' Kinematoscope viewer, 1861



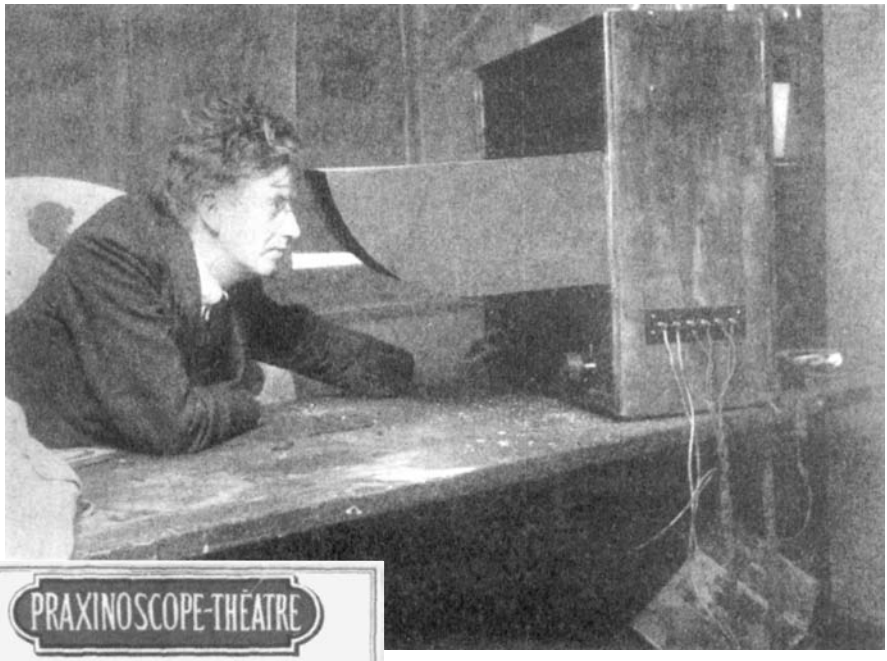
The Mutoscope



The Kinora (Lumière)



Edison's and Dickson's Optical Phonograph



Baird searching for an image
on his experimental TV set

The Kinetoscope

tional Industries in March 1895, the high expectations many entrepreneurs placed in the project of public gratification of the desire to look, the possibility of exploiting the process commercially: this was the point of breakthrough. Opticians, precision engineers, photographers, projectionists, magicians, artisans, and tradesmen from various neighbouring professions and jobs, all plunged into the new market that was emerging. Under a profusion of fantastic names, one machine after another was introduced and offered for sale, i.e., hyped and hawked. Films were hastily cobbled together for the sole purpose of demonstrating that the machines did, in fact, work. In his book on the 'Living Pictures' that was finished in 1898, Hopwood describes in detail some 60 machines from all over the world. He also includes a list of the same length giving only machines' names, 'for the sake of completeness' but also as 'a warning against the production of further etymological monstrosities', e.g., Anarithomoscope, Mouvementoscope, Motorscope, Zinematograph.[49] The year before, Jenkins had also had no difficulty at all in compiling a list of over 200 machines for his book, the names of which all ended in either 'scope' or 'graph'.[50] The number of important articles that appeared in international specialist journals, as registered by Hopwood, also increased significantly: between 1895 and 1897 the number approximately doubled each year, from 8 in 1895, to 16 in 1896, and in 1897 there were 31. Projected illusions of motion were now established as a subject. The apparatus which was the prerequisite for a new medium of reproduction – after photography and the phonograph/records, the third important one of the nineteenth century – existed and had attained a standard where it could be reproduced itself, could go into mass production.

In the meantime, a new era had also dawned for the lineage of communications technology. Both theoretically and practically, the foundations were being laid for the mass-communicative structure that would play a determining role for much of the twentieth century and into which the television project was pressed: radio communications. After Heinrich Hertz's experiments at the end of the 1880s proving the existence of electromagnetic waves – predicted earlier by Maxwell – and describing their properties, in 1897 the Italian physicist Guglielmo Marconi had had spectacular success with wireless telegraphy. Supported by the British telegraph authorities, he sent signals successfully over a distance of five kilometres in the Bristol Channel. A year later, Ferdinand Braun's system for wireless telegraphy, which differed technically from Marconi's, was patented in Berlin. Up to the turn of the century, the two systems competed fiercely with each other. This was an integral part of the battle between German and British imperialism for supremacy, in which the flow of and access to information had become indispensable. The first successful transatlantic crossing by a radio commu-

nication was accomplished by the British. In 1901, on behalf of the British Government, Marconi sent the letter 'S' in Morse code over a distance of 3,400 km. The airwaves had now become the material medium for the information and entertainment technologies interconnecting the world. The submarine cables, uncertain because of natural deterioration and vulnerability in times of hostilities, gradually fell into disuse. Only fifteen years after its first tentative beginnings, wireless telegraphy had developed artefacts that turned it into the new mass communicative dispositif of radio.

However, the first practical steps towards the 'global village', the interlinkage of the world by radio telegraphy, initially only interested a few people in politics, industry, and engineering. Their discourse was determined by the expansionism of imperialism in its heyday: to establish fast and permanently available connections between the colonies, dominions, and the centres of capitalist industry and trade. In these centres, the desires and cravings of those who had experienced industrialisation at first hand, who had to bear and suffer its burden, turned to the new diversions offered by show business. These people's life-time in the form of work-time was, for a good portion, at the disposal of the industrial process in order that this might continue at the greatest possible speed in its capitalistically-determined form. Now, these people were permitted to buy back a piece of frozen, technically preserved time. With amazement and fascination, the common people of the metropolises watched how visible events could become reproducible, motion could be seen again, could be experienced over and over again.

It was not the realities behind the projected images that were exciting and brisant, but the fact that they were now able to re-engulf the senses in a three-dimensional form (2D-surface plus time). Women workers coming out of a factory, boxers sparring, people on bicycles, cars driving past and pedestrians at busy cross-roads, parades, marches, trains pulling into stations, variety artists performing serpentine dances, jugglers on stage, smiths shoeing horses ... such were the subjects of the first films lasting only a few seconds that were shown in New York, Paris, London, and Berlin. It was all familiar stuff from non-filmic everyday life in the city. Nor did the minuscule stories, like the Lumières' man watering a lawn who gets drenched after a boy stops the water running through his hose for a moment, open up any new (fictional) worlds of experience. After all, funny situations are a part of daily life. The fascinating aspect was, for example, that misfortune or accidents or whatever could now be experienced as happening to others, and that machines now existed to record such events and show them again at a time and place other than when the event or performance had actually taken place. Cinematographic exhibition as a further act

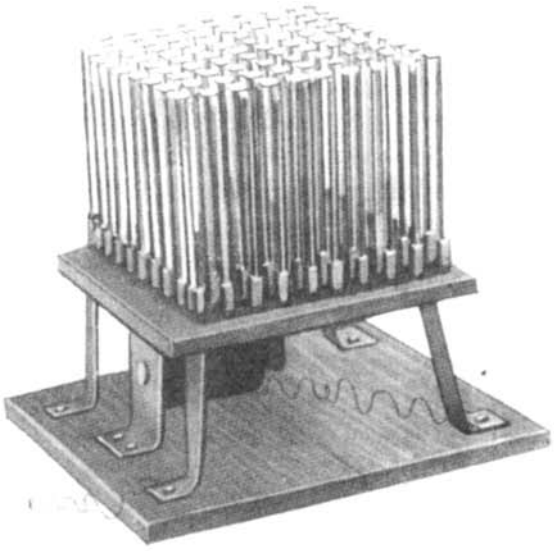
of domination over external nature, as Walter Benjamin has described this aspect with reference to the significance of works of art for the subject/spectator: 'In the final analysis, methods of mechanical reproduction are a technique of reduction and aid people to achieve that degree of power over the works, without which they would not find a use at all.'[51]

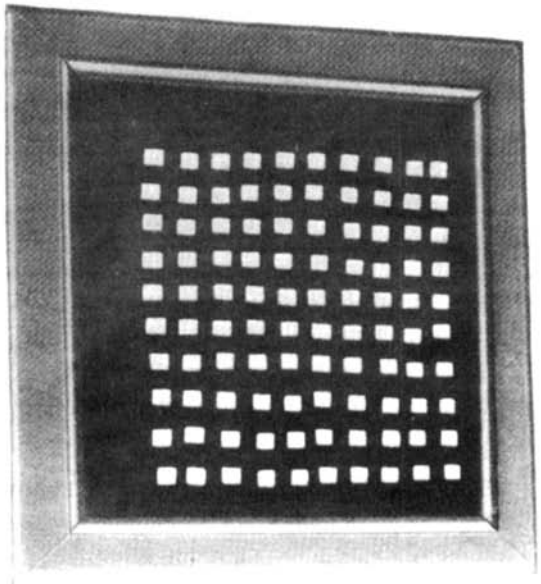
Moreover, the artificiality of the event was more or less apparent, according to the quality of the apparatus used for filming and projection. The more the technical arrangements disrespected the physiological and physical laws pertaining to visual perception, the more the photographs illuminated by the projector's beam flickered. This happened all the time. In the beginning, films were projected with only 16 or 18 images per second (the bladed shutter, with which it was possible to double or treble the number of frame changes, had not yet been invented), and this tired the eyes very quickly. The speed of the illusions of motion presented depended very much on the dexterity of the individual projectionist working the crank or his personal aesthetic taste. Frequently, the short film strips had to be fed through the projector several times in order that individual movements could be decoded at all. The projectors made a lot of noise and ran in the same room as where the spectators sat. The later spatial separation of projection and screen, i.e., the space of the imagination defined as typical for the cinematographic apparatus, was completely unknown in the period of these early arrangements.

The message of the apparatus and its owner or operator (usually identical) was: We can do the impossible! We can set anything that is static in motion. We have beaten transience. We can bring the dead back to life, we present 'living pictures'. We are doing our utmost to make the illusion as perfect as possible. We hide the whirring of the projectors by playing gramophone music, mechanically produced music, or we engage a musician to play an accompaniment. We may only be able to store a few seconds of objectified time on a film, but we've got a whole package of them! We bridge the unavoidable gaps by showing, for example, wonderful slides on a magic lantern, from whose opulent staging practices we have learned a lot. We have a programme to offer. We are able to sell time.

The small machines and what they could do was the main message. A further attraction was the skill of the projectionist who, at that time, was considered an artist. Reports on early Japanese cinematography describe forms of presentation where the imaginings on the screen were completely secondary: the focus of attention was the projection event itself. There, the audience's view was at right angles to the projectionist's line of sight to the screen. Thus they only saw the distorted images from the side but they had a very good view of the projectionists at work and of their machines.[52]

Archaic pixel structure – televison project by Friedrich Lux (1906): the brightness of the light cells in the receiver plate (below) was controlled by resonant light valves (above) in accordance with the degree of illumination of the selenium-cell mosaic on the pick-up side.
(Source: *Bosch Technische Berichte* 6 (1979) 5/6.)

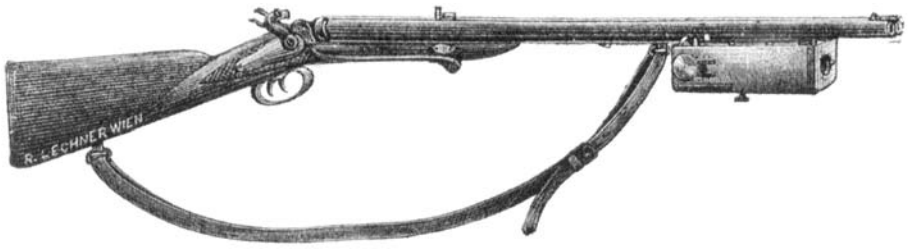




The main thing was, that the machines ran – at first, it was a matter of relative indifference what they were fed with. There had to be movement, that was all. The idea that the audience was illusioned with a single film work or a series of specific films, as some film histories lead us to believe, is wrong. Or at least it does not apply to the period of cinema's origins. The original signifying praxis of cinema was very close to that of television later, where the single sequence was nothing but the continuous, relatively arbitrarily composed flow of movements everything, with its heterogeneous subjects, methods of presentation, and forms of address.

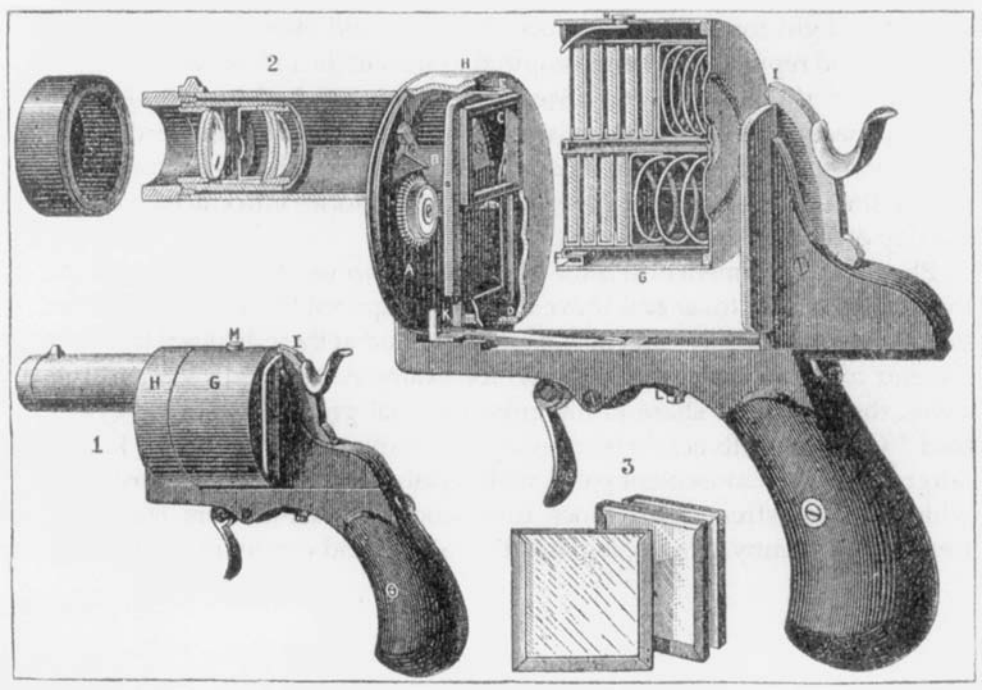
Those who were desperately eager to expose themselves to the cinematograph and its related apparatus, were used to machines and mechanics, or were beginning to get used to them. The new cultural technique of film was part of the technical culture of the closing years of the nineteenth century, the 'belle époque' of the machine. From the perspective of the history of technology, the invention of the feed mechanism for intermittently rotating film transport was not an isolated, special case in the genesis of film apparatus. Neither can it be – structuralistically abbreviated – monocausally linked to innovations from other areas of societal development, e.g., warfare technology, however seductive this may appear from the standpoint of anti-militaristic historiography. Yes, there is the obvious analogy of the photographic gun and the photographic revolver and the almost parallel development of firearms like the revolver and the machine-gun.[53] However, mechanisms like the one for rapid, intermittently interrupted transport of the individual photographs on the strips of film were developed and applied at that time in a variety of industrial praxes. 'The cinematic chain of parts and pieces', as Kapp expressed it in 1877, an analogy with reference to the 'living kinetic structure of an organism', represented a basic principle of advanced mechanics. In the last thirty years of the nineteenth century, kinematics became the most important scientific discipline in engineering. For Germany, the theoretical foundations were laid by Franz Reuleaux.[54] Artefacts for killing and for shooting photographs in rapid succession were rather marginal reifications in the wider process of refining the moving parts of machines, as were developed for textile production, the metal industry, and tool-making. If we seek the indivisible general principle behind this, we may understand them as objectifications of a new organisation of time, as technical concretisations and successors to the most important universal machine of industrialisation: the clock. Even in 1934, in his book *Technics and Civilisation*, Lewis Mumford judged its status to be higher than that of the steam engine.

The way that the intermittent film transport mechanism works is a variation on the basic principle of the mechanical clock: the continual action and



Lechner's Schützen Camera: 'Baron Victor Kalchberg as a hunter and an amateur photographer has set himself the twofold task of taking snapshots in the short space of time between pressing the spring to strike the percussion cap and setting off the charge, and secondly, to construct the device in such a fashion that the picture taken is a reliable control for correct aim…' (Source: Eder 1892, p. 589.)

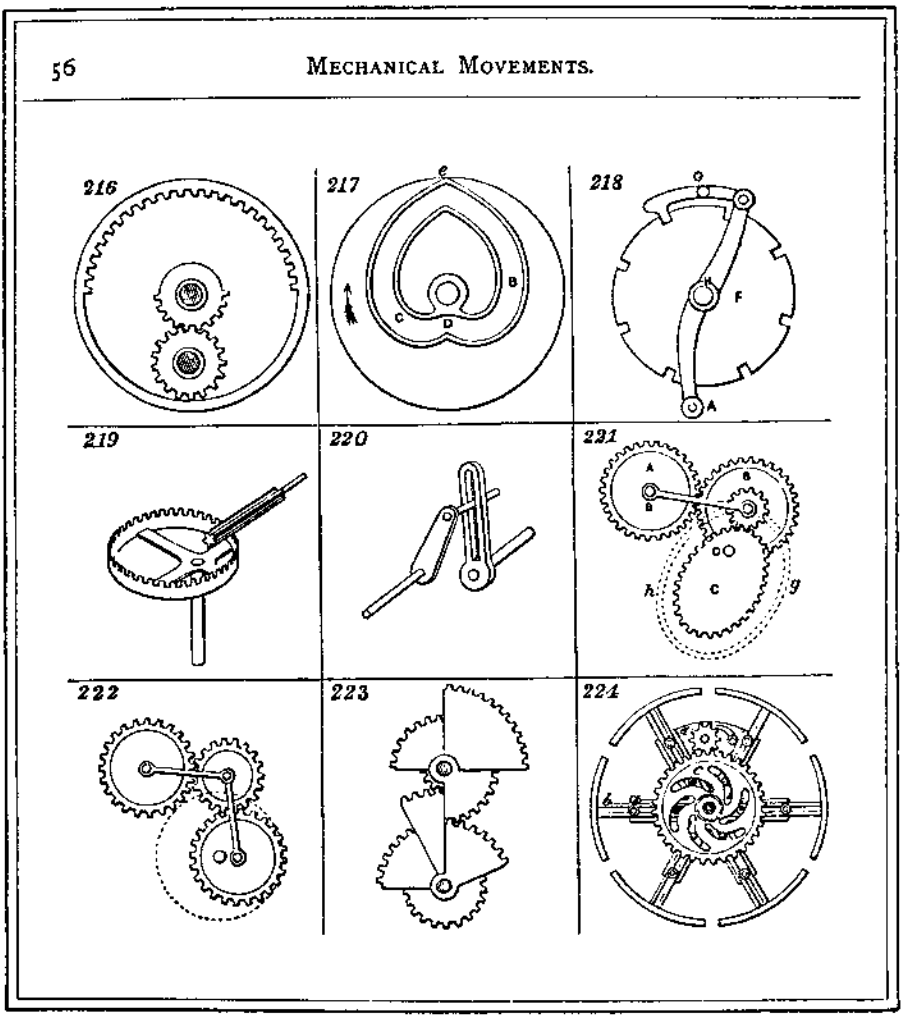
The Photorevolver (also referred to as Pistolgraph or Pistolcamera) invented by von Enjalbert could take up to 12 plates measuring 4 x 4 cm. In the muzzle is an aplanatic lens with a short focal length. (Source: Eder 1892, p. 579.)



counteraction of propulsion and stoppage of the same, the 'chopping up of a sequence of movement into alternating phases ... Or, to put it another way, a force is alternately braked and then released, i.e., a natural force is decelerated, artificially manipulated. The clock acquires its hold on time by continually and forcibly disciplining it and not allowing it to run on freely.'[55] In the same way, the mechanical time-preservation machine, cinematograph, gained a grasp on motion, manually driven in the beginning, but soon also by electricity. The new artefacts for dissecting and reassembling visuals were further objectifications in a process where homogeneous awareness of time was replaced by linear awareness of time, with its persistent, uniform measures and rhythms that are unknown in nature.

It was the new class of the factory proletariat that first took up this new medium, after it had been released from the workshops of the inventors and developers – ready to use and exchange-value enabled. These people, who were obliged to allow their bodies be worn out in the factories, who operated the machines or prepared work for them, and thus produced society's wealth, did not have an own culture, apart from that of the factory, in the fast-growing centres of industrialisation. The middle classes refused them access to their institutions and, conversely, established bourgeois culture did not mean much to them. The cultural and educational activities of the organised Workers' Movement, which was strongly oriented toward middle class cultural heritage, involved only a small section of the urban proletariat and the growing army of small clerical and service workers scarcely at all. In the industrialised nations, new forms of commercial mass entertainment developed to fill the gaps that became increasingly apparent as the workers fought for and won leisure time over and above the immediate working and reproduction time required to sustain the industrial work process. In the 1830s, 1840s, and 1850s, working hours had increased enormously, peaking at 80–85 hrs per week; however, from 1870 onward, there was a noticeable drop. As of 1890, industrial working hours began to approach the 10-hour day, and in Berlin, the first factories introduced a working day of less than 10 hrs in 1894.

Places of amusement also came into being, however, to skim off some of the surplus money (over and above what was required for survival) that the lower classes of society – the new plebeians – had at their disposal towards the end of the century. In Germany, for example, between 1860 and the 1890s, the per capita share in the gross national product had nearly doubled.[56] Circuses with acrobats, clowns, and exotic attractions of all kinds; fairgrounds and amusement parks with restaurants, machines to thrill and whirl, try-your-strength machines, roundabouts, helter-skelters, side- and freak-shows; penny arcades; music halls, varietés and vaudeville; pubs with



A page from Henry T. Brown's *Five Hundred and Seven Mechanical Movements*, 1867 (Strandh 1980).

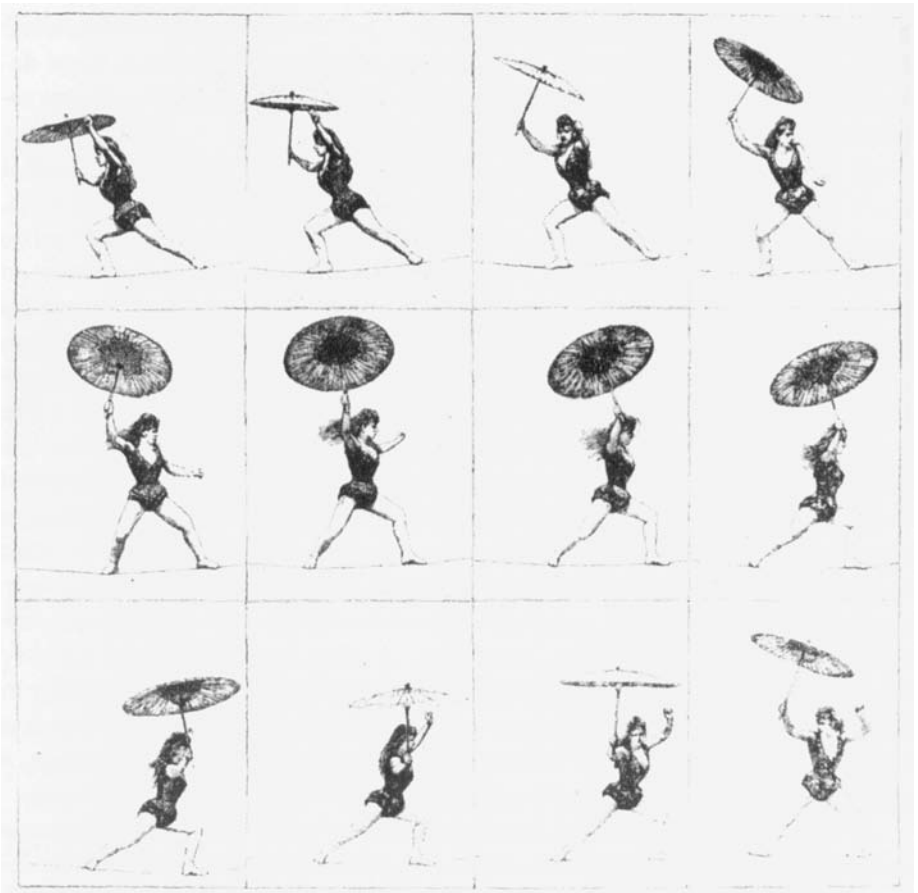
cheap entertainment acts; tea dances and concerts: with a few national distinguishing features, these were the places where the underprivileged masses – the factory workers, the uneducated, the lower middle classes, those who had left their rural habitats for the big cities where wage-labour was in demand, or the immigrants, who frequently could not even make themselves understood in their new surroundings – sought and found satisfaction of their 'rest-time' needs, the time that remained to them. It had to be fast; there was not that much of it to kill. It had to be cheap; there was not

much money left over after securing the needs of material existence. It had to be easy; something one didn't have to dress up in expensive clothes for, which one didn't possess anyway. And it had to be with others; the locals with their families, the mainly young and unattached new arrivals – they were all looking for contact with other people, superficial or otherwise, wherever and whenever possible.

It is not only in the latter years of our century that films are presented in a variety of places where crowds of people seek light and fast entertainment or distraction from concentration – in aeroplanes, shopping malls, discotheques, at exhibitions and fairs, in coaches, and in cinemas. This ubiquitous place is part of the originality of the presentation of film. Cinema did not immediately create its own spaces and places. To begin with, it sneaked into the existing and commercially proven venues of entertainment culture and gradually made itself at home there.

This applies not only to the film shows but also to the production, aesthetics, and perception of the early films. These short, preserved moments of motion were often shot behind or in front of the stages of popular theatres. In this way, the badly paid artists of the music halls, varietés, revue theatres, and vaudeville could earn a little extra to supplement their miserable pittance, although at first, it was by no means easy to win them over to this new, socially discriminated medium. The dramaturgy of the early non-talking films was based on musical rhythms and the exaggerated gestures and mime of the actors, corresponding to the dramaturgic framework of the playlets that were among the 'turns' on popular stages. Middle class domination of the publicly spoken and written word – reflected in the censorship regulations, for example – also influenced the popular stage where the masses were entertained.

In nineteenth century London with its strict divisions into social classes, for example, the music halls were declared 'illegitimate' and operated under the strict surveillance of the middle class watch-dogs of culture. Entertainment had to be non-literary; speech had to be kept to a minimum and be accompanied by music. Laura Mulvey's summary characterising the old music hall melodramas reads like a dramaturgic distillation of a considerable portion of film history: 'The aesthetics of the popular melodrama depend on grand gesture, tableaux, broad moral themes, with narratives of coincidence, reverses and sudden happy endings organised around rigid opposition between good and evil. Characters represent forces rather than people, and fail to control or understand their circumstances so that fate, rather than heroic transcendence, offers a resolution to the drama. A highly inflected narrative of passion and surprise must replace word with gesture and language with a visual representation of meaning. While the aesthetics



12 images taken with Londé's 12-lens camera ca. 1891 (Coe 1992, p. 38)

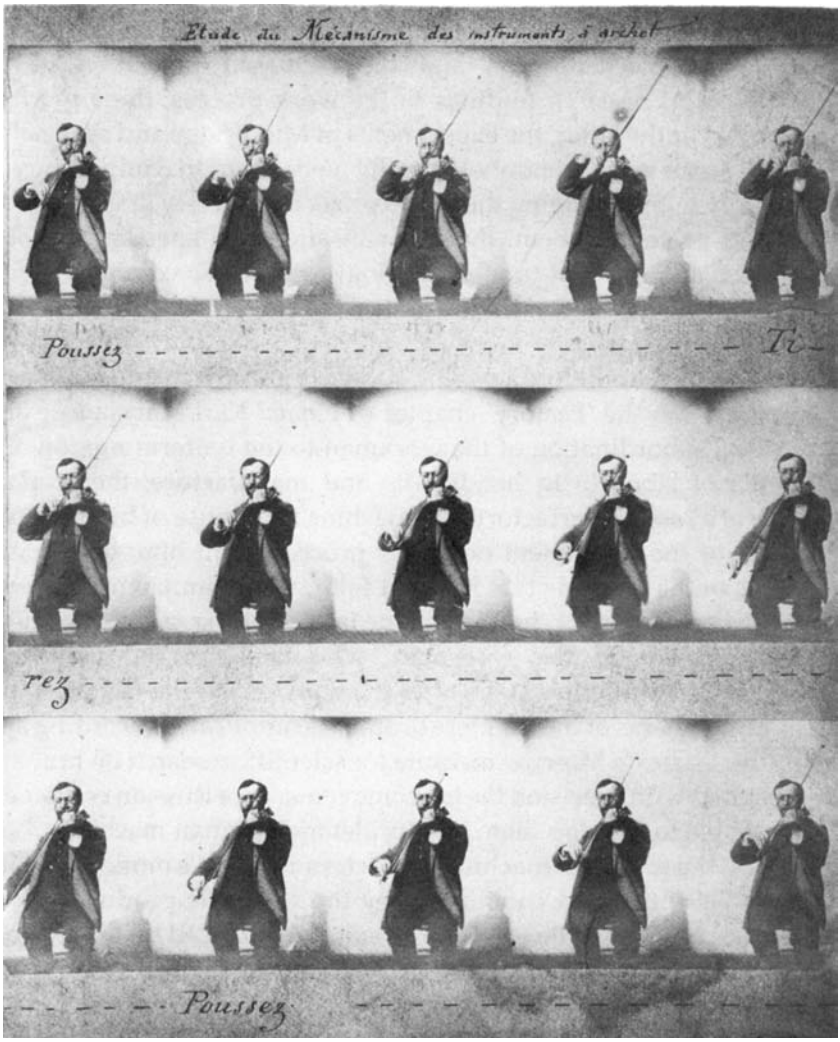
of melodrama evolved for a non-literate audience, the style both throws a doubt on the adequacy of speech to express the complexities of passion and, instead, offers a wide range of semantic alternatives: 'Gesture in all forms is a necessary complement and supplement to the word, tableau is a repeated device in the summary of meaning acted out, and the mute role of the virtuoso is an emblem of the possibilities of meaning engendered in the absence of the word.'(Peter Brooks, op. cit. 1985)[57] The classic slapstick comedies of cinema are unthinkable without the traditions of variety and vaudeville theatre. It was on their boards that later stars of the silver screen did their first dance-steps, somersaults, or performed their first funny juggling acts: Buster Keaton, whose career began at the age of five, the Marx Brothers, Charlie Chaplin, Fred Astaire, W.C. Fields, Mae West, and James Cagney, to mention only a few. Even later television stars, like Bob Hope, came from

this theatrical tradition.[58] Just as television was later held to be the *Beelzebub* responsible for the decline of cinema, so the stars of the plebeian stage declared with cultural pessimism that the cinemas were the main villains responsible for killing off this popular form of culture.

Up to the end of the 1920s, when the talkies became firmly established, it was usual to combine film shows with stage acts. Particularly in the USA, this practice survived for a long time in the vaudeville theatres. Even more strongly integrated into the existing forms of commercial mass culture in the early years were the technically reproducible illusions of motion: film shows as sequences in a complex *montage of attractions*. (Sergej Eisenstein, for example, was an enthusiastic fan of the theatrical and early filmic slapstick comedies, as were the Italian and Russian Futurists before him.) The projection of a filmed 'number' by acrobats or a fire catastrophe was followed by a real juggler or a dance troupe on the stage, or it might have been placed before the performance of a mini-drama. The audience proceeded to partake of the film experience after descending from a roundabout or after careering down a slide and after having heard a record or phonograph. Thirty, forty seconds long, a car ride, an embrace, the ankle of a dancer, visible for a moment on the screen... intermission, then a new film strip, a barely perceptible fleeting screen-kiss, the fire brigade in action, a laughing baby in its mother's arms, an absurd chase, where usually the symbol of state law and order, the police, got the worst of it (the sympathies of the underdogs of society clearly lay with the lawbreakers)... in a few minutes, it was all over.

Until cinema had its own exhibition rooms, until the images became sharp and flicker-free, until the single, organised story-line became the focus of signifying praxis, cinematography was not a 'hot' medium in the Marshall McLuhan sense. The spectator did not immerse him or herself in the cinema experience and did not sink down into high-definition moving pictures. It began as a 'cold' medium, as did television. It offered diversion, fast, superficial entertainment in concert with other, similarly structured offerings of the nascent culture industry. The object-character of the media-technical arrangement was apparent and offered no space for total imagination.

The individual awareness of time, that was a necessary prerequisite for the enjoyment of this type of spatialised 'rest-time' offer was created essentially in work processes that were increasingly based on the division of labour: on the conveyor belts of the huge Chicago slaughterhouses, in the tinning factories of London, Berlin, and New York, in Westinghouse's iron foundries in Pittsburgh as well as in the machine work shops, the textile and steel mills of England, France, and Germany. Here, to a growing extent, it was concentration on the moment that counted. It had been a long time



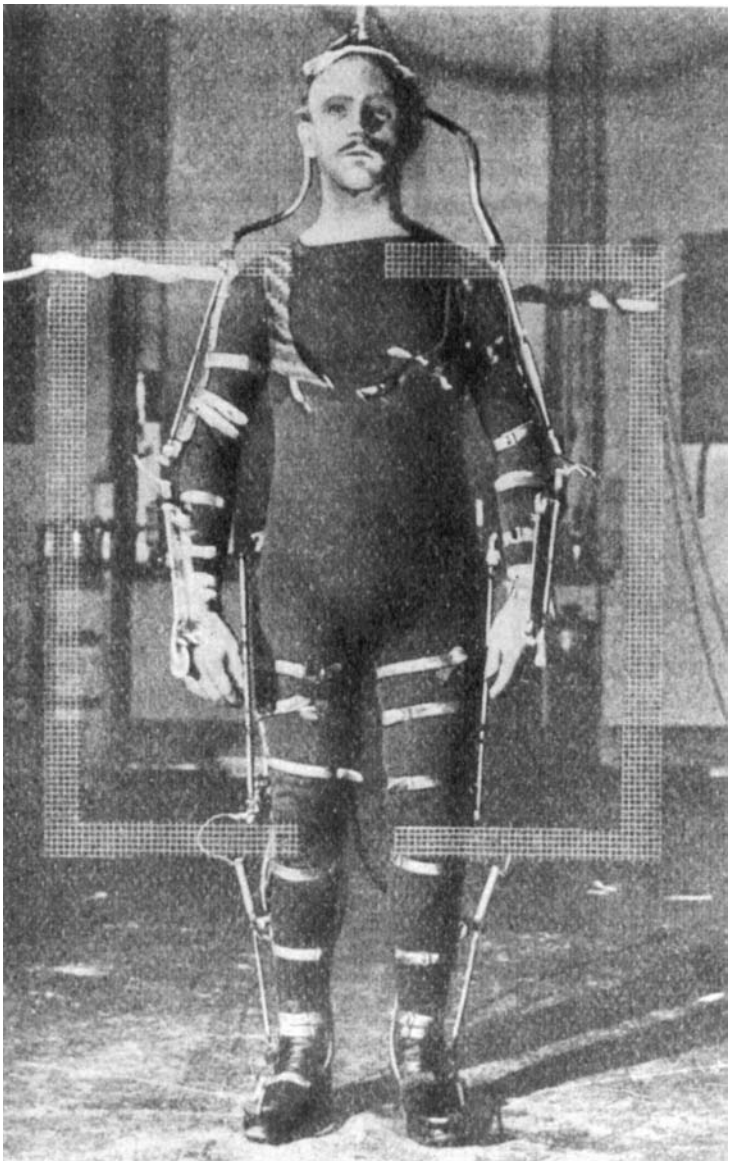
Georges Demenÿ in his film, shot for an *Etude du méchanisme des instruments à archet* (1891). (Source: *Le cinéma des origines*, Paris 1976.)

since the rhythm of the industrialised subjects' lives had been organised by natural courses of events; now it was determined by the tempo of machines and the structure of the work processes. The dogged regularity with which the film carrying the photographs was moved on a fraction, 16 or 32 times a second (according to shutter-type), stopped, illuminated, and then transported again, was in complete accord with the monotonously repeated, identical operations in mechanised factory work. In both cases, of course, there was considerable latitude for tolerance – similar to those other new set

patterns of time, the timetables of public transport – however, in the course of onmarching mechanisation and the increased utilisation of psycho-physiological research findings in the work process, these gradually disappeared. For the latter, the experiments of Muybridge and especially of Marey with series and chronophotography were of seminal importance. Almost certainly without having these two projects expressly in view, they facilitated and promoted them: the rationalisation and speeding-up of the work-process and the 'rest-time' technology which, in a commercial form, was supposed to compensate for the deficits and afflictions produced by the first sphere.

Twenty-eight years before a paying audience gazed in wonder at the first cinematograph, in the 'Factory' chapter of *Capital* Karl Marx wrote about the 'technical subordination of the workman to the uniform motion of the instruments of labour': 'In handicrafts and manufacture, the workman makes use of a tool, in the factory, the machine makes use of him. There the movements of the instrument of labour proceed from him, here it is the movements of the machine that he must follow. In manufacture the workmen are part of a living mechanism. In the factory we have a lifeless mechanism independent of the workman, who becomes its mere living appendage.'[59] – Twenty five years after the workers left the factory in front of the rolling cameras of the Lumière brothers, complicated recording apparatus in A.K. Gastev's Moscow institute for scientific research on human labour registered with precision the exact movements of Russian craftsmen in order to be able to develop them into 'proletarian human machines'.[60]

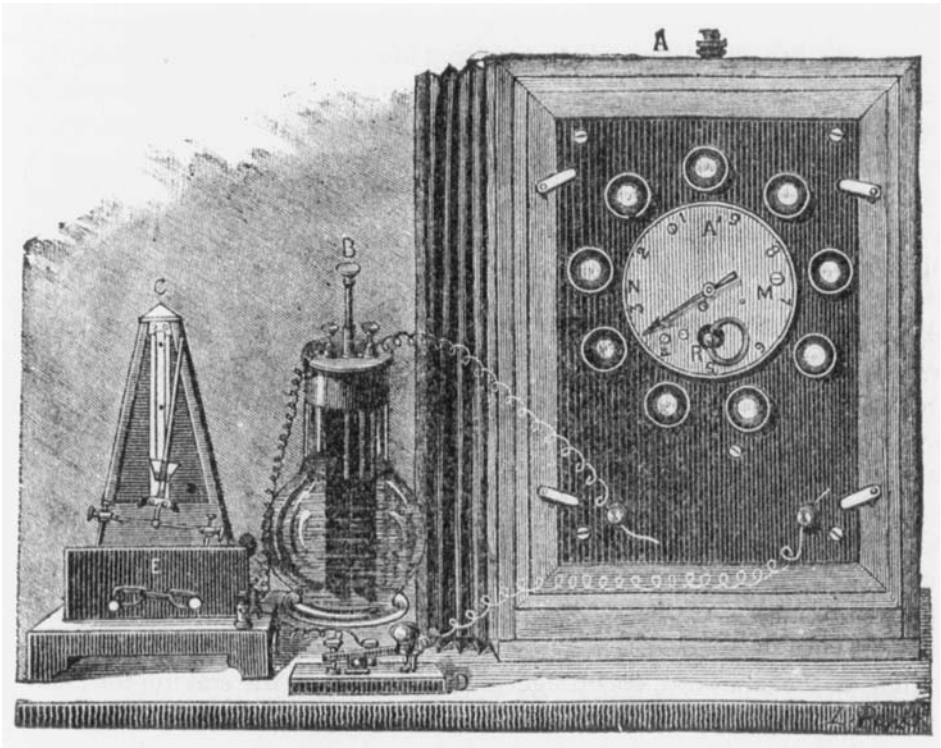
The clock, the universal machine that determined life's motion, had itself become a mass-produced commodity by the 1870s, its production being based on the principle of the division of labour. Produced by the million, it compressed subjective time and established the rule of abstract patterns of time – the individual's awareness of time was not only worked over and maltreated in the centres of material production. In a comprehensive sense, the technology of cinematographic culture was inextricably linked to the new, technically mediated subjective experiences *'I see!'* and *'I am moving!'* of modern times. The entire reproduction process of industrialised society was subjected to a violent restructuring that abused the human psyche. In 1880, the medical doctor George Beard, specialist for neuropathology and electrotherapy, published a paper entitled 'Nervous Exhaustion – Neurasthenia' in New York, where the new electricity-based technologies had become established faster than anywhere else. This paper triggered a flood of publications and debates which soon made their way across the Atlantic to Europe. Nervosity, situated in 'the no-man's land between illness and health',[61] became the synonym for describing how the individual felt under



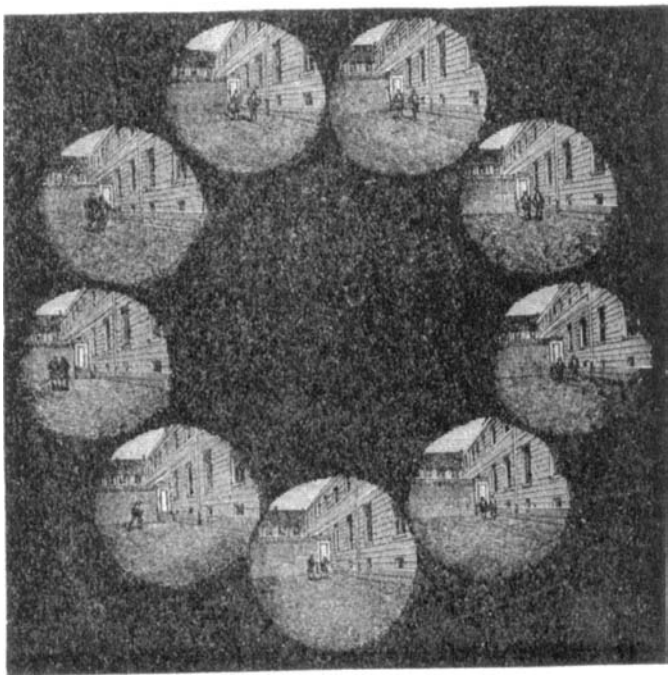
Marey's method applied in a Russian experiment aimed at working towards the ideal 'proletarian machine' at the Moscow Institute of Scientific Organisation of Work and Mechanisation of Man, founded in 1920 largely on the initiative of Alexej Kapitonovic Gastev. A worker is wired in such a way that his movements can be registered on a chronograph, analysed and evaluated as structures, and then their sequence can be effectivised. (Source: Tramm 1921.)

the hegemony of the second hand of a clock, the dictatorship of timetables and time clock, the hectic pace of the city, being pressed for time, and terrorisation by speed. Special tonics were concocted and appeared on the market in order to make money out of this mental distress. Advertising pillars on Berlin's busy thoroughfares, like the Spittelmarkt, prominently displayed posters advertising 'Neocithin' that carried as their visual hallmark a face contorted with pain. Particularly in connection with the technical system of the railways, the focal point of reference and view and the new organiser of perception,[62] in the preceding decades considerable experience had been gained in technology risk assessment, as this would be called today. This covered not only the new visual dimensions of seeing, the expanded field of vision, the panoramic view, but especially how time had come to be experienced: 'We act more decisively and, similarly, we live, enjoy, and work more intensively. Everything must move forward faster. The virtue of precision is, perhaps, the one that has increased the most. The railways act, as has been said, like great national clocks. Of course, if you want to get on in life, you have to relinquish personal wishes and fall into line with the fast pace and general conditions of the race of life. It has to speed up all the time. Not a moment to lose, that's the motto; the whole of life is like an express train', wrote Gustav Schmoller in the *Preussische Jahrbücher* in 1873.[63]

With the discovery of nervosity and its propagation as the paradigmatic illness of the age in the 1880s and 1890s, came an intensive examination of the effects of the nineteenth century's new technologies on the human psyche. Capitalism had arrived at a sort of 'self-contemplation', as Willy Hellpach expressed it in his *Nervosität und Kultur* [Nervosity and Culture] (1902), and substantiated the decisive effect of Beard's paper thus: 'Around 1880, the new epoch had already gone so far, that it felt the need to sit down in front of a mirror.'[64] Literature, art, and philosophy began to reflect in depth what these changes had brought the human subjects and on these reflections, the socio-technical driving forces of change made a marked impression. The original French edition of Henri Bergson's *Time and Freedom* appeared in 1889. The well-known social philosophical works by Georg Simmel and Werner Sombart on the urban experience and capitalist structures of meaning were published shortly after the turn of the century. New disciplines, situated between the social and natural sciences or combining hitherto separate fields, became established, like psycho-pathology or biological criminology. Richard von Krafft-Ebing, whose dissertation on 'Die Sinnesdelirien' was written in 1863, published in 1886 his work, *Psychopathia sexualis*, a strange collection of sexual monstrosities. Although extensive passages of the work were in Latin, from its first edition to 1924 it was reprinted 17 times.[65] In 'Die 'kulturelle' Sexualmoral und die moderne



Putting Hysteria into the Picture: The camera apparatus used by A. Londe at Charcot's La Salpêtrière in Paris to take series photographs of mental patients. The illustration above shows the main components of the system: a metronome, an electric battery, and a 9-lens camera for instantaneous exposures.



One of the results (left): the movements of two patients out for a walk are followed by the camera. (Source: Eder 1892, pp. 570-572.)

Nervosität' ['Cultural' Sexual Morality and Modern Nervosity], an essay by Sigmund Freud which was first published in 1908, (in the title he makes a clear distinction to his own theoretical approach and the role of drives, etc.), he cites a great number of colleagues and authors who, in the 1890s, saw a causal relationship between the neuroses of the age and changes in the technical and, particularly, the communicative conditions of life.[66] One forthright and very detailed example is Wilhelm Heinrich Erb's essay, written in 1893, 'Über die wachsende Nervosität unserer Zeit' [On the Increasing Nervosity of Our Time]: '...the immeasurable increase in traffic, the world-wide networks of telegraph and telephone lines – these have totally changed the relations in commercial and social life: everything is done in haste and agitation, the nights are for travelling, the days for business, even 'holiday trips' are a strain on the nervous system ... life in the cities has become more and more sophisticated and more and more agitated'. Erb also describes how, in his view, individuals try to free themselves from this pressure: 'The weakened nerves seek refreshment in stronger stimuli, in heavily spiced pleasures, so that they become even more fatigued; for the most part, modern literature concerns itself with the most disturbing problems, which agitate all the emotions, encourage sensuousness and the craving for pleasure, engender contempt for all ethical principles and all ideals; literature presents the reader's mind with pathological characters, psychopathic-sexual, revolutionary, and other problems; our ears are irritated and overstrained with strident raucous music served in large doses; the theatres captivate all our senses with their excitatory productions; art, too, has a particular fondness for all that is repellent, ugly, and exciting and feels no compunction whatsoever in presenting before our eyes the most horrible things that reality has to offer in repulsive realism.'[67]

For the middle classes, psychoanalysis offered itself as a possibility to cure them of their mental afflictions. However, the proletarians, the servants, the small tradesmen, and office clerks were provided with cheap drugs – commodities which were consumed on a massive scale and, naturally, also made handsome profits. Alcohol played the most important role by far. Its devastating effects on the drinkers and their families is frequently depicted in the early short films and this theme was also extensively dealt with audiovisually, e.g., in didactic series of slides for the magic lantern.[68] Friedrich Engels considered it 'a moral and physical necessity', that 'a very great number of workers succumb to alcoholism' because of the catastrophic conditions of their lives.[69] In the 1870s, there were 133,840 breweries in England and Wales, and a pub for every 182 inhabitants. Up to the early years of the First World War, alcohol was the most important opiate of

the people, which, according to Lloyd George, 'caused more destruction than all the German U-boats put together'.[70]

'Delicious! Refreshing! Exhilarating! Invigorating! Drink Coca-Cola!' This was the advertising message that J.S. Pemberton sent out in 1886, extolling the virtues of a new invention. Originally a noxious green colour, at first the new drink was aggressively touted as a drug and sold by the glass over the counter of eateries; later it was bottled. 'The wonderful nerve and brain tonic and remarkable therapeutic agent' – this was an advertising slogan of 1890. Founded 1892 in Atlanta, today the mighty Coca-Cola Company also owns prominent parts of the international entertainment industries. By 1896, the 'ideal brain tonic' was already so popular that it was exported to other countries.[71]

Cinema originated as a new and attractive segment of a mass culture whose spaces and venues for its events lay outside of the four walls of the home, the space for private reproduction. It was a special case in a historic departure where concentrated entertainment began to be mass organised publicly and commercially. One year before the first cinematographs started to whirr and rattle in Europe and the USA, specially modified automobiles were zooming over a piste from Paris to Rouen – the first car race. The emergence of football as sport for the masses and a public event in Germany coincides with the invasion of cinema. The German Football Association (DFB), the central organisation for this sport, was founded in 1900.[72] Outings to open-air cafés on the edge of town as a way of passing 'rest-time' were just as popular as group outings on bicycles – after these had become cheaper and more comfortable. By the end of the nineteenth century, there were about one million cyclists in Germany.[73]

The growing trend toward outdoor culture is a revealing expression of contemporary living conditions and how these had developed in the urban conglomerates in the course of the nineteenth century. In its final decades, the already aggravated situation came to a head. 'Wohn-Haft' [translator's note: 'wohnhaft' means living at; 'Wohn-Haft' is a play on words, meaning literally house arrest, but with the connotation of prison conditions] is an apt description from the title of Gilles Barbey's essay 'on the inside history of the living quarters of the masses', and summarises his critique of contemporary urban planning, taking New York, Berlin, and Paris as examples. In all three cases, the new designs for the cityscapes are revealed as strategies of greater or lesser brutality for merely managing the vast numbers of people streaming in, a typical phenomenon of the industrialisation era, but it was effective management from a capitalist standpoint, i.e., speculative and profitable. Collective housing construction was the universal remedy. This label conceals the plan to create housing for as many people as possible on

the smallest possible space, to a great extent with no regard for the fact that people also need light, air, and room to live. In the multi-storied New York tenements, identical blocks that covered the peninsula of Manhattan with a brutally geometric grid, in the architectonic arrangements of Berlin's Hinterhöfe [courtyards], or Paris' Cités Ouvrières and the tiny units of its town houses, the buildings owned by the emergent real estate branch of industry were bursting at the seams. At the end of the 1880s, the average density of population in Paris was 392, in Berlin 657, and in New York 1,157 inhabitants per square hectare.[74] Property speculation had become one of the most lucrative businesses around.

In Gustav Schmoller's famous warning about the housing question, delivered in 1887, he wrote: 'The property-owning classes must be roused from their slumbers; they must finally comprehend that, even were they to make great sacrifices, this would represent only a modest insurance, with which they might protect themselves against the epidemics and social revolutions that will surely come if we do not cease pressing down the lower classes in our cities into barbarism, into an animal existence, through their living conditions.'[75] Such warnings did not go totally unheeded for self-interest is always a factor. In the 1880s and 90s, a growing debate on the housing question in Germany produced a very active middle class reform movement and early forms of cooperative organisation among the tenement-dwellers themselves. However, practical processes to change conditions were very slow getting underway and only really took effect in the large-scale projects in public sector housing construction in the twentieth century. For the period 1871–1910, when the population of the German Reich increased by a half, from 41 to 65 millions, and was increasingly concentrated in the urban agglomerations, living conditions for the lower classes remained absolutely catastrophic. For a worker, living quarters meant one, or at most two rooms (including kitchen), where all the members of the usually large family were crowded together. To have a bed of your own, and to sleep in it by yourself, was a privilege – unknown except, perhaps, to childless couples. In order to pay the rent, it was often necessary to rent the beds to *Schlafgänger* (overnight/day sleepers) when not in use by their owners. In a contemporary brochure published by an association concerned with public morals and decency, 540 of these bed-renters were counted in a single Berlin tenement. Often, the apartments were windowless, without adequate ventilation and daylight, and the tenants exposed to wind and weather. These habitations were a breeding-ground for lung disease, particularly tuberculosis, bacterial disease, and, obviously, psychic deformations of all kinds. A private, intimate sphere was practically non-existent although this was desperately longed for in the course of the ongo-

ing spatial separation of work and living. Even sexual activity, which had to take place outside of one's own four walls or else within them, was reduced to a hasty experience of a few minutes' duration, if the opportunity presented itself. A worker's apartment was a place for sleeping and eating, nothing more; moreover, it and its tenants were bound over by the rigid house regulations of the managers and owners of the property. Despite marked national differences in urban planning and architectonic details, in a social respect the great metropolises of the industrialised world hardly differed at all, as little as did the cities of the German Reich, whether Halle, Duisburg, Leipzig, Magdeburg, Berlin, Hamburg, or Breslau.[76]

The experience of seeing illuminated illusions of moving pictures in a public place was one of very few possibilities to escape from the dinginess, from being crammed together, from the terrorisation of the spheres of living and working: the film experience as a light at the end of the tunnel of everyday existence for those that could afford such escapades, on a par with the Sunday dance, the visit to a travelling circus, the pub with entertainment, the stand-up beer halls, the family and suburban varietés, or the fairground. As long as cinema was itinerant, the film owners and projectionists changing the performance locations, and not the films, in order to make their living, cinema was a part of this kind of small attempt at escape. It was only

after the turn of the century, when the demand for films increased and production was expanded, that film became sedentary. Film got and occupied its own spaces, like the narrow shop-cinemas or nickelodeons which, from 1905, began to spread through the working-class areas and side streets of the amusement districts of the cities. The narrow architectural dimensions of these early cinemas with their close rows of seats was, in a sense, a continuation of the cramped private sphere of experience but in a more public space (in the same way that from 1910–1920, the grand architecture of the buildings erected at this time were an extension of the middle class living sphere, but they also allowed the lower classes, for a short time, rented by the hour, to experience a different, artificially inflated social environment.) The important difference was, that the terror of familial and forced intimacy was replaced by freely chosen anonymity in the dark cinema. There, particularly for the young, what one saw on the screen was not as important as what could not be seen.

As a segment of the outdoor-culture of the waning nineteenth century, nascent cinema was an excellent candidate for integration into urban mass culture, which was beginning to mix the collective and public with the intimate and private. Film perception drew these two contradictory sides of cultural expression and experience together as the plebeian parallel to a trend in middle class life and experience, a historic phase characterised aptly by Richard Sennett as 'The Tyranny of Intimacy', the sub-title of his excellent book *The Fall of Public Man*. The middle class citizen, hunted and rushed through the process of industrialisation, was definitively no longer the 'public man' of the ancien régime, who had entered the public sphere to express himself (to others). He had become a spectator who had relinquished his powers of expression and his potential to act to a few others, who now, on his behalf, were privileged to act in public, as political speakers, for example, as artists, as sportsmen, or as actors. From the beginning, neither the members of the new middle class nor of the lower classes had the chance or the opportunity to act in public, to stage themselves. At least not as individuals; if at all, as a collective; and it was as a collective that they then became a film audience. This limited form of a public, whose collectivity was only established through a short-term contract by buying a ticket at the box-office, then proceeded to be amused by actions and plots that formerly were exclusive and private. Now technical reproduction had dragged these into the projector's limelight, made them public, exposed them to the laughter and pity of the many. The embittered resistance of large sections of the educated middle classes to the new medium was not least founded on the fact that the members of the old class were often por-

trayed as idiots in the comedy shorts, as character masks on which a custard pie fitted perfectly.

In cinema's origins, it is disorienting to attempt to find objects for identification among the characters, roles, and events. Rather, the opposite was the case. The spectators with their needs and desires became the projection screens of the cinematographic apparatus. Just as other commodities were progressively endowed with personality traits – in a Marxian sense, became fetishes – the same happened to the commodity of film, initially a product of manual labour, then mass-produced: the action and actors on the screen, through their strange and disturbing (technical) connotations, gained a new personal meaning for their recipients that was added to their original meaning and laid over it, almost obliterating it entirely. It was not the facts external to the film, which were then experienceable as such, e.g., that in Lumière's film real women workers came out of the factory, that counted in the cinema experience but the fact of the medium itself: that this event had been made imaginary for the audience. The accident that happened to a film figure or the occurrence of the same that was feigned on the screen; through technical reproducibility, as a specific form of mise-en-scène, these accrued signal importance for the internal state of those watching it in the cinema.

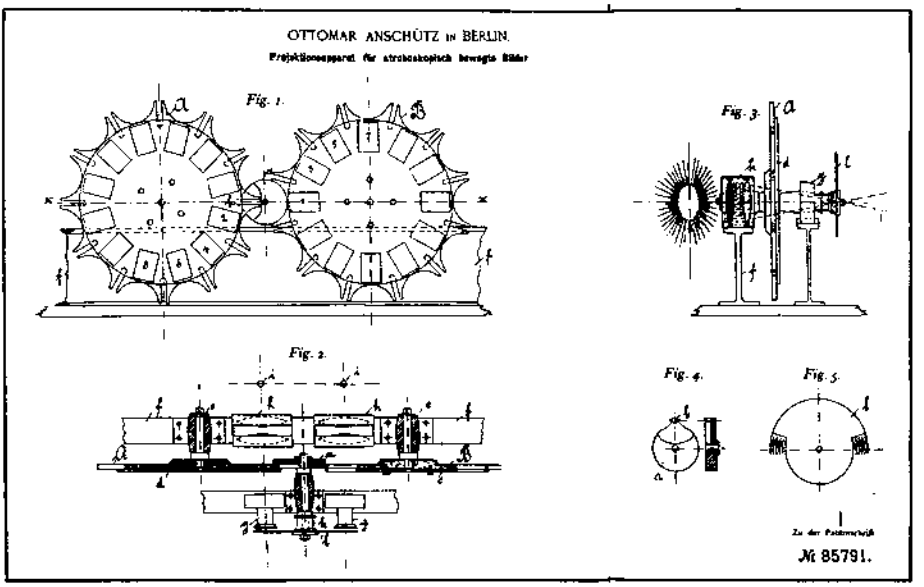
The analogy to the new forms of organisation and realisation of the exchange of goods that had developed in the urban context is obvious. Historically, the cinema and the department store share not only their gradual decline, their supersedure, and/or transformation in history, but also their beginnings – they originated together. When Skladanowsky's Bioskop started to run in the Berlin Wintergarten, Tietz was constructing the first phase of his palatial department store, Wertheim, in the Leipziger Strasse. He opened his first grand store in Munich in 1895. Immediately, Tietz began to integrate the cinematograph into the store's salesrooms.[77]

The novel flickering products for the heart and the head and the material products for everyday use were subject to the same economic principle: the mass-produced pair of trousers was sold over the counters of the department store at a relatively low, fixed price (no haggling there, nor at the box office) and the profit margin was also correspondingly low. In the same way that the low price of a cinema entrance ticket only paid off if a great number were sold, the department store owner only began to make a profit after many pairs of trousers had found buyers.

Both the cinema and the department store owed their existence to the fact that the customers bought things that were not strictly necessary for continued existence on this planet. Therefore the commodities that had to be 'moved' were offered for sale in spectacular ways and charged with additional meanings in order that the act of exchange would actually take place.

In their historical phase of expansion, from the turn of the century until the outbreak of World War I, the cinema and the department store began to occupy the same space: the new inner city areas, the 'place for the most intensive exchange of goods and ideas', the 'sector for exclusive service and services, for administration and controlling authorities where, even at that period, the economically and socially relevant forces were concentrated'.[78] Thus, with a common strategy, they attacked the perception of the urban population together. The imagining-imaging praxis on the screen and in the cinema corresponded to the staging praxis at the new shrines to material goods. Particularly striking is the montage-like syntactic structure that both these offers of experiences have in common. That which I have described in the above as being the essentials of early experiences with film, applies equally to the department store: it organised the effect of its offers through a combination of heterogeneous elements that were subjected to constant variation. The arrangements of commodities and groups of commodities were always being changed around; 'the strength of a department store is increased ten-fold through the accumulation of the most varied goods that mutually support and drive one another forward', as Sennett cites Emile Zola[79] in this context, who made literary use of this new microcosmos of capitalism in *Le Ventre de Paris*. Or, for example Werner Bergengruen: 'Siberia! China! Saxony and Peru! – / Ocean! Studio! Factory and the tropics! / He (the doorman of the store) knows: Whatever they can deliver, you'll find / here everything, everything on display!'[80] Like the first commercial exhibitors of films, the directors of commodity exchange backed the strategy of surprising, or even of taking their clientele unawares, long before the new artists of cinematography discovered this and developed it as a formal principle for making certain films. And long before facets of internationality tumbled into the living rooms of the TV-households in the form of electronic picture transfers, these were delivered in the form of purchased goods from the department stores of the industrialised nations, packaged and portioned just as neatly, or, for cinema, in the form of the innumerable film reports on the cities of the world, which were shot by Pathé's and Lumière's travelling camera-men.

For historiography with a perspective that aims to integrate technology and culture, what matters is: cinema, as a historically special form of audiovisual praxis, did not begin suddenly in the mid-1890s with the demonstrations of Lumière's cinematograph (who, with this name, established a use-value monopoly par excellence), Paul's Theatrograph/Animatograph, Armat and Edison's Vitascope, or the Skladanowskys' Bioscope. The origin of cinema was a process of invention and innovation. It overlapped with the development of moving picture machines and their entrance into the living



Anschütz' 'Electrotachyscope' for projecting moving images (patent diagram).

rooms, extended over the last third of the nineteenth century, and merely peaked in the new cinematographic apparatus arrangements. For the time being. It was not in the invention of the film, nor of the cinematographic devices, but in the origination process of cinema that the rise and growth of the class of factory workers and the new lower classes in the urban agglomerations was reflected. Their 'rest-time' needs, their gradually increasing share in society's wealth, their specific forms of collective culture from the street, public spaces and places, were at once the preconditions and the projection screens for the emergence of the new, commercial mass culture of cinema and, at the same time, were closely linked to the peaking of other processes of industrialisation in advanced capitalism, particularly with regard to people's changing perception of time and of things. The socio-cultural complex that achieved expression in the cinematograph, was already there before it received this special apparatus form, and it then proceeded to develop further together with it.

However, if we follow Arnold Hauser's proposal for periodisation, as described in his social history of art and literature, where he places the artistic production of our century firmly under the 'sign of film', – 'The twentieth century began after the First World War, i.e., in the 1920s, just as the nineteenth century only began in 1830'[81] – then fully established cinema would stand at the end of the development of his nineteenth century, with its gen-

erally acknowledged, typical dispositif[82] structure: its own, darkened room, where the spectators, like Plato's cave-dwellers, are virtually held captive between the screen and the projection room, chained to their cinema seats, positioned between the large-size rectangle on which the fleeting illusions of motion appear, and the devices that produced the images of darkness and light. Cinema as an environment for the enjoyment of art, for immersion in traumatic experiences, for hallucination, for irritation of real experience; and what is more, with films constructed in deliberate opposition to the experiences of those who pay to enter the dark womb and be at the mercy of the play of light and sounds. With this, cinema at once gives advance notice that it is a passing form of audiovision.

Until this dispositif became established shortly before and during World War I, the process of cinema underwent marked changes. Using developed cinematographic artefacts – but continuing the viewing praxis with projected images using Wheels of Life, electric Tachyloscopes, and particularly magic lanterns – an audiovisual cultural form became possible for a short time in the mid-1890s which corresponded to the *zeitgeist* of the fin de siècle: momentary experiences in the true sense of the expression, totally oriented on here and now imaginings of existing and imaginary realities, which started from the everyday experiences of the spectators and then took them into the absurd or the sublime, interposed in the film shows as a heterogeneous spatio-temporal experiences, the visual and the auditory relating to each other in multileveled ways. The whole thing was offered as a segment of a public mass culture that was fixated on motion, on rough, even coarse, expression, and that deliberately had no literary pretensions nor needed any.

Such was the praxis of film in the era of the craftsmen, handymen, and small tradesmen – film's first protagonists, who frequently incorporated in one person all the functions performed later by any number of specialists: camera operator, projectionist, developer, distributor, and often the actor, too. The fantastic stage cinema of Georges Méliès was of this kind. He combined his magic theatre consistently with film techniques and unleashed a veritable firework display of illusions of motion and colours on the screen, which, just as logically, only brought him the contempt of contemporary cultural critics. Only very few of the so-called pioneers, for example, Edison in the USA, Charles Pathé in France, Oskar Messter in Germany, survived in this profession after the mutation that followed: the development into a comprehensive industry of cinema and the transnational distribution of film. The majority failed and became resigned, confronted with what organised trusts with their patent rights and modern marketing methods had made out of their audiovisions. Reynaud, for example, embittered over the

technologisation of cinematography, who destroyed the majority of his wonderful, artfully painted animation strips by throwing them in the Seine; the Skladanowskys, who turned to manufacturing animated toys in order to finance their continued existence in films; Méliès, who ended his days in abject poverty in a home for cinematographers after trying unsuccessfully in the 1910s to establish himself in big business, at that time already located in the USA. From then onward, other qualities would be in demand, but not those possessed by the early masters of illusions of motion.

Two progressive processes of expropriation asserted themselves, intermeshing precisely. First, the cinema business became thoroughly capitalistic and elevated more or less to the standard of overall economic development. Second, the socially underprivileged were gradually robbed of their original medium for concentrated diversion and quick relaxation through progressive literary and theatrical estrangement of film together with its aurification in the cinema. Both processes, in a social and a cultural sense, were processes to *bourgeoisify* this medium. Fortunately, as with all historical processes, totality was never achieved.

The economic process of change was an extremely rapid one. This new branch of industry had no time at all to develop as a market where free competition obtained, at least not globally. Its consolidation in the period up to the Great War coincided exactly with the establishment of cartels and trusts (1895–1914), and the cinema industry did not escape their influence. A brief phase of anarchy in the manufacture of cinematographic films and equipment, which was grounded in the fact that both were based on relatively simple technical processes, was followed quickly by the hegemony of a few companies and groups of companies; individual firms staked their claim forcefully to monopoly rights, based mainly on the legally protected patents for the 'hardware', the cameras and projectors. In the beginning, the production of films by precision engineering and photographic factories mainly served to guarantee and expand the market for the machines they manufactured.

In Imperial Germany, Messter and his company represented this type of economic operation, although he was relatively insignificant in an international context. Messter's strength lay in the numerous constructive improvements made to the camera and projection equipment. Of historical importance are Messter's intense endeavours to invent cinema as a simultaneously acoustic and visual medium. From 1903 to 1913, he organised substantially the first epoch of film's talking pictures,[83] with numerous experiments to synchronise the two reproduction machines, record player and film projector. In his innovatory Berlin workshop, the first early forms of the newsreel with sound originated, where filmed news events were

commented on by a speaker off-stage. Other Messter talking pictures introduced facets of bourgeois musical theatre into this new industrial culture-context: in front of the camera, actors mimed synchronously to the recordings of famous operetta stars.

For about the first fifteen years, France played a dominant role. The Lumières were the European counterpart of George Eastman and his photographic factory in the United States, albeit far less important (at this time, Eastman-Kodak supplied about 95 per cent of the film stock used world-wide). However, the Lumières retired early from the film business, leaving the field clear for their competitors, Pathé Frères and Léon Gaumont. Charles Pathé had acquired his capital base for investment in the film business by utilising Edison's phonograph in the pleasure gardens and fairgrounds in and around Paris. In 1895, he entered the film industry, still using the kinetoscope of his American license partner. Pathé's modified apparatus reflects the media-economic rationale of the early years. Instead of the customary single viewfinder for looking at the films, Pathé had four put on his peep-show devices. As of 1901, he and his brothers went into mass production of short films and built up a global distribution network. Their trademark, the cock, soon appeared wherever films were shown. In 1908, Pathé Frères controlled one third of global film business, their closest competitor being Léon Gaumont, who, like the Lumières, came originally from the production of photographic equipment. The leading position of these two companies remained unchallenged in Europe until World War I.

In the United States, Edison's original plan to only hire out his machines and thus prevent them falling into the hands of his competitors, had failed because they were easy to copy and modify. However, using constant litigation over patents and owning the most important manufacturer of film stock, the Kodak Company, he attempted to establish an exclusive position on the market for his innovations factory. The high point of this industrial policy was the founding of the Motion Pictures Patents Company in 1908, which united under Edison's leadership the US firms Biograph, Essanay, Kalem, Lubin, Selig, and Vitagraph with the French Pathé Frères and Méliès. With this pool of patents, it was envisaged that all competitors could be kept out of the market. In 1909, Edison even managed to persuade Eastman to supply his film stock only to members of MPPC, but the latter only managed to do this for two years. The film industry had become too big, diverse, and non-transparent. There were too many people that wanted to produce films and did so, even before 1917, when the American economic authorities declared the trust initiated by Edison to be illegal.

Those who up to now had been at the end of the chain of commercial exploitation, who had earned their bread at the cash registers of the penny ar-

The apparatus for execution by electrocution was developed by Thomas Alva Edison, 1887 to 1890, parallel to improving the Phonograph, and was used for the first time in New York in 1890. This picture was taken in the famous state prison of Sing Sing in 1925.

cades and nickelodeons, began to make their presence felt on the market. In the beginning, they had been strangers to the industry, for example, the clothier Carl Laemmle, who emigrated from Swabia in Germany to Oshkosh in Wisconsin (later owner of Universal Pictures), the furrier Adolph Zukor, who emigrated to Chicago from Hungary (founder of the legendary Famous Players and later ruler of the Paramount media empire), or the travelling salesman in gloves, Samuel Goldfish, who later changed his name to Goldwyn (MGM).[84] They saw how people in the New World were pouncing on the commodity of film leisure and entertainment and simply changed their line of business. They saw the boom in local cinemas, which had to be supplied regularly with new stock, if they were to remain an attraction. Now they wanted to produce. They knew all about the production of ready-made goods. Moreover, as the owners and operators of film houses, they were close to their public.

The industrialists in the MPPC patent pool had made an important mistake. They had continued producing the same kind of thing and had not developed the form of their product to any significant extent. Large-scale cinematographic events, like the Australian epic SOLDIERS OF THE CROSS (1900), where 13 film strips with 200 magic lantern pictures were put together in a lavish spectacle,[85] did not interest them. Under their aegis, film remained a short spectacle of a few minutes' duration, a one-act melodrama, a comedy turn: it was dramatically unambitious, a transient by-product made on a production line, where the actors were kept in anonymity, for they were simply used as cheap raw material. For example, even after Edwin S. Porter, a former documentary filmmaker of Edison's, had demonstrated with THE GREAT TRAIN ROBBERY (1903) that also and especially more complex films were extremely well received by the audience, that they wanted more and could certainly cope with it, this strategy of commercial exploitation did not change significantly. The form of the short film was merely stretched a little, from 15 to 20 minutes, to just the length of one roll of film. This was where the producers independent of MPPC came in. They moved away from the East Coast, Edison's sphere of influence, to the West, where ideal climatic conditions and the cheapest lighting available, the California sun, made the production of films even more attractive. Hollywood, which has become the metaphor par excellence for industrially produced film and symbol of a quasi-monopolistically structured world market of filmic dreams (or nightmares, to some), originated as a move to escape the dominance of an industrial conglomerate.

From then on, new priorities were set in the communication process of cinema. The central focus became the film message. The best acts and actors on the stages of popular theatres were bought and henceforth performed on

the screen. The star system, which would be an antagonistic element in a film form where the individual figure is nothing and the illusion of movement everything, was gradually built up. The film texts were stretched to the narrative length of a full evening's entertainment and became more complex in structure. The montage-like construction of the early film event, with its combination of various film strips about surprise happenings, comic interludes, and one-act melodramas re-appeared in the form of the combination of shots, scenes, and acts contained in a single film, harmonised and stylistically polished by one unit comprising a director, a cameraman, and a cast of actors and technicians.

After making ENOCH ARDEN in 1911, his first two-act film, (he was still with Biograph but it was made without their approval), Davis Wark Griffith began to expand his filmic stories into rhythmic melodramas and historic epics. In 1913, Cecil B. De Mille made a successful film with several acts, THE SQUAW MAN, for Samuel Goldfish and Jesse Lasky. In the same year, Griffith made THE MOTHERING HEART and THE MASSACRE, the latter being a nasty reversal of interpretation of the white American strategy to wipe out the American natives. Mack Sennett wrote new chapters in comedy history. After leaving Biograph, he churned out one slapstick film after another for Keystone in Los Angeles, and with Harry Langdon, Charlie Chaplin, and the squinting Ben Turpin, who cultivated his physical defect for the camera, built up some of the greatest stars of this genre. In 1914, Sennett made TILLIE'S PUNCTURED ROMANCE, the first evening-length comedy. The first high point of the new narrative form was reached by US film with a war film, when Europe was actually already at war: in THE BIRTH OF A NATION (1915), his melodramatic epic on the American Civil War, D.W. Griffith carried his film practice from the preceding years forward to a cinema event of monumental proportions. With a projection speed of 16 pictures per second, this film filled 212 minutes of cine-time. Economically, technically, and from its wealth of ideas for film dramaturgy, the film was far ahead of its time, whereas the brutality of the camera's contemptuous view of black people reveal it to be an ethically and politically retarded condensation of film history, from which propagandists of sweeping gestures and feelings in the cinema have learned, and still learn, a great deal.

This change of paradigm set in on the European continent, too; even earlier, in point of fact, than in the United States. At the end of the new century's first decade, the young industry of film began to make overtures to socially acceptable literature and theatre. The first small films of literary classics started production, and well-known stage actors and authors put under contract to celluloid culture. Italians and Frenchmen (the latter under the aegis of Pathé) led the way. To Germany, cine-attractive innovations

came at first from northern Europe. In ABGRUND (Abyss) (1910), the Danish actress Asta Nielsen made her screen début under the direction of Urban Gad as a lascivious object of desire and laid not only the foundations for her own fame as enigmatic beauty, muse of the North, but for that of the entire 'Nordic school' (Georges Sadoul). Griffith's mammoth BIRTH OF A NATION was just 90 minutes longer than the Italian epic QUO VADIS? (1912), the first adaptation of Henryk Sienkiewicz's novel for the screen, the film which put its director, Enrico Guazzoni, and Italy firmly on the world film market map. The resounding success of this long piece of filmed literature was an important precondition for Griffith being able to realise his own ambitions, first at Biograph and, from 1913, at Mutual. In the film business in Imperial Germany, film production was only of marginal importance for the first 15 years. This changed only after 1910, above all due to imported creativity from Denmark, including Urban Gad and Asta Nielsen. However, in Germany as well, the epic film established itself before World War I and, finally, cinema was able to command the respect of bourgeois cultural critics that it had long craved. An outstanding example: THE STUDENT OF PRAGUE, shot in 1913 by the cameraman Guido Seeber, according to the script by Hanns Heinz Ewers and, particularly, the ideas of his leading actor, Paul Wegener, for German Bioscope. Naturally, it was not directed by a German but by a Dane, Stellan Rye. With this tale of the student Baldwin, who enters into a pact with the personified Devil, Scapinelli, and sells him his mirror reflection but is then so tyrannised by it that he shoots it and thus kills himself, 'individual psychology'[86] – or 'vulgar' psychoanalysis – entered the film temple of light and shade. With it came unrestrained and clichéd exploitation of classics from bourgeois literature: from the figure of Goethe's *Faust* to extensive borrowings from Edgar Allan Poe and E.T.A. Hoffmann. The trend toward the 'big picture' and away from 'cheap kicks for the nerves and the senses over a beer and cigarettes for a moderate admission price', as Kurt Moreck expressed it in his contemporary history of traditions and customs in the cinema, denigrating early cinema as was customary at the time, was not due to a single determining factor, such as the economic battle for supremacy, nor can it be derived solely from the fact that, all of a sudden, directing and acting geniuses revolutionised the world of cinema. The explanation for this development must also be approached from the interactions under which film discourse was advancing.

Without changes to the material basis of this medium, the expansion of the single film event into a full evening's entertainment would have been impossible. Only with the doubling and tripling of the brightness volume enabled by the introduction of the three-bladed projector shutter at the beginning of this century – systematically described in Karl Marbe's history of

cinema projection – guaranteed relatively flicker-free pictures on the screen. The physical fatigue resulting from eye-strain, characteristic of the first years of film, was thus ameliorated. The reflecting properties of materials used for the screens were progressively improved. In order that single shots or scenes could be joined together and wound on bigger film spools, it was necessary to refine and stabilise the projecting apparatus and to improve the quality of the film stock and its perforation in order to avoid constant interruption of the illusions due to the film breaking. In order that the fixed camera could be moved, to vary the distances and angles to the object, the apparatus had to get smaller and become mobile.

Such modifications to the apparatus were not motivated by the production of filmic entertainment alone. Cinematographics had originated from various social spheres of media utilisation, and similarly, these areas of social praxis continued to be co-factors in the development of seeing via the new machines. Of course, it was feasible to use the apparatus of entertainment culture for, e.g., monitoring in psychiatry, for ethnographic studies, or for training films about industrial processes. However, for the study of the organism in medicine, for biological investigations of natural processes in the macro- and microcosmos and, particularly, for the military and their technologies of destruction, it was necessary to expand the optics of the cameras, make them a handy size, and equip them for extreme manipulations of time. Indeed, in Lehmann's portrayal of cinematography, published in 1919, the precise description of high frequency filming for ballistic studies dominates all other uses. 'In this manner, Privy Councillor *Cranz* and his assistants, Captains *Bensberg* and *Schatte*, and Lieutenant *Becker*, studied e.g., the functioning of automatic weapons; further the effects of modern infantry projectiles exploding in damp clay and vessels filled with water (phenomena that are analogous to shots in the head and organs of the body containing much fluid); also the impact of elastic steel cartridges, and the splintering of bone from a bullet.'[87] – Thus long before we had to accustom ourselves to film fictions that relished the slow, drawn-out destruction of bodies, this voyeurism of violence was already part and parcel of everyday life for military technicians in reality.

A pleasant contrast to the above is Liesegang's emphasis on the cinematograph's contribution to (re)construction of harmony in his *Living Picture* of 1910. 'Its real significance lies in other areas: in the hand of a nature-lover, the cinematograph has become a great researcher. It looks through a magnifying glass and follows the comings and goings of small creatures; it eavesdrops on the birds in their nests; it observes the plants and flowers, how they grow, bloom, and wither; then it goes to visit foreign countries and their native peoples, studies their customs and their meanings; or it goes

into big industrial factories with the technician. It sees all, records everything on its film, misses nothing. Moreover, it will tell you everything over again, as often as you wish, accurate down to the last detail.'[88]

This accentuation reflects an approach to the new technology that played an important role in the process of bourgeoisification of cinematographics as a whole: the medium had to shed its air of disreputableness, its plebeian status and *don an aura* of grandeur, enriched by education, and informed by culture. As the nickelodeons spread through the working-class districts in the cities and the provinces, increasingly, the voices were heard of those who held the established intellectual system of coexistence together and effectuated its reproduction: 'teachers and clergymen, doctors and professors, civil servants and writers, journalists and artists, all were tireless in their efforts to prove the harmful health effects and the ethical and aesthetic inferiority of contemporary film shows, particularly of cinema drama. They drew attention to the dangers threatening public morality and the taste of broad sections of the populace through the way it currently operates.'[89] In his thick, polemical volume on reforming cinema, published in 1920, this is how Konrad Lange characterised the social strata who vehemently disapproved of the commercial creation of illusions in the dark 'dens of iniquity' where the early film events were held. (Significantly, this culturally pessimistic lament was not directed mainly against what one saw in the cinema but rather against what one didn't see, which the moralisers could imagine extremely well: 'The seats are so cramped that there is no room at all between people sitting next to each another, and through this circumstance – additionally, there is complete darkness between the rows during the shows – the sexual attacks on women and children reported in the newspapers are made enticingly comfortable. How many schoolchildren spend their free afternoons in the stuffy atmosphere of the 'flicks' instead of playing healthy games in the fresh air! ... The cinematographic depiction of ticklish scenes of infidelity etc., excite the sensitive sexual nerves of precocious children and the close proximity of the seats under the cover of darkness lead to 'erotic situations'..., which the badly shaken moral energy of the child is no match for.'[90]) Bans, strict police regulations, censorship, and socialisation of unrestrained money-making were the demands of the radical opponents of cinema. The enlightened reformers, though, pleaded for a more clever and long-term strategy: the moulding of cinema by decree of the authorities, its permeation with educational content, maintaining of appearances and the literary heritage of their own social class, still the most effective weapon of the educated against the alleged non-culture of the gutter. Immeasurable quantities of printed paper evidenced this will to reform,[91] which coincided most fortunately with the goals of the film producers in the

New and the Old World, i.e., to broaden the cinema audience socially, to open up the classes of higher wage-earners to the commodity of film, in short: to force the pace along the road that each and every mass-produced article takes – away from a limited group of users and towards a mixture of classes and strata of consumers.

From this perspective, it was not only necessary to change the subject matter and its presentation. The places where film events could be put on for a levelled, socially averaged public would have to change as well. Definitely a thing of the past were the cine theatres 'at the markets and the fairs. Makeshift wooden shacks, rows of wooden benches, a white sheet, and a manual device represented the complete inventory of these 'film theatres'. The films shown were neither new nor in very good shape ... A musical box or a wind-up gramophone provided 'musical illustration', and an 'announcer' entertainment... Who does not remember the myriad of little film theatres around 1910, with their bad and stuffy air, their inferior films, and terrible equipment?'[92]

Der Kino, *Le* cinéma – the initial masculine gender of the cinema was neutered. What cinema needed now was an aura, if it was to go down in history as an accepted piece of culture. The auditoriums where the films were presented were draped with an ambience borrowed from the museum and theatrical tradition. In 1911, the magazine *Der gute Geschmack* [Good Taste] opined: 'The possibilities that lie dormant in the cinema to be a completely modern theatre, have been obscured by a few embarrassing years of obligatory bar-keeper's taste, but in the end, it was inevitable that such a popular phenomenon would encounter the hands and senses of a creative architect, who developed his spatial concept from the special gesture of these picture-plays.'[93] Beginning with the big cities, luxurious auditoriums for film shows were fitted out in existing buildings of bourgeois theatre culture or cinematography was captured architectonically in its own palaces. The seats became more comfortable, covered with plush, rep, or velvet, inviting the visitor to sink down in them; the dimensions of the screen approached the dimensions that the middle classes were accustomed to from their experiences with the panorama; a generous amount of electric light guaranteed that one could see and be seen before and after the performance; beside the screen, stucco and kitsch served to catch the eye; before and after the projector had gone to work on it, the screen was veiled by rich and glittering curtains, as though a costly gift was being proffered, just like the ones that one knew from the opera or the theatre.

In Germany, Berlin took the lead in this reorientation of society. The Union-Theater on Alexanderplatz opened its doors to the upper classes from September 1909. Before the Ufa swallowed up this cinema and film produc-

tion company, it was owned by the PAGU, the company that had invited Max Reinhardt to radiate some of his glory as a great theatre director on the decried medium of film by asking him to make a few. The Prinzess in the Kantstrasse and the Biophon in the Potsdamer Strasse opened in 1911 and 1913; both cinemas were integrated into existing buildings. The Cines-Theater on Nollendorfplatz was the first detached cinema in Germany,[94] that in 1912–13 began to represent monumentally in the inner city space. Others followed, and the exception soon became the rule.

Shortly before film was again called upon to provide rough and ready entertainment in hastily erected wooden huts, namely, the military cinemas behind the front lines, the dispositif had taken on the shape in which from then on, it would become the idealised vanishing point of the cineastes. The new 'film person' was someone who was trapped between the projection room and the screen in total comfort. The 'elimination of everything that might potentially distract from complete abandonment to the work of art', 'the removal of all disturbing background noise from the technical apparatus for projection by installing it outside the auditorium, sealed off behind a thick glass window for sound-proofing', 'carpets, runners, and appropriate seating' as the means to remedy any 'disturbance of aesthetic detachment and will-less state'[95] – these demands of Rudolf Harms' from his *Philosophy of Film*, for example, not only articulate the pressing desire for perfect imagination in the cinema as an act of subjective escape and cultural pleasure, but at the same time expose a design for an arrangement of power, an ambivalence which the dispositif was to move in throughout the coming decades. In the central perspectival modelling, mediated – reversibly – by the camera objective, technology had subjugated the living diversity of the visual and made it re-available in the form of standardised reproductions of everyday perceptions. (Interestingly, this happened at the point in time when Modern Art took its radical leave of central perspective. In 1907, the first Cubist paintings by Picasso and Braque were a provocation in the eyes of the art-loving public. In 1910, Kandinsky painted his first abstract picture in translucent water colours. Malevich created the absolute form, his black square on a white ground, in 1913.) The phase of anarchy, which treated the results of this process of cinematographic subjugation of the visible world, did not last for long as a determining filmic form, although it continued to make brief appearances at the periphery of the historic process, e.g., in the films of Jean Durand or Ferdinand Zecca, where George Méliès' theatre of the absurd was dislocated to the street and everyday happenings mutated into surrealistic adventures – at least a decade before André Breton published the 'Manifeste du Surréalisme'. Another example is slapstick, with the stars who changed from vaudeville to the more lucrative cinemato-

1916 (Baacke 1982, p. 31)

graph. The first year of the war was Chaplin's most productive, 'fabulous year', with appearances in 35 films, 22 of which he also directed.[96] However, in the established cinema dispositif the audience had again become subjects, attending a world that was not their own, with a fixed position, rendered defenceless, but of their own free will, and paying for it as well.

This trend was not interrupted by the First World War but rather augmented. France lost its supremacy in film production to the USA. There, after the collapse of the Edison Trust, the new tradesmen in the branch took over – Fox, Goldwyn, Lasky, Laemmle, Loew, and Zukor – and, moreover, they began to carve up the market between them. What came to complete fruition in the 1930s and 1940s, was founded in these years: the studio- and the star-system. In Germany, the Danish film company, Nordische Film-Kompagnie, supplied the cinemas for a few years with more ambitious material for the socially differentiated audience. Towards the end of the war, in 1917, the Ufa was founded in a concerted action on the part of government authorities, the military, banks, and the electrical industry. This represented the first high point in the concentration of film business and the low point for the project of cinema with a perspective of enlightenment, emancipation, and plebeian entertainment; just two short decades after its spectacular start.

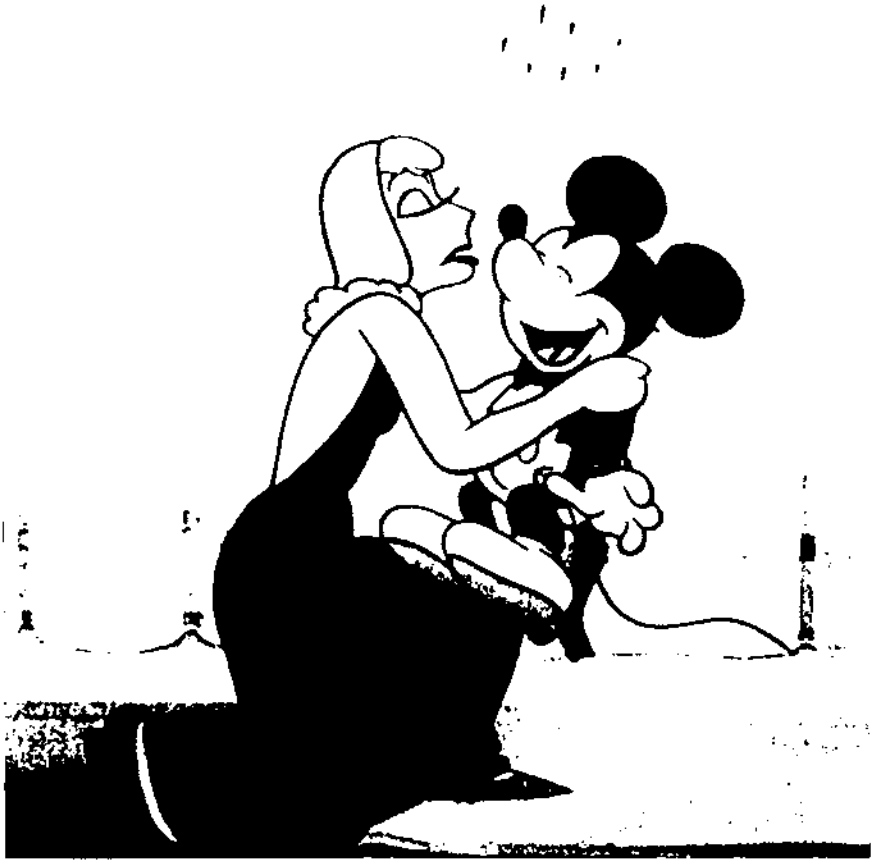
Between the Wars

Between the Dispositifs

Pre-war television in Europe came to an abrupt end with the animated appearance of two superstars of global cinema. In the final sequence of Walt Disney's cartoon, MICKEY'S GALA PREMIÈRE, the goddess Greta Garbo breathes huskily into the microphone, 'Ah tank ah go home. I vant to be alone.' These were the last words to be broadcast from Alexandra Palace, the main BBC transmitting station, at noon on 1 September 1939, before the screens went blank and the medium of television was taken off the air for six years. At 12.10 a.m., the order to close down was given. Only a few minutes before, an extensive programme for the following week had been announced to the approximately 20,000 Britons who owned a TV-set at that time, which included five television plays, at least two solo appearances of famous stars, two new editions of the news magazine *Picture Page*, various outside broadcasts, feature films, and more besides.[1]

At that time, the young British television industry was firmly on course for expansion. It predicted that by Christmas 1939, a television set would be sitting next to 80,000 living-room fireplaces in Great Britain. Images were transmitted and received on the technically advanced basis of completely electronic equipment with a resolution of 405 lines and 25 pictures/sec, a standard that Great Britain retained until the 1960s. Even thereafter, the BBC continued to transmit duplicate programmes in this standard for the owners of old TV sets until 1985. This television system, which had an image resolution that compared favourably with the quality of 16 mm films, had been developed in the main research laboratories of Marconi-EMI (Electrical and Music Industries). However, when a regular public television service commenced on 2 November 1936 two competing systems were transmitted. Developed in collaboration with Marconi and following Zworykin's electronic television patents from the innovation factory of the Radio Corporation of America (RCA), Marconi-EMI's system rapidly proved superior to the Baird Television Development Company's (BDTC) which was based on a mechanical system.

Although it was not apparent to the civil audience in front of the 'box', these events for private entertainment were also serving the military defence of the isles. The close technological relationship of television and radar (radio detection and location of aircraft) had prompted the British government to follow closely research in the television sector with a committee set up for this sole purpose in 1934. It saw an important spin-off particularly in the de-



'Ah tank ah go home. I vant to be alone' – MICKEY'S GALA PREMIERE (BBC Yearbook 1940).

velopment of high definition electronic images, and this was indeed put to military use later: it was possible to utilise television's highly sensitive cathode-ray tubes in optical early-warning systems of air attacks by hostile powers. Thus the development of this type of television system for entertainment would enable the corresponding industry to produce these tubes quickly and on demand. Although so far, no documents have been found that confirm this connection, British scientists assume that research at EMI was directly supported by the government. Even if this should turn out not to be the case, the effect of the interplay between pre-war television of the BBC and the military use of television technology is indisputable: 'Television helped Britain to win the war ... If Britain had not had a system of early-warning radar around the coast, it would almost certainly have lost

Elizabeth Cowell and Jasmine Bligh. Mise-en-scène of friendly, solid, and decent intimacy: The production of televisual proximity – the BBC's first women announcers (Ross 1961).

the war. Without the technical resources that went into developing television for entertainment, it is highly unlikely that radar would have been ready when war broke out.'[2]

Televisually, Great Britain had attained a relatively high standard before World War II, and not only technically. At the point when cartoon Greta Garbo took leave of the audience in lieu of the young medium, television already represented more than just a toy with a flickering screen that was brought into the private sphere of the home because of its novelty apparatus value. 'Television is Here – You Can't Shut Your Eyes to It' – this 1939 slogan of the television industry reflected the programming concept of the BBC that aimed to develop specific attractions for the new medium: direct broadcasts of plays and variety shows from theatres, live reports of topical interest and political events (like the return of Neville Chamberlain from his talks with Hitler in 1938 (shortly afterwards, the BBC gave televisual instructions of how to extinguish an incendiary bomb and what to do in case of an air raid)), outside broadcasts of major sporting events like the tennis championships at Wimbledon, boxing matches, and big horse races; weekly newsreels from British Movietone News as well as the BBC's own weekly news magazine, plays produced specially for television. Of these teleplays alone that were produced in the studios, one was broadcast almost every day in the months prior to television going off the air when war broke out.[3]

The chroniclers of the BBC's programme up to 1940 were especially proud of the development of a dimension that did, in fact, become essential for the ideological method of functioning of the televisual apparatus: the carefully cultivated intimacy between the personal representatives of the medium's organisers and the recipients of the televisionary messages. Strategies to create this intimate relationship consisted, for one, in the construction of special TV-events with audience participation, for example, the live broadcast of a discussion with the first Director of Television, Gerald Cock, on Christmas Eve 1938, where the audience could telephone in; or the first ever 'Television Party', held on 26 June 1939 in the concert hall of the Alexandra Palace (or Ally Pally as it was popularly known, cutting the aristocratic connotations of its name down to size). For another, from the outset the BBC built up 'television personalities', whom the viewers were intended to receive in their homes like personal friends. Joan Miller fulfilled this function for the topical and general interest magazine *Picture Page*, an early, feminine prototype of the later 'anchorman' principle of US news and magazine shows. Still more important were the two carefully styled announcers, Jasmine Bligh and Elizabeth Cowell, whose function was to commend the electronic audiovisions to the viewers at home and bring them closer to the tele-visions. The BBC had selected them from thousands of applicants from

all over the Empire, who were required to possess the following qualities: charisma, charm, tact, a voice in the mezzo-soprano range, a good memory, acceptable to both men and women, photogenic, not red-haired, and unmarried.[4]

Technically, the television of the Nazis was at a comparable stage of development to that of the British at the outbreak of World War II. However, seen from today, the combination of the most up-to-date electronic equipment, a differentiated programme, and a clear orientation toward reception by a public of private individuals, it is apparent that BBC television possessed the most advanced media quality of the time. In Japan, they were still experimenting non-publicly with apparatus developed on the basis of patents from the USA, their later enemy. The French broadcasting authorities only started to telecast test transmissions in 1938, using the technical standards of their future occupying power, Nazi-Germany. In July 1939, Ente Italiano per le Audizione Radiofoniche (EIAR) began public test transmissions; the Italian broadcasting company used studio equipment provided by the German Fernseh AG. In the USA, the country whose licences had been used to build Western Europe's electronic television services, the medium had been formally inaugurated with the transmission of Franklin D. Roosevelt opening the World Exhibition in New York on 30 April 1939. However, analogous to radio, from the beginning RCA and their market competitors would only entertain the idea of television in a commercial form, financed by advertising, and sponsored by industry.[5] For this, they quite correctly considered television in 1939 to be insufficiently developed. It was not until 1 July 1941, in the middle of the war, that US profit-oriented television commenced its service; admittedly, they started immediately with 22 stations distributed throughout the country which were operated by the three powerful networks NBC, CBS, and DuMont.

When German Fascism began its murderous war against the rest of the world with a faked attack on the radio station at Gleiwitz, the German television station, Paul Nipkow had been transmitting its televisionary imaginations for five years. The images broadcast at that time – electronically, pixel for pixel at great speed, and reconstituted in the receivers at 441 lines per image – had very little to do with the everyday experiences of those at whom the electronic beams were directed. There had been a slight shift in priorities in 1938–39, though, with regard to the types of programme transmitted: the distribution of cinema films via the new medium – typical of the first years – was gradually superseded by programmes produced for television, cabaret, and variety shows, which were prefaced each evening by the topical news magazines *Zeitdienst* and *Aktuelle Bildberichte* from the film production of the UFA. However, just like the cinema, the most important

ideological offerings continued to be escapism and diversion from the worries of everyday life, as Hans Bredow in 1923 had once described the main task of radio at the inauguration of entertainment broadcasts. Closely related to the cinematographic apparatus was also the arrangement of TV-viewing. Personal ownership of a set was the privilege of certain party officials, a few critics, and those directly involved in R & D. For the associate members of Hitler's 'national community', television only existed as a communal experience in specially equipped 'Fernsehstuben' [television parlours] and projection halls set up by the German Post Office, to which everyone had free access. Naturally, people did not only visit these communal TV-viewing institutions to see what was on, but also to warm up on cold winter days or simply for the company of others. Thus, long before – 50 years, in fact – the major film distributors of Hollywood and the planning departments for High Definition TeleVision started to think about Video Cinemas, i.e., supplying illusions of motion electronically to film theatres, this form of reception of tele-visions had already been practised. At least in Germany, early television took place as a state-organised variant of public cinema performances.

In the cine temples themselves, the production of illusions reached visible heights in the year that war broke out. Vivien Leigh and Clark Gable stood in front of a Technicolor camera for David O. Selznick's GONE WITH THE WIND at the time, the most expensive production ever made for the US studio and distributor giant Metro-Goldwyn-Mayer. Advertised as being in 'natural' colour, the surrogates of cinema were becoming more sumptuous all the time. The gateways to occupation of the imagination were flung open even wider. Especially the mise-en-scène of women, enhanced by colour, was to become an important factor in the war for the sexually starving bodies and minds of men in the dark cinemas. 'It was wartime and there were millions of American G.I.s around the world who wanted nothing more than to have lovely, talented ladies entertain them. Movies were a touch of home, and there were few things that pleased the men in the Armed Forces more than a Technicolor movie filled with attractive females ... The timing was perfect. Technicolor had managed to glorify the leading lady just when she was about to be in big demand. The combination of Technicolor and beautiful girls was hard to resist.'[6]

For the time being, bringing colour into the picture world of cinema was the last step taken by the 'fantasy machine' (Fülöp-Miller) on the long road to an ever closer approximation to the surface of the actual visible world. The process of implementing Technicolor in the 1930s, particularly in the USA and Great Britain, was accompanied by a massive concentration of power in the cinema industry. The modifications to film equipment made

necessary by the advent of colour resulted in a further rise in the cost of producing filmic illusions. The birth of the talkies about a decade before had accelerated the process of film's development into a standardised commodity. On the eve of the Second World War, US cinema was in the hands of a very few, very big firms. The five most important ones (Paramount, Loew's Inc. (MGM), Fox, Warner Bros., and RKO) together with three smaller companies (Universal, Columbia Pictures, and United Artists) produced 70 per cent of all feature films in the USA, collected 95 per cent of the hire charges, and controlled more than 70 per cent of the first-run houses in the major cities.[7] Thus the structure of Hollywood cinema had evolved that, in essence, it has retained until the present day.

In 1939, the Nazi dream/nightmare factory was producing almost exclusively black and white films, although in that year the IG Farben company had started to manufacture film stock using the Agfacolor process it had developed in the previous years. The first colour cine worlds illuminated on the screen were the presentations of commodities in the advertising prologues to Nazi full-length feature fictions. Production began on the UFA's first full-length colour feature, FRAUEN SIND DOCH BESSERE DIPLOMATEN, with Marika Rökk as the female lead. This colourful, feel-good spectacle swallowed – for the time – an astronomic figure of 2.4 million Reichsmarks before its première on 31 October 1941: the same month that construction work began on Auschwitz concentration camp and the mass deportation of German Jews to Poland started; parallel in time with the massacres in Riga, Vilnius, Kownno, and Dwinsk. The professional 'critics' were '... utterly charmed with the silken costumes of the dancers, the black hussars, the elegant Biedermeier furniture',[8] of the 'UFA's masterpiece', while outside the cinema, in the severe winter of 1941–42, hundreds of thousands of people in occupied Europe starved to death.

When the first 50 *E 1* television sets were presented at the Berlin Radio Exhibition in August 1939, the artefact that in future, would allow the Germans to receive audiovisions in their own living rooms, the concentration of the German film industry was on a par with that of the USA. The future film monopoly of the National Socialists in the form of the UFI united companies could already be anticipated. The film market was dominated by a few production and distribution companies, which later were all indirectly owned by the state.[9] Apart from the two main companies, Ufa Filmkunst and Tobis, who still financially lived off their sound film patents, only four others were big enough to be of relevance: Bavaria Filmkunst, which after an abortive attempt in 1935–36 to restore it to profitability and its collapse in 1938 traded thereafter as a limited company; Terra Film, a subsidiary of Ufa ('Terra – The success company' gave advance notice of its 'grand production,

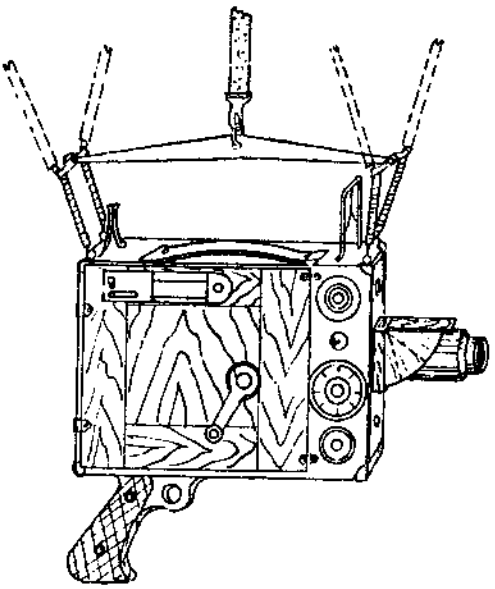
JUD SÜSS' for the 1939–40 film season); Wien Film Ltd., which was hastily founded when 'suddenly the sales possibilities of German films increased due to the return of the alpine and Danube countries to the German Reich';[10] and Berlin Film, which incorporated some of the smaller film companies. This concentrated Nazi film factory produced 111 films in 1939, thus achieving approximately the level of 1933 (114 film productions); however, it was only an ephemeral highlight for as the war progressed, production figures decreased enormously while at the same time production was intensified: in 1942, a mere 57 films were produced and in 1944 only 70.[11] Although film food was very important in the war, raw materials to produce it were scarce.

In the two decades between the World Wars, the ambitious audiovisual projects of cinema and television underwent significant mutations. The cinematographic project was aurified as film theatre, and also bourgeoisified with regard to consumer orientation, rounded off aesthetically and technically with colour and synchronous sound, industrialised to a high degree and, in the course of this process, domesticated by the international electrical industry. Finally, it attained its ready-made goods form as a further resource at the disposal of a very few, economically very powerful, people. As in other areas of production and trade, the USA rose to the position of leader in the field of film industry. And German fascism robbed cinema once and for all of its original dividend as an innocent fairground and public house amusement of the proletarianised lower classes, not only because it took the contradiction between social event in the cinema-space and private destinies on the screen to extremes. In the most perfidious manner, it also demonstrated what lies film script authors are capable of penning, cameras can film, directors can stage, composers can set to music, actors can play, and light electricians can illuminate, above all, for the sake of their own careers.

By the outbreak of World War II, the televisual project had arrived at the threshold of becoming an electronic mass medium. It had outgrown the workbenches of the enthusiasts who had racked their brains over its every problem and it now concretised the models of the early theorists and dreamers. The idea of visualising objects over great distances instantaneously now obtained an industrial form – as in the case of cinema, although underdeveloped by comparison – that was watched suspiciously and guarded carefully by state organisations and authorities alike, not least on account of its undisputed military significance. This was particularly true in Germany, which was preparing for war on a scale where the rapid overcoming of time and space barriers would become essential.

To offer its audience-subjects diversions through staged audiovisions is but one function that can be realised using film and television technology.

'A sliding handle of a pistol is mounted on the base of the camera and this is attached by two matching springs, slightly apart, to the upper wing of the bi-plane, so that it is possible to pan horizontally and vertically ... In light of the experiences of the previous war years, this arrangement should prove advantageous.' (From *Die Kinotechnik*, 6/1920, p. 220.)

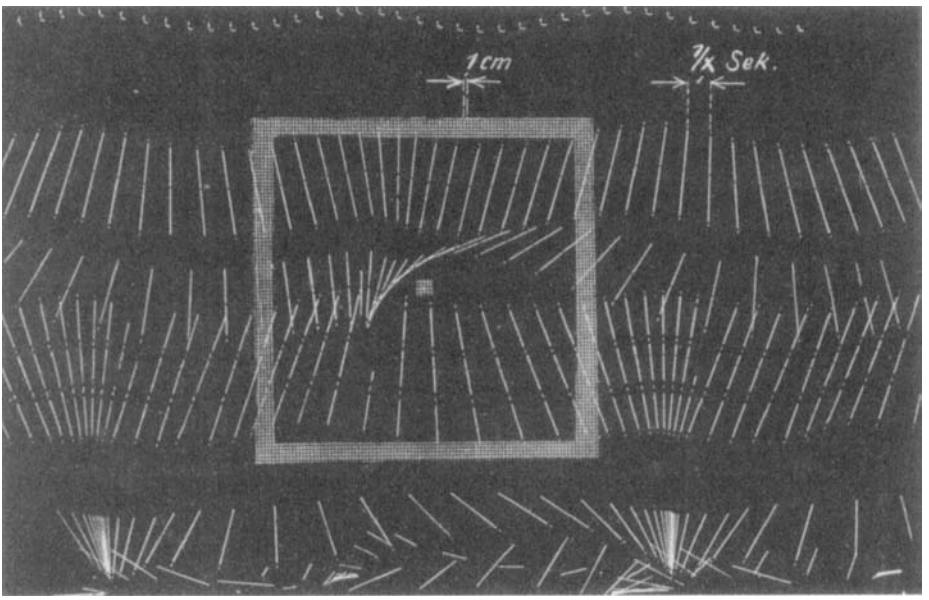


Similar to countless other artefacts belonging to the phylum of image-machines in the nineteenth century, the utilisation of camera and projector for the purpose of surveillance and control played an important role from the outset. This field of application represents the complete opposite of illusionisation. Film technology can provide the most exact reconstruction of visual events possible, especially those that take place so slow or so fast that they are imperceptible to the naked eye. Photographic recordings of biological growth processes were an early example of this type of application and, at the other extreme, the recording of projectiles in flight. The physicist E. Mach had successfully accomplished such ballistics studies in 1887. Combining 'Mach's projectile photography with the principles of wireless telegraphy and cinematography', in 1909 C. Crantz succeeded in filming at a speed of 5000 exposures per second.[12] Projected at normal speed, the result is the extreme slowing down of a visual process. Distinctive names in German were found for the stretching of time produced in this way, formed analogously to aids for the perception of spatial changes: *Zeitmikroskop* (time microscope), for example, or *Zeitlupe* (time magnifying-glass), which is still in cinematic usage today for slow-motion.

In one of the first sequences of MODERN TIMES, after the parallel montage of driven cattle herds and workers hurrying into the factories and after the automated production lines have been started up, Chaplin outlines his vision of tele-vision: in a luxurious office far from the machine-shop, a bored, comic-reading manager turns on a large monitor on which he can see what's going on down on the shop-floor. The foreman has left the machine which

controls the production lines for a moment and is curtly ordered to return immediately over microphone and loudspeakers. At Charlie's place on the assembly line, where he is a piece-worker adjusting screws, work is not being done fast enough and the manager orders the tempo to be stepped up; then begins the absurd and hilarious show at the 'interface' of human and machine, ending with the anarchistic break-away of the protagonist from the deforming rule of machines. In these opening sequences of Chaplin's filmic satire of 1936, he brilliantly links two technological processes in an interpretative way that his contemporaries were still treating as separate entities but which do, in fact, belong together historically: 'the assembly-line as the symbol of the period between the two World Wars'[13] and the new technology for visualising processes that take place at a distance, which otherwise cannot be seen at that moment in that place. Mechanised production became generally established in the 1920s and 1930s, with Henry Ford and his scientifically organised production of automobiles as the paradigmatic entrepreneur of the period. Increasingly, this demanded the centralised control of production where work was organised in many small piece-work processes: audiovisual media technology in the function of surveillance apparatus and a necessary counterpart of the growing hegemony of automated mechanisation. MODERN TIMES reached the cinemas just at the same time as Walter Benjamin, in exile in Paris, was writing his celebrated essay, 'Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit' (The Work of Art in the Age of Mechanical Reproduction), a theoretical farewell to the old aureate art under the conditions of the then New Media. The confluence of material and ideological production in the new media for reproduction was, however, not an issue for Benjamin at that point in time.

At the end of World War I, intellectuals in Germany were a long way from the critical comprehension of the relationship between technology and power practised filmically by Chaplin in MODERN TIMES (and before him, by René Clair in A NOUS LA LIBERTÉ [1932][14]), especially the avant-garde artists working with media. The *zeitgeist* that also pervaded experiments on the project of television, which were resumed after the war with new vigour and commitment, was a completely different one. Beneath the desperate fantasies and engagement with the deformations of the individual psyche in the aftermath of the horrors of the war experience that found cinematic expression, e.g., in the short series of Expressionist silent film works of art, from Wiene, Mayer, and Janowitz's THE CABINET OF DR. CALIGARI (1919) to Leni's WAXWORKS (1924), other attitudes and ways of thinking had emerged. There were elements of the idolisation of technology found in Italian Futurism, its fetishisation of speed, and particularly an unequivocally positive attitude to advanced technology as a formative force for cultural production



Chronographic registration of a worker's movements taken at the Moscow Institute of Scientific Organisation of Work and Mechanisation of Man.
(Source: Tramm 1921)

and organisation which had been introduced by the Russian Cubo-Futurists and early Constructivists. These elements converged with the experience of a new and radical departure in global politics: the revolution in Russia and the establishment of the first dictatorship of the proletariat in the Soviet Union. This Constructivist world view, which was obsessed with structure and with media materiality, was first articulated during the war as a new artistic way of viewing phenomena. After the war, it came to the forefront of debates on art and design.

'Over the last hundred years, art and reality have had nothing in common. The personal satisfaction of creating art has contributed nothing to the happiness of the masses', noted László Moholy-Nagy in his diary on 15 May, 1919. Three years later, as a campaigner in the 'Constructivist International' he propagated his brand of constructivism as 'socialism of seeing', 'the final destruction of feudalism' by classless technology: 'At the machine, everyone is equal ... Anyone can be master of the machine or its slave.'[15] At the first international DADA exhibition in 1920 in Berlin, George Grosz and John Heartfield posed with one of the central exhibits, a placard on which was written in large letters

Art is dead
Long live
the new Machine Art of
TATLIN

(The Dadaists' major offensive against all middle class cultural traditions was not welcomed at all by the organised working class. The *Rote Fahne* [Red Flag] newspaper called the exhibition 'idiotic kitsch'[16] and compared it to the 'advertising-ballyhoo of a film company', the latter being at that time just as disparaging as the first epithet.)

At approximately the same time, the former designer Lev Kuleshov was experimenting with the technique of montage in the Soviet Union, taking heterogeneous pieces of film and constructing new units of meaning from them. His revolutionary ideas were indebted in part to necessity: there was an acute shortage of film stock and cameras; to create something new, one had to resort to the old. The technique of montage thus originated from scarcity, not from abundance. Later, Pudovkin and Eisenstein were among Kuleshov's students at the State Film School in Moscow.

In the year that CALIGARI was premiered, the Swedish painter Viking Eggeling made his first abstract film, ORCHESTRE HORIZONTALE/VERTICALE, and shortly afterwards began work on his DIAGONAL SYMPHONY. Eggeling both influenced other artists and motivated them to engage with film technique as a new art form and to help it to achieve its own unique and specific expression. In film, painters discovered a possibility for overcoming two-dimensionality, in the very materiality itself as well, and for expanding their worlds by adding the dimension of time. The moving picture was dynamite to traditional perception in art. Conversely, musicians experimented with the visual concretisation of rhythm and melody.

Film as film: in the quest for a specific expression for the filmic, visual-rhythmic exposés, poems, and essays were created in the post-war period. Whereas commercial cinema was absorbed by catchy narrative film, a courageous international avant-garde was responsible for creating the *cinéma pur* of classic cinematography, intended as a critique and necessary corrective of the existing situation. The titles of these mainly short films were programmatic and reflected their experimental nature, e.g., Walter Ruttmann's OPUS series, in which he animated thousands of hand-painted geometric figures and made them dance; Hans Richter's RHYTHMUS experiments; and the abstract STUDIES by Oskar Fischinger. Man Ray rejected the lens as being necessary for photography. Moholy-Nagy, who also worked with such 'Rayograms' (photograms), began in 1922 to experiment with his Light/Space Modulator which was to preoccupy him for several years and

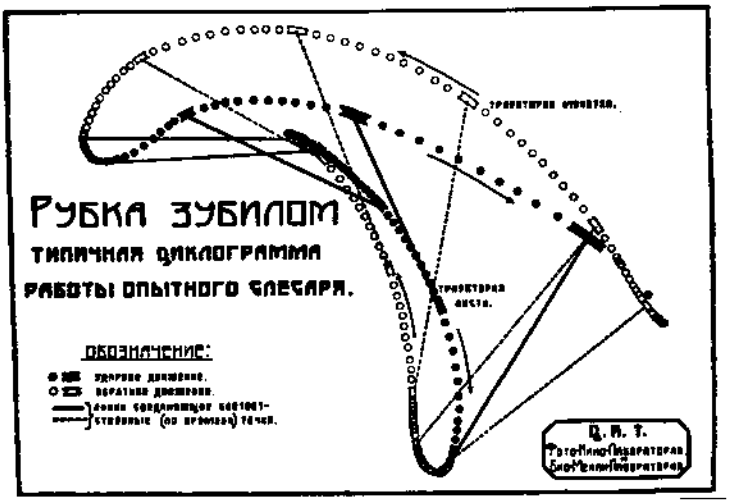
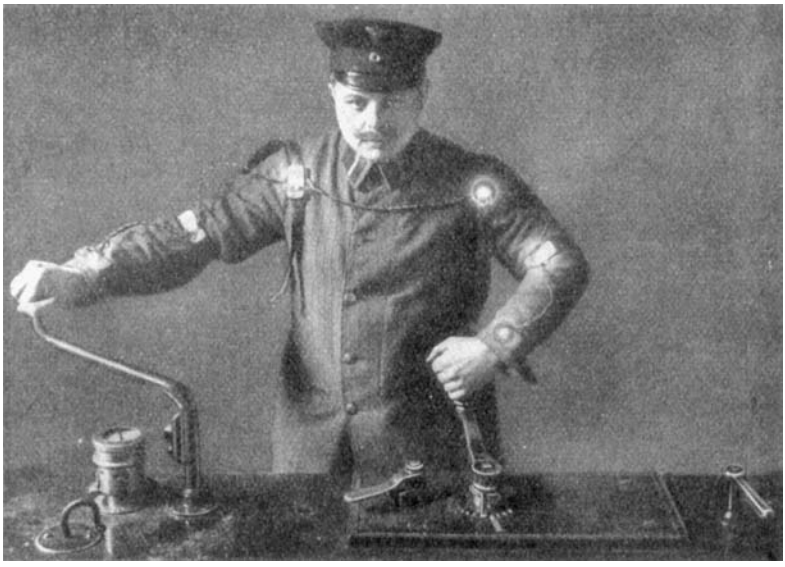


Diagram of the time trajectory of the movement of a hammer beating a chisel. (Source: Fülöp-Miller, 1928.)

'ORDER 02
To the machines.
Stand up.
Pause.
Supply of attention.
Feed.
Contact.
Shunt.
Stop.'
(Taken from Gastev's last collection of poems, published in Riga 1921, *Packa orderov – A Package of Orders.* In: Johansson 1983, p. 95.)

Tram driver with affixed white dots which facilitate the photographic registration of his movements. (Source: Tramm 1921.)



with which he hoped to open up new dimensions in visual design and perception. In his Dadaistic film pamphlet of 1923, LE RETOUR À LA RAISON, Man Ray sprinkled salt and pepper on the negative, made screws and nails dance, edited in a revolving female torso as well as one of his earlier pictures of a clock's works and a sign proclaiming 'Danger!', which was interpreted by Peter Weiss in his brilliant essay, 'Avantgarde Film', as a 'battle cry' that was also levelled at the film industry.[17]

To work on this new means of artistic expression was to work on breaking up the prevailing dispositif: in 1924, Ferdinand Léger set his Cubo-Constructivist world of items of practical use in fascinating motion in his triptych BALLET MÉCANIQUE where, in the scene of a washerwoman permanently descending a staircase, he created a seminal sequence of filmic discourse. Here, aesthetically, Muybridge and Marey's studies of motion meet Marcel Duchamp's *Nude descending a staircase* as well as Eisenstein's dynamic montage in the steps sequence from BATTLESHIP POTEMKIN. At the high point of the Dada movement, René Clair made ENTR'ACTE (1924), constructed as an interlude for a ballet performance by the painter Francis Picabia, the composer Erik Satie, and a host of other avant-garde celebrities, a film that heralded Dada's supersedure by surrealism. Abstract play with form is continued here on another level by playing with real actions and rendering them mad, comic, and absurd. In ENTR'ACTE, as in the films of surrealistic provenance that followed – by Richter, Germaine Dulac, Buñuel and Dali's masterpieces – an important principle of the filmic avant-garde finds its expression: the conscious return to the plebeian origins of cinema in the pleasures of the fairground and variety theatre, in expressive nonsense, and in ridiculing authority in all its guises.

'Away
From the sweetly moist romances,
From the poison of the psychological novel,
Out of the clutches of theatre-lovers' plays,
With backs to the music!
Away
Into the pure sphere, in the space of four dimensions (three + time)!
Let us seek for its material, its iambus, its rhythm!

The inability of humans to control themselves is shameful in the presence of machines; yet what is to be done when the flawless functioning of electricity arouses us more than the disorderly mad rush of active people and the enervating slackness of passive people.'[18]

A vision in 1924 (Krafft) and an everyday gadget in the late 1980s.

In the same year, the Kinoki Group around Dziga Vertov made the most radical break of all (verbally as well) with all that had gone before – including cinema. 'The 'cinematograph' must die so that film art can live. *We are calling for its death to be hastened.*' In place of the old came the idealisation of all that was electrified, mechanical: 'Our way – *from the citizen squirming via the poetry of machines to perfect electrical man* – with eyes wide open, sensible of the mechanical rhythm, enthused by work with machines, cognizant of the beauty of chemical processes, we compose our film poem of flames and electrical power stations... Long live dynamic geometry, long live the sequences of dots, lines, planes, and volumes! Long live the poetry of mobile machines and machines in motion, the poetry of levers, cogs, and steel wings, the iron screech of movement, the blind grimaces of glowing rays.'[19] Vertov, whose real name was Denis A. Kaufmann, began working with film in 1918. As master cutter and editor, he assembled the material for the first Soviet newsreel *Kinonedelja* (Film Week); from 1919-1920, he made his own first documentaries and travelled with the agit-trains of the All-Russian Central Executive Committee on a cinematographic voyage of discovery from one end of the Soviet Union to the other; from 1922–1925, he worked mainly on the film magazine *Kinopravda*, of which 23 issues appeared during this time. It was during this latter period that his radical designs for a new way of seeing using the cinematographic apparatus originated and these began to collide increasingly with the ideas of the young Soviet Republic's government. Under Stalin, the constructivist-oriented avant-garde's attempt to renew cinema was vilified as 'degenerate formalism'. With 'Socialist Realism', the new administrators created – also for Soviet film – a culture industry dispositif that presaged the opposite direction for development: planned economy, planned society.

Vertov's outstanding film experiment to realise aesthetically his notion of Kino-glaz – Kino-Eye, – 'more perfect is the human eye to investigate the chaos of visual phenomena that fill space',[20] – was not shown in a cinema until 1929: CHELOVEK S KINOAPPARATOM, ('[Hu]Man with Cine Apparatus' is the literal translation – 'Man with a Movie Camera' is inaccurate and does not reflect adequately Vertov's intention). When, four decades later, Jean-Luc Godard abandoned the cinema for a while and, together with Jean-Pierre Gorin, turned his attention to the electronic medium of video, he chose the name 'Groupe Dziga Vertov' for the new project. This reminiscence has a historical significance. In both his theory and praxis Vertov had left the contemporary dispositif of cinema far behind. Although technically it only existed in rudimentary form and aesthetically only as a utopia, what he described, what he practised from the principle of production and with regard to an audience's perception, was essentially *tele-vision*: of course, in a

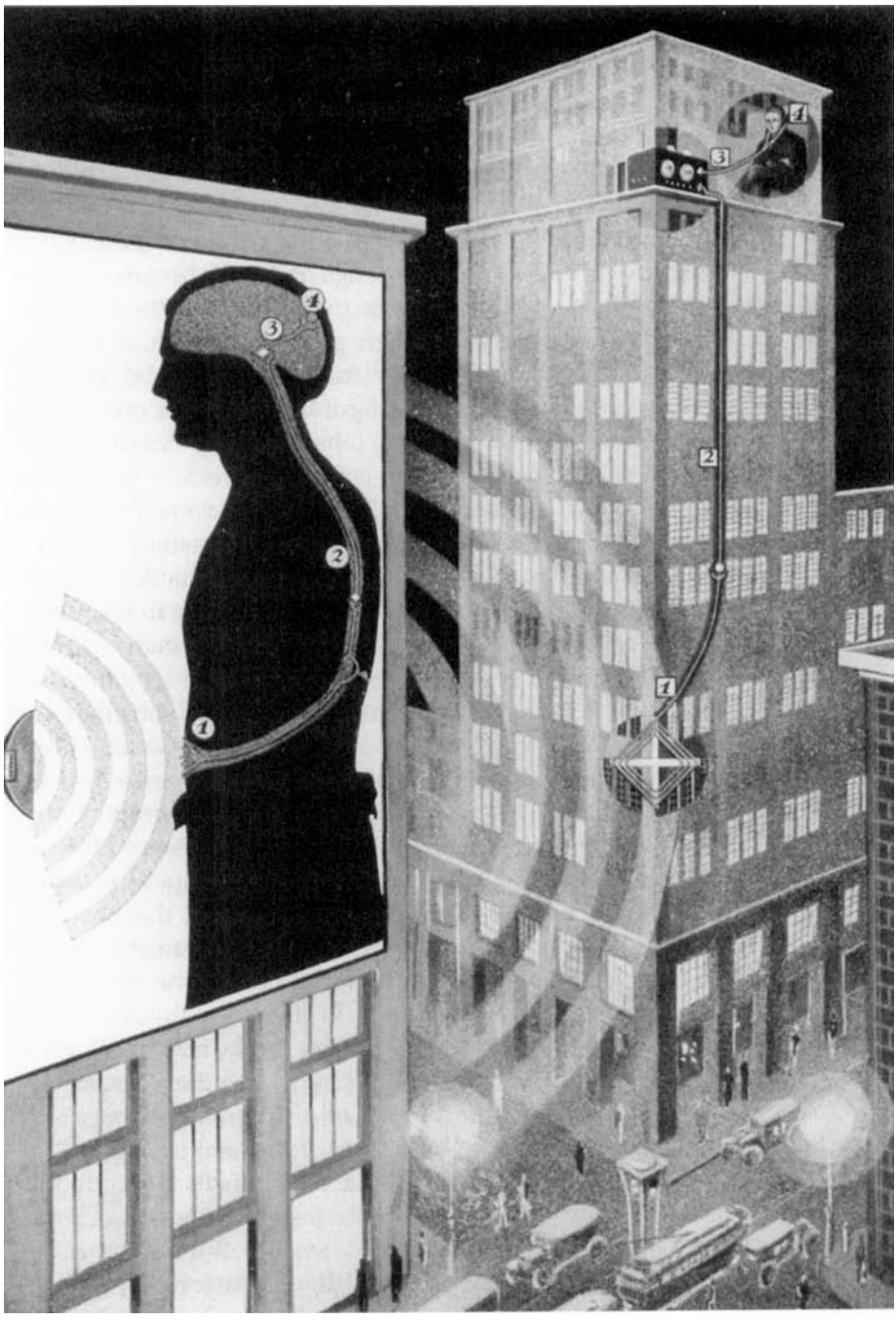
'Kino-Eye', a poster by the Constructivist Alexander Rodchenko (1924).
The 'Film-Eye' as a possibility of making the invisible visible... .What is meant by film-eye is something 'that the eye does not see', a microscope and telescope of time, pointing the camera at the distance (like a telescope), an x-ray eye, life taken unawares, etc.' From Vertov's diary in: Vertov, undated, p. 23.

form that until now this electronic medium has only achieved in exceptional cases. 'Kino-Eye – the montage-like *I see!*' (video means precisely the latter), the eye, that 'in the chaos of passing, escaping, converging, colliding move-

ments ... captures life unawares',[21] is the idea of radically operative film, long before it became realisable with the advent of the automatic electronic camera and the continuous recording possible with a videorecorder. In fact, in the meantime it has become reality through the brutal omnipresence of television in its industrialised form. *Film plus electricity*[22]: in live television, representations and representers coincide for the first time in time. To drive both levels of reality to a maximum of correspondence was Vertov's great vision at a time when cinema, with the coming of the talkies, was on the verge of its last step toward theatricalisation, literariness, and thus to its own incapacitation. The formulation of his visionary ideas coincided precisely with the moment when television emerged from the laboratory and was being groomed for its public.

It was another medium, though, that had provided the inspiration for Vertov's visions and for the other proponents of the symphonic documentary film (particularly Walter Ruttmann in Germany): radio, which had entered the public arena after World War I. The 'Radio-ear – the montage-like *I hear*!' (Vertov) was the analogue of Kino-Eye and a permanent point of reference in the manifests and resolutions of the Kinoki Group. Vertov's own first experiences with montage were with audio. In 1916–17, he had created a 'laboratory of hearing', which was technically based on phonograph equipment and which he used to produce 'documentary compositions as well as musical-literary montages of words'.[23]

The First World War was also the first war of the 'ether'. Supported by the military and the state, the new technology of wireless communications had been pushed ahead and had given ample proof of its many and varied applications, besides its immediate usefulness for military strategy. On 7 December, 1917, the news of the successful takeover of power by the Soviets was broadcast by radio from the warship *Aurora*. Five days later, Lenin availed himself of the new technology for propaganda purposes. His famous radio message, 'To everyone! To everyone!' announced the first Soviet Congress's passing of a decree on peace. Since then, Lenin's equation – Communism = Soviet power + electrification – has been associated with radio, although these famous messages were, in fact, not radioed but sent in Morse code. The Telefunken Company, founded in 1903 as a subsidiary of Siemens & Halske and AEG on the initiative of the German Kaiser for the express purpose of developing and utilising wireless technology commercially, was much further ahead at this time. In 1917, it successfully transmitted a direct broadcast of speech and music to the German Western Front, using valve transmitters and feed-back receivers. Thus, the first people in Europe to enjoy radio entertainment were soldiers in the trenches of the



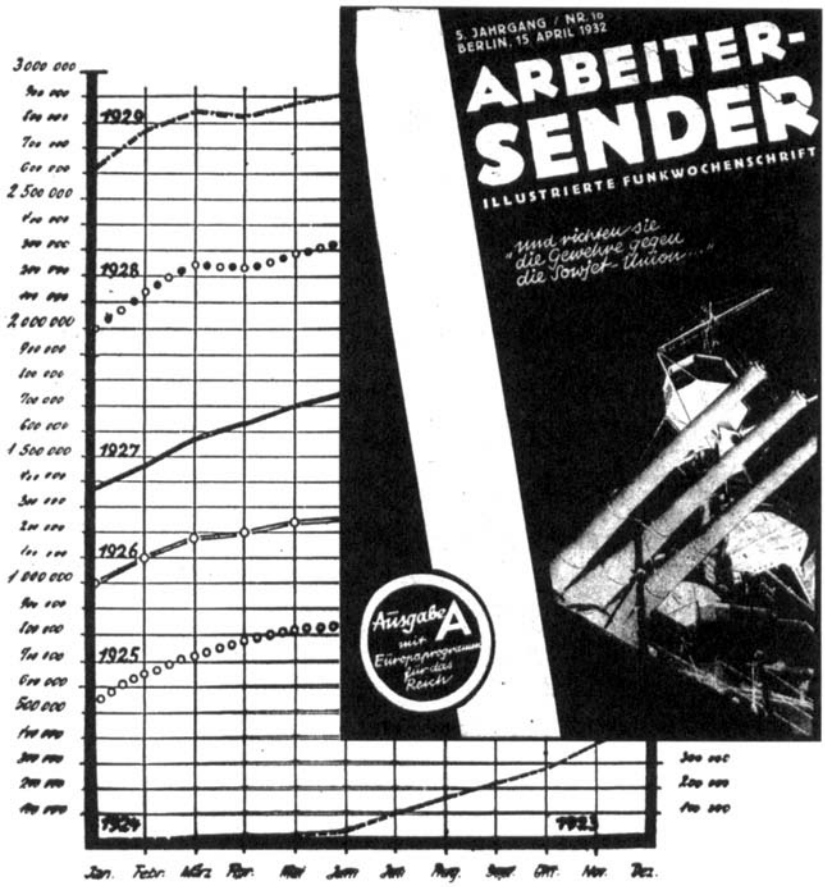
Mechanical-electrical Man: Fritz Kahn used – amongst other things – the construction of a radio receiver to trace and illustrate the path of a stimulus to the brain from the receptor neuron via the transmitter and brain-stem neuron to the cerebral cortex, which he called the 'consciousness cell'.
(Source: Kahn 1929, p. 80f.)

First World War, on the English side as well – German radio entrepreneurs' most bitter rival on the world market.

After the war was over, the developed technical system of wire-less radio offered itself for politico-ideological and commercial-industrial exploitation. There was a collision of needs and constellations of demand. A veritable army of radio operators had been trained to use the equipment but immediately after the Armistice, their knowledge and skills became redundant and they demanded loudly that these be put to use. For the radio industry, the most important customer for their products (which, of course, could have been patented), the army, had virtually ceased to be, playing only a marginal role economically. This configuration – on the one side, a widespread demand to use radio, and on the other, a highly developed industry that needed civil outlets to put its capital to work – led to the build-up of such pressure that eventually controls on radio were lifted and a new mass communications dispositif was formed – a broadcasting service.

In the USA, this came about in an anarchic and organic fashion, commensurate with the country's system of liberal capitalism. Already in July 1919, wireless telegraphy was deregulated for private use, and many people wanted a part of it. Those with economic interests began to structure the market. In November of the same year, RCA took over the US subsidiary of the British radio avant-gardist's company, Marconi. RCA and General Electric signed an agreement allowing each to use the other's licenses. In July 1920, General Electric and the American Telephone and Telegraph Company (AT&T) made a similar agreement, as did RCA and Western Electric, the production department of AT&T. Naturally, it was a competitor of this consortium, Westinghouse Electric and Manufacturing Co., that inaugurated commercial radio with the first radio station to begin transmission in August 1920. The effect of this head start was that barely one year later, Westinghouse had a 20 percent interest in RCA. With RCA at the centre, the US electrical industry had formed itself very quickly for the new medium of radio. In the United Kingdom, the BBC began its radio activities in 1922, initially as a private company. The same year radio programmes began in France in a form that was a mixture of state and commercial providers.[24]

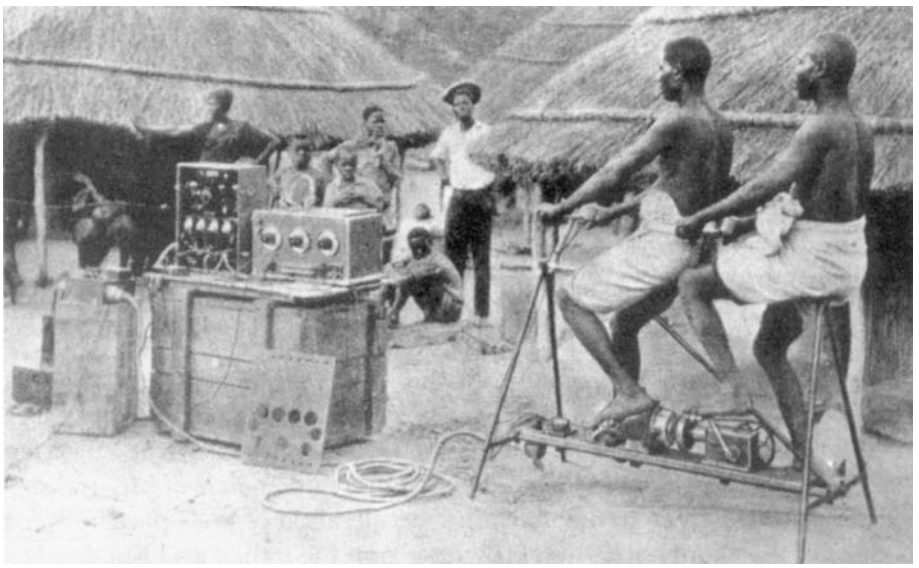
In post-war Germany, the workers' and soldiers' councils attempted to utilise the chaotic and revolutionary situation to install this medium from the bottom up, so to speak, as a communications system of the users of the machines; however, this remained but a short, though historically important, intermezzo, indeed, as did the whole phase of organised revolt. In a concerted action, the state and industry succeeded in rapidly resolving the pressing situation outlined above according to the logic of capitalism. On the political and juridical basis of a state monopoly of broadcasting, an ob-



The growth of German radio audiences 1923–29 (In: *Rundfunkjahrbuch* 1930, p. 364) and two publications of the Workers' Radio Movement.

scure privilege with feudal and absolutist overtones which represented de facto state hegemony embodied by the Reichspost [German Post Office], radio was 'deregulated' in October 1923. To translate this into the calculations of free enterprise: the public is assigned the status of a collective of consuming individuals; amateurs interested in the apparatus become potential buyers of the same and receive in return a supply of acoustic entertainment, education, and information – a triad that was to structure the signifying practices of radio promoters in the future. Moreover, in the form of license fees the public is even allowed to pay for these offerings. The infrastructure is installed and maintained by the state (partly funded by a portion of the license fees) which reserves the right to influence the organisation and content of the messages broadcast. This was for a long time the basic principle of broadcasting in Germany which was only slightly modified in the course of history, for example, the further ongoing expansion of state hegemony and centralisation of organisation during the Weimar Republic. Thus, on the eve of state power being handed over to Hitler, this process had resulted in a mass medium constituted in such a way that the Nazis merely had to occupy it – fundamental reorganisation was not necessary.

Of course, mass communicative radio as an institution for social integration did not come about without frictions and contradictions. There were frequent collisions of interest between state controllers and the various factions of organised parliamentary opposition, between the suppliers of radio programmes, the representatives of the established press, and the young record industry (insofar as the media entrepreneurs in these branches were not broadcasters of programmes themselves); further, frictions between programmers and culture critics belonging to the establishment distinguished this complex process. In addition, there were serious attempts to organise this new context of technically mediated communication differently to the proscribed top-down approach, although these protagonists were quantitatively insignificant compared to the masses who let themselves be supplied willingly. One example was the German *Arbeiter-Radio-Bewegung* [Workers' Radio Movement], an organised union that remains unique in German media history. It started out as a loose association of amateurs who wanted to learn how to build their own apparatus so that they could transmit and receive radio messages themselves. It must be remembered that the rate of unemployment was 14 per cent at the time (1924) and the economic situation was utterly desolate when entertainment broadcasting began; thus these activities were of considerable socio-cultural significance and, moreover, were a thorn in the side of the radio industry who was offering manufactured receiving sets for sale. In the course of the 1920s, through the influence of the two largest left-wing political parties, the KPD



Radio Colonialism (Source: *Armchair Science*, July 1932)

(Komunistische Partei Deutschlands – Communist Party of Germany) and the SPD (Sozialdemokratische Partei Deutschlands – Social Democratic Party of Germany), these clubs and associations became increasingly politicised. They began to criticise the programmes of established radio broadcasting and presented their own suggestions for organising the medium according to their interests, organised evenings for collective listening (particularly to Soviet radio stations), and protested about censorship of programmes. In the end, the fundamental media-political question of whether the workers should demand their own radio stations or be content with the position of co-determination in existing ones, brought about a split in the movement: a Communist-led and a Social Democratic faction, a reflection of the deep rift and clashes between these two political camps in the Weimar Republic.

Connected with this movement, but to some extent following a parallel trajectory, was a section of the artists and left-wing intellectuals who were committed to establishing a different kind of radio broadcasting. Erich Mühsam, Ernst Toller, and Kurt Tucholsky were among those who wrote articles for the publications of the Workers' Radio Movement which bore pleasing names like *Der neue Rundfunk* [New Radio], *Arbeiter-Funk* [Workers' Radio], or *Unser Sender* [Our Radio Station]. Others still, Walter Benjamin, Bertolt Brecht, Hanns Eisler, Paul Hindemith, and Kurt Weill, for example, not only devised concepts for actual programmes for a radio that

would really represent an apparatus of communication (Brecht), but also worked with the established broadcasting authorities. To re-invent radio, to help develop the emancipatory potential of the apparatus, to bring together theatre and radio in the sense of the *Neue Sachlichkeit* [New Objectivity] movement, education, and information – these were the kind of aims with which they confronted the heavily criticised sameness of the daily acoustic flow. Radio features such as Brecht's interactive model piece, *Ozeanflug* [The Flight over the Ocean], or Weill's *Tempo der Zeit* [Tempo of the Times] are just two exceptional examples of aesthetic praxis in accordance with these aspirations.

Tempo der Zeit was a treatment of the idea that, 'If a person's time is worth, say, fifty cents an hour, then a 10 per cent saving in time represents a surplus profit of five cents ... If twelve hundred employees can be saved ten steps each per day, there is a saving of distance and energy of fifty miles.'[25] The prominence given to the machines' acceleration of life's pace by large sections of the avant-garde in their work, from the Italian and Russian Futurists to the exponents of German Neue Sachlichkeit with its superficial expression in the inflationary designs for artefacts of speed, including their components (locomotives, aeroplanes, racing bicycles, motorcycles, pistons, tyres, etc.) was (merely) a reaction to the profound changes in the objective organisation of time by the sphere of production and transport systems, as well as the individual's changed subjective experience of time. Henry Ford's production method, which introduced the assembly line with its moving conveyor belts, became rapidly and widely established in the 1920s, both in the USA and in Western Europe. More and more branches of industry adopted the system of mechanised assembly lines which were based on the strictly differentiated division of labour; in 1924 an absurd point was reached with the setting up of the assembly line system of the 'Reichsauschusses für Arbeitszeitermittlung' [Committee of the German Reich for the Determination of Labour Time], which had analogues in other industrialised countries. This development was not confined to the manufacture of goods: under the paradigm of time-saving, the mechanisation of work processes in service industries, offices, and private households soon became the trend. Typewriters and adding machines found implementation in everyday office work. In 1924, the US company Hollerith Machines assumed the name under which it still trades internationally today: International Business Machines Corporation (IBM). Its punched-card system for statistics applications rationalised information processing in transport companies, insurance firms, and large concerns; tabulator machines proved their efficiency for business accounting. (In the year that power was handed over to Hitler, the first census was held and the Germans were counted us-

DER RUNDFUNK ALS KOMMUNIKATIONSAPPARAT

AUS EINEM REFERAT VON BERT BRECHT

Unsere Gesellschaftsordnung ermöglicht es, daß Erfindungen gemacht und ausgebaut werden, die sich ihren Markt erst erobern, ihre Daseinsberechtigung erst beweisen müssen, kurz Erfindungen, die nicht bestel

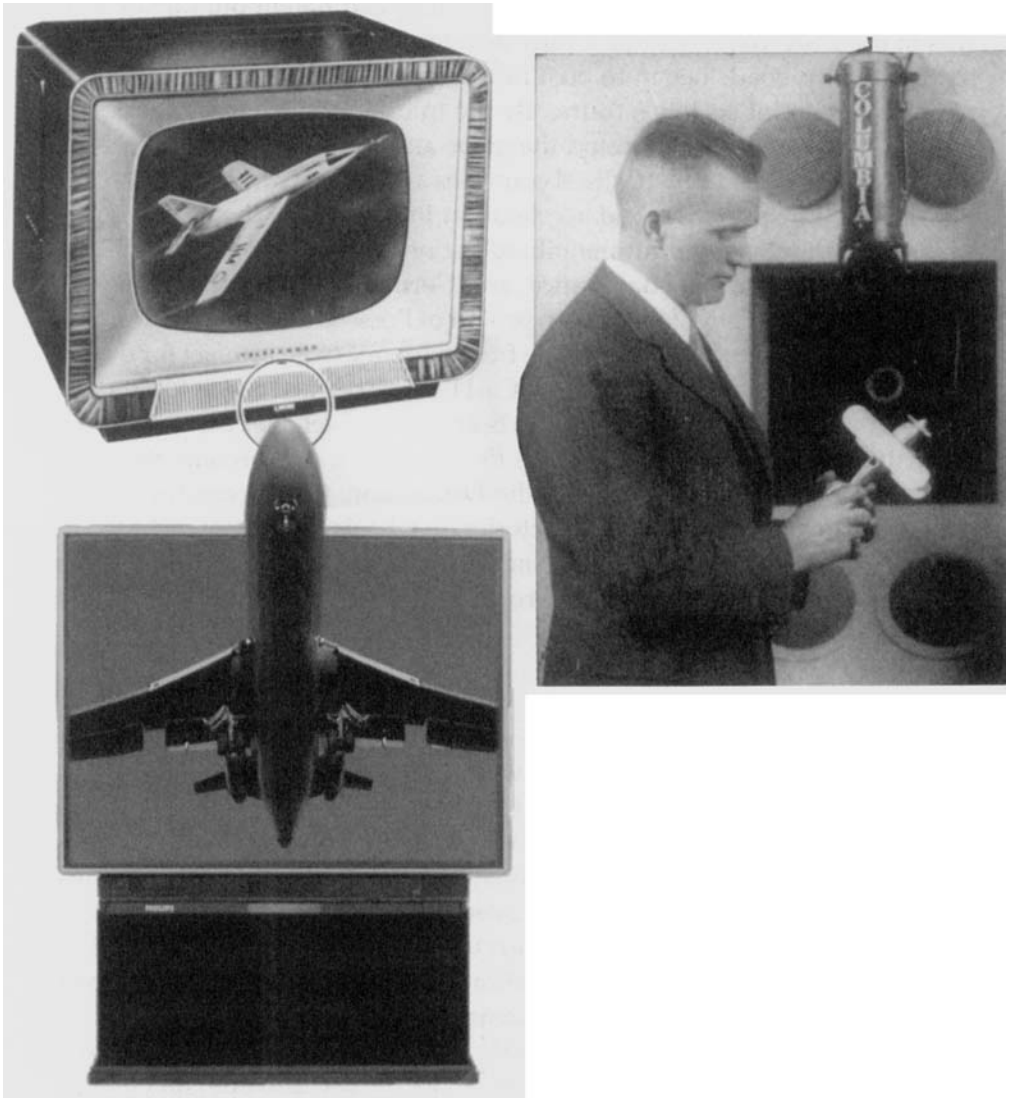
einer Zeit so weit sein, den die Gesellschaft nicht so weit der Rundfunk in seiner erst Stellvertreter des Theaters, träge, der Kaffeemusik, des weiter. Es war dies die golde Ich weiß nicht, ob sie scho wird sich auch dieser Jüngli keinerlei Befähigungsnachwei wenigstens hinterher nach müssen. So fragt sich ja a Jahren, wenn er seine Unschuld eingebüßt hat, wozu er eigentlich auf der Welt ist.

Rundfunks betrifft, so kann ehen darin, das öffentliche ch als Methode, das Heim Familienleben wieder mög- Rundfunk nicht. Aber ganz en Funktion, hat der Rund- en müßte. Er ist ein reiner lich zu. Um nun positiv zu unk ist aus einem Distribu- onsapparat zu verwandeln. oßartigste Kommunikations- in ungeheures Kanalsystem, rstünde, nicht nur auszusen- also den Zuhörer nicht nur achen und ihn nicht zu iso-

ing Hollerith machines.) Although electrical household appliances continued to be luxury goods, nevertheless, in the course of the 1920s they became steadily more common. In 1930, the first standard was established for electric hot plates for cooking. Belgard, a small town with 15,000 inhabitants in a far corner of Pomerania, was the first town in Germany to change over completely to cooking with electricity.[26] In the same theatre programme of the Hessisches Landestheater in Darmstadt, published 1931–32, that re-printed Bertolt Brecht's *Radio as an Apparatus for Communication*, there was an article of Walter Benjamin's on the interrelation of theatre and radio, reviews of Neue Sachlichkeit theatre productions, and – advertisements for electric washing machines manufactured by the Miele household appliance company.

'What do you need a mind for in a world that runs by machines?' This Dadaist maxim, intended ironically, was becoming a bitter, everyday reality for more and more people. 'Apply nut to bolt. Screw on. Apply another. Screw on ..'. 'Type the following: 'With reference to your letter of ...'. 'Four copies'. 'That'll be three eighty. One twenty change'. '136 'Standard Oil' at 374 ... 28 boxes of tins. Lever up. Lever down. Cogs. Ball bearings. Belts. Hot sausages. Line A. Line 10 ... Typesetting machines. Work benches. Milling machines. Presses. Rollers. Apply nut to bolt. Apply another ..'. In the last chapter of Ilya Ehrenburg's novel *Die Traumfabrik* [The Dream Factory], there is a very elegant expression of the interconnection between daily experience and media experience. Both realities have left their impression on language; the mega-time machine, the factory system, and the time machine, cinematograph, complement each other, are mutually dependent: 'The hands of the clocks are rushing round in Detroit and in Osaka, in Charkov and in Seville. The people are hurrying: faster! The lights go out. Dreams begin. A waking dream. An audible dream. A dream just like the poster promised. The film runs fast: eighteen pictures per second. You can't shout 'Be still!' at it. You can't stop it. The tiger jumps and roars. The violinist sobs. Nobody knows them. The woman Komsomol member with the snub nose smiles contemptuously, 'So that's how they live in Paris!' In Paris, a lonely little old man sighs, 'So that's what these tigers do!' Neither of them are aware of the fact that this violinist and this tiger don't exist; only Papa Zukor (this refers to Adolph Zukor, the legendary founder of Paramount Pictures – S.Z.) and some sweating film extras, only David Sarnoff (the likewise legendary founder of RCA – S.Z.), electricity, and anaesthesia.'[27]

Significantly, Henry Ford had speeded up production with the product of the most important system for making individual humans faster: the car. His grand ambition, to 'democratise' auto-mobility by means of mass production and mass consumption of his products, began to take shape in the

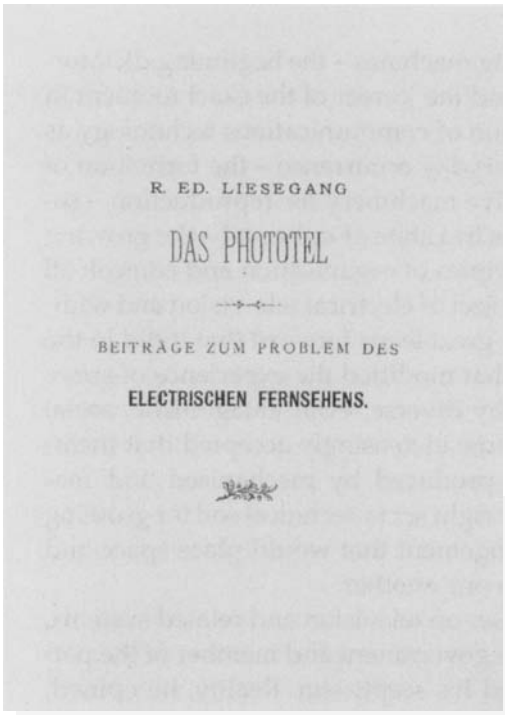


Speed-machines as promoters of media artefacts that overcome space and time differences: 1950s (Telefunken); 1931 (CBS); 1988 (Philips).

1920s, especially in his home country, the United States of America. Like the cinematograph, the car was originally a European invention; however, it was in the USA that it became a fully developed mass-produced commodity. Gradually, roads began to oust rails from their function as the central nervous system of society's traffic. By the middle of the decade, about 25 million cars were driving around the globe and four fifths of them were in the USA In the other industrialised countries as well, the car's importance as a means of transportation and acceleration increased. At the beginning of 1926, the hierarchy of the automobilised nations was as follows: USA, Great Britain and Ireland, Canada, France, and Germany. In Germany, long before 'The People's Car'-Volkswagen project of Porsche and the Nazi leaders, the transformation of the automobile from a luxury to an artefact for everyday use was well under way. In 1924, Carl F.W. Borgward began to produce his three-wheeler, the 'Blitzkarren', in Bremen. This vehicle cost under 1000 Reichsmarks, was aimed at the small firms' market, and became the most important mini-transporter during the Depression. Car ownership, 'these funny purring and devilishly fast factories on wheels', was even included in the demands of the trades unions: 'The revolutionary automobile will serve the revolutionary working class', wrote the German metal workers' union newspaper on 8 March, 1930.[28]

World War I had not only given the young automobile industry an enormous push; it had also forced the development of means of mass transportation. In 1922, the global railway network was some 1.2 million kilometres long; it measured 30 times the circumference of the Earth at the equator and was three times the distance to the moon. Actually, compared with the preceding decades, the growth of the railways had begun to slow down by this time and in the USA, a decline had even begun: there were less miles of track in 1922 than there had been in 1913. The Great War had also acted as midwife to newly forming civil aviation. The aeroplane 'had developed from its original determination as an instrument of reconnaissance to an instrument of attack and ambush. Increased use of the aeroplane has led to a level of air safety that was inconceivable before the war and one can identify the present-day triumph of technology over air space as a direct legacy of the War. Moreover, the War created the psychological preconditions so that the transition from the earlier flight in a sports plane to the present flight in a commercial aircraft could proceed so quickly.'[29] At the end of the 1920s, Valiers made his first experiments with rockets. In 1930, the first helicopters were built.

Designs for new ways of seeing and hearing – the establishment of the mechanical as the rhythm determining the movements of everyday life – the


R. ED. LIESEGANG

DAS PHOTOTEL

BEITRÄGE ZUM PROBLEM DES

ELECTRISCHEN FERNSEHENS.

'When the first automaton, that is better constructed than man, is brought to life, the purpose of the world will have been achieved: Man will be God.' (Final sentence: Liesegang 1891)

The glide bomb Henschel Hs 293 D with television warhead; the aerials for transmitting the pictures are on the tail. (From: Joseph Hoppe: *Fernsehen als Waffe. Militär und Fernsehen in Deutschland 1935-1950.* Published by the Museum für Verkehr und Technik Berlin, no date, p. 70.)

propagation and spread of new moving machines – the beginning dictatorship of the second hand of the clock and the 'career of the exact moment in time'[39] – the manufacture and utilisation of communications technology as both a general need and a natural everyday occurrence – the formation of the culture industry as a comprehensive machinery for reproduction – social, political, and economic conditions in a state of upheaval – the growing importance of (state) centralised principles of organisation and control: all these dimensions were vital for the project of electrical tele-vision and without them, it would not have made the great leaps forward that it did in the 1920s. A society where technologies that modified the experience of space and time were held in high esteem by diverse, even antagonistic, social groups; a society where artefacts became increasingly accepted that themselves compensated for the deficits produced by mechanised and machine-based everyday life; this was the right socio-technical soil for growing a communications-technological arrangement that would place space and time in a radically changed relation to one another.

At the end of one of the early treatises on television and related systems, Walter Friedel, Privy Councillor to the government and member of the patent office of the German Reich, voiced his scepticism. Reality, he opined, was too poor for direct visualisation. 'The majority of events are not worth transporting and installing a television apparatus for, let alone a transmitter', he wrote. 'Whether it would be profitable to build theatres for showing television pictures appears very doubtful, for one must not forget that something interesting and worth seeing doesn't happen every minute of every day. As television can only show events that are happening at the same time as it transmits them, there would probably be many transmissions at certain times that overlap and then for many hours nothing to see at all. Thus the television theatres would be empty most of the time. Only when there are 'world shattering events' like boxing matches and similar sensations would the television theatres have a 'full house'.'[40] Leaving aside the worthy councillor's conception of adequate real events for televising, which is not so very different from what contemporary national politicians would like to see as TV reality today and, in fact, do see: Friedel anticipates here the most advanced and original form of this medium, the simultaneity of event and visualisation, even though he was not thinking of the personalised use of television but rather of the extravagant technology thought to be necessary at the time and of a form of reception analogous to cinema.

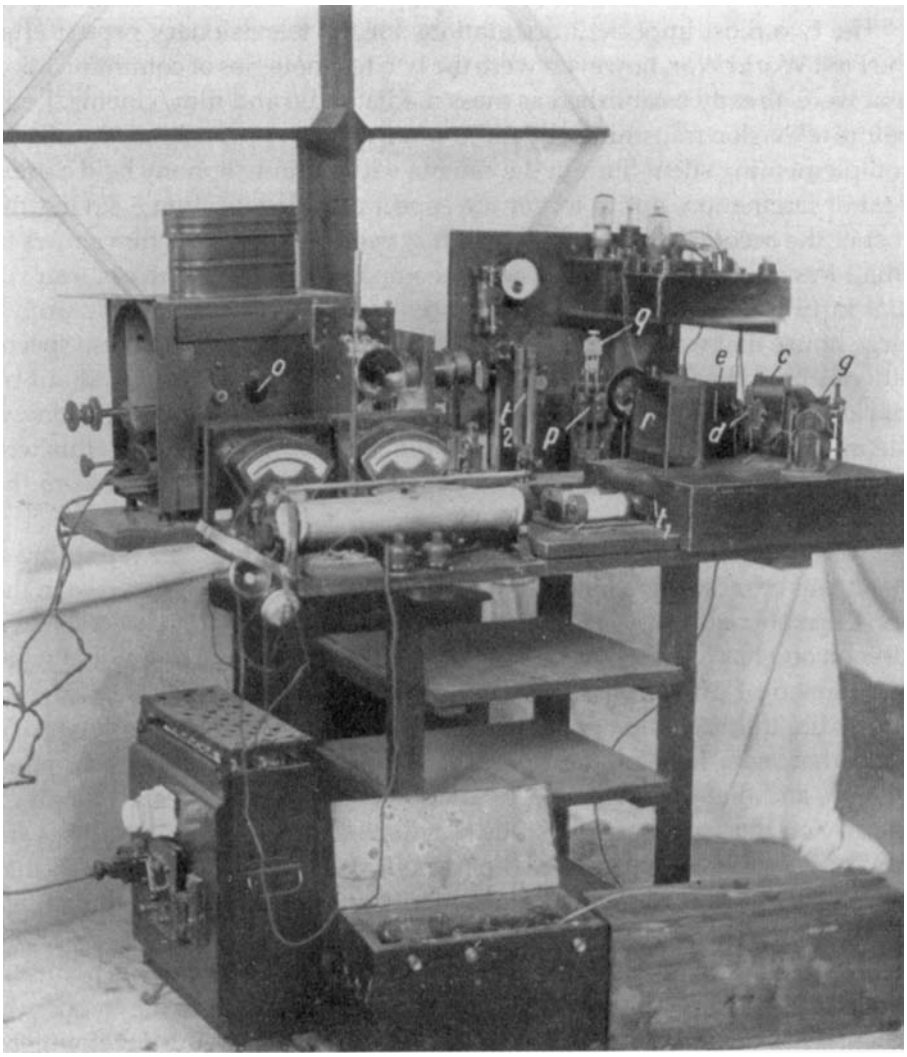
A *live* medium such as this had been the conceptual spring-board of all theories and models since the end of the nineteenth century. However, in practice and particularly for the public that did not have access to experimental workshops for devices and ideas, it only slowly crystallised out in

Intermedia 1925: Radio in film on the cover of the magazine *Der Deutsche Rundfunk*.

the course of a process of differentiation. This extended from the resumption of experiments after the First World War over the whole of the period between the wars. 'Radio movie', 'Bildfunk' [radio phototelegraphy], 'Fernkino' [tele-cinema], 'Funkfilm' [radio film], 'Fernsehsprechverkehr' [televisual telegraphy], 'Bildrundfunk' [picture radio], and 'Fernkinematographie' [tele-cinematography] are just some of the terms that were current usage in the 1920s. They designated an entire phylum of technical systems for visual communication over distances. The examples cited here comprise the most important technical and socio-cultural orientations, through which the practical realisation of the project of television was approached. Here there are four different contexts of origination and application which must be distinguished:

Developed technically the fastest, yet only distantly related to the idea of seeing at a distance was the telegraphic transmission of still photographs and drawings that is, a further development of Caselli's Pan Telegraph from the nineteenth century. In Germany, this process was principally developed by Arthur Korn and, in the latter half of the 1920s, was produced in a marketable form in collaboration with Lorenz AG as an efficacious addition to the state apparatus of surveillance and control. Police stations, criminological institutes, border posts, and the coastguard were equipped with these receivers and transmitters. What was electrically visualised were photographs and descriptions of wanted persons, finger prints, pictures of the *corpus delicti* of a crime and stolen goods, but also weather charts, sketches, etc. In addition to the good quality of the reproductions, the high use-value also consisted in getting visual information from far away quickly, although the scanning and reconstitution of the images by the receiver did take some time. With Korn and Lorenz AG's industrially implemented process, the transmission of an original measuring 13 × 18 cm took around two and a half minutes.[12]

The second context is telephony. Tele-vision was understood here as a sensory extension of individual telephonic communication, as a realisation of 'an age-old dream ... to see each other at great distances' (Friedel), which does not appear to reflect any deep-seated need, though, if one considers the project of the video-telephone– resuscitated from time to time but obviously not widely demanded. Nevertheless, this was the germ-cell of television in Germany. For the work on developing this prospective application carried on from Nipkow's 'master patent'. His electrical telescope was essentially a magnifying optical instrument that implemented the findings of the – then – new telephony and adapted them for the purposes of visual communication. The technical problems that still had to be resolved for this application were just as great as for direct television, even though the



The total hegemony of the machine: Dénes von Mihály's 'Telehor', 1924, from the receiver side. The image could be seen on the tiny monitor (*r*). (Langer 1924, p. 531)

close-up picture of a person using a video-telephone was only a tiny snippet of reality that had to be reproduced and transmitted. Moving objects had to be visualised simultaneously. Thus it is not surprising at all that the first scanning devices for video-telephony only came into operation in the mid-1930s, approximately at the same time as the Nazi administration commenced television test transmissions.

The two most important orientations for the televisionary project after the First World War, however, were the two technologies of communication that were already established as mass media: radio and film/cinema. Long before television transmitted by radio was a realistic proposition, the idea of complementing silent films in the cinema with radio-telephony held a great deal of fascination, not to forget the aspect of rationalisation – saving the cost of the accompanying musicians. It was envisioned 'that film shows in small towns could receive musical accompaniment from one orchestra ... that in future, all the small film theatres would receive the music from a large house that was showing the same film'.[33] What triggered these speculations about the future was a joint experiment successfully carried out by Ufa and RCA. In New York's Century Theatre, a full-piece orchestra played the music to Fritz Lang's NIBELUNGEN film and, at the same time, this was relayed to another cinema at some distance away in Briarcliff, where the film was also running.

There were also misunderstandings and severe criticism regarding a symbiosis of radio and cinema. For example, an incensed critic wrote in the top German radio magazine: 'Recently, an American film director from Holeywood has been seized by bubbling enthusiasm at the thought of what undreamed-of possibilities might result from the combination of cinema and radio. If this gentleman sees these fantastic opportunities in the possibility that from now on, all operas will be recorded on film in cinema-fashion, and that they will, say, be shown on all cinema screens in a given country on the same evening while the music is delivered over loudspeakers from an opera house where the opera is actually being performed that evening, then in my opinion this idea is not fantastically beautiful but rather fantastically grotesque.'[34]

The orientation toward radio and cinema as well as the various points of connection between the two media was not only reflected in the frequently articulated perspectives of possible uses and applications: the development of the television project was directly linked to persons and industries which had co-determined the communications technology of the other two contexts. 'The components that might possibly be employed in experiments with television and transmission of pictures, such as photosensitive cells, light modulation, etc., are the same as are required for the sound film', wrote the Hungarian inventor, Dénes von Mihály in his book *Der sprechende Film* [The Talking Film], alluding to the close connection that existed for him, the technician, in his experiments with the two audiovisual media. Supported by the Budapest Telephone Company and the Austro-Hungarian Ministry of War, von Mihály had begun experimenting in 1914 with light and electricity and had conducted practical trials in sending elec-

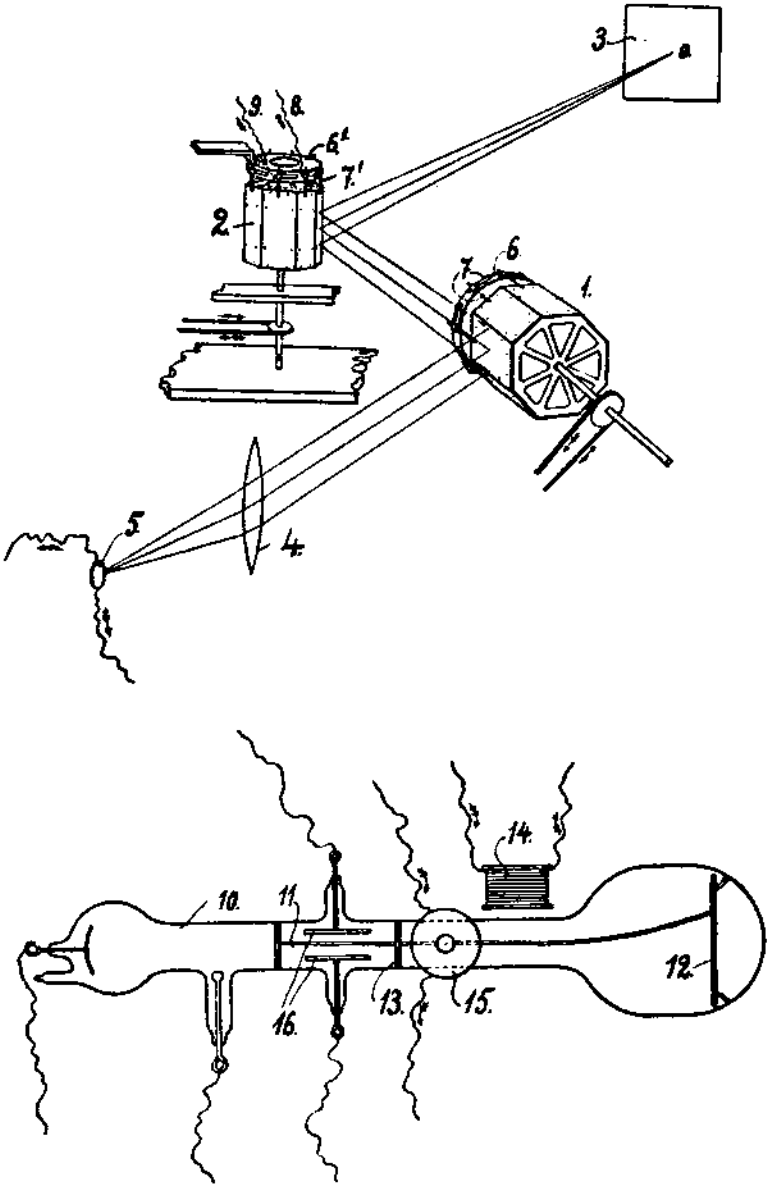
trical pictures. In 1917 the Royal Hungarian patents office patented his Projektophon, which he claimed to have used in June 1916 to produce and project the first 'talking film' with images and (synchronous) sound recorded on the same strip of film. In 1919, the same year that the Triergon group commenced their experiments with sound film, von Mihály patented his first television system. In 1923, he published a book entitled *Das elektrische Fernsehen und das Telehor*, [Electrical Television and the Telehor] in which he presented this artefact and the many subsequent improvements, emphasising the wide field of its applications and uses. In this book, the Telehor – a short while later the device's name was used by a Czech avant-garde group for their magazine – had become a universal medium for transmitting pictures. It included the telephotograph and photophone, anticipated its use by science 'for research in all places ... which are difficult for people to visit at present', and stressed its suitability as a reconnaissance instrument for the army – a manifest appeal to the most potent funding agency for large-scale technical innovations. 'A receiving set for pictures that utilises wireless transmission installed in an aircraft can immediately deliver information anywhere about the exact positions of the enemy, the positions of artillery, movements of troops, strikes of own artillery, and thus it offers multiple possibilities for 'testing' own artillery strength. No less important is the circumstance that the general staff, at any time and within a few seconds, can be in possession of information about the exact deployment of their own troops and thus *totally centralised direction of operations* is possible [italics – S.Z.].'[35] For a mass audience, the engineer von Mihály imagined a synthesis of cinema and radio. With the Telehor it was possible 'to erect theatres at various places around the globe, following the example of the cinematograph, which, by means of central organisation would all have reporters that set up their equipment at the scene of any interesting events in order to transmit these immediately to the corresponding theatres'.[36] Were this notion to be enriched with Vertov's revolutionary aesthetics, here we would have exactly 'Kino-Eye'!

Despite the confidence of these visions, the discrepancy between farsighted anticipation of uses and the actual performance of the existing artefacts for distant electrical seeing continued for a prolonged period of time. The televisual advances pointing the way forward that were made in the early post-war years, were nonetheless still rudimentary and a long way away from the illumination of living things. Using rotating mirrors in his Telehor to scan the area of the picture, von Mihály just about managed to re-visualise objects with sharp contours, like scissors or pliers. The majority of systems patented in the early 1920s still belonged in the category of constructive models rather than devices that yielded visible results. Nonethe-

less, experimenters abounded. Edouard Belin, Alexandre Dauvillier, Georges Valensi, and Edvard-Gustav Shoultz in France; Alexander Graham Bell, W. Case, Philo T. Farnsworth, J.E. Gardener, H.D. Hineline, Charles F. Jenkins, and Vladimir Zworykin in the United States; Max Dieckmann, Rudolf Hell, and August Karolus in Germany; the Englishmen W.S. Stephenson and G.W. Walton; the Scot John Logie Baird; the Russians Boris Rtcheouloff and A.A. Tchernischeff; Kenjiro Takayanagi in Japan – these are but a few of the scientists, engineers, and technical enthusiasts who took patents and presented designs for electrical distant vision in specialist journals. Their ideas had very diverse technical implications and envisaged uses.

Jenkins, for example, abandoned the tradition of the cinematographic project for the tele-visionary one. He applied himself to the problem of the meagre results in image quality obtained from the attempts to visualise objects directly and tried to get around this by photographing the object first and then scanning the photographed object, that is, he reproduced reproductions. It was possible to illuminate the celluloid frames with a strong light beam so he had very light pictures to work with for scanning. The goal of his work was the symbiosis of radio and cinema with regard to the visual dimension. For him, electrical television was first and foremost a new distribution form for filmic products that obviated the necessity of transporting reels of film, only the photo-information stored on them. In 1922, he patented the first equipment to this end. By 1925, he had succeeded in developing his Radio Movie so far that practical trials yielded modest results. Thus, the first transmissions of illusions of motion used the raw material of film.

The man who became an absolute legend of American television historiography was Vladimir Zworykin. A student of Boris Rosing's around 1910, Zworykin was familiar with Braun tubes being used for the picture telegraph in Rosing's private laboratory at the St. Petersburg artillery academy. In the years preceding the October Revolution in Russia, he had been entrusted with establishing a laboratory for research on electronic tele-vision. After the revolution, he emigrated to the USA where, at first, he was unsuccessful. Then Zworykin was hired by Westinghouse Electric, the first company to have his knowledge and experience from the electronic experiments carried out in Rosing's laboratory at their disposal. (The seminal research that laid the foundations for US television's know-how was imported from the Soviet Union; the same applies to Great Britain. The head of research at Marconi-EMI, Isaac Schoenberg, who organised the electronic breakthrough in British television experiments, was also a student of Rosing's in St. Petersburg.) By 1923, Zworykin was able to transmit electronically the shadow picture of an X-mark using modified Braun tubes in both



Mechanical-electronic television system invented by Boris Rosing in 1907. 3 object (original); 4 lens; 5 photo-electrical transducer; 1 and 2 rotating mirror drums for virtual picture scanning; 6/7 and 61/71 rotating resistors for generating the (proportional to time) deflecting currents for the cathode ray (11) in the Braun cathode-ray tube (10); 14 and 15 line and frame deflection coils; 16 electrodes for the modulation of the cathode ray. (Source: *Bosch Technische Berichte* 6 (1979) 5/6.)

transmitter and receiver; at the end of the same year he applied for a patent for the first fully electronic television system for scanning slides and film material. Unfortunately for Zworykin's ideas – revolutionary compared to the mechanical method – they did not concur with the short-term profit-oriented interests of his employers. The demonstration of his equipment was deemed to be too inadequate by the Westinghouse management, who did not foresee a fast return on their investments from it. Zworykin was ordered to 'forget television' and work on something more promising commercially, like sound films or photocells. So he changed his work focus for Westinghouse but didn't forget television. In his spare time, he continued to experiment with his electronic camera tubes.

The re-orientation of the RCA electrical company was not least due to the fact that in the years 1923–25, mechanical television systems were making a name for themselves and achieving first visible results. Particularly active in the mediatisation of his research progress was the Scottish engineer, John Logie Baird. One of the most brilliant personalities of early television history, he devoted all his imagination and energy to the televisionary project. His biographer, Sydney Moseley, has written a fascinating account of his life and work.[37] In June 1923, Baird placed an advertisement in *The Times* asking for assistance with his experiments for 'seeing by wireless'. With typical British understatement, he explicitly ruled out financial help in the advertisement, which meant that he was desperately in need of it. Baird also attracted the attention of a man who subsequently became one of his most important backers, Wilfried E.L. Day, an entrepreneur in the British film and radio business, who provided Baird with the means to set up his first laboratory. Apparently, Day was prompted to do this after reading an article in the *Kinematograph Weekly*, which described Baird's project as 'Radio Kinema'. In July 1923, the Scottish engineer filed for his first patent for mechanical television. It used Nipkow discs for scanning the objects into picture elements and producing the image in lines. Two years later, Baird had progressed so far that he was able to illuminate the first images of a face. However, it was not the face of a living person; no human could have physically withstood the force of the media-machine, the intensity of the artificial light that had to be used and hours of sitting still. Baird used the head of a wooden ventriloquist's dummy called 'Stooky Bill', later accompanied by another called 'James': the first electrically/mechanically illuminated star was a doll. It was at this stage of experimentation that television first reached out to a wider audience in England. As a publicity stunt, London's Selfridges department store paid the Scottish inventor to present his laboratory equipment to the strolling shoppers for a few weeks. Now, we have already encountered an event of this kind in the phase when cinematography

was establishing itself (the Wertheim department store in Germany): the future commodity of communications became a part of the mise-en-scène of commodities in the department store.

Despite the lukewarm reception of his invention by the public and potential financial sponsors alike, Baird did not relinquish his efforts. Soon after, in 1925, he succeeded in reproducing a human face. His first human subject was an office boy whom he had to pay to sit motionless and close to the transmitter. From the very beginning, nobody did anything for nothing for television. In 1927, the Scot achieved the first really spectacular results with his experiments. Over a standard telephone line, he sent images from London to Glasgow which were able to be decoded by a receiver there. It really was tele-vision. Further, Baird addressed for the first time the transitory nature of the televisual process with a system that at the same time highlighted the poor quality of reproduction of the mechanically produced visions. He constructed a 'video-disc player', the first device for television recording, that he called the Phonoscope. On a wax disc, like those used for sound recording, the fluctuations of light converted into electrical signals were engraved and could be viewed on a tiny mirror when the disc was 'played' – a process that was only practicable because the amount of information stored was very small: the images consisted of only 30 lines at 12.5 pictures/second 'Bottling up television' was what the contemporary popular press called this early creation in the genesis of the video recorder.

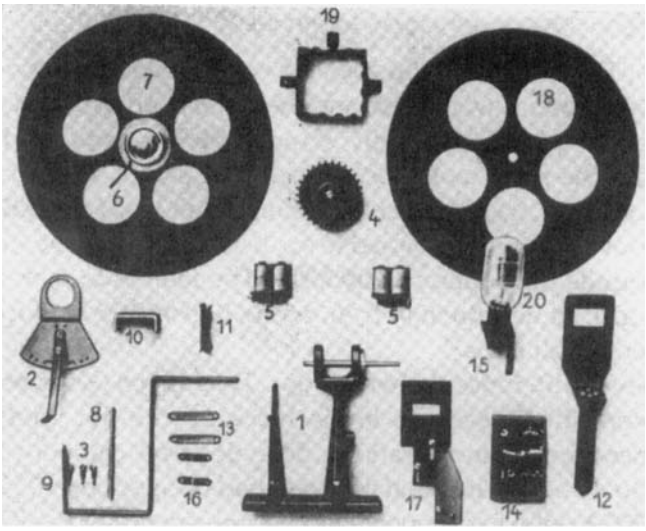
However, Baird was not the first to strive to preserve the fleeting signals of television. The Russian engineer, Boris Rtcheouloff, had patented a system of magnetic recording in 1922 as part of a larger system, where the signals were to be inscribed on a steel band. This system, that Rtcheouloff also patented in England in 1926, never reached the stage of actually being produced, but nevertheless stands as the model for the magnetic recording of visual data. Thus, before the images even moved or appeared to be alive, ways of preserving them had been invented.

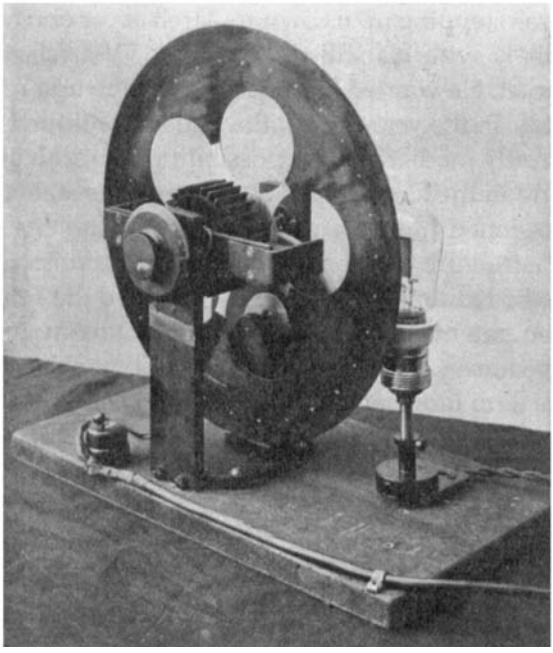
Although the electronic variant of this technology was represented in Germany by two outstanding scientists, the physicist Max Dieckmann and his assistant Rudolf Hell, here, also, it was two 'mechanics' on the television project that first made a name for themselves: von Mihály, who moved to Berlin in 1924, and the physicist and electrical engineer, Karolus. Their intensive experimental work had the effect that both the government and industry started to develop an interest in the new communications technology and began to intervene in the process with support but also with regulations. Von Mihály worked at first for AEG and then founded his own independent company, the Telehor AG, in order to push ahead with his television ambitions in close collaboration with the Reichspost. In October

1924, Telefunken made Karolus an offer he couldn't refuse and in the years that followed, he continued to improve on his mechanical system while drawing a generous, continually increasing, guaranteed salary. His most significant innovation in the system for dissecting and synthesising the images with Nipkow discs: he utilised a special Kerr cell which would be modulated by the picture signal.

Fundamentally influenced and supported by the two principle political and economic institutions – the state-owned Reichspost and the private capitalist-owned Telefunken company (which had also initiated and organised the beginning top-down consolidation of radio as a mass medium that was centralised at the broadcasting end and decentralised at the reception end), television in Germany gradually left the speculative phase behind it, entered the laboratory stage, and finally, toward the end of the 1920s made its debut in the public sphere as a new and provocative medium. (Initially, it was confined to the capital, Berlin, as the experimental work had been, too.) In September 1928, on the occasion of the event held annually since 1924 to whet the appetite of potential customers for innovations from the world of acoustic reproductions, the Grosse Deutsche Rundfunkausstellung (Berlin Radio Exhibition) in Berlin, the funders and backers of the project deemed the stage of development reached as adequate to give demonstrations to a wider public, outside of the laboratories.

The exhibition stand of the Reichspost showed von Mihály's equipment where the Nipkow discs rotated 600 times per minute and produced shadowy 30-line images. On the monitor of a Telehor, 16 cm^2, appeared what optical information remained after scanning diapositives at such low definition. Telefunken presented – just in time for the company's 25-year jubilee – Karolus' system, which had better quality pictures, in two models that also indicated the different socio-cultural types of utilisation envisaged. The transmitter, a construction with Nipkow discs with three sets of spiral holes, scanned transparencies and film material for a receiver with a screen for individual viewing that was only 8 × 10 cm; however, it did at least have 96 lines. Parallel to this, Karolus projected his images on a daylight screen for collective viewing which measured 75 × 75 cm. To convert the pixels and lines into pictures, Karolus used a Weiller Mirror Drum with 96 mirrors, slightly staggered, which projected the beams of light onto the screen. Telefunken's demonstration also presented only illuminations of reproductions, diapositives, and film strips. Direct transmission was, at this point in Germany, not on the agenda. In England, by comparison, Baird was working with daylight transmission, and in the even more advanced USA, three days after the Berlin Radio Exhibition ended, General Electric transmitted the first TV-drama from its station, WGY: *The Queen's Messenger*, by





Build Your Own Television Set: Before domestic television sets came on the market, in 1930 the German company Telefon-Apparate, Kabel- und Drahtwerke AG (TEKADE) brought out a complete kit for constructing a universal picture receiver to pick up English and German test transmissions. The price was 195.50 Reichsmarks; Nipkow disks, for example, cost between 12 and 27 RM. (Source: Goebel 1953, p. 296.)

J.H. Manners. The pictures and the sound were broadcast on two separate channels. Three cameras were used, and their information mixed during the test transmission; two mechanically scanned the heads of the play's two characters, and the third took close-ups of their hands and other details. Fortuitously, one might say, direct television didn't work at the Berlin exhibition. For what Telefunken planned to do, had the trials in the run-up been successful, sounds uncommonly dreadful. The television men wanted to find a pretty girl, sit her down in front of the transmitter, and from the receiver, ask her to pull faces.[38]

The decisive difference between the Telefunken/Karolus and the Reichspost/von Mihály systems lay in the socio-cultural implications of their equipment and demonstrations. The electrical company's primary concern was to demonstrate what progress had been achieved, particularly to American RCA, who had signed a license agreement for the Karolus system in 1927 but was stepping up its own research at the end of the 1920s. By contrast, von Mihály with his still rudimentary TV-artefact, was already aiming at the market. He wanted his Telehor to be the first receiving set for private households. In the years that followed, he continued to pursue this direction and adroitly mediatised the possibilities of receiving reproduced pictures and sound in the home, again at first with the state postal authorities, who commissioned him to erect transmitting stations and provided him with the infrastructure that enabled test transmissions. In the same year that the Berlin Radio Exhibition was held, he founded the Telehor AG to exploit his television patents. In early 1929, he was already propagating his concept of a televisionary *Volksempfänger* (literally: people's receiver), thus appropriating the term long before Goebbels annexed it for Nazi radio ideology. '... for me, any system that required large amounts of money to test it, was out of the question. With these files, drills, and hammers we cobbled together our own apparatus – it is obvious that we would eventually achieve the simplest and cheapest system. That is why I have been successful in solving not only the technical television problems but also the social ones– anyone who owns a detector will be able to afford this apparatus',[39] – this was the optimistic opinion of the aristocratic inventor cited in a report published in the journal of the Volksverband für Filmkunst (Popular Film Society). Its author had been present at one of the demonstrations that von Mihály had put on, mainly for disseminators of information, after the Reichspost commenced test transmissions from Berlin's Witzleben radio station on the night of 9 March 1929. The technical standard used could only produce rough shadow play, for the pictures were scanned into only 1200 picture elements and dissected into only 30 lines at 12.5 pictures/sec. The author writing for the revolutionaries' film journal was filled with enthusi-

Television in Daylight.

In evening dress at home: the transformation of outdoor culture into private sphere. The targeted social stratum is obvious: the middle class. The private sphere is entered by the public domain in the shape of TV, the medium that arouses the impression of making the private public. (Cover of the first specialist journal for televisuals)

asm for the simplicity and 'common touch' of von Mihály's concept. However, with reference to the inventor's prognosis that, to begin with, only existing film material would be telecast, that 'before direct television, there would be tele-cinema', his enthusiasm gave way to scepticism, fed and founded on the ongoing contemporary industrial shaping and aesthetic-ideological tailoring of cinema, which the Volksfilmverband had been founded to oppose. 'Will *Fernkino* [tele-cinema] simply serve to present us with the desolate state of film art all over again, shall we, as state-sanctioned home-cinemagoers, be spoon-fed harmless picture-book films like good children, uplifting us to become docile and devout subjects of the state, or will television also open up intellectual spheres to our gaze that so far have been denied us by cinema?'[40] By contrast, it was precisely this possibility for the future that had the popular Berlin newspaper, *12 Uhr Blatt*, raving with delight: 'Television Success in Berlin!' proclaimed the headlines of a special edition of 9 March 1929. 'In future it will be possible to run all feature films in the broadcasting studio on the day they are premiered, which will allow millions of people to view them sitting at home in their armchairs.' In the same article, its author Fritz Winckel anticipated the contours of the TV-show that, three decades later, every evening, would mean the world to the collective of German viewers: 'As the radio and television audience generally does not have the time to attend important events of the day, reporters all over the world will film important occurrences and telegraph them to their broadcasting stations, and then the days' events will be transmitted to the listeners at some time in the evening in a condensed form.'[41] Just in passing, Winckel formulated here the basic principle of a tele-communicatively based economy of time.

The opposition of these two views is both striking and fascinating. At this time, especially in Germany, projects for collective production and use were developed in a host of areas of cultural praxis and socialist strategies tried out. With the Prometheus company (Willi Münzenberg was particularly instrumental in its foundation at the end of 1925), the Weltfilm (founded in 1927 partially at the instigation of the Internationale Arbeiterhilfe (IAH) [International Workers' Aid]), and the Soviet Russian-German cooperation project, Meschrabpom, the workers' movement had successfully set up its own network of film production and distribution under the noses of the capitalist film industry. Not surprisingly, it was not plain sailing for this enterprise for it constantly had to do battle with state censorship and credit institutions. Sergei Eisenstein's BATTLESHIP POTEMKIN, TEN DAYS THAT SHOOK THE WORLD, and THE GENERAL LINE, Pudovkin's STORM OVER ASIA, and THE DESERTER were all shown in German cinemas along with many other feature and documentary films of new Russian cinema. The Prometheus company

'In film, we shall always oppose the infinitesimal expression of a Jannings with the monochord of Keaton's. Jannings is overtaxed by the cineasts, who even multiply the slightest contraction of his facial muscles by *n*. In Jannings, pain is a prism with a hundred faces. Therefore, he can fill an area of fifty square meters, and if 'still more' were demanded of him, he would prove that a whole film could be made just of his face, and the title would have to be: Jannings' Expression or The Combination of *n* to *n* Wrinkles.' (L. Buñuel as film critic, 1927. Cited after Bodmer 1988, p. 122). Film poster by Hans Richter (1926).

produced many great social epic pictures like ÜBERFLÜSSIGE MENSCHEN [Superfluous People] (1926), JENSEITS DER STRASSE [Harbor Drift], HUNGER IN WALDENBURG [Hungry in Waldenburg], and MUTTER KRAUSEN'S FAHRT INS GLÜCK [Mother Krausen's Journey to Happiness] (1929), thus carrying the everyday life of the underprivileged into the cinemas. 'Our struggle is against artistic trash, against cultural poverty, against political and social reactionaries, who only too often put their stamp on current film productions; we are fighting in order that film may become what it can and should become: a means of spreading knowledge, enlightenment, and education! A means of promoting international understanding and reconciliation! An enlivening factor in everyday, intellectual, and artistic life!' These were the demands that were programmatic for the Volksfilmverband when it was founded in January 1928. Heinrich Mann was its first chairman, Erwin Piscator, Béla Balázs, Käthe Kollwitz, and G.W. Pabst were members of the executive committee, and with an honorary committee that ranged from Count Arco and Alfred Kerr to Arnold Zweig, it had, in short, the best that the transitional cultural scene of the Weimar Republic had to offer.[42]

In 1927, the first meeting of the Arbeiterphotographen (Workers' Photographers) took place in Hamburg. In the performing and fine arts, organisations were created for collective production and reception. The Workers' Sports movement reached its zenith towards the end of the 1920s in Germany. Thus, the most important cultural discourses were located outside of the private and intimate sphere – on the streets, in public places, in halls, and in pubs. This applied not only to the cultural expressions of political and social revolt but also to the various forms of commercial entertainment and diversion; whether cinema, variety, or the department stores for ordinary folk.[43] And this was the social situation when the advent of a new *indoor* medium was announced, a communications-technological arrangement directed toward individualised usage in the sphere of the home?

When one reviews the audiovisual discourse up to this point in time then, admittedly, to a certain extent the break does appear logical. The history of cinema had already traversed many a great pinnacle where, later, monuments would be erected. The Futurists and the material artists among the Dadaists and Constructivists had even processed the very strips of celluloid themselves in an attempt to elicit a specific filmic quality from their projection. Comedy and fun, which still was in the habit of holding up a mirror to the spectator-subjects, was hardly likely to outdo what Charlie Chaplin, Buster Keaton, and Harry Langdon had created. With Lumière's huge screen, Grimoin Sanson's Cinéorama, and Abel Gance's giant screen-triptych, NAPOLEON (1927), the enlargement of the dispositif arrangement was already at its limits. The lavish trappings surrounding a narrative, as in

Griffith's BIRTH OF A NATION and INTOLERANCE or Lang's METROPOLIS, had been done to death so there was nothing new to discover there either, there could only be new variations on what had been done before. In Vertov's (HU)MAN WITH CINE APPARATUS, the filmic portrayal of contemporary reality was exemplary, more than adequate. After Eisenstein's POTEMKIN, with its virtuoso montage that addresses the head and the senses, it hardly seemed possible that rhythm, speed, and expressivity could be intensified much more. After seeing the screen performances by actors such as Emil Jannings, Werner Krauss, Conrad Veidt, and Paul Wegener, could the quality of acting be increased significantly? The symphonic potential of the filmic already had its master, Viking Eggeling. In his film JEANNE D'ARC, Carl Theodor Dreyer had developed the literature-oriented silent film to a level where one imagines hearing the dialogue and visually, with its hegemony of the close-up, Dreyer was already practising the play with the landscape of the human face that would come later with television. And what there was to be shown in a ruthless settling of accounts with the bourgeoisie and their traumata, Luis Buñuel and Salvador Dali had just brought to the cinemas. Their film cut through the eye in UN CHIEN ANDALOU, released in the same year (1928) that Georges Bataille's *History of the Eye* was published; it was also a radical cut in the history of seeing in the cinema: henceforth the material would be stretched, expanded, and embellished in innumerable ways, there would be variation upon variation of telling a story, countless modifications of subject, increased returns on invested capital and human resources, aesthetic-technical optimisation of many and diverse kinds – but it did seem as if there could be no renewal of the cinema any more.

In the logic of the apparatus, its industrial manufacturers, and the industrial policy and planning perspectives of the Post Office, the contradiction all but vanishes. But there was definitely logical consistency in the fact that it was precisely at this point in time when the television project went into the public sphere and onto the market.

In the majority of industrialised countries, people's personal/individual spaces for reproduction were becoming increasingly filled up with preserved music, acoustic lecturing, and staged worlds of sound. They began to get accustomed to these mechanically alienated representations, especially as sound recording and reproduction techniques improved significantly in the 1920s. Newly created brand names like Electrola and Electravox denoted the arrival of electromagnetic editing and reproduction in the record industry. Considerable improvements in the technical quality of valves and loudspeakers were also made during this period. By the end of the decade, it is estimated that world-wide around 20 million private radio sets were blaring. In Germany alone, the figure approached 3 million. In

its resumé of the financial year 1929–30, the German radio industry concluded: 'Through the variety of its presentations, radio has become so rooted in modern life that it has become a necessity of life. Sets for radio reception and their accessories are thus not luxury items but household utensils for everyday use, which continue to have good sales prospects even under difficult market conditions. Particularly with the trend of falling income, radio is able to supply the broad masses with entertainment and instruction in the cheapest form in their own homes.'[11] Coupled to the upswing of radio was the development of the phonograph record as a product for mass consumption. The turnover in this branch of industry grew into the millions and the phono-shares on the stock exchange rose by rates of as much as 1.000 per cent. In 1929, the US company Victor, which since the end of the nineteenth century had dominated the industry together with Columbia, merged with RCA to become RCA Victor. Thus, the company that had been the key to global genesis of television was now expanding into the commercial music reproduction business. Further, the development of electromagnetic sound recording technology had made marked progress. In 1928, Fritz Pfleumer presented the first viable tape for recording. His tape was still made of paper and coated with ferrous oxide, but in the years that followed, BASF developed it into practical synthetic tape and Telefunken built the recording apparatus to go with it. (The presentation of the complete system for preserving sounds coincided with the year that the Nazis commenced public test transmissions of television – 1935.)

The expansion of acoustic supplies to private households to include visual messages was also logically consistent from the film industry's point of view. At the end of the 1920s, three processes converged: first, the drastic decrease in the numbers of cinema audiences, which began in Germany before the immediate effects of the world economic crisis were felt, falling by over 100 million from 1928–1932 – a drop of nearly one third; second, the decline of cinema connected with the sound film becoming generally established, which resulted in a further concentration of the various branches of the culture industry – radio, film, and records; and third, of lesser force but historically important as the germ cell of future developments, the advancing development of narrow-gauge film with its stronger orientation toward the private household as the venue for showing filmic commodities.

Warner Brothers, founded only in 1923 as a joint-stock company in a highly prosperous period, was the first of the international film companies to launch a singing and talking film offensive. In spite of heavy debts, with this lucrative innovation Warner Bros. was well prepared when the cinema crisis set in in the USA in 1927. In 1926, after a lengthy trial period, they had made the first short films with synchronous sound (sound-on-disc) with

The Paramount Building, New York 1930.
(Source: Fülöp-Miller, 1931)

their own company, the Vitaphone Corporation which had been established for this express purpose. From popular vaudeville to the New York Philharmonic, Warner Bros. bought up all the musical stage entertainment that was popular and expensive for the Vitaphones which ran as supporting programmes to silent films, supplementary to regular stage shows, or substituting for these entirely. Success followed quickly and the season of 1926–27 was a very good one for the company, with DON JUAN, the first feature film to include musical numbers, as the attractive highlight. The big breakthrough for the Brothers came in the season 1927–28 with THE JAZZ SINGER. In this film featuring the singing comedian star of vaudeville, Al Jolson, in the title role, for the first time there was synchronous dialogues (and monologues) in the cinema. On 8 July 1928, the first full-length, all-talking film was premiered: LIGHTS OF NEW YORK by Warner Bros. Cinema had successfully integrated the popular theatre form and – together with radio – relegated vaudeville in the USA within a very short time to marginality.[45]

At about the same time, the Fox Film Company established its Fox Movietone News as the first weekly sound newsreel of the cinema. Its spectacular and appropriate start, as befitting the logic of machines, was Charles Lindbergh taking off for his flight across the Atlantic to Paris on the morning of 20 May 1927. That same evening, an audience of 6,200 people saw it in New York's Roxy cinema. Brecht used this euphorically applauded (media) event for his didactic radio feature experiment, *Der Ozeanflug* [The Flight over the Ocean], where he attempted to practise attitudes of socialist collectivity with radio listeners. The success of Warner Brothers and Fox put pressure on the rest of the financially powerful US film companies to follow suit, which they did – fast. Within a very short span of time indeed, the history of cinema made the aesthetic and technical epochal leap to the hegemony of the spoken and sung word and of the synchronous background of sound over visual movement. Many avant-garde film-makers waged a bitter war against this development for they considered the aesthetics of the non-speaking film to be the only aesthetics possible for cinema and because they feared – quite rightly – that the end of dream production would come for the people in the dark cinema-bellies. The chattering and blaring screen would no longer be viable for the organisation of mass illusionisations, suggestion, and agitation. The talking film was the anticipation of television in the cinema, as was clearly formulated in the magazine *Der Deutsche Rundfunk* by the demand for 'an epic audience'. In an article on 'Probleme des Funkkinos' [Problems of Radio Cinema], the author pointed out the power of the new talkies to engender distanced reception and he proposed an individualised form of reception for them – 'families, small groups, who would lis-

ten to the narrative of the talking screen in their homes, separated by distance'.[46]

In Germany, this process of reshaping in film production began in 1929 and was all but completed three years later. In January 1929, Harry Liedke sang ICH KÜSSE IHRE HAND, MADAME [I kiss your hand, Madam] in Berlin cinemas, but only on the screen, for the voice that came out of the loudspeakers belonged to Richard Tauber. Two months later, an impressive sound film experiment by two art-for-art's-sake avant-gardists was released; MELODIE DER WELT [World Melody] (1930) by Walter Ruttmann and Wolfgang Zeller. A few years later, both were indiscriminately following each and every turn of fascist film, even to its most brutal climaxes. Ruttmann ended up supplying film images to the Nazi armourers, and Zeller, as Veit Harlan's personal composer, played an essential part in making JUD SÜSS the intense organiser of feelings in the cinema that it was.[47] In December, the Ufa released MELODIE DES HERZENS [Melody of the Heart]. In its wake, there was a veritable operetta epidemic, culminating for the interim with DER KONGRESS TANZT [The Congress Danced] (1931), which was exemplary for this new form of filmic commodity: the cinematographic idea at one of its all-time lows, with Willy Fritsch and Lilian Harvey as the German super-stars. Some of the elite directors, who had stayed in Germany, attempted to counter this frenzy for musicals by setting other directions on the talking screen. Joseph von Sternheim made DER BLAUE ENGEL [The Blue Angel] in 1930, G.W. Pabst made WESTFRONT 1918 in 1930, KAMERADSCHAFT [Comradeship] (1931), and with his version of Brecht and Weill's *Die Dreigroschenoper* [The Threepenny Opera] confronted the author of the work with a commodity-aestheticised product that not only drove Brecht to take legal action but inspired him in his 'Dreigroschenprozeß' experiment to formulate some of the most brilliant theses in cultural sociology of film of the time. M (1931) was Fritz Lang's first sound film, with Peter Lorre whistling a few bars of Grieg's *In the Hall of the Mountain King* whenever he felt the urge to kill.[48] By the time that Lang had finished DAS TESTAMENT DES DR. MABUSE [The Last Will of Dr. Mabuse], which fell victim to Nazi censorship practice and was not shown in German cinemas, the aesthetic and technical process of transformation was complete. All 132 films produced in 1932 were talkies. In the USA, more sound than silent films were produced in 1929. In the same year, after touring in America, the theatre director Max Reinhardt laid the blame firmly at the door of the cinemagoers: 'The audience only wants to see talking films and boycotts the cinemas that don't show them. Only yesterday, an entire industry knew only silent films and today it has plunged into the production of sound films. No bank will lend

even a single dollar now for the silents. At the moment, the silent film is dead over there.'[49]

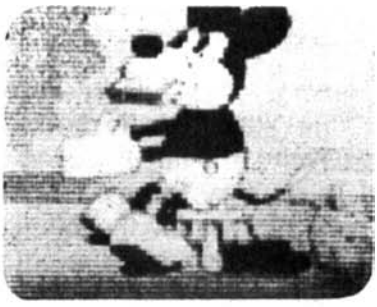
The synthesis of acoustic and visual reproduction in the cinema and their culture-industrial implementation in the commodity form of the sound film signified a further step in the expansion of the electrical industry as the new economic and technological centre of innovation in the history of the media. In the USA, the firms which were locked in an embittered struggle over the leading position regarding patents were the giants of the industry: General Electric and its subsidiary RCA, and Western Electric with its Bell Telephone Ltd. These two companies were also the most important factories for television R & D. In Germany, the market was also divided up between two (groups of) companies: the Tonbildsyndikat (Tobis) AG, an amalgamation of holders of sound film patents and various banks, and the Klangfilm GmbH, which was owned jointly by the record company Polyphonwerke AG (10 per cent), and the electrical giants AEG and Siemens & Halske (each with a 45 per cent interest); both had developed their own sound film systems and both were part owners of the innovatory television company, Telefunken. Klangfilm laid claim to the manufacture of sound playback equipment and its marketing to cinemas, Tobis usurped the film production sector, supplying it with sound recording devices. What is more, in 1929, the US and the German groups became more closely associated. After raising their share capital by a huge amount, AEG transferred shares with a nominal value of 100 million Reichsmarks to General Electric, with whom they were already allied by an agreement allowing use of each other's patents. This sum represented one quarter of AEG's share capital and the US group received five seats on the board of directors.

Telefunken was not the only television innovator in Germany. Their most serious rival came in the shape of an amalgamation of firms which were involved in the radio and film apparatus business. In July 1929, shortly after the first test broadcasts of the Reichspost, the Fernseh AG was founded jointly by Robert Bosch GmbH, the British company Baird Television Ltd., D.S. Loewe, and Zeiss-Ikon, for the purpose of combining their diverse industrial expertise in television products. This was a masterly move indeed, both economically and technologically, for it enabled the different firms from various branches of industry to pool and exploit their resources together. Bosch – as early as 1917, the company had represented its interests as a founding member of Ufa's board of directors – contributed the know-how from precision engineering and technology of measurement, Loewe's speciality lay in valves and amplifiers, Baird was the leader in the field of mechanical image scanning, Zeiss-Ikon had already made a name for themselves as manufacturers of quality optical and photographic equip-

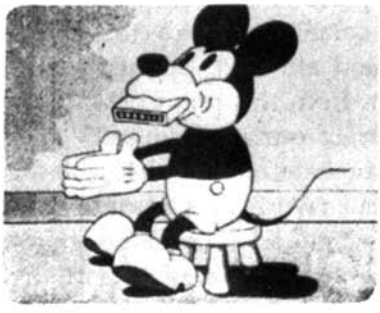
ment, and their subsidiary, Ernemann, for their excellent construction of film projectors. The times where lone inventors tinkered around in small private laboratories were thus absolutely a thing of the past. From this point in time, the triad of Telefunken, Fernseh AG, and the Reichspost would push the television project forward in the coming years.

Television represented the ongoing diversification of an industry that had located itself at the interface of the various reproduction media as a new terrain for investment and exploitation in the increasingly internationally competitive communications industry, which the state had begun to take notice of and follow closely, and was a further stage in the development of a culture industry that was tending increasingly in the direction of symbioses of heterogeneous representations of staged and non-staged realities. – Although patterns of explanation such as these are not, in many respects, logically inconsistent, and although popular histories of technology would have us believe that from this point onward everything moved steadily toward the realisation of 'our' medium of TV, the underlying historical process remains incomprehensible, unwieldy, and certain aspects are almost grotesque. The capitalist world plunged into its most murderous crisis ever. Rising unemployment, poverty, serious housing shortage, and hunger were the existential worries of a very large proportion of the population in the final years of the Weimar Republic. For example, in the cinemas the more expensive seats were hardly ever sold. It is very hard to associate, let alone reconcile, the documentary footage in films like Hans Tintner's CYANKALI [Cyanide] (1930), Alfred Döblin and Piel Jutzi's BERLIN ALEXANDERPLATZ (1931), and Bertolt Brecht and Slatan Dudow's KUHLE WAMPE (1932) with the industrial and state project of conquering the poorly furnished households with a new media artefact. Neither does the fact that from 1929, certain firms were marketing kits to build your own television, change the impression that there was a glaring contradiction here. The type of historiography that digs out one or two tinkerers from the experimental phase of the project, who did manage to receive the low-definition test transmissions on home-made apparatus, as evidence of its 'Volksnähe' or closeness to the people, are merely victims of the industrial complex's propaganda that shouted 'Fernsehen für Alle!' [Television for Everyone!]. Promises, like 'up-to-the-minute pictures ... get through everywhere, to every home',[50] must have sounded like pure cynicism to the ears of those whose very existence was threatened.

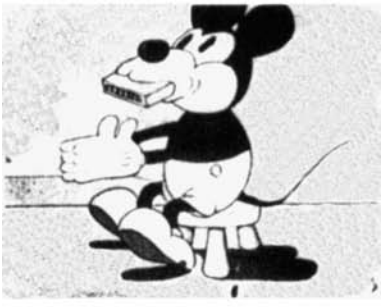
The contradiction loses a little of its socio-cultural edge if one considers more closely the conceptions that crystallised after the propagandists of television had taken the step of going public and after television became the industrialised reception of televisionary worlds. Options like von Mihály's



60 Scanning Lines
(a)

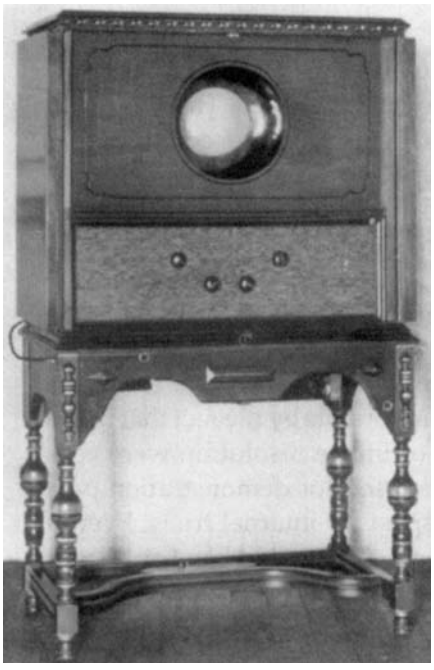


180 Scanning Lines
(c)



Enlargement
(e)

Zworykin demonstrated the quality of image definition produced by his 'Iconoscope's' picture tube using the sharp contrasts of Walt disney's famous mouse. (In: *Television* 1936, p. 223)



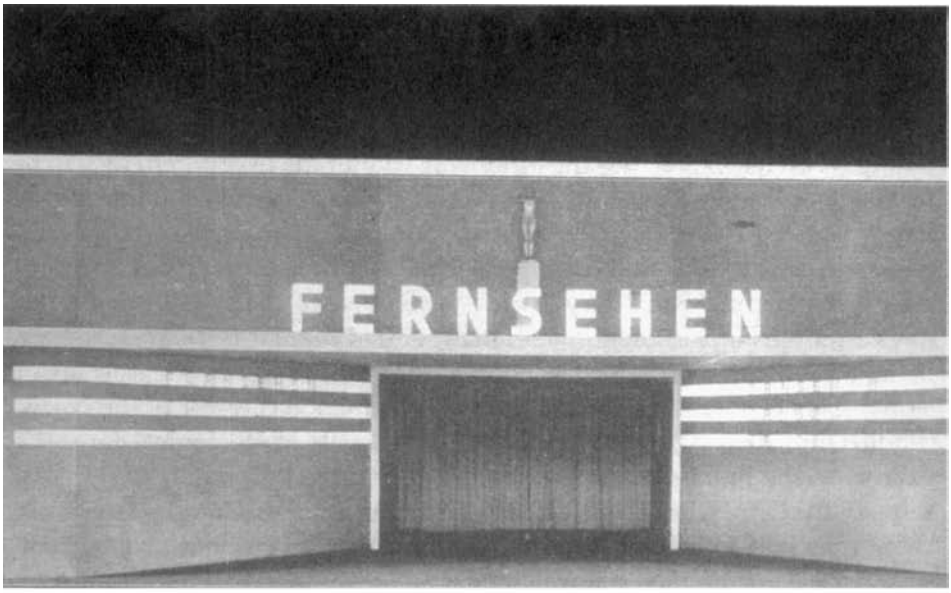
TV furniture from the early period of electronic television. Receiving set with a round screen and a cathode-ray tube for reconstituting the images by Philo T. Farnsworth.

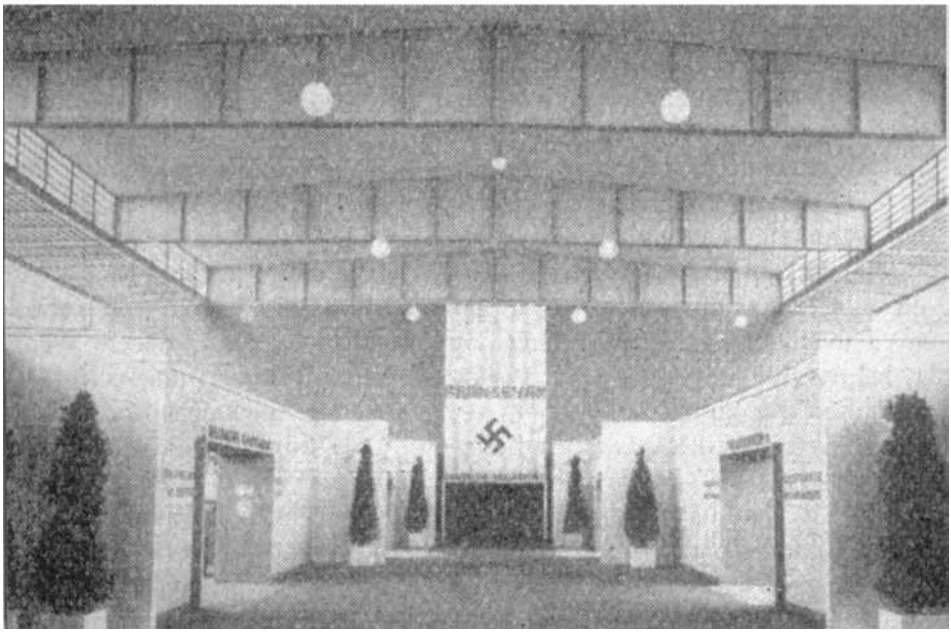
The British counterpart of Germany's *Volksempfänger*: Baird's TELEVISOR of 1930 in close-up and in a viewing situation (in the October 1930 issue of *Television*).

Volksempfänger or Baird's comparable Televisor (1929–30) were not pursued beyond a certain point and did not become established. The simplicity of their construction and the rudimentary images they produced meant that they could bring little more than shadow-plays into the living room. By contrast, with the prototypes of television sets for individual reception presented to the public of the early 1930's which were encased in mahogany or walnut veneer, the piece of luxury furniture took on significant shape. Veritable shrines of affluent domesticity were offered here which, incidentally, took up rather a lot of space, for the cabinets had to be large in order to secrete the cumbersome mechanics of the apparatus. None of the early sets ever went into mass production (also made impossible by the fact that in the period 1929–1935, the technical standards for image resolution were constantly being changed). The prototypes were used for demonstration purposes and many were bought by the Reichspost for internal trials. Even if they had been produced in significant numbers, they would have only been affordable by an economic elite, whom the manufacturers took pleasure in personifying in their promotional pictorial material. It is possible that a part of the fascination which these noble artefacts held for the masses was founded on the social status that they represented.

However, the social form in which one's vision was going to be tele, was still an open question. Beside the perspective of family-cum-intimate reception, engineers and disseminators of the new communications technology also envisaged collective public viewing events. In 1927, the General Electric Company (Alexanderson TV system) and Western Electric (Bell TV system) had designed the first monster apparatus for televisual large screen projection, and ever since then, work had been in progress on apparatus for cinema-type utilisation of television in addition to the artefacts that targeted the living room. – Here, too, no rigorous distinction was made regarding the sites where viewing would take place. Antedating the beginning of the debate on High Definition Television (HDTV) and its opulent screens by half a century, the pioneers were already thinking in terms of 'life-size television on the big screen',[51] which the owners of such apparatus would be able to savour at home.

In Germany, Telefunken and Fernseh AG developed projection equipment that was viable for the cinema but which had different arrangements. For the time being, this was to be the television of those who could not afford to buy their own TV set – a first and second class system that was also retained during the era of German fascism: expensive luxury furniture for the privileged few and collective consumption for the masses. In a popular treatment of the time for the Siemens' publishing house, this becomes a





Entrances: (above) to the television section, with August Kattentidt's allegorical sculpture in the centre (above the 'S') (source: *Fernsehen*, No. 10, October 1930, p. 1); and (below) to the television demonstration studio of the German Post Office at the Berlin Radio Exhibition of 1933 (source: *Fernsehen und Tonfilm*, No. 5, October 1933, p. 53).

clear temporal succession of two levels of diffusion: 'Radio developed in such a manner that first came the home set for individual reception and from this, about ten years later, developed the appliances for collective listening. With television, it is the other way round: the first urgent task to be tackled is collective television ... and then – perhaps – television sets for the home may be developed.'[52] However, the first *Fernsehstuben* (television parlours) of the German Post Office – this neologism preserves linguistically both the public and the private – were only set up in April 1935, a few days after the Nazi leadership had inaugurated regular test transmissions. 'If television can't come to the people, then people must come to television.'[53] This is how Eugen Hadamovsky, production director of the Nazis' 'Radio Unit', dressed up the virtue born of necessity in ideological garb. The visitors to the first television parlour, set up in the Berlin Post Office Museum in the Leipziger Strasse did not, however, enjoy enlarged tele-visions. What they had to look at were two Telefunken FE IV domestic television sets, removed from their natural habitat and re-located to a public place.

'Today, National Socialist Radio, in collaboration with the Post Office and German industry, begins regular transmission of television programmes – the first broadcasting authority to do so in the world.'[54] If one were to classify the radio-political event of 22 March, 1935 by simply reproducing these words of Hadamovsky's and leaving it at that, as the history of television has done up to now, it would imply that the boastful speeches of the Nazi leaders are to be taken literally. Obviously, in the eyes of the world they wanted to be seen to pre-empt the British BBC, which had planned and announced that programmes would be going out to the public at the end of the year. Just as obviously, the professional pride of German technicians was convenient for the nationalism of the political leaders. However, what lay behind this propaganda façade was, in effect, an entirely unspectacular event. Radio programming was the responsibility of the Reichs-Rundfunk-Gesellschaft (RRG) [German Broadcasting Company], which was under Goebbels' ministry – responsible for the heads and hearts of the people – and the RRG had its competencies extended. Henceforth, it was allowed to carry out audiovisual experiments with programmes, starting with just three evenings a week, and was permitted to use the transmitters of the German Post Office, which had been transmitting trial telecasts for years anyway. The appendix, that this would now also be available to a section of the public in Berlin, was a political gesture that should really have been regarded as self-evident, considering that radio and the years of experimentation with television carried out by the Reichspost had been financed by the listeners through their license fees. 'Now that television is operational, a certain level has been reached that will allow the public to participate in further

The material power of the medium was also experienced by the people who stood in front of the cameras. Right: the illustration shows US TV star Maria Gambarelli wearing the typical make-up and clothes required by low-definition television (Dowding 1935). Below: A photograph of Jane Carr, made up for television and how she looked on the TV-screen (1932).

TV Make-up and the Force of the Medium

Above: Images from British TV-experiments 1927–28, photographed direct from the screen. Far left is Baird's first model, the doll 'Stooky Bill' (Swift 1950).

trials.'[55] It sounded quite simple in the words of Postmaster General Banneitz, whereas Hadamovsky stylised it to an event of ontological significance, to the 'most holy mission of broadcasting', serving only a small number of Berlin 'Volksgenossen' [National Comrades] for the time being, but in anticipation of the hour 'when the few have become thousands and tens of thousands until, finally, our whole people will share in the highest visual delights that we can give them'.[56]

At the international level, such pathetic propaganda did not go uncontradicted. Already in May 1935, the journal *Intercine*, edited by Rudolf Arnheim and published by the League of Nations International Institute for Instructional Films in Rome, had openly voiced the fears aroused by Nazi-TV: 'Whereas television, considered in an international context, should serve exclusively peaceful purposes and understanding between nations, it is to be feared that in certain instances it will not only serve to fire nationalist sentiment – which is in itself fair enough – but also to launch defamation campaigns, crusades based on lies, and even to prepare the way for territorial annexations and conquests. It is quite probable that, under the guise of propaganda programmes, we shall witness a *war of minds* (italics – S.Z.) which is nothing less than the preparations for a real war, as soon as words, which have operated alone until now, are joined by pictures.'[57]

What the 'National Comrades' were served up to begin with in the way of fleeting 'visual delights', the organisers did not even dare to charge admission for. Access to the public presentations in the *Fernsehstuben*, which were opened up successively in the years that followed and maintained their service until the outbreak of war, was free. They served the ends of the gigantic and – considering their life-time of only five years – most expensive advertising campaign for a new mass medium ever waged. The 'first television programme service in the world' was state-financed and state-organised advertising to establish a new industrial product.

'The medium is the message' – Marshall McLuhan formulated his core statement at a time when the signifying practice of television was still strongly dominated by the artefacts themselves. The meaning of the images was overlaid by the importance of the technology that enabled their reception. This is especially applicable to the period of public access to trial TV transmissions. Their use-value for the organisers was testing, for industry it was presentation, and for the public, the adventure of a new communications technology.

The pictures that flickered on the screens of the receivers were, for the most part, not new. They had been seen before in the cinema. In the main, feature films and 'cultural' films were shown that had been ruthlessly chopped up for the television scanner and the tiny screens of the receivers.

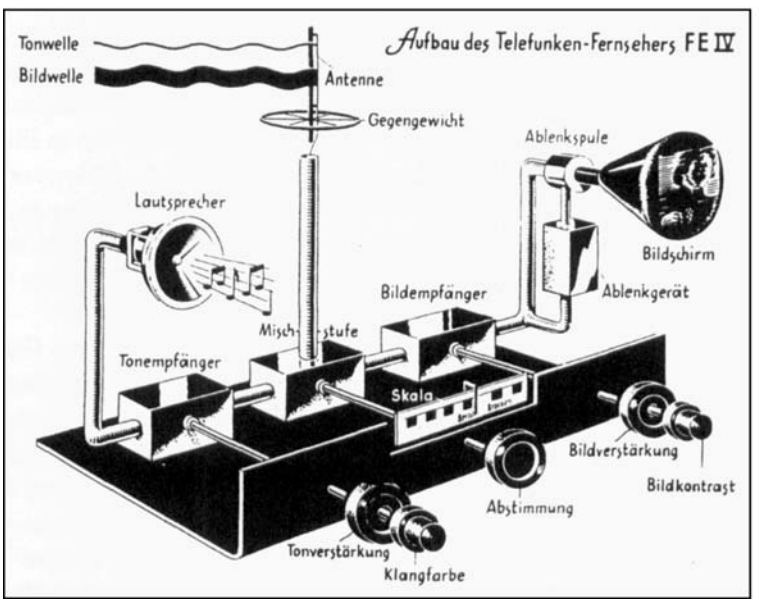
Only motifs with clear contours, particularly close-ups, and films dramaturgically constructed in such a way that they could be compressed for television were possible candidates for transmission. Long before the video-clips of our day started to use film history as a quarry for their rhythmic montages, it was processed to render it telegenic, and this applies to both fiction and non-fiction works of the body of historic film. Nor was it the film-makers who decided how and what of their product would be presented in the new medium; it was television engineers and post office officials who selected the material on the criteria of its televisual suitability. This is one of the circumstances on which the deep mistrust of creative film-makers vis à vis the voracious image machine was grounded that still survives until the present day. Both the apparatus and the raw material for this act of violence against filmic material was supplied by cine-technical industries and film distributors. No wonder that Tobis and the Ufa got a special vote of thanks from Hadamovsky in his bombastic inauguration speech.

The first production for German television, often referred to as a 'teleplay', was a short film titled *Morgenstunde hat Gold im Munde* [The Early Bird Catches the Worm]. It was made in 1930 by the Kommerzfilm AG under the direction of the Post Office engineer Banneitz, in the same studio in Berlin's Chausseestrasse 123 where Asta Nielsen had stood in front of the camera for her first German film production. At the time, Eduard Rhein was fascinated by this media event: '... and now a new film, a film for wireless tele-cinema, takes its first halting steps into the world of black and white dramas of destiny in the selfsame place. To give life to the soulless work of the engineers with the human face. Of course, there would have been other possibilities; animals, plants, or things. But man likes best to see himself – but only when the image of his own, multiform appearances is successful, is the work of the engineer considered as complete.'[58] In actual fact, the production of this first film made especially for television merely used simple aesthetics of expediency. In the absence of suitable film material, with a dramaturgy of simple gestures, of crude illusions of motion, an attempt was made to realise images that were as undifferentiated as possible for the new apparatus.

Apart from these cine-clips, the first forms of current affairs reporting for television appeared in 1935. Again, film was the raw material used. The technical arrangement employed is significant in that it illustrates the relationship of these two modes of realising visual illusions of motion: the TV conglomeration, Fernseh AG, developed a so-called intermediate film process. The scene that was ear-marked for transmission was filmed with a conventional movie camera. The film was then developed, using a fast process, and could then be scanned for television transmission without any signifi-

cant time lapse. All the equipment necessary for this was stowed in an outside broadcast vehicle, specially built in cooperation with Daimler-Benz. In the course of time, the film development process was speeded up to such an extent that the mechanically and chemically reproduced products were broadcast by the television station only a matter of seconds after they had been shot. This procedure served not only to bring television temporally closer to the events themselves. In reversed order, it was used for the big projection of images which were shot with a film camera directly from a receiver and, immediately after the film had been developed, it was projected with a standard cine projector. In its most advanced form, this system degraded film to a wholly temporary and malleable raw material. The intermediate carrier used was not a roll of film but a loop. As soon as the images had been scanned or projected, respectively, the film emulsion was washed off, a new coat applied, and the loop was ready for re-exposure. Economic use of material in the service of television at the height of its rationale: the filmed pictures were not even considered of sufficient value to warrant preserving.[59]

Of seminal importance for experiencing the new communications technology were the directly transmitted announcers who introduced and smoothed over the transition from one piece of film to the next. This represented de facto something like a new use-value of television. Directly addressing the audience was, and still is today, how the temporal immediacy of the medium and the diffuse feeling of taking part is organised. When this practice began in 1934, the possibilities of direct visualisation were exceedingly limited and subject to extreme, almost grotesque, arrangements. The 'studio' consisted of a dark cell with a stage measuring 1½ × 1½ square metres. A bluish light beam, controlled by a Nipkow disc, shot through a small aperture and scanned the person pixel by pixel. It was necessary for the camera's subject to be only a short distance from the disc, so only close-ups were possible. The faces of the scanned persons had to be made up garishly, and reddish areas, like the lips or eyelids, had to be covered with green or black make-up because of the photo cells' strong sensitivity to red. The first announcer who submitted to the violent dictates of the new medium's shooting technique was the young actress Ursula Patzschke. A stolid personality who fitted in well with the zeitgeist, in addition to introducing the programmes, she was occasionally allowed to read a poem, or play a short scene she had written herself, or talk to her dog. Gradually the organisers began to coax stars of stage and – particularly – screen into the small dark cell. Among the first to let themselves be scanned for TV were



(Above) Ursula Patzschke, Germany's first TV announcer on the screen of a Braun tube receiver (photograph taken from Kappelmayer 1936, p. 46).
'For those to whom a private telephone connection, a typewriter, or driving an automobile are natural amenities of everyday life, they will soon take the use of a television receiver for granted.' (R. Thun in: *Fernsehen und Tonfilm*', No. 3, 1930, p. 106)
(Below) Schematic of Telefunken's FE IV television.

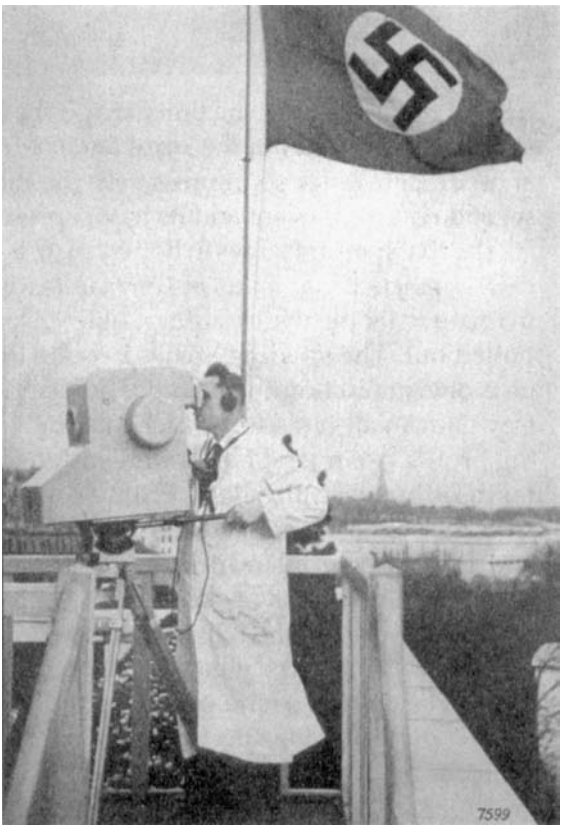
Johannes Heesters and Otto Gebühr, the actor who played Fridericus Rex in the lavish Ufa production.

Yet this primitive arrangement represented enormous progress on television's path to a signifying practice of its own. In the years 1929–1934, electrical television was nothing more than cinema distributed via new

channels, with its products suitably truncated, *telecinematography*, actually. Moreover, it was silent cinema. The capacity of the radio wave bands on which the tests were transmitted did not allow audiovisual presentation. Whereas Baird in England was successfully transmitting live broadcasts of horse races, for example, in Germany they still clung to the raw material of film as the basis for electrical illuminations. It was considered that the yield of the mechanical image dissectors and reconstituters was too meagre for producing illusions of reality in motion to be worthwhile. During this time, the concept of electronic television gradually became more concrete. Zworykin, who in the meantime was working for RCA, had developed the Braun tube into a useful picture tube. With this tube, or *Kinescope* as it was called, at least the receiving end of transmissions was liberated from mechanics, and Zworykin claimed that with this tube he would easily be able to produce image definition equivalent to that of narrow-gauge film. A year later, Manfred von Ardenne who had contact with the exiled Russian in the USA, began to experiment with electronic scanners and receivers. However, it was not until 1933 that Zworykin (for RCA) succeeded in developing the Iconoscope, the famous component that was celebrated in expert circles as the 'electric retina'.[80] This meant that the camera apparatus was also free – potentially – of the sluggish mechanical method of scanning.

Television production technology had caught up with that of cinema. For this first functioning camera tube enabled pictures for television to be taken under similar lighting conditions as for film. Zworykin's invention, though, was not patented until 1935. The same year, RCA began with its mass production. By this time, there was another competitor of the Iconoscope on the market, a second electron-optical system. Philo T. Farnsworth had worked for many years on an alternative solution to the problem of the camera, along the lines of the work done by Dieckmann and Hell in Germany. In the years 1928–1934, approximately parallel to Zworykin's research efforts, he succeeded in building an Image Dissector tube that worked. With these two systems in existence by the mid-1930s, the days of mechanical television were numbered, although it was not immediately ejected from industrial praxis.

An imposing piece of media history could be written focussing exclusively on the modern-day Olympics as historical events. For broadcasting in particular, these massive international sporting spectacles had often coincided with technical innovations and sharp increases in the number of households with receiving apparatus, especially in the case of television. The Olympic Games received their ultimate shape as gigantic media events and, in the meantime, it appears as though they are only held for the purpose of mediatising them. Apart from the pictures of rockets in the early



Electronic storage television pickup camera from Telefunken on the roof of the German pavilion at the Paris Exhibition of 1937 (In: *Fernsehen und Tonfilm*, No. 6, 1938).

'Intermediate film' outside broadcast vehicle of the Reichs-Rundfunk-Gesellschaft with camera mounted as used at the 1936 Olympic Games.

days of the space-race, the first man on the moon, and the world championship boxing matches in the 1950s and 60s, no other socio-cultural phenomenon demonstrates so impressively the interconnected fusion of first and second reality, of event and its media presentation.

The XI Olympic Games in Berlin, 1936, is not only exemplary of the politically aestheticising praxis of German fascism. It was one of the first mega media events for which all available technical and directorial stops were pulled out. The sporting arenas became the parade ground for the strategists of visualisation and sound. The electrical industry threw itself into the fray with an all-out effort which, naturally, meant reaping the corresponding profits. 350 microphones were installed in the Olympic sports complex for radio broadcasting alone. From a control centre, reporters from 40 countries sent almost 3,000 radio reports. There were additional microphones and loudspeakers all over for announcements and internal communication purposes. The beams of powerful floodlights made sure that the powers-that-were were suitably illuminated in a martial fashion as an effective optical complement to the gigantesque architecture of the Berlin Olympic Stadium. The natural sound of the bells in the stadium's bell-tower were not loud enough for the spectacle's directors, so electric amplifiers were installed to heighten their acoustic effect. There was a special 'Olympic Newspaper' and Leni Riefenstahl was given carte blanche to shoot kilometers of celluloid for the 'Olympia Film'. Her cameramen were omnipresent, filming from every angle, every perspective, every distance; from towers, from holes in the ground, under water, from zeppelins and balloons, from aeroplanes. In 1938, after two years in the edit suite, the two feature-length parts of the film were released, FEST DER VÖLKER [Festival of the Nations] and FEST DER SCHÖNHEIT [Festival of Beauty]: an impressive example of totally stylised advertising aesthetics, which has received renewed international attention and approbation in recent years precisely because of this aspect: the language of advertising has become the ontology of media expression. Leni Riefenstahl was a past master of it.

The Olympic Games were grasped as a welcome opportunity for a thorough practical trial of a media technology that afforded a vast number of people visual and acoustic participation in an event to which they had no other means of direct access. In the run-up to this monumental show, there was a wave of excessively brutal arrests of potential resisters, creating the appearance of internal peace by force. For the first time, the German Post Office and the Reichs-Rundfunk-Gesellschaft (RRG) [German Broadcasting Company], together with their industrial suppliers, practised live television on a grand scale. To this end, the whole gamut of the most advanced technology available plus apparatus specially constructed for this event was

employed: two mobile outside broadcast vehicles equipped with intermediate film transmitters supplied by Fernseh AG, electronic cameras with Farnsworth tubes, and electronic cameras (*Bildfänger*) with Zworykin's Iconoscopes. In fact, in this way German industry was replicating the American market situation and its competitors. The Farnsworth camera was operated by technicians from Fernseh AG, and, behind the Iconoscope camera, were technicians from Telefunken (and the German Post Office which had also built an electronic camera of this type). The Telefunken camera dominated the assembled apparatus not only symbolically but also on account of its sheer size. Zoom lens included, it was 2.20 metres long and thus had the same dimensions as a semi-automatic rifle, as a picture album published by the cigarette industry, an important and popular guide to the games, pointed out. Technicians and commentators, too, lapsed into military metaphors when referring to this artefact: they called it the 'Fernsehkanone' [television cannon].

The various types of recording apparatus were systematically deployed around the Olympia sports complex. In a control room underneath the stadium – dubbed the 'TV bunker' – the images supplied from 10 different locations were edited and transmitted to 26 public television parlours and two big screen projection theatres in the Greater Berlin area. It appears that they were in great demand. Tickets were distributed to visitors to these public television places. The Nazis had counted them. According to their figures, 162,228 people watched television during the Olympic Games, an average of 10,000 per day. The viewers experienced the most extensive televisuals ever offered in Germany. The television transmitting station Paul Nipkow broadcast live from Olympia from 10–12 a.m. and from 3–7 p.m., interrupted by a sprinkling of clips. Later in the evening, in the regular programme from 8 to 10 o'clock, the day's highlights recorded on film were shown again – quite an extravagance, considering that this television was practically an exclusive event for Berlin.[61]

Although the 180-line images could still only give a shadowy impression of the sporting events and had to be supported by radio reports in order that the viewers could decode the details – technically mediated participation being the decisive factor involved here – Nazi television did score important successes with this major offensive that were acknowledged by their competitors from abroad. For the first time in history, this communications technology was made accessible to a large number of people as a medium and thus to potential customers for receiving sets. Further, electronics had proved its ability to realise these new dimensions of use-value: the direct visualisation of a public event. Although the picture quality of the intermediate film system was still much better than the electronic images, however,

in contrast to mechanical scanning, which had clearly reached its limits, for the first time the variant with scope for further development, electronics, had been brought under control in practice. – The technical possibilities of this perspective are illustrated by the tremendous progress that was made within the brief period that followed. The Fernseh Co., in 1939–1940, i.e., during wartime, developed and built an apparatus for 1029 lines.[62] This is roughly approximate to the vertical density of today's HDTV sets.

Suddenly, it was possible to show everybody everything; the trouble was, one didn't quite know what one really wanted to show. Brecht's pamphlet of 1927, 'Radio – eine vorsintflutliche Erfindung?' [Radio – an antiquated invention?] was a critique aimed at the bourgeoisified programmes, in which he accused the young medium of radio of producing a mere technological shell that was devoid of content. 'It is indeed a colossal triumph of technology that finally, a Viennese waltz or a food recipe can be made accessible to the whole world. A surprise attack, as it were.'[63] In the case of radio, this polemic was, at very least, contentious. For even before it became widely established, radio did possess use-value for certain limited sections of the populace such as tradesmen, radio-amateurs, or the press. In principle, the rudiments of a mass democracy that did begin to develop in the Weimar Republic were an appropriate environment for the new media discourse of radio, to which many and varied suggestions were brought for an emancipatory form, particularly from 'below', from the radio users themselves. But now television? Apart from the special case of the Olympic Games: What did one want to show, and indeed what could one have shown in a societal situation where the most important events and processes were not intended to be visible, were not allowed to be visible? The massive preparations for war, of which only a tiny facet became tangible when 2-year military service was introduced in 1936? The build-up of a military economy by the Nazi leadership, which increased military expenditure already in 1937 to 16.5 billion Reichsmarks, 22 per cent of national income? The intensive and extensive development of the state apparatus of terror and annihilation? From 1 October 1936 to 31 January 1937 alone, 4,305 people were arrested and interned in concentration camps for 'communistic subversion', according to a report of the Gestapo. The decrease in workers' wages in real terms? In 1937, wages were on average – in spite of a considerable increase in productivity – at the same level as 1914 or 1928, and, additionally, depleted from the progressive rise in compulsory contributions to the various Nazi Party fund-raising organisations and their alleged social projects. The permanent deficit in the production of consumer goods, that in 1936–37 was even below the level that Germany had achieved before the world economic crisis? The talks on industrial planning held in March 1937,

which included the plan to annex Austria because of its rich iron ore deposits?

What one wanted to show was that which stood in diametrical opposition to social and political reality, and this new communications technology was still almost totally unsuitable for that. To reproduce audiovisually the gigantesque mise-en-scène of power was the privilege of advanced film technique. The television screen, still small, still shadowy, still blurred, would have jeopardised the quality reproduction of stylised dictators' speeches and massive mass rallies, would have turned the effect of these events into the very opposite of what was intended. For organising the rapid circulation of the Nazi gospel, they had usurped radio, which had been a top priority for systematic improvement and expansion ever since 1933. At the receiving end, the availability of really cheap radio sets like the 'Volksempfänger' (VE 301) or the 'Deutscher Kleinempfänger' (DKE) meant that virtually every 'National Comrade' had access to one.

More tolerated by the political top leadership than regarded with particular interest or specially promoted, television continued to advance but within an odd kind of vacuum. Industry, RRG, and the German Post Office had got themselves the 'Reichspostforschungsanstalt' [Post Office research institute] on 1 January 1937 specifically for the television project. Work progressed there intensively with large sums of money being invested in perfecting the individual system components, the setting up of a transmitting infrastructure, and the organisational side of a programme service. In 1937, the Post Office announced the introduction of a new standard for television images. With 441 lines at 25 frames/sec, this standard approximated the quality of definition obtained with 16 mm narrow-gauge film and had thus arrived at the picture quality of home movies. In actual fact, the standard was not introduced proper until the end of 1938, when the corresponding transmitter in the tower of Berlin's America House went into service. At the same time, the television studios were expanded. Increasingly, pieces written especially for television were produced: 'entertaining' one-act plays lasting a few minutes and with a parsimonious use of actors and dramaturgy, whose banality knew no bounds. *The Menu*, *Frau Matschke Intervenes*, *At the Bus-stop*, and *A Nice Old Man* were some of their riveting titles.

As of 1937, all the television receivers were electronic but what most frequently flickered across their screens were still products of the cinema, cut up to the length of a trailer, and occasionally shown in full length. Riefenstahl's filmic tribute to the Nazi Party's convention at Nuremberg, TRIUMPH OF THE WILL, was still one of the most popular candidates for dissecting into pixels and lines in 1938. Her photography, with its wood-

cut-like quality and clear advertising aesthetics was eminently suitable for illumination by electrons. Only in 1939 was film as the raw material of television overtaken by direct transmission. The prerequisite technical and production conditions for this were met when three new studios opened in Berlin's Deutschlandhaus, equipped with sophisticated cameras and mixing equipment. The teleplays, performed live every evening, got longer and dramaturgically more complex. Plays about one hour long were now the norm. Two news magazine programmes, *Zeitdienst* and *Aktueller Bildbericht*, established television's profile as a fast medium, like radio. 'Specials', like 'Police Warning – *Dr. Schwiegk talks to the officer in charge of thefts by pickpockets and stolen luggage at Police Headquarters*', televised on 20 June, at 8.40 p.m., created programme types that post-war television was able to take up again.[64]

The production machinery was highly developed and began to function. Great efforts were being made for the nation-wide distribution of the Berlin tele-visions by laying cables with a wide band width and erecting new, powerful transmitters. But for whom was this immense effort? From 1937 to 1939, the annual expenditure of the German Post Office on technical equipment was between 18 and 23 million Reichsmarks, not including the cost of the programme service.[65] But where were the viewers?

In its most advanced form, television is an omnipresent medium where the event and its reproduction coincide, blurring the dividing line between the private and the public. Television levels out both spheres of social life on another plane in its specific representation and in the basic apparatus arrangement of the medium. Facets of the public realm, of the surface of public discourse, are delivered to the private sphere of groups or singles in front of the receivers. And vice versa: this medium lives off publication of the private, whether it be staged expressly for the camera and microphone or whether the apparatus directly invades the private sphere of the people shown. In the reception of television itself, the private and the public are again interlocked. The individual television set, which is tuned to present that which is public, is always one of many. The use of the broadcast messages by an individual presupposes mass use of the same. Without this ambiguity of television's reception, the discourse does not function.[66]

The latent tension between public and private is one of the most conspicuous features of historic records depicting the outward appearance of German fascism. The gigantesque and cold architecture of the Nazis' prestige buildings for culture, politics, and industry confronted their propagation of an intimate idyll of house and hearth, which found its stylised philistine ideal in a semi-detached house with garden and fence. The 'aestheticisation of politics' (Benjamin), pointedly symbolised in the mass marches, parades,

Pictures from the magazine *Fernsehen und Tonfilm*, No. 7, 1935.

and living human ornaments of tableaux vivants, went hand in hand with the de-politicisation of commercial mass culture that Goebbels, as the chief organiser of the vast Nazi culture industry apparatus, pursued very effectively indeed. This underpins emphatically the view that the escapism desired by the system had an ideological character. The pragmatism of a media service that aimed to produce feel-good moods and jollity round the clock, united the needs of aesthetic commodity-producers, who wished to find a *modus vivendi* with the Nazis without actually having to celebrate them, and the impulses of the conformists to the system and fellow-travellers: all could at least drop out of harsh everyday reality by consuming entertainment. Neither did the interspersion of the thick carpet of entertainment offerings with propagandistic acts of violence militate against this – on the contrary, the two dimensions cross-fertilised each other.

The signifying praxes of cinema and radio, the most important media for conquering and defending the hearts and minds of the people under fascism, can be interpreted as media realisations of this tension: coherence/organisation on the one side; diversion/individuation in consumerism on the other. There were a few exemplary attempts to implant explicit filmic translations of racist, militaristic, anti-communist, and terroristic politics in the dream-factory of cinema – they nearly all failed ignominiously at the box-office – and these contrasted with the non-stop mise-en-scène of heart-rending melodramas, sickly-sweet classics and operettas, and thigh-slapping comedies. SA-MANN BRAND, HITLERJUNGE QUEX, and DER EWIGE JUDE were the one side of the coin, KRACH IM HINTERHAUS, RENATE IM QUARTETT, and the tear-jerkers starring Hans Moser, for example, were the other. Both were part of a systematic context. Admittedly, the exploitation of the cinema by the Nazis achieved a special quality in a few instances of filmic productions where these two sides were brought together. Here, the melodramatic and inflammatory film JUD SÜSS of 1940 stands as a prototype; its director, Veit Harlan, as exemplary for a type of art producer who knew how to combine cineastic standards with the exigencies of day-to-day politics outstandingly well. This applied equally to radio. 'Goebbels provided non-stop entertainment right up to the end of the war', interlaced with isolated interventions of political agitation whenever the Nazi leaders deemed it necessary, like the radio play *Skaggerak*, a sabre-rattling acoustic battlefield; with choral works, whose concept had been stolen from the Workers' Movement; with the *Stunde der Nation* [Hour of the Nation]; and during the war, of course, with reports by the propaganda units from the battlefields of Europe.[67]

The priorities given to the two sides of this ideology conglomerate in the various media changed over the course of Nazi rule. In the second half of

the 1930s, a stronger accent on the production of pragmatic entertainment can be detected. The mise-en-scène of the public space was confined to a few spectacular events which thus augmented their potential effect. By contrast, in diverse areas of socio-cultural praxis the offers of satisfaction of the individual's needs within a corset of collective forms of organisation increased considerably such as, for example, the programme of the 'modern leisure company' Kraft durch Freude[68] [Strength Through Joy] but also through others that consciously distanced themselves from KdF. The elimination of individual (bourgeois) freedoms from the processes of work and politics corresponded with the offers to realise such freedoms through consumerism, at least for the privileged strata of society who had profited from the relative prosperity of the immediate pre-war years.

One project where these heterogeneities merged conspicuously was the plan to auto-mobilise the 'National Comrades' with the Volkswagen. Extolled by Hitler and his propagandists as the means of liberating individuals from 'the collectivistic obligatory transportation by the railways',[69] the KdF-car symbolised in exemplary manner a whole bunch of Nazi ideology elements. A trades union demand from the late 1920s was taken up, whereby through the production of a 'people's car' class distinctions would be abolished; this was included as well as action directed against 'Jewish-Bolshevist collectivism', the propagation of 'a source of pleasure within the reach of each and every National Comrade',[70] plus felicitous fulfillment from buying German goods.

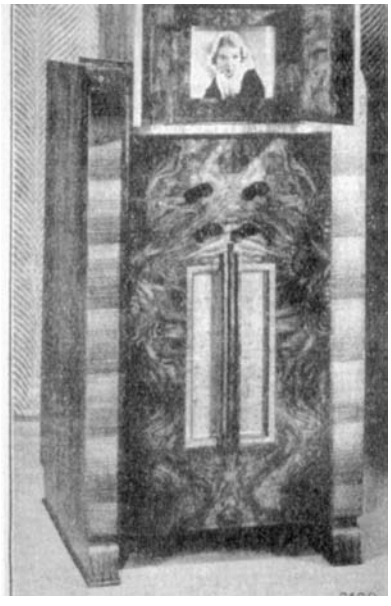
On the other hand, in connection with this project for supplying a personal means of transportation the social ramifications were constantly being cited for its production was tied to the creation of a 'model factory of National Socialism' and inextricably linked to the building of the Autobahns. From the standpoint of Nazi politics, the scheme for financing this was a stroke of genius: 'Volkswagensparen' [Save Up for a Volkswagen], which started in August 1937. The public and the private were brought together here again in a striking way. By saving just five Reichsmarks per month, the longed-for vehicle would be obtained after a saving period of four years. The scheme was organised by the Deutsche Arbeitsfront (DAF) [German Labour Front] and the KdF enterprise, which also did the mammoth advertising campaign for 'Save Up for a Volkswagen'. More than 300,000 would-be customers, the majority of whom had the ready cash for the car, fell for this large-scale fraud of the masses. Through the DAF/KdF offices at the Bank der Deutschen Arbeit, the monies were paid into Special Account No. 21 706, which had no connections whatsoever with the Volkswagen factory.

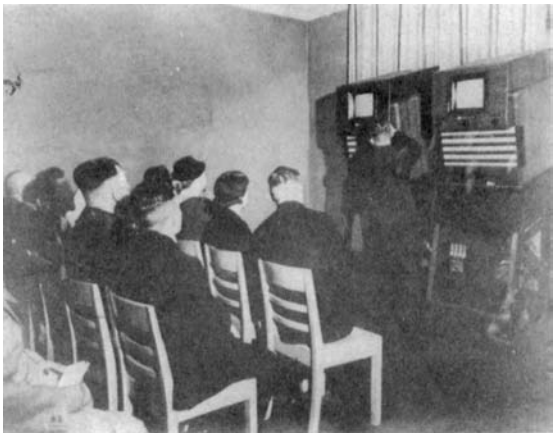
These millions in savings were used by the bank as additional capital to speed up the arming of Germany.[71] All that remained to the hard working savers was the dream of driving in their own car and, in the final years of fascist rule, the increasing certainty that they were co-financing the war of Hitler's Germany against the rest of the world. Not one of them ever received a Volkswagen. Instead, they were able to watch the 'Kübelwagen' [bucket cars] trundling into battle, which in technical respects could not hide their descent from the 'sources of pleasure' on four wheels.

The automobile as a means and guarantee of personal physical mobility and television with the same function for the imagination of being without ties to spaces and places – both of these pivotal dimensions of the socio-culture of advanced industrial nations developed in Germany in the post-war republic of Konrad Adenauer. However, their later organisers and propagandists were able to carry on from the foundations that had been laid down for both projects by the Nazis in the late 1930s.

After practising for the real thing at the 1936 Olympics, the industries that participated in and profited from television were obviously pushing for controls on the reception of TV to be lifted. They wanted, at long last, a return on their investments. Moreover, competition from abroad threatened. On 2 November 1936, the BBC had commenced its television service in England with a sophisticated programme structure and the declared intention of creating a market for receivers for industry. In the USA, the television project was entering its second phase of inauguration, after the mechanical television project had 'gone down the tube' at the end of the 1930s. On 15 June 1936, RCA's president David Sarnoff painted the future of television for the Federal Communications Commission in Washington DC – commercial television financed through advertising. He had impressive statistics to present: 623 radio stations were already broadcasting acoustic messages to 23 million homes. There were already 3 million automobiles on the road equipped with radios. The new medium had amazing prospects. Two weeks later, he canvassed a gathering of representatives of the Advertising Federation of America in Boston for support. He wanted to whet their appetites for the future of advertising on television and ended his speech with his concept of democracy in the media: '... the ultimate censorship of television, as well as of sound broadcasting, will remain between the thumb and forefinger of the individual American'.[72]

German industry had presented a prodigious number of receivers at the Berlin Radio Exhibition in 1936. In a variety of formats, Fernseh AG, Loewe, Lorenz, the German subsidiary of the Dutch company Philips, and Telefunken all offered appliances designed for the home, large cabinets packaged as luxury furniture with the tube positioned vertically inside and





Class television (also) under Fascism: Luxury models for private TV reception (*Fernsehen und Tonfilm* No. 7, 1935), large-screen projection installation for the 1936 Olympics (Telefunken), and one of the many 'television parlours'.

a mirror screen which folded open, but also smaller table models. Although work on powerful large-screen television projection for public reception continued parallel, the perspective of private reception gradually came to dominate. The Reichspost openly favoured and supported this variant. It fulfilled its remit as an instrument of industrial policy when, in spring 1938, it stated: 'From the political-propagandistic point of view, a television system where widespread ownership of home receivers is common, offers a means that far surpasses the possibilities of radio to influence the entire population, supported by the pictures, in important matters of state politics, to arouse their interest, and convince them through appearances.'[73]

But how could this perspective be realised without openly demonstrating and confirming with the example of television the de facto class structure of the 'Volksgemeinschaft' [National Community] that was allegedly socially homogenous? For the prototypes of receivers produced so far would have cost an estimated 2,000 Reichsmarks and thus were even beyond the means of large sections of the middle class. Solutions were sought along the lines of those employed previously for radio and the industrial joint project of the VE 301, the cheap radio set nicknamed 'Goebbels Schnauze' [Goebbels' Gob]. It is likely that Fernseh AG was thinking of the 'Volkswagensparen' model in the following confidential document of July 1938 addressed to the Post Office Department: 'An idea which immediately suggests itself is to bring together all circles that are interested in introducing television and letting them help to co-finance television *in general*. Not only the television industry, the Deutsche Reichspost, and the Reichs-Rundfunk-Gesellschaft are extremely interested, but also the electrical industry ... Now, it is conceivable that the aforementioned group, expanded to include the DAF and its subsection, KdF, because of the important political and cultural responsibilities of television, could be brought together in an umbrella finance company, making it possible to mass produce television sets in such quantities that the price of a single appliance would be kept very low so that at first, perhaps, the poorest people would not be able to afford one, but certainly wide sections of the population would be prospective buyers of television sets.'[74]

The management of Telefunken started another initiative with the result that, before the 1938 Berlin Radio Exhibition had closed its doors, an agreement to cooperate had been reached: on the basis of a joint effort, industry committed itself to mass produce a receiver at the lowest possible price; the Reichspost agreed to guarantee 25 per cent of the financial risk of the production process. A proposal that went even further, also tabled by Telefunken, was rejected by the authority. Analogous to the distribution of

telephones, it was suggested that the Reichspost should buy up the entire production of television sets and rent them out to interested parties. The German Post Office would then have carried the whole financial risk of the venture alone.

Production of the 'Einheits-Fernsehempfänger E1' [Standard Television Receiver E1] began in October 1938. The first sample for demonstration purposes was ready by February of the following year; design-wise, the artefact was a cross between a radio and a television set. The advertising campaign was launched with photos of stylised familial reception arrangements in the living room. The number of sets to be produced in the first series was increased considerably, from 4,600 to 10,000. 650 Reichsmarks was what individual access to the tele-visions of the Nazis was supposed to cost, a sum that an average worker would have had to work six months for. But the fate of the TV artefact was similar to that of the Volkswagen; it never made it onto the civilian market. Although 50 E1 sets were manufactured before the 1939 Berlin Radio Exhibition, which even had television programmatically in its title for the first time, decontrolling of the air waves for television did not come about. Twenty-six days after the exhibition had ended, Hitler's army marched into Poland and began to turn Europe into the biggest battlefield that the continent has ever known. For the private reception of audiovisual messages there was neither space nor money. The television industry had brought in its means of production and its technology in an all-out effort; the results of this concentrated endeavour were, however, no longer translatable into consumer goods.

Both projects, of physical mobilisation and of audiovisual mobilisation – the 'sources of pleasure' Volkswagen and television set – flowed into the war effort and were modified in this vanishing point: the one served the logistics of the fascist Wehrmacht, the other, too, in the 'logistics of perception' (Virilio). The automobile carried military personnel and armaments; in front of the remaining televisions sat the closed user-groups of war invalids and munitions workers.

In the First World War, the cinematographic apparatus was used for the first time on a large scale as an offensive weapon. In the Second World War, it was complemented in this function by the televisual apparatus.

Vanishing Point Television?

On the Permeation of Familial Privateness by Televisuality

'Television is a means for approaching the goal of possessing the entire sensible world once again in a copy satisfying every sensory organ, the dreamless dream; at the same time it holds the possibility of inconspicuously smuggling into this duplicate world whatever is thought to be advantageous for the real one. The gap between private existence and the culture industry, which had remained as long as the latter did not omnipresently dominate all dimensions of the visible, is now being plugged.'[1] Theodor Adorno wrote this in the early 1950s in his *Prologue to Television*. He is referring to the 'gold fever' that, since 1948, had gripped American television appliance manufacturers and the purveyors of audiences to the advertising industry. Aggressively expansionist, within a very short time they had succeeded in occupying the living spheres of North Americans with this new piece of furniture and, in just a few years, had made it the focal point of commercial mass culture.

The establishment of the hegemony of radio/television functions as a hinge in the history of the audiovisual discourse. It connects the forms of public (film) amusements which, already under attack in the 1920s and 1930s, were in a state of advancing disintegration and the flourishing development of the new media for singularised individuals and decentralised groups. The supremacy of television lasted for approximately three decades and, at the time, it seemed as though nothing could relativise it. In the USA and England, television's dominion began immediately after the greatest war of organised annihilation in recent history and, by the mid-1970s, had already passed its peak.

By that time, the market for private receivers in the most advanced TV-nation of the world had already reached saturation point. In 1974, 97 per cent of U.S. households had at least one television set; in the following four years, the industry was only able to increase this percentage by 1 per cent. The sets were switched on for an average of a good 6 hours a day, so an increase there was hardly feasible. Further expansion of broadcasting seemed to have become impossible. The federal states of North America were covered with a dense network of terrestrial stations. The time had come for a differentiation of the market, for the intensification of supply, for the implementation of additional innovations which the advanced accumulation of electrical and culture industry capital with the private TV screen as its focus made possible; especially since the market researchers had ascertained that

there was considerable readiness to spend money far in excess of the price of a new television set. New conceptions aimed at catering for special interests were developed: separate channels for news, sports, feature films, and also for socially sanctioned 'serious' culture. Pay-TV had arrived: this was where the audience, that was normally sold by network TV to the admen and their clients in the consumer goods industries, paid to have its programmes served up neat and not as a side-order to advertising spots. It became established on a large scale. In the years 1975–79, the number of subscribers increased ten-fold, from 500,000 to 5 million.[2] In the urban conglomerations, the installation of cables was quite far advanced and in space, communications satellites were in crowded orbit over the USA. This marked the creation of a new national multi-media system that was available for exploitation in variety of ways. In September 1975, Home Box Office, the electronic offshoot of the media giant Time Inc., began to feed its pay-as-you-view offerings of feature films and sport into local cable networks via the RCA satellite Satcom 1. Naturally, the networks had to pay a high price for this which they, in turn, got back from their subscribers. The conglomerates of the electrical industry – in this case RCA – began to widen their areas of exploitation for the long-term, even to the detriment of their traditional bulwarks of the market, the networks.

The year of 1975 also welcomed an effective addition to the range of home electronics. Sony launched its video recorder with the Beta format on the Japanese and US markets; an event that instituted far-reaching changes in the modes of distribution and utilisation of the filmic. At the same time, three hippie students were working in a garage near the elite Stanford University on the first home computer, Apple 1, which they also designed as a playmate for electronic games. In their first year on the market, 1975, video games generated over $15 million. Sales increased at such an amazing rate that on occasions even the stock market's Dow Jones Index was perturbed, with turnover shooting up to $2.6 billion in 1982.[3]

In Germany, the mounting pressure on industry to innovate and by industry on policy makers began to make itself felt in the early 1970s. Data processing equipment, that in the 1960s had been 'locked away'[4] in a few firms and administrations, became smaller, more powerful, and cheaper. It demanded to be freed up in order to conquer wider markets. The external processing of large amounts of data in connection with the installation of in-house networks in business firms demanded new infrastructures. Microelectronics and the increasing integration of components in multi-functional modules indicated new perspectives, also for the end products destined for the mass market. To cite but one striking example of the sheer speed of this techno-economic process: in 1966, a fully electronic table computer

model cost about as much as a small car. Through the introduction of integrated circuits, in 1968 it was possible to reduce the price to one tenth of the 1966 level. And in the 1970s, machines built on the basis of a single integrated circuit for near-effortless, fast computing had already become cheap mass-produced commodities.[5]

The German government reacted to this pressure social-democratically. It formed a commission for the planning and administration of the media future. This 'Kommission für den Ausbau des technischen Kommunikationswesens' (KtK) [Commission for the Development of Technical Systems of Communication] began its work in 1974 with the explicit remit of 'developing proposals for an economically rational and socially desirable expansion of the telecommunications system'.[6] The commission's mandate came from the State Post Office Department. At the end of 1975, the KtK submitted its proposals. 'For the benefit of the economic and social system of the Federal Republic of Germany, high priority should be accorded to the development of telecommunications networks and forms of communication enabled by these, taking into due consideration the conditions of the existing communications media.'[7] This was purely material exigency packaged in formulations of appeasement and consensus. In the following years, the 'economically rational' pushed the 'socially desirable' – which had never been clearly defined anywhere anyway – completely into the background. The future of telecommunications was quite simply *made*, through the successive implementation of new techniques and services in the existing networks and through expansion of the infrastructure to admit additional forms of technical communication. Social scientists, vying to secure research grants, were allowed to accompany – in the full sense of the word – this process and supplied findings on the degree of public acceptance for the various innovations on the market. While the regional governments embarked on a protracted dispute with various interest groups and amongst themselves which, however, was definitely not staged as a public debate on the issues involved, the Post Office and industry created practical facts. The telex network was expanded into an integrated telex and data network (IDN). Datex, Fax, Teletex, and electronic memory typewriters began to effectivise and rationalise internal and external business communications. Private households received data transmissions via teletext. This last system, however, originally nicknamed 'people's data processing', was a disastrous economic flop, at least in Germany. The video text used the blanking 'gap' in the transmission of television images – rational use of material develops a momentum of its own – but the usefulness of this particular service remained a mystery to the majority of TV-viewers. Nevertheless, copper cable was laid by the ton so that the Federal Republicans could be hooked up

to the future electronic nirvana which had been proclaimed. When, on 28 August 1985, the fourth cable pilot project commenced its activities in Berlin – according to the KtK's recommendations, these field experiments were intended to test whether extended television was useful or made sense at all – 6 per cent of German households were already connected.[8] Obviously, then there was no going back. At the same time, the private sphere was both concentrated and opened up as a social space where potentially, the various channels of technically mediated communication would converge as in a vanishing point, with the oscillating monitor screen as the focal artefact of the emerging home *terminal* – 'archaic for: the border, of or relating to the end', is how the German Duden dictionary explains its adjectival usage in German, and in English it also means the end of the line – whether railway or disease.

Compared to cinema, the changes in technology and culture that television brought to the supply of illusions of motion to people were profound and compound.

With regard to the materiality of the media, it implied the successive supersedure of the mechanical and chemical by the electronic, which wrought deeper changes in the spheres of production and distribution than for sensory perception. For the perceiving subject, there is not an important difference discernible between the photographic image on a film that stands still for a split second and the reconstituted illusion of motion on the *Kinetoscope*, the picture tube. The never-ending stream of pixels, the continuous bombardment by the stream of electrons, which, ever since McLuhan, is defined as essential for televisual materiality, remains imperceptible to human perception.[9] If this were not the case, the illusionisation would not work. As a subject-related feature of the televisual it is, therefore, an imagination, albeit a useful one.

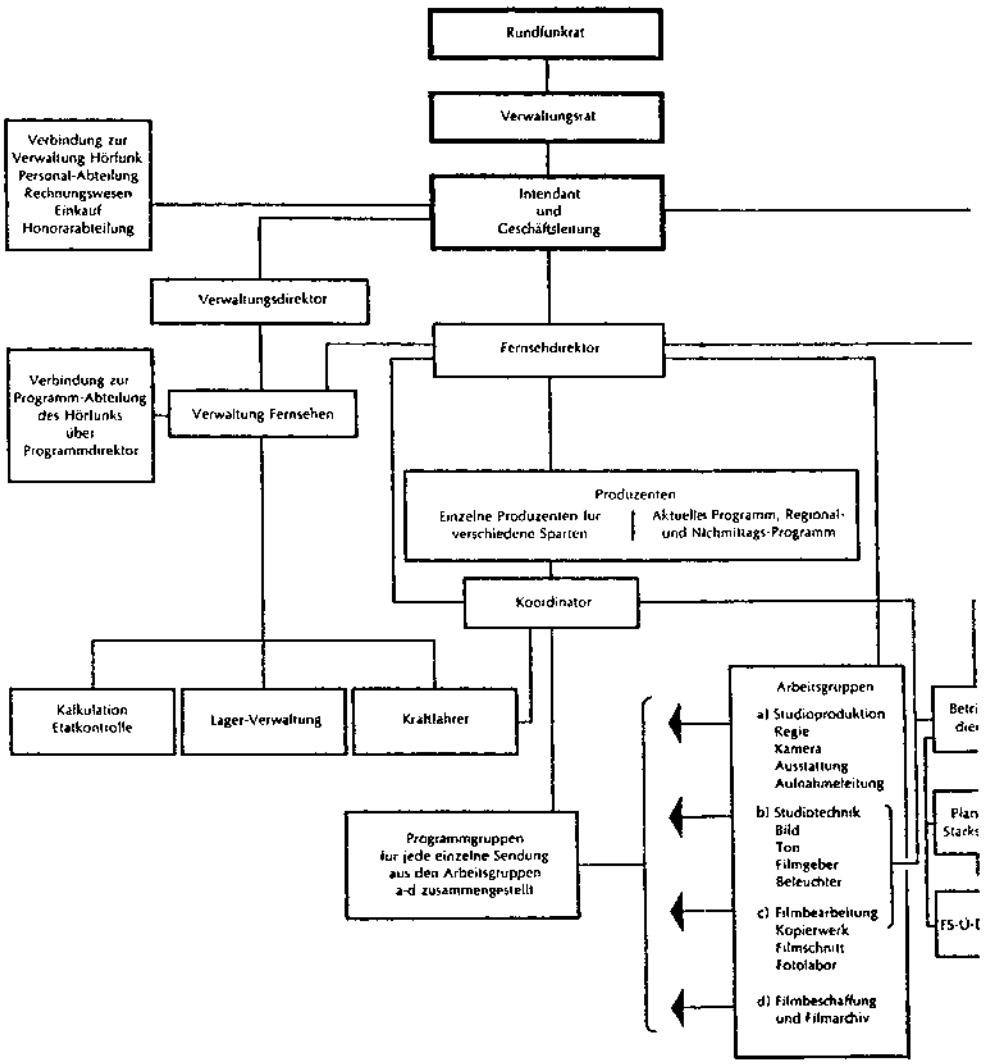
Here, the metaphor of the stream is apt: in relation to products, there was a changeover to providing a permanent, continuous service on the public channels and to supplying allegedly free programmes on the commercial television channels, respectively, in contrast to the discrete single commodities offered by cinema. However, this contrast, too, is only 'pure' in cineastic hype. The practice of tying-in a particular filmic event, live elements, newsreel, adverts, and direct product merchandising is one of the almost unwritten chapters of cinema history. – Why advertising should be condemned in the private sphere but can be accepted in the public space, and why one should even pay admittance for the screening of advertising in the cinema; these are among the well-kept secrets connected with the mythos of cinema.

There was a far greater shift of priorities in the distribution of acoustic and visual elements than there had been in the period when sound film be-

gan its take-over of the screens. Sound was privileged, even to the degree that the spoken word became omnipresent. The hollow-sounding chatter issuing from the glossy wooden cabinets became the most prominent feature of the signifying praxis of television. The new medium also stood for an important change in the dimensions in which movement appeared visually. The distances between the camera and the objects shifted as did the spatial presence of the visible surfaces of the world on the screen. Televisual seeing became, first and foremost, an act of *near*-seeing, of viewing details and pieces to the detriment of the overview and the long shot, which, to make matters worse, were shown with the distorting perspective of a wide-angle lens.

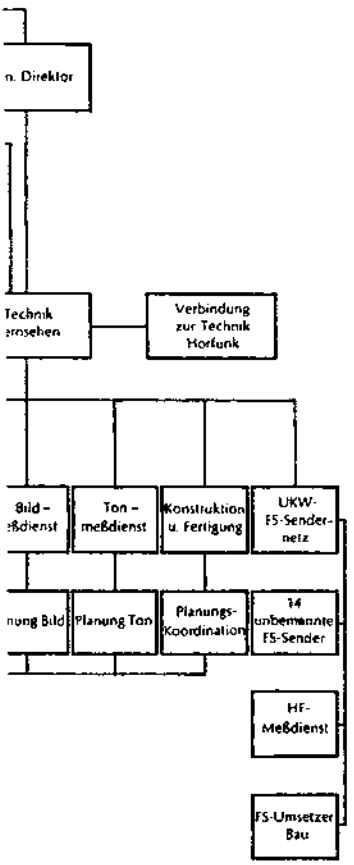
However, changes such as these appear but marginal compared to the changes at the level of the complex apparatus. Structurally, there was a transition to a centralised form of organisation of the communicative process. Radio and television can only function on the basis of a sophisticated technical system, comprising various cameras and recording apparatus, signal converters, transmission cables, amplifiers, transmitters, and the devices of the end-users. Millions of viewers and listeners were supplied by a thoroughly organised institution, ideally – but only in theory – controlled and determined by equally institutionalised social interest groups. This was how broadcasting was supposed to represent democracy. The highly complex and widely branching internal system of the entire infrastructure needed its technical base secured and administered in order to stay in good working order. In the cinema, it was increasingly people who were new to the industry – businessmen, tradesmen, bankers, but also aesthetic producers – who organised the culture-industrial process. In television, Post Office officials, Post Office technicians, communications engineers, jurists, and administration specialists made the decisions as to what should be televisualised and how it should be done. The close relationship of this institution with the government, both regional and federal, resulted in a most strange and non-transparent representativity of the public sphere and its players for the viewers in front of the TV sets, which had now moved into the private sphere with its messages.

Here, its historical hinge function is clearly illustrated: in contrast to cinema, television created new conditions of ownership in the reference frame of culture industry, cultural commodities, and their owners. In the picture-theatres, the people who visited them rented film-time or temporal cine-space (another unwritten chapter of cinema history: the cinema as a place to warm up in, as a second apartment, as a place of escape from the street). Cinemagoers paid a relatively small sum, only a fraction of their weekly wage, for two or three hours of diversion, enjoyment, daydreams,



and the physical proximity of anonymous Others. All the artefacts that were required to realise this communicative process, including the machines for copying the films, stayed with the producers, laboratories, and those who ran the cinemas, including the object of desire, the film itself. In its material form – a series of photographs spliced together with a sound track – it was generally at the disposal of the cinema operator alone who, in turn, only had the film on a temporary basis for screening. Attempts to establish very different conditions of ownership to this constellation, or at least to supplement them, are as old as the cinematographic project itself.

'*Knowledge of the place is the soul of the service* (Freiherr von Stein). At first, all bureaucracies have the intention of profiting by experience and understanding what they are the administrators of, entering into contact with it. However, at the same time they will exclude everything that is indeterminate or any work that is alive which tries to penetrate these systems and cause breaks in the apparatus. The network of a bureaucracy is a kind of automaton. This machine will shape the areas of experience that it deals with according to its own image but will not allow real conditions to form the apparatus. For theory, this means: representative thinking emerges. It operates according to the mechanisms of a representative public. An administrative structure of this kind can be recognised by its centralism. Some things are too narrow, and some things go too far, and in these cases, an elaborated system will seek and occupy the medial position.' (Negt and Kluge 1981, p. 304)



Schematic of the organisation structure of an early West German television broadcasting authority – Süddeutscher Rundfunk Stuttgart (1961).

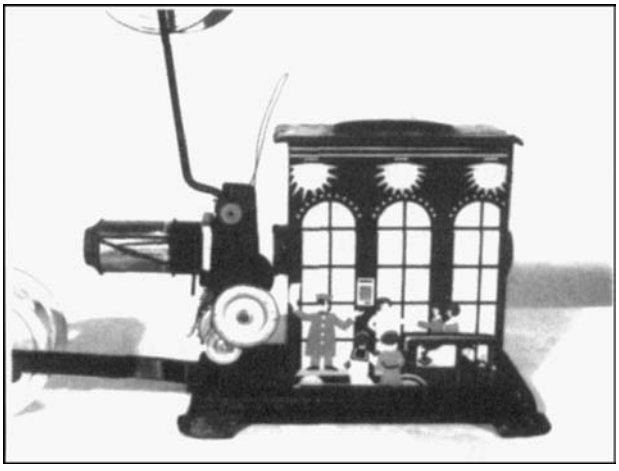
A history of amateur films, with their small-size pictures and attendant modest quality of reproduction, would have to start with the milieu of Lumière's Cinématographe. Further, in the concept of the slot machines and peep-shows of the 1890s, the economic perspective of a market for multiple devices is already implicit. In fact, in Great Britain the first examples of apparatus for private family use were launched on the market in 1896–97; for example, W. Watson's Motograph and J. Wrench's Cheap Form of Cine-

matograph. In the second decade of this century, it was not only the so-called semi-professional market for cinematographic apparatus, for schools, universities, church institutions, industry, the military, and the advertising industry, that developed. Audiovisual technology in support of the 'point of sale' did not begin with the advent of the laser videodisc: there was a veritable boom in manufacturing and offensively marketing *home cinema* in Europe and the USA. This industrial initiative was once again led by Edison, who fully anticipated that 'living pictures' for the sitting room would bring him success of similar dimensions to the mass sales his Phonograph was achieving. The target group for his Home Projecting Kinetoscope was select. With these reduced-size devices Edison was offering a type of conversation theatre for the home to the well-situated and well-to-do strata of the middle classes. The prices for the projectors ranged from $75–100 and the film commodities cost around $20; translated into today's prices, $650–850 and $175, respectively. However, in the years before World War I, this rashly ambitious project of Edison and his competitors was an utter failure. The potential customers for the expensive devices and films were too few in number, the projectors were too difficult to use and to repair for non-experts; the private sphere could not draw on any traditions of being a space for audiovisual events, unlike the phonograph with its precursors of house music and mechanical musical instruments; and importantly, the filmic was still much too informed with a plebeian image and culturally discriminated for the middle classes to want it in their sitting rooms.[10]

It was only after World War II, with the development of the advanced TV-dispositif, that private ownership of apparatus was realised on a large scale. The purchase of a receiver became the precondition for participating in the audiovisual discourse. The filmic products were denigrated to the status of a side-dish, for which one either paid a monthly license fee, about the same price as one of the more expensive seats at the cinema, or were supplied free of charge – or so it seemed at first sight. Of course in the case of marketed television, the bill was paid at the check-outs of the department and electrical goods stores where electronic equipment was sold. Although part of the technical system required for communicative exchange was now in the hands of the subjects, its use was limited. At best, they could only slightly modify the products by using the brightness or contrast control to make the images darker, lighter, sharper, or blurred; by manipulating the volume, and, later, the colour control. The filmic remained in the possession of the broadcasters or the copyright owners. Particularly ownership of the costly machines for production and distribution remained concentrated. The abolition of the strict division between production and consumption,

The industrial project for distributing the filmic to private households accompanied cinematography from the very beginning and created the corresponding artefacts for this purpose. Advertisements of the Ernemann Company from the 1910s.

Below: Cinema as a mere reference on the projection apparatus in bourgeois sitting rooms.



including access to electronic machines for copying the products, only came about at the stage of advanced audiovision.

The apparatus dimension was the one that was the indispensable prerequisite for socio-cultural change: via television sets, reproductions and adaptations of middle class culture now also entered the private sphere of the plebeian classes, albeit in an evanescent form. With the piece of furniture with its electronic picture tube now an integrated component of the domestic environment, the privilege of receiving graphic image transfers of literature, theatre, and art, as well as information, instruction, and facets of political discourse at home was passed on down to those in society's nether regions. In this respect, the Western European variants of television differed radically from others, for example, the USA. In that paradise of commodity culture, television was not obliged to show any consideration for cultural heritage and the classical canon outside of the mass media. It carried on where commercial entertainment radio had left off. In contrast, German television tried fervently to disguise its (culture) industrial origins by enveloping itself in a mantle of seriousness. Anarchy, as there had been in the cinema, was not tolerated from the outset and, to begin with, neither was commerce. The play chosen to open the two public broadcasting channels was none other than Johann Wolfgang von Goethe's *Faust*, the quintessential work of German classical drama. Broadcast on 2 March 1953, the 'Prologue for the Theatre' from *Faust Part One* was the first dramatic work after the Second World War to be electronically scanned on the studio stage for television. The Zweites Deutsches Fernsehen (ZDF) [German Channel Two] commenced broadcasting on 1 April 1963, with the very same play. Television, at once modest and arrogant, re-cited the words of Goethe's theatre manager in the drama: 'Fain would I please the public, win their thanks;/They live and let live, hence it is but meet./The posts are now erected, and the planks,/And all look forward to a festal treat./Their places taken, they, with eyebrows rais'd,/Sit patiently, and fain would be amaz'd./I know the art to hit the public taste,/Yet ne'er of failure felt so keen a dread;/True, they are not accustomed to the best,/But then appalling the amount they've read./*How make our entertainment striking, new,/And yet significant and pleasing too?*' (italics–S.Z.)[11] Well, they had begun by televising the 'Prologue' and not *Faust* proper. However, as Adolf Grimme remarked on January 1, 1953, at the inauguration of the northern German television station, NWDR: 'Television offers us a great opportunity to serve once more German and European culture; all great things ... evolve slowly'.[12]

The first Federal German TV sets were produced in an architectonic relict of the greatest war of aggression in recent history: in the tower bunker that

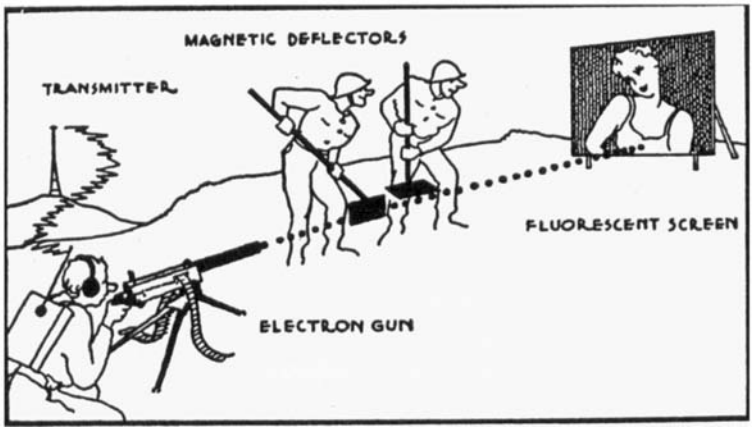
dominated the wasteland of Hamburg's Heiligengeistfeld like a sinister memorial. That which was declared new, grew out of the remains of the old. The societal dimensions and the prerequisite dispositions of the populace that converged to become effective as the framework of conditions for television, the medium of familial privateness, are part of post-war and war-time history. It is true that the start of Hitler's offensive marked a six-year interruption for the TV project that state and industry had developed in order to create a nation of set-owners for televisual messages, for the war had boycotted consumerism. Yet on the other hand, war had continued to mould intensively the state of the subjects, a co-factor in facilitating the establishment of television's hegemony.

In the spaces where co-existence with anonymous Others had been ordained by the dictatorship – in the trenches, in the air-raid shelters, in the forced collectives working in production and supplies, and, at its most brutal, in the prisons, in the labour and the extermination camps – what little that remained of privateness and privacy became a refuge that, increasingly, was only realisable in dreams; in the cinema, for example, for those to whom it was still accessible. War-time filmic production meant manufacturing thousands of kilometres of battle scenes, reports of military successes, and heroic stories from the various fronts. The propaganda units did their work meticulously. Many learned the tools of their trade there who, after 1945, again made pictures or directed them, also for television.[13]

War-time filmic production also meant the occupation of the cinema-space with the most private feelings, with passions, melodramatic emotionalism, the joys of life, and heartbreak, but also with pageantry and extravagance that were painfully absent from people's real lives at this time. To a far greater extent than in the 1930s, when the war began Goebbels counted on underpinning Nazi politics and forestalling criticism of the same by providing ample diversions and entertainment. While German husbands and wives, common-law marriage partners and sweethearts, were forcibly separated and subjected to the utmost strain; while familial life only existed during a short span of leave from the front; while the news of fathers, sons, and friends shot dead was an everyday occurrence, dreams of private happiness and immersion in the fates of other individuals had a very high status. A great deal was invested in their mise-en-scène, as much as could be spared. Even the high costs involved in colour-film production were not prohibitive. Veit Harlan, for example, was allowed to film all of his expensive melodramas in Agfacolor: DIE GOLDENE STADT (1942), IMMENSEE (1943), OPFERGANG (1944), and KOLBERG (1945) – the last 'Film of the Nation'. And the popular Hans Albers, too, was permitted to be seen in colour in the grand production of MÜNCHHAUSEN (1943) to mark the 25th anniversary of

the Ufa.'[14] – These films had to make a strong and overwhelming impression. The intoxication lasted only as long as the visit to the cinema. At the very latest when the cinema's neon sign went out, awareness of the ever-present danger of an air raid dawned on the cinemagoers. Lavishly illuminated cinema façades had been categorically banned in November 1940 by the 'Implementation of the regulations prescribed by the air-raid protection law'[15] of the Reichsminister for aviation and commander-in-chief of the Luftwaffe who, incidentally, was also responsible for all military applications of television.

The televisual medium was itself a part of wartime history. Only the building of a TV 'National Community' anchored in the private sphere had been shelved for the time being. Electronic cameras had been perfected and continued to run in the TV studio of the Berlin Deutschlandhaus; broadcasting continued. However, to an increasing extent the audience was no longer recruited from passers-by or casual visitors to the television parlours but selected and organised around the remaining receivers, above all, the troops and wounded. '... any child knows that bright music is part of the life of a soldier'.[16] In September 1940, the station formed a 'Spielgruppe in Feldgrau' [Group of players in field-grey], 'artists play for the wounded, the wounded play for the wounded, soldiers play for the wounded'[17] – wartime entertainment produce in its most extreme form. *Wir senden Frohsinn – wir spenden Freude* [We broadcast cheerfulness – we give pleasure] was the name of a two-hour variety show, performed from March 1941 to 1943 in the hall of Berlin's Olympia Stadium to a live audience of around 2,000 soldiers and transmitted to military hospitals. There were 43 of these stations in existence, intended to restore soldiers mentally and physically for active front service again, before the activities of the electronic 'pleasure-givers' were forcibly terminated. Even after Allied bombs destroyed the VHF television transmitter in Berlin's Amerikahaus on 23 November 1943, the televisual messages continued to flow via cable 'in order to bring our wounded soldiers relaxation and pleasure. Thus a permanent audience is following the artistic development of this new instrument that, later, will belong to the whole nation'.[18] Because they were now needed elsewhere, some of the television sets were removed from the public TV-parlours of the Post Office but Berlin civilians were still able to watch the box there until 1942. In addition to the reports from the propaganda units and the programmes for convalescent soldiers, full-length feature films were telecast once or twice a week and 'domestic entertainment' showed people how they could satisfy their basic needs in times of acute shortage, for example, with 'new cooking recipes, in keeping with the times'.[19] Televisual show-cooking kept going well



This is where cinematographic pictures get shot (*Der Deutsche Film*, No.2/3, 1941, p. 34).
'Logistics of perception' (Virilio) par excellence: A military metaphor explaining the electronic principle of television. Picture scanning by 'electron gun', woman as object in the picture (Bettinger 1947, p. 5).

into the 1950s, but was dropped when the Federal Republic became too sleek and replaced by dieting and Keep-Fit programmes.

However, the function of wartime television went beyond these dimensions aimed at exerting influence internally. Advantageous for the firms involved, Telefunken and Fernseh AG, serious attempts were made to incorporate the televisual into the military discourse, an idea that had accompanied R & D since the beginning of the twentieth century. In 1910, in the French journal *Excelsior*, the Russian father of electronic television, Boris L. Rosing, put it thus: 'The electric eye will become the people's friend, their vigilant companion who does not suffer in cold or stormy weather, who will have its place in the lighthouses, with the *sentries*, and high above the shrouds on the ships' sails, will shine close to the sky. The electric eye, the people's aid for peace, will accompany the *soldiers*...'[20]

'Fernseh GmbH was able to continue working in the field of television, whereby the direction of development often had to take new paths.'[21] This is how the concretisation of strategic televisual uses for German fascism reads in a company jubilee publication – succinct and pragmatic. They experimented with high definition, with reducing the weight, size, and complexity of the apparatus so that non-experts could use it at the front, and also on possibilities for recording radar signals electronically. At Telefunken, television became direct military aggression – experimentally. In the 'Tonne' project, small portable cameras were developed which were mounted on guided glide bombs. The war did not last long enough to develop these weapons to the point where they could be used in strike warfare. They remained at the stage of macabre experiments which Walter Bruch, the inventor of PAL colour television, recounted later, apparently without feeling any compunction to distance himself: 'Coming from Diepensee Airport – today part of East Berlin's Schönefeld Airport – we dived down toward peaceful pleasure steamers and motorboats on the Müggelsee lake in a JU 52 (as fast as we could in that slow old bus). The pictures taken by a camera installed over an open hatch in the floor were transmitted via a station to the airport. There, army officers studied the picture on the screen to ascertain ... whether it would be possible to approach a target on the basis of such pictures.'[22] At any rate, the equipment's standard sufficed to fulfil the observation function that Rosing had set his sights on. In 1942–43, Telefunken built a television station in Peenemünde which monitored electronically the many failed attempts to launch V2 rockets and their precursor models.

Administrators, Post Office and studio technicians, and programmers were all able to gather much invaluable experience with another TV-variant, which remains historically unique: occupation television in Paris.

From June 1943 to August 1944, the 'biggest television salon in the world today'[23] was put on at Magic City, a former amusement establishment in occupied Paris, in close collaboration with the occupied French.

Thus, it is apparent that Federal German television of recent history by no means lacks tradition. A decade of televisual signifying praxis at the experimental stage; for a limited audience, 15 years of building an infrastructure and, particularly, of industrial work on the apparatus: these represent the objective points of departure for the development of the dispositif after the Second World War, although at first, obviously, the experience of historic upheaval was of prime importance. The German situation was different to that obtaining in England and especially in the USA. There, technology for information and entertainment had been fine-tuned during the war and afterwards, there were no obstacles to a smooth transition to its exploitation in civvy street. In the bombed cityscapes of Germany, with its ruined and dismantled industry, it was unthinkable both economically and politically that television could take up where its pre-war variant had left off. Full of suspicion, the Allies controlled the publishing and journalism sector rigorously, for it was held to be a cornerstone of the fascist system of rule. At first, all activities to do with television were banned because of its close relationship with radar.

The central concerns in everyday life for those who had lost the war were the struggle to survive, the search for shelter, food, paid employment, and, of course, for relatives, friends, and loved ones. The hunger for images, for alternative psychological experiences, for acoustic excursions, and for information was very strong but, compared to the existential worries, of secondary importance. And this hunger was satisfied in different, less expensive, ways than television. Under the aegis of the Western Allies, the foundations were laid for the West German press empires; variety shows enjoyed a renaissance as cultural events outside the home; and it was the golden age of radio, which dominated the media landscape of private reception well into the 1950s. And film did not require a complicated infrastructure. Of the 7,042 cinemas that the German Reich boasted at the height of its expansion in 1942, 1,150 were salvageable for use in 1945. In 1946, 300,000,000 people in Germany went to the cinema, in spite of and because of hunger, cold, and the miserable plight of the many refugees, far more than in any one year in the 1980s, for example. Apart from re-runs of German films made before 1945 and showing others that were begun before 1945 and finished after the end of the war, the projectors beamed images that had not been seen for a long time, in particular, films of the Western Allies. For a short while, France enjoyed a return to its glorious, pre-First World War film past and became quantitatively the largest supplier of film wares to the Western Zones. Be-

ginning with the film season 1947–48, the USA took over France's hegemonial role, which it expanded over the following decades and has not relinquished to date. It was in these post-war years that the course was set for the particular economic and cultural shape that characterises the remaining Federal German cinemas even today.

In the bombed-out cities, spotlights were quickly set up again and filmic scenes enacted. Wolfgang Staudte trained his camera unsparingly on the landscapes of rubble, and the troubled minds of perpetrators, victims, and those who had 'just' gone along with the Nazis. In East Berlin, he made the first German post-war film, which was also his own first reckoning with the Hitler-regime: DIE MÖRDER SIND UNTER UNS [The murderers are amongst us], premiered on 15 October 1946 at the Berlin Metropol Theatre. It was a real attempt at a new start. Staudte did not cast familiar faces from Nazi entertainment films in the main roles but instead, the young Hildegard Knef and the theatre actor, Wilhelm Borchert. Arno Paulsen played the hated manufacturer, a company commander and murderer during the war, who quickly succeeds in building a secure livelihood again in the ruins: he makes cooking pots from steel helmets. Staudte's style counterposed off-angles and hard cuts to the softly insinuating narrative techniques of Nazi entertainment films. Ernst Roters wrote the appropriate fractured music. In the Western Zones, this was only the third feature film to thematise Germany in ruins. Helmut Käutner shot IN JENEN TAGEN [In those days] in Hamburg, premiered on 13 June 1947 in Hamburg's Waterloo cinema: a metaphysical retrospective view at the period 1933–1945, narrated from the perspective of an automobile. The car is the focal point of a series of loosely connected episodes which are concerned with the remnants of humaneness that a few people manage to retain in the inhumane conditions prevailing under fascism, and which ends with an overt appeal to build the 'Wirtschaftswunder' [economic miracle]. The framework of the plot closes with a dialogue between two men who are stripping the wreck of the film's mechanical protagonist at a car dump:

'Karl: Hey, Willi, you asked me something a moment ago.

Willi: Yes, what being human is. But you don't seem to know either?

Karl: Perhaps it's impossible to know, perhaps you can only feel it. It's certainly impossible to put it into words.

Willi: The main thing is, you try to be one.

Karl: Nowadays, there are an awful lot of opportunities, right?'

Just to emphasise the direction that the consequences of this pep talk should take, so to speak, they both attack the car's body-work with new vigour.[24]

The actress Kristina Söderbaum was the female lead in the hugely successful and infamous anti-semitic melodrama JUD SÜß, directed by her husband, Veit Harlan, in 1941. In 1953, Panorama Film is again wishing her all the best for her latest film, DIE BLAUE STUNDE, again directed by her spouse. It co-starred Harald Juhnke, who later became one of the most popular television entertainers in Germany. Montage of the two films' press cuttings.

Films like these, that used the real ruins as the scenery for filmic imagination, were the exception. They met with the resistance of the ruins in people's minds. 'In the cinema, one wanted to relax, to 'forget', not to be reminded of the need and deprivation of everyday life. One did not want to see ruins and ragged soldiers returning from the war. One wanted pleasant impressions' – this is *Der Spiegel* quoting the zeitgeist in its first issue of 4 January 1947. Once again, or better – still – there was a call for smooth, harmonious, conventional illusions; for dreamed-up images which were to shroud the harshness of existence like a permanent soft focus lens.

While neo-realism was celebrating impressive triumphs in Italy, for example, with the (anti-) war films of Rossellini, and the 'film noir' – particularly the Hollywood films famous for their use of chiaroscuro to stage dislocation, crisis, and destruction in society and personal relationships – produced its fantastic visions in light and shadow, West German film productions had again become the stamping ground of those who had either learned their trade under Hitler or at least had an intact relationship with the so-called 'great age of German film'. In his vitriolic satire on the Adenauer-republic, *When the Führer won the war, or, We say 'Yes!' to the Federal Republic*, the writer Joachim Seyppel did not forget cinema: 'So the Ufa, the only German film company to do so, continued its nationalist German activities from the Weimar Republic, through World War II, into the post-war period and now in our own times. Truly exemplary of national German film culture! Under the Führer and chancellor's extremely adroit domestic policy, young German cinema aspired to lofty heights of filmic art never scaled before. Think only of the great German 'Heimat' films, like GRÜN IST DIE HEIDE [Green is the heath] or DAS SCHWEIGEN IM WALDE [Silence in the forest]! One recalls how, because of this education in the appreciation of artistically high quality films, German cinema audiences boycotted shoddy foreign efforts like '491' to a man! ... Yes, indeed, under our Führer and chancellor we experienced a veritable renaissance of the German film. Thus the Führer coined this very apt motto for the Heimat film: If you want to get to the summit, come down first into the valley with me!'[25]

So when a new generation of film-makers proclaimed in the Oberhausen Manifesto of 28 February 1962 that 'The old film is dead. We believe in the new', they had the worst possible conditions to start from. The historical perspective of their revolt no longer lay in the public space; objectively, its vanishing point was already television.

The audiovisual medium of receiver-owners was tied to two important material pre-conditions. First, in its developed form as electronic TV, it demanded a high level of technological development; second, in order to

become widespread, it required prosperous private households, in particular, an affluent upper middle class who could guarantee the initial diffusion of the rather expensive TV hardware. Then, 'what is a luxury today ... will be commonplace consumer goods tomorrow', as Ludwig Erhard, the popular, big cigar-smoking minister for economics in the 1950s formulated this market economy paradigm in 1953 under the motto of 'A refrigerator in every home', 'if we can live with the fact that in the first phase, it will only be available to a small minority in the high income bracket whose buying power is strong enough to purchase these goods'.[26]

In early 1953, UNESCO surveyed the television landscape of the globe for the first time. The stage of planning that the medium was at and the distribution of television receivers mirror certain aspects of the economic situation after World War II like a prism. Of the 52 countries that had anything to do with television at the time, only 16 had a regular programme service. The majority of these were only just beginning and had only one, or very few, transmitting stations and a few thousand private receivers. At the top of the list was the USA with 22 million receivers, which meant that every seventh American possessed a television set. Great Britain was next, with a receiver for every 24th inhabitant, followed by some of the regions of North and South America within the USA's sphere of influence: Cuba, with a TV-set for every 55th person; Canada, with a ratio of 1:56; and Mexico, with 1:578. Everywhere else, including the Federal Republic, the imbalance was even more gross.[27]

The high ranking of the USA and Great Britain reflected the relatively high standard of living in these two countries, the traditionally important position of radio, and especially the psycho-social soil without which it would not have been possible to install private aerials – the signals of participation in the televisual discourse – on so many houses: the great importance that was and still is accorded to private life, to house and family, in these countries. In the USA, this had old and stable foundations rooted in the strict Puritan tradition that the immigrants from the Old World brought with them to the Land of Opportunity, where socially upward mobility in a classless society could be combined most fortuitously with increasing consumerism as the highest aim in life. In the United Kingdom, this was rather anchored in an aristocratic and middle class tradition, which proclaimed 'my home is my castle' as one of its foremost ideals expressed in home-ownership – for the lower social strata, a small terraced house – and which had also been propagated for the working classes since the nineteenth century as the fulfilment of social existence per se.

In Germany, the predispositions for a social culture which pushed private familial life into the centre, united in and propped up by consumerism,

had gained in importance and impetus since the end of the Second World War. Fascism had occupied the public sphere with coercive representation and terror. The acts of destroying its symbols by the military victors, of also prosecuting those who had submitted to Hitler's Nazi Party and supported his politics in a small way, resulted in the collapse of even the last vestiges of identification with those who represented society. The culture and politics of the street and public places, organised from below, had been destroyed, the people who had been its moving force had either been murdered, forced into exile, or were facing a new wave of discrimination with the onset of the Cold War. For the people who had been deceived, had been kept unpolitical, even in uniform, everything influenced by politics either stank and they didn't want anything to do with it, or had the status of a business profession that others were paid to work in. (Rainer Werner Fassbinder erected a fascinating monument to this mentality in his LOLA [1981].) At this juncture, the main social systems of reference increased in relative importance. As binding orientations for the subjects, there remained the institutions of family and religion, located between the terrains of society and private life.[28]

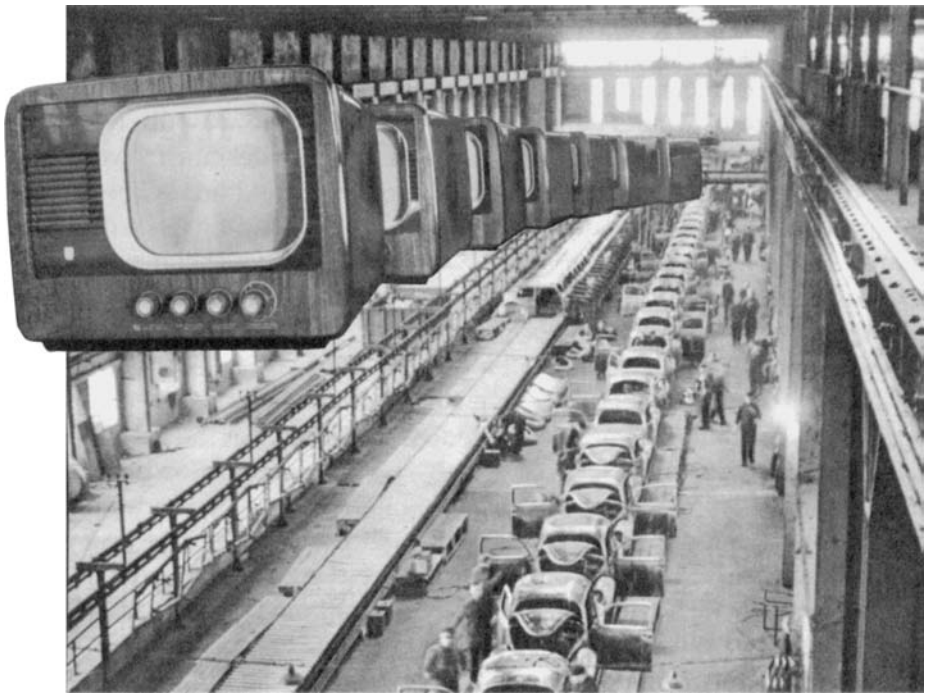
Yet fascism had systematically paid homage to the ideology of the familial; the institutionalised, intact, private context as the pre-condition and reflecting surface of an ostensibly just as harmonious 'National Community'. Moreover, closely connected with this, fascism had worked at building expectations of gratification that tied familial happiness to private affluence; naturally, without ever having been able to come up with the goods. The subjects must have experienced a tremendous build-up of ungratified expectations. They had been promised their own Volkswagen and their own home and hundreds of thousands had saved up for them. Even in November 1940, in his 'Decree of the Führer for the preparation of the German housing programme after the war', Hitler had promised to create all 'conditions necessary for healthy living for families with large numbers of children'.[29] The desires aroused by this propaganda were destined to remain unfulfilled. Indeed, the contrary was the case. Familial connections were severed for ever on the battlefields or destroyed in the long treks of refugees. The individual as consumer was reduced to a desperate searcher for something to eat, for somewhere to escape from the cold and damp, for shelter. Need drove people to embittered rivalry with each other, it was indeed 'every man for himself'. 'Life in Germany's second largest city is reduced to hundreds of thousands of small battles by each and every individual for survival. Those who don't win, fall by the wayside.'[30] This is the writer Alfred Andersch summarising the situation in Hamburg in a report in 1947.

When the headlong decline of the cinema in the late 1950s is discussed, we are usually confronted by an impressive juxtaposition of two columns of

TV and video buses are not just a contemporary phenomenon in international mass tourism. They also accompanied the period of post-war reconstruction in West Germany. Physical mobility joined with the mobility of information technology. The privateness associated with the consumption of television was transformed here into collective reception by the individuals brought together by the means of transport.

figures: the dramatic drop in the number of cinemagoers and the rapid spread of television. In a one dimensional way, the two events appear causally related – the columns of figures themselves encourage this. For the first time in the post-war period, there was a downward trend in West German cinema audiences at the time when the number of television households passed the million mark, namely 1957–58. Indubitably, the two phenomena are related. However, they are first and foremost phenomena with a common context: the successful strategy of both national and international post-war capitalism to develop the increasingly technology-based forces of production in a market economy in close connection with the perspective – internalised by the majority of subjects – that freedom and happiness cannot primarily be realised in the social but rather in the private sphere, in competition with and alongside the individuals and families who represent their identity internally and externally through the share of social prosperity which they manage to command. This share had to be reified in consumer goods which, in turn, possessed representative character. Long-lasting machines, consumer durables, were very suitable for this. Their diffusion was initiated by the higher classes of consumer society and then, gradually, they began to be distributed as mass-produced commodities down through the social hierarchy, facilitated by the possibility of hire-purchase payment and increasingly easy credit terms, which strengthened the subjects' structural dependency and firmly established it in the long term. Refrigerator, washing machine, camera, and hi-fi equipment were suitable objects for consumer desires of this variety.

However, pride of place in importance was reserved for two artefacts which had already been built up as coveted objects in the thirties and where the promised use-value had since been exaggerated out of all proportion: the automobile and the television. The one guaranteed unlimited personal and familial mobility, a dream-turned-commodity of personal freedom; the other represented access to staged and non-staged fragments of the world and guaranteed an ongoing cultural experience within one's own four walls. Both artefacts are quite obviously symbols of inner self-sufficiency, of independence, irrefutable signs of affluence for rivals in the neighbourhood, at the workplace, in one's own society, but also for farther afield: in Germany, with its shattered extended family structures and proximity to the Cold War front line, these symbols additionally signified status to the rival system in the East and in this context continued to be of considerable importance far into the 1960s. At least to some extent, both objects were means to gratify needs and wishes that had lain fallow, been pent-up, or re-stimulated: the hunger for real experience of the world beyond the pale of one's own small town, one's own country; the hunger for views of things



foreign, things exotic; and also for knowledge and education. Moreover, the utilisation of both objects in the private, familial idyll, where friction between generations meant it was increasingly being desperately held together as a forced collective for communal churchgoing on Sundays followed by a communal dinner, did not collide with it: on the contrary, the three combined extremely well. Both men and women worked and saved for their cars and television sets, did overtime, and if necessary, cut down on food. Thus automatically, they prepared the way for the gradual transformation of the familial context into a primarily economic-based community of expedience with pluralised relations, which was the most important pre-condition for the maintenance of the television dispositif.

VW Beetle, BMW Isetta, NSU Prinz, Lloyd, Goggomobil, Messerschmidt bubble-car, and, in the upper price ranges, Borgward Hansa 1500 and 1800 with their streamlined pontoon shape; later came the Isabella and the luxurious Hansa 2400 – these are some of the automobile models that evolved into symbols with which motorisation of the Federal Republic of Germany took place at high speed.[31] In the year of the currency reform (1948) alone, 15,000 VW Beetles were sold, and in 1949, nearly 40,000. At the beginning of the 1950s, half a million private automobiles were registered; 1952–53 their number passed the million mark, and ten years later, 27 per cent of all

households had at least one car; in 1973, this had risen to 55 per cent. Thus the market saturation point for these expensive vehicles was higher than for the telephone or record player.[32] Only briefly checked by the energy crisis in 1973, the citizens of the Federal Republic were on the way up, especially with regard to horsepower. The shores of the Mediterranean were now within reach and became for many a temporary second home. Intoxicated by speed, one could leave quite a lot behind one, including the recent German past that had built the motorways, on which one now believed one was moving in absolute individual freedom; where the ideal of cars for the people had taken on mass (ideological) form.

When on 5 August 1955 the millionth VW Beetle rolled off the assembly line at Wolfsburg, the cabinet with the electronic tube was only just beginning to go forth and multiply in the Federal Republic. For the vast majority, television sets were still out of reach and, obviously, not the top priority luxury article. In September 1951, German Philips had started series production of the table-top model TD1410 in a small way. In the same year at the German Industrial Exhibition in Berlin, there were already 17 rival firms presenting their TV wares. However, for the time being these devices stayed very expensive. When at Christmas 1952, the NWDR station graduated from test transmitter to public broadcaster, the smallest Philips model cost DM 1,150 and one of the more solid pieces of television furniture, DM 2,100. Average take-home pay of a German wage-earner at the time was DM 267 a month. On 1 March 1953, West Germany had a mere 1,117 registered television licensees. It was only in 1954 that these figures made a substantial leap from 11,658 to 84,278 TV-households. The reason for this increase was not primarily to be found in the fact that the ARD, the first national television network of the Federal Republic of Germany, commenced operation in November 1954 but rather in the first large-scale event since the end of the war where the nation could exhibit its self-identity uninhibitedly: the *Football World Cup*. In July, the increase in license holders reached 22 per cent and was thus the highest rate of increase in the history of post-war television.[33] However, the most important goal in the history of German, i.e., West German football was seen by those who had televisual access not in private isolation but in public. Collective viewing was still more prevalent than individual-familial viewing, albeit no longer in the Post Office-organised television parlours, but rather on the basis of private arrangement. The privileged owners of TV-sets in the early years were the publicans, the restaurateurs, and the television and radio retailers. In the tavern or restaurant and in front of the shop windows, first contacts with the new artefact were made which were attractive to a wider audience, as well as in privately organised 'TV clubs',[34] and in the cinema.

Hungry for images in front of the radio shop window

Leonardo Luxus,
53 cm screen,
22 valves,
38 features,
4 ZF positions,
90° tube,
picture control,
noise filter,
volume control,
channel dial and display
DM 1,118

Philips Television Models 1957–1958: *Tizian* with 43 cm screen DM 712; *Raffael* with 43 cm screen DM 848; *Raffael Luxus* with wide-range picture and volume control DM 885; *Raffael Spezial* with wide-range picture control DM 765; *Leonardo* with 53 cm screen DM 1,098; *Leonardo Spezial* with wide-range picture control DM 1,118; *Leonardo Cabinet* DM 1,378; *Michelangelo* with 61 cm screen DM 1,695; *Leonardo TV and Radio Luxury Combination Model* DM 2,190.

The business dealing in public film illusions soon felt the pressure when television began to spread and reacted with a counter-offensive. Wider screens for more opulent visual experiences and work on developing 3D films represented one side of this effort. The Todd-AO wide screen process with 65 mm film, Superscope and Cinemascope, coupled with more complex sound amplification equipment in the cinema, all had the growing televisual competition in the USA to thank for their commercial implementation in the 1950s. As time went on, film producers began to make pictures for the electronic medium with more enthusiasm. By producing for the competition as well, it was possible to better utilise existing capacity. At first, the holders of film rights staged a boycott but this did not last long. Big productions which had originally been made for the cinema were soon an integral part of TV fare. Conversely, the attempt was also made to integrate this new medium, with its speed, its temporal proximity to the events which were to be reproduced, into the old one. In the USA, Paramount had shown how it could be done in its chain of cinemas. With large-scale projection equipment, spectacular sporting events were shown in cinemas and this was very successful – as long as there were enough spectators who didn't own their own TV set. In 1952, there were 75 cinemas in 37 towns and cities with this equipment for cinema-TV in the USA[35]. Their numbers increased considerably until the mid-1950s. The television and film industries had not yet merged into an entity with common interests so both sides fought with their gloves off. Chains of cinemas bought the exclusive rights for public transmissions of sporting events, particularly of boxing matches.

In Western Germany, it was above all the 'Aktualitäten-Kinos' [news cinemas] that earned their money with the people's hunger for fast pictures of topicalities. The old anarchy from the first days of public cinematography flared up briefly once more. There, news and current affairs reports were screened non-stop, including the popular *Tagesschau* daily TV news programme and other material of the competitors from the electronic medium, which allowed the audience to come in at any time it pleased. Obviously, it was only a matter of time before conflicts broke out, legal as well. The courts decided in favour of those to whom the future belonged. In 1959, the Aktualitäten-Kinos were forbidden to screen publicly the topical programmes of German television. – Retrospectively, it is difficult to understand why the makers of public television took such exception to the public showing of their programmes. TV in taverns and restaurants, in department stores, in radio shops, in coaches, and in cinemas was, after all, a concerted advertising campaign for the new medium. It was of great service in further popularising television. And surely nobody doubted for a moment that 'The ultimate goal of television will always be individual reception on one's

Magazine of the Nordmende Radio Company: 'A delightful surprise on Christmas Eve, the young husband's present to his wife: A Nordmende Souverän, renowned as a masterpiece of television technology. 'At last we now have in our own home a window on the world', he said and opened the perfectly designed cabinet'.

own set in one's own home.'[36] This teleology of the medium established itself irrespective of political system, i.e., it was not confined to the specific constitution of the private in the capitalist countries. In the mid-1950s, East Germany started a large-scale attempt to organise televisuality for the workers in factory clubs. After work, from 5.30 to 7.30 p.m., they were offered a daily programme-mix of agitprop and light entertainment. It was not an overwhelming success. The workers preferred to exchange the sphere of production for the private as soon as work was over. After a few months, the experiment was abandoned.[37]

From the late 1950s, the triumphal rise of the televisual for private use was inexorable. Principally influenced by the USA, the economy of the West German Republic had been re-stabilised and developed as a free-market economy. In the bombed-out cities, new housing developments and tenement blocks had been erected fast. In the decade 1950–60, approximately half a million apartments were completed on average each year, more than half of which was public-sector housing. Most of the flats were small, cramped, and with low ceilings but all had a bathroom, a kitchen or kitchenette, and an electric cooker. In 1956, a second law designed to encourage private housing construction and ownership was passed and began to yield results. Private income had increased nearly three-fold in the course of the decade and private consumption had more than doubled. The average monthly salary of wage-earners increased from DM 218 to DM 442. The Republic was high on consumer goods (literally – in similar proportion to the increase in private consumption, the expenditure on cigarettes, beer, spirits, coffee, and tea increased as well), people were on a spending spree. In particular, the new apartments needed furnishing. The old furniture, insofar as it was still intact, did not fit into the little boxes in the new high-rise blocks, and the dark and heavy wooden furniture exuded an unpleasant air of the recent past. Light in weight and colour, easily transportable furniture was the order of the day and there was plenty on offer. These furnishings were not intended to last a life-time. Bucket seats on spindly legs of tubular steel or wood, plastic-coated kidney-shaped coffee tables, standard lamps with conical shades, curtains with abstract designs, fold-away sofas and beds, reproductions by Picasso or Paul Klee for the walls, electrical gadgets for quick cooking and cleaning – these were among the essential furnishing items for the – in many ways – mobilised society.[38]

In September 1957, for the first time there were more applications for television licences than for radio. With an annual rate of increase of more than a million, this artefact had established itself as the most important technical aid for communication. This trend only slowed down in the last third

of the 1960s, partly due to the general economic recession but also as part of a normal process of saturation. In 1967, nearly two-thirds of all private households owned at least one receiver. It was high time for the next big step forward in innovation, the last significant one before the supersedure of radio and television by advanced audiovision. At the Radio Exhibition in Berlin, Willy Brandt gave the symbolic starting signal for PAL system colour television. The compere, Vico Torriani, was allowed to ring in the colourful televisual future for ZDF [German Channel Two] with a programme called *Der Goldener Schuß* [The Golden Shot]. At the time, this singer and entertainer from Italy, incorporated in an idealised way the West German audience's longings and desires in connection with the 'Gastarbeiter' [guest worker] phenomenon of the post-war 'economic miracle' years.

The television set had lost its character as a status symbol. Within the space of little more than a decade, it had passed into the hands of the majority and been integrated into everyday life as a commonplace item of practical use. The nimbus of being new and special, which in the early years had made the few private TV sets an attraction for visits from relatives and friends, creating regular collective situations of reception, had given way to the ordinary. The fine-sounding names for the early models were gradually replaced by the brand-names of competing manufacturers. The TV sets were no longer lovingly framed by rubber plants, Venetian gondolas that lit up, or the Chianti bottle candlestick, souvenir of the first Italian holiday, nor adorned with abstract mini-sculptures any more. The cabinet doors that had closed off the screen to the inquisitive gaze of children disappeared. Furniture manufacturers adjusted their designs to the artefact's integration and offered sideboards and shelf units into which it could be set, or – in the households of TV-disapproving teachers and other culture vultures – hidden away, if need be. Its position in interior domestic architecture was increasingly dictated by the whereabouts of the wall socket for the external aerial.

More and more the signifying praxis of the televisual apparatus corresponded to the everyday stream of undifferentiated normality of the commonplace. Gone were the days when the 'Raffaels', 'Leonardos', 'Konsuls', and 'Diplomats' – the nomenclature of industry for a luxury commodity imbued with culture – were switched on in the evening for an extraspecial event, acoustically heralded by the fanfare of the *Tagesschau*: electronic adaptations of Goethe's *Egmont*, *Stella*, *Brüder und Schwester* [Brothers and Sisters], or *The Sorcerer's Apprentice* (all in 1954), Schiller's *Kabale und Liebe* [Intrigue and Love], (1955) and *Don Carlos* (1957) and also Brecht's *Threepenny Opera* (1957) and *The Caucasian Chalk Circle* (1958) – to mention

but a few of the 459 televisual adaptations of literature made in the 1950s, with which television's department responsible for art, television drama, aimed to establish a profile of high cultural value.[39] Gone were the days when the family all gathered round the piece of TV furniture in order to see, for example, the latest episode of *Familie Schölermann*, a series of which 111 instalments were produced between 1954–59 that manufactured a new, electronically transmitted, surrogate neighbourhood and relations to it for the audience. At the beginning, the test transmissions of the NWDR broadcasting station lasted for barely two hours; at the end of the 1960s, the daily output of objectivised time by the ARD national TV network had increased to the length of an average working day and was flanked by a programme of roughly the same length on the ZDF Second Television Channel.[40] The week had now been given definite contours, with fixed time slots for series, magazine programmes, shows, and feature films which people got used to. The programme had become *a structured, set time pattern*, that nestled up to the daily life of the average Federal Republican who began to orient their rest-time toward it: television had become social time.

It was at this time that the moulding of the subjects by the dispositif of familial privateness reached a peak. With the introduction of colour into the television process the 'telepresence' of superficial reality in the living rooms was extended significantly. Professor Grzimek's exotic animal worlds could now be transmitted in bright colour, as well as the television dancers in richly contrasting Courrèges-look from the popular music hit parade, *Musik aus Studio B* and, of course, the direct advertising of products. By comparison, the colours of drama productions like Peter Weiss' *Marat/Sade*, that the NDR station chose as its first television play in electronic colour, appeared drab and subdued. In the first coloured TV year, ARD and ZDF earned more than DM 600 million from the sale of advertising time, although the amount of time they were permitted to sell was extremely limited.[41] Television time had become very expensive. In 1966, a 30-second spot on German Channel Two already cost DM 19,200 with each further 5 secs costing DM 2,650. There was a lot of money available to purchase series and feature films on the international market, particularly from the USA. Expensive shows were produced at home as were the popular televisual contestant shows, in front of which the work-stressed Federal Republicans relaxed. After the communications satellite 'Telstar' had been successfully put into orbit in 1962, the global communications network was expanded and perfected: TV-mediated immediacy was now possible world-wide. The Olympic Games in Tokyo (1964) and Rome (1968) now took place imaginarily in Wanne-Eickel and Flensburg as well: the planting of the Stars and Stripes on the Moon on 20 July 1969 was synchronised into a common

Biscuit tin

Familie Schölermann – the clean-living and over-ambitious German version of the TV families of the 1950s. Television's position was so important that it left its mark on many items of daily use in the familial home.

Cigarette dispenser

televisual experience for an audience that was composed of many different nations and cultures.

Far-away places were now even closer still. Via their iconic representations on the screens of the picture tubes, they could be inserted into the familiar private sphere – a compensation of tremendous significance to many people for whom social proximity was becoming an ever more foreign experience. For in the latter years of the 1960s, the young Federal Republic was rocked by a number of traumatic events, which also affected the self-image of its citizens. The ideology of continually accruing prosperity showed the first cracks. There was a strong economic recession and in 1966-67, for the first time since more than a decade, there was a wave of mass strikes in which over 200,000 workers from nearly a thousand firms downed tools.[42] The two major political parties, CDU and SPD, formed a coalition government. In December 1966, Rudi Dutschke called for the formation of an anti-authoritarian movement as 'Ausserparlamentarische Opposition' [extra-parliamentary opposition]. International politics led to the crystallisation of focal points of conflict at home. 1967: the right-wing dictatorship in Greece under Papadopoulos; Israel's 'Six-day War' in the Near East; in Bolivia, Che Guevara was murdered. The starting pistol for coloured television went off only a few weeks after the shots had been fired that, symbolically, hit an entire generation of young Germans: police bullets killed the young student Benno Ohnesorg during a demonstration protesting about the Shah of Persia's visit to West Berlin. Time and again, on television too, there were pictures of the unbelievable brutality with which the US military were trying to bomb the small republic of Vietnam back into the stone-age. It was at this point that the electronic medium of privateness developed ambivalence. It incorporated the horror of destruction and organised genocide into the normality of everyday life. Over beer and potato chips, watching TV drama and Persil advertisements, one got used to catastrophe. However, the ambitions of those who took the pictures and their principals in the networks, to get as close as possible to the action with their cameras and microphones, to make the horror, fear, and desperation in the victims' faces as vivid as possible, naked and live, for many this concretised their ideas about the nature of war and, at the very least, provoked a moral response.[43]

The protest that was taking place in the streets and public places did not by-pass television for one of the fundamental political functions of public-service broadcasting was and is integrative. In a few editorial niches, there were even certain attempts at televisual work that contradicted the prevailing discourse of consensus in consumerism. The debate on the crimes committed by German fascism, on the guilt of the perpetrators, the role of fascist sympathisers, and the suffering of the victims, represented a

historical point of crystallisation. While the Auschwitz Trials were taking place in real court-rooms in Frankfurt and to an even greater extent afterwards, imaginings about the history of National Socialism pushed their way into the private sphere of West German living rooms: in 1965, Egon Monk made *Ein Tag* [One day] by Günter R. Lys for NDR, a play that attempted to approach the horrors of the extermination camps; Rolf Hädrich televisualised *Mord in Frankfurt* [Murder in Frankfurt] (1968) for WDR; the same year, Leopold Ahlsen made Rolf Hochhuth's *Berliner Antigone* for ZDF; – these are only three exceptional productions from a long list of television dramas on this subject. Toward the end of the sixties, even revolutionary theatre was performed on the boards of the television studios. In plays by Erika Runge and Max von der Grün, for example, the everyday work experience from the plebeian perspective made its entrance into the popular audiovisual medium.

In the 208th edition of the news magazine programme *Panorama* on 4 November 1968, Gudrun Ensslin, a member of the Baader-Meinhof group, appeared on television: 'The people in our country and in America and in all West European countries, they have to gorge and guzzle so that they don't even start to think about the fact that we have something to do with Vietnam or what it might be about, O.K.? ... I just can't believe that there won't come a day when people won't be fed-up with being over-fed ... That they won't get fed-up with the self-deception that all this fantastic food is the whole point of life. Wonderful – I like cars, too, I like all the great things you can buy in a department store. But when you have to buy them in order to stay unaware, comatose, then the price you pay is too high.' The programme was telecast five days after the trial of Ensslin, Andreas Baader, Horst Söhnlein, and Thorwald Proll for arson attacks on two department stores in Frankfurt in April 1968. However, such flagrant breaks of the rules were rare exceptions. Those who were responsible for the content of the programmes were liable to prosecution or the threat of such by the authorities. In the hegemonial centre stood the levelling of the cracks and contradictions which were experienced on daily and gratification on the basis of increased offers of consumer goods and diversions. – No other film-maker succeeded like Rainer Werner Fassbinder did in portraying the psycho-social atmosphere of these years concentrated in a filmic microcosmos: KATZELMACHER, his second full-length feature film and one of the 5 films he made in 1969. The film's motto came from the writer Yaak Karsunke: 'It is better to make new mistakes than to constitute the old ones until one is completely comatose.'

However, the television apparatus increasingly became the target of radical criticism from discourses and areas of practice outside of the

dispositif. Sections of the arts assumed the function of an avant-garde. Already in his happening, 'TV Funeral' (1963), Wolf Vostell had wound barbed wire round the artefact and buried it for the modern age. The Korean artist, Nam June Paik, successfully initiated a creative, Dada-inspired treatment of the electronic devices and their media material. From the closely connected movements of 'Fluxus' and 'happenings', intense work with video began as both medium and subject of artistic expression. Beginning in the USA and Canada, various sub-cultural groups at the end of the sixties prepared for alternative television. In the project 'Guerrilla Television', active subversion of existing television was proclaimed and tried out using small and cheap electronic instruments of production, 'the television equivalent of offset printing'.[44] An easily portable system of industrial equipment, the handy Portapak manufactured by the Japanese firm Sony, became a veritable symbol of work on the project to enlighten using the same tools that, in a highly developed form, were held to radiate the nimbus of powerful counter-enlightenment.

In Western Europe, too, groups committed to alternative political information and culture plus creative people from the filmic discourse in sympathy with them began to produce alternative TV images and to formulate and substantiate theoretically their new audiovisual praxis. After LA CHINOISE and particularly WEEK-END, Jean-Luc Godard considered that he had exhausted the cineastic means for a critique of the detested bourgeoisie and with ONE PLUS ONE, made at the height of the Paris revolt of 1968, had shot his last cinema film for the interim, he turned to probing the possibilities of new electronic techniques as 'Magnetoscope des amateurs' for several years. Turning back to Brecht's 'radio theory' – actually, a fragmentary body of theoretical writings – Hans Magnus Enzensberger outlined his 'Baukasten zu einer Theorie der Medien' [Constituents of a theory of the media] for the magazine *Kursbuch* in 1970. Oskar Negt and Alexander Kluge's *Organisationsanalyse von bürgerlicher und proletarischer Öffentlichkeit* [Analysis of the organisation of the bourgeois and the proletarian public] was first published in 1972. Drawing on Enzensberger's work, they wrote: 'The problem lies in the fact that it is not possible to formulate a critique of television in literary or journalistic form, i.e., in the ways the bourgeois public expresses itself. Production, that is internally dependent to the extent that television is, can only be criticised through productions of a different nature.'[45] – At the time, this represented a fundamental challenge to the academic disciplines that were beginning to engage with audiovisual media: for the young subject of media studies, whether at the University of Munich, Bremen, or Berlin, was mainly engaged in ascribing solely apologist functions to the institutions of mass communications within the frame of the

political economy of the FRG. While the manufacturers of electronic equipment and systems were busy at work breaking open the constraining framework of the televisual apparatus, radical critics of 'television as a class medium'[46] gained entrance to university lecture halls and public galleries. There was little if any space at all in this concept for alternative televisual production.

Yet Oskar Negt and Alexander Kluge were not merely dreamy idealists. They were very aware of the apparatus' intrinsic capacity for resistance, of the tremendous difficulty of intervening efficaciously in the triad of technology, culture, and subject; thus they conclude the section on television as follows: 'Awareness, freedom, and sensory substance must be transported by the same individuals that flesh out the social situation with their real lives. A long period of experience-gathering will be necessary in order to develop products which correspond to this stage of the social production of consciousness. Regarding the accumulation of this production experience, one cannot expect any great social leaps forward as if by waving a magic wand.'[47]

No Longer Cinema, No Longer Television

The Beginning of a New Historical and Cultural Form of the Audiovisual Discourse

The global economy of the 1970s was impacted by the shock of an event which concerned the production of and trade with an energy resource. The rich oil-producing countries of the Near-East threatened to cut off supplies of this elixir of life for the advanced industrial nations in the West, whose economies were (and still are) geared to growth-at-all-costs. Instantly, it became absolutely clear that this most important foundation for continuing expansion of the material and social wealth of the 'have' nations was not an unlimited resource, but finite and, moreover, the quantities required by the consumer nations rendered them extremely vulnerable to manipulation. It was not internal industrial strife in the form of strikes that stopped the wheels turning but a chain of boycotts by the oil producers, engineered bogus shortages, and price increases. This resulted in the consumers in the commodity paradises being hit in one of their most sensitive spots: their hitherto unlimited personal auto-mobility. What the obvious alarm signals of acid rain, death of the forests, the ongoing destruction of the natural environment, and the growing lobby of the 'Green' movements had signally failed to bring about, was effected by a severe disruption of the economy: temporarily, motorways became pedestrian precincts, for a brief period, towns and cities were car-free, and the 'free citizens' moved freely about – in neutral.

The consequences in the energy sector alone indicated the underlying contradictions. Growing public awareness that fossil energy resources were limited and that it was necessary to restrict exploitation of this natural wealth, together with increasing efforts on the part of the grass-roots ecological movement to find and propagate alternative, renewable energy sources, clashed with authoritarian state industrial interests in developing nuclear power, the production of which was predicated on advanced technology and management, both political and administrative, that was hermetically sealed off against any type of fundamental fault or breakdown. Whether there would be sufficient demand to justify creating the prerequisites for producing this type of energy, was a matter of relative indifference. What did matter was to set up this new branch of industry which would then develop a momentum of its own; the possibility of it getting out of hand was inherent, whether by chance or design.

The world-wide shock to capitalism in the 1980s was the temporary collapse of financial markets on the stock exchanges of London, New York, Tokyo, Rome, Paris, and Frankfurt. The nations of shareholders and obsessive stock-market gamblers – in the UK, for example, in 1988 the number of people who owned securities exceeded for the first time the number of trades union members – were again shaken to the core of their self-image. The 'flow of cash', which looks to outsiders like an impenetrable, mega-complicated, quasi-mythological game played at high speed with rows of numbers, was temporarily interrupted and threatened to burst its banks, metaphorically and literally. It seemed as if the channels had become too narrow for the gigantic amounts of money being moved around every day on the basis of and by means of highly developed systems of data processing and communications technology. On the stock market, movement had become everything. In post-modern capitalism buying and selling, the basic processes of the system, had dissolved into an abstraction, into infinite strings of numbers which represented exchange. The gap between the quantity of material wealth and the amounts of securities that were moved on the financial markets widened ever further until it was a yawning chasm. Whereas in the 1970s, only one, two, or three billion US dollars fluctuated internationally per annum, by 1985 this had reached the figure of $65 trillions, double what it had been the preceding year. In 1986, the figure was $87,000,000,000,000; about twenty-three times the size of the USA's annual gross national product and several times that of the global one. It was no longer the volume of trade – in 1986, this accounted for only about one tenth of the 87 trillions –, no longer physical activity that pushed currencies ahead, but money in an electronic form as an information value that was sent through the networks in phenomenal quantities. In 1986, this was around 48 billion in Tokyo alone, in New York 50 billion, and in London, even 90 billion US dollars per day. 'With the continuing integration of the world's national economies, exchange rates have joined the list of things that nobody controls', concluded the *Washington Post* in its economic report for that year.[1]

Peter Schwartz, a professional observer of movements on financial markets, headed Royal Dutch Shell's Business Environment section from 1981 to 1986, one of the three largest companies in the world at the time with an annual turnover of $100 billion. It was due to his knowledge of the market and his prognostic abilities that Shell was able to react in a timely fashion when the price for crude oil collapsed again in 1985. In 1987, Schwartz was hired by the London stock exchange as a 'strategy consultant' to develop future scenarios on the global financial markets.[2] For Schwartz, 'electronic entertainment', which encompassed the entire range of media of reproduction

and distribution, was economically the most important sector of the market for the 1990s. And for the last decade before the turn of the century, he forecast that this market would collapse in a similar way as the energy sector had done on the stock markets in the 1970s.

In the world of electronic audiovisions movement had become everything, too. What was distributed daily in the form of electric waves, digital data or pre-recorded media commodities, sent via satellite, through cables or via older terrestrial stations, was quantitatively impossible to register nor, in fact, was it closely monitored by anybody. In West Berlin alone, in 1988 more than 100,000 hours of objectivised time in the form of TV-time was sent to the households with cable television. The output in New York, that Mecca of global television, was more than four times as much. These are just two examples of limited regional markets. Televisuals were provided in the form of state prescriptions, paid for by license fees, or as sequences within a carpet of advertising messages. For these, the consumer paid either as a subscriber to a Pay-TV service or the trade was organised direct according to Pay-Per-View; designed time for money that was debited from the customer's private bank account like the standing orders to pay the gas, electricity or phone bill. The major TV networks only represented the main streams of the flow of broadcasting. In addition to these providers, there were countless islands of so-called closed circuit TV – television for restricted audiences in hotels, hospitals, educational institutions, civil aircraft, and business firms. For example, Japanese 'in-house information television' in large firms which showed the latest stock market news and prices, trade reports, exchange rates, information from higher management, and relaxation programmes, represented in the mid-1980s an important factor in realising the propagated 'electronic dreams' of the nation.[3] The in-flight entertainment on international passenger flights, with monitors installed, for example, in the back or arm-rests of the aircraft's seats, was predicted to be one of the most lucrative audiovision markets of the 1990s. The reception of filmic commodities during the act of crossing boundaries corresponded to the general tendency toward boundlessness in the distribution of audiovisual wares.

Globally, the map of tele-visions had virtually no more blank spots. That the penetration of private households by this coveted piece of electronic furniture had made leaps and bounds in the course of the 1980s was demonstrated impressively by the example of the People's Republic of China with its own variant of top-down cultural reorganisation: in 1978, only about 2 per cent of Chinese households possessed a TV set, which nevertheless represented around 80 million potential viewers. According to a survey published by the central television broadcasting authority in early 1988, by that

time there was a TV in 47.8 per cent of Chinese households; a potential audience of 600 million Chinese gathered around 112 million television sets.[4]

However, the screens and loudspeakers were no longer supplied with illusions of motion, light and shade, music, and sounds exclusively by central distributors. Whether in the People's Republic of China, Soviet Union, Bahrain, Alaska, Thailand, Venezuela, Finland, or South Africa, video cassette recorders operated to realise supplementary audiovisions. At the end of 1986, an estimated 120 million of these machines were in existence world-wide and the number was increasing rapidly. In early 1988, the former discriminated minority advanced to become the majority: the saturation of households with video recorders passed the 50 per cent mark in January. At this time in the Federal Republic of Germany, around 9 million households owned this most coveted consumer durable of the 1980s. With the 4.4 million pre-recorded tapes sold by this industry, in Germany alone over 6 million hours of video time awaited the end-user buyers or renters of the cassettes.[5] In addition, in 1987 a tape capacity of nearly 200 million hours waited to be fed with copies of industrial software or recordings from the television. Videodisc players, video games consoles, and personal computers, for which an increasing number of programmes with illusions of motion were marketed, rounded off the range of products on offer.

For such a vast reservoir of reception and playback possibilities, the economically effective distribution of audiovisuals had become of prime importance. On the one hand, there was a widening discrepancy between limited raw materials and deliberate restriction of creative resources, and on the other, the almost unlimited demand by the channels for filmically exploitable material. An attempt was made to compensate for this in two ways: material created in the course of media history was frequently repeated and recycled, and filmic mass products were continually rearranged, repackaged, variedly deployed, and shunted back and forth between the various instances of distribution.

The extremely horizontal concentration of economic power that had accompanied the dispositifs of cinema and television ever since their inception, was no longer adequate to the task of thoroughly organising this culture-industrial process. The type of enterprise which did enable the functioning of the system at an international level, was the integrated, vertically organised media concern. This type of operation optimally brought together all levels and lines of business involved in technical reproduction of materials for entertainment and information, from book and journal publishers (which had material at their disposal), to printing houses, wholesale and mail order firms, record labels, radio and television stations, studios,

Beijing 1984.

Public television set in Kirov Park,
Baku 1982.

film processing works, audiovisual production firms, video cassette and video disc labels, and the venues for showing filmic works of all kinds.

Towards the end of the 1980s, all market leaders in this branch of industry were prototypes of such concerns for the exploitation of rest-time. World-wide, the ranking list was headed by Bertelsmann, with an annual turnover of 11.5 billion Deutschmarks and an army of 41,915 employees. This empire of the Mohn family and Bucerius (10 per cent shareholder) was still primarily based on the production and distribution of print media, but trade with recorded music and, particularly, with audiovisuals played an increasingly important role in the expansion plans of the concern. In second place was the News Corporation, owned by the Australian-American Rupert Murdoch, his family, and around 6,000 small shareholders, with 7.7 billion DM turnover, to which belonged the prestigious Times Newspapers plus over a hundred other daily newspapers, the US film giant, twentieth Century Fox, a satellite channel serving Western Europe (Sky), television stations in the USA, and production companies for audiovisions. With only a few thousand dollars less turnover, in third place was Capital Cities, which together with ABC owned one of the three American radio networks, publishing houses for books and magazines, radio stations, daily newspapers, mass tourism operators, and more besides.[6] In the age of boundless reproducibility and exploitability, respectively, of entertainment and information messages, concerns such as these were only surpassed by conglomerates such as The Coca-Cola Bottling Co. In fact, Coca-Cola was by no means a stranger to the industry, as the parent company was often described in relation to its subsidiaries that traded in media products. On the contrary: the production and trade with audiovisual commodities fitted in extremely well with the global concept of Coca-Cola, which aimed at filling people's entire rest-time with one brand name, whether the stuff that dreams are manufactured of be consumable in the form of a soft drink or of light and sound signals. In 1983, the company's president Roberto Goizueta expressed this in an interview when Coca-Cola took over Columbia Pictures: 'It is the idea of playing the same role on the domestic television set as in the refrigerator. We now have soft drinks, wine, and juice in the fridge and we want the same on TV, that is, that everything one sees there comes from Columbia; whether it is broadcast, or comes via cable, satellite, or video cassette.'[7] The project of 'the ideal brain tonic', with which Coca-Cola had begun in the environment of the innovation that was cinema, thus reached a new and all-embracing stadium in its realisation one hundred years later.

For a long time, a co-constituent of the differences between the dispositifs of cinema and television had been the different materials used for

inscription of the images and sound, which even today generally serve as the starting point for the specific forms of exhibition: 35 mm photographic film stock and electromagnetic video tape, which over the past 50 years has been reduced from the original 2 inches to 1/4" wide tape. As we approach the end of this century, a process is discernible towards the dissolution of such material limitations. The highly integrated international media market of the 1980s and 1990s with its global channels of distribution demanded a compatible product, a uniform standard like that already existing in the music industry – first 78 rpm, then singles, LPs, and EPs; later MCs and CDs – which were then undergoing modification with the advent of digital recording. It was imperative that this compatible material form had the capability for all dispositif arrangements, without exception. Aesthetic and technical differences in the representation of the audiovisions, either on the big screen in public or on the oscillating small screen in private, had to be done away with or at least reduced to insignificance. As a tendency, the ubiquitous space of the filmic was demanding uniformity in the appearances of the imaginary.

This was the foreground of work on standards for high definition television (HDTV), which the Japanese television industry had already begun in the early 1970s, being joined in the early 1980s by Western European and North American electrical industries. HDTV, or HiVision as the Japanese called it – this signifier had already left television etymologically behind it – was only at first glance a quest for higher quality images and a scheme to open up the hotly competitive market to a new generation of television devices. First and foremost, it was the formula for an audiovisual master product, that could be used in cinema and aeroplanes alike, in the supermarket or the living room, without any degree of recognisable difference. Initiated in the 1920s by the radio industry and the television hobbyists, this project for bringing electronic picture definition and film material closer together was approaching a first developmental high point. With more than 1000 vertical lines and more than a million pixels, the TV images envisaged by the laboratories involved, whether in Tokyo or Eindhoven, were capable of carrying a similar amount of information as 35 mm film. (The fact that when the first devices for HiVision were put on the market, an even higher electronic definition was already being elaborated, was a good illustration that this was only an interim peak.) Since the mid-1980s, a publicly fought battle had been raging over different standards between the American, Japanese, and West European electrical industries which had temporarily joined forces as a consortium for the HDTV project, Eureka 95. This battle was waged with unconcealed protectionistic vigour and it would only have been possible to end it through political intervention. In fact, it only served

to disguise the real battleground, for this conflict merely reflected the short- and middle-term competitive interests on the world market. Analogous to the audio sector, its resolution in the long-term announced itself by its anticipation of a global digital norm, for illusions of motion as well: the dissolution of all material constraints on reproduction and distribution in the binary code.

This future was already being worked on, at least in the laboratory. In 1983, after the Japanese industrial avant-garde had already invested more than $200 million in the development of HiVision and had made it patently obvious that this was going to put Far-Eastern domination of the home electronics sector on a whole new level, a project began at the Media Laboratory of the Massachusetts Institute of Technology (MIT). Officially titled Advanced Television Project, it was supported by all US networks and major appliance manufacturers. Its goal was: to invent a process for excellent high definition TV images that would not require the immense transmission capacity called for by the variants of HDTV that had been developed so far. MIT sought the solution of this problem in the design of the receiving apparatus itself. They wanted to develop a high-performance image processor. The streams of data to be transmitted would be digitally compressed and the receiver, no longer a normal television set, would transform them into visions that could be decoded by the viewers. Nicholas Negroponte, at that time head of MIT's Media Lab, put this endeavour into its technological-industrial perspective: 'You have 600 million TV sets out there. To put out another 600 million, each of which is an image processor that removes all the shadowing and ghosting and all that, is a big potential market. Twenty years from now your TV set will probably have 50 megabytes of random-access memory and run 40 to 50 MIPS (Million Instructions Per Second–S.Z.). It'll be basically a Cray computer.'[8] At that time, the Cray was the most powerful, fastest computer around and cost approximately $15 million.

Already the perspective of advanced audiovision was being conceived of as an integrated system. The technological heart was the global network of fibreglass cables with satellite connections through which the streams of data, with a uniform standard, carrying the most varied information, flow. This is what stood behind the international formula ISDN (Integrated Services Digital Network). After the network of the railways in the nineteenth century and the network of roads in the twentieth, a new nervous system had been implanted in the industrial world, which was capable of transporting the most important commodity of all – information – quickly and effectively to anyplace anywhere. The pivotal function for social reproduction which formerly had been exercised by the railway stations and docks

for goods traffic, would be taken over in the future by 'Teleports', intersections of the various information channels dotted around the globe where hard- and software were produced for industry and finance, but also for art, culture, material for contemplation, and for entertainment.

In Orwell's year of 1984, an organisation was founded in the USA which was charged with the planning and installation of such constructions for the architecture of the new media, the World Teleport Association. One of its favourite brain-children was the MediaPark in Cologne, Germany, on a site of some 200,000 m^2 where once the Gereon freight depot stood. This particular urban development project was an excellent exemplification of the principle of connecting areas of communications and service industries that used to be separate. It was envisaged to structurally permeate the sphere of work (with media machines) with the sphere of leisure (with media machines), harmonise the two architectonically, and embed them in a magnificent park landscape. 'Musikproduktionszentrum Digiton' [Digiton Music Production Centre], 'Design-Börse' [Design Exchange], 'Publicon' [an area mainly for audience-oriented spectacles], 'Telemathek' [Television Museum] – in these codes for the planned institutions the envisaged symbiosis of economy, technology, and culture is expressed beautifully. At the time of writing, in 1998, this park is still under construction; the scale of the plans was too large. The hotel ruins by the French star architect, Jean Nouvel, is a constant reminder of the relative failure of this project.

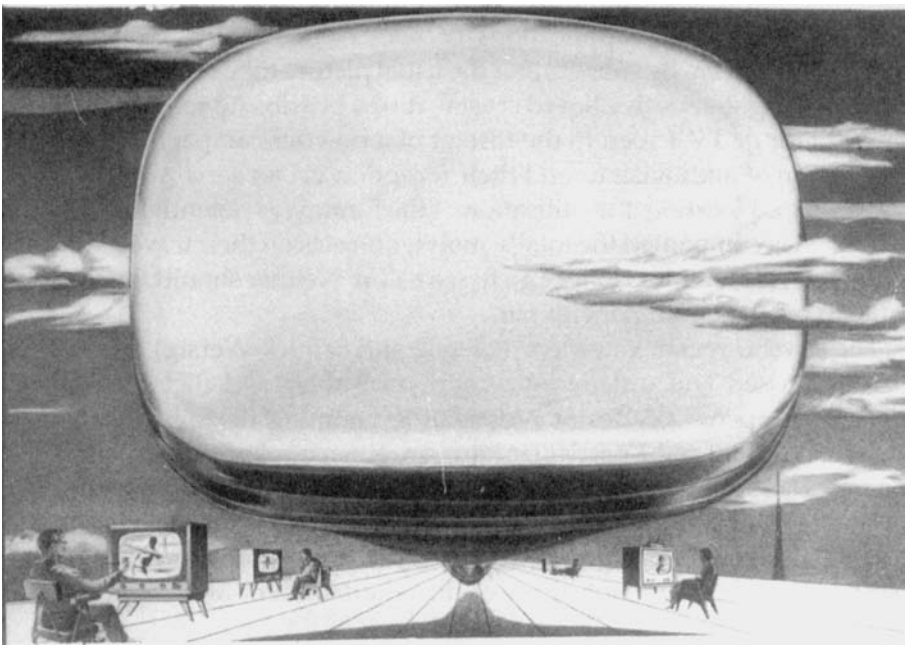
Yet aside from projects of this nature: with filmic material dissolved into the binary code, the audiovisual discourse of leisure was finally connectable to the integrated digital networks for offices, trade and service industries, universities, and the individual terminals in the private households. Potentially it was possible to link up fiction with the facts of the working day, once RAMBO, HEIMAT, DALLAS, or WINGS OF DESIRE had been converted into rows of 1's and 0's like a bank transfer, a notice of dismissal, the financial budget, or architectural plans: the classic filmic discourse as a sub-discourse of audiovisuals like teleshopping, telefaxing, videoconferencing, mailboxing, or telemarketing. This signified nothing less than the fusion of working time and rest-time at the artefact of the multifunctional monitor.

However, that generation of personal computer users had already begun to practise this synthesis for they utilised the computer not only as a learning aid and working tool which required intense mental effort but they saw it equally as an object for playing with as concentrated relaxation. When, in the mid-1970s, telegames and video games, new objects from the entertainment electronics industry, became established as a mass market, at first the machines occupied the very same places from whence the cinematographic, in the form of Edison's Kinetoscopes, had once sallied forth to conquer the

world: the penny arcades, the public amusement arcades. By inserting a coin, you could rent computer-game time. The next development was to connect equipment and accessories necessary for playing games to the TV set at home. Game consoles, with joysticks and other control devices for moving elements on the screen, could be plugged into the television receiver via the jack for the aerial. Analogous to the VCR, which permitted the playback of filmic material of all kinds, the stimulus–reaction consoles from Atari or Mattell with their accompanying software cassettes represented an expansion of the traditional television experience which offered rudimentary interaction possibilities at the interface of man and media-machine. These artefacts of plastic and electronic components had the obvious character of toys and this found its most evident expression in the subject matter of the cassettes – from little yellow monsters that gobbled up pixels to the numerous adaptations of the heroes of juvenile pop culture and shoot 'em up games of every variety.

As the private households were increasingly permeated by computers with ever larger memories, the element of games and play became more and more integrated into the new mega-machines. The alphanumeric keyboard, which could now also be connected up with the libidinally satisfying joysticks, replaced the consoles which were of no other use at all; the cassettes began to be replaced by floppy disks which were also used for programmes in a work context; and the TV set, as the surface for generating images, made way for the monitor which was not a receiver. Video games were followed by computer games with increasingly complex dramaturgic structures and qualitatively ever better definition of the illuminated graphic images. Adventure, fantasy, adaptations of Hollywood films and pornography, like the sensory offerings themselves roughly scanned graphic contours – all these new perception surfaces pushed their way onto the monitor screens of the terminals. Further, in the late 1980s, several software firms marketed programmes with which their young customer-kings of kilo- and megabytes could produce rough animated moving pictures themselves, provided that their computers were equipped with an accelerator, a 'blitter'. With this step, the simulation of visuals gradually approached the industrial level which the simulation of music had already attained. The composition of synthetic worlds of sound from pre-existing set pieces had already reached the market for personal computers.

An important short-term aim of the project of occupying the millions of monitors at individual terminals with pre-fabricated illusions of motion was marked already in the 1980s by the term *Paperback Movie*.[9] This most sought-after of all audiovisual commodities for filling up rest-time, the feature film, was planned to be packaged and retailed in a form which had long



'Guerilla Television', Raindance Corporation 1971.

existed on the book market: a storage medium for the information which was so cheap that it was not worth the consumer's while any more to copy it. The object of a research project carried out at MIT's MediaLab was to digitise and compress the incredible amount of data of an entire 35 mm feature film into the space of a compact disc like those already in use in the music sector. The cost of the material needed to mass-produce such discs was only a few pfennigs/pence/cents. The filmic would thus achieve a product level where it could be sold cheaply in any supermarket, department store, or kiosk: audiovisual dream and nightmare worlds sporting similar digital bar codes to deodorants, whisky bottles, or glossy magazines. This represented an economic and technological offensive on the part of film's producers and distributors in order to challenge the most important channels through which private households gained possession of films: rented from video libraries or videotaped from TV with VCRs.

However, not only the physical products wherein film will be packaged in the future will be smaller, more flexible, and transportable anywhere. With regard to the devices for receiving and reproducing electronic images, this process reached its first peak in the mid-1980s when the Watchman was launched onto the market. In this manner, an entity received the shape of a consumer article which, since the 1950s, had been developed for various in-

dustrial and military applications of television, namely, the extremely small, mini-screen. By substituting the usual picture tube with a honeycomb filled with light-sensitive liquid crystal, it was possible to reduce the size of the monitor or TV screen to the format of a powder compact. Thus the reproduction of audiovisions and their reception via an aerial was no longer tied to a fixed location, the utilisation of the filmic was potentially without a locality. It accompanied the totally mobile subjects on their travels throughout the day. I should no longer go to see a film. Neither should the film only come to me. It should go with me.

The psycho-social 'gateways' (Wersig and Schuck-Wersig) for this type of singularised and unfettered reception of noisy and flickering stimuli were wide open. Decades of propaganda vaunting flexibility, independence from family and a particular location as essential prerequisites for selling one's labour power on a continuous basis, but also the internalisation of mechanisms of competition, these factors had affected the state of the subjects themselves. The single, always ready to do anything or go anywhere, had become the compliant object of the entertainment industry's compulsory innovations.

To begin with, the Walkman was laughed at as a device whose importance would be confined to gadget-status for a few avid listeners and young techno-freaks; a further, but marginal, step on the road of development to 'musica mobilis'.[10] Meanwhile, radios and hi-fi quality stereo systems in cars represented a further expansion of the homely private sphere into the public space. However, it also marked a point of fissure, for it filled a locality with sound that mediated between intimate and public traffic. The familial, or the individual within it, had thus gained a kind of outpost. The jangling noise of the transistor radios (someone really should write a history of rock and pop music of the 1950s and early 1960s with the transistor radio as media focus), the portable plastic record player with a slot where the 45s were inserted, and the outsize stereo radio cassette recorders, the 'ghettoblasters', were first popularised by various youth (sub)cultures. These machines carried their musical identity purposively and loudly on the outside, and informed the outside world about it by means of acoustic assault. They also served to create insider worlds of experience for the group, the clique, by making the reproduction of music independent of the parental home. The Walkman – and also its supplement, the Discman mobile mini-CD player – represented a qualitatively new phenomenon in this genus, the significance of which was no longer limited to youth culture. From the early 1980s, one observed how they gradually developed into an electro-industrial icon of a specific type of solitude. They appeared in all those places where urbanites have, of necessity, to congregate in masses. In

Perception change at a famous traffic intersection: home electronics instead of alcohol, tele-view instead of long shot, of a total view; 'Coca-Cola' is the only constant factor. (Picture postcards from the 1950s and 1980s)

commodity form, they were the possibility, in the midst of the concert of foreign sounds and strange voices, on acoustic foreign territory, to create supposedly individual worlds of experience and, in this way, with at least a part of the senses, to become immersed in imaginary worlds. On the underground and in buses, in school playgrounds and universities, in shopping precincts, and on beaches where mass tourists holiday, Narcissus equipped with mini-cassette player and headphones signalled to his co-actors: 'I do not wish to be spoken to! I do not want to talk!' The egocentrisation of the zeitgeist: in a bizarre ambivalence of mental absence and physical presence, the daydream-walkers between the control centres of everyday life embodied a kind of singularised nomadism, of which the common industrial basis was most obviously recognisable when sounds escaped the ear-pieces of the head-phones. Then one could hear clearly the high frequencies of the monotonous rattling of the carpet of sound produced by rhythm machines and samplers from the studio-factories of the record companies.

With regard to the determination of the perception of the media that had now become mobile, the project of the Watchman went a good deal further. Additionally, at any time and anywhere, it offered its users access to visual worlds of experience that collided with the actual environment experienced, complemented it, commented on it, or had no relationship with it whatsoever. The nomadism of the singularised subjects in the information society thus approached a peak, where the society caricatured itself, as was the case with the Video Trolly, designed by a US firm in 1987 for supermarkets. These shopping trolleys were fitted with small TVs which only ran adverts, transmitted from a nearby TV station. When a customer passed a shelf containing a product for which an advertising spot existed, the advertising automatically appeared on the screen.[11]

Artefacts for media uses and media signifying praxes stand in a close interrelationship with one another. Communications refer to the forms and structures in which their utilisation takes place: in the apparatus arrangements, aesthetics and dramaturgy are laid down and retrievable. In this interdependency, historical succession is always discernible: new media machines announce new signifying praxes. It is a matter of decoding these from the artefacts.

Corresponding to the artefacts for singularised, and to an extreme extent, decentralised perception was a structure of audiovisual messages that had not only said goodbye to continuity and homogeneity but also to the traditional tirades of information, entertainment, and education which once constituted radio/television as a programme. Audiovisions for temporally and spatially unlimited mobility had to be distinguished by discontinuity, fragmentation, and retardation. Both aesthetically and materially, they de-

manded organisational structures that were concentrated on the quick look-in and the brief listen-in. The span of the individual segments had to be geared to the fact that their users would perceive them only fragmentarily, and often secondarily, alongside other everyday activities. The only thing that needed to be reliable was the same daily time-framework which, in addition to the specific acoustic and visual atmosphere, constituted the 'channel identity' which distinguished the various providers of audiovisions. 'Service Radio', which had had a successful career in that medium of auditory perception in the 1970s, was a possible model: the tyranny of the three-minute spot, which pressed everything that existed or happened into the temporal length of a 45 rpm single record. For the medium of hearing and seeing, this meant weaving a fabric from the smallest audiovisual particles whose perceptory area was just large enough to administer acoustic and optic stimulants; the weather news, the latest stock market prices, a short sketch of a catastrophe, or a few quick images from the ups and downs of institutionalised daily politics, and naturally, (here the attribute 'naturally' is totally apt, for a signifying praxis such as this does correspond to the ontology of advertising) – commercials.

Music Television (MTV) was an offer where such principles were realised in their purest form, both syntactically and semantically. In 1981, this channel intended for US households with cable TV was installed by Warner Amex Satellite Entertainment Company (WASEC), the electronic entertainment conglomerate of Warner Communications and the finance consortium American Express. It was bought by Viacom International in the mid-1980s, which in turn was swallowed by National Amusement Inc. in 1987. The new owners of MTV planned to turn it into a more conventional commercial network programme. However, for the purposes of our discussion MTV's original structure is of interest, the structure in which it was first fed into West European networks: it flowed 'without a beginning, without a middle and without an end', as a *New York Times* critic once described it. In a continuous 24-hour loop, MTV broadcast practically only advertising. On the surface this was not immediately apparent: fantastic quality pictures down to the smallest detail, fascinating balancing acts between art and commerce, sequences of amazing dullness, but also formal beauty at the height of contemporary design, buried under an infinity of feel-good messages of consumerism from the satellite-infested heavens. For this unending chain of disparate images, which was wrapped around the continuous beat of the 'in' music of the moment like a layer of packaging, followed only a single purpose: to promote optimal sales of these conserved sounds for the music industry and, at the same time, to market the entire arsenal of youth culture fetishes that were for sale. All signifying elements of the station were subor-

dinate to this end of producing subjectivity – the brief announcements of the young programme presenters in the studio, whose gestures and outfits paraded the various cultures and sub-cultures currently in fashion, interviews in the form of snatches of conversation sprinkled throughout the programme to promote the stars, short news features with the latest from the concert and record industry, advertisements for the channel itself at very frequent intervals with high quality animation and special effects, a series with '10-second films', flashbacks to the past, where, e.g., scenes of the massacre at My Lai were accompanied by a track from the Mamas & Papas, and, last but not least, the visualised sound tracks of the pop charts for which a number of the film-making elite did not consider it beneath them to supply the images, e.g., Derek Jarman, Nicholas Roeg, and Andy Warhol.

Sales ideology and determination of dreams[12] entered into a synthesis in these *montages of attractions* that was an exemplary representation of the post-modern. Re-processed into brief references or simply fragments pilfered from others' work, in the course of single day a viewer was likely to be confronted with a sizeable portion of superficial film and television history. Current cinema myths and Hollywood's past glamour alike were recycled as well as, e.g., Cocteau's poetic collages, surrealistic pieces by Buñuel and Dali, Clair's Dadaisms, Cubo-constructivist elements of images, and the expressionist decor of CALIGARI, and all were mixed with the insignia and accessories of the fashions of the moment. A reprocessing plant for the heads and the hearts: the intense images adhered to the accompanying song like cling-film and were mentally reactivated when the song was heard again on the radio or the record player. Moreover, the extreme temporal and spatial discontinuity of the visual messages, with their continually changing locations, angles, distances, perspectives, and time levels, was electronically objectivised dream experience. The televisionary structure coincided with the structure of the dreamlike, additionally supported and expressed through detailed strategies of visualisation that were evocative of somnambulism: slow motion effects, exaggerated camera movements, dissolving and multi-superimposed images, chopped-up time sequences, and a plethora of subjects and motifs borrowed from fantasy and fairy tales. A never-ending invitation to a hypnotic trance, in which the viewer was held in an state of unsatisfied desires but was, at the same time, supplied with the illusion that these would be satisfied by the electronic stream of sounds and images.

In these televisionary worlds composed of tiny fragments, it was not only possible for the viewers or listeners to switch on or off at any point, this was even expected and welcomed. Regular repetition of certain videoclips guaranteed that over a longer period of viewing none of the advertising messages would be missed and would impress themselves on the memory,

respectively. The subject, with his/her fractalised subjective consciousness of time, was even a prerequisite for this design. Here, future TV worlds were reflected as in a microcosm. The supertext MTV was readable as an ideal offer of an audiovisual landscape where artefacts like the Watchman or the large monitors in public spaces everywhere constituted additional intersections over and above the technical systems for an expanded determination of the imagination; these I shall discuss in more detail below.

The industrial sector specialising in the exploitation of rest-times and direct reproduction of labour monitored with great sensitivity – and much earlier than the cultural critique of social scientists or journalists – just how the organisational patterns of the everyday life of their (potential) customers was changing. The example of the music channel, where communications industry and finance capital collaborated so well, was one rather advanced case for it catered exclusively to the target/customer group of young people interested in pop music. The amount of time this group spent consuming tele-visions was, in general, not oriented toward larger homogeneous time-slots but rather they helped themselves to the material provided by the industry in frequent, but small, portions; between parental home and school, college and job, listening to music and playing computer games, disco, sport, and many other outdoor activities. However, to a certain extent it is possible to interpret the signifying praxis of the other providers of commercial audiovisions via terrestrial and cable networks in the Federal Republic of Germany and other West European nations as a programmatic reaction to a changed subjective awareness of time. The line-up of long-running series, short magazine programmes, game shows, stock exchange rates, news, and weather forecasts appeared – on the surface – to be merely maximum output for minimum outlay. However, at the same time it tested structures of programming that were diametrically opposed to the traditional ones of the public broadcasting authorities. Particularly, different time structures were tried out, for television is nothing more than the reification of time as a service or a commodity. As a result, the heterogeneous programme slots of the public broadcasters, whether ARD and ZDF, BBC, ORF, or SRG, that over the course of the week changed both with regard to content and to time length, were confronted by the relatively unchanging 30–60 minute elements of the private channels (SAT 1, RTL Plus, Tele 5, Super Channel, and, even more extreme, Sky Channel), where the dramaturgic and thematic constellations were frequently similar and constantly updated.[11] Actually, this was programme planning based on the findings of leisure time research which, especially since the beginning of the 1980s, had been widely conducted and published. According to these findings, television had become (with the exception of prime time programme

highlights) an activity where the screen was no longer watched with concentrated attention over a longer period of time. For many, the time spent with the technical communicator in the living room had assumed more the function of a 'time buffer',[14] that one used interrupted by or parallel to other activities associated with reproduction. Such behaviour towards the audiovisual possibilities on offer was based on the pervasive feeling of 'being pressed for time',[15] which was experienced by many people constricted by rigid time regimes. Although working hours had been gradually reduced, this phenomenon had become stronger both objectively and subjectively, due to the continual intensification of work processes, the gradual withdrawal of the State from public services, and to the fact that accomplishing everyday chores had become more time-intensive and demands on reproduction had increased: journeys to and from the workplace, shopping, cooking, active care of and bringing up children, keeping fit, and much more besides. Those most affected by this were the people whose organisation of their reproduction tasks was made even more difficult by the social framework in which they lived: families with many children, single parent families, employees with long working hours, and particularly those doing shift-work. The temporal flexibility of the service and production sectors – vehemently demanded in the 1980s as an economic must for the 1990s – opened the gateways for the new media of private and personal mobility in an immense way.

The speed of time passing, being pressed for time, having no time... reproduced illusions of motion as a reflection of states of mind, but also as compensation for deficits that the speed-up of everyday life had brought with it: in principle, history had clung to this functional connection since the dispositif of cinema emerged. Under the conditions of advanced audiovision, one new aspect was that in addition to cinema and television, the associated members of an information processes co-based society were offered a multitude of possibilities to enjoy themselves with industrially designed time products in the intimate private sphere; to relax, turn off, experience thrills. A further new quality was that technology and industry had supplied the mass market with equipment (systems) which made it possible to intervene manipulatively in the time structures and processes that had been fixed centrally from the users' side.

Essentially, the video recorder is one such audiovisual time machine. Its orientation towards this specific use was responsible for its successful establishment as a widespread cultural technology from the mid-1970s onwards. It was in this context that it became a focal artefact for filmic discourse at the stadium of advanced audiovisions. The entire range of dimensions, that could be differentiated analytically in the use value of video technology and

its realisation through its users, were of greatest significance with reference to time:

In combination with a camera, the video recorder enabled the individual to preserve pieces of life-time – events, and occurrences that he/she wished to keep and, if and when so desired, to retrieve in a technically estranged, and in some cases, processed form, to watch them again and evaluate them. Unlike the technique of the narrow gauge film,[16] which had been available to the hobby filmmaker since the 1920s but for technical and economic reasons only allowed the inscription of brief pieces of photographic film, it was possible to store much longer events without breaks on magnetic tape. The price of the material was low and there were no additional costs for developing as the tape did not require chemical processing. This also represented a new quality: the industrial process that had been inserted between taking the image and reproducing it, – the development of the film (originally introduced by Kodak, 'You press the button, we do the rest') – was abolished by video. The videographer controlled all steps of re-visualisation him/herself.

Certain cultural critics were quick to dismiss the new technology as being only fit for deep-freezing holiday pictures and family celebrations or other very private uses including erotic stimulants – criticisms of this ilk were common. I shall not deal with them here for they were feeble in the extreme and refused to engage with the cultural process that availed itself of this media technology. (So far, nobody has even taken the trouble to research what and how the amateurs tape.) In the early 1960s, for example, the deliberate exhibition of time processes, particularly those cast in everyday banality, was an integral component of the activities of the Happening and Fluxus movements around Wolf Vostell, Nam June Paik, Charlotte Moorman, and Joseph Beuys, where 'the events are experienced as a piece of time that is lived through'.[17] The preservation of one's own 'lived-through time', 'to manifest and to document biographical life-time',[18] was the basic idea but taken to extremes in the artistic objectifications by, e.g., On Kawara, Stanley Brouwn, Hanne Darboven, and Roman Opalka at the beginning of the 1970s. For people whose lives were occupied by the public sphere (and vice versa, who occupied the public sphere with their lives), it was considered both as a matter of course and desirable to store as much as possible of their objectivised time, whereby the private moments – virtually impossible to filter out as such – were particularly of media interest. For example, the long-running ZDF series, *Zeugen des Jahrhunderts* [Witnesses to This Century] served no other purpose than to prepare and collect visible and audible testimonies of lives. Even ten years ago, the finished products were already considered to be an important audiovisual archive of the

twentieth century. With the 'cinematograph of the amateurs' – as Godard once referred to size and price-reduced video technology – , a former privilege of the affluent classes and social groups and strata that were deemed important, had come down to the lower regions of society. The cultural significance of this event was comparable to the mass spread of photography in the nineteenth century which, for the most part, replaced portrait painting and allowed people who were not so rich and important also to have their pictures taken.

The many millions of hours of everyday time recorded by the cameramen and -women in the 1980s and 1990s of our century using video equipment that, in the meantime, had become small enough to be easily transported anywhere, represent a vast archive that orally-oriented historians (their successors will be visually oriented) of years to come will gratefully pounce upon. In its time, only a minuscule fraction of this material ever became known, i.e., was made public: in connection with one of the competitions held regularly by industry in order to promote and popularise still further their products, or when the images of some spectacular event not originally scheduled for media coverage were recorded by amateur videographers who happened to be present by chance and no professional camera people were at hand. Impressions of the first mass demonstrations in Azerbaijan in 1988 originated in this way and were circulated around the world. And film strategies that were presumed to have landed on the dust-heap with the class struggle at the end of the 1960s, were revived in connection with the threatened mass closure of factories in Rheinhausen in 1988: *Operative Video* as electronic cinema verité, Kinopravda using a video camera, where trades union activists produced their own images and attempted to organise their own self-determined publicity via the community TV channel. The students, who were on the move again, followed their lead. At the end of the 1980s, when there were mass boycotts of seminars and lectures in protest at the material and intellectual impoverishment of the universities, their video strike-bulletins were an important factor in spreading and motivating the protest.

Originally, video technology had served US network television to synchronise the various time zones of the continent along the median of a television programme. The video recorder had been developed in the 1950s principally to facilitate the manufacture of simultaneous TV experiences, to standardise TV time as social time.[19] Two decades later, when it had passed into the hands of the viewers in front of the TV sets, this artefact then served the opposite purpose: the temporal deconstruction of time as fixed by the provider, i.e., the heteronomous raster of programmes for the subjects of reception; it no longer served to produce shared but instead singularised au-

diovisual experiences – in a temporal sense, the production of anarchic televisual relations. With respect to the interrelation between techno-industrial and socio-cultural factors, this was a striking process of development for an innovation for the mass market: since the 1960s, all attempts on the part of industry to market devices that could only play back filmic commodities had been unmitigated disasters and spectacularly bad investments for the firms concerned. Only when the artefact had been poured into the mould of a television recorder, relatively easy to operate, and with magnetic tape enclosed in cassettes that was long enough to record at least one feature film, was it able to arouse the desires of many potential customers. It coincided with the need for more flexibility and self-determination time-wise on the part of those who were increasingly caught up in rigid everyday time processes. Industry promised them a machine with which they could compensate for deficits experienced in work and reproduction processes and kept it, too; albeit only restricted to certain aspects of how they spent their rest-time.

What was going on here, was no longer television in the sense of the central organisation of circular effects. This time machine, which was now hooked up between the events of transmission and reception, led to profound restructuring with significance for the quality of experience of the

subjects: the immediacy of address of the television medium, fabricated both by live programmes and the continual verbal and gestural invitations by announcers and moderators to stay tuned, was now paralysed and rendered an absurdity through the temporal reshuffling of the programme segments. Recorded and, for example, played back the next morning, the 'Good evening, so glad that you're with us again!' is rather farcical and pointless, to say the least. The continual flow of sounds and images that were the hallmark of traditional broadcasting, was interrupted and partially frozen over by the time machine. The continuum of the event was confronted by the discontinuity in its viewing. The centralised organisation of an aristotelian audience by means of technology was broken up into many decentralised viewing events at different times and in different places. For TV reception via video recorder, it was not the series character of the supertext that was television that counted but rather the singular event isolated from it.

Additionally, this extrapolation accorded it more importance. Attentiveness to the audiovisual object increased, for it was no longer a mere sequence in a continuum delivered to the living room – often only taken note of secondarily – but had become a personally selected object of media desires. This process encompassed the restructuring of content as set by the television programmers who had provided it. The users of the time machines set their own priorities, which lay mainly with the narrative fictions broadcast. Particularly feature films and episodes of series were videotaped and played back. The complex structure of the flow of programmes that was comprised of heterogeneous elements, did not interest the activists with their video recorders. This heterogeneity of themes and forms on offer became, when partially used, a quite homogeneous collection of very similar set pieces.[20]

The video recorder 'inscribed'– as it was called in technical jargon – the picture signals that had been transformed into electrical pulses onto magnetic tape. The video heads 'read' the picture signals from the tape during playback. With this etymological analogy, the engineers unconsciously drew attention to a significant cultural fact; for with this privately utilisable recording technique the materiality of audiovision was rendered quasi literary. That which appeared to Günther Anders in the mid-1950s in his book, *Die Welt als Phantom und Matrize* [The World as Phantom and Matrix] his 'philosophical observations about radio and television',[21] to be still very 'doubtful', became cultural and technical reality. That which flowed through the 'Kulturwasserhähne' [culture taps] installed in the living rooms, was now at the disposal of the 'Schmidts and Müllers' via the video cassette. Power of disposal over audiovisual constructs was no longer only

in the hands of the producers, rental firms, and distribution companies of the electronic distribution channels. The act of exchange had become qualitatively different. The customers, eager to possess the commodities, no longer exclusively rented film-time. The filmic had become something that they could own and thus its new owners had the possibility to use it in any way they desired. For the first time in the history of synthetic illusions of motion, it was possible for the subject who was to be illusionised to intervene in their syntax in a major way. They could be speeded up or slowed down to a complete standstill, freezing individual images; they could be viewed almost frame by frame or their colour could be changed; stroboscopic effects were possible; sequences or shots could be skipped or repeated at will; the order of the elements of a text could be changed, e.g., a two-hour epic could be compressed into a fragment which included only the highlights and lasted for only a few minutes. The object of these changes was both *expression time* and *content time*, as Umberto Eco defined semiologically the two components of art time.[22] Time, that was reified in the material of the media became experienceable as used-up time even to the point of being confronted with its physical demise in the form of a worn-out videotape that had to be thrown away.

What had formerly been regarded as the privilege of print productions as opposed to image productions, had now come down to these as well. With the advent of magnetic tape and – faster and even more flexible – the videodisc, it was possible to leaf through the filmic text and to mark text passages in order to find and 'read' them again quickly. With regard to how the audiovisual material was used, here, too, the didacts had to hand over a privilege to those who had generally been the instructed: the possibility of analysing and dissecting with the help of these storage techniques. The harsh criticism levelled at the time machine by the didactic faction, particularly in the early phase, was partly because of having to relinquish this privilege.

The literarisation process of audiovisuals was also of importance for the constructors and providers of everyday audiovisions. Their most cogent argument as to why their messages were made so uniform and superficial – that these were only perceived for a fleeting moment, their presence could not be made to last – increasingly lost its validity. The lack of ability to create filmic entities which would stand the intellectual and aesthetic test of being looked at and scrutinised repeatedly, could no longer be excused by the constraints of the material form. A new opportunity had arisen for more complex and even complicated constructions of sound/music and images. These no longer had to be confined to the productions of the avant-garde, who had always proceeded on the assumption that their objectifications

would be used many times and not just once. The producers of entertaining, informative, and didactic mass culture could learn a great deal from people who use audiovisions in education and professional training. For even in the 1980s, film texts with selected possibilities for intervention on the part of the user were established, sophisticated, practice.

By contrast, in the industrial amusement sector another consequence of the ability to intervene had settled in, which hinted at things to come: as a preventive measure, audiovisual commodities were constructed in such a way that they no longer left themselves open to attack and manipulation by their consumers – an incidence of high-grade deconstruction-production in the sense of Brecht's *Threepenny Opera* law suit. Such phenomena were particularly manifest in genre-films, the staple of trade in conserved film products, which were fabricated in ever larger quantities to international standards especially for reproduction with video recorders. The specific rules and conventions of the various genres for the corresponding target groups of viewer-cognoscenti, whether horror, sex, action, crime, or war films, comedies, Westerns, or Easterns, began to be packed so tightly together and in rapid succession that the acceleration or compression machine, respectively, had no chance of intervening. This was the model of audiovisualised pornography raised to a general production principle: there, one act of copulation follows the next; foreplay and afterplay are dispensed with as an unnecessary waste of time between the feigned climaxes, which are thus themselves rendered null and void in a narrative sense. The rationale of production had become staging praxis, revealing the reverse side of this cultural technology with its ambivalent functions: running like an instantaneous water-heater, the video recorder had created its own aesthetics of use-and-throw-away commodities which, considering the gigantic quantities produced for this distributor, is hardly surprising. In 1987 in West Germany alone, three new video titles appeared every day,[23] and the trend was quantitatively upward. In this connection, it was a paradigmatic change for the market when the most prominent international innovation and production factory for home electronics, the Japanese Sony Corporation, founded its own firm to feed the time machines in 1988: the Sony Video Software Company.[24] The emergent trend was towards coincidence of machines and programmes.

In Bussinovo, a mammoth new housing development in north-west Moscow, the central Soviet film organisation Goskino opened the first video library in 1987. Although only very few Muscovites had access to a video recorder at that time, the library more than attained its planned financial target in its first year of operation. An average of 100 denizens of the satellite town visited daily, either to borrow cassettes or, for a small admission fee, to

watch classic films of Soviet Cinema and (only a limited selection of) imported Western best-sellers in the intimate atmosphere of its Video Salon. The difference in the exchange levels was telling: 'The rental charge for cassettes of historic and revolutionary films, children's films, and cartoons is 1 rouble 30 kopeks, and 4 roubles for box-office hits from the West'.[25] – 'Luxiang' is Chinese for video. Video recorders were not only being produced as cheap consumer goods in Taiwan, the People's Republic of China also began to take notice of the reproduction machine for audiovisuals as the demand of their comrades increased. Nearly 6,000 yen, sixty times the average monthly salary of a Chinese wage-earner, was the prohibitively expensive price of a video recorder at the beginning of the 1980s, then only available as imports from the West. Soon, however, the first factories for manufacturing units and cassettes were built in the provinces of Liaoning in the north and Sichuan in the south. Naturally, this was to supply the home market with goods that were much cheaper than the imports. – Before long, video recorders were operating in country buses in Sri Lanka, Malaysian restaurants, tea houses of the Far East, and luxurious private houses in the oil-producing Arab countries. This machine was not only to be found in places that already had cinema and television, but especially where cinema and television had not, could not, and would not penetrate. In such places, the reception of audiovisuals was effected via the video recorder, whether on big building sites in Siberia, in deepest Kurdistan, in Alaska, or in the Australian outback.

The decade of the 1980s saw the video recorder not only become established as a component of technical culture in the capitalist industrialised nations, it also developed into a globally distributed technical culture. As such, it developed homogeneous but also contradictory functions at the international level, for it demonstrated like a prism the interdependent relationship between technology and culture in all its brilliantly multicoloured facets according to whichever socio-cultural context it operated in. Whereas in advanced capitalist societies the video recorder was useful first and foremost for the entertainment and leisure industry to expand the market for its products and to create new ones, in 'Sandino-Video' it served to spread the Sandinistas' oppositional political propaganda in Nicaragua, and in South Africa was used to support the organisation of resistance to Apartheid. In the communist-run societies, it conflicted with the hitherto *sine qua non* culture-political principle of centralised state control and distribution, of the filmic as well. In spite of a strong concentration of economic and political power at the top of its hierarchy, the global video market was decentrally organised in the direction of its addressees, and at the base, it was no longer controllable. There it functioned for the most part according to a dynamic of

its own and anarchically. Once a filmic entity had entered circulation –frequently through illegal means – then it was possible to copy it at will on the domestic units, to make many copies, and distribute it through non-official market channels. This was the aspect that was potentially damaging economically to the original owner of the film commodity. But this was also the aspect that had hidden subversive potential. Against this foreground, it is hardly surprising that the former communist-block countries, like the Soviet Union, Bulgaria, or Hungary, where it had even been enormously difficult for private citizens to gain access to other, simpler, reproduction technologies like photocopying, obstructed the electromagnetic invasion from the West and, what is more, took no initiatives of their own in the direction of this innovative technology. It was only in the second half of the 1980s, as part of a large-scale restructuring of the society and economy, that these obstructions were gradually removed, giving way to a rather offensive strategy. It was planned to implement the new technology, which was relatively cheap and easy to install, specifically in those areas where the infrastructure of film culture had either failed or was non-existent.

A similar function, but with much more far-reaching consequences for the national cultures concerned, was fulfilled by the video market in those countries which did not have an advanced level of industrial development. The countries of South East Asia, for example, in many regions did not have much infrastructure for cinemas in place at this time and television broadcasting was only just getting started. With the aid of this new technology, historic stages in the development of the filmic discourse were left out completely. The video recorder arrived and joined the magic lantern of centuries past, which was and still is used in training and education.[26] The cassettes of images from the entertainment factories of Western capitalism spread rapidly: Nastasia Kinski, e.g., as a much sought-after super-starlet and pin-up girl on the video monitors and in the video magazines of Bangkok.[27]

Yet it is striking that there was the same competition between the systems. The private sphere, which had already asserted itself in the utilisation of television, also demanded satisfaction with regard to video technology in nations with a state-determined public sphere. The offensive to open up the market to video in the Soviet Union, for example, was not primarily because of a sudden impulse on the part of the planned economists but was a reaction to the subjects' ever increasing demands for access to and use of these consumer goods – a strong indication of the possibility that the audiovisual is principally founded in a private context.

Artefacts and audiovisual materials for the hyper-mobile single, always prepared and on call anywhere, and for the flexible and invasive structuring of time, however, were but one side of this process, rich in contradic-

tions, at a new level of the media discourse. For those subjects for whom the domestic private sphere had become the centre (of self-identification) of their lives, an even stronger opposite force made its influence felt: the ongoing and unrestrained conversion of the private living space into an electronic fortress, with the intercom as its contact with the outside world and made transparent by the interior design trend to windows without curtains (Sennett terms this contradiction the tension between 'aesthetics of being visible' and 'social isolation'[28]). In these biotopes heated by visual and acoustic signals, a radical blurring of the boundaries between the classic dispositifs of audiovisual perception took place. In concert, electronics, leisure, and home furnishing industries set about imaginising the living rooms on a grand scale, in the manner envisaged by the bourgeois over a century before and which since that time, had frequently re-surfaced, for example, in Robidas' vision in his novel, *Le vingtième siècle* (1894), where the French novelist imagined the television-watching citizen in front of a large screen worked by a phonograph; various arrangements for life-size television in the 1930s; and the large format projectors of the 1950s.

The systematic analytic penetration of film *texts*, particularly in the tradition of linguistic structuralism, began in the second half of the 1960s with the very different work of Christian Metz, Umberto Eco, Jean-Marie Peters, and Pier Paolo Pasolini,[29] but on the whole, it was as yet indifferent to the special quality of the encounter between the experiencing/viewing subject and the filmic on offer. Semiotics of film was born and flourished briefly at the time when cinemas world-wide had lost some three-quarters of the audience they had once quantitatively commanded in their heyday (1946).[30] It must have been connected with a painful sense of loss, which moved the art and film scholars of France, Great Britain, and the USA to invest considerable effort in studying the special locality and/or the special environment where the filmic was staged in the cinema and cinemagoers were imaginised. By generalising the cinephile, addicted to the big screen, who was a near-fossil of cultural history with only a few members of the species still surviving, and by idealistically exaggerating everyday cinema experience – both elements were of great significance for the new, primarily psychoanalytically accentuated approach – intensive studies were devoted to researching the dispositif of the subject in the cinema.[31] Insofar as television entered into the discussion at all, it and its features relevant to perception served merely as a negative point of reference: a permanent venue of events that formed a striking contrast to cinema, where the 'festival of affects which is called a film takes place'. Significantly, 'En sortant du cinéma' [Upon Leaving the Movie Theater] was the title Roland Barthes gave to the

essay[32] where he formulated his subjective experiences as a 'scrupulous fetishist'.

In the 'anonymous, indifferent cube of darkness' of the movie theatre, one undergoes 'hypnosis'. The night-blackness of the cinema 'is foreshadowed by a 'crepuscular reverie'' which is a 'preliminary to hypnosis' and in which one finds oneself before even entering the cinema. Barthes defines the 'darkness in the cinema' as 'the very essence of reverie', as 'the color of a very diffuse eroticism', which he sees as the 'modern eroticism ... of a large city'. In this 'place of being unattached [disponsibilité]' with its 'anonymous, crowded darkness' and 'lack of ceremony' it is here that 'the body's freedom luxuriates' which is so important for the quality of the erotic experience. 'Inside this opaque cube, a light: the screen? Yes, of course, but also, visible and yet unnoticed, the dancing cone which drills through the darkness of the theater like a laser beam. This beam transforms itself according to the rotating movement of its particles into changing figures. We turn our face toward the traces of a flickering vibration whose imperious thrust grazes our head from behind, or obliquely, a hair a face. As in the old hypnosis experiments, we are entranced by this brilliant, immobile and dancing surface, without ever confronting it straight on.' Finally, 'the narrow space where the filmic paralysis, the cinematographic hypnosis takes place – at least for the subject who speaks here; I must be in the story ... but I must also be *elsewhere*: an imaginary slightly detached..'. The filmic image as a 'lure', which the subject pounces upon 'as an animal snatches up a 'lifelike' rag ... In the movie theater, regardless of the distance I find myself from the screen, I glue my nose, to the point of disjointing it, on the mirror of the screen, to the imaginary other with which I identify myself narcissistically...'[33] The numerous attempts to define the cinephile subject and his/her cinema experience which are related to Barthes' essay only vary and dissect meticulously the elements of his interpretation: basic situation for hypnosis, dream experience, cube, eroticism, mirror, identification, and narcissistic imagination – these are the constantly recurring categories of psycho-structuralist analysis.[34]

The experience of television is completely opposite: 'the darkness is dissolved, the anonymity repressed, the space is familiar, organised (by furniture and familiar objects), tamed. Eroticism, or, better yet in order to stress its frivolity, its incompleteness, the eroticisation of space is foreclosed. Television condemns us to the Family, whose household utensil it has become just as the hearth once was, flanked by its predictable communal stewing pot in times past.'[35] Anglo-American theorists of media discourse have constructed a significant linguistic pair of opposites to designate the two poles of audiovisual reception: the spectator of the cinema and the viewer in front

of the television. Voyeuristic identification is seen as being ruled out in the latter. Tele-vision is fragmentary, dispersive, variable. The perception of what is offered for viewing on the screen is always interfered with and modified by the familial context. The communication-objects of desire must compete with other objects in the domestic environment. Both the distance to the visualised object and the point of viewing change all the time. In the living room, it is not the singular filmic event that is of consequence but rather a kind of present-time continuity of immediate presence. Taking up Baudry's comparison of Plato's people in the cave to the prisoners in the cinema, Robert Stam concludes pointedly: 'It is not Plato's cave for an hour and a half, but a privatised electronic grotto, a miniature sound and light show to distract our attention from the pressure without or within.'[16]

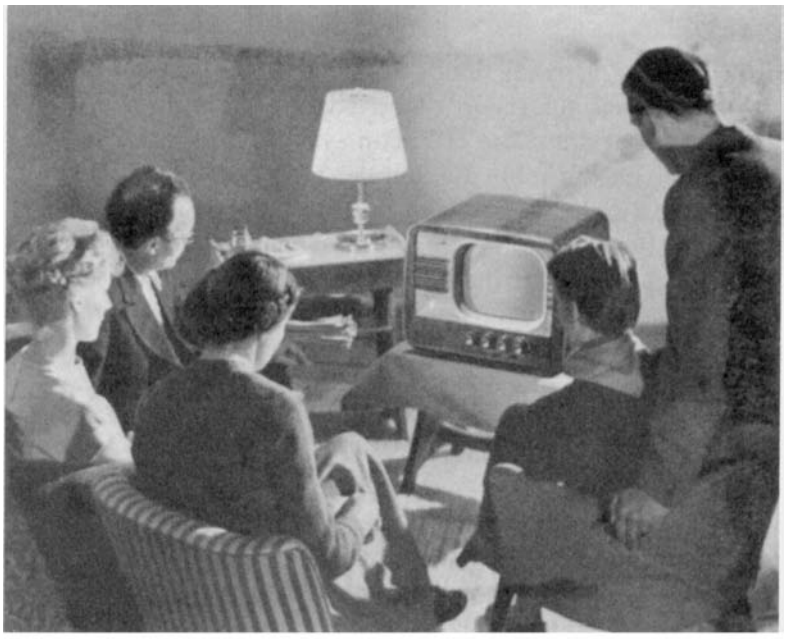
The aurified art-space of cinema versus the interchangeability of the audiovisual sprinkler in the living room? Constructed dichotomies served and serve the purpose of rendering the different structures of experience – of cinema on the one hand and television on the other – more accessible to (psycho)analysis. Such dichotomies were oriented on history for they explained, from the subjective point of view, the change of paradigm in audiovisual culture from a concentrated imaginisation in the public space to individualised diversions in the private sphere. They continued a discussion that Marshall McLuhan had provocatively started in the early 1960s with his famous 'magic channels' – the German title of *Understanding Media* (1964). Making a similar distinction, he had classified cinema as a 'hot' medium and television as 'cold', but without being willing to go into the depth reached by subsequent discussion in the 1970s. However: the dichotomous comparison negated the process-nature of this continual change of the dispositifs and their discursive ties/links. It had to accept the criticism that it was frozen at a particular moment in time. It ignored the ongoing dismantling of the sharp distinction between the arrangements of the dispositifs, which had been apparent from about the time that McLuhan tossed his provocation, *The Medium Is the Massage*, into the international debate. The dedicated Canadian culture critic had experienced television when the screens were still very small, the images fuzzy, the quality of sound reproduction bad, and a television set still a piece of solid furniture. Since that time, television reception had become highly differentiated. To take just the receivers as an example: these comprised a variety of object relations, from the tiny, mobile black-and-white set to the large and flat screen of the brilliant colour TV with integrated stereo and all-around sound. The firmly structured family context, co-constituted by television, had increasingly become a fiction. In the course of the 1970s and 1980s, in the advanced industrial societies the classic family household had declined to minority status.

In many European countries, for example, its share in the institutionalised forms of living together had decreased to under 40 per cent, in 1988 in West Germany it was only about a third, in Sweden it was under 30 per cent, and in the city of Zürich only 20 per cent.[37] Even within the structures of familial cohabitation that continued to exist, individualisation and pluralisation had increased to the point where they had become one of the foremost social trends.[38] For televisual perception, this meant that, similar to the artefacts themselves, the social form of watching had also become highly differentiated and the singularised, or even isolated, form of confrontation with the messages of the medium was increasing in importance.

On the other hand, it became more and more difficult to find that locality with the eroticised mystique, cinema, of which Barthes spoke as he was leaving it, in the cultural landscape. For the purpose of effectively exploiting the filmic wares, the palatial cinemas with their big screens were cut up into many small ones, which facilitated the more flexible implementation of films. The ambience of the 'cube', – to stay with Barthes' metaphor for a moment – had capitulated to that of a peep-show with a collective booth. The profession of the projection artist, who had been principally responsible for creating the imaginisation through perfect light and shade of the pictures, was virtually dead. Badly trained temporary assistants, who often had to operate several projectors at the same time in the multiplexes, made sure that the technical process intruded on the film shows through asynchronous images and sound, picture loss, out of focus images, film breaks. That efforts began to be made to ensure perfect cinema experiences again, both technically and architectonically, did not negate the general rule; on the contrary, they confirmed it. The new and expensive grand houses that were erected in the metropolises and cities will be the museums and cinemas (subsidised as temples of culture) of tomorrow.

'Everyone knows that what is better is always the enemy of what is good. The turboprop aeroplanes had to make way for the jets, the old records have stepped aside for the high quality sound of the compact discs – and now television technology has been improved.'[39] What the author of this singularly clumsy advertising copy was trying to announce in the late 1980s, was the entertainment industry's major offensive, codename *HDTV/HiVision*. Plans were afoot to expand the private sphere into an environment for audiovisions that would go way beyond the scope of what was familiar – literally.

Since the introduction and establishment of television as the medium for privatised audiovision, in principle, the parameters determining both the image and its perception had not changed. The high definition television projects promised to intervene here in a radical. way. Superficially, it was a

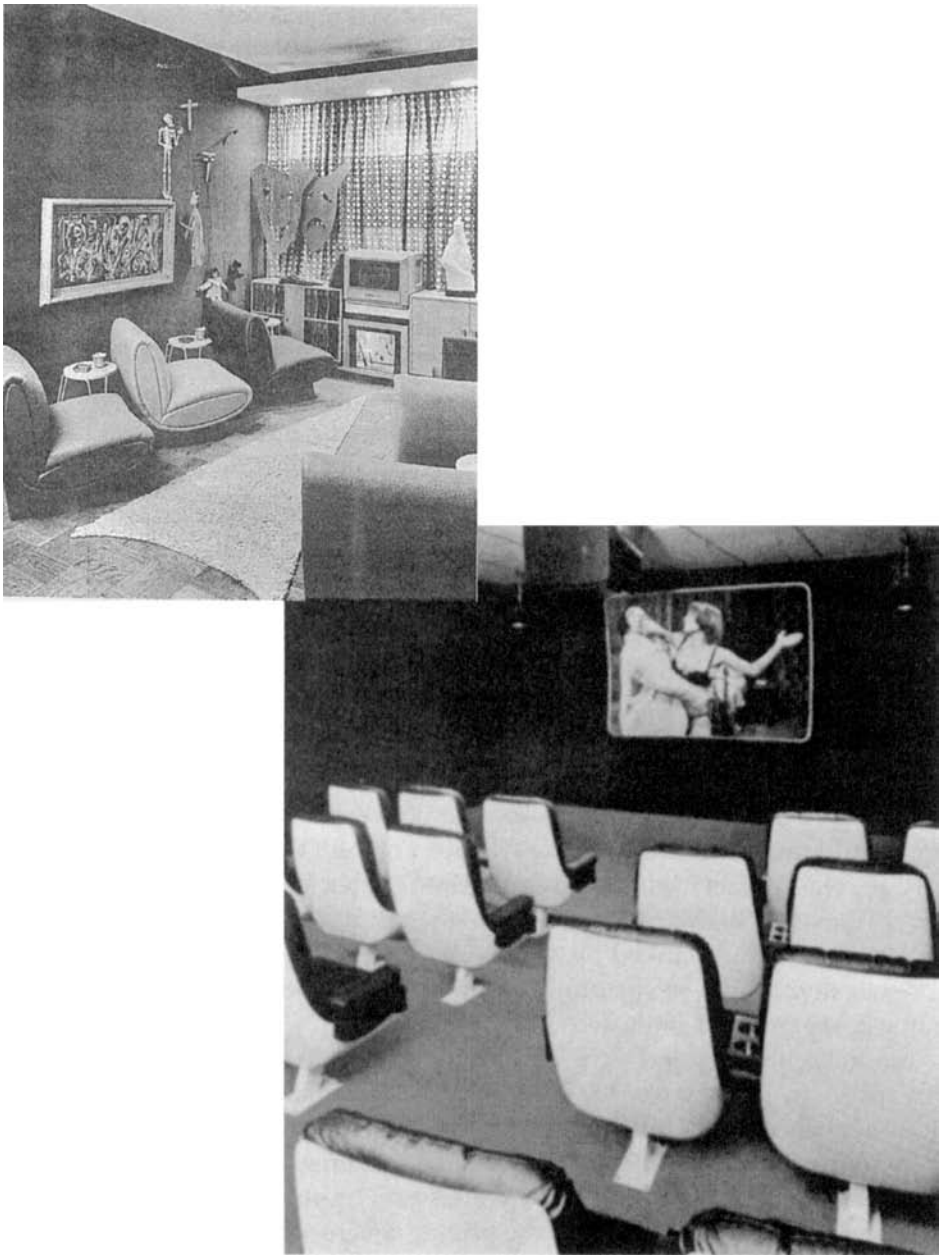


Central point of reference in the classic TV dispositif: the family grouped around the set, 'the negative living room table' (Anders). In its early days, the medium was obviously so compelling (massage), that the screen was fascinating even without a picture (above).
Interior architectonic arrangement of transition from the late 1970s: the character of television as an object is gradually receding. The familial context no longer plays a major role or at least it is not markedly foregrounded (below).

question of creating a much finer structure for the visual surface of the screen. Conventional television standards had inscribed images with around 200,000 light dots. The HiVision system, developed in Japan and fully operational, used double the number of lines (around one thousand) and six times the number of pixels to constitute the image (around 1.2 million). However, the enormously heightened telepresence of the illuminations – as technicians refer to their approximations of the surfaces of reality – was not achieved solely by the fine-grained structure, the sharper contrast, and the more brilliant colours that appeared on the screen. Above all, it was effected by a changed format that potentially had the power to exert considerable influence on the perception of the viewers. At the ideal distance of viewer to screen with conventional TV sets, 2.40 metres, the horizontal angle of vision was only 10 degrees. With HiVision and its larger screen, this angle was at least three times as wide, and thus came closer to natural conditions of sight, non-modified by technology. Consideration of the physiological dimensions of visual perception had led to the development of the wide-screen format in cinema production and projection. This had become the point of reference for new work on projection systems of gigantic proportions, like the Canadian IMAX, the OMNIMAX installed in La Géode in Paris, SHOWSCAN, PANRAMA, and OMNIZ + MOBILE VISION. These can all be interpreted as new cine-industrial responses to the work in progress on perfecting the illusions in the living room. HiVision introduced the wide-screen format into the sphere of television. Before, the screen had been rather square (with a width-height ratio of 4 to 3); this was now stretched horizontally (with a ratio of 5.33 to 3), and the higher definition of the images made it possible to illuminate an area that was a good 1.5 metres wide.

The hegemony of the rectangle, the quasi standard frame for the plastic arts since the Renaissance, at a new level of its realisation: a gallery was created in the private sphere where the exhibits were not hung for a certain length of time but where, in a frame that was a permanent fixture, a stream of visions – in principle, infinite – was channelled into the space of perception.

It would be foolish to view the obvious weaknesses of high definition electronic technology of the 1980s as absolute or to project these into the future. This would be merely a feeble strategy for reassuring traditional cinema, and was practised quite enough on the occasion of the public premiere of the first feature film in HiVision, Peter Del Monte's JULIA AND JULIA in 1988. Inadequate depth-of-field, poor range of contrast, a camera that was 30 per cent less light sensitive, burned-in effects of fast moving images – these were all video-specific parameters and they were changing all the time, as the history of video recording technology had shown. However, this should not divert our attention from the fact that with regard to the fac-



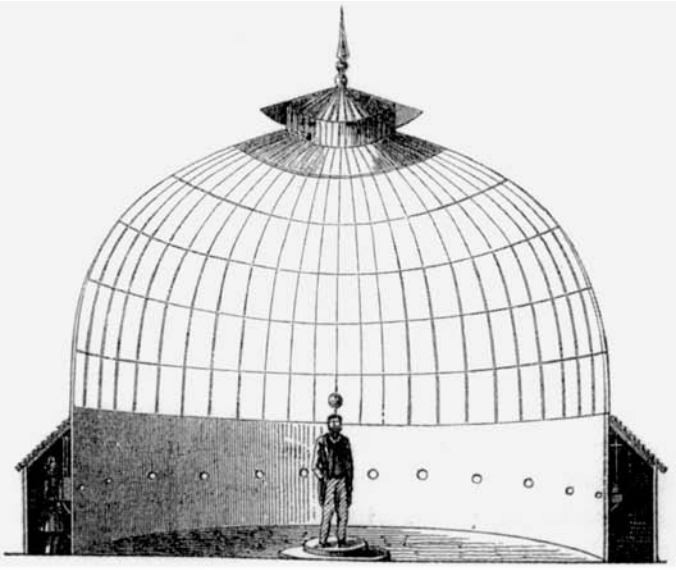
The permeability of the dispositifs: Designs for a home television room at Bloomingdale's department store in New York, anno 1949 (above, Allen 1987), and for an auditorium of a private public's intimate electronic films from the early 1980s (below).

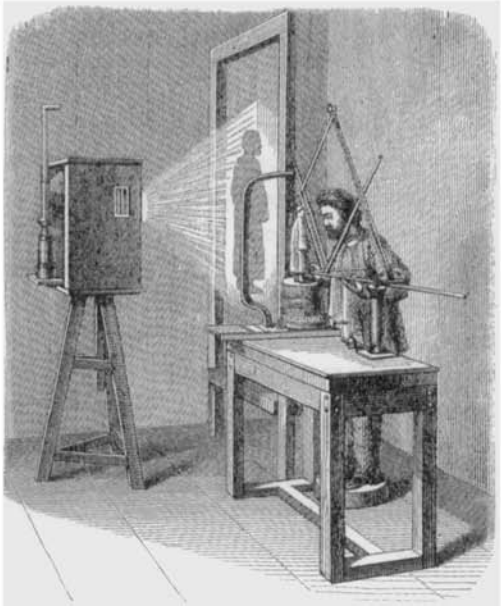
ulty of perception, high definition electronic vision is a *bastard dispositif*, in which prominent qualitative features of the traditional arrangements mingle. In whichever technical standard HiVision is ultimately realised, it will likely create cinemas with the ambience of a living room, intimate spaces targeting not mass, but specific minority audiences and the new sociality of the small group, where the public and the private meet in a symbiosis that is no longer divisible: film viewing spaces which, in the hands of the distributors of sought-after commodities, may represent a further diversification of the cinema and film landscape, a logical continuation of the process of breaking up large entities into small units which could be observed over the last three decades. Such electronic cinemas of public intimacy would probably be viable in those places where rival big cinemas no longer exist or never did exist, e.g., in satellite towns or areas lacking the infrastructure of commercial mass culture. These would be obvious and worthwhile candidates for the attentions of the audiovisual entertainment industry; in developing countries, for example, where habituation to electronic reception as the primary experience of the filmic is already far progressed.

On the other hand, typical characteristics formerly unique to cinema would be implanted in the living room. To enjoy the optimal effects of HiVision, it isnecessary for the viewer to take up a fixed viewing position. Analogous to the paying cinemagoer, the HiVision viewer is chained to his/her seat. Within the foreseeable future, the large-dimensional images will require electronic projection equipment that will necessitate the room being made darker than is necessary for conventional television. In turn, this would cause the furniture-like character of the TV set to disappear even further. The artefact itself would recede into the background and to the fore would come the high-grade presence of the visions, their illusioning potential supported and flanked by technically opulent acoustic sound experiences in stereo, hi-fi, or surround-sound as was formerly only experienced in the best equipped cinemas.

Media technology and signifying praxis constitute an interdependent relationship. In the long term, it is as yet difficult to imagine what kind of visions and sounds will be activated by dispositif arrangements such as this. They will not be the same as those that characterise traditional television broadcasting, although undoubtedly there will be overlap. The heightened telepresence of external reality in the private sphere of the subjects will have an unwieldy relationship with everything that formally represents the public sphere, particularly institutionalised politics. Take, for example, images of politicians of the variety that television constantly brings to life for us in glorious close-ups. As high definition images, blown-up to large format and projected on the living room wall, these pictures would represent an attack

Archaic 3-D scanning: In the 1870s in Paris, Willême invented a process called Photosculpture. In the band around the wall under the glass dome, 24 cameras were installed. Then, using a stork's beak, a three-dimensional mass of modelling clay was impregnated with the 24 different views. The enlargement of the pictures on a white screen was an aid in transferring the two-dimensional images as accurately as possible. It took 2-4 days to complete a photosculpture. (Source: *Photographisches Lexikon*, Halle 1882, pp. 351-354.)



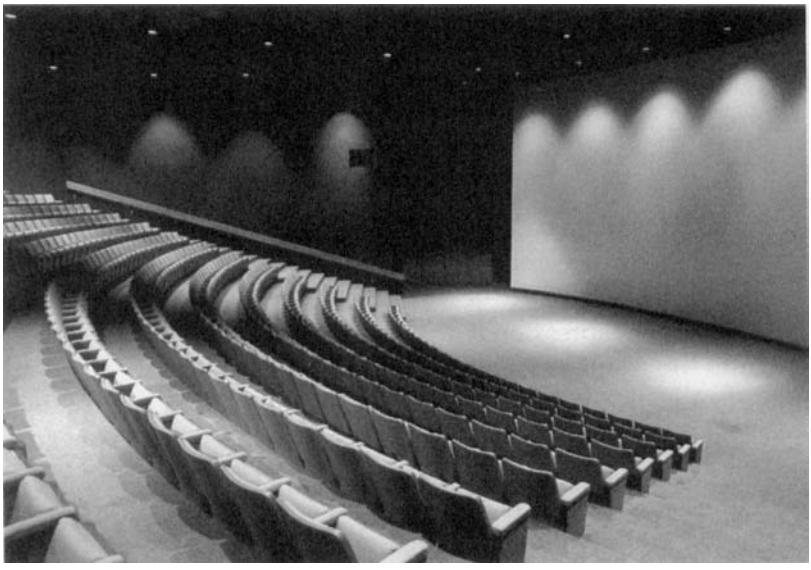


on the private sphere of the subjects. Catastrophic events, accidents, common afflictions, in short, everything that many people consider ugly, that irritates their private need for harmony, these things are bearable in the distanced viewing situation of conventional television or may, for some, even hold a kind of fascination. However, should they begin to approach the actual dimensions of reality, graphic and with a fine-grained structure, mercilessly hard in their presentation like the pictures of photo-realism, they would completely take over the living room landscape and cling to its atmosphere. It is likely that such subjects will fall victim to an audiovisual suppression mechanism. They will be televisualisable on the smaller portable TV sets, second or third appliances dotted around the home, and especially through 'real video' as part of the World Wide Web network, but not on the new arrangement that will arise with this fine-tuned audiovision technology in the private sphere.

The attractions of future signifying praxes will reject the reality of everyday experiences to a far greater degree than conventional television does already. On the other hand, everything that our advanced societies of commodity exchange consider elegant will be even more viable for staging by the media. HiVision is the ideal presentation cover for sensual crutches of all kinds, for regressive erotic animation – in the history of the media, pornography has always been among the first to avail itself of new or expanded mediation techniques – for body commodities, and above all the bodies of commodities and packaging of advertising. Things styled and designed according to commodity aesthetics can be easily integrated into the ambience of the living room. They can appear or be in action on the enlarged screen, whereas the accompanying human figures tend to be reduced in size. In 1988, John Sanborn and Mary Perillo made a model video entitled CAUSE AND EFFECT for the Canadian Rebo High Definition Studio, technically the most advanced production studio for the new technology at that time, in which this reversal of dimensions played the major role. Sanborn and Perillo intentionally played with a surprise attack on the viewer by shifting the real proportions that exist between people and objects.[40]

Audiovisions that occupy the home atmosphere with dream worlds which are experienced as positive will be marketable on a new level, continuing the extant video-wallpapers with their glowing log-fires, rustling forests, or surging oceans. Still labelled as avant-garde electronic art in the mid-1980s like, for example, the strange views of New York by Brian Eno, they would be immensely suitable for industrial mass production of expanded opulent audiovisions. Electronic wallpaper could play a similar role in the next decade to the cubism-inspired designs for domestic walls of the 1950s. KOYANISQAATSI adaptations or sequences, like the British New

HiVision in the cinema: An experiment (as yet). Japan 1984.



Architectonic differences to the latest cinema architecture, including the more opulent examples for advanced visual experiences, has become marginal. Below the SHOWSCAN theatre at the World Exhibition 1986 in Vancouver.

Age-inspired 'Landscape Channel' produced: audiovisualised feel-good literature, clouds racing past and exotic landscapes, shot from breath-taking perspectives, speeding up or slowing down time, with minimal, meditative music. Naturally, some types of programme will also still be around – in HiVision and HiFidelity in the living picture frame – which were adapted from past outdoor culture and pressed into the service of television: sporting events, popular concerts, shows, and big film fictions. The reception of these programmes will be less secondary and not so much part of the routine domestic scene. At this level of advanced audiovision, it is possible that, in connection with these programme types, a new centre of gravity in the private sphere will originate, perceived and received as particular points that are complementary to the viewing activities with the smaller portable artefacts, the second and third sets in children's rooms, offices, kitchens, and the monitors for the new world-wide data networks.

In 1979, when he had just unleashed on the cinemas his gigantic onslaught on the senses and audiovisual feat of strength, APOCALYPSE NOW, Francis Ford Coppola had a vision. To the assembled Academy of Motion Pictures, Arts, and Sciences, he outlined a sketch of future film production in a totally electronic and computerised age.[41] At its centre was an idealistic utopian concept – at once pointing far into the future and turning back to the past – of the putative autarchic director-artist in the midst of a world of video technology and superfast computers. Coppola dreamed of a film director who would sort of 'breathe' his imaginings that were capable of being formulated in sounds and images into an 'intelligent' and highly 'sensitive' computer system which would then take over the work of objectifying these for him. The traditional linear and chronological means of producing a film, from the first idea to post-production, would be replaced by a 'spatial' method of working. Once fed into the computer, the film outline could be processed at all levels of expression with the help of a digital 'universal editing machine' until the result satisfied the film-artist's conception, a procedure comparable to text processing with computers. The analogy which Coppola chose revealed the cultural-historical root of his dream: '... you're beginning to create your movie somewhat the way a *claymodeler* (italics–S.Z.) does. You don't finish the nose and then work the ear, but you're constantly working the entire piece spatially with this electronic armature, getting the piece closer and closer to what you want.' The bourgeois painter and poet genius now working in visuals and audio? Obviously, with this conceptual and work model Coppola intended to exclude the whole complicated and complex apparatus of industrial film production, which took the director further and further away from the end result and with which he personally had just had bad experiences yet again with APOCALYPSE NOW. However,

Coppola appeared to be unaware that the fundamental principle of industrialisation was intrinsic to his vision: the total rationalisation of production that, ultimately, would also make the director superfluous; unless, of course, he and the programmer of the Mega-Editing Machine were one and the same person.

At the beginning of the 1980s, this vision of the enfant terrible of Hollywood cinema was laughed at and dismissed as crazy by his colleagues, culture critics, and academics; not so much for the principle on which his thinking was based but because his ideas were considered totally unrealistic and cinema-unfriendly. By the end of the 1980s, it was clear that culture-industrial reality was moving in the direction outlined by Coppola, admittedly not driven by aims of artistic liberation and emancipation but rather defined by more advanced levels of the industrialisation of culture.

The encroachment of electronics and computers on the production of the filmic in the 1970s and 1980s was a progression of small, but rapid, steps. Script writing, or the visualisation of the same, with the aid of video was commonplace, as well as the practise of videotaping parallel to the shooting of the film on photographic stock. This permitted continuous control, and thus rationalisation, of the production process. The results were available immediately and individual shots could be corrected or repeated faster. In so-called post-production, where the finished film was readied for public presentation and special effects added or re-recording done, the advantages of the more flexible electronic machines had long been made use of, even by film-makers who otherwise were wont to treat them with arrogant cultural pessimism. (Wim Wenders, who in his frequent television appearances made much of despising this medium and of not using it himself receptively, is a prime example: for his cameraman, Alecan, and Wenders' film HIMMEL ÜBER BERLIN [Wings of Desire], stylised a 'cineastic masterpiece' by certain critics, he engaged for the post-production – amongst others – the services of the firm videothec electronic tv, the first studio in Germany to work with HDTV technology.) Computer-controlled cameras, particularly for action films and their extreme movements of the camera, had become just as common as the simulation of backgrounds, architectonic elements, and bits of landscape with the help of computers and programmes like those developed for Computer Aided Design (CAD). Cutting had been speeded up and effectivised enormously through the introduction of time codes. These made it possible to mark precisely each frame of a film using digital data (production, scene, shot, date of the take, reel number, camera, etc.: the variables could be expanded according to the capability of the computer). That which had still been an essential principle of revolutionary aesthetics at 'the critical zero point of film history', where the relation between

film and history had been both theoretically and practically re-defined by Dziga Vertov, had become an element of everyday film production determined by industry: the organisation of the material according to intervals.[42] Admittedly, there was the important difference that the principles of defining the intervals for Vertov were still essentially coupled to movement in reality which here was no longer the case. The time code offered the possibility of high-speed grouping of film time according to various conceptions of rhythm at will. The Colorization process, with which classic black-and-white film mutated to glorious colour in order to render them exploitable on the electronic channels – a brutal sub-form of media recycling – had occasioned an outcry at the beginning, in the mid-1980s, amongst the critics and a section of the filmmakers' guild. However, this – according to the lights of the culture industry – completely normal process of expropriating the producers of their products, quietly continued to gain ground and it is foreseeable that audience acceptance of this practice will increase as original cineastic experiences are withheld from them. From a culture-historical point of view, it must be pointed out that the protest of the film-makers and critics came too late, much too late. Colorization was but one spectacular example where the institutionalised gulf between art and commerce was experienceable in a particularly crass manner. For decades, the aesthetic producers and their champions from the press had stood idly by (for the most part) while cinematographic works were messed about with for exploitation in various areas within and without the cinema. They had derived considerable profit from this, including being able to continue their work. It was and is considered bad form to concern oneself with the lowly economic side of affairs – even their own – , and beneath one's dignity. Brecht wrote in his *Short Organum for the Theatre* with reference to this attitude in actors, 'when the pay is settled, art is transported to the highest spheres'.[43] In the case of living film directors, to generalise from the experience of history, their protests about processes like Colorization on moral and ethical grounds will be heard less and less the more that revenue from them sets the film distributors' cash registers tinkling.

Originating from military research, advertising, construction engineering, and the promotion departments of producing industry, in the 1980s a signifying praxis entered the design of filmic fictions that was not so far removed from Coppola's vision: two- and three-dimensional computer animation. It marked a break in the history of audiovisuals, the significance of which is comparable to the establishment of cinematographics and which possesses paradigmatic character for the filmic discourse at the level of advanced audiovision. In computer animation is articulated most decisively

what Alexander Kluge has called 'the industrialisation of consciousness' through new media technologies.

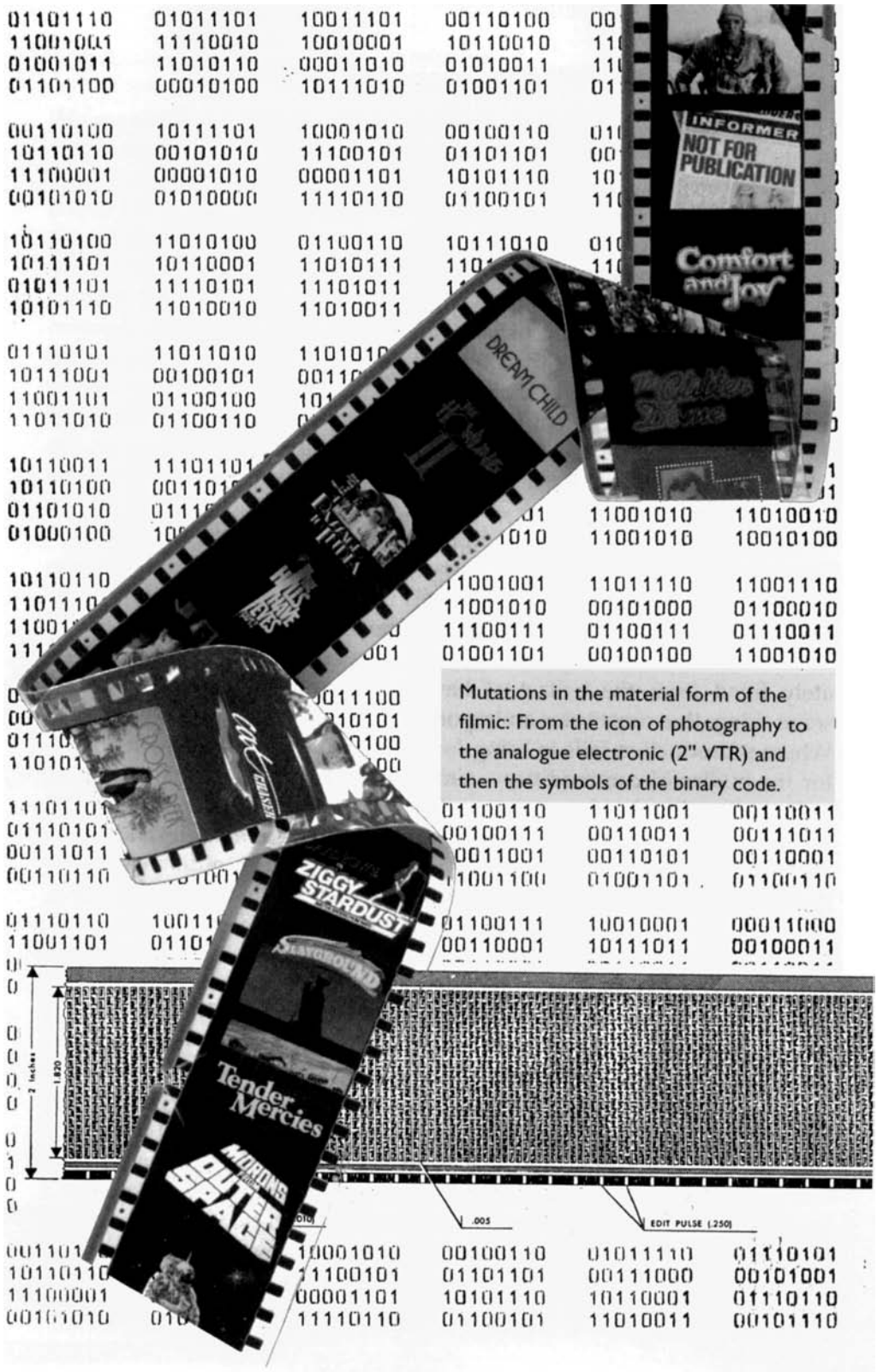
In contrast to the reproduction of existing (outside the computer) or constructed visual surfaces and mass by means of conventional photochemical and electronic methods, computer animation generates objects and their movements through modelling. In this process of the simulation of illusions of motion, the complex cinematographic and televisual apparatus for shooting/taping pictures that formerly organised perception of the filmic is gradually replaced, bit by bit. Cameras and their equipment, like special lenses, aperture stops, filters, artificial lighting with spotlights or natural light, set design and construction, props, make-up, costumes, and prospectively actors and extras as well: all can be replaced by fast computers. The same applies to the sound. Microphones and musical instruments are replaced by machines producing sampled or synthetic sounds. Programmers have the possibility of assuming the various functions of trained specialists such as cameramen, light electricians, set decorators and designers, make-up people, hairdressers, and sound engineers. In the long-term, the sum total of their expertise can be translated into working and standardised programmes. The size and the perspective of shots, which determine to a great extent what is and should be perceived in a film, set-up of camera and action, time length of shots, colours, lighting conditions, etc., etc., – all can be dissolved into strings of numbers or computing operations and retranslated into formal processes: the algorithm as the new audiovisual mega-rhythm, and linearity as the dominating principle in the micro- and macro-world of narration.

What did this substitution of the complex filmic means of expression and of the organisation of perception mean at the end of the 1980s? How had one to decode the products created so far using this method, in the main for utilisation in the context of cultural diversions, audiovisual advertising, animated trade marks, and trailers of programmes on TV, artists' experiments, and a few (relative to the global output of film footage) sequences in feature films? I shall focus on several distinctive features in which some of the general principles become comprehensible:

– The lively and infinite diversity of possible camera views is reduced. The simulated gaze appears to be determined by a kind of subjective 'camera', by which means the perceiving subject is supposed to be optimally drawn into the movements on the TV set, on the monitor of the head-mounted display, or on the cinema screen. The overworked activation of the third dimension, into or out of the depths of the imaginary space, contributes considerably to this. This strategy was named *immersion*: the viewer is permanently moved to viewing positions which it is impossible to take up in life outside the medium or only in extreme situa-

tions. (In this connection, three-dimensional computer animation reveals its origins in military research and the arms race. The involved viewer is constantly being bundled into a flight simulator.) That the simulated objects and events are lacking in life is compensated for by breathtaking speed. The subject experiences him/herself as taking everything in while in a permanently shifting state.

- Focusing, which in film is the result of a complex combination of size of shot, camera perspective, depth of field, and many other parameters, gets lost or, rather, it disappears in the computer's absolute lack of a point of view, no matter how emphatically software packages, such as Softimage, claim to have one. It follows that the point of view of perception can no longer be defined, it is ephemeral. It disintegrates into a kind of spatial arbitrariness. The simulations of computer animation do not (yet) have their own scene.
- Mathematical calculations of the infinite complexity of lighting conditions and techniques, one of the most essential dimensions of filmic illusions, is scarcely conceivable as yet. What computer animation has to offer, and for the foreseeable future as well, is more or less uniform illumination of all simulated objects, where a differentiated play of light and shadow is non-existent. The impression of cold and bare proximity, which the animations convey to the viewer, is decidedly the result of this deficiency. The mixed reality of analogue and digital appears to be the solution of this for far into the foreseeable future
- In RENDEZ-VOUS À MONTRÉAL, N. Magnemat-Thalmann and D. Thalman from the University of Montreal started at the end of the 1980s to simulate actors. In a short animation sequence, two legends of the silver screen met there imaginarily for the first time, risen again from the binary code of the computer: Humphrey Bogart as private eye Philip Marlowe and Marilyn Monroe as herself. In evaluating such experiments, one should not be irritated by the fact that due to the standard of technology of the time the animations seemed rough and ridiculous. The ability to simulate the living was still at a very premature stage and the results clashed with real film experience. The decisive point is that the best actors and actresses, or even very good ones, cannot be reduced to masks with a calculable range of potential expressions. What can be simulated are clichés, highly standardised portrayals that can be reduced to superficial and easily recognisable characteristics like gestures. There are abundant examples in the history of film. It was no coincidence that Monroe and Bogart were the first candidates for feeding into a computer. They are signifiers of industrial cinema. Their filmic presence and their acting could be interpreted as an anticipation of their own simulations.



Mutations in the material form of the filmic: From the icon of photography to the analogue electronic (2" VTR) and then the symbols of the binary code.

The general principle may be seen here already: what is calculable are elements or processes that are law-governed, grammatical; standards can be easily expressed in algorithmic terms. An algorithm is nothing else but a command, however complex it may be. This was the perspective in which computer animation was used and will be used in the immediate future. It has proved an extremely effective tool in the expanded production of cultural commodities which are anyway highly standardised. The reasons which the established technical and artistic avant-garde who use supercomputers in the 1990s give for their enthusiasm and involvement are that they thus have the possibility to make things accessible to sensory perception that have never been seen or heard before; that with the aid of technology they can intervene in existing sound-and-image realities. However, the driving forces behind this branch of industry are much more banal and located in the here and now.

Destruction of the natural environment in the real and simulation of nature in the imaginary: the sea is nowhere more blue, the forests will probably never ever be as green again as in the images generated by the computer. The creation of signifiers whose signs are no longer to be found – or at least not like this – in the real world of everyday experience or which are deliberately freed from the ballast of having to signify something concrete, some-thing: this constitutes an important function of computer animation. Where reproduction fails to bring forth new crutches for sensuality – e.g., for the bodies of commodities – simulation has great possibilities. Computer animation is also welcome because it supplies the instruments whereby to confront the increasingly acute shortage of material and, at the same time, to deep-freeze creative potential. Synthetic audiovisual constructs can be easily multiplied by simply changing their variables. Thus, series production as the principle of production becomes generalised: the ideal form of production for dream commodities destined for the media landscape of a thousand and one channels.

Moreover, computer animation fits neatly into the concept that currently governs the economies of our societies, namely, rationalisation cuts in all areas of work not connected with information technology and their reduction to the absolute minimum necessary to effect social reproduction. At the stage of advanced audiovision, this principle has begun to affect filmic production. This is the other side – for many, a cacotopic one – of the vision of Coppola and all those people who have begun with its realisation in a small-time way, in the rash of small firms involved with the new media where the principle of Desk-top Publishing has been hoisted up to the level of audiovisual production. Many well-paid specialist jobs that have developed in the film branch, where division of labour is extreme, will be re-

There is a fundamental connection between apparatus arrangements and filmic signifying praxis. Above: Still from the computer animation film *Rendez-vous à Montréal* and below: Audiovisual living in the late 1980s (Panasonic advertisement).

placed by a few even better-paid programmers and engineers and their extremely badly paid 'free'-lance support staff who, prospectively, will not even need a work-place in the studio – they can be anywhere, even in India or Malaysia. Old production methods that were thought obsolete and new machine-based productive forces combine: with computers, it will be possible to produce filmic commodities at home, cinema – a future cottage industry? Now this is an area to do battle over which should be more important to those involved at all levels with film-making than the secondary area of combat where *culturati* and *literati* shadow-box in their contest between cine-fetishism and video-pragmatism.

The market for acoustic diversions possesses model character for the world of future commercial audiovisions that is coming up fast. The development of the popular music scene over the last two decades has demonstrated the kind of predominant forms of electronics and computer technology that can be integrated into mass culture. Here, rationalisation reached a qualitatively new stage with the introduction of multi-track tape recorders. With the help of these devices, it became possible to break down the process of music recording, to store single voices or instruments at different times or even in different places, and to put them all together again in what then passed for a collective musical event. In the layers of tracks on the master tape for the record pressing, we rediscover that spatiality or the aesthetic-technical process that Coppola spoke of in connection with film. However, in the 1980s digital recording and -processing not only intensified this process, it also pushed the music commodities up to a new product level. Technically perfect compact discs could be produced without the musicians even having to get together in a studio. To mention but one spectacular experiment in 1987 that found many imitators: the pop-star Stevie Wonder and the guitarist Nile Rodgers recorded a CD. Wonder sat in his studio in Los Angeles, and Rodgers played with him in a New York studio some 5,000 kilometres away. They were connected illusionally via satellite. The quasi-simultaneous co-production was enabled by a digital recording machine with 24 channels. They could hear each other in a quality that was equivalent to being in the same studio. Over a videoconference link (strange sarcasm towards Stevie Wonder), the two studios were also in visual contact with each other.[4] This example is an exceptional demonstration of how the interplay of various communication techniques will be relevant, not only for distribution but also for production, in the new networks. The only issue will be the transmission capacities of these nets as to when models like the Wonder/Rodgers one will become relevant for the production of film and television wares.

The resolution of musical material into digital code especially affected the production of sounds and the possibility of manipulating them. When the first synthesisers came on the market, they were used to change and estrange sounds that had been produced by the human voice and conventional music instruments by modifying their frequency spectra. From these huge fossils of the early days of sound manipulation came complex, microprocessor-controlled interfaces of linked systems with almost limitless capabilities for the simulation of sounds and musical styles on the concert stage and in the studio. The sound material of the most attractive elements of pop-music history on the market (with a high re-recognition factor) was saved in sampler programmes, retrievable at will. First and foremost, for the production side pop-music represents a gigantic data bank. Towards the end of the 1980s, the production of canned melodies and rhythms meant management and control of a huge amount of data, which was more the province of the programmer than the musician or the composer.[15] The fate of the profession of the experienced, versatile studio musician was thus not even in the balance but sealed; the first to go were those who were easiest to replace – the drummers and percussionists. The identification figures still needed for the market, in the shape of personal vehicles for novelties and fashions, were increasingly degraded to actors in video-clips or appeared on stage as their own simulators. Great innovations in music – creations in sound never heard before that delight the ear – are hardly likely to be achieved in this way. That which applied to film was the same for music: the optimal duplication of standards. For the acoustic taps of the radio stations, for the functional carpets of sound in supermarkets, department stores, boutiques, and passenger planes, soundtracks of TV features, reports, and magazine programmes, or as the basic rhythmic material for videoclip-channels, these synthetic music commodities were eminently suitable. It was against this backdrop that in the 1990s, a new underground movement of anonymous techno-musicians originated and, taking the synthetic sound material as their starting point, de-composed and re-rhythmised it.

At the level of advanced audiovision, the phalanx of electrical, cultural, and computer industry capital and their associates, the developers of software, played on the wishes of many people to participate actively in the reshaping of culture by technology. They created possible things to buy in order to suggest a share in the control of kilowatts and megabytes. These took the form of very small devices, gadgets like the remote control for TV, stereo, and VCR, which goes by the apposite name of 'Telecommander' in Germany. As with the video recorder, a phenomenon can be observed in connection with the utilisation of such artefacts that constitutes media technology as ambivalent as a matter of principle. Once these had passed into

the hands of the media-users, they could serve to develop new plebeian power. Playing around with these artefacts resulted in the limits of their function, as intended by industry, being breached. The remote control, which was originally developed to foster the viewers' inertia and keep them even more firmly glued to their armchairs, became a cultural technique of intervention, a kind of uncouth editing machine. Gentle pressure applied to the sensor-buttons sufficed and it was possible to cut the filmic on the TV screen any which way one wanted; of course, the 'editing tape', from which the personal montages were fashioned, was pre-given. Nevertheless, this activity gave rise to a completely different audiovisual structure on the screens of the domestic TVs than that organised by the providers of the different channels: it was potentially a heterogeneous compound of fragmented material of time, space, subject matter, colours, and moods; programmed irregularity, breaks, and also dissonances.[46]

The remote control and, at a more advanced level, the keyboards of the computers for home use were at the same time reifications and icons of something that had been implanted in the project of the new media like a mythos: interactivity/dialogue capability. Technology, i.e., a promise-turned-commodity, namely, that the one-way traffic of media communication could be expanded to allow traffic in the other direction, which would permit chance collisions as well as deliberate and wilful violations of traffic regulations. This mythos, that had persisted in spite of hefty criticism because it does, in fact, refer back to actual wishes of the subjects to participate and does demand mental and manual activities of them, primarily conceals expanded product-marketing strategies. In the culture-industrial context, interactivity is only in demand insofar as it refines trade and drives it ever forward to higher levels of sales. The claim of dialogue capability, translated into commodity aesthetics, is exhausted in illustrious offers of more choice for the consumer. Extended utilisation of the artefacts of technically mediated communication is, defined from the view point of the culture industry, perfected optional utilisation.

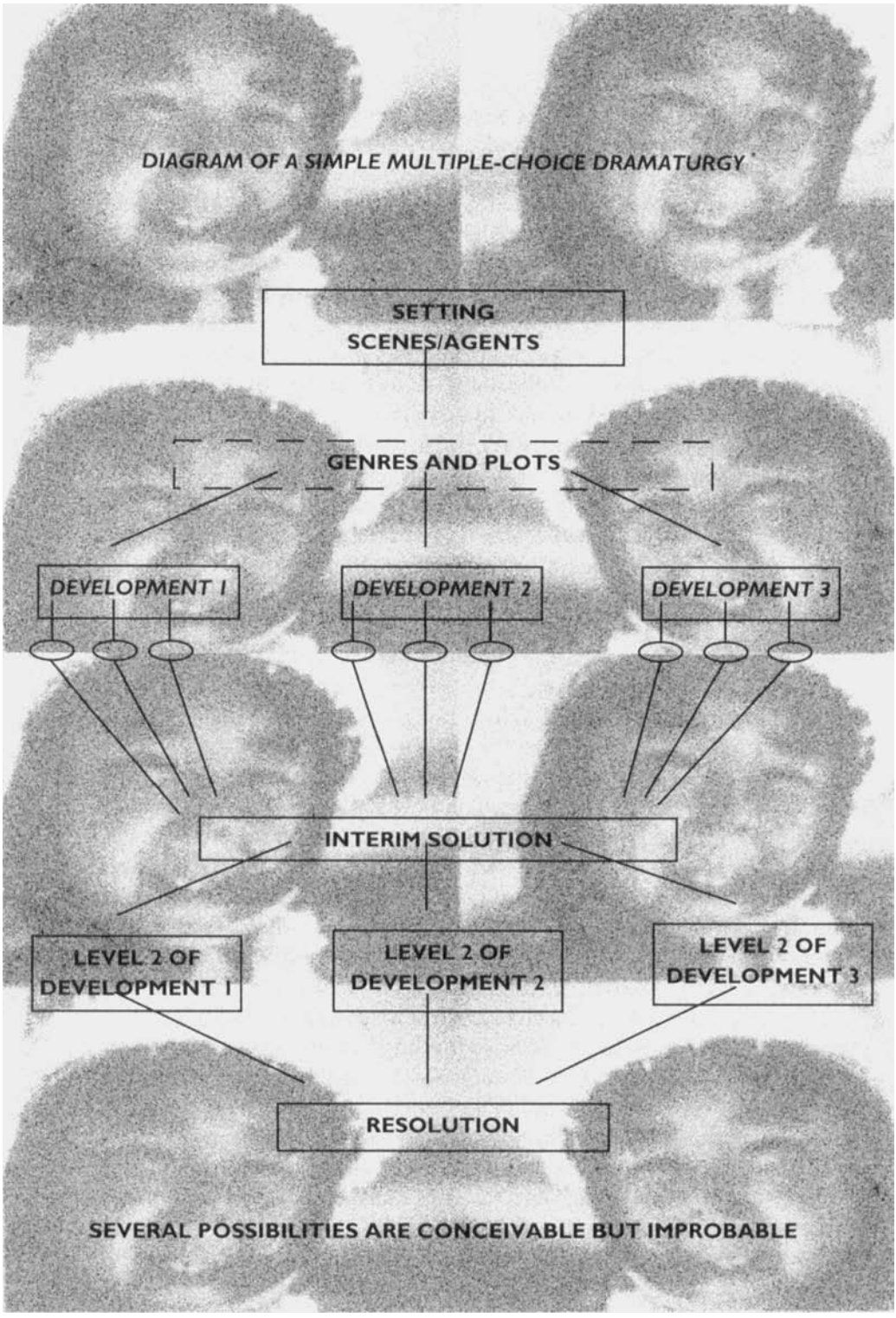
At the stadium of advanced audiovision, feature films were no longer exclusively organisable as chronological cycles of sequences and takes in a material sense. The enormous capacities of digital memories opened the way for multi-level arrangements, to begin with in the form of computer games. Spatio-temporal parallel editing as the formal principle of narrative technique was tranposable to another level through technology where it was even capable of caricaturing its own original meaning. Thus, it is conceivable and probable that narrative constructs will be produced where, for example, a basic conflict will be defined at the beginning and then a choice of different possibilities will be offered configuring how the story will

progress. By entering certain codes or commands, the player of such a product can select the plot of the conflict preferred. In this scenario, depending on the costs invested and the capacity of the storage medium, subtle differentiations can be constructed in many respects: scenes of the action, costumes, constellations of characters, favourite genres, or the casting of minor characters. The various, slightly different lines of the plot running side by side that would have to be exactly synchronised in such a computer-film-game, could be brought together in interim solutions of the plot. From this point – of which there could also be several – the story constructions would again branch off in all directions until all lines of the plot lead into the ultimate single resolution. Naturally, several possible endings to the film would be offered. However, a definite ending there must be – usually a happy one – for this is one of the fundamental gratifications that consumers of narrative cultural commodities expect from the suppliers. The need to be entertained and product rationale would combine here most fortuitously. Even if the film-games for advanced players were to demand a certain amount of practice in order to reach the last level where the tension is relaxed at last.

Such multiple-choice dramaturgies – significantly, the term comes from the American practice of thorough testing of advertising spots[47] – were by no means visions completely divorced from everyday reality. More systematic and sophisticated versions existed in audiovisual training and education, and particularly in areas of application in industry, medicine, and the natural sciences. The manufacture of 'interactive videodiscs' and the corresponding devices[48] experienced a veritable boom in the second half of the 1980s. They served to effectivise and rationalise training. I have merely extended the intrinsic principles to the culture industry sector. It was not the first time in the history of media technology that the so-called semi-professional sector functioned as the preliminary stage for developments that later, in simpler versions, become effective on the mass market. Under conventional conditions of production that require considerable personnel, technical equipment, material, and time, mass production of such computer film-games as computer game-films will take their time. Providing alternative parallel plots would mean an enormous increase in production costs of the filmic illusions. It is only with the digital 'material' form and its implications for fully simulated mise-en-scène that a culture-industrial perspective could open for such multiple-choice constructions. Detailed, computer-aided film analysis,[49] as has been elaborated and practised since the early 1980s in various places, not only in Germany, could probably supply valuable material for this kind of game. The breakdown of filmic oeuvres or individual works of film and television into data containing structure of

suspense, typology of set characters, or sequences of takes is not only available and useful for historiography and aesthetic criticism, it could also be used for simulation: software for Hitchcock-type suspense dramaturgy, Griffiths' curves of tension, Eisenstein's montage characters, or Bergman's organisation of film sequences. Instead of purchasing memorabilia of stars and film favourites, instead, there could be special products offering the opportunity to assume the roles and functions of the filmic heroes and heroines in front of and behind the camera.

At this point, when the audiovisions had reached the interface of media-people and media-machines, where the subjects themselves had begun to use the apparatus in order to co-design or at least to modify the results of the illusionings, the relatively sharp contours that had obtained so far began to blur. Unlike the arrangements of the classic dispositifs of cinema and television, the artefacts of advanced audiovision did not stand alone and isolated from one another. What had increasingly disappeared from the lives of individuals living together, had been handed over to the world of machines: they developed their new qualities through the networks, in the functioning interplay of technical systems. (Both a strength and a weakness, for it made the whole thing unstable and open to attack.) The individual units were designed to be compatible and thus combination possibilities were legion. With Macintosh's Hypercast, for example, one could fuse materially different image sources from a videodisc, computer graphics, and electromagnetic videos to produce a 'photographic' still video or a moving illusion on the monitor screen. Many PCs at home already had the capability of hooking up MIDIs (Musical Instrument Digital Interfaces) to produce synthetic sounds. The ultimate in fulfilment for every narcissist, of which Roland Barthes spoke in connection with his cinema experience, appeared to be within reach – but at a different level: in the form of the simulated penetration of the machine-users into the fictional worlds, made possible by the players at the keyboards of the terminals implementing the images of their own bodies or faces and the nuances of their natural voices into the arbitrary action. The imaginary no longer invaded the living rooms, the subjects could also immerse themselves in the imaginary: amusements at the boundaries between real and media worlds: *media-lity*. Or, it can be viewed as the fulfilment of Marshall McLuhan's prophetic words regarding the change of paradigm from viewer/spectator to actor/participant when the first Sputnik was put into orbit: 'At instant speeds the audience becomes an actor, and the spectators become participants. On spaceship Earth or in the global theater the audience and the crew become actors, producers rather than consumers. They seek to program events rather than to watch them.'[50]



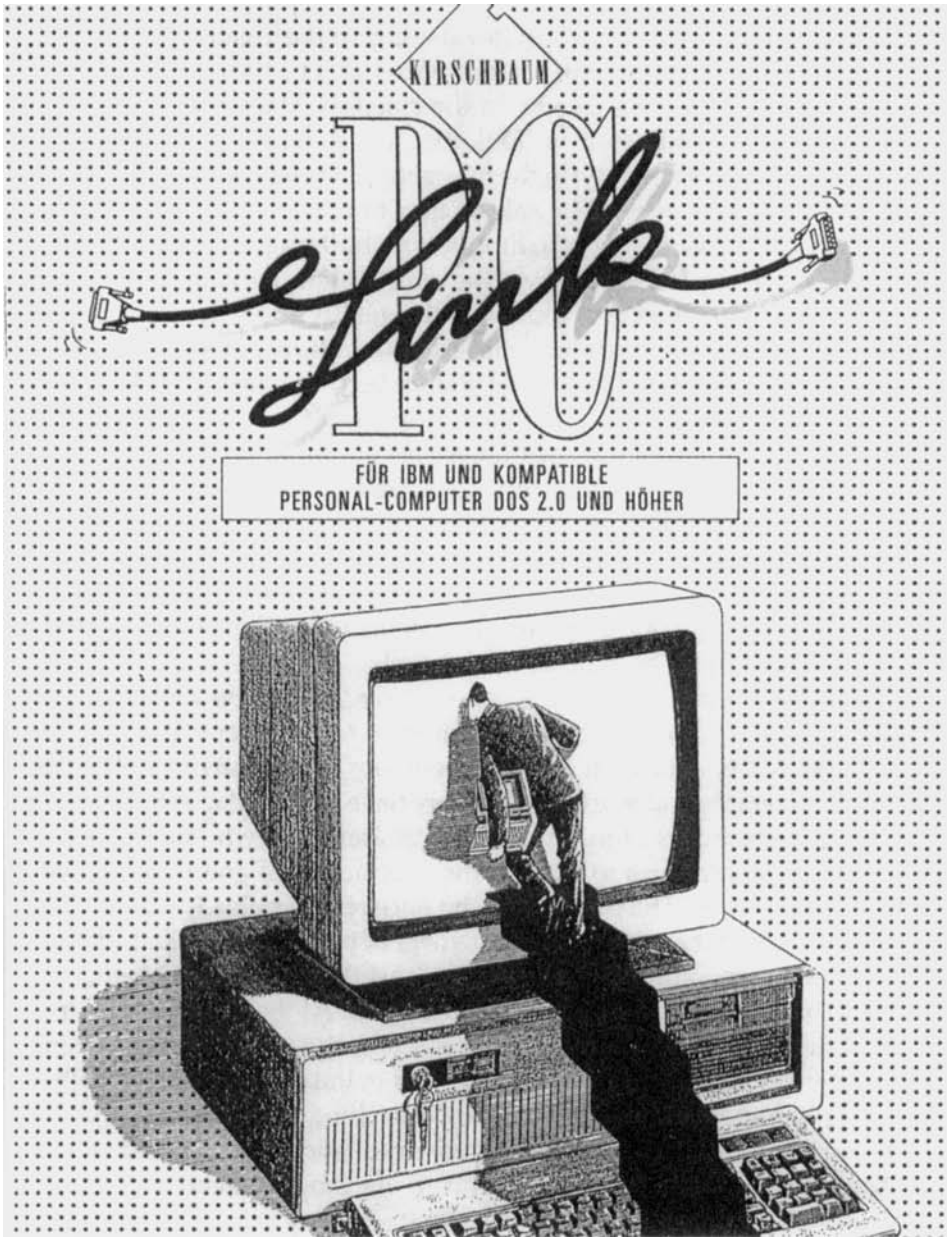
* Depending on the capacity of the storage medium and how much money is invested in development, there could be more or less subtle differentiations in the branches at all levels.

The beginning of a new form of audiovisual discourse: the camera, the recording apparatus that once founded cinematography, has not yet become obsolete. However, it is no longer an indispensable prerequisite for realising illusions of motion. The reduction in size of electronics to microelectronics and its combination with semiconductor technology also led to certain aspects of the visualisations performed by video and television cameras becoming substitutable. Visible surfaces and structures, whether generated expressly for media use or not, were no longer needed as references for producing images. Film cameras, electronic cameras fitted with microprocessors or pick-up tubes and the hard and software used for computer animation, analogue and digital taperecorders, synthesisers and sampler-programmes offered complex systems for media mixing, for the expanded production and processing of visible and audible entities.

Similar to the sphere of production, the forms in which the visions and sounds reached the subjects became more differentiated. Neither the projection of the filmic in public spaces, which one attended on a rental basis, nor the supply of the households through state-regulated centres of broadcasting were the predominant forms any longer. The last links in the chain of trade with filmic wares had become a direct exchange of goods; canned films for cash. 'Business as usual – oil, petrol, video', proclaimed the sign of a petrol station seen in the English countryside even in 1984. The filmic changed hands in places where the other everyday necessities of life were also traded; in supermarkets, department stores, grocer's shops, tobacconists, and kiosks; on Laser Vision, Compact Disc, cassette, or floppy disk.

Within the triad of industry, film(text), and viewer-subject, the boundaries of the dispositifs, which had once been sharply defined, opened. Cineastic constructs reached the major part of their audience through television and other markets of electronic diversions, which were mainly financed by these. Conversely, traders in video became cinema entrepreneurs in order to maximise return on the licences they had bought. The new stars of televisuals celebrated their acceptance in the faded splendour of the cinema theatres. To an increasing extent, the screens were occupied by those who had won the heads and hearts of the audience in front of the box: Schimanski, Otto, Didi Hallervorden or Loriot, for example, were the German stars of the intermedia discourse. Mixing, in a literal sense, could be observed also at the apparatus level: electronic viewing theatres of publicly displayed intimacy, and domestic audiovisual centres with at least some features of the cinema dispositif, tended to fuse in a focal point of indistinguishability.

In numerous phenomena belonging to the stadium of advanced audiovision, there were flashes evoking the era when the cinematic gaze



Germany 1988: Kirschbaum PC Link advertisement. Insert: For IBM and compatible personal computers DOS 2.0+, stairways to heaven.

and cinematic perception were just developing: in the gigantic flight simulators, modified for amusements, of the Space-Lab cinemas; in the large format projection of Paris' La Géode; in the cinepark Maquette Bruparck in Brussels; in the Cosmic Hall in Tsukuba, Japan, where projection with HiVision was already a reality; in the new shopping-experience malls of the multiplex complexes, where the sale of film time was combined with the sale of mundane consumer goods, fitness, bodybuilding, and other accessories for body-styling. In fact, this was the rebirth of the panoramic view and the circus event, the illusion of motion in the quality and surroundings of a fairground, extra-ordinary commercial outdoor-culture as a permanent fixture. In the televisual clip, that had long since become a metaphor of a form and was being applied to other trimmed-down facets of culture, like literature, opera, or all kinds of information, we encounter again the momentary event, the fast answer for fast rest-time needs. Earlier, we became acquainted with the dazzling range of artefacts for creating illusions of motion at that stage in history when hand-painted series pictures, wheels of life, mutoscopes, vast dioramas and pleoramas were used in combination with various other lighting and mechanical systems to produce jumps in time and space which could be experienced visually.

This is why it makes sense to speak of this era as a new *Gründerzeit* or founding years.[7] The historical difference to the founding era of audiovision in the nineteenth century is obvious: the amateurs, hobbyists, individual inventors and workshops of yore have been replaced by a liaison between manufacturers of machines and programmes, who invested vast sums in their laboratories to expand the production of goods for amusement and orientation. The plebeians, who once rented publicly offered film time, have become the proud private owners of machines to manipulate or to create their own audiovisual time, or at least the possibility is there.

On the other hand, the difference is marginal. At the culture-industrial centre of this new *Gründerzeit*, the principle of facilitating and maximising profits operates then as now. However, this culture-industrial centre has never been the space where anything really exciting and stimulating could unfold; where actively intervening culture or artistic, scientific, and technical obsessions could develop their power. As long as these remain the spaces of nomads and non-disciplines, they will stay relegated to the periphery, to colonising the niches.

From this perspective, the new *Gründerzeit* of the 1980s may be conceived of as a pre-era of a future that is not teleologically determined, but is open for tensions, breaks, dissonances. By no means is everything regulated and controlled irretrievably, not even with regard to the media. Therein lies hope.

Conclusion

Good Machines, Bad Machines
For living heterogeneity in the arts of picture and sound – Against psychopathia medialis

Before making HISTOIRE(S) DU CINÉMA,[1] at the end of the 1980s, Jean-Luc Godard tried out the aesthetic conception in the electronic short PUISSANCE DE LA PAROLE (1988), shamelessly taking full advantage of a commission by the French national telephone system for a commercial. In the prologue, the film-maker is heard voice-off to a picture of the revolving spools of a film editing machine: 'In the entrails of a dead planet, a worn-out mechanism shudders. Tubes reawaken, emitting a pale vacillating light. Slowly, as if reluctantly, a commutator changes position...' – just a nostalgic farewell, so it would seem, to a hundred years of cinema history, or might it also mark possible transitions to what will come or even pinpoint new beginnings that could be connected to a changed position?

The debate on the proliferating and rapidly advancing apparatus of the media and its relationship to both the condition and the perspective of that which we have been taught to call culture, threatens to degenerate into a cold war of opposing beliefs at this fin de 20ième siècle. Euphoric endorsement of the expanding machines and their programmes in telecommunications, especially in the form of the globally wired computer and data networks, is assuming more and more metaphysical or even missionising features; in Europe, with the politico-strategic slogan of the 'information society', it exhibits overt ideological traits. In the opposing camp, the champions of the classical media – including traditional technical production of sounds and images – declare their instruments, their systems of describing and of viewing, to be an irrefutable holy mythos. In the case of film, for example, this applies to its production and even more to its classical venue, the cinema.

The crux of the matter is the dualism between analogue and digital media. Although in this debate as a rule both properties tend to be defined in images and not technologically. Analogue stands for the traditional mechanical and photochemical processes of production and reproduction; digital stands for electronics and the future. The value or moral judgement implied by the deliberately pointed emphasis of my title for this chapter, in fact refers to fundamental psycho-technical distinctions, as were assigned to different physical frames of reference by Albert Einstein and Leopold Infeld in their famous work *The Evolution of Physics*: 'We assume, therefore, the

existence of one co-ordinate system (CS) for which the laws of mechanics are valid. Suppose we have a CS such as a train, a ship or an airplane moving relative to our earth. Will the laws of mechanics be valid for these new CS? We know definitely that they are not always valid as for instance in the case of a train turning a curve, a ship tossed in a storm, or an airplane in a tail spin. Let us begin with a simple example. A CS moves uniformly, relative to our 'good' CS, that is, one in which the laws of mechanics are valid. For instance, an ideal train or a ship sailing with delightful smoothness along a straight line and with a never-changing speed. We know from everyday experience that both systems will be 'good,' that physical experiments performed in a uniformly moving train or ship will give exactly the the same results as on the earth. But, if the train stops or accelerates abruptly, or if the sea is rough, strange things happen. In the train, the trunks fall off the luggage racks, on the ship tables and chairs are thrown about and the passengers become seasick. From the physical point of view this simply means that the laws of mechanics cannot be applied to these CS, that they are 'bad' CS."

In 1997, James Cameron made the film TITANIC about this century's first tragic break-down of a mechanical techno-colossus as a bombastic love-story. For this film, the most expensive and financially successful ever made to date, a vast army of digital effects specialists worked on the simulation of a catastrophe that really had taken place at the interfaces of humans/nature/machines. At the beginning of this last decade of the outgoing century, Cameron had made a better film: in TERMINATOR II, he dramatised with ingenuity the conflict between the two technical frames of reference with the resources of the action-movie genre. The mechanical – all varieties up to and including the sophisticated electro-mechanical – represents good. It is bulky, gravitationally heavy, touchable, vulnerable, in a traditional sense – human. Its rhythm is akin to that of the human heart; the cogwheel clock, with its constant stop & go, is its inner master-machine.[4] In contrast, the electronic – particularly when linked with computer hard- and software – stands for the evil Other. It is fluid, not robust, exceptionally adaptable in its form, regenerates itself from itself continuously, surprising, spooky and tricky. Its basic metre is determined by algorithms; the mathematical structures of these are as inaccessible to most people, including artists, as the mysteries of the occult.

The world that became an image with the advent of photography, naturalistic on the surface, amazed, fascinated, and shocked people at first. At the beginning of cinema's history (in a narrow sense) at the last fin de siècle, it was completely baffling to the majority of spectators as to how, suddenly, on white linen sheets, movements and artificial life could expand and develop in the colours of death[5] – black and white – before their very eyes. The

projectionists in the darkened halls were the real heroes of the first cinema-years. The 'camera obscura', the dark space of what is hidden of our time is the computer. Because of its bright-coloured interfaces[6] with their symbols and icons, it threatens to become so hermetically sealed off that for many people, it appears as the epitome of all that is foreign and inexplicable, capable of inspiring awe or even fear. The heroes of this medium are the engineers, programmers, and hackers.

Sometimes dualisms can be useful. Nevertheless, their only justification for existence is to effect a temporary clarification of a given situation. Then they are played out and it is time for them to disappear.[7] The arduous period of clarification seems to be drawing to a close. Between the two self-styled opposing poles, bridges have been built that are sturdy and within reach. Beyond all the hype surrounding expanded world-wide data communications, even the most dogmatic advocates of artificial intelligence must have grasped the fact by now that the fastest computers are very useful indeed for much that runs and can be processed systematically, but that they are not the universal machinery for solving all conceivable global problems, not even of aesthetics and art. Conversely, from the mechanical viewpoint, it has become increasingly clear and empirically experienceable that in the alliance between the film and the computer – for the present, drafted as digital apparatus – there are exciting discoveries to be made and productive frictions abound. Further, a perspective for hardware is now becoming conceivable where analogue and digital are linked at an advanced level (as in optical computer models powered by lasers) or where the analogue again comes more into its own, as in the ideas for biochemical computers. Perhaps in the future we will even be able to grow the hardware, like the Japanese artist Yoichiro Kawaguchi's bizarre structures, which he has been growing from genetic algorithms since his *Morphogenesis* in 1984;[8] perhaps, in the next century, these will be computed on nerve cells integrated into circuits. In this case, the model really would come very close to its mortal archetype.

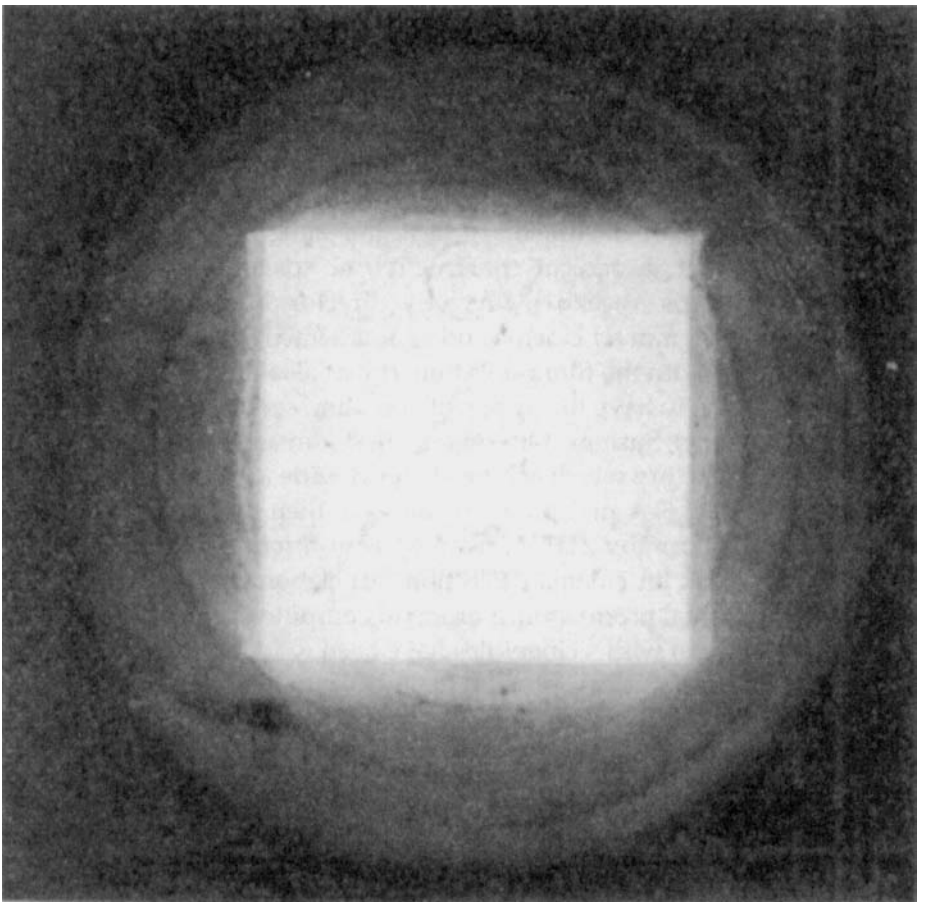
'We are standing in front of a huge rubbish heap of words and incorrectly used symbols and next to it, is a vast store full of new discoveries, inventions, and possibilities, which all promise a better life',[9] wrote Siegfried Giedion in 1948 at the end of his fantastic book about the rule of mechanics. The Giedion of electronics has not yet been written, as Peter Weibel has often pointed out, quite correctly and challengingly.

Whereas the greater part of academe involved in the humanities and cultural studies plus many critics still persist in ossified cultural pessimism and indolence, lamenting once more the fall of Western civilisation as a direct result of computer-permeated media culture, other people have long

since begun to create practical alchemy. Innovative firms like, e.g., Das Werk or Die vierte Art in Germany; the already legendary Computer Film Company of Michael Boudry – since sold to Hollywood –; The Mill in London; Cinesite in Los Angeles; not to mention major enterprises like George Lucas' Industrial Light and Magic or Cameron's Digital Domain are working on combining analogue signs and digital code, are attempting to baptise the devil of the real with holy water of the digital code. In the form of marketable products, they experiment on the possibilities for hooking up digital technology with the undisputed advantages of photographic, video and cinematographic techniques.

'Effective counter-production ... must find an entrance into the strengths of its opponent',[10] postulated Alexander Kluge in the mid-1980s, and since then, his film work has been devoted to opening windows for cineastic luxury goods in the stuffy petit-bourgeois building that is German commercial television. With the Development Company for Television Programs (DCTP), a cooperative project with the Japanese advertising agency Dentsu, he has managed to secure for himself and his auteur-colleagues broadcasting slots with the largest private broadcasters. Here, he holds his listening and viewing classes to sensitise televisual perception, or simply talks with people who have something to say: 'The public and the private sphere unified would be a strong form of organisation',[11] – this he had propagated with Oskar Negt in *Geschichte und Eigensinn* a few years previously.

Zbigniev Rybczynski, who learned his trade at the film school in Lódz, Poland, made film/history and the present to collide in STEPS (1987) in an incredibly provocative way. In the cinema film sequence par excellence, the scene on the Odessa steps from Eisenstein's BATTLESHIP POTEMKIN, he inserted a group of neurotic American tourists using blue-box, who follow the action with ghoulish delight. Zbig demonstrated here impressively how electronic matting and mixing techniques can be used to open new worlds of audiovisual perception; a playful interventionist method for treating film experience, media and political realities; for it was primarily as a media spectacle that the gradual rapprochement of America and the Soviet Union at that time was offered to us. What is more, in the meantime, the dimensions of mass tourism in the metropolises of Eastern Europe have outdone even the wildest filmic fantasies. *Ghosts in the Machine* was the title of the programme series produced by John Wyver for the British Channel Four which made the production of STEPS possible.[12] – Peter Greenaway produced his most exciting crossings of boundaries between cinematographic and electronic techniques, analogue as well as digital, in the 1980s – long before his Paintbox-orgy, PROSPERO'S BOOKS (1991): FOUR AMERICAN COMPOSERS (1983); A TV DANTE (pilot of Canto 5: 1984, Cantos 1–8: 1988); DEATH IN



Fluorescent screen of a Braun tube (1930).

THE SEINE (1989). Derek Jarman's compelling visualisation of Benjamin Britten's *War Requiem* at the end of the 1980s demonstrated how a cinema aesthetic, in the grand style but leisurely, and with the brutal material force of the electronic, could be concentrated into an anti-militaristic spectacle for a young audience socialised by MTV; the gigantic clip in the filmic tableau's middle section was edited by John Maybury.

Even film artists who are wedded so closely to the gravitas of sensuous material, like the Brothers Quay, began in the 1990s to take careful and very discreet steps toward the possibility of integrating layers of digital images into their work (INSTITUTE BENJAMENTA, OR THIS DREAM PEOPLE CALL HUMAN LIFE, 1995). Alain Resnais' bunch of variations on a story, SMOKING – NO SMOKING (1993), is not a only playful reminder that the filmic avant-

garde has been grappling with the construction of complex multi-perspective stories for decades. At the same time, Resnais plays nicely with the aesthetic surface structure of multiple-choice variants of film narratives. Like Coppola's ONE FROM THE HEART (1981), this film will probably only be really appreciated in years to come, even if only as an archaeological find from the early period of film dramaturgy influenced by hypertext structures. In the sector of documentary film, the same can be said of Peter Krieg's experiment in radical constructivism, SUSPICIOUS MINDS – DIE ORDNUNG DES CHAOS (1990/91), which the director produced as a 100 min version in Super 16 mm for cinema and as an interactive WORM CD. When this was coupled with the film projection, it was also possible for the audience in the cinema to have the option of accessing certain film sequences.[13]

NICO-ICON (1995), Susanne Ofteringer's first film about the unique heroine in Warhol's Factory which achieved world-wide acclaim in the cinema, was first shot on Hi-8 as an exposé. The film was then produced professionally in electronic form by ZDF's *Das kleine Fernsehspiel* before being transferred to film stock for cinema projection. An elaborate example of a film process before actual production: a group of computer scientists, programmers, and – to begin with – cinephiles have been working for some time in Cologne, Germany, on a digital 'Film Planner' with dialogue capability. To imagine what this is, one has to forget completely everyday experiences with computers. This model works with a so-called – by Michael Hoch – 'intuitive' interface, which is, in principle, as simple as could be: the film-maker enters a room equipped with cameras and sensors and acts in front of a large screen (like Jean-Luc Godard does in SCENARIO FOR 'PASSION' in the Sonimage studios). His spoken and gestured directions are recorded by cameras and microphones, digitised, transformed into algorithmic commands, and, finally, produced as a simulation on the screen – as virtual architecture and set decoration, in the form of virtual characters, whose movements and positions, where possible also directions for lighting, varying camera positions, etc. The only complex thing about it is the computer programme that makes it possible within a very short time indeed, in quasi-real time, to generate the directions as images.[14] The intuitive interface is not binding, however, for this tool in general. Especially at the planning stage of a film, working with a PC at a keyboard might often be more useful.

Above all in the area of shooting and projecting films, photographic/chemical material is still unbeatable and likely to remain so in the foreseeable future. However, both in pre-production and post-production, i.e., in the phases dominated by logic and planning, the advantages of fast computers and digital tools are developing continually. Not to mention the

future of distribution, the area where economic calculations play the greatest role. In the phases before the film is shot and before it is finally printed for screening, the digital is strong for here the film-makers are not concerned with a found or staged reality but solely with designs, conceptions, and with reality that has already become images, sounds, and data. On the other hand, the strengths of mechanics and photochemistry lie in their capability for free interchange with what is real, what can be grasped by the senses; and conversely, that the intensity and diffuseness of life, with its summits and abysses, is less amenable to computation and more to narration and mise-en-scène.

The so-called non-linear editing systems, for example, AVID, Quantel, or the cheap version for home use, Fast Video, currently demonstrate most clearly the hybrid nature of audiovisual production and the way in which the two greatest technical systems of reference can coexist. For the filmic illusion of motion, digital non-linear editing marks the transition from a horizontal to a vertical method of working. The process of montage no longer takes place between the horizontally positioned feed and take-up plates of an editing machine or a video console. Now, it is more a kind of expanded data-processing operation. After conversion into digital form, the film material is then available in the form of files, documents, and data lists, which can be moved around or combined at will without the film or video material having to be touched at all. Only after the complete construction has been assembled in the computer – on the more complex machines, this includes montage, processing of effects and sound – comes the step back to the realm of what is perceived by the senses. The package of data is brought together with the coded original material and edited and woven together according to the given structure of instructions. Possible inordinate extravagance (in the shooting) and predictable calculation (in the post-production) enter into a symbiosis. 'The feeling man shoots, the thinking man edits', was how Nam June Paik once formulated the basic idea of this split style of media production.

In this process toward increasingly extensive processing of the audiovisual source material by means of cutting and editing machines which are becoming more compact and cheaper, lies the potential for a shift in the individual production conditions for film-makers and for sound-and-vision artists in general. What could only be realised a few years ago by renting outrageously expensive time in post-production studios and on special effects machines (and as a consequence was beyond the pecuniary means of many people), can increasingly be done in home-work using own means of production. Currently, at the end of the 1990s, Zbig Rybczynski is working on developing possibilities for such a praxis of autonomously producing

complex illusions of motion. In 1997, Lynn Hershman made her first feature film CONCEIVING ADA (about the famous computer pioneer, Ada Lovelace, who was the daughter of Lord Byron) with Tilda Swinton in the title role. Although one can criticise aesthetic details of this work, which cannot be overlooked on the big screen of 35 mm projection, nevertheless, with this film, the media artist has presented an exciting and challenging model for future audiovisual productions. For just a fraction of the current costs of industrial productions for cinema, Hershman used simple Macintosh machines and programmes to combine live acting with virtual characters and sets to create a complex filmic reality.

At present, I am very curious to see the outcome of a British experiment that has brought artists together from these two universes: the text writer of the London 'underground', Iain Sinclair, the film-maker Chris Petit, who ushered in the 1980s with his cutting-edge road-movie, RADIO ON, and the graphic artist and cartoonist Dave McKean. The recently combined energies of John Wyver and Keith Griffiths in Koninck & Illuminations are primarily responsible for production of THE FALCONER, a fictive documentary on the eccentric 1960s film-maker Peter Whitehead.[15]

In 1927, László Moholy-Nagy developed a sketch for his film DYNAMIK DER GROSSTADT [Dynamics of a Metropolis]. In the introduction to this project he wrote: 'Thus the creation of a central film laboratory where manuscripts with new ideas will be realised will soon be a completely self-evident demand, even from the point of view of private capital, and it will be acceded to.'

In the 1990s, generations of young artists were growing up for whom combining, intertwining, and parallel use of a variety of technical instruments and means of expression was already completely second nature. Laboratories and academies like, e.g., the International Academy for Media Arts and Science in Ogaki-shi, Japan; the Center for Culture and Communication (C^3) and the Intermedia section of the Academy of Art in Budapest, the Zentrum für Kunst und Medientechnologie (ZKM) in Karlsruhe, and the Academy of Media Arts in Cologne, Germany, have not only anchored the permanent crossing of boundaries and linking of traditional analogue techniques and newer digital tools in their syllabuses – their students and fellows skip constantly back and forth between these two arenas of form and production. For many, the concern is to secure attractive possibilities of working in the media in the long-term which will allow them to earn a decent living (and justifiably so): as directors, as authors, as providers of audiovisual conceptions, tapping into the pulse of the age and working on their own futures. Those who are more interested in design experiment on

Things found and things invented, fiction and reality, myth and fact in dense layerings of text and images: THE FALCONER 1998.

optimising the ergonomics of the interfaces between media machines and media people, which are envisaged in the future as smooth in the literal sense of the word, quasi tender. Klaus Gasteier's *Dumb Angel* of 1996 is one such project. It uses the fragmentary material composed by Brian Wilson in genial anticipation of listening habits to come, which was collected under the title of *Smile*. The project allows the user (who does not have to be computer-literate) easy access to material from a package of around 140 music fragments. The fragments are assigned imaginative graphic representations, which can be called up through a touch-screen in any order, one flowing on from the next. For the user of this legendary piece of pop music, computer and computer programme seem to fade away completely in the sheer media pleasure.[16]

The young Canadian artist Stuart Rosenberg founded Westbank Industries in 1994 on the WorldWideWeb, prompted by Ingo Günther.[17] At that time, it was a model of a virtual economy in the tradition of the Situationists. After intensive research on how movements on the international financial

markets function in the form of streams and channels of data, which he partly had to conduct 'under cover', Rosenberg set about de-mythologising something that is, for most people, unfathomable. He made it accessible in the form of a kind of electronic game of Monopoly. Just four years later, trade using digital cash is becoming a routine matter. From 1993–94, Stahl Stenslie from Norway and Kirk Woolford from the USA experimented with tele-haptic systems. They investigated the possibilities of communicating sensory sensations via ISDN lines: the interfaces consisted of a catalogue of brilliant digital 3D images of the human body, which the participants could select and target, as well as wired leather underwear in which sensors were mounted for the designated parts of the body. That this experiment in computer science, art, and telecommunications was a serious attempt to investigate and dramatise the interface between feeling people and calculating machines and their programmes, rapidly faded into the background in published public interest. The visual images were spectacular and coincided with the vogue in S & M, the popular media were greedy for the project's sensational aspect, and the artists were quickly stamped as the first 'cyber-sex' stars. This much too rapid rise to fame effectively brought their collaboration to an end.

Radical ideas and designs like these, which operate on the increasingly diffuse terrain between artistic action and design, are without doubt necessary. Not dissimilar to the way that experiments in the field of artificial intelligence helped and still help us to understand better how human understanding might work in reality. However, such experiments operate on a surface that is slippery in the extreme, for they are eminently suitable for training people in the change of paradigm from consumer to communicator; they prepare the 'intellectual proletariat' of immaterial labour for all-round competence in a future economy where the production and maintenance of virtual social relations will be absolutely indispensable.[18]

Heterogeneity also contains heterologous elements, in the sense of George Bataille's 'incommensurable', that evade being integrated into all-pervasive exploitation. Probably only very few instances will be stubbornly resistant and lasting, for the half-life of interventions and blocks have become exceedingly short where these involve the use of advanced technology.

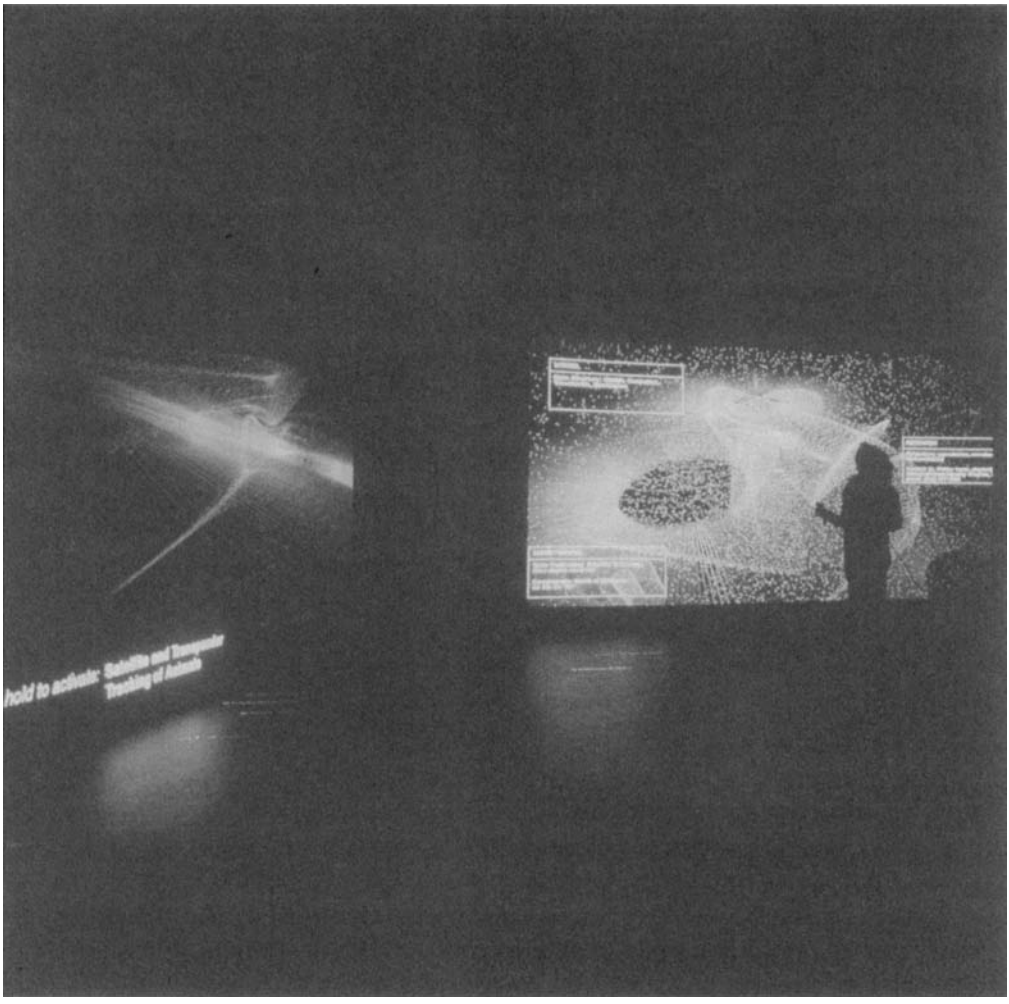
Artists who have worked uncompromisingly for years on the dramatisation of the interface are Ulrike Gabriel and the group Knowbotic Research, who currently all work out of Cologne, and have also been strongly influenced by study and research visits to Peter Weibel's unique but unfortunately short-lived think-tank for new media at the Städelschule in Frankfurt. Ulrike Gabriel represents a type of artist whose determination

'CyberSM Project', Stahl Stenslie and Kirk Woolford 1993–1994 (Photo: Stahl)

and resoluteness is very rare in the world today. In her work, the development of ideas, conceptions, projects, and their complicated programming form an indissoluble and synergetic whole. She began her artistic career with computers by constructing bizarre arenas to try out how future perception might look and has continued to work on this ever since (she calls her productions 'Otherspace'). In a game with the two most extreme positions possible vis à vis the world, observation and participation, Gabriel creates installations where, in real time, the visitor can influence and move large sections of a surrounding world of images and sounds, its geometric structures, through their movements of their body and gaze in the arena. In

Terrain (1993), she experimented for the first time with mini-robots powered by solar energy, which react in minimal ways to changes in light levels. A highlight so far was the 1997 installation at the new Institute for Communication and Culture (ICC) in Tokyo, which originated from cooperation with the Canon Art Lab, Tokyo, two years before. On a circular space stand an impressive population of her solar-robots. The visitor sitting relaxed in front of them can control the movements of this artificial population through his/her brain activity. A special helmet measures currents in the brain, analyses them, and relays them to the robots in the form of qualitatively oscillating light intensities. The more relaxed the visitor, the more intensive the light becomes, and the more violent the movements of the mini-robots.

Knowbotic Research – Christian Huebler who comes from Performance art, the computer musician Alexander Tuchacek, and the visual conceptualist Yvonne Wilhelm – generated a great deal of interest with their spectacular project of a walk-in music data bank (SMDK), which they developed in collaboration with Georg Trogemann's group of computer scientists and presented for the first time on a ship at the Mediale festival in Hamburg in 1992. Since then, they have worked dedicatedly on their idea of implementing networking technology; not primarily for optional use in connection with interactive art works, but as a possibility for expanding human intervention with the aid of machines and programmes. Their projects that followed, *Dialogue with the Knowbotic South* (1994/95), the Rotterdam spectacle *Anonymous Muttering* (1996), and *10_Tendencies – Questioning Urbanity* (1997) are characterised not only by their wilful, powerful, and dynamic aesthetics in space and by the deliberate irritation they generate at the boundaries between art, science, and technology; they are becoming, in a specific sense, political, because there is a progressively deeper reflection of eventual politics of machines and their users. Certainly a convincing alternative, not only to the cyber-mysticism of American West Coast surfers, but also to the model of a technically based 'collective intelligence',[19] developed by Pierre Lévy as ideological mortar for French Euro-strategists, which is, in the final analysis, a technique of power and control. The coordination of scattered 'active subjects' through linked machines and programmes serves the post-Fordist requirements of capitalism excellently.[20] In contrast, the basic concern of Knowbotic Research's projects is to develop artistic models for collaborative action, whereby the kind of action implied, reaction to and with others, is not understood as group-imposed discipline and subjugation, but rather as an attractor of coexisting activities that encompass the unforeseen, interference, ruptures, chance enhancement, and enrichment. Against the 'media competency' demanded by the pragmatists of the infor-



Knowbotic Research: 'Dialogue with the Knowbotic South', Wilhelm Lehmbruck Museum 1997. (Photo: Martin Gaissert)

mation society, it sets the necessity of developing the ability to deal with chaos, complexities, and opaque conditions.[21] The locations of their current projects are two mega-metropolises, that have developed at crazy speed over the last decades: Tokyo and São Paulo.

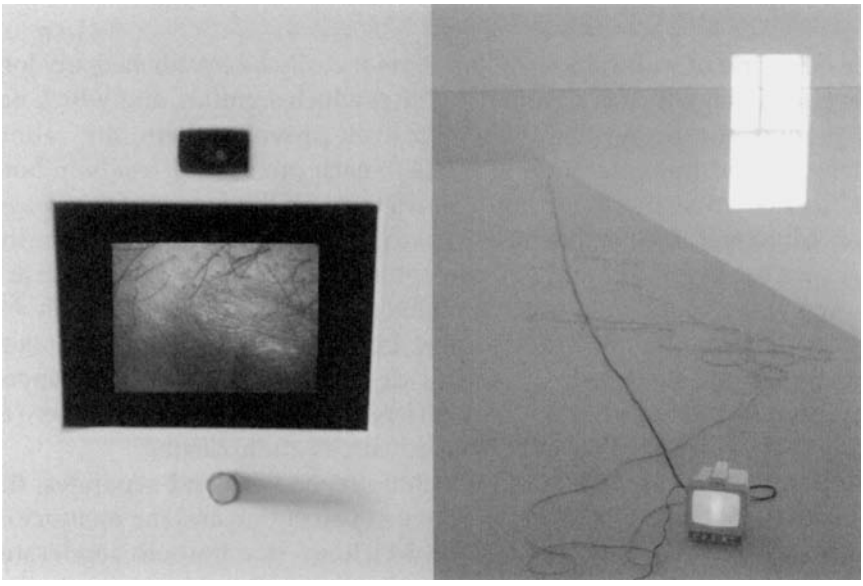
... As one sees[22]... In 1928, when Buñuel and Dali celebrated their radical cut through a cow's eye, and Georges Bataille, in his *Other History of the Eye*, made his protagonist Simone tear out the eye of a priest and insert it into the orifices of her body, Paul Klee commented in his way on the insecurity of perception which prevailed in the period between the wars and between artistic conceptions: in one of his filigree etchings on zinc, a daring acrobat balances precariously at the top of a flimsy ladder, almost on a level with the symbol of knowledge, the sun, but the acrobat is very unsure of himself – the experience of subjectivity as a balancing act, as a dance on the border line, where ascent and fall are equal options, cleaving together with energetic tension.

At the twentieth fin de siècle, art that uses images again moves in a strange intermediate time. Trust in depictions has been shattered even further now, has become almost indecent. For us, the objective truth content of a photograph or film sequence is not worth a light any more. Sophisticated techniques for manipulating and simulating images have brought about a deep rift between what is seen and the person who sees it. The space in between, where art takes place – whether filled by a photograph, an installation, a film, or a video – is plagued by doubts, seeks orientations, vibrates in some stronger instances, oscillates like the monitor of an electrocardiograph, that seems to pose the urgent question: Will the patient live?

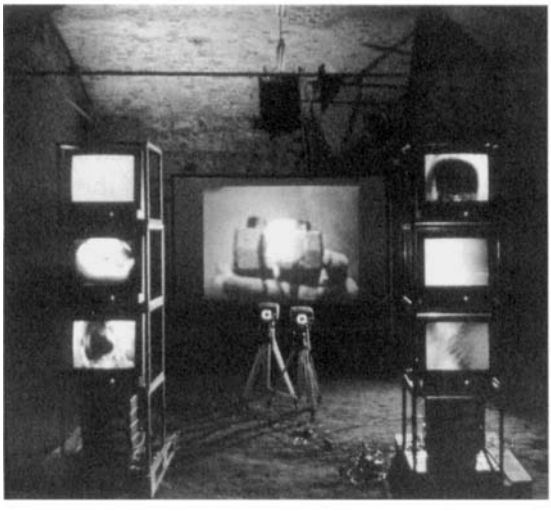
In the relationship to our fathers – insofar as one spoke at all – the story, the text, was predominant. I learned to grow up with the phrase, 'I don't believe a word you say anymore.' It was useful.

Gunnar Friel, Tilmann Lothspeich, and Achim Mohné, three young artists whose background is in photography and who have learned much from Jürgen Klauke, belong to the generation that has learned to live with the phrase with regard to each and every authority, 'I don't believe an image you show me anymore.' Nevertheless, or perhaps precisely because of this, they have decided each in their own way to continue to create images, to accept the challenge of working artistically in a partial world which appears to have lost its secure basis. A risky path, always searching for the image that might possibly become their own.

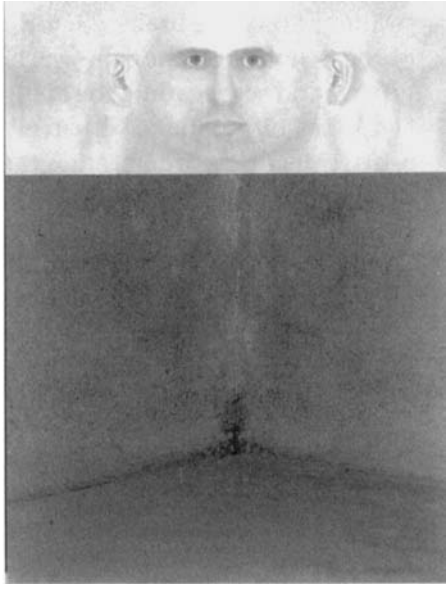
Their latest works are models of this search in several respects.[23] They represent the nervous tension of imaged realities between analogue and digital methods of processing and manipulation; they represent research



index:flove, Achim Mohné 1997



Assoziationsmaschine, Gunnar Friel 1997



Kopfgeburt, Tilman Lothspeich 1997

into a new kind of truthfulness, which cannot easily be established any longer between that which is signified and that which signifies, and which not only permits competing definitions but even provokes them; they allow moderation and immoderation to relate to each other, they reside in both *modi*: in calculation and in infringing laws through the power of the imagination. Moreover, each in their specific way, they take as a central theme the images we see every day and our perception of them. However, in the artists' own visual worlds not much remains as it used to be. Familiar photographic, filmographic, or videographic frameworks are stretched, taken apart, panicked, shattered, dissolved, de-collaged. Although advanced technical media are used, it is a very different world that is created here to the one that we are familiar with from advanced audiovisions.

Gunnar Friel focuses on 'and', which both connects and separates; the conjunction, that which takes place between perception and the memory of what was perceived. His 'Association Machine' is a particle accelerator turned inside out, the imagination of an inordinately large image-brain that has been exteriorised and become an installation. I saw this electronic sculpture for the first time in a place that appeared to have been made for it: in the humid, warm cellar of the Overstolzenhaus in Cologne, which breathes the (hi)stories of many a century of civilisation, on a hot July day in 1997. The second part of the brain, the 'cellula rationalis', was, according to the ideas of the Scholastics, the quasi-alchemistic laboratory of the mind where the mixing and segregation, the analyses and correlations, the divisions and the syntheses of the material perceived by the senses takes place; where concepts, categories, orders, and grammars originate before being stored in the refrigerator of the memory for possible future recall. On entering the cellar, at first I perceived the stacks of monitors to the right and left in front of the screen at the back as being the projections of the cool and dry 'cellula phantastica', where sensory perception of the real stages its chaotic orgies. However, it took only a few moments before dis-illusion set in, which appears to be the intention of Gunnar Friehl. The attention and sensibilities are directed less toward the origin of the individual fragments and their possible originality than toward the artistic distillation of the process as to how contemplation might originate: juxtaposed and intertwined abstract symbols and concrete structures, colours, rhythms and eventful spectacles, rapid mechanically beating sequences, which all work unnoticed to configure our cultural memory, and surprises, fractures, delays, which intervene and combine with them.

Kopfgeburt [literally: born of the head, the mind] – this nicely ambiguous metaphor in the title of Tilman Lothspeich's series of photographs 'flache Bilder' refers to something very decisive: digital processing is primarily an

intellectual process, an act of calculation. Or at least it will continue to be so, as long as the interfaces between people and machines/ programmes operate mainly according to pre-given symbolic interactions. Lothspeich's image compositions really celebrate the strange relationship of the analogue and digital worlds of images in a common framework created by the artist. Taking up more than a third of the total space of each work, endowing the whole with tensile strength and solidity, is the proximity to materiality, the faithfulness to matter, however unsettling its impenetrable blackness may be; a symbol of the infinite halo, from which variety comes, which in the course of civilisation has become that which we call reality. (300 years before Malevich's famous painting, Robert Fludd took this for the beginning of his history of the macrocosmos and microcosmos, where it was depicted as a pitch-black, almost square rectangle. On the four sides of the text he wrote the same thing: 'et sic in infinitum'.)[24] At the top, the head of the dark body, are the parts of the picture which stay in the light of knowledge and have been through the digital processing machine: unfolded, stretched views of heads in light shades of grey, each square centimetre extremely close to the real object superficially, but as a total construction it shows a monster, alienated to the point that it is a techno-biological hermaphrodite, evoking irritation and fear. Only the eyes, always positioned in the upper middle section of the picture, seem to want to play the game of individual identity and look straight at the visitor/lens of the camera, provocatively.

In an installation by Achim Mohné, the tension between calculated order, grammar, and the desires and fears underlying it also plays a significant role. In *index:/love*, his archaic interface is an editing machine for 16 mm film, which he uses to generate the images for his peep-show machinery. Here, a loop of fragments captured from commercial porno-films runs which has been scanned from a monitor. The voyeurs watching the image machine find themselves placed in a situation of permanent disappointment. The routine clichés of sexual animation are never played out but constantly interrupted, patterned, frozen, or set in frenzied motion. Sometimes the images are split-screen collages, sometimes inserted, all are so fleeting that the viewer can hardly register them: facets from the social context of the peep-show in the form of a 'videobooth' – a hand inserts a banknote into the slit of the automat; another keys in the selected videotapes on its keyboard; notices display the operating instructions. In a third layer of images, the camera takes extreme close-ups: extracts of details from the surface of a body – particles of skin with hair, recurrent shots of a male nipple, eyes wide open, blinking, lusting, and closing, base joints of fingers – not everything in this index is identifiable but, as a totality, it does make sense when the fragments are combined with a close-up of the artist as observer edited

in at frequent intervals. The enhanced peep-show apparatus is only part of the installation. In a separate room, the pictures from the intimate viewing situation are made public. On a small and inconspicuous television screen rather like a line monitor, visitors to the separate room can watch the furtive observers in the darkened room for these are filmed by a video camera. This represents both a doubling and a shift in the positions of the voyeurs: the observers in the peep-show apparatus cannot watch themselves watching; only the visitors to the separate room have this privilege. (Commercial) images as the highest precept and (moral or state) proscription of images, tyranny of intimacy as well as of the public sphere, exhibitionism and voyeurism by means of machines – a reconnaissance between desire, fear, and media which appears like a prospective archaeology of the WorldWide-Web.

Culturally pessimistic complaints will not help in coping with either the present or future of image production. However, if one understands the co-existence of heterogeneous forms of expression and media praxes that wander between the analogue and the digital as a challenge and an opportunity for radical experimentation, for risky balancing acts between different worlds, then leaving behind conventional patterns, it is possible to create something which would be unthinkable without its passage through the media, but which at the same time keeps the option for subversion open but the option for supervision closed.

To expend one's strength for the sake of tomorrow, or even the day after tomorrow, only makes sense if motivated by the attempt to make the impossible more possible and by practical hope. Although one is in danger, at least periodically, of becoming a somnambulist. In the inseparable weave of ethics and aesthetics, my activities as a collector of curiosities from the genesis of the audiovisual media and organiser of artistic media processes are driven by two all-embracing hopes, whose origin is of a profoundly alchemistic nature.

First: the melting together of the heat of tears and laughter with the cold of advanced technology is possible, and the result must not necessarily be lukewarm. To turn base matter, the heterologous, into gold or at least to experiment with this exciting process and have the privilege of experiencing transcendence was the old alchemists' animus. Today, the task is to process artistically what remains of reality with all the technical means at our disposal in such a way that its resistance and autonomy remain intact and to succeed, perhaps, in even adding something to its varied riches: dignity, sensation, attraction.

Second: in the same way that I cannot bear powerful hierarchies in life, I hope for a media reality that is organised not vertically but horizontally, and characterised by a lively alongside-of and in-one-another of distinctly different praxes. Just as I never recognised television as the 'master medium', I refuse to bow to the computer as the teleological vanishing point, in which direction all our aesthetic and cultural strength has to move.

My plea for the arts of pictures and sounds in the age of advanced audiovisions is emphatically to work on the strengths of diversity. Spectator, viewer, and participant/player are not positions or attitudes that are mutually exclusive. One can – according to situation and disposition – assume them in alternation.

Multimedia is a chimaera, an exaggerated promise of use-value born under the sign of the global market. *Unimedia*, which would be a more appropriate term, sounds much less dynamic and would not be so easy to market successfully. The combination of text, still and moving images, and sound on a CD-ROM or on the pages of the WorldWideWeb with its common technological basis in the digital code is aesthetically an event of reduction: the strength of each and every means of expression is reduced and the text clearly dominates, the grammatical or mathematical order, respectively.[25] Bringing these together can allow something new to develop, if the constructors of the medium really concentrate on creating complexity; if they are absolutely committed to producing challenging and stimulating connections within the material gathered together. However, this sounds trivial but: an inspired CD-ROM is not a book nor a film nor a music record; it is an archive connecting differing sign processes, a kind of library in which I, as a user, should be able to move about as freely as possible and must be able to have the most surprising experiences. The most valuable dimension of the WorldWideWeb is that part of it represents something like a mega-library, rather like the utopian one designed by Jorge Luis Borges,[26] in which I can move through some of the knowledge of this world as in a labyrinth, on the quest for my own identity, but always aware of the fact that I – like in any real labyrinth – can never reach the goal of my search, it remains of necessity imaginary.

The potential, that resides in contemporary art and culture of the audiovisual media, I understand to be first and foremost an obligation of the artists, writers, and producers of images and sounds (to whom, if not they, could it otherwise be delegated!): together with independent producers they could succeed in contributing powerful diversity through constant irritation and differentiation of the media architecture. This would entail both strengthening the autonomy of the individual forms of expression and au-

diovisual praxes and practising their combination with a delight in risk-taking. Inter- or transdisciplinarity only makes sense if in the cooperation the different fields have the possibility to be strong and develop. However, work on the connections is of seminal importance, comparable to the significance of montage for the historic avant-garde of the 1920s, the auteur-film, and the nouvelle vague of the post-war period.

The Internet, the expanded telephony initially set up by the Pentagon which makes it possible to send texts at lightning speed to one or more designated addressees at one and the same time and to communicate with them practically without any time-lag, has two great advantages which I appreciate very much in my daily work. I can send large chunks of data to colleagues and collaborators in remote places fast and get their reaction almost immediately. Both for professional correspondence and for publications this saves time and material. The quality of communication does not get better but it is often faster and cheaper. The second advantage is (or rather still is; the Internet is not yet thoroughly commercialised) that on the Net, one can organise events like festivals, congresses, or political manifestos quickly and effectively. Through creating so-called mailing lists, defined groups with network connections can be provided simultaneously with the same information and can react to it among themselves. 'Nettime', initiated at the Biennale 1995 by Paul Garrin, Geert Lovink, and Pit Schultz amongst others, is one such example, which focuses on a critique of the Net and brings theorists and artists from Eastern Europe together with activists from the West. However, if one looks at current Net practices, it is very conspicuous that the greater part of it is self-referential, including the critique. Scandals, that are exposed, contradictions, that are revealed, refer in the overwhelming majority of cases to the world of computers and the networks of computers and programmes themselves. Electronic communication in almost real-time I consider to be inadequate for exchanging matter of a private nature and certainly for intimacies; no matter how much the mass media-isation of the Internet hypes the inclusion of the affects of the user-subjects. Intimacy requires the tension that lies in hesitation, the temporal distance that corresponds with the spatial one, and not the illusion of synchronised presences. The Dutch artist Merel Mirage created an impressive installation on this in 1997: a correspondence of more than 1,000 pages, attempting to bring two people closer together, she condensed poetically into five pages and put on an electronic loop. *Subject: Emotions Encoded*[27] – a beautiful exotic butterfly, a computer animation by Jordi Moragues, flutters and beats its wings against the inside of the monitor screen, conveying sensuously the inevitable futility of any attempt to break out of artificially based reality. 'The spectacle reunites the separate, but reunites it *as separate*',

as Guy Debord said in 1973 in his film THE SOCIETY OF THE SPECTACLE,[28] referring to the changed sociality of telecommunications, and in his book on which the film was based, he wrote: 'The only thing that the spectacle desires to bring about is itself.'[29]

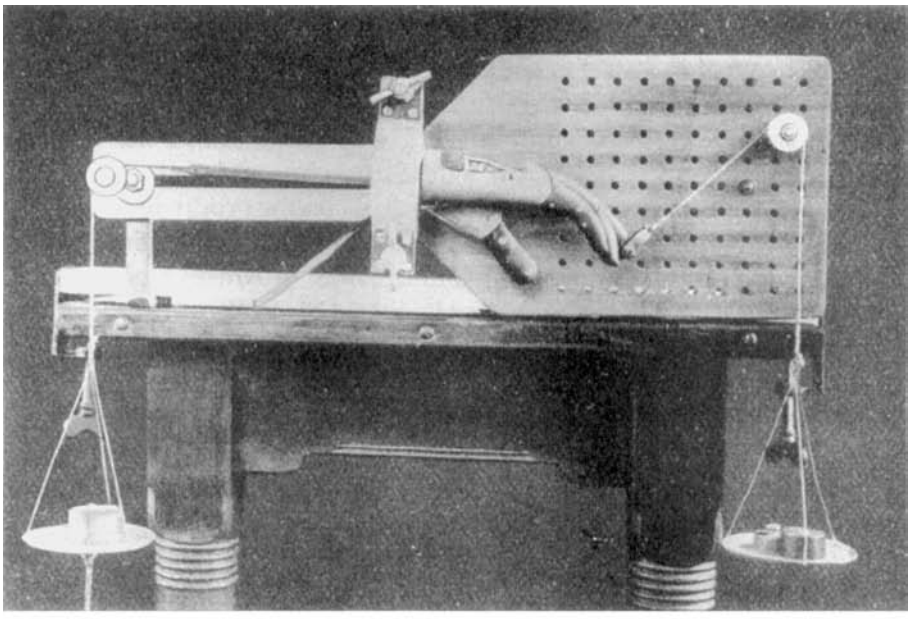
The expansion of the Internet into the WorldWideWeb, enabling the inclusion of graphics and sound, gave a gigantic boost to the commercialisation of the data networks which, up until then, had been the privileged domain of the military and scientists. In mid-1997, the lion's share of the estimated 10,000,000 websites belonged to the providers of commercial goods and services, and in the meantime, these cover virtually every aspect of life, including, of course, the big Hollywood entertainment companies, from whom one can download all kinds of hype on current film productions, providing the user is prepared for a lengthy wait. Mad haste and Waiting for Godot: working with and in the Net forces one into a pendulum existence between two time-modes – extreme acceleration in the procuring of information and interminable waiting until the computer has finally downloaded the sounds and images, made connections, and found its way out of the many dead-ends. Acceleration and extreme drawing-out of time coexist in the time-machines of advanced audiovisions. Working intensively and extensively with them can lead to a splitting of perception and to a real dependency on the machine. For these polar extremes of how time is perceived either far exceed or fall far short of human dimensions.

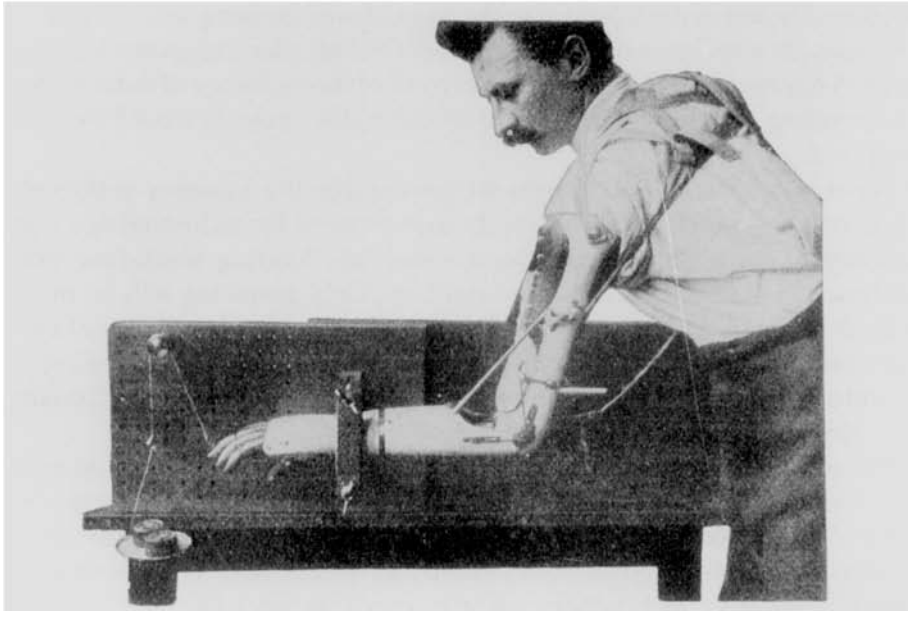
As a source of information, this strangely dynamic and, in principle, infinitely branching archive does have great value. *Ctheory*, the first journal devoted to media theory in the Internet, founded and run by Arthur and Marielouise Kroker in Canada, has been demonstrating convincingly for several years how interventionist writing and world-wide-connected text machines can be combined in a meta-discourse. In the sector of making texts for illusions of motion, first projects are being initiated for net-supported distributed script-writing. I am curious, for example, about the results of the many projects between Berkeley and Helsinki, which are very active on the Net with new electronic film publications and new ideas on film criticism that include the moving image and sound. As yet, they have not gone very far beyond announcements and promises of various projects. However, with regard to the cinematographic experience that is so dear to us and the works of art that are increasingly offered by electronic galleries, it should be emphasised that: we are not dealing with the direct perception of films or pictures or sculptures here, but with a communication *about* the works, which is a different thing entirely. This will probably turn out to be the decisive handicap in connection with trade in other commodities: the objects of the consumers' desires cannot be experienced as real sensations but, in the

form of data information, remain untouchable, untestable, and untasteable. In the case of highly standardised mass commodities, including audiovisual pornography, the communication may possibly work but not in connection with goods invested with luxury, where exchange predicates sensory experience of the object. Thus, the electronic department store will primarily be an event for the intellectual proletariat and lumpenproletariat, whereas those who can afford it will continue to be served in boutiques, specialist shops, and luxury department stores. In the German state of Northrhein-Westfalia, the first snack kiosk with an Internet connection opened in April 1998. One thing I am convinced of: in the next century, it will be a privilege not to *have* to act and interact socially and culturally on-line. Just as it is already a privilege not to be among those who have to be reachable everywhere and at all times by mobile phone.

With the proliferation of offers of information, the problem of selection and sorting is becoming increasingly acute and in the foreground. Programmed search engines, so-called agents, offer effective help but this also means effective control, categorisation, and selection of the utilisation of information. 'AltaVista controlling..', who really knows who or what is behind this, who selects the information provided, who makes the connections? This is where once again in the history of the media, a new and enormous political problem of power is concealed, which to date has neither been publicly reflected nor discussed at all.

In point of fact, the genesis of political and economic power in the networks is not so far removed from that which we are familiar with from cinema and film history. Slowly but surely, clear constellations and cartels are forming as they once did before, which led to the establishment of the Hollywood majors. And the global distribution of the distributors looks very much the same as it does in the film business: in 1997, two thirds of the world-wide providers, the 'hosts', were at home (in reality) in the USA. Relationships of world-wide equality do not automatically arrive at the same time with expanded telecommunications, neither in macro-cultural nor macro-social life nor in its micro-conditions, e.g., the relationship between the sexes. To believe this only fosters illusions, under the cover of which the real conditions of inequality can quietly spread out and become stabilised. On 26 June, 1996, *Ctheory* distributed Bruce Sterling's 'Unstabled Networks', as Text No. 1.9b in the series 'Global Algorithm'. Sterling, who, together with William Gibson, is the most prominent American sci-fi author on advanced media, wrote: 'I'll be an American science fiction writer living it up in Denmark. How many Danish science fiction writers do I know? Zero. I know they must exist, so I hope I'll meet some. For me to get published in their country – it's easy, it's something I can do by accident. For a





Russian Taylorism and the Economy of Time, Institute of Scientific Organisation of Work and Mechanisation of Man, Moscow 1920. (Source: Tramm 1921.)

Danish science fiction writer to get published in my country – they'd have better luck trying to ooze face-first through a one-way mirror.'[30]

In the first founding era of audiovision, Thomas Alva Edison devoted serious effort and energy to his goal of selling projectors and films, hardware and software, to every household – standardised on the production line just like his electric light bulbs that he intended to illuminate every home on the globe. His competitors from Europe and at home in America backed the time-rental system of cinema. Bill Gates launched his Volkswagen-Beetle of the operating systems, DOS, onto the market in order to make the computer a mass medium. It was envisaged that every computer and every user application would run under DOS, every private household would be able to operate communicatively. In 1998, 90 per cent of PCs run under the operating system from the house of Microsoft and this company is even more powerful than Coca-Cola. Netscape, on the other hand, from the very beginning pursued the strategy of renting contacts to high performance intersections in the wired computer world and charging for the time spent. With Windows 95, Microsoft took the first stride in the direction of multifunctionality and of the interface to the capacities of the computer networks. Windows 98, with its 12 million characters of code, plans to connect finally the DOS micro-worlds to the macro-network of the exchange of data. Plebeian operating system and imaginary global traffic systems would then be connected.

The consequences of such shifts are foreseeable: the economy of the networks will be – much more rigorously than those of the industrial age – an economy of time, its expenditure, its intervals, binding work-time and rest-time together with a ribbon of symbols. Only invoicing will be more difficult to begin with than it was for the tickets to rent two hours of cinema-time and the registration of the units of telephone-time. The coding of individual customers by assigning them the numbers of international credit cards already functions partially as a basis for this.

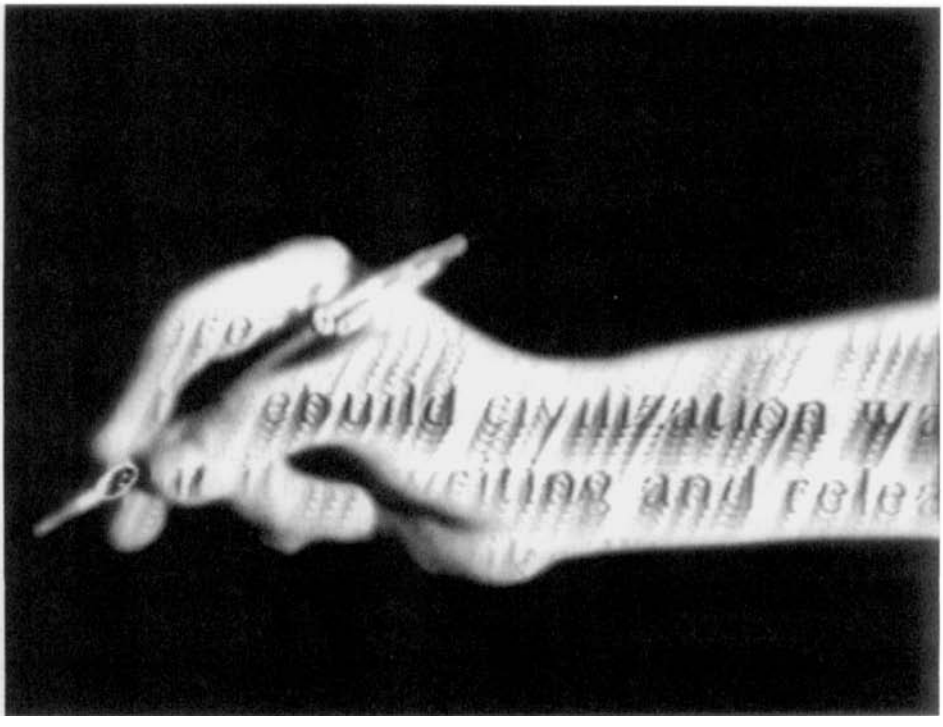
The social flood-gates for such an economy of time have been opened considerably wider for this compared to the 1980s. To an even greater extent, public and commercial services for everyday reproduction are delegated to the singularised private individuals themselves. With the aid of telecommunicative technology, we are forced to organise ever greater portions of everyday chores ourselves, confronted by non-answering machines, numbers for automated phone services, and very few, very overburdened personal communicators at the junctions of the social and commercial networks. –At the most extreme pole of the time-based economy on the production side of immaterial labour are the top programmers, comparable to top athletes: they can sell their highly specialised intellectual labour

Partnership of discourses – film production per foot and cars from the production line: Edison and Ford conversing intimately. (Source: Undated American newspaper cutting, probably ca. 1930.)

power concentratedly and very lucratively while they are in their twenties, i.e., for a period of 8–10 years, after leaving college or university. After that, they must either come to terms with being on holiday permanently, or must train for a new profession.

All over the world, established video festivals underwent a remarkable process of change during the 1990s. Only a handful resisted the temptation of jumping on the bandwagon and giving prominent focus to computer-based digital media. In the foyers and spaces where installations once stood or lively discussions about aesthetic trends, new works, or artist colleagues took place, masses of power-PCs lurk in the dim light for getting on the Web and calling up the latest Web-pages or accessing CD-ROMs. The environment is virtually indistinguishable from the hundreds of Cyber Cafés that have sprung up in cities the world over, or from the public info-points, which assiduous city fathers and local bankers have installed all over the place in order to train the predominantly youthful user-visitors for the future. The visitors to such video festivals also became noticeably younger, but also much less talkative, riveted to the terminals. The media of advanced 'mobile privatisation'[31] are primarily media for participating in games in isolation, they are not media for an audience. With their aid a shell can be produced that is ubiquitous and easily installed, where the individual can be at once alone and in the world. This type of interface with the world was brilliantly anticipated by Oswald Wiener in his *'Bio-Adapter'* 30 years ago (1969). – In spring 1998, German cities have been plastered with advertisements for a new fragrance. On large-format, vertically designed posters, Calvin Klein links his new product to the production of this type of new subjectivity: 'She is always and never the same.'

Almost obscured by the fairgrounds of the sensational and liberated from the art market-oriented compulsion to produce flickering sculptures and electronic paintings, particularly of the variety that Bill Viola has made highly acceptable to museums and exploitable, artistic tape-oriented video production is only just beginning to develop really exciting aesthetic ideas. Automated techniques for special effects have been done to death and are sliding more and more into design and television. In this situation, a number of exceptional artists have begun to develop their own poetry of the electronic texture of the image and its mise-en-scène, increasingly in collaboration with musicians and composers, which recalls the common techno-roots of electronic recording of sounds and images. Recent work by such completely different artists as Irit Batsry (particularly her trilogy PASSAGE TO UTOPIA, which took eight years to complete (1985–1993)[32] and David Larcher (VIDEOVØID TRAILER, VIDEOVØID TEXT, ICH TANK, 1983–1998) are fine



Stills from 'Leaving the Old Ruin' (second part of 'Passage to Utopia') by Irit Batsry (1989).

examples of this. Their audiovisual-poetic energy can develop more adequately on the big screen than on the small monitor. Thus the presentation format of video-poetry and video-essay is approaching that of the film festivals and will probably return there, the more that video festivals are dominated by computers with monitors. (Significantly, this highlight in the development of the electronic imagination coincides with the disappearance of the traditional material form of video art. The videotape, inscribed and read lengthways, across, or diagonally, is being replaced by the digital media's storage on disks.)

The marvellous exhibition on cinema's centenary in the London Hayward Gallery in 1996, 'Spellbound', demonstrated that this process can also work the other way round. Cinema and film directors like Terry Gilliam, Peter Greenaway, and Ridley Scott occupied this space that is normally reserved for the fine arts with their cineastic *Wunderkammers*, and media-socialised artists like, e.g., Douglas Gordon and Steve McQueen staged large-format, filmic time-spaces in the gallery. And holding everything together and connecting it: the gigantic reservation and curiosity cabinet of Eduardo Paolozzi, through which one has to pass in order to reach the spaces of imaginised screens.

Examples such as this also show that the loss of the cinema as the sole, ideal locality of the presence of film does not mean that film must necessarily lose its artistic power of effect and attraction in the public-intimate space. On the contrary: the highly differentiated implementation of forms of design and presentation enables more lively and diversified creations of filmic ideas in the internal and external spaces of the city.

A decisive element that remains of seminal importance in this proliferation of media praxes and techniques is the inner, inextricably linked substrate of themes, material, narrative methods, apparatus, and expectations of reception as well as desires of perception.

I am convinced that the multiple perspectives of narrative and authorship that, in contrast to the many previous and similar projects of the avant-garde, are facilitated and accelerated by the Net, are potentially an intriguing enrichment for the present praxis of authors of texts and images. They will not replace the classical author, but rather strengthen his/her position. For extending our knowledge of the world and our orientation in it, the multiple view-and writing-point is very valuable, also in an economic sense: it is no longer an option but a necessity for the network-based infrastructure of future sociality that the plebeian intelligentsia be players on both sides of the interface, that the consumer become a communicator.[33] On the other hand, where it is a question of extravagant sensations, of what is totally unpredictable, or where the great themes of art history are concerned

'Ich Tank', David Larcher 1983–1998

– love and death, Eros and Thanatos and their many daughters, sons, and issue – then in the future as in the present, we can visualise that people will gravitate towards extraordinary personalities, who possess the ability to express something in words, sounds, and images that they are unable to express themselves. – Also for this, James Cameron's TITANIC is, paradoxically, an example: revelling in identifying with it, hordes of TV-, video-, and PC-socialised youngsters flocked in their droves to have their feelings and emotions played upon for the space of half a working day, celebrating in Barthes' dark cube, together and anonymously, orgiastic feasts of fairy-tale invested passion and tragedy. – Multiple-choice dramaturgies, hypertextual constructs of images and sound, or Story-Space texts are media attractors of a slightly jaded passion for playing games. And products, which are generated with their aid are all the better the more their individual fragments are created by strong constructors of words, images, and sounds.

It is so: in the cinema, our bodies are outwardly at rest and bound to the – hopefully – comfortable seats in the cave. Personally, I cannot see why the enormous energy of feelings and emotions that are set free in the confrontation with a gripping film should be less culturally significant than those produced by typing on a keyboard, clicking on a mouse, or moving in a strictly pre-ordained trajectory in a virtual space. Especially as the implemented interactivity with the apparatus all too often rather covers up for the aesthetic weaknesses of the images, sounds, and texts with which one is supposed to interact. Perry Hobermann took up this theme in an installation in 1993: visitors throw rubber balls at projections of keyboards and when they score a direct hit, the keyboards transform into simple graphic interfaces from the Windows-world. An electric cooker or a lift is also an interactive apparatus in the language of machine construction engineers.

The digital images show it, still: they are the most numerous type of pictures in history to date that are produced in interminably long nights in front of monitors and at keyboards; they are physically sat out. Perhaps this is the most decisive change of all in the techniques of culture which is approaching us: in the loop of production/reception that was cinema, the nomadic filmmakers ran around excitedly and were obliged to continually move their bodies and apparatus about (Godard's PASSION (1982), his first film for the cinema after a long absence, is a nice example); the spectators had to sit down and were condemned to immobility. With television, the viewers were allowed to start moving, to leave their seats, the programmes went on uninfluenced by the viewers' activities, except that their structure became more and more fractalised and strident in order to keep the audience on 'their' channel. With the digital media, this process goes even further, even making a reversal with regard to cinema: the programmers and

engineers of immersion and hypertexts sit out the images, texts, and sounds, and the players of the interactive games become hectically active producers of the narrative version that they themselves select. The creation of something unique is no longer the prerogative of the work but is delegated to the participant/player.

In essence, all these aspects of position and possession are secondary. In art, in its production as in its perception, it is ultimately the passions that count, the bad and the good. They will continue to resist against being formulated. However, to at least attempt their expression, almost every tool and every medium should be part of the repertoire history has provided for us.

Notes

Notes to Orientation

1 From the title of Ries's book, published in 1916.

2 The original essay referred to here was first published under the title 'Le dispositif' in *Communications*, No. 23/1975. For the English translation, see Baudry 1980; also in Rosen 1986. This theoretical approach is summarised in Flittermann-Lewis 1987. For a critique of the previous English translations, see the translation into German by Zielinski/Custance and our introduction in: *Eikon*, No. 5, 1993, particularly p. 35.

3 For further details on this subject, see Zielinski 1988.

4 For a summary, see Fiske 1987; a selection of Williams' works can be found in the bibliography.

5 Cf. Ropohl 1979 and 1985.

6 Cf. Comolli 1971/72, 1980; Metz 1982; for Baudry, see endnote (2), this chapter.

7 Cf. Heath 1976, 1977, and 1981.

8 Cf. Bitomsky 1976.

9 In: *Filmkritik* No. 242, February 1977, unpaginated; see also Zielinski 1991(2).

Notes to Chapter 1

1 Die Pariser Weltausstellung in Wort und Bild. 1900, p. V.

2 W. Benjamin, 1987, p. 14; see Sternberger 1955, Buddemeier 1970, and Oettermann 1980, for the history of the Panorama.

3 T. Heine, in: *Die Pariser Weltausstellung in Wort und Bild*. 1900, p. 28.

4 De Vries , 1975, p. 91f., who used contemporary accounts in the journal *de Natuur* for his descriptions of the Panoramas.

5 See Oettermann 1980 and also Stenger 1939.

6 After de Vries 1975, p. 92f.

7 Notice sur les titres et travaux de M. Louis Lumière, Lyon, Imprimerie Léon Sezanne, 1918, p. 15. Cited here after de Vries 1975.

8 See Lumière 1936, p. 50f.

9 For a description of the Ballon Cinéorama, see Grimoin Sanson, Le Film de Paris, in: *Le cinéma des origines*, 1976, p. 96. Cited here after de Vries 1975.
10. This list does not correspond to the organisation of the exhibition but rather its system reflects that developed by the history of technology; see, for example, Singer 1958, 1970(4).

11 G. Malkowsky, in: *Die Pariser Weltausstellung in Wort und Bild*. 1900, p. V.

12 *Die Zweite Industrielle Revolution*...1981, p. 137.

13 G. Roessler, Electrotechnik. In: *Die Pariser Weltausstellung in Wort und Bild*. 1900, p. 10.

14 Citation (and the following paraphrase) from: *Die Pariser Weltausstellung in Wort und Bild*. 1900, p. 361.

15 In this connection, see also Schivelbusch 1983, p. 76f.

16 Published in *Electrician*, No. 45, September 2, 1900, pp. 820–822; see Abramson 1987, p. 23.

17 Mierendorff: *Hätte ich das Kino*, 1920; cited after Kaes 1978, p. 139.

18 See Peternák 1997 for a detailed description.

19 Antebi 1983, p. 8.

20 See Antebi 1983, p. 8.

21 See Comolli 1980, p. 122.

22 For numerous suggestions for remedying this situation, see Armes 1988, and Gebauer 1988; in the meantime, Rick Altman has commendably initiated a project to re-write the history of cinema from the perspective of sound:cf. Altman 1992, 1994; see also our recent media-archaeological research, Zielinski and Moore 1997(7). See Anderson and Ritchie 1959, on the Japanese benshi.

23 See, e.g., Ceram 1965; Cook 1963; Haberkorn 1981; Hoffmann and Junker 1982; Hubbel 1946; Zglinicki 1979; and Zielinski 1994(1), 1994(2), and 1997(7).

24 See, e.g., Eder 1932; Freund 1976 (1983); Haberkorn 1981; Gernsheim and Gernsheim 1969.

25 See Münsterberg 1916; Chanan 1980 (Chapter 4); and the excellent essay by Anderson and Anderson 1980. For a review of research findings in physiology, see Schmidt and Thews 1985, p. 296f.

26 Hoffmann and Junker 1982, p. 30.

27 For further reading on the history of the magic lantern, see Liesegang 1926 (trans., ed. Hermann Hecht 1986); Historisches Museum Frankfurt 1981; Hoffmann and Junker 1982; Lange-Fuchs 1987; and particularly the *Newsletter* and *The Optical Magic Lantern Journal* of The Magic Lantern Society of Great Britain which contain a wealth of reprints of historical materials. Amongst other things, the Society intensively cultivates the praxis of lantern exhibition performances. In Germany, the Institut für historische Projektionskunst at the Deutsches Filmmuseum Frankfurt has recently launched similar activities.

28 See Liesegang 1921, p. 11f.

29 Helmholtz 1868.

30 Cf. Schöffler 1898, and also Zielinski 1997(6) in this context.

31 For example, see Kapp 1877, who speaks of the 'general parallelisation of telegraph system and nervous system in science' and of 'nerves as cable arrangements', a metaphor which became very popular in the 1920s, e.g., in F. Kahn's studies in human physiology (1929), see Zielinski 1997 (1).

32 See, e.g., Klemm 1983, p. 173f; Schivelbusch 1983, p. 54f.

33 Springer 1988, p. 47.

34 See Barnes 1985, p. 6.

35 Cf. Eder 1892, who devotes an entire chapter to a host of these bizarre devices (pp. 577–591).

36 See Michel Baudson: 'Von der Kinematischen Darstellung zur vierten Dimension', in: Baudson 1985, p. 163.

37 See also the interpretation of Bacon's work by Schmied, op. cit. 1985, who connects Bacon's painting more closely with Muybridge, a view which I do not subscribe to.

38 In principle, Albert Londe's 9-lens camera and Le Prince's 16-lens camera follow the same concept of the successive exposures on separate plates or cadres.

39 I have devoted a separate article to a comparative study of the two E.J.M.s of serial photography: see Zielinski 1993(2).

40 Cited after Eder 1932, p. 701.

41 Cited after Muybridge 1901, foreword of the 1955 reprint, p. IX. For biographies and descriptions of the work of all three, see Eder 1892, pp. 449–591, and 1932, pp. 694–716; Gernsheim and Gernsheim 1969, pp. 434–446; for Muybridge, see especially Coe 1992, and Lesser 1988; for Marey, see Dagognet 1992, and Frizot 1984.

42 Abramson (1987, p. 13) calls Paul Nipkow's patent 'the master television patent', because for the first time, the systematic scanning of an image with a perforated disk was described as was used later in the experimental phase of television.

43 In the USA, a history has been devoted exclusively to celluloid film; see Friedel 1983.

44 See Thun 1939, p. 81; on the work of Anschütz as a whole, see Eder 1932, p. 718f., Liesegang 1910, p. 13f., and Rossell 1996.

45 Cited after Brownlow 1979, p. 28.

46 See Thun 1939, p. 80.

47 In his book, Jenkins gives an exact description of the arrangement and refers to the openings also as 'peep-sights'; Jenkins 1878; reprinted 1970, p. 37.

48 See Wallon 1922, p. 292f. For an exact and detailed description of the mechanism, see, e.g., Hopwood 1899, p. 95f.

49 Hopwood 1899 (reprinted 1970), p. 187.

50 Jenkins 1898 (reprinted 1970), p. 24.

51 Benjamin 1963, p. 88.

52 See Anderson and Ritchie 1959, p. 23f.

53 See Virilio 1986, and Kittler 1986. However, one should bear in mind with regard to this perspective that since the fourteenth century, there have been experiments with multiple-shot guns and revolving magazines, cf. Feldhaus 1914, pp. 404–406.

54 For a summary, see Strandh 1980, p. 61f.

55 Wendorff 1981, p. 55. In this connection, see also Zielinski 1995(1).

56 See, e.g., Wehler 1973, p. 147.

57 Mulvey 1986, p. 93f. See also Chanan 1980, p. 94, on the relationship of music hall and early film history.

58 Stein (1984) has published a collection of fascinating portraits, biographic reports, and contemporary accounts of American Vaudeville.

59 Marx 1867; English edition first published 1887; (1974) pp. 398 and 399. The character of Marx's argument is easily discernible in popular media discourse at the end of this century. The only difference is that the human subject is now declared to be an appendage of the mega-machine computer.

60 Cf. Fülöp-Miller 1928, particularly p. 274 ff; 'The scientific organisation of labour ... is a slogan of the movement which reveals the mechanisms to us. The groups from the machines and the factories educate us only in combination with machines.' (Gastev 1921, cited in Baumgarten 1924, p. 13.)

61 Müller 1987, p. 85.

62 In connection with cinema, see, e.g., Paech 1988, p. 116. For the whole context, see Schivelbusch 1977.

63 Volume 31, No. 4, p. 424, cited after Becker 1986, p. 116. For this whole context, see also Schivelbusch 1977.

64 Cited after Müller 1987, p. 85.

65 In this context, see my case study of Cesare Lombroso: Zielinski 1996.

66 The essay is contained in volume 7 of the German edition of Freud's *Collected Works*, London 1952.

67 Both citations after Freud 1974, p.15.

68 In the collection of picture series from Victorian England published by Household (1979), alcohol and its social effects is the most prominent theme. Of interest to the film historian are the impressive combinations of text and illustration structured as an ongoing narrative. Visually, these series belong to the category of *live models*, as the photographed scenes were really staged using (amateur) actors.

69 As cited in Schivelbusch 1980, p. 161.

70 After Household 1979, p. 10. The significance of alcoholism in Great Britain is frequently discussed in connection with the living conditions of the underprivileged. In this context, see the study by R.G. Rodger in: Teuteberg 1985.

71 See Fritz 1985, from which the advertising slogans are also taken.

72 See Walter 1988, Chapter 1, for a comprehensive account of the development of football in Germany.

73 See Glaser 1981, p. 159, and the essay by Wolf-Dieter Lützen in: Ruppert 1986, pp. 117–126.

74 See Barbey 1984.

75 Cited after C. Wischermann in: Teuteberg 1985, p. 169.

76 In addition to the works on the housing question already mentioned, see F.-J. Bruggemaier on working-class housing in: Ruppert 1986, pp. 117–126.

77 See Kluge 1983, p. 567.

78 Gerlach 1987, p. 393.

79 Sennett 1983 (1986), p. 189.

80 Cited after Strohmeyer 1980, p. 80.

81 Hauser 1953 (1975), p. 993.

82 For a detailed study, see Baudry 1980.

83 See Jossé 1984.

84 For a (still) fascinating account of their biographies, see Fülöp-Miller 1931.

85 Bottomore 1988, p. 200.

86 In this connection, see Kracauer 1947, p. 30.

87 H. Lehmann 1919, p. 83.

88 Liesegang 1910, p. 43.

89 Lange 1920, p. 43.

90 After Noack 1913, p. 3f.

91 Lange's monograph (1920) was his third work, after two others published in 1912 and 1918, and offers a broad and vivid summary.

92 Cited after Harms 1926, p. 61.

93 Cited after Baacke 1982, p. 23.

94 ibid, p. 30.

95 Cited after Harms 1926, p. 60ff.

96 See Payne 1952, p. 107ff.

Notes to Chapter 2

1 See *BBC Handbook* 1940, p. 53.

2 Fox 1986, who discusses in detail in this essay the connection I refer to here.

3 Cf. the summaries in the *BBC Handbooks* for 1929 (pp. 36–41) and 1940 (pp. 53–58).

4 Taken, in this order, from Ross 1961, p. 64a.

5 See in this connection the speeches by David Sarnoff 1935–36, in: *Television* 1936, Vol. I.

6 Basten, F.E.: *Glorious Technicolor*, London 1980; cited in Neale 1985, p. 154.

7 Cf. Prokop 1970, p. 75ff, and for the whole of this period, see Bächlin [1947] 1975, pp. 54–82.

8 Citation from a contemporary review; cited in Koshofer 1988, p. 89.

9 Kriegk 1943, p. 253.

10 ibid.

11 Cf. the statistics in SPIO 1955, p. 3.

12 Cf. Lehmann 1919, especially pp. 80–92.

13 Giedion 1948, 1982, 1987, p. 147.

14 'At that time, I was rather extreme Left Wing, and I wanted to fight the machine which was enslaving man instead of contributing to his happiness.' (Clair 1970, p. 9) In René Clair's fantastic film, a media artefact is even the centre of the film story: the gramophone record.

15 Moholy-Nagy 1974, pp. 12 and 16.

16 Cited in Siepmann 1977, p. 89; cf. also Riha 1977, p. 117f.

17 Weiss 1968, p. 12; the essay dates from 1955.

18 Dziga Vertov: Wir. Varianten eines Manifests, 1922. In: Vertov, op.cit. 1973, p. 8.

19 ibid, pp. 8–10.

20 Cited from 'The Council of Three', 10 April 1923, in: Albersmeier 1979, p. 28.

21 ibid., p. 34f.

22 Cf. the essay by Fargier 1988.

23 In this context, see Vertov's essay of 1929, 'Vom 'Kino-Auge' zum 'Radio-Auge'' (From 'Kino-eye' to 'Radio-eye'), in: Witte 1973, p. 88f. The citation is from Beilenhoff's filmography, in: Vertov 1973, p. 158.

24 For USA, see Abramson 1987, p. 46f; for England and France (in comparison to Germany), see Reiss and Zielinski 1976 and Zielinski 1986(2); for the history of radio in Germany, see Lerg 1980.

25 Citation from Ford, undated (1922), p. 89.

26 Cf. Zerrahn 1965.

27 Ehrenburg 1931, pp. 301f and 303.

28 Both citations are from the *Metallarbeiterzeitung*; cited in Weymar 1983, p. 24.

29 Weckerle 1928, p. 43.

30 Cf. Müller 1987, p. 84.

31 Friedel 1925, p. 174.

32 Cf. 'Radio für Alle', supplement to *Bildfunk und Fernsehen*, No. 2, 1929, p. 88f.

33 *Die Filmtechnik*, No. 11, 1925, p. 250.

34 *Der Deutsche Rundfunk*, Vol. 2, No. 40, 5 October 1924, p. 2289.

35 von Mihály 1923, 1926 (2), p. 195.

36 ibid. p. 194.

37 Moseley, undated (ca. 1952). A cogent analysis of Baird's work by Glyn Jones appeared in *New Scientist*, 10 December 1988, pp. 39–43.

38 Letter from Fritz Schröter to Karolus, dated 24.6.1928; cited in Riedel 1985, p. 37.

39 Cited in Egon Larsen: 'Fernseher in Sicht!' In: *Film und Volk*, vol. 2, no. 4, May 1929, p. 10f.

40 ibid, p. 11.

41 Cited from a facsimile in: Riedel 1985, p. 41.

42 See the reprint of *Film und Volk*, February 1928–March 1930, Cologne 1975.

43 See, for example, the many and varied ways of life and cultural areas presented in the compilation volume edited by Ruppert (1986).

44 Bertold Cohn in *Funkalmanach* 1930, p. 32.

45 Cf. particularly Stein 1984, Part 5 'Decline', p. 335f.

46 *Der Deutsche Rundfunk*, Vol. 8, No. 23, 6 June 1930, p. 4.

47 On the latter, see Filipschack 1987 and Zielinski 1981.

48 Cf. Rügner 1988, in particular p. 62f.

49 In: *Kunterbunt*, Berlin, October 1929, p. 10; cited in Jossé 1984, p. 259. In addition to this book, see the following titles on this seminal stage in the history of cinema: Allen and Gomery 1985, pp. 115–124; the early Ph.D. thesis by Strohm (undated); the essay by Gomery in: De Lauretis and Heath 1980, pp. 38–40; and the the contributions by Roy Armes on redefining the relationship between the auditory and the visual in cinema history.

50 *Der Deutsche Rundfunk*, Vol. 9, No. 35, 28 March 1931, p. 7.

51 Cf. the article of the same name by Albert Neuberger on the Alexanderson system in *Fernsehen*, Vol. 1, No 10, 1930, p. 460ff.

52 Kappelmayer 1936, p. 60.

53 *Der Deutsche Rundfunk*, Vol. 13, No. 22, 24 May 1935, p. 10.

54 *Fernsehen und Tonfilm*, Vol. 6, No. 2, April 1935, p. 15.

55 ibid, p. 14.

56 ibid, p. 15.

57 Blemmec 1935, p. 283f.

58 *Fernsehen – Zeitschrift für Technik und Kultur des gesamten elektrischen Fersehwesens*, Vol. 1, No. 4, 1930, p. 158.

59 For a detailed account of the intermediate film process, see Zielinski 1986(1), p. 62f.

60 From an article in *Der Deutsche Rundfunk*, Vol. 11, No. 38, 15 September 1933, p. 64.

61 For detailed accounts of Olympic Games television, see: *Fernsehen und Tonfilm*, Vol. 7, No. 8, 1936, p. 57f.; cf. also, e.g., Reiss 1979; Riedel 1985, p. 82f; and Goebel 1953, p. 356f.

62 Cf. the jubilee edition, 25 Jahre Fernseh GmbH, undated, p. 14. The joint-stock company became a public limited company in 1939; one by one, all the shareholders except Bosch got out, leaving the latter as the sole owner.

63 Brecht 1967, Vol. 18, p. 119.

64 For programme details, see Reiss 1979, Hempel 1969, Goebel 1953; for teleplays, see Hickethier 1989.

65 Cf. Goebel 1953, p. 383f.

66 In this context, see Flusser 1978.

67 For radio, see the synopsis in Knilli et al. 1979, particularly p. 212ff; for Harlan and JUD SÜSS, see titles by Zielinski listed in the bibliography and the author's co-projects with F. Knilli.

68 Cf. Peukert 1982, p. 231.

69 From Wilfried Bade's biography of the automobile: *Das Auto erobert die Welt*. Berlin 1938; cited in Reinecke 1986, p. 116.

70 Cited in Hickethier et al. 1974, p. 40.

71 Cf. Holzapfel 1962, particularly p. 40ff.

72 Both speeches are published in *Television*, Vol. 1, 1936; citation p. 19.

73 From a memorandum of the Reichspostministerium [German Post Office Department] dated 4 April 1938; cited in Reiss 1975, p. 87.

74 Cited in Reiss 1979, p. 86.

Notes to Chapter 3

1 Adorno 1998, p. 49. The 'Prologue to Television' was based on studies conducted by the author in 1952–1953 USA.

2 Cf. in this context the data in GG 1980 and Steinberg 1980.

3 See Warner Communications Inc.: WCI-Research. Annual Report. New York 1982, p. 15.

4 See Kubicek and Rolf 1985, particularly p. 20ff.

5 For details, see Oberliesen 1982, p. 253f.

6 *Telekommunikationsbericht* 1976, Preface p. III.

7 ibid. p. 1.

8 Cf. Teichert 1988, p. 15f.

9 See especially Winston 1985, p. 258f.

10 In this context, see Singer 1988.

11 J.W. von Goethe, *Faust*, Part One. Translated by Anna Swanwick. New York 1994, p. 5.

12 Grimme 1955, p. 63. For this period of German television, see also more detailed Zielinski 1993(1) and 1983(1).

13 For a detailed account, see Reiss 1979.

14 Cf. Koshofer 1988, p. 89ff, and Zielinski 1981, p. 32ff.

15 For the wording verbatim, see *Filmkurier*, 13 November 1940, p. 1f.

16 *Nationalsozialistische Rundfunk-Korrespondenz*, 18 September 1940, cited in Reiss 1979, p. 182.

17 All citations from Reiss 1979, p. 181.

18 *Reichsrundfunk*, January 1944, p. 206; cited in Reiss 1979, p. 189.

19 *Neuer Funk-Bote*, No. 49, 3 December 1939; cited in Riedel 1985, p. 98.

20 Citation in Goebel 1953, p. 375f.

21 *25 Jahre Fernseh GmbH* (undated), p. 12.

22 *Funkschau*, No. 5, 1974; cited in Riedel 1988, p. 26.

23 Riedel 1985, p. 101.

24 For details on both of these 'Trümmerfilme', see Zielinski 1979; citation p. 133.

25 Seyppel 1965, Chapter 17, unpaginated.

26 L. Erhard: *Deutsche Wirtschaftspolitik*, Düsseldorf/Vienna 1962, p. 221; cited in Schildt and Sywottek 1989, p. 27.

27 UNESCO 1953, particularly p. 12ff.

28 Cf. Tenbruck 1974, especially p. 291.

29 See Harlander and Fehl 1986, Document of the 'Erlass' p. 131f.

30 A. Andersch: 'Wintersende in einer fremden Stadt'. In: Kürbisch 1981, p. 22. See also in this connection Schildt 1988, p. 15.

31 Cf. Weymar 1983 and Kubisch and Janssen 1984, p. 46ff.

32 See the statistics cited in Holzapfel 1962, p. 156, the *Sozialstatistik des Bundes*, and Lenk 1982, p. 60.

33 See the statistics published by the Federal Government (Bonn 1976) and, e.g., cited in Eckert 1963.

34 Cf. Gabler 1956, p. 148.

35 Cited in Halpern 1959, p. 140ff.

36 Gabler 1956, p. 154.

37 ibid, p. 152 f.

38 In this context, see Hilger 1974.

39 Cf. Hickethier 1980, particularly p. 77ff.

40 For a detailed account of these developments, see *ARD-Jahrbuch* 1969, Hamburg 1969, p. 310f.

41 Cf. Holzer 1971, p. 208.

42 See the detailed statistics for these strikes in: *Arbeits- und Sozialstatistiken des Bundes*, Bonn 1976, unpaginated (pp. 3 and 4).

43 Elefanten Press publishers (Berlin) devoted one of their legendary picture/reading books to this extremely contradictory decade: *CheSchahShit – Die Sechziger Jahre zwischen Cocktail and Molotow*, EP60. Berlin 1984; for television, see my essay, 'Die Ferne der Nähe und die Nähe der Ferne', pp. 50–62, in this volume.

44 See Shamberg & Raindance Corporation 1971, Manual, p. 5.

45 Negt and Kluge 1972, p. 220.

46 This is the title of a book catalogue for a 1973 exhibition of the Berlin Neue Gesellschaft für Bildende Kunst.

47 Negt and Kluge 1972, p. 223f.

Notes to Chapter 4

1 Citation and statistics from Brand 1987, p. 231.

2 ibid, p. 229ff.

3 In *Japan*, Vol. 8, No. 4, 1985, p. 1ff.

4 Cf. *World Broadcast News*, March 1988, p. 12.

5 Cf. the statistics in Alvarado 1988; *Variety*, 17.2.1988, p. 166; and the 9th Annual Economic Report of the Bundesverband Video (BVV) [Federal German Video Association], Hamburg 1988.

6 Cf. the hierarchy in *Medien*, No. 4, 1988, p. 9.

7 Cited in Fritz 1985, p. 139.

8 Cited in Brand 1987, p. 77f.

9 Cf. Brand 1987, p. 78ff.

10 Cf. Hosokawa 1987, p. 16.

11 Cf. *New Scientist*, 26.5.1988, p. 9.

12 Cf. Kinder 1984; and more comprehensive, Kaplan 1987.

13 See in this context Neumann-Bechstein 1988.

14 ibid, p. 177.

15 Müller-Wichmann, 1984.

16 See, for example, Zimmermann 1988.

17 M. Jochimsen: 'Zeit zwischen Entgrenzung und Begrenzung der Bildenden Kunst heute'. In: Baudson 1985, p. 222.

18 ibid, p. 230.

19 For concretisation of this context, see Zielinski 1986(1).

20 For a detailed appraisal, see publications on the time-machine video recorder, most of which were written in the 1980s, and also, e.g., Cubitt 1988.

21 Anders 1956, 1980 (5), p. 97ff.

22 U. Eco: 'Die Zeit der Kunst'. In: Baudson 1985, p. 73.

23 See 'Statistiken vom Videomarkt'. In: *Der Ikarus*, (organ of the syndicate of video librarians of Germany), No. 8/9, 1988, p. 48.

24 See the leading article in *Variety*, Vol. 331, No. 10, 29.6.1988, pp. 1 and 68.

25 *Sowjetfilm*, No. 8/1988, p. 26f; see also No. 7/1988, p. 26f, with which the broad discussion on video in the USSR began; for an overview, see Kornilov 1988.

26 To take India as an example, see: 'An experiment in appropriate communication technology: The Chitrabani Magic Lantern'. In: *Development Communication* (Calcutta), No. 44, 1981, p. 1ff; on the relation of cinema to video, see Datt 1984 and Agrawal 1988.

27 For detailed studies on a variety of countries, see Reiss and Zielinski 1992.

28 Sennett 1983, p. 27.

29 *Film 1966*, the year book of the German journal *Film*, published the first extracts from the French original in which Metz expounded this theoretical discussion under the title, 'Theorie einer Sprache des Films' [Theory of a language of film], (p. 52ff). For the beginning of a broader discussion, see Knilli 1971a.

30 See Giles 1985, p. 14.

31 'Le dispositif' is the original title of one of the most important essays by J.-L. Baudry which initiated this new orientation (first published in *Communications*, No. 23, 1975). Cf. Hak Kyung Cha 1980 for an English translation.

32 First published in: *Communications*, No. 23, 1975, pp. 104–108.

33 All citations from the English translation of Roland Barthes, 'Upon Leaving the Movie Theater', by Bertrand Augst and Susan White in: Hak Kyung Cha 1980, op. cit., pp. 1–4.

34 For a precise and useful summary, see Flittermann-Lewis 1987, p. 179ff.

35 Barthes in: Hak Kyung Cha 1980, op. cit., p. 2.

36 Cited in Flittermann-Lewis 1987, p. 188. On the differentiation of the televisual from the cinematic, see, e.g., Heath and Skirrow 1977 and, particularly, Ellis 1982.

37 Cf. particularly Hoffmann-Nowotny 1988, p. 3.

38 See Bertram and Borrmann-Müller 1988, p. 14ff.

39 From the brochure 'Bessere Bildqualität im neuen Format' [higher quality picture in a new format] published by NDR, Hamburg, undated, unpaginated.

40 See also the special issue of the Austrian *Medienjournal* on High Definition Television, Salzburg 1992.

41 See Coppola 1980. This lecture text is the same with regard to content but the issues concerning us here are formulated more pointedly. In the following, my paraphrasing is based on Coppola's original text.

42 Cf. (also for citation) Costard and Ebert 1978, p. 631.

43 Brecht 1967, Vol. 16, p. 631.

44 See the production report in: *Sony Monitor. Aktuelle Nachrichten über Bildkommunikation und professionelle Audio-technik*, Vol. 3, June 1987, p. 1.

45 For more details in a condensed form on this whole topic, see the studies by Bickel 1988 and Pauschert 1988.

46 Serge Daney wrote a series of articles on his adventures as a zapper for *Libération*, which were published in book form in 1988: *Le salaire du zappeur*. See also the interview in *Cahiers du Cinéma*, No 406, April 1988, p. 53ff.

47 Cf. Thomas David Boehm's essay 'Pleasures and Treasures' (in: Zielinski 1983(2), p. 29ff) to which I owe the idea for the Multiple-Choice Diagram illustrated here.

48 Cf. S. Smith: 'Computer-based tutorials take off'. In: *Nature*, Vol. 333, May 26, 1988, p. 379.

49 See *Probleme der Filmanalyse* 1986, particularly the lecture texts by H. Korte and G. Giesenfeld. Cf. Kluge 1985, especially p. 52ff.

50 McLuhan 1974, p. 57.

51 Cf. Kluge 1985, particularly p. 52ff.

Notes to Conclusions

1 This multi-part electronic work by Godard is being made for the French Pay-TV channel Canal plus. He began it in 1988–89 and parts appeared at irregular intervals throughout the 1990s. To date, eight parts have appeared. See, e.g., Temple 1998; Zielinski 1991(2) and 1997(9).

2 Cited in: *Art in America*, November 1991, p. 108.

3 Einstein and Infeld 1938, pp. 157–158.

4 'Der Körper gleicht einer Uhr..' [The body is like a clock]. La Mettrie in: *L'homme machine* (1748); German translation: *Der Mensch als Maschine*, Nürnberg 1985, p. 78.

5 A further reference to Godard's 'Histoire(s)', from Part 1A, 'All the Stories'.

6 Cf. Zielinski 1997 (2).

7 Following an idea in Deleuze/Guattari 1992.

8 Cf. Kawaguchi 1994.

9 Giedion 1987 (1948), p. 770.

10 Kluge 1985, p. 125.

11 Negt and Kluge 1981, p. 339.

12 For further details about 'Steps', see Zielinski 1990(3), and 1991(1), p. 360ff.

13 See Krieg 1992, p. 14ff.

14 Cf. Fleischmann and Schwabe 1995, and Hoch 1997.

15 See the interview with Sinclair and Petit in: *Vertigo*, Autumn 1997, pp. 31–34.

16 For obvious reasons, I concentrate in this section on examples of work from the Academy of Media Arts in Cologne.

17 See Zielinski 1997 (8)

18 For a sociological account of this process, see the excellent essay by Lazzarato 1996.

19 Lévy 1997.

20 See particularly Lazzarato 1996.

21 For a description of the group's work, see also their interview with H.U. Reck in: Lab 1996.

22 This is a reference to Harun Farocki's film WIE MAN SIEHT (1986).

23 These works were exhibited in 1997 in the Strasbourg gallery of the Academy, 'La Chaufferie'.

23 Fludd 1617.

24 On the primary identity of the computer as a text machine, see also Winkler 1997.

25 Borges 1974.

26 See the essay of the same title by Mirage in: Lab 1996/97, pp. 262–276.

27 Debord 1992, p. 62.

28 Debord 1978, item 14, p. 9.

29 In: Ctheory – Theory, Technology, and Culture, vol. 19, Nos. 1–2.

30 Cf. Williams 1974 and 1984.

31 In this context, see the monographs on Irit Batsry (1994) and David Larcher (undated), *chimaera* No. 6, published by the Centre International de Création Vidéo Montbéliard Belfort.

32 See Lazzarato 1996, especially p. 141.

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