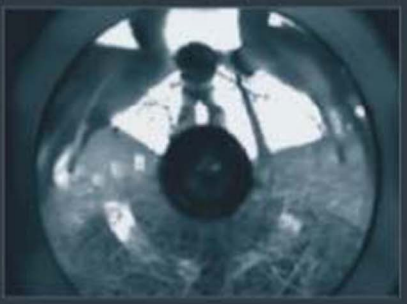
VIDEO THE REFLEXIVE MEDIUM



YVONNE SPIELMANN

Video

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Video

The Reflexive Medium

Yvonne Spielmann

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Contents

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Video

Introduction: The Audiovisual Medium

Video is an electronic medium. This means its origin depends on the electronic transfer of signals. Video consists of signals that are kept in constant movement. Video signals are generated inside a camera and can circulate between recording and reproduction equipment (closed circuit). They can be variously modified by processors and keyers and transmitted both auditively and visually. Video is the first truly audiovisual medium that, in contrast to film, does not generate images as a unit and does not display the materiality of a film strip, which makes use of one track for image and one for sound. Thus differentiated, the electronic signal processing realizes—in recording, transmitting, and projecting—unstable states of pictoriality, which are variable in terms of their scale, form, directionality, and dimensionality. In addition, the audiovisual idiosyncracy of video consists in the fact that sound signals, which may have been generated by an audio synthesizer, are transformed into image signals so that audio signals govern the way video looks and, vice versa, the information contained in the video signals can be broadcast visually and audibly at the same time. The way the electronic signals are processed and transformed alternately into audio and video denotes the media-technical conditions for realizing a medium, whose forms of display derive directly from these electronic signal processes.

The simultaneity of recording and reproduction differentiates video from the photochemical recording media, photography, and film, though video does equally possess optical recording technology. The optical recording of light, however, does not represent the only form of realizing video: the video signal, in contrast to the external input, can also be generated internally, in the devices themselves. There exist in video various possibilities for signal input before recording—for example, the signal output of one device can be used as the signal input for another device. More important, however, video can simply consist of signal processes, which are generated in the devices (for example, synthesizers) without any recording. Such basic forms of video demonstrate that there can be no

particular place and no fixed dispositive sequence for the generation, transmission, and display of electronic representations of visuality. Instead, video contains multiple audiovisual possibilities for transforming audio and visual signals.

Video first appeared as a technological development in the mid-1960s with the technical introduction of the portapak videocamera. Initially, video possessed only image-recording technology; from 1969, it also had videotape and, from 1971, replay and rewind capacity. In the early phase of the medium, the ability to conduct experiments in closed-circuit techniques was decisive, because no tape recording is required for the synchronic or time-shifted signal transmission from the camera to the monitor (or from camera to camera). These early experiments with circulating video signals (feedback), time delay, and recursive loops (delayed feedback) were carried out live and had to be filmed with a film camera from the screens onto which these experiments were projected if the procedures were to be preserved. Significant extensions of the "live feedback" techniques have resulted from the development of processors, synthesizers, and keyers. Modulations of the electronic signal concern primarily the manipulation of electronic voltage and frequency and produce various audio and video effects in the devices (analog image processor, synthesizer, and analog computer), which cannot be automatically recorded but are "filmed" with an external camera and are stored on videotape. This is also necessary in the development phase of video, to document the various electronic procedures in the audiovisual medium and be able to repeat the experiments with signal processors.

In this phase of experimenting with electronic signals, which are transformed (*audio* and *video*) and synthesized but can also be variably composed with processors and analog computers thanks to the electronic voltage, building blocks with a programming function and capacity for storage represent an integrated step in development, which bears out the close connection between switching and programming, that is, of video and computers. The first digital devices, which have numerical functions and work with algorithms, could not, by contrast, be employed for the processing of electronic image information before the end of the 1970s.

This outline of the technical preconditions and particular media-related qualities, which are fundamental in the origins of audiovisual medium video and in the development of its characteristics of immediate presence, touches, from a media-historical perspective, above all on questions of how the relationship between technology and medium is determined. As with the introduction of every new medium, video encompasses a process of development from a technical novelty to the formation of media-specific forms of expression, which reflect the basic technical conditions governing the apparatus aesthetically and, finally, culminate in the cultural connotations of a new medium, which can assert its singularity in setting itself apart from other media. This development sets in with the intermedial interactions with such media as define the historical context of the medium's origins and set out the framework for a structural comparability of the electronic with other media imagery on both a synchronic and a diachronic level.

In the structure of media relations, video makes its entrance with the introduction of a new technology, which has technical characteristics of transmission and presence in common with television. In the technical development of the media, the electronic medium assumes a prominent position because, beginning with satellite television, its technology of direct transmission delivers the real-world precondition for a globally networked transfer of audiovisual information and communication in real time. Building on that development, the technical conditions for the generation of aesthetic forms of expression in video also free up—in the applications with processors, synthesizers, and analog computers—those very principles in which the specific forms of other technical image media either persevere or are transformed.

Video shares with television the basic characteristic that fluid forms of imagery arise through its signal-transmission technology. In a simple technical assembly with a camera and a monitor, information carried by light is registered by the cathode ray and translated into video signals that are transmitted to a screen radiating the electronic signal. In these two processes of registering and reproducing, the electronic signal, which contains the video information, is continuously written in scan lines. This process of writing the video information in lines from left to right requires a horizontal line shift at the end of every line and a vertical line shift from the first to the last line. The ongoing process of writing generates television and video images, respectively, by bringing the flow of electronic information into a form (a horizontally and vertically established structure of lines) and by broadcasting in standardized formats (like PAL and NTSC). With that, the signal path is also standardized, from left to right and from above to below, as this order corresponds to the writing and reading process in Western cultures. The information necessary for synchronizing the lines is codified in the video signal itself so that electronic pictorial forms can arise as a standardized image format establishes itself.

In comparing media, it becomes obvious that video is not only related structurally to the parallel medium of television but also shares the automatic registering of rays of light onto a surface with the historically precedent, analog recording medium, film. This happens, on the one hand, in the photochemical fixing of shadows on the light-sensitive surface of the filmstrip and the production of the light image and, on the other, in the electromagnetic sampling of the light and shadow information penetrating from outside in the interior of the video camera, where the transformation of the "light/image surface" which occurs as a signal is inscribed in lines, contains the video information and transmits it.

In contrast to the projection of transparent light images from film onto a screen, which are present in a successive order on the filmstrip and only convey the impression of continuity and movement through the process of reproduction, the video signal "written" in the camera through scanning with the cathode ray tube is transmitted in a conventional setup of camera and monitor simultaneously over a distance—that is, constructed (camera) and reconstructed (monitor) at the same time. Electronic signals are sampled, or scanned synchronously in the camera (recording technology) and on the screen/monitor.[1] Strictly

speaking, this process does not produce a coherent type of image in the established sense but a linearity interrupted by the horizontal and vertical line shifts caused by the writing of scan lines, which are synchronized according to format.

The process of simultaneous production (construction) and reproduction (reconstruction) of electronic pictoriality in media technology signifies a break in media history, to the extent that a technological step in the development of time-based media has appeared with video and television, which diverges from photography and film as it is based on processuality and, therefore, evokes another concept of imagery. That is, even if compatible characteristics of recording can be discerned in both of the analog media—film and video—a relevant material difference in the status of the technical images remains. The electronically recorded "image," which is then transferred to a display medium and mostly projected onto a screen, deserves this designation only on condition that the continuous flow of the signals, through which an electronic image can be evoked, is kept in mind. In tune with its unstable and incoherent character and in the interest of precision, I, therefore, suggest separating the transformative characteristics of video anchored in the signal processes conceptually from the entity of the image limited in space/time, perhaps as "tableau," surround, or "frame."

I understand video in the following discourse as "transformation imagery." Whereas for photography and also for film the single image or a sequence of framed single images is what matters, video distinguishes itself by the fact that the transitions between images are central and, even more so, that these transitions are always explicitly reflected and tested in new processes. My suggestion about considering a transformation image in the discussion of video begins with the description of the procedural production processes of electronic pictoriality. These comprehend processes of reconciliation, shifting backward and forward, and transfigurations, which include reversibility. Transformation, therefore, connotes flexible, unstable, nonfixed forms of the image. These I shall term "pictoriality."

This categorization will, then, also be assumed in the further course of the discussion, when I will occasionally cite the video image and the electronic image for reasons of simplified language use. It will be shown that video does not just remove the cinematographic passage from frame to frame, even if not actually negating it. Rather, video is structured so that it also has the possibility, in presenting fluid pictoriality, to make contextually visible the transitions from the single unit of the image to pictoriality. In this way, video can, in the development of the technology into a medium, employ figurative forms of expression from preceding pictorial media. The connection between video and computers also proves itself particularly relevant here for the deployment of the electronic vocabulary: the more use is made of programming functions in electronic manipulation, the more comprehensively can preceding pictorial forms be technically manipulated in all possible ways, which means technically simulated under computing specifications. The particular nature of electronic media images will also, therefore, be designated in what follows with

the descriptive category of a transformation image, because that denotes the transition to the digital simulation image.

In the development of the media, structural phenomena common to video and computers can be initially recognized on the analog level, and they become particularly conspicuous when the electronic manipulation of the "image" displays the processes of generating transformation imagery. In such attempts at self-reflexivity, in which the reflexive character of construction and reconstruction are displayed, for example, in feedback, the reflexive structure of the new medium comes to be seen as bound to the direct presence of pictoriality at the place where the image is generated. This reflexive characteristic of the medium video comes close to digital technology, because, whereas video distinguishes itself through the direct presence and new possibilities of multiple image formation, the contribution of computers consists in challenging the physical characteristics of the medium and overcoming the optical laws governing the image. Unlike the recording media linked to the principle of the camera obscura—paradigmatically photography and film—digital technology can use the potential from constructing unlimited variability, which allows it in the digital mode of presentation to express pictoriality through unrestricted flexibility in the digitally constructed space. Because of this possibility, pictoriality is now realizable as simulation in all directions and dimensions, and in computer simulation it achieves the technical preconditions of multidimensionally and of omnidirectionally unlimited transformation imagery.

In determining the characteristics of technical transformation imagery, the position of video is central: on the one hand, the electronic medium rests on analog recording technology, yet it establishes, on the other, the essential features common to electronic and digital media in processuality and transformativity through flexible forms of audiovisuality. In this respect, the electronic principle of the processual image type finds a way forward and a dimensional enlargement in the more highly complex digital image type. In the enlargement of electronic processuality, the operation of calculating in a binary mode on an algorithmic basis adds unlimited possibilities for connection and for exchange relations in its elements. At the digital level, transformativity merges with modular media connections, which exist under the rubric of numerical simulation and include particularly the treatment of space, reversibility, and negation. In the digital mode, the limit is reached to the physicality of an image type, which exists on a material basis and correspondingly in determinations of frame and format, and video represents an important building block in this accumulative process.

As a reality principle for video, audiovisuality indicates a technical level of the electronic image and sound processing in which the reversibility of audio and video denotes the mechanical operation of individual elements. Therefore, the fundamental transformational character of the electronic medium also comes close to computers, with reference to procedural structures, because mechanical operations in both media transform individual

elements into different states. With both media, the electronic signal process and the digital coding, individual elements can be, at the same time, shaped differently. The coding of information, as this already appears in the electronic signal process, allows government and oversight of individual procedural steps and sets up presentational forms of visuality, which denotes various—electronically written or digitally programmed—states that do not express an image as end point of an operation but, rather, forms of the potential for pictoriality in process.

In this respect, video can be understood as a medium that develops in both its dimensions and direction differently from preceding pictorial media and produces transformative forms of pictoriality, but no images. This is why video already produces, both inter- and intramedially, the dialogue between an image type, which originates, on the one hand, in the fixed inscription into a surface and, on the other, in a processual image type, which lets the passage from analog to digital emerge in electronic transformativity. This difference from other analog media also explains the basis on which video, with its media-specific features of processuality and transformativity, is effectively predestined to play a decisive role in the intermedial context of computers' development—and of the more complex hypermedia.

When surveying video practice since the late 1960s and early 1970s, three different main strands of the technical/aesthetic engagement with video stand out. One direction includes videotapes and installations, which bring the institution and the format of television or video and art into relation with one other and address, above all, a pictorial critique of the media and their institutions. Video works—which primarily concern the sequential ordering and structural differences of image, text, sound, music, and so on—form a further direction. Instead, these are intended to create transitions to nonsequential hypermedia as well as interactive media and even further forms of virtualization. To the extent the characteristics of video become formative features in a hypermedial order, filmic-videographic forms of image, which exist in linear stipulations, can also become a component in an image structure capable of sequential combination. In this context the experiments figure with linkages and transformations of electronic image and sound signals, which use the processual structure of video as medium to modify individual elements permanently. Finally, work on the difference between analog camera images and digital computer images leads in the third direction to visions of a technological pictoriality, which open up new sculptural dimensions in the synthesis of the image. For instance, this happens when parallel yet differing treatments of individual segments, like enlargement and reduction, are undertaken. These works also make clear the position of video in ongoing differentiations, in which video as medium is pushed to its limits.

From this media-historical context of the overlap between media forms, which are based on differing technical preconditions, there arise overarching questions about determining the dialogic relations of technology and aesthetics when placing video in media

theory. As the main directions of video practice make clear, the technological development behind the emergence, transmission, and presentation of video forms is marked by what can be called "media-specific" characteristics and arise in the confrontation with related media forms and in the delimiting reference to the technical preconditions of their functions. In particular, the references to the film and television media, but also art forms such as performance and happening, have been variously incorporated into videographic experiments to establish the particular capacities of video through comparison of media. Whereas one tendency in image technology works more intensively on the technology's possibilities, which result from audiovisuality and deviates from its previous possibilities, a further tendency tests the representative forms of video in performative experiments with different setups that stress the live character of the medium and demonstrate video's multiple display practices in various constellations of the apparatus.

From this, the need arises for the media-theoretical discourse in the electronic media to establish common factors and differences between video and relevant reference media in a reconstructive discussion of videographic practice. This also becomes necessary if we are to understand how aesthetic constructs derive from the specific possibilities for generating, manipulating, and presenting video and from the developments in an electronic vocabulary building on them. To do justice, in technical and aesthetic respects, to the intermedial interactions among the media film, video, and computers, all of which contribute fundamentally to the development of video as an independent medium, the transitions primarily figure as what is significant in media-theoretical perspectives. It is, therefore, a question of contextually framing the structural relations and differences in the media so that, from these peripheries, we are able to define the main aspects of video's specific identity as a medium so that technical changes in the medium are also noted. In the center of the media-theoretical discussion, therefore stand the reflexive processes that share in the construction, or reconstruction, of videographics in and with video and can make the specifics of the audiovisual media forms visible in various procedures. The technical basis of audiovisuality forms the point of departure for this discussion of the specificity of video as a medium.

On the basis of the technically determined nature of the image in video, media-specific characteristics evolve in the aesthetic articulation and differentiation of an electronic vocabulary—in conjunction with additional devices such as processors and synthesizers—characteristics that, however, more firmly separate video among the analog media as a field of reference from the visual media of photography and film and emphasize the genuinely audiovisual character of video. In the media context, digital options, therefore, also come to the fore in the unfolding of media-specific parameters. In light of the prevailing technical difference, the bridging function of video rests above all on two facts: the open, dispositive structure and the nonprescriptive quantity and arranging of the devices involved and the fundamental audiovisuality of the medium.[2]

Under a medium's audiovisuality, a merely additive process (sound plus image) should not be understood. Instead, it should suggest the possibility of an intramedial transformation between both forms of expression. In addition, video should be differentiated from film in this respect, as far as media technology goes. Unlike the necessary separation of image and sound in film, where image and film operate together multimedially in the reproduction of a sound film, the general interchangeability of optical and acoustic signals indicates something else—in fact, the common technical basis of the electronic image and sound elements. Audiovisuality means here nothing other than the real-world circumstance under which the electronic signal can be emitted and processed both aurally and visually, something that includes the reversibility of audio and video in both states. Even if film, on its technical principle, can be generated without a camera (by scratching, painting, and treating the filmstrip chemically, etc.), the medium cannot dispense with its material basis. By contrast, video can manage completely without videotape, and even the video recorder does not represent a necessary condition for its realization as a medium.

Seen technically, the raw material of the audiovisual medium consists of noise, which here denotes the condition of electronic signals, generated as both audio and video signals. The descriptive category of noise stresses the fact that video, considered precisely, does not present image and sound (like film) but instead forms of expression from both these signal states. Audio and video are interconnected noises with which the video signal can selectively produce the electronic noise aurally/auditively and visually. From the definition of the audiovisual qualities, it follows, in terms of categorization, that video in its radical media form has to be actually allotted to the category of noise rather than to a consistent type of image. In other words, electronic noise can also be moved horizontally and multiplied into a spatial object—different from a "fixed" moving image as in film—by means of feedback and delay. It is possible to vary the information carried by noise, which defines the "content" of an image field horizontally and vertically by use of scan processors so the image field seems to separate from the surrounding surface of the image, which is itself defined by the standardized image format. In this way, there arises a visible difference between image format and image field that allows the transformation of the image surface through processors, bending the image field and separating it as a freely moving object from the frame's limitations. This form of relation represents a condition for video's real existence, which also finds expression in the fact that the information in this video input can be represented as much visually as auditively. Information of the image field deviates from the image format; we see and hear how lines are bent and spacing between image lines is changed.

From this perspective, one must recognize that video represents a genuinely audiovisual medium, unlike silent film, to which sound film was added decades later. It is only on this basis of audiovisual technology that further technical developments in the equipment first become comprehensible, allowing the specifics of video to be made clear in an electronic vocabulary and in contrast to other media languages—for instance, film and television. In

the light of the concomitant differentiation in video genres, however, it should be remembered that such divisions do not generally apply to the experimental sphere. There, ever since its early phases, the reflexive character of video continues to inscribe itself prominently in that it combines various technical apparatuses and media in such a way that the result is a performance of video, in which the audio-visual medium is made structurally discernable in its components. The performative capacity of the medium video becomes obvious when the formation of electronic pictoriality comes about in competition or in parallel with digital image types.

The self-reflexivity of the apparatus and the development of an electronic vocabulary occupy the foreground, particularly in the experimental directions, which also extend video as a medium toward installation and into a sculptural dimension. For the early phase of the medium, dividing it into genres like videotape and video installation, video performance and video sculpture has little meaning and scarcely contributes to determining the specifics of video. As the governing criterion for investigating video-specific characteristics, circumstances need to be established concerning what facet of the media exploration and intervention with the new technology emerges from. From this perspective, dialogic, intramedial connections in the area of video, which are guided by the reflexive interest in the medium, must be separated from similarly situated fusions that should be located in the realm of performance, theater, and television and later in the interactive media. This is because there the potential of video is coopted in the interests of presenting other medial and intermedial problems—prominently, for instance, in the electronic film/videofilm of Jean-Luc Godard, who restructures the *Histoire(s) du cinéma* (1988–1998) in an electronic bricolage of his own imagery.

By way of comparison for the purposes of the present discussion of the video medium, those initiatives in video practice in which the application of electronic media[3] relates self-reflexively to the media formats chosen should be highlighted, for example, performance and installation. This also applies to the replicable intention of bringing forward the aesthetic formal language of video and its multiple expressive modalities and syntactic linkages for consideration.

Because these factors include particularly experiments in combining various devices (in the 1970s predominantly synthesizer and analog computer), there is no question of a uniform, dispositive structure.[4] A systematic model of the dispositive order of seeing comparable to cinematography (and the perspectival construction of the Renaissance) cannot succeed, because video does not establish any location for showing comparable to cinema. The modular mode of presentation of video structurally opposes such an institutional presentation from the beginning. It is also not possible to proceed from a dispositive structure of seeing because video—as in its difference from the system of perspectival construction, for instance—produces no systematic connection between the deployment of the equipment and the dispositive models for the construction of visibility (something that would have to imply the relational address of an observer subject).

Video deviates from such closed media systems, with their dispositive adjustments. It is of less use in the imaginary homogenization of the difference between seeing and what is seen than for reflexively making visible the visual construction of heterotopic possibilities of the apparatus's manifestations, which also include audiovisual transformativity as an index of an open, nonfixed systematic structure in the plurality of the equipment's spatial relations.[5] This applies all the more when various technical devices are connected together in numerous early experimental arrays, which generate electronic image and sound signals partially without camera input. Video can also be demonstrated in conducting a performance and in externally recording effects.

Because the self-reflexive structure inscribed in medial presence—where that structure emerges in the generation of pictoriality on screen as a result of construction and reconstruction of signal scanning—plays a particular role here, it simultaneously permits the presentation of transformative pictoriality in the analog medium as a bridge to the computer medium. As the possibilities of what can be displayed of the visual in videographic signal processes multiply, the location of video can finally be defined like this: video is the predestined medium of figuration, in which elements of analog and digitally coded pictoriality can be made visible in an ambivalent relationship. The ambivalence inherent in the video medium also emerges in the audiovisual quality of transformation, from which it follows that the exhaustive realization of video as transformative medium can offer an anticipatory grasp of the digital quality of simulation. In the final analysis, video marks this boundary between the media in such a transition. Electronic media images can, then, be allotted to the digital category of simulation images to the extent that video reflexively displays this passage from analog to digital. This weighting of transformative and similar components in video depends finally on how far the related devices and technologies possess a programming function.

In light of video's noisy quality, its audiovisuality and performance, the concept of the image, as it predominates in the discussion of video within media and art history, is insufficient. Within this context, video is demonstrated as a surface image that is generated on—or, more technically precise, in—the surface of a screen and possesses no dimension of depth.[6] Even if video does belong to the time-based, linear media, the decisive difference lies in its potential for dimensional extension arising from the circumstance of its source in noise. Furthermore, because video enjoys nonfixity, it cannot be allotted to either a particular mode of display like the monitor image or a carrier medium like the video recorder, video disk, etc. Here the observation could be introduced that the way video is realized conventionally expresses mainly a surface image, which satisfies these specifications. That, however, does not permit any conclusions on the medial preconditioning of video in reality, because it principally enables multidimensional and multimodal statements, even if these are often not exhausted in the aesthetic applications.

The confusion of media characteristics and applications should, however, also be avoided at another point, where possibilities for intervention located in the use of the

video recorder are hypothesized with widespread medial attributes, which aim to demonstrate the particular suitability of video for the production and reception conditions of alternative programs. Without wanting to discount the political dimension of an intervention in program structures, this is, however, precisely what is not meant when the question is taken to be about the precondition of the realization of the medium and not merely about what makes a variant valid. The possible applications of video recorders document a cultural use of video but not any premises for its media specificity.

By contrast, precisely understanding its structural openness as an apparatus is fundamental to denoting the specifics of the video medium. Here the plural forms of video in no way stand opposed to a media specificity but, instead, bring this out precisely in the difference from the specifics of other media, especially closely related ones such as television, computers, and film. The apparent pluralization of media forms and the contextually significant recognition that technological developments manifest themselves in various media—so that video and television have basic characteristics of signal transfer in common—do, however, lead in the recent debate on art and aesthetics to misunderstandings in assessing media specificity, above all, when discursive differences between technology and a medium and between a medium and its forms of representation are omitted.[7]

On the one hand, it is a question of noting how the relations between the technological premises and the medial forms of expressions attendant on the emergence of new media change in their dynamic and in stages when competitively confronting related technologies and already existing media. On the other hand, intermedial processes and open, not yet completed forms of video's appearance (including the coupling of devices) affirm a dynamic and potentially expandable capacity for display in video's specifically audiovisual characteristics of transformation. They verify video's specificity in such a way that a dynamic concept of media is necessary to grasp the technological and medial structural features in the processes of emergence or development in comparison with other characteristics of media. A medium also does not appear as pure technology, but always in culturally semiotic forms of expression that not only communicates the particular, specifically technological characteristics but also generates those features, which a particular medium has in common with other media. It follows that the difference between the technological manipulation of signal processes in video (its technical self-reflexion) and its media-specific modes of appearance (in the format of the video image) must be drawn more precisely.

Accompanying the evolution of the video medium from the technological setting, there also figures a progressive reappraisal of those structural networks of relations, which constitute relevant intermedial contexts for new developments between the media. As the process of development in point of media specificity demonstrates clearly, homologies in the analog media prove to be, in the end, less compelling for the media-cultural siting of the electronic medium than the immediately definable analogies in the structure of technically distinct analog and digital media, which cannot be applied without regard to

structural models. Such analogies in the structure appear above all in tackling problems when displaying processual-transformative phenomena. They are manifest when commonalities obtain between the media in ways of proceeding and reflecting themselves.

Proceeding from this basic assumption, interest in computers represents a necessary technical step in the development of automated electronic processes, in relation to both the developing of plug-in devices with switches and the first analog computer with a programming function. With such experiments, the creative potential resides partially in the machine and its functions of switching or programming, to the effect that with the changed sphere of pictoriality and of audiovisual vocabulary the level of creativity also has to be newly defined (among other things, with regard to the subsequent human-machine interaction in virtualization). In light of the early structural connection between video and computers, it seems justifiable both to grant the electronic medium coding and programming functions and to follow, in this respect, the language use of the video technicians of the time. When stressing homologies, however, the technological difference between analog and digital technologies must be borne in mind, as the programming on an algorithmic basis shifts the potential of electronic transformation into the limitless possibilities of merged conjunctions.

To an extent, the close meshing of technological and media-theoretical language use is significant for the analysis of video in the context of this book, because the formal characteristics of the video medium's structure are subject to debate here. It is a question of a media form, which owes its specificity both to technical-technological criteria and to a cultural-semiotic vocabulary, that expresses this technology in audiovisual forms and plural dispositive structures. For the discussion of the aesthetic dimension of video, the conclusion that the presentation format of video cannot represent a sufficient selection criterion for defining media specificity arises from its structure's technological premise. At the center of this investigation stand those reflexive processes needing clarification, which share both in and with video the construction, or reconstruction, of videography and can make visible the specifics of the audiovisual media form in various aesthetic processes.

This investigation necessarily requires a reconstructive method of producing video that not only explores the possibility of structural similarities (homologies) in the closely related analog field of comparison but also includes it more intensively in the relationship of video and computers. The elucidatory benefit results, on the one hand, from the discoveries of early video praxis, which, in its experimental initiatives in media, seeks to test the connective possibilities of conventional video technology and the multiple switching and programming devices. On the other hand, this direction no longer contents itself with the devices variously available on the market but much rather develops—where necessary—its own types of devices, such as video synthesizers and image processors, in close cooperation with engineers, television technicians, and programmers. To this practice also belongs the application of technical devices that are developed for other purposes, at any rate not

specifically for video, and contribute to the production of an abstract electronic vocabulary when used with video. In this case, the fundamental manipulative character of the electronic image type suggests an interdependence of machine and medium. This displays itself particularly in the guidance and monitoring of signal processes and leads to computers and their storage capacity as the next step in development.

With a view to the historical steps in the development of a differentiated concept of the electronic technology of the video medium, this book concentrates on genealogically representative works. The discussion devotes attention to the spectrum of video activity once more expanding in the past decade, but only to the extent that the analysis of such recent works can furnish evidence for aesthetic strategies that penetrate other areas of the media from the perspective of the video medium. It is important to ascertain whether the media-cultural dimension of video is enforced more intensively along with border phenomena in the medium. From another perspective, the application of video in digital media, virtual reality, and net-based work does not come in for debate, because no confrontation with the specifics of video that would contribute to the further development of the medium is intended here. The adaptation of video for mixed areas of the media such as virtual, augmented, and mixed reality comes about to solve problems in displaying movement in digitally constructed space. In these areas, less work takes place in developing the basic characteristics of video as medium.

The finding that there is strong interest in the video medium, just as always in the area of the application of new, primarily interactive and net-based media, as well as in the international art scene, will be taken as point of departure for the argument that video, like every other medium, transits various stages of evolution, articulating and establishing its specificity as a medium in the course of its technological, cultural, and institutional development. It is astonishing that the debate on media theory has simultaneously declared more or less unanimously that video is obsolete by virtue of digitization. For all that, video has long since developed into an aesthetically differentiated medium with its own vocabulary and electronic syntax, which has meanwhile come to represent the reference medium for subsequent experiments in audiovisual and digital media. For this reason, even if video does not display a uniform dispositive structure or a media system comparable to the cinematic institution or the institution of television and does not, therefore, possess a site that combines social, psychological, and economic mechanisms, it does provide a systematic contribution to the pluralization of media. The realization that video is not further developed as video elsewhere in media systems should surprise no one: neither the adaptation of videographic techniques in film (electronic film) nor the newly formulated interest in the art and museum context for what are, as a rule, narratively motivated video installations are primarily oriented toward an explorative and exhaustive realization of electronic forms. Beyond that, video gains access to the emergence of aesthetic forms of expression in digital media, above all in such constructions as mixed reality and augmented reality, where physical reality merges with digital reality in new spatial environments.

Video's particular significance becomes obvious as soon as one explores problems in virtualization, which points especially to the technology of visualization of processually governable elements. Such test arrays for simulating visual movement in real time are certainly close to the electronic means of constructing pictoriality with respect to the process of presenting a dynamic in time and space and are also labeled with the appropriate descriptive categories (see, for instance, the implantation of video in cyberspace). But different from the expansion of electronic vocabulary through computer technology in interactive, immersive realities, video forms, by contrast, an important building block in the medial environment of alternative undertakings. That is because they take possession of video to enrich virtual reality. That such is the case cannot reduce the significance of video in the electronic media. On the contrary, the way video demonstrably influences the "new" media more widely reinforces the thesis that the conceptually intermedial references to video in interactive and virtual media do recursively stress precisely the independence of the fundamental reference medium in retrospect.

Inquiring into video's specificity, therefore, presents neither a purely historical account nor a debate that has, in fact, grown superfluous. This impression could arise because a conceptual shift is happening away from video art to media art and more generally from the denomination video toward the designation "new media." Almost completely overlooked is the genealogy of the specific media, which have been foremost in building an independent media language before they could become appropriate elements of a renewed application of the media and of digital processing, with which the separation between the media is removed and loses its relevance on common technical basis in simulation.

This discursive shift remains generally media unspecific and is, without any wider genealogical reflection, supported by the notion of complying with a fundamental merging of the media in the age of digitalization and globalization. This presupposes, however, an understanding of the singularity of the media as media specificity, because, without the assumption of media specificity, the discourse on a "media-integrating machine," like computers, the particular nature of which consists precisely in removing the separation of the media, ensues tautologically.

What drops out of sight in the debate is how the significance of this difference is denoted. Merely studying the historical development of the multiplicity of media forms, however, allows differentiation between the connections on a "new," simultaneous, and, therefore, digital media level and the linkages to date technically possible in the analog process. In this context, the particular significance of video inside the spectrum of analog and digital media and their merged interrelations should also be clarified. Only where differences and commonalities in the development of the media are made contextually understandable can the specificity of the respective new medium be determined, regardless of whether it concerns digitally integrative machines such as computers and complex hypermedia or interactive mixed media in virtualization.

At the synchronic and diachronic levels, the contextual designations of continuity and discontinuity in the media system are to a large extent significant for the definition of video, because video not only holds a specific position in the succession of emerging technical media but also takes on an undeniable position (for instance, in music clips, interactive installations, and multimedia DJ/VJ performance) in the new simultaneity of media. Although the latter areas do not belong to the core issues in the suggested discussion of video as reflexive medium, pointing out that these new, merged forms are insufficiently denoted with the label "new" media—and that what is new in the respective "new" media must equally be relativized in the process of media history—must suffice for the discussion of definitions. Because specific media forms intervene in the merging, the recursive process of repetition also means eroding the structure and the gestalt of the media forms involved. On the basis of this intermeshing, video takes up, in the context of recent processes of mediation (strictly speaking, of remediation of preceding media forms) the position of a particularly prominent level of encounter in the present media system.

The following discussion of medial characteristics and dynamic changes in video concentrates on works, which are conceived as videos and not as installations or performances. Therefore, it connotes the premise of treating the respective overlapping with other media conceptually. Although the parallel media performance, dance, music, and then television also played a role in coining the electronic vocabulary, it is, instead, the presentation of the technical overlay of media forms and the dimensional shifting in image formats that is foregrounded in the majority of studies from the 1980s and 1990s. Such shifts in focus also require, in the final analysis, the opening up of the field of investigation toward integrative forms of presentation in video, which belong to the larger context of visual culture and virtual environments.

Despite the numerous international examples, this study cannot offer a comprehensive cultural historical perspective. The cultural dimension of video cannot be considered in its full extent. This has to be reserved for further investigations, which will furnish a transcultural treatment. For this reason, the adoption of the video medium—and equally of television—by artistic and political groupings, which produce an alternative, manifold pictorial culture in, for example, Brazil and South Africa as well as South Korea and Australia, remains beyond this discussion. These examples, which do not belong to the Western tradition of imagery and media but have points of contact where this tradition becomes a repertoire of syncretic innovations, exceed the framework of this investigation and my own current level of knowledge. In the final analysis, this study cannot deal with the field of sampling of Western media images from film and television—for example, in music video, on videodisc, and in live VJ/DJ performances, and also the transcultural remix of electronic images on public live-size-screens, as in Japan and South Korea—in the framework of this debate.[8]

Under these premises, I will discuss selected examples of video works that refer self-reflexively to the theme of visuality or, alternatively, audiovisual media phenomena. Methodologically, I will undertake a formal analysis of structure for various positions in work with video in which it is a question of investigating, for example, from a historical perspective comparing media, aesthetic formatting in video, which enriches the medium in various ways and leads experimentally to its limitations in display and visibility. The methodological approach of construction or, more accurately, reconstruction of the conditions of reality video-aesthetic statements has the goal of bringing overlapping principles of style to notice. These can be seen as an indication of how the development from technology to the medium video takes place in the dynamic process of the electronic medium's birth. Here the specific mediality, on the one hand, and changes in the cultural use of a medium, on the other, must be recognized. In the final analysis, it concerns the understanding of a taxonomy of electronic audio/visuality and the definition of the contribution of video to the complexity of today's hypermedially structured media culture and to the typology of the hybridization.

Departing from the art-historical video debate dominant in the discourse, neither single formats within the artist video nor the concept of art will be discussed from the media studies perspective. It is not, therefore, video art but characteristics of video aesthetics that will be debated, even if the term *video art* cannot be completely ignored, to the extent that, for example, artistic formats interested in the multiplicity of video aesthetics emerge from the modulation of signal processes. Central to these reflexions is accordingly a media aesthetic definition of experimental video practice, which must be called experimental because, in the intermedial frame of reference as described, it provides a reflexion that influences the differentiation and the formatting of media specificity self-referentially. Experimental video practice shows the developmental stages of video aesthetics, the language of its forms, and the principles of its style.

The discussion here proposed on the reflexive character of video begins with the definition of the relations of technology and medium in the context of media historical, aesthetic, and technical theories related to equipment. Here it is also a question of including new initiatives in the art debate that concern the expansion of the visualization and multiplication of media forms. And, finally, a discussion will emerge on the technical conditions for the composition of the equipment in video in relation to television and in the experimental forms of video. To be able to situate video as a medium in the historical development process of the media, a discussion on the border phenomena in what is specific to video is also needed. Demonstrating matrix phenomena has a double function here, on one side making clear the capacity of the electronic media as regards its common features with the computer media and on the other also defining conceptually the differences between analog processes of transformation and what is, in principle, limitless reduplication and variability in all directions and dimensions as a result of programming functions.

To consolidate this categorization of the material theoretically, an integration of the media-technological definitions with the audiovisual manifestations of video practice/art will be undertaken under the heading of video aesthetics. Here the concern is to gain core categories. Given the need to understand media dynamically, such categories can also apply to the discussion of video from its early phase up to the present. They would particularly help in enabling interrelations to other media, especially to film and computers, to be respectively tested using concrete examples. That is why categories of capacity, speed, and operationality stand at the center of the media-specific debate on video aesthetics.

On this basis of media-theoretical and technical-aesthetic categories, video can be finally defined as a reflexive and genuinely audiovisual medium that can demonstrate its media-specific transformativity and multiplicity in the subsequently discussed positions.

The first part of the book situates video in a genealogical media model and reflects existing discourses on imagery and media in the mirror of demonstrable continuities and discontinuities, which link video to the film, television, and computer media and differentiate it from them. The second part discusses the reflexive processes in video as medium and investigates, via the three main strands of video praxis, how the articulation of the electronic vocabulary and the institutional establishment of video come about. In individual cases, it is a question of (a) a documentary direction, which brings media forms into relationship with each other and conducts applied media criticism; (b) an area of experimental practice in art, which takes up new media and promotes performance in video; and (c) experimental image technicians, who concern themselves primarily with signal processes and necessarily involve computers by dint of electronic audiovisuality. The third part relates multidimensional and omnidirectional phenomena in the electronic medium to exemplary formats in video aesthetics and discusses selected video works, which elaborate the spectrum of medial possibilities in video and shape connections to other media forms. The discussion of the material relates to media-theoretical definitions of image, writing, and language, to the extent that these definitions seem appropriate for giving insight into the categories and concepts of image and medium. Regarding future prospects, I will discuss the potential of video as it relates to complexity and hybridization.

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1

Video, a Technology, a Medium

Video denotes neither a transitional phenomenon nor an in-between medium on the much-described path from analog recording to digitally coded media images—in short, from analog media to digital media. This is because video, like any other technical medium, displays various developmental steps from a technological birth through to one in the media. Among the most important steps are the introduction of a new technology, which constitutes an epistemological break with related technologies; the articulation of an electronic vocabulary; and the aesthetic establishment of a difference from the expressive potential of other media technologies, with which the economic, institutional, and cultural levels should be circumscribed. The deployment of these developmental steps not only allow us to talk about the specific nature of a medium, which differentiates video from other media, but also links with other media (particularly film and digital media) in terms of individual elements and qualities. The next step is to shed more light on this general verdict on relations within the media system to demonstrate the pictorial and media-aesthetic contribution of video in comparison with the forms of realization of analog and digital media.[1] Both media types depend on differently constituted premises in their technology and apparatus, but we may assume that both stimulate and enrich the genesis of video in one way or another. Because they are, not least, antipodes to each other, they must play a part in the investigation, articulation, and establishment of the electronic vocabulary.

Continuing the suggestion of André Gaudreault and Philippe Marion, to set up a genealogical model of media development, which is discussed in prototype through cinema—but can claim equally the character of a model for the description of the genesis of other types of media—video also lends itself to being understood as a result of dynamic processes. These proceed from certain technological preconditions, come about within an existing media-cultural setting, and constitute the particularity of a medium. As

Gaudreault and Marion make clear in justifying a model, "When a medium appears, an intelligible media culture already exists. When a medium comes into the world, it must also get to grips with preestablished codes (genres, institutions, other media, etc.). What we hope to demonstrate here is the extent to which the very concept of the birth of a medium is problematic and paradoxical, at least if we consider birth as a unique and circumscribed event that punctuates the unfolding of history. Our task here is thus to propose a dynamic model that can contribute to our understanding of the *genealogy of media*."[2]

Genealogy of media means that the birth of a medium comes about step-by-step, and a confrontation with the existing media culture is necessary so the new medium develops, beyond its genesis as a technology, the level of a specific character as a medium. The advantage of this genealogical model for media theory lies in the fact that it neither has to set the factors contributing to the development of a new medium in absolute terms nor discuss them paradigmatically. Instead, the initially "relative specificity" allows itself to be understood in a complex configuration, which is determined by technological, culturally semiological, and institutional factors. In the process of increasing complexity in the process of a mediums' development, this setting will prove to be variable. From such points of view of a still-nascent media specificity, Gaudreault and Marion can finally speak of the formation of the self-sufficiency of a medium through intermediality: "Various criteria interact when we paint the portrait of a medium or design its identity card: its relationship to an institution, its semiotic configurations, its means of transmission and the technological possibilities of this means, the ways it is disseminated, the communicative and relational devices that are put in place or induced, etc."[3]

With the formation of a medium that maintains synchronic and diachronic relations to those media falling within a system of media that forms the context of its development, the focus on the characteristics of media specificity comes about. In this, the technical developments, commercial market conditions, and political-institutional considerations play an equal part to artistic-aesthetic interests, to name but the most notable fields. The specific media character of video must be fundamentally understood on the basis of electronic technology and in the confrontation with forms of analog media, it should, however, be seen just as much against the horizon of the uses of electronic technology in television, in public security systems, and finally in an alliance with digital technology. The position of video as a medium should be described so that the noticeable changes in video's structure and form highlight, on the one hand, the relations of film and video and, on the other, the links of video to computers. In this way, the respective continuities and discontinuities make transparent the popular, cultural concepts oriented to uses, which co-opt one or another form of specificity. We need only to think of the entertainment culture of film as the first mass medium of modernity and of the strategic surveillance function of video cameras via recording in public space and the globally networked commercialization of information and communication in the data domain of the Internet.

In relation to the genealogical model, the technological phase of video interlocks closely with television because of the elements common to the technology and apparatus of both media. The cultural-semiotic phase initiates the exchange with other media in terms of the differentiation of an independent media language capable of being termed "video-specific," a process in which the interplay of video and film and of video and computers seems particularly significant. Only when a difference distinguishes video's particular nature does the new medium first become established. This is not to be understood in the sense that links to other media are severed. In configuring the formal language of the medium, the factors specific to it assert themselves. In video, these are primarily signal processes and simultaneous transmission. Consequently, complementary factors, which support the intermedial phase of development of the medium, surrender their relevance. In video, the specifics of other media withdraw from the phase of direct intermedial confrontation but remain important points of reference in the overall context of the media system.

This constitution does not exclude the use of video in a "nonmedium-specific" way, maybe for recording of television programs, feature films, theater performances, and so on or for the production of video films in a narrative-dramatic or semidocumentary genre, respectively (maybe for live broadcasts of theater performances). These practices can be discounted in the video debate, to the extent that nothing is being done on an audiovisual aesthetic but, rather, filmic depictions of the theater footage, for example, are displayed. The observation that transitions from video to video as film and video as television are more fluid and less sharply drawn than, for example, the differentiation of the media languages of film and television has to do with the open, dispositive structure of video. The hesitant institutional acceptance and integration of the medium, however, also carries weight, apart from path-finding initiatives like Gerry Schum's television/video gallery (1968–1973)[4] and the video collections of the odd museum.[5] Because of its structural flexibility, video is employed initially in the political, counter-cultural domain and used by conceptualist artists, who exploit the experimental qualities of the medium (direct recording and transmission, mobile technology, coarse-grained imagery) to abandon aesthetically analyzed art forms. Further technical refinement and distinction then contributes to an aesthetic establishment of the medium of video, which leads less to the consolidation of the medium-specific potential (as in the development of styles, genres, and traditions of display) than to the development of plural forms of institutionalization, which are just as much influenced by the spectrum of formats (tape, installation, sculpture) as by the apparatus's various aesthetic and economic interests. In the video domain, the economy has not been rendered conventional (as in the film industry), regular performance formats do not recur either (as in cinema, on the stage, in the gallery and the museum), and a wide-ranging field of forms and places of presentation has equally developed (be it in the expanding art context, marginally in television and in more or less specialized video

galleries), yet all that does not block the constitution of video as a self-sufficient medium. The dynamic understanding of a media genealogy does, in fact, point to various degrees of institutionalization: they are not equally strongly developed with the technical media here in question. Independent of the evaluation of how strongly a media institution asserts itself, the basic relation of technology, aesthetics, and economics constitutive for every technical medium is also valid for video. This means that the peculiarity of the medium's own quality remains, as indicated by the self-reflexive recursion, bound to the technological setting of the medium's genesis.

In assessing the way video has become institutionalized it is necessary to note that this stage of development should be understood as plural and modular, according to the specific constitution of electronic media. With this rider, the conclusions from Gaudreault and Marion's siting, modeled on film, of a new medium can hence be applied to video. For a new medium to assert itself implies institutionalization, economy, production, and aesthetics, which means that related and preceding media formats are subordinated and transformed. Marshall McLuhan had already drawn attention to this circumstance, as his much-quoted statement "the medium is the message" also declares that the medium in question—as soon as it becomes the content of something new—is modified and transformed by the new medium. His message specifically runs, "The message is the massage."

In short, the relational structure of a medium should in no way be cited as an index for its lacking independence. Quite the contrary, each new medium has by force of necessity to have such relations on an intramedial level of confrontation. Video contains preceding media forms as languages in its electronic vocabulary. This internal area of friction contributes to making dynamic the differentiation and singularity of the new medium. The media specificity of video in its nature as a medium of reflexion results, therefore, in and from the difference from other media and from the audiovisual medium television, too. This applies regardless of the ways of using video at any time, which do not unconditionally motivate media specificity but can relate characteristics of various media to each with varying intent. Such processes would be deemed specific to video when they aim at delineating and extending the electronic vocabulary when, therefore, the interest in video defines the development of parametric functions in video aesthetics.[6]

Video presents itself as a field of investigation for media theory, where considerable shifts in the media system can be discerned that appear in the context of technological changes both through networked systems of mechanical processes and as a consequence of them. In the debate about changes and innovations due to the shift from analog to digital media, particularly relating to the components of simultaneity and increased complexity, video occupies a key position, because the electronic medium no longer comes under the paradigm of intermediality and has not yet merged into hybridization. The position of ambivalence and plurality will become visible and in such a way that the siting of video not only within analog but also within digital parameters actually permits the designation of a specificity for video, which can be differentiated from the specifics of other media. As a

result, as the conviction is advanced here, the discussion of the media specificity of video concerns the forms of realizing a potential, which is not exhausted within the subsidiary categories of a transitional phenomenon from analog to digital.

Given that the specificity of video plays itself out in a complex fashion parallel to larger transformations in the general development of information and communications technologies, it will also be interesting to observe how the horizon of systemic shifts in reflexion on electronic pictoriality and in the linking of media and machines shapes up. One avant-garde function of video could also consist in critically anticipating the potential for pluralizing and amalgamating, which is being realized at a higher level of complexity in the hypermedial structures and hybrid mixtures of the digital media. Video here acquires in the structure of the media the position of pointing to matrix phenomena in the shift from analog to digital, each using the means of audiovisual display to make transparent in electronic matrix images the transition to complex forms of simulation. If, as a consequence, the focus of the investigation lies on phenomena and concepts of a media-specific video aesthetic, it also occasionally concerns the pedagogical function of video in explaining certain components in the understanding of electronic media culture. This will contribute to a more appropriate understanding, in terms of images and media, of how the electronic relates to the digital.

With the decision to place the central focus on video aesthetics in choosing and debating the video examples, I am suggesting a process of analysis on twin tracks, because in the realm of aesthetics both components of pictoriality—that is, the features of the way the visual is constructed—and also those of mediality—the dispositive conditions of the apparatus governing the framework of the appearance of media forms—play a role. On the one hand, I enter critically into the discourse on image and pictoriality, because it is mainly gained from the art-historical debate and, above all, with regard to stabilizing the difference of image and reproduction. The attempt to work out a feasible concept of the image for the electronic medium through close reference back to the aesthetic-technical realizations aims at applying a structural model, which is also capable of making comparisons with film as a medium and with the numerical generation of imagery in simulation. On the other hand, I pick up the debate in media studies on the interrelation of the media at the point, where the discussion of the intermedial setting in the starting phase of a new medium assists in gaining insight into the structural changes introduced in this phase. It is a question of how structural changes, which evolve on the horizon of the general development of the media—and concern, for example, the confrontation of existing media such as painting, photography, and film with video and computers—underpin the processes of developing media specificity and the self-sufficiency of the medium. In terms of the theoretical goal of this video debate, I am concerned with defining, through comparison to the existing monographs and collections, an extended understanding of the concept of video aesthetics, which will only be able to stand up by engaging with current discourses on imagery and media.

The investigation of electronic pictoriality results from a media studies perspective, which takes in the location of image culture under medial conditions. In this the medium of video does not by chance occupy a prominent position in a debate on mediation: in the electronic medium of video the confrontation with the technological development of "analog" to "digital" in various stages is taking place parallel with its development in the media into a specificity of video. This circumstance can, as I will posit as premise, contribute to the understanding of greater shifts in the structure of the media, but it presupposes the analytical establishment of the specificity of the medium of video. This is because the novel phenomena of remediation can, for example, become visible, where the self-reference of the processes generally familiar from other developments in the media (for example, from the avant-garde) corresponds to the self-reflexion of the medium, which is, in any case, integrated already in the structure of the apparatus in video.[7] If the thesis can be substantiated, to the effect that the medium of video already subverts dualistic oppositions (before or after a "media rupture") in the current media landscape because video can display its specificity not only in analog but also in digital forms, then video would be the excellent medium for the developing of a concept of the image and of the media, which could be relevant for a structural definition of the relations between analog and digital media. This positioning contradicts the rupture eagerly described in media studies discourse in overwhelmingly violent metaphors, if not in the terminology of a "digital revolution." Concise beginnings for a specificity of video appear exemplarily in the work of Steina and Woody Vasulka,[8] when video visualizes the processual restructuring of analog into digital pictoriality.

Media theory takes up this problem area mostly by confirming generally the removal of difference among media and the way they can be manipulated in digital simulation as a paradigm with the concomitant conclusion that any need to confront the reshaping of analogic characteristics in the digital medium (i.e., of video in computers) might well fade away. This implies a further exclusion concerning the analysis of the reverse effects of digital operations on analogic aesthetics, which happens in a limited form where—as in digital film and video—technical innovations and horizontal expansions exist.

Digital form is first seen as enriching the originating medium but then as an argument for the replacement of film and video and for their role as circumscribed historically. It is significant for the debate over video that both directions (expansions into digital form and the reflection of digital form in the analog) demonstrate in their respective dealings with the challenge of computers a spectrum of aesthetic possibilities, which in total confirm a basic analog-digital tension. This tension underpins both discontinuity and continuity in the forms of media and plays into a new, paradoxical simultaneity, which presents itself prominently on the electronic level.

In the discussion of the recent debate on video, it is almost exclusively the horizon of expansions and manipulations in digital form that comes into sight. It is less the fundamental relationship of tension between "old" and "new" media, which is mentioned here as the historical phase of precedents. In this regard, apologists for and critics of the "new" in the new media share a viewpoint that underlines the break in the system of media and, in fact, also when what is new behind it all is criticized as, for media, a reclaiming and a reworking (remediation) of what has gone before. What comes up for discussion here are, on the one hand, processes of transformation on a diachronic level and, on the other, the simultaneity of variously structured forms of media. Both levels of interrelationship merge by dint of causal logic with the diagnosed restructurings of the media, and we can assume that the diachronic/synchronic media setting must structure the emergence of computers. In the end a discourse is lacking in media aesthetics about how the *massage* prestructures the "new" *message*.

In view of this state of the discussion, with little variation internationally, my suggestion points in the direction of analyzing more vigorously not only the common factors but also the difference in video relating to other discourses shaping the media environment so that, in this way, we are able to present the status of video in the system of media—that is, in relation to relevant technological steps in the media. With that, a gap in media studies could be closed, where the discussion about aesthetic questions is underdeveloped and the understanding of video often leads into a purely technical debate—which logically removes the medium of video with the application of the digital—or concentrates on the ways video technology is used. In this division, media aesthetics remains a largely untreated area that has found interest recently within an art history that concerns itself with artistic applications in the "new" media. It is especially discourses from this perspective, which investigate the changed character of the image, that come to the level of the simulated image with reservations and problems of determination, mostly in the absence of a more precise understanding of the use of technological preconditions.

Conspicuous about the status of discussion in the debate on image and media in the new media is the fact that a competent understanding of formal-aesthetic questions of realization and knowledge of structural forms of the image is largely lacking in the media studies debate, insofar as it discusses aesthetic viewpoints. In this respect, the envisaged comparison of concepts of the image in media is confronted with particular difficulties. By comparison, the debate on imagery in art theory does not per se provide by any means a treatment of the apparatus's specific technical and cultural context, in which electronic and digital images, that is reckoned by and written in binary code emerged, even if it has recently come to include a concept of the media. It mainly lacks a concept of movement, which could be gained, first and foremost, from film studies. Film theory does not necessarily contribute an analytical apparatus for facilitating an approach to a solution to a linking discussion of the changes in the concept of "image" due to electronic and digital

developments in the media, because it rarely argues through a comparison of the media. Exceptions aside, the theoretical debate focuses on the interplay among the media largely from a historical viewpoint on the early phase of the medium and is, on the whole, more strongly oriented toward narrative and style than toward visuality.[9] In film discourses, which are open to the new media, the images of electronic media remain either largely excluded as *quantité négligeable* (a negligable quantity), as in the debate in art theory, or digital and hypermedia are sounded out in terms of their cinematographic features and attributed to the medium of film or excluded according to the results. The particular problem area of synthetic simulation images, with which all other forms of visualization can be exploited, remains outside the pale and only denotes the most obvious, neglected area in that discourse on the image.

Taken together, the various gaps in the theoretical definition of images in the electronic media stand out most obviously when definitions of the relations to photographic-filmic and to digital, hypermedia, and hybrid forms are sought. It turns out that a common level of comparison, on which structural qualities of difference can be set against each other, can only be found with difficulty. Added to the difficulties of a debate on the structure of images in the electronic media is the fact that the categorical divisions mostly available—as here analog, there digital—wind up with classifications of the simulation images not specific to the media. They then, above all, illuminate the potential of the new and are less suited to shedding light on the different manipulative possibilities of electronic images. What, therefore, comes more rarely into the outlook of a comprehensive theory of media and will be ascribed higher value in the present investigation concerns the specific terms of convergence of continuities and discontinuities. In the end, allocations of the schematic sort—before/after and either/or—must be avoided in favor of a comparatively analytical placing of accents, which brings the messy phenomena of the both/and into focus.

For the reasons already cited, the orientation of this study toward media theory attempts to provide a contribution to the current debate on visual media culture, the need for which has been repeatedly underlined in art history and in media studies but to date not realized anywhere systematically. The relevant status of the discussion in the Anglo-American debate on visual culture is at present dominated by art-historical positions, which refer to a static concept of the image and hence scarcely address the phenomenon of movement. Instead, attempts are made to expand the discussion onto the digital medium out of an understanding of the image schooled on individual images (as in painting or photography) and mostly omitting film and video so that the transformative character of the electronic image disappears along with the lacking developmental steps in media.[10] An understanding of the image going beyond that would have to be developed, which also goes beyond film theory and includes as media different types of movement in pictoriality. That is because, in the available reflexions, a concept of the image is too limited where it marks the critical boundary to the simulation image and to the digital level

of hybridization in the media. Such a reduced perspective perforce results in an impractically conducted discussion of virtualization.[11]

Under the concepts of hybridization or hybridation, which are used as synonyms, the media debate concerns interactive and virtual forms of media, that is, of complex forms of connectivity, of endless combinative potential, and of the human-machine interface. The character of hybridation is tied into the precondition of numerical technology and hence shows—in accordance with the genealogical model of media—the first phase of a new genesis in media. Following from the genealogical model, the cultural semiotic phase is marked, in principle, by unlimited possibilities for options in merging and in networks. The level of establishing the medium, and hence of the institutional constitution, shows itself in immersive media contexts, in net-based and interactive media, which work with webcams and telerobots and produce telepresence in parallel worlds.

From a closer understanding of the digital media, Edmond Couchot suggests the concept of "hybridization" for the discussion—or more precisely for the designation—of the technological process of interactivity and virtualization. "It allows various, almost genetic operations on the media unrealisable with traditional technologies. Numerous forms of hybridisation are available to digital media, affecting the morphogenesis of media as much as their distribution. One of the most decisive examples in the evolution of arts and culture is the subject-machine hybrid, which shatters the traditional standing of the work, the spectator and the author. A technological process specific to interactivity, hybridisation also characterises a transversal aesthetic proper to the digital."[12]

From a perspective of the aesthetics of the media, hybridization denotes a technological model, which should be restricted to pluralization and multiple options and which has, with digitalization, achieved the full development of the possibilities for real and virtual events in simulation, objects, and figuration and has realized itself in interactive and virtual media (forms). The consequences of virtualization relevant for the debate on aesthetics, which have been brought up by the technological process of hybridization, Couchot makes visible through the shift from representation to simulation: "In this way the problem of realism (or of its negation) and the problem of representation (or its negation) find themselves being broached anew. Consequently, an aesthetic of the virtual and of simulation replaces traditional—but, as we should not forget, relatively modern—aesthetics of appropriation, distraction, and transfiguration of the real (and of its emergence). Can we, in fact, still talk about appropriation in relation to numerical objects, which cannot be appropriated or adapted, because they are by definition metaphorical, hybrid, utopian, or timeless, and display neither an enduring nor a durable identity and know no definite originator?"[13]

Bringing models of singular authorship and creative control in virtuality into question points to a still more fundamental problem area, which positions itself differently from the traditional image in painting in relation to the localizable, material level of pictorial potential when we set out from photography and film to define real and virtual components

in aesthetic creation in the technical media. "The virtual world," as Couchot explains, "consists firstly of space and time, which obey other laws. The space of data is a purely symbolic space: its physical substructure is never based on matter or energy, although the circuits of computers (the hardware) are parts of the physical reality. The space consists of information. Hence its *utopian* character. It does not possess any dimensions of its own, any permanent place (*topos*) of its own. Whilst the traditional image is a localisable phenomenon, always remaining tied to a place and a vehicle and hence fixed or mobile, the numerical image (in its electronic form) is not allocated to any place exclusively reserved for it (which it hence cannot escape); it is constantly dislocated and relocated. It is a question of a translocal phenomenon. Virtual space consists of circulation, nets, connections, which we 'navigate' within the space of data."[14] And in the numerical "image," the model of a timeless (uchronic) time, which extends itself, in accordance with omnidirectional space, most obviously in metamorphic states of the digital forms of expression, means paradoxical simultaneities. In short, a multidimensional, hybrid time, "which merges the time of the machine and that of the subject."

The decisive difference in virtualization, as Couchot posits it, on the one hand from physical space and, on the other, to "the recording time of photography and the cinema, or to the direct time of the video, of television or of radio"[15] denotes a different sort of linkage. Different, because it does not orientate itself any more after the transformative model demonstrated in intermediality but, on the contrary, no longer carries out any acts of linking or merging at all. Here linking means contact between the real and the virtual—that is, elements of our physical reality encounter elements, which are calculated and can represent more or less exact physical "copies." In a "virtual" zone of contact, these diverse elements now become possible in simulation, which denotes the translocal place of hybridation, the paradoxical simultaneity of not only real, but also virtual, components arises, something that is not possible under "normal" physical conditions. Hybridization hence forms a new paradigmatic level of connections, relations, and interrelations of elements that do not have to belong to the same reality. The structure of linkages is itself hybrid, as friction among elements of the media no longer transpires, but rather spaces, objects, and figurations in any scheme of combinations can be represented without any transitions and limits.[16]

From a genealogical perspective, a further component from media technology can be added, because the open character of potential linkages already comes to light in the electronic media, particularly with open dispositivity and the receptivity to computers—that is, to programmable building blocks. In an electronic medium, phenomena at the basis of hybridization that are prefigured in the audiovisual stage of pluralization and transformativity and display in virtualization an extension of the machine-machine relation to the human-machine interaction can be studied. This means a shift in the ordering of interconnected video devices to a cooperative interactivity with the systems of computers. It can be

shown that, with machine-generated forms of image that realize the transition from analog to digital (prominent in the videotape *Artifacts*, Woody Vasulka, USA, 1980, 21:30, color, sound [see ills. 121–123]), dissolution of unmistakable authorship identified by Couchot establishes itself in a creative coauthorship, in a cocreativity of subject and machine, which goes on taking shape in the technological process of interactivity as a building block of hybridization.

This stage of the development of media is set out conceptually in Alan Turing's model of a universal machine. Here it is a case, as Kittler makes clear, of another principle of connectivity, creativity, and referentiality under conditions of technical simulation. "With the Universal Discrete Machine, the system of media is closed off. Media for storage and transmission both merge into code-switching, which can simulate all other information machines, simply because it stores, transmits and calculates in each individual program loops. A bureaucracy devoid of humans takes over all functions, which are necessary to a formal definition of intelligence."[17] In this technological model, the cooperative creativity with the machine is prefigured, which carries out its own, self-modifying processes in its functioning as a complement to the human creative process. The digital production of images (software art), dependent on programming functions, is confronted with this aesthetic of the machine. The explanation of the way logical functions of the "machine which integrates media" (Coy) transpire, with their mathematical-abstract principle of switching, is related to the electronic signal processes in terms of the logic of the machine and differentiates, as a digital corollary, a syntax of binary images from the analog model of relations in its semantic imprint. The formal principle of electronic abstraction in video, represented by the circularity of writing signal states and their functions, both audio and video, is a step in this direction and justifies the paradigmatic linking of the nonrepresentational media video and computers.

On the basis of the technical possibility of producing audiovisual forms of viewing time, space, and movement from signal states and switchings, a "crisis of representation," beginning with video technology and inherent in all electronic forms of image, can be talked about in a technical context. The difference between video and computers as media means that the potential for pluralizing media connections and the unlimited possibility for choice in the forms of presenting writing, image, text, and numbers only reaches its full extent with digital simulation. Hybridization means all representations and connections of elements can be technically realized either in representative or in abstract mathematical form and—more decisively—both levels can be imperceptibly and seamlessly combined. It is this potential for pluralization and amalgamation that stands out with regard to the definition of hybrid forms of expression—on both the digital and the electronic level. Consequently, hybridization demonstrates an extended level of media, which expands itself with computers in virtual space and interactive manifestations and should be noted in the debate on electronic media. Defining factors—namely, co-creativity with

machines—and dissolution of temporal-spatial representations are already at work in video. That is, they appear in the transition from recording technologies to technologies of simulation and evince points of contact to the level of hybridation.

Gilles Deleuze has formulated this notion of alteration prefiguratively in his characterization of the omnidirectional organization of space in the electronic image, when he stresses, in conjunction with Edmond Couchot, the mechanism of a vectored circulation, "a perpetual reorganization, in which a new image can arise from any point whatever of the preceding image."[18] Going further, Couchot has differentiated how the electronic image type of recording does not present the temporal-spatial parameters in expansion because of the synchronization of the cathode ray and the simultaneous transmission but how these implode at the location of presentation in a containment effect (*effet d'incrustation*). The electronic "image," which Couchot takes up audiovisually under the category of noise, produces simultaneity and spatial density in a containment, with which transformation follows, so to speak, on the spot. "The image, visual and auditory, that the electronic screen introduces violently into the place where it is located, without the transition via framing, imposes itself on the spectator to the detriment of the space surrounding it and which it transforms at 'base.'"[19] There is not only a difference obviously of apparatus from the film image here present, when electronic pictoriality "presents" the information of the written line images in direct presence. With transformation, it is also a question of an abrupt disturbance (*violence*) acting on the continuous passage of images, which the presence of video at the surface level seems to deliver for the observer—although the broadcast flow of images arises quite differently, namely, discontinuously through inscription on the same basis (*en fond*). This is not saying anything more than that an inscribing of images takes the place on a succession of images and repeatedly rescans the established format from left upper to right lower.[20]

For the electronic images under discussion, Couchot's comparison of technical images in the media offer a suitable point of departure for the reason that it, on the one hand, substantiates the elements of recording technology common to the electronic image and the filmic-photographic image and, on the other, insists on a difference in the synchronized transmission. "In this sense, one cannot say that the image of television functions in the mode of re-presentation: it operates in a mode mildly different, that of *presentation*."[21] More important still is the fact that the containment effect typical for media, which "represents" the result of the transmission of energy, differentiates the electronic type of image from the numerical, where, in "continuous reorganisation," the same thing can be further inscribed, recombined, and renewed ad lib. Points of contact in the recursion do, in fact, arise[22] when the electronic feedback in the audiovisual effect of reduplication varies the given schema of the "image," as generated and defined by the raster grid format, in such a way, that the repetition of the same schema comes structurally close to numerical simulation. The technical difference, however, lies exactly here: the electronic feedback in the linear medium of video denotes a continous change in a given schema of pictoriality,

whereas the hybrid space-time structure of digital simulation can paradoxically carry on inscribing the identical schema as the repetition of what is unchanging, without the nature of the process as process expanding itself temporally.

With such paradoxical states, which can "further inscribe" the same thing without any change and in one place without expansion, the issue will go on being such that they, because the numerical image cannot call one site its own and denotes a "translocal phenomenon," always bring with them virtual and real components. With that—and this is the particular nature of the digital—this contact and this combination can also result out of the repression of the electronic schema or, more generally formulated, from the negation of the real. Whatever exists (for example, the recording) can be negated, and pictoriality can be a purely virtual process that simulates, for example, the electronic generation of shifting recursion as an outcome. A contact in which the unsuppressable circulation of the real and the virtual, from delocalizing to relocalizing in the virtual, find expression, and the aesthetic of simulation can establish itself is also necessary. Because this process does not reside physically in recording and reproducing, the digital simulation calculated by computers opens the field of representation for other dimensions and the spectrum of relations for innumerable possibilities. By dint of these characteristics in its structure, the digital type of image has to be, as Couchot remarks, understood in essence synthetically: "The synthetic image does not represent the real, it simulates it."[23]

This law of virtualization denotes the inescapable technical-aesthetic difference between electronic transformation and digital simulation. This is because, whereas transformation includes a process between signal states—notably an in-between, which no longer shares the temporal-spatial intervals (difference) from frame to frame in film (but, all the same, means change, that is, movement, and were it to be that the signals circulate in closed circuit)—the nature of the process in the digital is such that the electronic transformation switches over to the simulation of this event. It is not the spectrum of manipulation in transformation that is realized. Rather, the schema, which every process of transformation needs, is itself endlessly manipulated as code, that is, simulated in every arbitrary direction, which (in accordance with the digital circulation of 0 and 1) logically includes reversibility and negation, too. Here I am referring to Friedrich Kittler's concept of computer-determined simulation, with which negation can be realized mechanically. "For the first time in the history of language, a code has liberated its subjects or vassals to manipulate negation and to advance this manipulation up to an operative concept. To get to the technical status of today, negation would only have to emigrate: from people's mouths and documents into the electronic meshes of Boolean algebra.... Since then sentences can, very differently from in everyday language, be added up or multiplied—simply through the connectors OR and AND. That all connections out of negation are feasible in that, but not the other way round, proves the primacy of negation.... When using computers, it is also feasible to affirm mechanically something that does not exist: the triumph of simulation."[24]

There remains to be noted: the reversibility and negation of the electron-based connections in electronic transformation from border phenomena in electronic media, which appear all the more obviously the further electronic and digital media correspond to each other and merge at the level of digital hybridization. Consequently, this process of coming together of analog-digital technologies leads to the removal of the division between the media of image and of writing and marks the indivisibility of writing and calculating images. "As mere structure, the new generation of writing in computers is the synthesis of image and writing, both at the same time and its perfectly contingent expression on a screen, which no longer has to differentiate between the sign, the thing, and its meaning."[25] From the technologies of transformation, which depend on discourse, technologies of simulation have arisen, which depend on calculation and represent the synthesis of image and writing.

From a genealogical perspective, the historical-systematic foundations of these technical steps in the development of the media (electrical, electronic, digital) can be determined, which Friedrich Kittler discerns in switches and switching schemes that govern recording and discourse and that later computer-based media can take up. "What writers astonished by gramophones, films, and typewriters—the first technological media—committed to paper between 1880 and 1920 amounts, therefore, to a ghostly image of our present as future. Those early and seemingly harmless machines capable of storing and therefore separating sounds, sights, and writing ushered in a technologizing of information that, in retrospect paved the way for today's self-recursive stream of numbers."[26] Not only can the three storage media named above be related to computers as anticipating them, the birth of the media of recording, or inscribing respectively, in the process of writing can be "reckoned up" with the basic category of writing in digitalization. To support this argument, I refer to the information scientist Wolfgang Coy, who attributes writing to the digital medium: "Every finite alphabet can be conversely represented and recalculated quite clearly into the binary alphabet IB = {0, 1}. This is the basis of the capacity for a written media to be digitalized (like writing or telegraphy). Digitalizing of the forms of expression in the media does not stand still with that: all mechanical, electrical and optical signal values can approximate to each other to any degree of precision whatsoever. With that the path to digitalization is open for such differing media as records, film, telephone, radio, TV and video."[27]

The way simulation removes the differences between the media has shown hybridization has to be considered as the horizon for technical-aesthetic change when discussing electronic forms of presentation, because the audiovisual media of video and television do not "represent" the real similarly to other optical media: as something that belongs to physical reality and is recorded as a light-trace. The electronic media should be called *reflexive* and *nonrepresentative* to the extent that the audio signal can emerge from the circulation of electric impulses in the devices and requires no external input. Various possibilities exist for signal input before anything at all is recorded, and video can also mean a signal process, which gets by without recording anything. If anyone is inclined, when faced with

such an insight, to allocate the electronic image to the category of synthetic images, this cannot hold true, because there still does not exist any calculated simulation—an image derivable from negation in the technical sense of computer simulation. The transformation image affirms: it writes signals, even if they do not rest on an analogical relation to a "recording" of something or are not recorded at all, but simply circulate within the devices. Despite a tendency to abstraction, the internal exchange of auditive and visual signals, electronic media cannot negate; video, as a medium that "writes" electronic signals, cannot deny its basis in physical reality. "The optical image always shows us a completely momentary, discreet reality literally crystalized in the granules of film in the arrangement of the magnetic particles of electromagnetic tapes. The concept of representation, which, through the image, offers something present once again for consideration, expresses precisely this technology's very own way of expression, . . . With the information machines, a different way of expression appears through a radical break with optical representation."[28] I would like, with reference to the containment effect (*effet d'incrustation*) of the electronic image that Couchot establishes elsewhere, to explain precisely how the concept of presentation seems better suited to expressing the specific envisioning of something present in the electronic image, given that it is, with this process, a question of, as Couchot says himself, an immediate presence and not of a temporal-spatial difference and expansion as in film. All the same, the character of the electronic image's presentation, linked to the format written in lines, which can normally consist of the electronic "recording" and "reproduction" of signals and also in the circulation of the signal in the devices, differs from control by computers.

What counts here is the fact that making representations on the level of computers sets up a question of operating them and not of the specificity of media. Computer research repeatedly points to that: "The problem lies in the fact that the relations of representation only exist in the consciousness of the programmer(s). Nothing, either in the design of the machine or during the running of the program itself, indicates that structures of symbols are to be regarded as a representation of anything else."[29] With algorithms, hence with a "collection of commands for manipulating logical expressions," computers and computer systems can be controlled, without any user having to know how the program is translated into a sequence of commands which the machine carries out. Whereas analog media are bound to representation in such a way, that the technical relation of representing an analog image—for example, of film or photography—has a material side based in its apparatus (something, which materializes qua recording in the *image*), such relations of representing, by contrast, are not ineluctably necessary with the mathematical-logical and with the electronic-abstract expression of the "image."[30]

With electronic media, the mode of presentation means the immediacy in invoking the process of imaging itself, which is to say the reference to reality locatable in the analog relation can be displayed here self-reflexively—by realizing the electronic noise in *audio* and *video*. What is meant here is an interchangeability of *audio* and *video* that completes

itself on the level of electronic processes and should be differentiated from a merging of image and sound in an intermedial relation of correlations. It is not a question of a relation between components, which exist separately and can be referred to each other: "audiovisual" means much more the possibility of broadcasting the signal optionally as audio OR video or audio AND video. The reflexive character of video has its basis in this tendency to abstraction: it differentiates itself just as much from the repetition by the photochemical "image" of what was as from the transfer and processing of information in symbolic structures of the binary kind.

From this perspective, it can be shown how video is capable as a reflexive medium of processes to configure local delocating and relocating. An approach to digital, metamorphic transfigurations can equally appear through interventions into the electronic image raster, when the information written in lines is manipulated in its format of lines. This can, for example, be self-reflexive displays of the course of signal processes, where the entire electromagnetic information of a video image diverges from the usual image raster and forms a visible and audible object. The yardstick of the electronic recording impulse can be finally envisaged through such a radicalization of the possibilities for reflexion in video, by which process the "image" written in lines differentiates itself from the entity of an optical image of representation, which presents the effect of recording.

In the end, assessing these factors suggests calling the process of electronic images itself hybrid. This conclusion is countered, however, by the necessary reservation that an analog image, as a recording, is not to be called synthetic just because it does not represent anything. It cannot relinquish the realization of the linear type of presentation as process. For this reason, the audiovisual image in video cannot be hybrid, but it is capable of describing the transition to the hybrid. Paech also advocates a critical description of status or electronic "representation" when he estimates the difference between film and video proportionally as greater and that between video and computers as less: "The electronic images, that much is clear, are nothing more than imitations of film's ontologically established, photographic representational processes of display. That means that they have also given up the trace, which led from things to their light-generated images in photography and film. The image of things does not need the things themselves any more; the image of this world only needs the world as a pretext or an energy-charged field for electronic image production; the traces of the real are engaged in fading away."[31]

In comparable fashion, the situation of video in relation to computers can be established: on the one hand, computers inherit from video the electronic principle of functioning via process, and, on the other hand, dealing with the stipulations of the standardized television format[32] no longer represents a compulsion. The level of presentation has shifted to the character of pictoriality as object. Here metamorphic processes in digital simulation are set out in crude outline.[33] Video can only convert this change technically to the extent that computers, programmable building blocks, can actually become part of the medium

and that transfiguration, unrestricted in space-time, becomes possible in video by means of software.

It follows that, if hybridization is under discussion in the debate on aesthetics in video, consideration must be given to which technical conditions governing realization exist individually. By contrast, the state of the discussion requires coming to terms with the use of the concept of hybridization as applied to the digital, which serves in this discussion to comprehend structurally an increasingly interconnected system of high complexity, which can dispose of the range of analog technologies for negation. Regarding this horizon, the discourse on media theory must bring such events under an operative definition, with which the self-identical, homogenizing hybridization can be differentiated from self-reflexive processes of interconnection, which can equally be displayed on the level of technical simulation. In hybridization both are, in the final analysis, possible: the self-identical repetition of the schema (which explicitly denotes the potential of the digital) and the self-reflexive presentation of the principle of "schema," as it always rests on transformation, hence change, in the electronic performance of repetition. In this light, it should be said that having options available in the digital does not mean only self-referentiality, indivisible combinations of the real and the virtual, simulation, therefore, as an OR connection and the negation of difference; there exists in the digital system also the AND function affirming difference. In the first case, it concerns the manipulation of negation (digital); in the second, connections out of affirmation (analog), which are incorporated in the digital. Depending on where it originates, the functioning and the weighting tend to one or the other side.

Applying hybridization to the debate on video should make evident that concepts like representation do not suddenly take on a critical dimension with digital simulation. This status is preceded by various levels of technical forms of reproduction, with which we could find a critical distance from representation and what is represented confirmed everywhere in images from the media, in which representation of something exposes the nature of representation. For instance, in the technical self-reflexion of recursive images from video. What can be deemed definitive are the flexible, nonfixed forms of image in the electronic medium, which by definition function reflexively, also in understanding collaborative processes in the mechanical generation of image and sound. In the reflexive structure of video is already prefigured a co-creativity with the machine, which produces new, paradoxical formations of the real and the virtual in the programming of computer applications.

Here a renewed change in design and structure emerges, in which the forms of existing media (like video) are reshaped. In accordance with the genealogical model of the development of the media, the emergence of the hybrid media comes about both on the foundation of digital technology and also in the setting of electronic media. From this, it follows that virtualization can be grasped adequately only from the perspective of the history of

the media as electronic development, which is, in turn, not to be conceived without the history of film as media. What is necessary in the assessment of each new technological development is an exact knowledge of those fundamental elements, which are formed by the *massage* becoming the *message* of the new medium according to McLuhan's model of evolution and which merge into, for example through virtualization, an aesthetic of simulation (which realizes real-virtual combination formally).

In this vertical perspective, the interaction of media-technical and cultural-semiotic factors forms a level of reference, on which differences and transitions from the "old" and "new" media stand out and can be observed in terms of setting new paradigms (in the power relations between new technology, the specificity of media and cultural practice). In this setting, because it is to be meaningfully instituted for discussing current new definitions in the systems of the media, the electronic medium has, since its inception, taken up a position from which realizing the format of images, transformativity and variability can be given expression and diverge from previous technical forms of media. If we want to link with these phenomena discursively, perceptual notions of image and medium in the discourse on media must be revised.

Even if it sounds initially dramatic, both the concept of media and image are, with the introduction of electronic media, up for renewed discussion. The discussion of electronic and synthetic images is often carelessly differentiated and frequently underestimates how the function of an image in representation as double/reproduction no longer pertains to both technical forms, and, in the end, the difference between representation and what is represented tends towards zero. Stated radically, the electronic medium of television also does not possess any function of representation attributable to any reference to reality. What opposes this insight denotes *only* the familiar credibility, derived from the cultural usage, of its media products as double/image of reality. A critical discourse on media for electronic image technologies would have to point much more strongly to what no longer exists structurally as the optical version of representation (as in the closely related analog recording media) if it wanted to do justice to video practice. A debate on images and on the media, which highlights here the reflexive, audiovisual character of video and television as media—construction and reconstruction of image as image, of sound as sound, of image as sound, and of sound as image—also has the advantage of being able to demonstrate the key position of video in the system of the visual media—and beyond that, at the transition to hybridization. A position, as I would like to claim from the genealogical perspective, has become possible, because video is fully established in the system of the media—and because it, to use McLuhan's terms, fulfills the tasks of the *message* of every single medium, namely provoking the alteration of yardstick, speed and pattern.[34]

The Visualization Debate

The paradigmatic turn of the pictorial, the so-called pictorial turn, as pertinently discussed in the art-historical discourse, bridges—interestingly for this context—the current debate

on the image and the visual culture of the media. W. J. T. Mitchell, whose concept instigates this debate, has linked the space of resonance of the visual's increasing presence most comprehensively with the electronic technologies and the dimensional expansion of simulation. "If we ask ourselves why a pictorial turn seems to be happening now, in what is often characterised as a 'postmodern' era, the second half of the twentieth century, we encounter a paradox. On the one hand, it seems overwhelmingly obvious that the era of video and cybernetic technology, the age of electronic reproduction, has developed new forms of visual stimulation and illusionism with unprecedented powers. On the other hand, the fear of the image, the anxiety that the 'power of images' may finally destroy even their creators and manipulators, is as old as image-making itself. . . . Whatever the pictorial turn is, then, it should be clear that it is not a return to naïve mimesis, copy or correspondence theories of representation, or a renewed metaphysics of pictorial 'presence': it is rather a postlinguistic, postsemiotic resdiscovery of the picture as a complex interplay between visuality, apparatus, institutions, discourse, bodies, and figurality. It is the realization that *spectatorship* (the look, the gaze, the glance, the practices of observation, surveillance, and visual pleasure) may be as deep a problem as various forms of *reading* (decipherment, decoding, interpretation, etc.) and that visual experience or 'visual literacy' might not be fully explicable on the model of textuality."[35]

Following from this, the setting out of the "pictorial turn" means a departure from the culturally dominant model of text and language and the recognition of a system of description limited not only to the narrow field of the fine arts. The argumentation takes root, on one hand, at the core of the discipline in Erwin Panofsky's "iconology" and reaches back, on the other, in less canonical form to Nelson Goodman's theory of the "languages of art" in order, from that viewpoint, to win support for a debate on the fine arts based not on linguistic symbol systems but on verbal *and* pictorial models. In this perspective, conflicting theoretical models are to be compared under the heading of art history in a wider discourse (for instance, the language-oriented, linguistic-semiotic and the image-oriented, formal aesthetic debates over film) and in a context of visual culture as this is considered dominant in the present day and includes interactive and performative aspects.

This context, which Mitchell sets in a cultural-semiotic dimension—even if he does not use the term—should be identified, in comparison to the preceding debate on images, separately as *pictorial turn*. The usual forms of representation and the categories of description are recognized as, to that extent, no longer pertinent, because the simulation of images rests on other preconditions from depiction in painting and photographic-filmic recordings. What has changed is an interference in the connection of "pictoral representation" and "verbal description" (Goodman), as based on analogy. According to this concept, grasping of visual presence in the age of "electronic reproduction" (Mitchell) requires visual literacy emphasizing visuality.

We can fundamentally agree with Mitchell's diagnosis insofar as the changes in the visual realm contained in the *pictorial turn* require resetting the dimensions of competence

in the media. His concept, however, lacks a technical understanding of the apparatus of the media, in which, for example, the electronic character of images was identified with its simultaneous anchoring in linear writing and in audiovisual transformation. In the same way, Nelson Goodman's[36] advocacy of removing the ranking of language and imagery does not introduce a technical distinction, with which the representations he discusses critically can be more clearly ascribed to the media. The interest is located elsewhere and aims more intensively at the verifiability of symbolic meanings qua representation. Thus, it should come as no surprise that, from the viewpoint of theory on the media, arguing with examples from painting and sculpture for a representation not bound to similarity seems meaningful but is more difficult to pursue for the technical analog media.

The problem of verifying the thesis, and with that the difference in the discourse on analogy between levels of meaning and of technology, cuts in at the point where representation is seen in general, not, therefore, as specific to media in describing them—that is, in an interpretative construction that does not need any relation of similarities. This cannot be reconciled with the technical principle of the analog media of recording through inscribing of light onto a vehicle for imagery (film) and into the surface of the screen (video). What Goodman's concept, which Mitchell cites in advocating an extended notion of the image, lacks is a concept of difference between the media that, in its application to theory on the media, would have to differentiate between the technically based contrast of what is represented and how (as this applies for painting, photography, and film) and the removal of this preface (as determined by the media) in the signal processes of the electronic images. Here it should also be noted that the relation of similarity consists in the technical recording of photography and film onto a material vehicle, whereas video, by contrast, realizes this relation in writing linear information successively into a surface, which presents the pictorial result to the observer. Only on this basis of differing categories will it then be possible to differentiate technology from technical applications and carry further the discussion of textuality and visuality as specific to media.

To make this suggestion visible, I want to recall a prominent example from film history, where the Soviet director and theoretician Sergej M. Eisenstein seeks to convey the levels of expression of writing and image in film.[37] What Eisenstein is after, in contrast to mere sequentiality, is "the combination of two 'representable' objects," so that the hieroglyph "achieves the representation of something that cannot be graphically represented."[38]

In this film-historical tradition of merging textuality and visuality, a pictorial effect comes about that softens the transitions between image and writing and emphasizes the pictorial and the graphic components in the skiagraphical recording of the image.[39] In this reflection on the process of image and text in film there appears a level of comparison to the transformative character of the electronic media inherent in their systems. On one hand, a parallel to the process of writing exists and, on the other, video displays a specific variant to the verbal-pictorial form of realization, which exists in the coupling of the noise-

laden conjunction of image and sound, in audiovisuality. This reciprocal relation of signal states structurally resembles, at another technological level, the technique of working with the principle of hieroglyphs, as Eisenstein employs it as a method in film montage.

If we assume *audio* and *video* are in an OR relationship of exchange with each other, which evens out differences, because the video signal can be realized in each mode of expression, the audiovisual character of video corresponds structurally with the pictorial character of writing—as derived from the history of film—or with the character of imagery as writing. In observing the interrelations of the media in their system, the discourse can be continued, therefore, about an enmeshing of linguistic-textual with visual elements (film) in the electronic writing of the medium coming next in history, video. A reconciliation of textuality and visuality, which the debate on visualization centered around the *pictorial turn* suggests, cannot only be anchored in the genealogy of the technical media and paradigmatically in film. The discourse on visualization itself comes in for expansion with the basic audiovisual circumstance, as the electromagnetic writing of visuality in video means audiovisuality.

In this perspective, Vilém Flusser's suggestion appears forward-looking, as he locates the interrelationship of *audio* and *video* in a general tendency toward musicality, which describes the common traits of abstraction in images and music. With the introduction of this discourse on musicalization in the visual, Flusser wants to apply abstract principles of organization from the realm of musical composition as a comprehensive model for denoting the structure of technical images in the media. For the present debate on audiovisuality in electronic media, there opens up here an extension of the discussion of the dialogical relation of textuality and visuality, as this can be gained from film theory. With Flusser, it can be shown, that video maintains structural relations to the diachronic media of film *and* music, in which the relation to music also suggests a linking of visual and abstract principles that gains, in the final analysis, still greater significance for ascertaining the numerically calculated computer images based on the rules of abstraction and mathematics. Against this horizon of the development of the media, Flusser's reference to a musical tendency is not limited to a single medium, but it claims, instead, a paradigmatic validity for technical images from the media. He discerns in their nature (i.e., in the technical conditions of combination or, alternatively, of composition of elements) abstract structural principles, which are closer to a mathematical-abstract model of the organization of elements than to a model such as language, based on semantics and adjoining relationships. This tendency to abstraction deploys itself where a mathematical-abstract principle (with the computer) is introduced as technology, which enables a synthesis of writing and imagery and of imagery and music in binary calculation.

Flusser is immediately concerned with proving the basic condition of the interrelation between image and music. Audiovisuality means, then, a tendency toward mathematical abstraction, which exists in the electromagnetic signal states of video. The technical operationality of the electronic media are what Flusser takes as his point of departure in order

to make perceptible structural links between experiments with musical composition principles in modern painting as well as with the visual adaptation of notes (e.g., with the color/light piano) and the technical media of today. At the same time, it is also made clear that the tendency to musicalization in the electronic media, located in the avant-garde arts, can deploy itself, because the technical preconditions of audiovisuality are already given. Flusser declares, finally, a musical tendency in the technical image, which should not be confused with the intermedial translatability of imagery and music. The transmission of correspondence of pictorial motifs in music and vice versa is also not what is meant here. Instead, it concerns definable structural relationships between imagery and music with regard to the conditions on the realization of abstract forms of expression in the media. The shared tendency of imagery and music toward abstraction can only be realized to its full extent, however, on the technical level of computers, because computers, considered technically, are based on the mathematical, abstract principle. In the electronic, audiovisual capacity for expression, this has, however, as I would like to add here, a technical precondition from the media, which makes it appear meaningful for the audiovisual medium video to locate the musical tendency in the technical image.

Flusser sums up the paradigmatic line of his argumentation for acknowledging the correspondences between image and music as follows: "Only in this way, I believe, is insight available to the 'audio-visual' character of the universe of technical images. Since there has been computing, the technical images have been rushing spontaneously over to sound, and sound spontaneously to images, to combine with each other. . . . Image and music don't 'intermingle' in the sound image, but are both raised to a new level, to that level, which the concept 'audio-visual' means, but could not define as yet, as it stems from the preceding levels. The impending setting of images to music and of music to images has been long prepared for. We can recognise it in, for example, so-called 'abstract' painting and in the scores of recent musical compositions. But it is only since synthetic images that the imagination has worked musically and its power has been used for music, and it will become meaningless to want to differentiate between music and so-called 'fine' arts."[40]

A decisive difference has to be maintained, for, as setting film to music means realizing a formative-compositional decision, perhaps using the idea developed by Germaine Dulac of film as a visual symphony as an example, setting technical images to music in electronic and computer-based media occupies a different level. Here the mathematical-abstract model expresses the very conditions of the reality and the characteristics of visualization, as audio and video no longer come together to complement each other across different media, but exchange with each other on a common technical level. By contrast, transferring this model onto film sets an evaluative criterion for the aesthetic adaptation of intermedial concepts, but not by any means a condition for generating media. By making this point precisely, I would like, in the final analysis, to counter a curtailed perspective that consists of wanting to allocate to technical images a tendency to musicalization as well, where a merging between media arises through visual and acoustic techniques. On a level

yet to be created, it would ultimately have to abandon the transformative tension in the audio-visual in favor of a synthetic form, in which the separation of the elements would be removed and repetition of sameness continued in a self-referential form.

To demonstrate a tendency to mathematical abstraction, which can be shown technically in video as a medium (in contrast to analogical relations of similarity with optically "reproducing" film) on the part of the technical images, entails, when determining the structure of relations between media, making Flusser's suggested definition of musicalization evident also as the boundary, in terms of media, between film and the electronic media. The level of audiovisual mixing, which sets in with video, would then no longer be dealt with in this discourse under the paradigm of intermediality but would be up for discussion in terms of the transition to hybrid blends. Where modular operations, which correspond to the way the electronic medium functions (and become particularly obvious with the modulation of video signals and the plugging together of devices), can be discerned in audiovisual transformativity, a hybridization close to the principle of optionality is indicated in video, which continues structurally in the digital media and there governs particularly the blending of virtual and real components.

The musicalization demonstrated in the electronic media, therefore, reinforces the homological structural characteristics of video and computers in abstraction and there simultaneously supports the argument for needing to differentiate more rigorously between film and video within the system of analog recording media. In this case, the optional modulation of electronic forms of presentation behaves differently from the categories of optical inscription valid for film and photography. We could say the tendency toward acquiring musicalization (mathematical-abstract model) accompanies the tendency toward dismantling the recording model of representation and all the more obviously drops out, the more intensively the images of the electronic and the computer-based media converge. All the same, we need, with Flusser, to take account of the fact that the hybrid basic relation of image and sound in the audiovisual medium of video applies to exchange relations within the media (intramedial) and does not describe external relations to other media.

With this addition, Mitchell's advocacy of *visual literacy* can be reinforced in such a way that changes that are specific to the media and extend the realm of reference of a debate on visualization necessarily into audiovisuality must be considered. It is not only the level of definition not specific to media that needs critiquing in Mitchell's concept of a phenomenology of the *pictural turn*, however; the notion of a medium is simply missing. Mitchell indeed wants to stress for media the dimension of visual "presence" and expand the framework of the art-historical canon, yet he follows, for example, no differentiation of technology and medium. With that, the transformative form of visualization in video cannot be adequately differentiated in this discourse from the simulation of this process in the digital, where the problem area of the blending of textuality and visuality and the problems surrounding depiction and relation to reality present themselves differently.

These aspects are equally relevant to an academic discussion specific to imagery, which deals with the nature of the image as simulation in the debate within German art history with reference to the dichotomy of image and reproduction. Gottfried Boehm discusses the models of image and representation via the "theorem of iconic difference," a category of difference, which expresses the circumstances of tension and contrast in the relationship of the image carrier and the image, of what is represented and is visible representation, that is, of medium and form. Whereas the image as image arises from a difference, which enables the form of representation to reveal these conditions and limitations in the medium represented, the image as representation, by contrast, negates this difference. In simulation this means self-reference, endless variation, then, of the matrix, the schema of the image. In conclusion, Boehm declares, "The image in extremis denies itself as image completely, in order to bring about the perfect representation of a thing. It achieves this goal, when we, as observers, are fooled into taking the image for the very thing it is representing and with that ignore it as an image."[41]

As a consequence of the *iconic turn*, two avoidance strategies result here that must be harnessed in particular for the debate on electronic images. By contrast, the critique of the conflation of image and representation prevents a paradigmatic prescribing of the relation, as derived from photo-technical recording media, of the similarity between image and representation, which would result in the image being understood only as a double and not as a construction of what is visible. On the other, from the critique of the critique of simulation—and in particular the critique of self-referential dissolution of the image—a divergent concept of simulation can be gained, which means a type of image representing the construction of similarity and nonsimilarity in form and process and ascribable to the model of self-reflexion by dint of this double characteristic.

This type of image is formulated in the debate on simulation, which arises from the conceptual history of the image and from the crisis of the conditions of similarity (which replaces the representational function in the seventeenth century), derives a description of function in which simulation is defined ambivalently. The understanding of the concept of simulation possesses a dialogical pairing, consisting of "simulation" (pretence) and "dissimulation" (disguise). This type of image is described in the debate on intertextuality as the "ambivalence of simultaneity" of "representing and concealing of this function, of affirmation and negation," which is concerned with the "pretence (simulation) of false semantic facts" a "simulation," "which is at the same time a disguise (dissimulation)."[42] Friedrich Kittler extrapolates this double notion of simulation, which points precisely beyond self-reference and implies a difference between the medium represented and the form of representation, for the status of technical images. Decisive here is the enabling of precision so that only with the technical data processing in the numerically calculated media is the possibility of simulation in the double sense of pretence and disguise actually given, because manipulation here includes negation.

It follows that the double function of simulation, strictly speaking, appears only in digital pictoriality (and especially in digital morphing). To determine the parametric function of digital imagery in video images, one must remember that phenomena of digital pictoriality in the form of video can be displayed, which can make the transition from analog to digital applications/methods of processual pictoriality in the form of video visible. Such types of image realize the character of simulation in ambivalent forms so the characteristics of a medium (like closed circulation, delays in feedback, scanning lines of the image, and limitations in format) come through in the form of image, with that necessarily presenting a self-reflexion of the medium *and* the artistic procedure. A contrast arises here, consisting, for example, of the analog transmission of audiovisual information and interference in this very process.

Going on from here, a typology of representation for different images from the media that expresses the concept of representation in a technical dimension and diverges from the use of language in the visual studies can, in summary, be envisaged. Whereas, from the viewpoint of image technology, analog images of the film and photography type have a representational function, which reveals a technical relation of image carrier and image based on similarity, this relation disappears in the digital, where the data of images does not come out of an "iconic difference" or a recording. In the analog relation of similarity, the image carrier materially represents the image of the photochemical recording. Digital images here present possibilities for simulation, which can also contain the option of carrying out an (analog) representational function and an (iconic) difference between medium and form of display as simulation. This mode of presentation also applies in principle to electronic imagery, which simulates in an affirmative manner (and verifies the construction of similarity and nonsimilarity self-reflexively, that is, in an analog-processual way). The position of video diverges in this respect from the relation through analogy and the function of representation of the film- and photo-technical media. Electronic images do not realize any representation related to any material basis, any difference in material, and the multiplicity displayed. Video images are not bound to difference in a technical sense, but are, all the same—by recording light—bound to relations of similarity. By dint of their immediacy and their processual nature, video images possess analog forms of presentation and are as immaterial as the digital images of simulation.

Unlike from the digital, however, the electronic forms of image have the possibility, by virtue of the characteristics of reflexion specific to media to express an *iconic difference* through the fact that the image within the surface of the screen, in contrast to the representation and dissimulation, becomes visible as a process. This nature of the pictorial in being present describes the pluralization in the aesthetics of video and separates the status of pictoriality in video from attributions of self-reference.[43] Because this process establishes a technical condition for media, the form of presentation of the image in video is fundamentally reflexive.

With these differentiations, I would also like to make clear that the critique of the loss of difference (of display and of what is displayed) in simulated images, which negate the character of the image, means a critique of the digital media in which simulation appears unilaterally as dissimulation. This attribution does not apply to the electronic media, because the reflexive form of presenting in the video image includes the tension of the image's surface (the format of television) and written pictoriality. To be more precise, because it is not based in difference but on discontinuous inscription, the electronic image is reflexive, revealing the conceptual difference of self-referentiality and self-reflexion in an analog but processual manner just as it appears in the critical notion of simulation and affects, as computer-generated simulation, the relation of image and pictoriality. Like every other image from the media, video has, on the level of application, on the one hand, the possibility of transparency, of suppressing visible/audible technique in favor of a perfect simulated/illusory image and, on the other, the possibility of emphasizing the level of presentation in the media and the iconic tension.[44] But it is the peculiarity of video that the second possibility does not represent only a question of usage, but denotes, by contrast, the condition of video's reality itself.

The processual character of the image in video reveals itself in the positions of video practice critical of media and imagery, when definitive factors of image and pictoriality show up self-reflexively on whatever forms the limits of representing the visible. Such electronic forms of image, which articulate their characteristics as media, evoke between image and medium a difference, which can be compared conceptually with the *iconic* difference (with the inclusion of audiovisuality). The character of electronic imagery as media, which is made clear in such video works, points particularly to the sort of mediation of "images" that exists in television and in other public recording and transmitting of images that are broadcast *live* from shopping centers, airports, subway stations, and pedestrian zones to control rooms. In its critique of the public video image, installational art in the media, that works with video, pays more intensive attention to the deconstruction of the image on the level of both its nature as media and its mediation, in order to refer what is made, and can be made in technological images back, in that way, to the actual characteristics of the media. What appears in the already cited difference of image and medium is the structure of electronic pictoriality in video and audio, as it develops on the level of the technological manipulation. Reflecting on the media side of the electronic image at the same time contains, on the part of the form displayed, the possibility of displaying a reversion of the mechanism customary in public use, that transcends the formation of the pictorial in the media and presents the image as a representation. In these positions deriving from an analysis critical of the media, video's own specific characteristics find expression, in contrast (rendered visible and audible) to the usual public application of video images in the mass media. Here self-reflexion of the characteristics of media contributes to the establishment of a difference between the functions of the images in media qua images and as reproductions and representations.

Here the technical instruments of the medium of video connote permanent upheaval; the public, electronic images are quite different, in that they suggest lasting presence and, in that, the status of the reproduction, of representativeness and credibility. In terms of media technology, the unconstrainable transformation and nonfixity stands opposed to this usage as a basic quality of the electronic image technologies, which is suppressed in such applications, which—as in television and with the video recordings transmitted in control rooms—are in turn interested in maintaining electronic audiovisuality as reproduction/double and representation of reality.[45] Although it can manifest itself in various states of pictoriality, in closed-homogenous and in open-processual ones, a "unity" of image that might be defined is not generated. Video images are reflexive images, even when the use of video to achieve certain forms of visual *re-presentation* does not display this basic characteristic, bring it into question, or conceal it. If, by contrast, the particularity of video in states of permanent upheaval and transformation is displayed reflexively, the medium specificity of *audiovisual* video imagery is reinforced.

For a debate on video in the context of *visual culture* and *electronic culture*,[46] it can be deduced from both discourses, the pictorial turn and the "iconic turning point," that an unexplained definition of the electronic technologies exists there. However, the critical reference dispenses with not insignificant viewpoints, not only on the duality of textuality and visuality but also the dichotomy of image and copy for the aesthetics of video. Such is, above all, the case, if we consider that the technical debate on the character of imagery as simulation could scarcely be conducted without the dichotomy of image and copy. The fundamental ambivalence in the concept of simulation prompts discussion of simulation as a critical concept also outside of the classificatory descriptions within the discourse of the "iconic turn" (representation and iconoclasm) and making them productive for the debate on video. Seen in this way, a more general position of *visual culture/electronic culture* can be formulated with the characteristics of simulation (that is, the "pictorial" components) above all in video, when factors appear here showing imagery as imagery in the model of self-reflexion, by which video becomes, in this function, visible as a reflexive medium. Both for aesthetic notions of what is visible and for the praxis of cultural applications of the medium of video, the conceptual difference becoming clear in the critical concept of simulation gains increasing significance, and, in fact, all the more so, the more strongly simulation depends on programming. There arise, however, alongside linear extensions of digitality, new forms of simultaneity as well, where a sharpening and a new articulation appears in the analog medium, for example, of the function of representation of analog pictoriality, which is to be understood as a differentiating reaction to the loss already noted of referentiality, or, alternatively, of the function of representation in the digital, and dispenses with the analog character of another way of understanding imagery and the media.[47]

With the ongoing intention of, on the one hand, locating the discussion of the specifics of media against the background of paradigmatic changes, which range from the transformation resulting from intermedial methods to simulation characterized as hybrid, and, on

the other, of referring to an iconic notion of difference now grown critical, I am pursuing a double track, which brings into focus points of connection in the terminology used by media studies and art history for *visual culture* and *electronic culture*. For the further discussion of video, I want to refine the enquiry as follows: how and in what forms has dealing with the image and with visibility in the electronic media shifted its ground vis-à-vis preceding forms of media? This links up with the investigation of the way in which the increasing involvement with computers, because the early phase of the medium has contributed to the development of the specifics of video, and at what points computers (as well as television and other parallel media) have been (or could be) included in video, excluded from it, or connected to it.

From this perspective, so goes the basic assumption, the full development of the medium of video will be equally able to be revealed, as border phenomena in transition to other forms of media will come up for discussion. With reference to a genealogical model of the development of media, it remains to be asked under the same premise, how and what forms of video go on being effective (i.e., in what proportions do formal and functional shifts appear in the light of the recent connections between electronic and digital image processes and what significance these changes acquire in the systems of media developments).

With this inquiry, I intend a necessary discursive reinforcing of the status of video, a medium itself still in its youth, the justification for the existence of which has not been unconditionally supported by recent developments in the media.[48] Not least for this reason, defining the position of video as technology and as medium does seem a necessity, because the prevalent consideration of the specificity of video immediately results in committing the medium to history and taking leave from it, because new media are meanwhile figuring on the horizon, which ostensibly "eliminate" the electronic. Ostensibly, because all forms of expression in the media can, indeed, be written in the binary alphabet and draw closer to each other on the basis of digitization: the elimination of the specifics of media does not only affect video. Such positions committing video (and other analog media) to history can be countered, however, in the first place by the evolutionary model of the media (McLuhan) and further each new medium's context of developing intermediality, as it is proven in the genealogical observation (Gaudreault/Marion). Finally, the praxis of video's development sets quite different yardsticks: it describes a position that indeed prepares the setting for the appearance of other, new (digital) media; with that, however, it does not make the medium superfluous. On the contrary, video defines the framework for convergent and divergent relations to other technical media, particularly for computer media.

Preconditions of the Technology and the Apparatus

As an electronic medium, video has in common with television characteristics both technical and belonging to its apparatus. The concept of the reflexive medium means, first,

that an electronically generated image radiates its immediate presence right where the observer is located. The syntax of the radiating monitor/screen image is determined by the technology of the signal transmission, which generates a flow type of image as an unbroken stream. The video signal transmitted by the camera is kept constantly moving in its surface presence, the raster format of a screen, and it expresses the flow of the electrons. In addition to that, two interlocked half images belong to the definition of "image" in video and television so that all the information in an image is composed of linear images (even and odd lines) staggered in time. Both the signal transmission and the information compiled in the image connote the fundamental instability of the audiovisual medium. Talking about a "frame" in video means the result of two image fields intermeshed with each other, which contrive twice over to resolve the electronic scan vertically. Here various standards are customary: whereas in the North American and Japanese system (NTSC) the vertical field is constructed of 262.5 half lines, in the European PAL system, the vertical field consists of 312.5 half lines. The term *frame* refers to an image format, which numbers 525 lines, 30 images per second (60 half-images/second) with 60 hertz in NTSC, or, alternatively, 625 lines, 25 images per second (50 half images/second) with 50 hertz in PAL and SECAM. The technical need to scan two fields inside of a frame successively (odd numbers from above to below and then even numbers from above to below) is based on avoidance of "flicker." Through the two interlocking lines (the so-called half images) the image on the display-surface of a screen appears constant.

The video pioneer Dan Sandin demonstrates the technical construction of the electronic medium in his video *How TV Works* (USA, 1977, 30:000, sound, see ills. 88 and 89) through a didactic approach to the possibilities of working with video in comparison to film:

> The simplest video system to understand is a camera that produces an electronic signal, sends it along a cable to a monitor, which reconstructs the image.... Now, light that hits the front surface of the lens is focussed into an image down in the camera itself. In the case of a film camera, that image is projected onto a sensitive chemical surface, the film itself. In the case of a video camera, it is projected on the front surface of a vidicon and an electron beam inside the vidicon scans the front surface, scans the pattern of light and dark projected on the front surface, and creates the video image.... This reflection yoke magnetically positions the electron beam that scans the image and creates the video signal.

When Sandin later describes how the signal returns to the beginning at the end of the lowest line (vertical synchronization pulse) and the camera itself generates the information, which it needs for synchronization, to have the signal run back horizontally (horizontal synchronization pulse), he summarizes the technical description in the conclusion: "The actual video information is encoded only in the scanning lines from left to right."[49]

Apparently no coherent "image" exists—either in the scanning process inside the camera or on the surface of the screen. Whereas the fixed motion image of the film is tied, at shooting and projection, immovably to the template of a vertical ordering of the single image frames on the filmstrip, video cancels such demands: there exists an electronic flow of images that, like the filmstrip, performs a vertical movement and is equally capable of moving horizontally. The visible impression of a frame actually does arise through information coming in from outside as light, which is transformed by the scanning process into electronic signals (the internal scanning of the information as light with a cathode ray), which are ceaselessly transferred into scan lines. On a normal screen, these lines run from left to right and from above to below. In this way, they constitute an order, which corresponds to the description of a page in Western culture. There is, namely, no technical specification to determine a scanning process's direction: it is a cultural convention. (We can imagine that, if television and video had not been introduced into the Western industrial nations as a new standard but had originated in the Asian cultural sphere, the orientation of the line structure would have proceeded differently.)

The electronic signal runs vertically *and* horizontally and, therefore, constructs and reconstructs electronic images in the camera and on the screen synchronously: "The two electron beams, one in the camera, one in the monitor, are scanning identical patterns at identical times. Camera and monitor are scanning synchronously. There is a pattern of light and dark, which got there from the lens in front of the camera, and the electron beam is scanning the surface of the image. The image on the front of the vidicon is reconstructed on the front of a monitor. The scanning pattern has constant speed and retraces. A video system could step like digital video, but the electronic goes continuously."[50] The particular nature of video as process is based on this simultaneity of recording (construction) and broadcasting (reconstruction). This is something indicated by a type of motion image, which, unlike film's vertical sequence of image on image in time, is related to the simultaneous possibilities of digital image generation reckoned and displayed in real time, insofar as any difference in time and space does not have to play any role in the way the medium presents its images. The directional ordering of electronic pictoriality does not evoke any parametric (temporal-spatial) expansion—as where film needs a difference in time between the frames (interval) and also creates a difference in space between projector and the surface of projection (the dispositive area, in which the viewer is also situated). Video can essentially use a linear line structure, which is interrupted and synchronized and produces a fluid discontinuity.

The electronic transmission of image and sound signals cannot be compared with the passage of images in film. In contrast to the cinematographic motion image, which depends on "transition" (hence, on an exchange premised on the difference between single images), electronic transmission permits the fundamental flexibility in video to differentiate between a "constrained" film image and an "unconstrained" video image. Because the video signal has to be halted as the image continually moves vertically and horizontally,

the latter ought to be so termed so that a raster image can appear. A contribution to what is specific to video in the signal processes comes in the observation that the signal shifts ever further horizontally (except if the lines are fixed horizontally) so that the lines can be written exactly below each other. If this did not happen, video would consist of the horizontal drift of open lines. This technical requirement to arrest the image lines also confirms the character of electronic pictoriality as a process in contrast to the image circumscribed in space and time.

Video's lack of fixity separates it from the passage of discrete images in film, where, through transition, the interval in space and time between single image frames is bridged, lent motion by means of projection, and only then merges into a continual flow of images. In a discontinuous flow, the electronic technologies of imagery negate this concept of difference, because it exists in the constructed and continuous process of film images. The necessary arresting of the horizontal drift also does nothing to change this.

The technical difference presents the necessary, indispensable premise for motion images in film as medium. It alone guarantees the visible continuity of the sequence of images in motion. Motion can, however, only result as a perceived impression from the differences in various image frames projected sequentially. The composite image of film—which depends technically on an interval between the image frames—coalesces only in projection into a coherent, perceptible image in motion. Compared to the filmic process of lining up images, the electronic image displays an inherent linear structure, which demands that the signal must be synchronized where it shifts lines (leaping lines vertically). It is a question, then, of this signal permanently moving, not of an electronic process of rapidly lining up single images. The perceived impression of pictoriality functions differently in video: all the information in the image contains two interlocking half images, a technical necessity for stabilizing it, which produces the impression of the image together with the arresting of the lines. This makes it clear that the "video image" essentially represents an incomplete and discontinuous type of image.

On the differentiation of technical categories in media, we can say that the electronic linearity diverges from the cinematographic, because it does not realize any concept of difference but is variably structured, like the process of digital simulation, in directional and dimensional terms. In the electronic process, information is not coded as in the digital; however, it becomes available in multiple forms via a transformative process comparable to numerical coding. The limitless possibility for optionality in the digital cannot be reached by way of the linear premise of the electronic. Linearity in the electronic media is defined by the continuous process of inscription of signals governing the medium's realization. Because of the nature of process qua process, it is different from the linear succession of frames in film, a process of writing in which a sequence in dynamic form arises from the succession in time of static units of imagery. The *frame* in film not only represents the mode of photographic fixity but also connotes equally the duration and direction of the movement of the single images, which are necessary to generate the impression of

cinematographic images in motion (at normal speed 24 images/second). By contrast, a fundamental, fluid movement of signals prevails in video and is processed where *frames* are determined and arrested horizontally: with that arises the pulsing impression given by the image. With the difference already made between the unity of the image (frame) in space and time, on the one hand—which is meant to apply comprehensively to painting, photography, and film—and, on the other, the electronic information—which, according to Sandin, exists "coded" in the scanning lines and generates the transformative video image—it is possible to denote the flexible forms of the electronic, transformative image as pictoriality in terms of media technology.

The transformative process in the fluid movement of electronic signals is a technical precondition for the character of video as being present, which—in the direct broadcast of the transmission where the viewer is located—connotes flexible and inconsistent forms of media images based on time. On the basis of shared technology, they connect the electronic medium of video with the cultural forms of television, which fashion the transmission of events by denoting this same character of being present and of unconstrained pictoriality. As Sean Cubitt demonstrates, the basic property of not being fixed conjures up a flow of electrons, which is difficult for a viewer to understand:

> The discourse of TV flow is "present" in the sense that the viewer can enter into dialogue with the screen. Yet the broadcast flow is also a vanishing, a constant disappearing of what has just been shown. The electron scan builds up two images of each frame shown, the lines interlacing to form a "complete" picture. Yet not only is the sensation of movement on screen an optical illusion brought about by the rapid succession of frames; each frame is itself radically incomplete, the line before always fading away, the first scan of the frame all but gone, even from the retina, before the second interlacing scan is complete. . . . TV's presence to the viewer is subject to constant flux; it is only intermittently "present" as a kind of writing on the glass, to the distracted viewer, and even in moments of concentration caught in a dialectic of constant becoming and constant fading.[51]

The hybrid status of television, which comes in the discourse of communications and of social studies under the heading of a new technology and of a new medium is located here as technical device and as apparatus, but also particularly as regards the reception of its program structure, in the history of "flow."[52]

In the final analysis, television—in the sense of a concrete denotation—describes a "timeshift," which encompasses the union of television and video and particularly the cultural uses of video molded by television, for example when the video recorder appears as a technology to reproduce television. "Time shifting" denotes a way of dealing with television, which assumes a developed video technology, or respectively the video recorder introduced into the nonprofessional sphere. "The third video market was opened up in 1972 by the first Philips video cassette recorder, a half-inch cassette machine designed specifically for the domestic market so as to allow 'time-shifting' (the recording of awkwardly timed

broadcast programmes and their replay at leisure)."[53] What is here reaching the status of a cultural praxis of video technology basically means demonstrating the aforementioned fundamental condition of visuality (and this always means audiovisuality) of the time-based, linear and processual medium. "Timeshifting" refers, therefore, to two levels, that of technology ("flow of images") and that of its application in dealing with television ("flow of programming"). This happens in such a way that transferring something directly present to repeat it in segments at another time (video recording) denotes in the application of video technology essentially the mechanism of a flow of images. This describes how electronic signals are constructed and reconstructed and how the half images are put together while shifting them in time. The former can be actually achieved in the simple schema of camera and monitor/screen; the latter appears when the video recorder is used in fast forward/rewind and occasionally for a still image.

For the further discussion of video, the qualities of flowing and segmentation gained via the theory of television form relevant building blocks for defining the structural incompleteness of images from video and television. The common technological basis of video and television supports cultural applications of television by means of video technology.[54] Television cannot count as the prominent or even the sole model, because related media, like film, and the developments of computers contribute equally to coding a new setting for the media from an institutional and cultural viewpoint. In this way, the first steps in the development of video as a new medium on an analog basis take place. The appearance of a new medium happens not as a single installation qua introduction of new technology. We should instead start out with a dynamic process of development that, through interaction with other media, brings those qualities to fruition, so they become describable as specific to video (and that then also means in contrast to the specifics of television as medium).

For television as the new dominant medium in mass culture in the age of networked communications media (McLuhan), the aspects of flow and segmentation are, above all, significant with regard to the users' parasocial possibilities for interaction—who are, as subjects, addressed personally in television's programs and themselves feel addressed and included personally in this fictive mode of dialogue. In contrast to this, video's configuration concentrates more intensively on manipulative possibilities, to the extent that the interplay of image and medium found in television can be incorporated into a new dynamic interaction. The purpose of reflecting the characteristics of media in video can be the critical analysis of television's reproduction of reality, when the construction and reconstruction of the displayed video image separate out visibly. How transformative systems examine themselves in this way does not have to adhere absolutely to making obvious the character of video/television as manipulation and their status as critical representations. Aesthetically motivated interventions in the structures of media can also be in play and bring the latter to light to demonstrate aspects of the image lines, the image field, and

the image format not usually perceived, which is to say, to visualize the electronic vocabulary in its deep structures.

In general terms, video and television connote the definition of audiovisual media and belong, together with the older technologies of the gramophone and film, to the category of recording media. With this double reference, we can differentiate the electronic image medium video from the digitally coded, numerical media. With characteristics diverging from the continuous writing process and from the attachment to either continuity (film) or discontinuous construction/reconstruction (video, television), forms arise through programming in the digital image type, which are directional and arbitrary in their dimensions—that is, not limited and variable and able to show how the electronic images acquire definition in the media through technical simulation, opting, in fact, between validation and its erasure. There is also the fact that various preceding forms of media can be deployed operationally in digital media as building blocks. In this way, it becomes possible to intervene in the structure and the form of a medium by simulating structural traits of other media. In these new hybrid forms, which are generated by calculation, the differences in the media are removed by means of a uniform technical basis. In the same way, digital processing permits the simultaneously different treatment of segments in a defined image field of the video type. This makes it, for example, possible to show a spatial extension of the linear fundamentals and, equally, the compression of movement sequences on one level of the image. Such plural, parallel, and paradoxical forms of image in the electronic media are initially indicated where the open structure of the written lines runs counter to the standardized definitions of the image field.

The electronic image, however, is not optional in the same way as the digital. What distinguishes the synthetic simulation image is a dimension where it is optional in also comprehending the transformative potential of the electronic vocabulary. When the structural flow of the electronic media appears in the digital as a formative element, we can formulate it concisely: transformation represents for video as a medium a constitutive but not a variable precondition. In this, the transformation specific to video denotes the technical level of generating an image through a process, as it realizes what are in principle unconstrained, unstable, and incoherent forms of images on the basis of linear structuring. To the extent that videographic denotation presents its technical-material characteristics, video will maintain itself as a reflexive medium. With this reflexive potential for expression as a medium, video can also connote the transition to optionality founded on technology, as this exists in the digital media. The more video diverges from the historically preceding analog media (functions of representation founded on technical specifications), the more closely electronic transformation approaches digital simulation. Fundamental differences remain, which must, therefore, be stressed, if we are to assess adequately the interconnection of video- and computer-based machines (or, by contrast, the mounting of digital elements in video equipment) with regard to new experimental possibilities in re-

lation to the actual expansion of potential specific to the media and, finally, of connections between video and computers already realized technologically.

The correspondences between a transformative image in the electronic medium and in the digital cease with the category of optionality, because an electronic representation cannot simulate/dissimulate as a digital one, as generated by programmed commands. Kittler calls this double function "affirming something that does not exist" and "denying something that does"[55] and characterizes, in this definition of simulation, structural reversibility on a digital level. The category of optionality should, therefore, remain reserved for describing simulation in the binary syntax of the digital, whereas transformation is confirmed as the basic category for establishing the technical status of how analog processes function.

On the level of digital simulation, transformation is subject to a technical and operative process in programming, which I would like to term, regarding the theory of media, as the "optionality of technical simulation." In relation to this, simulation in the electronic can only be realized on the side of simulation, not of dissimulation, however, and this limits the operative optionality of video as medium and, hence, its actual characteristics of simulation in dimensional and directional terms. All the same, electronic media possess a distinct multidimensional and multidirectional potential, which set them apart from other analog media. These specifics appear more strongly in video than in television, because the dispositive openness of video, unlike the relatively stable system of television, includes multiple directions and extensions of audiovisual display, above all when various devices (camera, scan processor, keyer) and effects (feedback, delay, layer) work together.

From the perspective of the electronic medium, the transformative category signals the transition to the digital medium. Compared to the media, the technical differences mean that a multiple type of image exists in the digital, which is unconstrained in its spatial and temporal aspects and its dimensional arrays, yet is linked, as far as movement in space goes, with the processual characteristics in analog video. A link appears in video experiments with image processors and further analog computers.[56]

At the technical level of the digital medium there exist no structural homologies with the filmic-photographic peculiarities, which—on a differently configured, technical basis—can be simulated in principle with computer technology. By contrast, the situation with video is such that the electronic medium has not only characteristics of transformative pictoriality in common with the digital type of image but also shares other structural relationships with the composite image in film. These common factors concern, above all, the quality of linearity; electronic transmission (simultaneity and synchronization) separates video from film irrevocably. This does not apply any less to crossover phenomena, when all of the information of the two half images in video is "frozen," fixed, and treated as an object, in contrast to the vertical-horizontal linearity of electronic inscription. Video has to count, like film, as a time-based medium, something that does not oppose

experimental video's displaying (comparable to experimental film) the crossover phenomena as it is technically realized. In addition, it must be remembered that its processual character in fact predestines the medium of video to shift the fundamental definitions of the linear medium toward objectivity and nonlinearity in conjunction with the development of mechanical interfaces between the technology of video and of computers. Most important is the difference between describing the negation of linearity (which video can only manage in the conventionally representative sense of descriptive classification and only anticipate on the aesthetic level) and presenting images as objects in a programmatically defined pixel structure, which is, in fact, technically feasible.

In conclusion, to enable us to set out in the technical debate over apparatus, how for video the transformative character of the audiovisual constitutes the reflexive medium, we should recall the self-reflexive process in film. There it was possible to shape visibly reflexive processes for the medium's aesthetic reflexion on itself (prominent in the structural experimental film), in the course of which the self-reflexion of the technical features of film are made visible border phenomena in the media by means of flicker, variable running speeds, and stroboscopic effects. They are not dissimilar in their pictorial expression to the instability of reflexive video but here arise from the exigencies of the apparatus. Now a further parallel can be drawn, because, just as video performs basic technical characteristics of the digital in the aesthetic sphere—in the course of which devices with a programming function, which belong to the category of analog computers, go a step further in the direction of technical realization—film equally reveals characteristics of reflexion on the aesthetic level, which specifically constitute video. We could carry out a comparison of the status of reflexive images from the media, in which optical experiments with filmstrips and ways of projecting can be described as homologous with the open, dispositive structure and flexible pictoriality of video. In a comparable manner, the directional and dimensional simulation of pictoriality in video offers an aesthetic level, on which the constitutive features of simulation in the digital medium appear in the audiovisual, if not becoming comprehensively realizable. On the technical level of the apparatus, video remains bound up with the structural preconditions of electronic signals' synchronization and simultaneity, which enable other realizations from those of the analog representational medium of film and the binary-coded, digital medium of simulation, computers.

Establishing any common factors and differences from film and computers brings no surprises: not only the structural correspondences to but also the technical differences from preceding and parallel developments in media define the specific parameters of video's developmental context, which directly corresponds with that of television in several respects. Historically, the initial technological phase common to video and television is distinguished by the dispositive structural context of the screen, which becomes the convention in television, yet in video, by contrast, becomes further differentiated and pluralized. The development of video follows the creative interaction with the features of the

screen's surface and the specifications of its format. Within the interaction with the formal languages of related media, this leads to articulating reflexivity. In an almost contrary tendency, television suppresses its reflexive character as a medium in its institutionalized program structure to favor constructing an illusion of coherent and, above all, apparently representational sound image broadcasting by means of simultaneous effects. Nevertheless, the fundamental processes appear inadvertently when either the programming or the equipment breaks down or are (with alternative television programs and video transmissions) made into the topic of television. Reflexivity in television appears in interventions, which work against its homgenous institutionalization.

Video shares, like television, the quality of linearity with film, yet distances itself with increasing diversification of its device's configuration, with more and more dispositive areas, with direct connections between video and computer technology (for example, in compression, segmentation, and capture of individual phases of the image) and, above all, in the development of a genuinely electronic-audiovisual vocabulary for television, which has established itself early as a mass medium structured by programming. In this various stages of development identifying video and television as separate media can be discerned, from the genesis of a new technology and the graduated constituting of an aesthetic specific to the medium up to the establishing of institutional and cultural applications of video.[57]

By comparison, the phase of video's institutionalization is configured considerably more heterogeneously and includes the areas of videotape and installation as well as the applications of video in other media. On the contrary, by constraining this expansion and monodimensional from a cultural-semiotic viewpoint, television crystallizes into a specific medium for broadcasting (live) events onto a screen surface conceived as a mosaic and out into a private space.[58] In this development, addressing the viewer connotes a parasocial interaction, which goes into crisis at the latest when interactive and immersive options arrive in the media.[59] In summary, television as a medium means institutionalizing programs, television broadcasters, and corporations: from a technological viewpoint, this configuration equates to closing off, bundling up, and restricting of what was once the dispositive structure of the electronic media. Various dimensions of electronic processes are scarcely ever explored by television. This is where video operates.

Features where video and television initially coincide in their technical bases will diverge more markedly and will be differently fashioned as forms of media differentiate themselves, in which regard we should not overlook the already conspicuous differences between the two electronic media in terms of their levels of technological development. For example, the metaphor of "time shift" manifested in the discourse on television, as it refers to the nexus of the video recorder and television, applies in a much more fundamental way to the material quality of the discontinuous video image determined by the apparatus. In the process of constituting video as an independent practice in the media, the fundamental qualities that the discontinuous video image initially shares with television

gain relevance particularly in coining for video a vocabulary specific to the media, which displays the "flow" of information (the principle of television) in the construction and the reconstruction of electronic pictoriality, whereas television seeks to disguise this reflexive mode. This indicates that the category of "flow" spanning the media is treated differently in television and video. This is because whereas in television programming a flow of images—or information, respectively, as constrained as possible—is what defines the medium, a level reflecting transformative processes develops in video (by modifying the existing structure of flow), which can be created visibly or audibly.

When taken together, the structure of lines in a linear process and the structuring of the pictoriality in video as fluid produce an unstable form of medium-as-turmoil, which appears in the various applications of video as more or less self-reflexive. What remains important is that it does not concern a merely creative process, but much more the formal presence of video's fundamental characteristics, as a medium that is reflexively structured in contrast to other analog media. Here the electronic image can demonstrate through its technical specifications yet another form of reflexion, with which the electronic signal is short-circuited (synchronization effect). The simultaneity of the image in camera and monitor enables controlling of the camera image on the monitor immediately (simultaneity effect): as dispositive structure, which combines input and output (i.e., the input and output signal) and allows a closed circuit to come about. Video signals are also short-circuited in the feedback loops,[60] in which electronic signals (above all when they are circulating through various effect-devices) are amplified, distorted, and reduced. What is decisive for reflexivity is the directness of these processes caused by simultaneity and synchronization. Both closed circuit and feedback present reflexive basic forms of vocabulary in video, with which formations of image more complex in multiplication and variation can work. At the heart of all these processes lies an open-ended type of image: it is generated from the linear structure and its rules for combination, together with a dispositive arrangement. If video is to be further discussed as a type of image, which completely transcends restriction to the characteristics of a single, framed image in the process of transformation, it can also be said that the sequential flow of information in the electronic medium indicates a turmoil, in which the form of video affects its technological status: technical and media forms of self-reflexion are united.

Technical self-reflexion, as in the electronic scanning of image signals with the cathode ray and the possibility of simultaneous recording and playback, indicate a purely circular structure at first sight. Such forms of self-reflexion demonstrate particularly clearly the specific characteristics of video as medium in its direct signal transmission, its combining of input and output signals into a closed circuit, and in the video signals short-circuited in feedback. In the syntax of the electronic vocabulary, the direct transmission of the signal in feedback and closed-circuit processes is determined by the technical characteristics of the apparatus, which produce a "standing image" on the surface of the screen or recursively multiplying forms of pictoriality. The purest form of self-reflexion in video consists

of feedback: it produces the fluid, nonfixed type of image in permanent upheaval on—or, more exactly, in—the surface of a screen. Together with the process of the feedback loops—with a feedback, therefore, in principle unlimited, and with closed circuit—the fundamental optical constitution of the processual electronic image locates in transformation the basic condition of how the video image exists in the media. The technical circumstance of a signal being emitted in the screen/monitor defines video, qua apparatus, technically as a medium of reflexion, in contrast to film as a medium of projection and differently from the simulation seen in numerical images.

Surveying video performance and multimedia installations, which integrate electronic media in open art forms as successors to the happening and Fluxus, demonstrates that, in reflexive display, video technology suits the direct transmission of simultaneous events, self-monitoring, and surveillance of situations. Further examples exist in works that compare various (media) realities by being present simultaneously or directly or display something by paralleling perspectives shifted in time and space (for instance, when video is applied in multichannel installations). In interactive installations, the transformative potential of video forms a necessary precondition to enable mixed realities to be presented convincingly and to immerse viewers/users in them.[61] Bearing in mind the premise that interactive computer animations are intended to display the potential of images calculated in real time through creating multiple interfaces, we see that the status of the electronic medium of video remains important for displaying fluid transformations within movement in space. This becomes obvious, above all, at the limits of video's display, where the electronic image is deconstructed and dispersed into numerical codes. If computers are applied as an extension of electronic vocabulary, the structure of lines can be, for example, illustrated as a pictorial effect of signal transmissions. Via compression, the format of a video image can be manipulated vertically and horizontally as required. Such processes are suited to generating three-dimensional effects by synthesizing images. Therefore, the direct presence of fluid pictoriality in the electronic medium transmits, on the one hand, the transformative structure on a technical basis; on the other, reflexivity enables it to bring together elements specific to video and computer graphic elements on a common creative level, where transformation and simulation meet in the matrix image.

Matrix Phenomena

The aesthetic qualities of video as a medium of reflexion can be called seminal with regard to style and form in current *visual/electronic culture*, where pictoriality describes the transition to numerical visualization. In point of fact, we are talking about video, which, bordering on or blended with techniques of digital imaging, leads to the creation of new forms of images and deliberately no longer denotes an "image" contextually perceived as a visual unit, but instead strives to dissolve the distinguishing features of image and writing by emphasizing the audiovisuality of the electronics.[62]

Against this background, the media-cultural dimension of video under the heading of computers and hypermedia can be established, in that electronic media parametrically make transitions between media visible, as well as, at the same time, in the basal relation of exchange between *audio* and *video*, self-reflexively reveal the transformation processes with the vocabulary of aesthetic forms. This appraisal assumes an understanding of media aesthetics, which is more so than the processes generating style, form, and genre in film—bound to fundamental categories of technology, whose transformation only makes visible and audible. This fundamental, invisible structure is the matrix of the electronic reflexion, which, by means of the technical-aesthetic realization of video, makes a structure, a shape, and a scale visible.

From this perspective, it can be said that the matrix qualities of electronic media determine video's technological possibilities in its fundamental, manipulative character (processuality and transformation). These are operations which force a visible structure on the fundamentally invisible matrix of the electronic image, as it is available on the basis of generation, synchronization, and transmission of video signals. As examples for this, we can cite procedures that create the transmission process for signals as a visible structure by intervening in the invisible matrix of the synchronized signaling processes. This is possible by means of arbitrary changes in the locking mechanism of the horizontal drift—which causes the image field seemingly to breach its bounds—in feedback or even in scanning processes manipulating the deflection of lines and able, if used consistently, to shape the fundamental information within a frame into abstract forms.

Under the concept of "matrix" the media-theoretical and the philosophical discourse are unanimously discussing an invisible metaphor for a particular order. The conceptual parallel between the aesthetic-technical description and the metatheoretical contemplation lies in the matrix metaphorically representing a paradoxical visual order: it does belong to an invisible order but can nevertheless take on a shape conditioned by the visible order of a medium (for instance, when disturbances in the sequence of functions show up and experiments with border phenomena of display are being conducted). I refer to Rosalind Krauss's discussion of matrix phenomena of the modern to establish a link between the two separate discourses. It concerns a rhythm, an interval change of *on* and *off*, which resides paradigmatically in the cinematographic projection mechanism (image–no image–image) and Krauss identifies as the all-embracing (comprehensive) structural characteristic of the modern age. The paradoxical nature of the interval is important here, as it signifies a gap, a space between two states (on/off) and at the same time serves as a link and a bridge over this break.[63] This paradoxical phenomenon of difference between individual images, on the one hand, and the reversal of this difference through movement, on the other, becomes visible in the type of interval rhythm in film.

Krauss's theoretical justification of the matrix phenomenon refers to Jean-François Lyotard's treatise *Discours, Figure*[64] in defining matrix as an order "that operates beyond the reach of the visible, an order that works entirely underground, out of sight."[65] Another

aspect of the matrix's particularity is simultaneity, which means that the separation of opposites is canceled out (comparable to the blending of vertical and horizontal leaps between lines in the immediate presence of the "video image"). In Krauss's and Lyotard's definitions, the figuration of the matrix refers to the realm of the unconscious as well as to the structuralist system, in which the structural invisibility is part of a virtual order. Finally, this comparison illuminates why, although matrix and structure share the same characteristics—namely, invisibility and synchronicity—the matrix does not function as a structure because it does not operate with differences. "The elements of the matrix, Lyotard thinks, do not form a system, but a block." It follows that "the fantasy is the perfect matrix figure," with the justification that "the completed work of the matrix overlays contradiction and creates the simultaneity of logically incompatible situations."[66]

The matrix is a formal state "beyond the perceivable" (Lyotard). It cancels out opposites and undermines the "productive work of the structure" (Krauss). If the matrix forms a block rather than a system, it is, within the discourse of media theory, a hypertextual construction that points to simultaneity, when the realization or the combination of media elements with divergent natures is present at various places at the same time. Discussing digital simulation images, Couchot called this paradoxical state a "translocal phenomenon." Continuing the discussion of matrix phenomena, the paradoxical combination of real and virtual elements relating to the digital level can be mentioned with regard to the realization of "logically incompatible situations." An invisible order can be described at this stage of simulation—containing all potential forms of digitalization and of the interrelation of different media, which appear under the conditions of computer-based hybridization (of combination and blending) in a paradoxical structure.

The matrix of an electronic medium exists on the medium's level of invisibility and synchronicity in the signaling processes. In video, its order is based, in contrast to film, not on intervals but on the transmission of signals, which are being constructed and reconstructed—invisibly. In digital media, the matrix occurs in the translocal phenomena of hybridization, when real and virtual media interact (that is, when they become interchangeable in the binary code of computer simulation). In all these forms of media (film, video, and computer), the matrix signifies paradoxical simultaneities: they are located in heterogeneous states (image–no image in film), in transformation processes (construction–reconstruction in video), and in logically incompatible relationships of space and time (delocalization–relocalization in hybridization).

Matrix phenomena of the electronic type of image become conspicuously visible under certain conditions: for example, when the accumulation of signal processes caused by the application of multiple feedback loops creates visual forms. This means that a creation process of image structures is illustrated here, in which the shape becoming visible is being generated from the (formless) pulsating signal process. Then again, feedback loops in video do not only dissolve the image's directional determinants of right and left and top and bottom. They show—most clearly later on, in connection with digital machines for

processual image processing—a level of pictoriality in which the "image" (thus, the amount of electronic information of the television format's raster image) is locked into place by oscillators and, consequently, takes on the character of an object and acquires spatial structuring.

Woody Vasulka provides an early and, in its abstraction (or, alternatively, its musicalization), almost insurpassable example with his *Time/Energy/Objects* (1975/1976). These are studies of processualization of line and raster screen in video, supported by the idea of discovering the interplay of visual and auditive abstraction in video noise and of creating image objects solely from scan lines. *No. 25* (USA, 1975, 5:30, b/w, sound), in which the video signal actually (visibly and audibly) scans the raster field from top to bottom, exemplifies the purest form of creating video by means of video noise. *No. 25* shows recorded signal processes, that, as a result of the manipulation of electronic voltage and frequency, change their visible shape. The presented image content (the visible image) consists of a bending of the 525 lines (NTSC) and is not generated by an external input via a camera but exclusively by means of the blank television picture. A Rutt/Etra Scan Processor modifies the image information electromagnetically, which causes the entire information of the blank television picture to shrink and take on a cylindrical shape of 360°, which appears as an abstract object in the *video void* (see ill. 126). The scan processor can also alter the density of the scan lines, where the lines can be stretched so far apart that the electronic structure of the individual lines becomes visible.

This empty form of the electronic image is generated from an image source, which, in the case of *No. 25*, is provided by the rewinding of a videocassette. The noise this produces is treated in the scan processor, newly scanned according to the grid system (television format), then filmed. (Because of the low image resolution of the scan processor monitor, these experiments with video had to be filmed with a film camera.) Before the image source treated by the processor can be recorded or rescanned, however, the (interfered with) manipulated "image" needs to be stabilized and locked into place. The horizontal drift of the lines is stopped by means of a clock (video clock/variable clock) to readjust the altered image to the framework of the defined grid image so it can be recorded. This temporal operation of a clock occurs in the case of a scan processor by way of oscillators. The "newly" created "image" self-reflexively refers to the signal process for the movement within the image object, with its internal movement from top to bottom *and* from bottom to top visibly realizing the normally invisible vertical hiatus between lines.

The purpose of the clock in adjusting the random noise (*video noise*), so that we can see *and* hear an image, demonstrates how the horizontal drift of the scan lines can be locked into place as a frame and be visualized as the internal shape of the image's content as presented. The modulation of frequency and voltage controlled by this clock (which can occur either as limited to one single monitor or in a sequence of connected monitors) enables, among other things, the formation of a cylindrical form, which is equivalent to a video

image curved into an object (and does indeed consist of the informational unit of a frame). A shift in frequency (a change measured in hertz) modulates the image's course; the amount of voltage can influence the acceleration of the cathode rays (intensity) and affects the luminescence value. The deflection of the signal path induced by modulation of frequency and voltage marks manipulations on the border between the invisible generation and transfer of signals and a visible structure. These reflexively refer to the underlying invisible order and show, in a simple schema, how dimension and directionality can be formed—that is, manipulated—in the mode of electronic pictoriality. The transformative potential of the blank image field thus makes it clear that the visual component of video can take on any shape and can even become a three-dimensional object, anticipating, as it were, realizations of three-dimensional computer graphics.

In the same manner, Vasulka's *Time/Energy/Objects* belong to the category of "noise objects," for the transformations created by modulating the waveforms in the scan processor (with its oscillators) show an unfinished visual process consisting of the interplay of horizontal and vertical line shifts. At the same time, they amplify the nature of the blank image as noise. When the blank image is curved, stretched, and compressed, we hear *video noise*. The video image has become the presentation of its audiovisual structure. With such *Time/Energy/Objects*, Vasulka creates model forms of electronic images. These experiments point out the significance of the matrix in the electronic type of image: it is unstructured energy (video void) and contains the potential of all possible forms of electronic pictoriality (*audio* and *video*).

The visibility of matrix phenomena as a structure thus becomes possible, when processors electronically treat and form the "content" of a frame into abstract figurations. "Content" refers to the information of an "empty" television image, which does not convey anything beyond the sheer presence of information appearing in the video void. The procedures described involve processors and feedback technologies and demonstrate, from a multidimensional viewpoint, the electronically simulated images' potential for transformation: on the one hand, they reveal the ordering phenomena of electronic media; on the other, they contribute to the development of the vocabulary specific to media. The use of the clock adds a further factor, which is relevant for determining the position of video in the media system: it is the introduction of a programmable module providing the technical link between computers and video and indicating the multidimensionality of the videographical procedure with regard to the computer. This connection exists everywhere a clock (an impulse generator) permits controlling of individual frames (i.e., changing the moment of horizontal drift in relation to the television signal used). In such variations, audiovisuality can appear in any random structure, which can be presented in the given television/video format. This passage into an optative mode is available because the clock belongs to the category of programmable tools, or, alternatively, machines. With multifaceted digital "effects machines" the technical separation of video and computers as media

can scarcely be maintained. For example, with three-dimensional animation of moving images, the indivisibility of the technologies is a premise and also because analog and digital tools are modularly connected together in the devices.

In determining video's position in synchronic and diachronic media systems, it is significant that the work on—not to mention the acceleration of—developmental steps connecting video and computers has occupied the experimental tendency in video since the medium's early phase. The modular extension of analog technologies by digital ones belongs here. From this perspective, combining various technologies in video, like multiple layering, matte, and masking, with effects from computer technology—above all, digital morphing—presents excellent methods for making the matrix of fluidity and open-endedness visible. In the same way, modifying and converting electronic image signals into sound signals (and vice versa) gives expression to this abstraction and provides the means for changing shape and structure in the electronic medium's form.[67]

Regarding the structural analysis of video imagery, to trace the point still further, it can already be established at this point that a mechanism of vector circulation applies in the basic forms of video and an approach must accordingly originate in directional uncertainty and dimensional extension in video noise. This comes about, because, in drifting, precisely that technical-material formal context is transformed (if not actually removed), which guarantees the usual representational function of a technical image in an entity. From a stricter perspective, this means the analog media's features of representation as fixed by film and photography, which are now replaced by the direct presence of a videographic, continuous electronic impulse, which can, under the premise of a preestablished standard for the image format (broadcast signal, NTSC or PAL), be forced into the visibility of a matrix structure diverging in this form of presentation from the determinations of the conventional representative image (of the skiagraphic kind), where something called an "image" is resolved (fixed).

Vector circulation set the yardstick for simulation in numerical, binary-coded image types. At the hybridation level, they realize logically irreconcilable situations, which—in combining real and virtual—go beyond the electronic medium's restricted settings. In both cases (the electronic and the digital media), concepts of imagery in the pattern are respectively altered in the circulation (of signals and data): in one case, in the varying of a schema of pictoriality. Keeping the suggested media boundary to digitality, we could say the electronic medium simulates the category "image" through the pretense/simulation of its "content" (as defined in format) in a process of flow in principle open-ended. By contrast, the circulation process in the digital medium is capable, by the two components of simulation being optionally available, of realizing both pretense/simulation as well as disguise/dissimulation. Endless variability on the schema of image and pictoriality (the difference disappears in the digital) represents one among the possible variables for exhibiting digital matrix phenomena. We could say that the digital has in technical dissimulation—unlike electronics—both possibilities: bringing the matrix into the visi-

ble order and immediately concealing this process again. This second possibility, however, may not be seen as separate from the first—and this is the point—in that it is not here a matter of merely concealing the character of imagery, as can be the case in conventional analog reproductions. Instead, it is a matter of the indefiniteness of a paradoxical state, which becomes, with technical simulation, realizable as a new possibility for display. Couchot confirms this context, when he, in defining the hybrid, describes between real and virtual elements that necessary friction, which produces the diverse combinatorics in digital simulation.

From the viewpoint of differentiating the specifics of electronic and digital media forms, various theoreticians of the media, prominently W. J. Mitchell[68] and Couchot, have assessed the technical difference between analog and digital media with regard to the capacity for display resulting from it. Although both concur in ascribing an inherent representative function to the analog media image—for example, the cinematic image, by dint of the analog recording technology—the "digital image of simulation" (Couchot talks about *l'image simulée*, because it is based on computing operations) stands for the form of actuality. Mitchell discusses the representative traits of filmic and photographic imagery essentially through mechanical production and clearly delimitating it from digital image-processing processes. Mitchell terms the simulated image "the digitally encoded, computer—processable image as simply a new nonchemical form of photography or as a single-frame video."[69] In describing the digital type of imagery, Mitchell emphasizes the features of manipulation to underline a generally confirmed argument, according to which the digital, binary-coded image has its own status: it "blurs the customary distinctions between painting and photography and between mechanical and handmade pictures."[70]

Couchot derives the difference of technical representation in media from immediate presence more radically out of the definition of the digital, when he declares, the simulated image "is, however, a different thing from a representation, from a recording, from a trace." This other quality generates, "its own present among a quasi infinity of possible presents."[71] When it can be further assumed that all possible (that is, all conceivable) forms of image are realizable, then the position of electronic pictoriality consists in reflexively approaching transfer into the digital matrix category of imagery.

In the opposite direction, from the position of the digital concept of imagery, Couchot describes the origin of matrix imagery, when the light values in electronic display are converted into mechanically defined pixel values in integrating analog visuality into digital. "Physically, on the level of computers, the numerical image presents itself as a matrix with two dimensions of elementary points: the pixels. Differently from television, the position of pixels, as well as their chromatic and luminous characteristics is defined automatically by calculation: the television mosaic is now rigorously organised. . . . By contrast, it becomes possible, therefore, to shift an image deriving from analog processes to a numerical image by breaking it down into numbers with the aid of special cameras. The image

has become a matrix image."[72] On this numerical basis (endlessly repeatable in endless combinations) the computed image, the matrix image, confirms the concept of "every image": "The matrix image, when we define it in its morphogenesis, the networked image, when we define it in its mode of distribution, contains a potential infinity of other images. It is an image to-the-power-of-image [*image à la puissance image*]."[73]

In the light of the hybridity envisioned here, the observer in the end loses the possibility of orientation, as organizing in space and time and still existing in video's open dispositive are broken up in a potentially interactive setting. The observer no longer possesses a position determined in relation to a presentation form; instead addressing them means an effect of inclusion or, alternatively, implosion, something television has already presented metaphorically on the closed media level of its screen's surface. According to Couchot, this change designates the Matrix image's uchronic temporal character in visualization, where the *puissance* of "pictoriality" is fully deployed into the hybrid contact of the real and the virtual. Here the translocal matrix phenomenon is denoted (which does not indicate either time in the real world or a localizable site and a vehicle).

With this discourse, the paradigmatic difference of digitally simulated images is determined in comparing electronic and digital media. What is decisive is the observation that a presence exists in digitally coded, computed imagery, where displaying and what is displayed coincide in one form, and the "image" optionally gains or negates form and structure. In brief, with the simulated category of image, it is a question of a form of presentation, which endlessly varies a schema of pictoriality. This sort of variation, by contrast, describes in statu nascendi the transition from linear structure and sequentiality in electronic media to, on the other, nonsequential arrangement in hypertext.[74] The nonsequential network structure in computers can be more precisely described, if this textual concept is integrated with the basis of the machines' core functions and the change is defined in the concept of the hypermedium.[75] In their structure of bifurcation and layering, computers as components of hypermedia disclose multiple possibilities for options.

The written content of a change in the pattern applies, then, to video (if we follow Couchot's suggestion and include electronic imagery in the presentation mode) to the extent that, in principle, endlessly variable changes emerge in the image-object through recursion. They express electronic imagery's processual character, as already exemplified, *and* with that the variability in the process itself as well. The manipulative principle originates, as it were, in an endless variability—with linearity as yardstick—as regards "imagery" as a display schema. Parametrically, if not to say in its most radical form, video can "anticipate" the digital possibility of an "image-to-the-power-of-image," where video sets out its matrix phenomena in video noise. This would establish that, with a variability of the schema (of audio and video) as already established, it is a matter of a process allowing a matrix to be transferred to a visible structure. It follows that the possibilities for manipulating endless variability are the medium's core characteristics. It is not a matter of a display convention.

Digital pictoriality, varied on a schema of "imagery," comes under the concept of a technical "infinity." This realization is anticipated conceptually in analog media and, in fact, as Umberto Eco establishes, in an endless variation with its origins in painting with the breaking up of the closed surface structure of the picture in radical modernity. Under the heading of a new "infinity," Eco discusses the variation on the schema of "imagery," which goes beyond categories of seriality and repetition. According to him, "'variability' as a formal principle" may be less interesting today than "the fact, that one can make variations to infinity."[76]

Consequently, the character of simulated imagery as manipulation is not visible where the marks of difference among forms of imagery varying through mediatization are what determines style and form, but where traditions of imagery—endlessly variable through technical principles and formally repeatable—are continued as matrix and can be further adapted, adopted, and transformed. William J. Mitchell has summed up the characteristics of digital image processing's qualities symptomatically: "Digital imagers give meaning and value to computational ready-mades by appropriation, transformation, reprocessing, and recombination; we have entered the age of electrobricollage."[77]

If electronic imagery can be defined as processual matrix imagery, the level of pictoriality in computers possesses the pattern of this category of imagery to infinity. Because the results of the numerical construction steps do not correspond to the understanding of imagery and pictoriality, however, representatives of radical positions in the computer debate suggest avoiding a concept of imagery as far as possible and instead speak of iconic representations. Grahame Weinbren, theoretician of media and pioneer of interactive cinema, casts doubt on an appropriate use of language with digital images by dint of the technical configuration of computers:

> There are no images made of numbers. Numbers are abstractions. Numbers are non-visible, not even material, certainly not ingredients of a visual pie; while images have been essentially visual. Their visual qualities are encoded into numerical form for electronic storage and manipulation. But this process is not a superimposition of a new structure or composition onto images. If mathematical form delineates the digital image, it is inseparably bound up with en- and decoding. The "digital image," in other words, is not a particular kind of image, because it is not an image at all, if an image is understood to be a visual entity. The phrase "digital image" is a figure of speech, shorthand for the entire process of encoding, storage, mutation, transmission, and decoding. Only at the beginnings and ends of the process are there visual entities—in the middle there are only numbers and electrical and magnetic charges etc.

What matters here: "digital" does not denote a quality of media, which might contain visual information. From this, it logically follows, according to Weinbren, "To describe an image as digital is not like describing it as painted or cinematic."[78]

As Weinbren does cite as support for his argument, John Simon Jr. has, with his work in the Internet *Every Icon* (1996), performed this feature in the digital through

programming.[79] With this example of software art, Simon shows how like a matrix image, *l'image-matrice*, can look, which expands the parameters in space and time through constant modification in endless variations. In a defined raster of 32 × 32 pixels, *Every Icon* presents all the possibilities of imagery in this field in black and white (i.e., 1.8 × 10).[80] At an image speed of 100 pixels per second (the normal speed of a PC), it lasts 1.36 years, until all variations in the first line have gone through and exponentially 5.85 billion years for the complete transition of the numerical matrix image in the second line (see ills. 96–98). Simon's software art is interested in the programming of progressive numbers, where the software actually exhibits in binary mode all black and white possibilities of the elements' combinatorics in an image-field, until a "visual" state is reached, in which the element appears black and, with that, visible. "Imagery" as form is merged into the pure processual functioning of programming: "In contrast to presenting a single image as an intentional sign, Every Icon presents all possibilities."[80]

It follows from such reflexions that the area of visual display, which is identified by being programmable and develops from a source code of self-modifying sytems, is more appropriately understood with the concept of software art as suggested by Simon. Overall, we can agree with Weinbren that this area of application for visualization—based on virtual, hybrid operations—should be linked less with confusing image metaphors, which have different historical and technical connotations. The comprehensive discussion of the concept does not offer any uniform linguistic rulings for electronic and digital images, with which the "new" in the respective new media can also be discussed in relation to whichever media system is dominant, and with which genealogical models, could, therefore, be confirmed, which could diachronically and synchronically reveal how the forms of media interrelate.

To be able to connect with the electronic medium from the level of digital visuality and comprehend the transitions and commonalities conceptually, Dan Sandin's suggestion appears sensible: in descriptions of analog processuality in images emphasize those aspects that allow us to talk about coded generating of pictoriality in electronics as well. Sandin had established that video information is exclusively encoded in the scan lines. This technical definition supports determining the relations between video and computers as intermedial. It is particularly appropriate, because the coded information is understood from the beginning as much processually as transformatively. It contains auditive and visual possibilities for presentation, something Vasulka's electronic matrix image, *No. 25*, at least confirms. Video can figure in this discussion as a nonprogrammable form of coded information, whereas coding through use of binary numerical calculating systems expresses computers' characteristics. "We can start by looking at four fundamental characteristics of the computer—digitization, interactivity, random access to data, and programmability."[81]

With this conceptual convergence in coding, I would like to stress those common factors that determine analog video and digital computers and, at the same time, expand on the difference between video and other analog recording media. In this respect, Mitchell's

discussion of the "digitally encoded, computer-processable image" proves insufficient, as his object of reference remains a static image. We can agree with Mitchell initially, that the switch from photochemical to digital production in the area of static images can be defined as replacing emulsion with pixels. With moving images, however, the process displays more complexity and, in fact, does so particularly because the digital contains the processual technology of analog video. When using analog processors in video, a link exists between analog and digital technologies as media as they have to have a programming function (analog computers). Although the category of coding is meant to apply to both media, analog and digital, the aspect of programming with analog computers describes a passage from analog to digital, which can be defined, from the viewpoint of the computer debate, as hybrid. Here it is a question of video and computers relating ambivalently, characterizing a type of interrelations between media and unconditionally having to be separated from a discussion of a division in the media—before (analog) and after (digital).

The commercial video/music clip *All Is Full of Love* (UK, 1999, 9:20, color, sound) demonstrates how the analog type's model for intermedial interrelationships merges into a new communication form, where the separation of the media is removed in hybridation and communication itself is automated (i.e., has become a program). This music clip from the singer Björk has had a lasting effect on the dialogic function of that interrelation, with Chris Cunningham's iconic presentation of an anthropomorphizing machine-machine interaction, because the model of communication based on difference is here converted into a self-identifying process of commutation, which severs external interrelations or homogenizes them respectively. "For this reason," as Couchot says,

> there is, strictly speaking, no communication between a sender and a receiver any more, but a more or less instantaneous *commutation* between a receiver turned sender, a (in many cases, as in the networks, for instance) sender turned receiver and a floating theme (*propos*), which, for its part, sends and receives, increases or declines. The meaning is not longer generated by transmission and reception in alternating sequence, but following a hybridation between the author, the theme conveyed through machines or the Net and the receiver. This way of producing meaning is, of course, all the more marked the more intensively it links complex interactive and multimodal processes into the dialogue between humans and machines.[82]

In a machine-machine interaction simulating dialogue, as the music video from Cunningham and Björk performs, the machines first create their doubles on the model of identicalness. Considered within media's history, this process approximates to materializing a mirror image in such a way, that the boundary of media has been removed and interaction between the (real) body and its (virtual) replica has become possible. On the level of hybrid interaction of real and virtual elements, this process amounts to not being able to differentiate between the elements (of both identical machine bodies). The mechanical

process displayed in this respect completes the shift in the media from the technology of reproduction (analog technologies) to reduplication (digital technologies). All the same, the accustomed frame of reference in mechanical construction is retained, as the two anthropomorphized machine bodies are connected to tubes and steered by claw arms.

With the model of a machine generating itself, every frame of reference from cultural semiotics must, in the last analysis, collapse. The video work exhibits this process and, with that, makes the origin of hybridation clear after a fashion including and, in relation to difference, evening out any level of engagement between media, as well as between cultures. Difference does not count on the level of numerical simulation and, in that, establishes a new paradigm. The process is underlined by the video clip to the song "All Is Full of Love" thematically raising the principle of misrecognition in a closed system, as existing in the narcissistic underlying motif of reflexion, to a technological level, which displays a factual self-sameness through reduplicating machine bodies. In this way, the communication principle of a narcissistic reflexion based on a (simulated) dialogue/exchange of similarities is replaced by the commutation principle, which signals the (endless-) circulation of "sending" and "receiving" in dissimulation.

The principle of numerical simulation here becomes visible in the multiplication of sameness, where machines "create" their own models, which takes up the position of the reproduction in self-reflexion. The change relates to the difference between image (reflected body) and reproduction/double (reflexion): in hybrid interaction, both sides are identical. The levels of reality and virtuality are merged, so that the body of the "original model" is indistinguishable from the "double." This doubling is underlined, when the machine creates the double and integrates with it in an act of love, through which the "instantaneous commutation" happens in a closed circuit. This apparently biological merging of machine bodies is preceded by the generating of the anthropomorphic apparition of the machine, where mechanical components (torso, arms, legs, head) are endowed "seamlessly" with the gestures and the facial expression of Björk. The video particularly demonstrates the integration possible via computer graphics of "real" facial features and muscular movements into the robot machine. On this level of reflexion, difference between media is eradicated in favor of a synchronic equivalence of machine bodies homogeneously and homologously composed of various sorts of components and not really interacting, but rather being expanded using identical building blocks. The model of interaction is, in a sense, driven to absurdity: in the mechanical mode of digitization, the potential for difference contained in "inter" (this applies to both intermediality and interactivity) disappears. The interactive-virtual model of hybridation here presented culminates in sameness of difference (i.e., there are two machine bodies, which are not similar but rather identical), in self-sameness, therefore, which has only now become possible through the technical level of computer simulation.

If, in this example, the communication model of language based on dialogue has transformed into self-identical commutation on the numerical level, this level of the media's

development also shows in hybridation a divergence from McLuhan's model, which always also connotes in the massage of the message working on and working out beyond the preceding medium. As already discussed, McLuhan's model declares that capacity, operationality, and velocity change with newly emergent media, where the *massage* relates explicitly to the change of yardstick, tempo, and pattern. This latter can be confirmed particularly in the relation of analog video and digital computers. With the new level of hybridation it, however, appears that this model cannot be continued in this way, as the dimension and the effective radius of increasing interactivity and virtuality lead to changes in the structural characteristics of scale, tempo, and schema.

"With interactivity it consequently becomes possible in a way," as Couchot writes, "to model the model itself and to confirm its systems of functioning in such a way, as if we were subject to the real conditions of experience. Simulation automates experience and makes it limitlessly iterable. It replaces what is originally real with an abstract program—the software—which is capable of working just like what is real and of responding to questioning of experience."[83] Interactivity is, with that, defined as a multiple concept of function, which goes beyond dialogical exchange relations and relations of ambivalence in the media dimensionally but also contains the categories of substitution and self-reference. Interaction finally denotes a process of mutual interpenetrations, as these are already anticipated with McLuhan in the notion of a progressing development of the media. On the basis of McLuhan's understanding of media's extensions of the senses, interactivity means, as Couchot demonstrates for virtual reality, a "new form of relations between humans and machines."[84] It extends the model of intermedia exchange relations into, in principle, innumerable possibilities (i.e., it obviates this model in automatization, for example, by realizing negation and performing logically incompatible situations).

What is new lies in changing the structure itself, where, as the video example *All Is Full of Love* demonstrates, the step from invisible matrix to visible structure does not communicate any difference. With the model of reduplication, as displayed figuratively in the video, it is indicated that the matrix invisible in the coding does not reach the "surface" of visibility in all possible forms, but in viewing basic traits of digitalization (endless reduplication after the principle of binary coding). The status of the matrix changes with that, as it has become a visible structure, which does not only produce logically incompatible phenomena here (like the mixing of real and virtual elements in the anthropomorphic machine). Beyond that, the matrix not only equalizes differences through this paradoxical manifestation. In the situation of commutation shown in the video clip, it is subject to a concept of self-referentiality, which does not optionally apply the potential of the *image matrice* to infinity, but refers it in effectively the opposite direction to the process of coding itself. With that there arises a mediatized level of reflexion, where the self-reflexive progression of the discourse in the video clip brings the self-referentiality in the technical process of simulation (on the figurative level of the self-identical hybrid figure) onto the surface of visible configuration. In this process of hybridation, making the matrix

phenomenon visible in the digital, defined as a paradoxical order, becomes itself a border phenomenon of its "visible" apparition. What we get to see in the figuration of *All Is Full of Love* is a making of the potential for dissimulation of the "media-integrating machine, the computer" apparent.

These visualizations of mechanical simulation under computerized conditions are, insofar as they comprehend interactivity and hybrid relations between humans and machines, to be reckoned under virtualization. Because, however, under computerized conditions, forms of electronic transformation and their pictoriality are also included, where technologies of visualization show both participation in a rupture and processes of continuity as well, the refined concept of simulation can also be applied to the potential of the electronic medium video. I would like to designate the medium's limits clearly with the notion of hybridization, as virtualization and interactivity display a technical level of digitalization, which, in relation to the existing media system, necessarily constitutes other forms of media.[85]

2

The Reflexive Medium

I will describe the particular quality of video as a reflexive medium using various positions and directions, respectively, from the experimental video of the 1970s and 1980s to the present. I am proceeding from the observation that the level of debate with other media is necessarily shifting in the timeframe, and, in fact, following the general development of the media. For example, television and performance are significant in the early phase, computers and more complex digital media in the present. Changes in the technical quality of images—as they are determined by image formats, magnetic tape, sensitivity to light, image stability, and the introduction of new machines (beginning with the video recorder and going up to digital effect devices and software applications)—should not be neglected. The discussion does not proceed solely from how the material has to be limited but primarily from conceptual considerations on the videotape format, and it includes subsequently installations and performances—to the extent this does not reciprocally concern video performance.[1] Such a limitation serves to focus on how features of construction specific to video are defined for an audiovisual language of the media, where whatever is the medium of display—like the monitor/screen, the life-size screen, or the installation in space with several projection surfaces—is not unconditionally the primary decider. Second, I deal with the dispositive structure of video and more precisely with such works, which are reflexively related to the topic of image and its medium, be it in the form of video performance, video installation, video sculpture, or hypertextual linkages. In this, it is a question of noting how the open, dispositive structure of camera and monitor image has stimulated in numerous works from the 1970s various ways of testing out forms of communication in video. And, in addition to that, what is determined by the standardized image format appears in this phase as a parameter, which is integrated visibly (and occasionally audibly as well) into the stages of articulating the electronic vocabulary.

Applying these selection criteria, I will discuss installation and performance works with video, which self-reflexively take up aspects of the dispositive arrangement and of the nature of the screen image. I will separate out from them the applications of video as a technology for documenting other media images as well as the praxis of video as a projection format for multimedia installations. The use of video technology in the display medium of interactive and immersive, Internet-based applications must also remain mostly unconsidered, because, on the one hand, video appears as an intermedium assigned to the category of hybridization, and, on the other, as a possible form of movement, videographic images of transformation figure, which are integrated, for example in virtual environments (such as cyberstage), into real-time animation. If in these treatments video merges into the matrix of computer media, another stage of the development of the media appears, which no longer belongs to the realm of video.

This development is, however, of interest for the suggested discussion of the reflexive medium from the viewpoint that the link is anticipated in the medium of video itself (i.e., is being cultivated prominently in the direction taken by image technology). This is the case, for example, when video experiments are conceived and carried out via a direct linkage of video and computer technology. Investigating the possibilities of video and audio in complex spatial interactions, where, for example, several recording and processing levels interact *live*, all that also comes about with the intention of expanding video's potential. In contrast to references to video by other media in interconnections between media, this application of video technology is accompanied by the interest in investigating the forms of presenting pictoral processes in the electronic medium itself and in analyzing them in the context of how analog-digital media formats are configuring themselves as they develop in parallel with one other. This direction in video praxis aims at exploiting the cultural form of video in the media fully. Experiments seeking to stress the independence of video are strongly marked in the early phase, because video is inferior to film in terms of the technical quality of its visuals. To better account in this discussion for the capacity of video as developed in this competition among the media, a main focus of demonstration and analysis rests on the technical arrays, which have been tried out in the history of the medium. In the end, it is a question of repeatedly making connections to other technologies productive on the basis of video and of integrating them into the development of the electronic medium's formal language. This understanding of video as an open field for experiment concerns technically the application of synthesizers, processors, and keyers and, in terms of media aesthetics, the connection to music and language (particularly in feedback).

Experiments putting video in the context of other media are governed mostly by an almost scientistic research premise, which is motivated technically as well as aesthetically and aims to present video's qualities reflexively in more complex forms of illustrating audiovisuality. In observing how analog and digital pictoriality comes together and merges genealogically, particular attention attaches to various stages of working with

video, in which using computers in video praxis produces new aesthetic formations in the visual. What is significant for the debate on video aesthetics in media systems turns out to be largely the vectorial directions in the development of the media toward pluralization and optionality that correspond to the constructional features of video. In relation to the potential for connections between the media and for forms of presentation in the digital simulation media, the "video artists" working experimentally in aesthetics and technology deserve the greatest regard.

The coherent interest in technology and aesthetics, which distinguishes this group of "image technicians," makes the experimental initiative in video structurally interesting for developments into video, music, and advertising clips. Comparable to the abstract forms of image in experimental films, which challenged the customary viewing expectations of audiences in the twenties as in the 1960s by structurally radicalizing film and subsequently gained access in an aesthetically moderated form into commercial advertising aesthetics (and have been assimilated as media culture by other areas such as graphics and design as well as feature film), the tendency to abstraction in the experimental video of the 1970s and 1980s has an effect beyond the medium. Experimental video aesthetics, which makes transformative and processual procedures visible on the display level, develops creative traits, which are picked up by commercial video clips for product advertising (mainly by music videos), are aesthetically polished and further adapted. By contrast, experimental characteristics, which arise, for example, through modulating frequency and voltage in the signal processes displayed and overload sight and hearing, go structurally much rather into the image repertoire of VJ performance. Recognition of experimental video praxis itself remains restricted to a narrow cultural segment right up to today, not to mention to niches of the exhibition and festival business (and a few television broadcasts). These concepts have been influencing the sector of installational and multimedia works in video since the 1970s. More recently, aspects of co-creativity with machines and with the performativity of interactive machines is finding a conceptual expansion with initiatives in media art, which aim at creating human-machine interfaces. The experimental video praxis of the "image technicians" functions as an avant-garde for a "digital aesthetic" is just now developing.

We can say that the founding of video is shaped by this grouping from not only predetermined institutional and economic perspectives but also aesthetic ones, though it does not share representatively in establishing this stage of development. To put it another way, this tendency sets the yardsticks for an avant-garde in video, something that—as with every avant-garde—means that it is overtaken by wider, also commercially more successful and differently orientated goals in terms of institutional politics as the medium establishes itself after its experimental phase. Certainly the most prominent example is the career in the media of the Korean video pioneer Nam June Paik, who himself belongs to the early video scene and draws closely on the dispositive and programmatic structure of the new core medium television to promote the successful establishment of video as a new

sector in art, which gains access above all via screen format to presentations in museums (including the sculptures made from monitors). Through spectacular public stagings effective in the media, Paik has been repeatedly in a position to link his name[2] with an initial event in the development of the media (like the first video broadcast, electromagnetic manipulation of the television image, the live satellite broadcast of the opening of Documenta 6 in 1977 and the development of a video synthesizer), with which he influences the environment of other video artists and image technicians who are likewise engaged in this development and are realizing at the same time as Paik or even before him the same or similar experiments with video.

This example shows that a gap in development opens up typologically between adopting experimental video aesthetics in the growing commercial production area of visual culture/electronic culture and forgetting structural concepts and their developers, who have actually brought this video aesthetic about and—what is often overlooked—are still bringing it about. Inclusion shows, for example, where the video walls developed in the art context from numerous monitors are meanwhile reserved in public space for transmitting news, sporting events, and advertising. Exclusion means also the loss, as is inevitably noted in every development of the media, of the avant-garde function of certain experimental arrays, which accompanies the paring away of the roots of electronic media culture in the wider video debate. A presentation of the experimental direction—which is appropriate, in its technological understanding, too, to its historical status and its influence on further developments in media—is missing, because the discourse is carried on in terms of a few names, which have been able to achieve a certain success in the exhibitions and museum context, respectively. What carries more weight, however, is the reduction of the discourse predominantly to an art scene (Happening and Fluxus), the exhibition and museum business (video installation, video sculpture), and television broadcasts (video art in the television) results in a general underestimation, especially of the experimental development of video, in which video is denoted as *the* reflexive medium![3]

An as yet undecided problem area in terminology should be foreshadowed, which forms around the conceptual field of video art, art video, or video film and dates back to a historical antagonism (from the early phase of the medium). Various groupings took various sorts of interest in the then "new" medium and embarked in parallel on essentially three directions: video will, therefore, be described and analyzed here in the categories of "documentary video," "artistic video," and "technical-aesthetic video."

In the absence of coherent and unambiguous conceptualizations, the term "video art" has progressed to become a comprehensive working concept, which includes generally how the direction of image technology is denoted and replaces the concepts of video experimental video praxis and video film. The technical-aesthetic phase important to this discussion is not represented by any explicitly defined line of argument because the language used in the video debate has scarcely changed since the early phase. A gap exists in the research therefore, where, still today, a particular definition and a coherent discursive

survey of this grouping is wanting. Until now, the main representatives of this direction have overwhelmingly come in for discussion under the heading of "video art," which has the disadvantage that it carries other connotations as well, like, for example, the artistic performance video and the so-called artist's video. Both designations arise from discussion in the context of art and are not determined by a way of thinking, which comes out of categorization from the media, that is, from technology. Under such categories, video could be introduced into the art world as a new genre, but this discursive path is less suited to debating a new technology, which contributes to further shaping and varying electronic culture in the development of qualities specific to media and has been introduced paradigmatically with the new core medium, television. I shall consider these two developments, as they mutually influence each other, to the extent they contribute to establishing the characteristics of video as a medium.

Alongside the video works arising in the art environment, a documentary direction has formed in the context of political groupings, which have engaged primarily with the television format and the information medium. The direction of experimental video filmmakers-artists, more significant for determining video aesthetically, demonstrates crossovers with the two other fields of video praxis. The talk about *one* group or direction is indebted only to the pragmatism of this investigation and should not allow the wide diversification of experimental initiatives, as they arise alongside each other, partially supplementing and propagating each other, to be ignored. These "image technicians" are exploring widely across various components and facets of the apparatus, of the level of imagery, of the structure of imagery, of deconstructing the visible, of the interrelation of image, text, and writing, of video and computers, and of narrative and poetic techniques in the transition from video to hypermedial and virtual formats of media.

The context of video's development is, on the one hand, determined by experiments in television and by the institutionalization of alternative programming structures deriving from the political scene. On the other hand, the early phase is distinguished by the cultural setting of performances and happenings in galleries and extended spaces for art, respectively. The development of various video directions in the American context receives notice initially, because the way the structures parallel each other and run up against film (but also with established media institutions of mass communication and of the art business) is particularly pronounced. Altogether, video can, in the early phase of developing as a medium, figure as a new technology, an experimental sphere of production and an alternative form of television.

Experimental Phase

With the introduction of the battery-operated portapak camera by Sony in 1965, the development of recording on magnetic tape and of the video recorder,[4] a machine for recording images magnetically, which allows rewinding of recordings and with that replaying

them, video originated around 1968/1969 as a medium possessing separate technology for recording and playback. Not until the middle of 1969 did working with videotape establish itself through technical developments and the spread of affordable, portable video equipment on the market; by contrast, television experiments without videotape predominate in the early phase.[5] Whereas the first generations of portable portapak units (1967, camera, cable, recorder) could only record (a larger, external, video recorder was needed to rewind tapes and was used as a rule in television production for the control of movements when recording sport), the new version of portable video technology introduced in 1971 possessed the functions "record," "playback," "rewind," and "forward."

Experiments in closed-circuit techniques precede the use of (rewindable) video tape, and in them the video signal is transmitted synchronously or fractionally delayed from the recording camera to the display monitor without recording on tape, or the video signal circulates in the devices (feedback). Unlike the first experiments with video and television at the beginning and in the middle of the 1960s, which worked with a closed circuit for input and output, using videotape extended the structure and the organization of video works. Installational works arise with live cameras and delayed feedback, mixtures of live and prerecorded material on tape with television images, also using "live feedback" techniques.

Woody Vasulka describes the spread and acceptance of the new medium retrospectively, starting with its technical development:

The Portapack was considered a revolutionary tool, almost a weapon against the establishment. Overnight it dissolved the hegemony of documentary films. A vast number of genres sprang up (including the notorious 30 minute single take), and the documentary branch was never the same again. The middle ground was also interesting. With tape, new networks of distribution were quickly established. Video became truly international. It was easy to duplicate, mail and view. With the introduction of the video cassettes in 1973 it became even easier, and harmonized with the exhibition purposes of video. By the mid-1970s, video as art was fully entrenched in the galleries, with many developed genres, forms and concepts.[6]

Strictly speaking, portapak technology is a spin-off from industry and was prized by communal groups for its nonprofessional standard and its multiple possibilities for application. They formed themselves into video cooperatives, to develop alternative models of television and to evoke media events, which opposed control by the media industries.[7]

Portapak units were built by Sony, Akai, and Shibaden and were initially introduced in the U.S. market. Video equipment for the nonindustrial sector is not available, as the British video pioneer David Hall confirms, in Europe until around 1970:

Some experimentation occurred with a few artists (including myself) and community groups around 1970, but I think the significant moment was when I made ten unannounced *TV Interruptions* transmitted by Scottish television in 1971. It has been claimed by writers that "these works

have come to be regarded as the first example of British artists' television and as an equally formative moment in British video art." Also I was the first to introduce *Time Based Media* in an art context, and in 1972 created the first fine art degree department in Britain to acquire and promote the use of video (together with cine film, audio work and performance). The department was titled Time Based Media, at Maidstone College of Art, Kent.[8]

As its program, the transition from a technical novelty and documentary recording instrument to artistic happening and media event ushered in the first video-television exhibition, "TV as a Creative Medium," in New York in 1969. "In the spring of 1969, an event transformed the then-underground video scene into an aboveground phenomenon. Frank Gillette received a phone call from Howard Wise, a gallery owner on posh 57th Street in Manhattan.... He invited 12 video artists—including Nam June Paik, Eric Siegel, Paul Ryan, and Frank Gillette—to produce something for 'TV as a Creative Medium,' which opened in May 1969."[9] Video pioneers, who, like Paul Ryan, stand in the documentary tradition of film and television, here come together in the gallery context with a video artist such as Paik, whose approach is conceptually anchored in the Fluxus movement. Deirdre Boyle characterized this mixture as the hour of the American video scene's birth. "'TV as a Creative Medium' was a pivotal event for the video underground, attracting considerable public attention to the new medium while serving as a catalyst around which the video community coalesced. The show functioned as information central for practitioners and would-be videomakers who until then had operated in relative obscurity; many individuals who would play major roles in the video scene met there for the first time."[10]

What preceded it was the media event Paik initiated with the first playback of a video recording with a portable video camera, which has gone down in the history of media. "One version of the birth of portable video begins on an October day in 1965 when Korean-born artist Nam June Paik purchased one of the first portable video cameras and recorders at the Liberty Music Store in New York City.... That evening Paik played his tape at the Café au Go Go in Greenwich Village and circulated a video manifesto declaring this new electronic medium would revolutionize art and information: 'As collage technique replaced oil-paint, the cathode ray tube will replace the canvass.'"[11] Paik's claim to have been the first artist and founder of video art has not gone without criticism, as Boyle remarks in her investigation of the video activists in "Underground Video." On the one hand, differentiating "art" and "activism" in the video scene of the early 1970s plays no role.[12] In the same way, the alternative television movement, which calls itself "Guerilla Television,"[13] equally acquires a public presence from the mid-1960s onward, that is, in the information media, with the introduction of portable video technology. On the other hand, Paik's version of events needs correcting. That is because rewinding was not possible with the portapak Sony brought out in 1965, so that Paik was in any case dependent on additional technology to play his tape and, in fact, on the long-available video recorder, which belongs to the professional realm of television and not the new video technology.

The hour of video's birth as a medium, therefore, does not arrive with the introduction of the Sony portapak camera and not with Paik. It is Andy Warhol's achievement to have recorded the first videotape at the technological conjunction of television and video and to have displayed it in an installation together with film. It is established that, before Paik bought one of the first portable cameras and recorders in October 1965 and presented his tape in public (after the necessary rewinding on another machine), Warhol produced his first video tape in August 1965 with Norelco video equipment, which he included in his first double-screen film showing, to construct in *Outer and Inner Space* (USA, Double Screen Film, 1965, 33:00, b/w, sound) a dialogue between Edie Sedgwick's image on video and her image on film. This comes about by projecting the videotape recorded first onto a screen on which Sedgwick's portrait is displayed life size. In front of this screen and her own image, the same person is recorded a second time—now on film —as she relates to the previously recorded video image of herself, listens to herself, and visibly talks about and with herself.

What is certainly interesting in *Outer and Inner Space* is the transition from film to video in using a professional video system. To set up a dialogue in media, Warhol integrates video as the inner image of a frame-within-frame structure in a double-screen film installation. The effect of a double portrait results from it, as Edie Sedgwick can be seen in the film communicating *live* with her previously recorded and projected portrait, as if both levels of the image belonged to the same reality. The film installation reinforces this impression, because it shows Sedgwick in the same image (frame) as her video image, where both faces are turned to each other. Callie Angell has researched how this work came about:

The summer of 1965 was the time when portable, affordable video equipment designed for the home market first became available to the general public; a number of different companies, including Sony and Matsushida, were developing their own home video recording systems and beginning to market them at prices ranging from $500 to $1000 each. The Norelco video equipment was a rather high-end system costing about $10,000, and it was loaned to Warhol as a kind of promotional gimmick. . . . The Norelco equipment was delivered to Warhol's studio, the Factory, on July 30, 1965; in fact, the arrival of the video camera and the ensuing conversations about it between Warhol and his colleagues are some of the events documented in the early chapters of Warhol's tape-recorded novel, *A Novel*. During the month that Warhol had this video access, he shot approximately 11 half-hour tapes (at least that's how many Norelco videotapes have been found in the Warhol Video Collection). One of the interesting things about *Outer and Inner Space* is that it contains, in effect, the only retrievable footage from these 1965 videotapes. The Norelco system utilized an unusual video format, called "slant scan video," which differed from the helical scan format developed by Sony and other video companies, and which very quickly became obsolete. There are now no working slant scan tape players anywhere in the world, the other videotapes which Warhol shot in 1965 cannot be played back, and the only accessible footage from these early videos exists in this film, which Warhol, in effect, preserved by reshooting them in 16 mm film.[14]

But comparison of Paik's and Warhol's positions also does not determine the actual historical beginning for researchers. As Jud Yalkut, one of the first filmmakers to work with video, confirms retrospectively, we have to start out from a large field of parallel developments so that the history of video cannot be presented through single events and individuals.

Although, as with most innovative ideas which have changed the world, there were some parallel strains in developing the first video art, I would say that Paik was central to that core. Almost simultaneously with Paik's Galerie Parnass show of modified TVs in Germany, Wolf Vostell started showing pieces which involved TVs and broadcast television, but Vostell's innovative "decollage" TV work was relatively short-lived compared to Paik's ultimate commitment. Warhol might be considered a dabbler in video, just as he was often given early opportunities to work with different technologies, such as the first Amiga computers, because of his notoriety. It became a publicity push for companies introducing these technologies, and never became central to his own work.

When I started working with Paik in 1965 after filming all of the pieces in his first Bonino Gallery show, there were scant others trying to use television images with film. Our collaborative work predated accessible videotaping, and Paik's modified TV images would have been impossible to record because of the disrupted sync needed to produce them. Stan VanDerBeek briefly filmed some of Paik's images, but it wasn't until later in the sixties that we had a handful of a few other filmmakers foraying into video, like Emshwiller, Scott Bartlett and Tom DeWitt.

It was the final introduction of the Sony portapak in 1968 that initiated the big sweep of artists into the video fold, coming from many other disciplines, like filmmakers leaving film for the simple sound synchronisation of video, performance artists in search of moving documentation, radical documentarists, and others. Also, it was the development of independent engineers who created colorizers, video synthesizers, and supplementary devices which afforded video artists aesthetic means unaccounted for by the video manufacturers. Video installation art began with early pieces by Paik, and was later defined by early Vasulka installations, and many of the artists featured in Howard Wise's "TV as Creative Medium" show, which I feel was the apotheosis of the video art revolution.[15]

More significant for the development of video as a medium than the controversial story of its origins is the explosive growth of fascination with the medium around 1969. At this juncture, acquiring the technical devices and dealing with video technology happened at a distance from and outside of established production and distribution routines in institutionalized television and its program structures but also removed from experimental film, and sometimes strictly rejecting it. Surrounded by this media technology, Paik can convincingly claim an ideological position as herald of a new (electronic) age for the media, whereas Warhol attracted less attention with his aesthetic analysis of how film and video could interact qua media, but he, nevertheless, undertook a comparison of the recording and playback functions of both media. Above all, the double projection illustrates the possibilities for playback specific to video, which permit the image of the same person to be doubled in the one image and brings out the particular live character of video.

Video cooperatives put more weight on the live aspect as they promote the use of video as an information medium; however, not just alternative, countercultural movements, which formed in the 1960s in Western Europe and the United States, are interested in video. The setting up of video studios at the public and the commercial television broadcasters also proves to be an important forum for technical-aesthetic experiments. Whereas the idea of a video studio aims, from the viewpoint of program directors, at artistically developing television and exploiting aesthetic innovations for the business of commercial broadcasting, video artists can for a time experiment under professional conditions with electronic images, how their forms emerge and change through effects like feedback and delay.[16] These sites of production have become important for electronic experiments, which belong to the graphic tradition of abstraction and produce new images with movement, light, and color and contribute within television to multiplying the visual presence of the program structures. For the documentary video movement, the television broadcasters' video studios mean a step toward professionalization. Initiatives from documentary film tying the inevitable technical inadequacies of "underground video" in its initial phase into an aesthetic concept also gain reinforced emphasis in their radical claim to decentralized information media. The nonexistent video edit and the irregular image quality are held up, for example, as a sign of quality in a direct and authentic television and declared to be a style, borrowing on documentary strains in the history of the realist film. The French *cinéma vérité*, in particular, and the American *direct cinema* of the late 1950s and early 1960s are models.[17]

The video material available, half-inch tape, does indeed allow synchronous recording of image and sound but produces a pulsing instability, similar to filmic flicker, in the gaps between the scan lines. For television activists such as Frank Gillette and Ira Schneider, it is precisely in the technical imperfection of video where lies the desired index of difference to commercial film and also to film. "In exchange for the immediacy, portability, and independence video afforded, its makers had to compromise on image definition. The abstract, often murky black-and-white image was far removed from the rich textures and color palette of film. And when compared to broadcast TV, at the point of image reception on a home TV set, half-inch video's 220 lines of resolution was unmistakably inferior to broadcast's 320. Still, for Schneider and many others, the technological trade-off was worth it for the range of new possibilities video did provide."[18] In general, it is true that the character of direct application in mobile video technology takes precedence over considerations about the aesthetic constitution of a product.

Video cooperatives in Germany, which—like the filmmaker cooperatives—were founded in the 1970s on the basis of communal use of the technical equipment, frequently took up publicly a counterposition in political debates through their direct presence as media. Video activists in the United States, as in Germany, took part in the burgeoning protests and violent confrontations between organs of state, the democratic movements, and oppositional and militant forces as well (such as the Black Panther movement and

anti–Vietnam War demonstrations) in such a way that they recorded and presented events on television. In conjunction with these activists in the video scene, the early television and video debate emphasized video's freedom of expression compared to television as an institution of social control. With a view to the British context, Roy Armes characterized the basic relationship of the new media, news communications, and consumer industry as follows: "Our broadcast news and information are far more tightly controlled by politicians than are newspapers or journals: radio and television have for this reason to be seen as new forms of social control. . . . In the struggle for understanding of and control over the new media a particular importance attaches to those systems—still cameras, sound and video recorders—which allow us to act as producers as well as consumers and to create our own forms of sound and image expression."[19] In retrospective assessment, in the cluster of media produced by electronic recording and transmitting systems three groupings can be discerned, which must be more closely examined in what follows to determine what contribution they make to the further development of video as medium.

Video, understood as an electronic medium, which is suitable for television because of basic technical qualities, is employed by the first group of the political movement with a view to alternative television. The second group consists overwhelmingly of creative artists, who try to integrate the then-new medium into the gallery space through a continuation of happenings, Fluxus, and Event Art, and establish the beginnings of so-called artists' videos. The third group emerges from the area of technical experiments with electronic image and sound signals, is interested in abstraction and variation of signal processes, and in comparison to the two other directions, decisively fosters the development of the video medium.

Guerilla Television

The first grouping is characterized by journalistic, radical democratic, and political activities in the media, which can be attributed conceptually to the idea of "guerilla television," even if considerable differences exist in individual cases. Political groups and alternative movements in the United States, which take up the video medium, have sought to establish a radical form of television. To an extent directly and resolutely opposed to the existing television broadcasters, they try to bring about social change that way.[20] Media cooperatives were founded in France, England, and Germany as well, which advocated citizens' television and saw video as an instrument for countering standardized program structures and aesthetically homogenized offerings. Although the traditional gender roles in the American television avant-garde remained untouched,[21] their countercultural protest aimed, nevertheless, at stereotypes and inscribing of conformist patterns of behavior in the entertainment culture of commercialized television. That these countercultural currents secured notions of such roles, as these further affected all areas of the alternative scene structurally, that is not reflected self-critically in them—a process pointed up

explicitly by later feminist critiques of the media. Video's focus lies elsewhere; its potential stands, above all for a countermodel to the new televisual reality, which reflects plural, regional, and communal interests (community video) in opposition to the organs of the state and the media concerns.[22]

In their efforts to institute a more strongly decentralized sort of television, this group is notably influenced, particularly when they regard media theory and political practice as interlinked, by Marshall McLuhan's media theory. McLuhan's *Understanding Media: The Extensions of Man*, published in 1964, posits the age of television as shifting the paradigm to decentralization and that, in fact, because of a new phenomenon, the interrelation of the local and the global.[23] R. Buckminster Fuller, by contrast, opposed the dominant specialization with comprehensive thinking derived from system theory and provided for the video activists a complementary theoretical model as radical as it is influential on them. According to Fuller's analysis, specialization cannot contribute to maintaining humans on earth, because it grasps only single functions and not full contexts, which are needed to "govern" the earth. Fuller, who develops this theoretical premises on closed-loop thinking from navigation, designs synergetic concepts, which he bases on general, physical principles in order to also understand the maneuverability of the "Spaceship Earth" geopolitically. According to Fuller, this is necessary, because humans have to learn the way the circulatory system "Earth" functions, and with that, but "without an operating manual," how they can survive. On the basis of Fuller's cybernetic approach, the utopians of the video scene can create their media cultural visions of surviving on earth technologically and their ideas of comprehensive networking. It is not only the political video scene that orientates itself using Fuller's text, *Operating Manual for Spaceship Earth*,[24] but rather an entire generation of "Whole-Earth" projects.[25] Together, McLuhan's media theory and Fuller's geodetic thinking[26] underpin the optimism over the media of a video grouping, which—in harmony with a broader alternative movement in society—promotes institutional independence, the open access, in principle, for all social groups to the means of production and the idea of "do it yourself." This notion includes renouncing technical perfection as a deliberate "stylistic device." The understanding of the media remains, all the emphasis notwithstanding, generalized: it does not intend any realization of aesthetic techniques and technically possible effects. With that, any reflection on formal aspects in dealing with the media is simply missing from such culturally critical visions on the level of their content. No technical and aesthetic yardsticks are set up, which could contribute to further differentiating and establishing video's specifics.[27]

Artistic Video

The second grouping arises essentially from the art scene and comprises conceptual artists, Fluxus activists, and other artists in the sections event art, environment performance, happening, and intermedia. They are interested in pushing out the boundaries of what they

see as the closed context and exclusivity of the gallery and exhibition space—the so-called White Cube[28]—for example, by opening up new locations for exhibitions. Many artists working with video feel the particular boundaries of the cube, which prescribe the defined framework (of the art location) in the white gallery space, as disturbing, restrictive, and exclusive. They interact with this precondition by, for example, carrying out performances with a hand-held video camera, which reproduces circumstances of architectural space in disorientating close-up and set in motion. The neutrality of the white walls can also be countered dynamically and disruptively with cameras attached to cables for mobility. In his *Dynamic Field Series* (USA, 1971, 23:42, b/w, sound), Peter Campus contrasts the camera's lens coverage with the field of not only the performer's perception but also the viewer of his actions on tape, when he crosses the space with the camera pointing at his feet and sets it on the floor or pulls it up to the ceiling on a cable.

With such working methods, other artists of site-specific video installations model how they understand video in transition from the art space to the laboratory of experimental interconnections. In *Claim*, Vito Acconci puts himself into a cellar blindfolded and via video from there verbally attacks the audience, which is following his performance on monitors in the gallery space (USA, 1971, 62:11, b/w, sound; an hour-long videotape *Claim Excerpts* documents the three-hour video of the live performance). The audience of *Claim* has in reality the possibility of actually entering the cellar under the gallery space, in which the video recording of the action can be seen happening at the same time and of facing Acconci directly during the performance. No one, however, takes advantage of this possibility, because Acconci is holding a crowbar in his hand during the three-hour performance and—clearly convincingly—is threatening to kill everyone who invades his space. The aggression with which Acconci announces via video that he will immediately kill any intruder (visitor) into the live performance's cellar provokes from the artist's perspective a removal of the media boundary. Acconci declares *live* that he will regard any visitor of the performance space as an intruder into his realm and that this latter is, therefore, risking his *life*. The media boundary unilaterally crossed by Acconci is maintained by the audience, which takes the declaration in the art space seriously and keeps its distance from this reality. Consequently, the live-medium of video separates the space of the physical action from the location where the image of the action, simultaneously recorded and reproduced, is broadcast.

Acconci intensifies this basic situation in *Pryings* (USA, 1971, 17:10, b/w, sound), when, within a restricted action space, he physically "attacks" his partner in performance, Kathy Dillon, directly (i.e., tries to hold her down and "force" her eyes open). The action goes on until both are exhausted and it is perceived, just like *Claim*, by the audience outside of the space of action as a transgression of the boundary. Where it lies between performance and a reality to be taken seriously in the displayed actions is uncertain, especially as Dillon defends herself with all her strength in *Pryings* and tries to protect her face and eyes from Acconci's attack. This serious "play situation" within forms of behavior has

the nature of a scientific test arrangement. The parameters for behavior in this experiment are defined in advance; breaking out of the test circumstance is not anticipated. As in a laboratory, the experiment is under observation, on the one hand by the viewers and on the omnipresent video camera, which, as Acconci's action shows, focuses deliberately on Dillon's face (see ill. 2).

Alongside such investigations of the space for presentation and action through video recording and transmission onto screens, this video art works on a multimedia premise, includes performance and film shows, and investigates the possibilities for display in the areas between videotape and live video installation. This includes sounding out the relationship of perception, in both humans and the apparatus, when inventing new sorts of communication situations with video. Tony Oursler carries out an example of this premise in multiple installations, where human faces or eyes are rendered strange and even monstrous by enlarging them and isolating them as objects in video projection. Despite addressing the viewer, which would make a dialogue possible, these "talking heads" and video puppets seem, by contrast, to be exposed to a media presence, which enforces a permanent, monologic communication and allows no possibilities for withdrawal, silence, or inaction. The faces of the puppets "hidden" under sofas and in suitcases are projected onto cushions and, in the spatial constriction, reveal a helplessness that can also be understood as reaction to the fact that the inner world offers no protective space from the omnipresent "eye" of the media. Oursler understands this topic on the level of a dialogical encounter with the "inner space" of art (and the inner world of the figures) and an external reality, in which the personal and the private is externalized and subject to a media presence, which "lives" from an uninterrupted flow of information.[29]

Common to this direction of conceptual video work is the purpose of establishing video as a new sector in the canon of the arts, in the world of the art market and in the existing and recognized contexts of exhibition (essentially gallery and museum), something that only succeeds in individual cases with the exception of ephemeral, which is not displayable in the long term, performances in the early stage of the video art of the seventies.[30] Artists working conceptually, like Vito Acconci, Joan Jonas, John Baldessari, and Dennis Oppenheim, are above all concerned with the aspects of video as a medium, the live character, the directness and simultaneity of recording, and reproduction. The control function and the contact with the audience, as facilitated by the media but all the same apparently direct, stand in the foreground of their video actions and video performances.

In a particular way, Baldessari colors the performative presence of an artist in action before a video camera with an ironic critique of the genre of concept art and Fluxus, whose representatives stand out in the art scene by using video—for example, Paik in the context of Fluxus and Dan Graham in the conceptual area.[31] Modifying the function of video in the mass media, Baldessari sings the statements of Sol Lewitt on conceptual art in front of a running camera (*Baldessari Sings Lewitt*, USA, 1972, 12:35, b/w, sound),[32] with the declared intention of, in fact, expanding for a larger audience modernist aesthetics' recep-

tion, restricted as it is to the context of art, through video transmission and by choosing popular melodies. Still more obviously, the critique of an art-immanent illustrative typology of "art" comes out in Baldessari's video work *Teaching a Plant the Alphabet* (USA, 1972, 18:40, b/w, sound), in which a "dead" object, a potted plant, is shown the letters of the alphabet from A to Z on display cards. With this absurd communicative situation, Baldessari refers by way of contrast to the seriousness of Joseph Beuys' Fluxus action *How to Explain Pictures to a Dead Rabbit* (1965). The uncut videotape of Baldessari's live action points with a provocatively banal depiction to the way the protected realm of "art" can no longer be maintained and has to confront other measures of communication now that the mass media have arrived, which, like video, are directly and immediately accessible. In consequence, Baldessari applies this maxim to himself in *I Will Not Make Any More Boring Art* (USA, 1971, 13:06, b/w, sound), when he fills up the pages of an exercise book by writing out this sentence line by line and, in this, transmutes the mode of the linear inscribed video image in a self-critical demand on art to give up the immanent nature of art in the age of the media.

The way live video action is presented leaves its mark also on the first generation of women video artists in Germany and Austria, namely, Ulrike Rosenbach, Friederike Pezold, and Valie Export. From a decidedly feminist perspective and closely referring to this persuasion's discursive critique of art and the media, which is gaining critical weight at the same time as video is developing, these artists examine images of their own bodies with a video camera and compare the self-investigation of their bodies via surveillance monitors and superimposition with culturally determined stereotypes of the role of "femininity."[33] Reference points for comparing these images lie particularly in the poses of female figures in pictures, as they can be found repeatedly in depictions of the Madonna in the history of classical painting and have taken on a life of their own in the everyday aesthetics of advertising imagery. The women video artists apply their objection to deconstructing ostensibly (normative) poses of female bodies, which are supposed to express beauty and grace.

Combining video and performance, in which the test image on the monitor represents the reference point for dealing with your own image—and with examples determined by cultural history—links thematically to the increasing application of video technology in public spaces, where it is installed for purposes of surveillance and security. In the 1970s, the contours appear of a political strategy on the media by the state, which relies on the video surveillance of demonstrations and public meetings but also goes hand in hand with municipal and corporate measures for video monitoring of traffic centers and junctions, underground and railway stations, of shopping centers, state institutions, and bank buildings.[34] Numerous video performances and videotapes take issue with these specific video images, be it on the level of the recorded material or on the metaphorical level of the virtual encounter with one's own recorded image on a monitor. The later works of Dara Birnbaum follow this trend, as she has been, since the end of the 1970s, looking at the

public image of television by altering the iconographic context of television in video clips by dismantling their structure and putting elements together differently.

Still more obvious, Birnbaum positions video as a medium with her public works as a juncture of reflexion and transformation of public images from television and video surveillance. The enlarged electronic "images" in the *Rio Videowall* (USA, 1989, Rio Shopping/Entertainment Complex, Atlanta, Georgia, permanent installation, see ills. 12 and 13) perform the transformation of the image in the medium in the opposite direction from the usual commercial media practice. This process of deconstruction makes the fundamental mediatization of the image visible, which is easily overlooked when public images are normally perceived. "Inside the shopping centre, two live surveillance cameras are connected to the video wall—when pedestrians pass the camera, then, silhouettes of their bodies are fed into the paradiscally untouched nature of the image-databases."[35] In this public transmission of video images a reverse transformation of "image" into "nature" is depicted, in which Birnbaum brings to light the structure of manipulation—not perceived in the usual dealings with media—exactly at the point where a mechanism operates as the media industry intends (and its surveillance systems) to deny how media routinely appropriate and shape images and display the image as representative. Birnbaum's critique of the character of representation begins, by contrast, with displaying the construction of the image as an image.

In further bracketings of video, performance, and dance as well, the application of video in this trend of criticizing art and the media often acquires the status of a technology of surveillance and monitoring. Starting from here, the ways of using video in surveillance and monitoring functions are also investigated self-reflectively. This development emerges clearly with phenomena making the transition to video, for example, Joan Jonas's film *Songdelay* (USA, 1973, 18:35, 16 mm, b/w, sound), which records rhythmic movement studies and choreographic configurations of the performers in the open. Since the beginning of the 1970s, the close conjunction of performance, dance, and observing camera has formed the consistent emphasis of Jonas's videotapes and video installations, in which she herself appears as a performer. Paik's video treatment of the dance performances of Merce Cunningham *Blue Studio: Five Segments* (USA, 1975/76, 15:38, color, sound) points more strongly in the direction of video dance. What is interesting here is that the space of the performance is defined videographically, which means it concerns a performance for video. "In a series of short pieces choreographed and performed specially for the two-dimensional, theatrical space of video, Cunningham is multiplied, overlaid and transported from the studio to a series of unexpected landscapes."[36]

Paik's well-known video installation *TV-Buddha* (1974) demonstrates the topic of video surveillance in a quite parametric way through a self-monitoring circuit. The circulation of images consists in the sculpture of the sitting Buddha seated across from its video image as recorded live and displayed on a monitor. The spatial arrangement of the work also shows how the video installation expands to a video sculpture, in the course of which

this example shows how closely aligned the two developments are. In this artistic context for applying video technology, it not only comes, therefore, to differentiating between video works linked to tape and the installations with camera, tape, and monitor, which refer to the dispositive setting. Alongside them, complete environments, spatially and in media, arise, in which the often centrally situated monitor is only reminiscent of the function of a television set. In the environment, the monitor or television set represents no more than a sculptural element or a spatially situated object in a more complex audiovisual context in the media. Spatial installations go further in this direction, which employ several television sets, screens, cameras, and other "materials" and expand video sculpture into a multimedia installation. The early *Decollage* ensembles from Wolf Vostell,[37] Nam June Paik's monitor-laden *Robots* and video towers in the 1990s[38] and, not least, Dara Birnbaum's interactive *Rio Videowall* figure as examples here.

Despite the variety of innovative forms of media and art, video cannot establish itself in either the tape or the installation format as an aesthetically independent genre on the international art scene at the end of the 1960s and into the 1970s. Video technology does, nonetheless, become increasingly significant as a multimedia creative element for happenings and performances and at live video actions, which are either performed with an audience present or display presentations of the previously recorded actions in a performance for the camera. As a rule, a videotape (the result of such previously produced performances in media) is played for the audience present in a gallery or another art space. It can also happen that the live performance takes place in another space and is recorded on video and then transmitted to an "audience space" separate from it. With Acconci's *Claim*, the dispositive organization of a live performance is arranged interactively in a particular way. For the most part video serves to transmit directly from one location to another or to overlay various time levels in less aggressive performances, as, for instance, in the video works by Jonas and Jill Scott that relate to the body.

Scott uses video, as a component in performance, as it is predominantly understood in the seventies, as a transmitting medium. In live performances, like *Moved Up Moved Down* (USA, 1978), she records her own movements and the viewers' movements as if with a public surveillance camera and parallels the recorded imagery on screens with the immediate images of the same situation. In *Accidents for One* (USA, 1976), the image medium transmits to viewers in such a way that one person in the space is supposed to follow the taped instructions from a monitor, whereas the way they carry them out is, in turn, recorded live. With *Inside Out* (USA, 1978), the surveillance function in the application of video as a medium of transmission becomes still more apparent. That is because inside and outside, before and afterward, are here situated in spatially (i.e., also visually separate areas). A video camera provides the link, which is positioned on the street in front of a cellar window and gives a view into the live performance in the cellar. It is, of course—as with Acconci's *Claim*—possible to abandon the voyeuristic keyhole perspective on this segment of the performance and cross the medium's boundary. The viewers can enter the

space of the performance, which deals with movement in space and does not alter with the physical presence of the viewers, as would be the case with Acconci.[39]

The use of the video for recording and documenting performances and other art actions, as it began in the 1970s, should be differentiated from these ways of working.[40] With this, video replaced film, as what was previously the sole medium for documenting happenings, Fluxus actions, dance performances, and pieces from living theater. From the end of the 1960s, video, above all the forms of videotape for presentation on screens (monitors the size of a commercial television set), continued to become a part of multimedia installations, where it formed an element in scenarios together with other materials and objects. In the multimedia context, video went beyond that to mean integration of video showings of live video actions into theatrical, dance, musical, and other forms of action happening at the same time. They happened either in a space defined as a "stage" or in the participatory setting of a happening, of Fluxus and action theater, where the boundary between production and reception, between the spaces of viewers, and of the action is punctured and declared eradicated. Finally, video also became interesting in this developmental phase as a contribution to exhibitions, prominently in the gallery exhibitions of Bruce Naumann.[41]

As it became increasingly influential in the media for its further developed possibilities as image technology (image resolution, focus/deep focus, and color), video pushed its way, at the latest by the 1980s, significantly into the realm of the feature film, less from the perspective of video specific image forms than due to its handier technology and, in comparison to film, simplified and quicker processing of its material. Although video was thus integrated into film and film directors became interested in video for the aesthetics of its images the more its technology improved, there is no ignoring the fact that, quite particularly in the context of conceptual video art, in its early phase it clearly differentiated itself from film. Viewed overall, the competing media in those days meant that artists as a rule worked on combining video and art conceptually and did not exclude film in that, where, by contrast, wide sectors of experimental filmmaking maintained an attitude of rejection toward it because the aesthetic capacity for expression was markedly different and the photographic quality of film could not be attained with video.

Going back over the historical tension between film and art illustrates how the integration of the new medium video into the existing setting of the media ran up against predictable prejudices and resistance, where the medium of reference did not itself enjoy full institutional recognition (as this applied to the genre of experimental film to a particular extent).

The area of experimental film is confronted by the difficulty that it understands itself explicitly as artistic film and realizes the concept of film as film. As an example of the historical tension between film and art, we can point to the separate forms of reception through which the media responded to the surreal "artist," Joseph Cornell, whose collages and object boxes from the 1940s and 1950s had a wide-ranging effect on the art debate.

By contrast, his films (beginning with *Rose Hobart*, USA, 1939, 13:00) gained only distinctly hesitant recognition and only then at all in art criticism, after they have long since become established in the fixed canon of experimental film.[42] These various orientations in film reception necessarily produce demarcations between art and film, more precisely the artistic-experimental film, which has to develop, for its part, its own forum of presentation and distribution both outside of the film industry and also divorced from the art market to be able to assert a necessary extent of independence and self-reliance.[43]

Whereas at least some art critics greeted a new art form in video, and the art market at least to a limited extent recognized the new medium, film did not figure for a long time as an aesthetically independent art form. Even when the art scene—in a different way than film did—was initially less prejudiced against the appearance of video (above all in the context of the happening, of multimedia and action arts), when assessing its setting in media, the preponderance of evidence shows that implementing video in the realm of art did not come off at all without any tensions. The tension arose as soon as video appeared as a new form of media, which affected the interests of the art market. With every step toward institutionally establishing video, a competitive situation burgeoned. The recognition for video achieved only in the present day is paired in this way with an opening up toward contemporary and preferably intercultural video culture equally anchored in the institutions (refer, for example, to the video presence at the 49th Biennale in Venice in 2001 and the Documenta 11 in 2002 in Kassel).

The expansion of video in all guises, which can scarcely be surveyed today, should not deceive anyone in light of the annexation of media praxis, which seems topical, but whose specific aesthetic forms of expression are no longer up for debate at all. In the 1970s, the difficult field of the relations between video, film, and arts institutions presented itself, by contrast, from the viewpoint of the new medium in such a way that conceptual directions in video sought the links to the art business and certainly included film.

Excursus on the Relationship of Film, Video, and Computer

Video and experimental film did not pay equal attention to each other in the 1970s. Whereas the video scene was interested in other media, it met, in response, on the part of the experimental filmmakers, reservations over video that were of a fundamental nature, because the blurred, flickering, coarse-grained, initially black and white image lacking in contrast could compete with the film image. From the perspective of the artistic film, video did not represent an art form. How emphatically we want to cite this the tense relationship of the experimental film with the realm of "art" as the reason for the reservations may be left to one side. What must be remembered is, in any case, an aesthetic-technical difference between a differentiated film language specific to media, on the one side, and a medium still developing, on the other. The latter necessarily required the debate with other forms of media as it sought forms of articulation, which would form an electronic vocabulary.

In this situation, it was understandably difficult for experimental filmmakers, who were advocating the independence of film as art with exhibitions and film seasons like *Film als Film* in the Cologne Society of Arts in 1978 and *Film as Film* in London (1979),[44] to link up with the young and technically imperfect video scene, which was struggling to be accepted as a new medium, not least in the context of art. It is true that the ephemerality of the technically imperfect video image suited such video artists, who were interested in conceptual works, in actions, installations and events or happenings, respectively, and underlined their conceptual premises, which stressed the primacy of idea and process over finished works. This video art just does not want to compete with the filmic image but is also much more strongly interested in extending the realm of art towards the media and multimedia installations. It tries to do this, in fact, by integrating television critically and provocatively as the communications technology that is defining culture—citing McLuhan—and that is declared a "core medium" not much later. Taken altogether, it is the video filmmakers working, above all, more intensively on experiments in imagery who keep the interaction of video and film open and have a marked interest in experimental film and the stages in its development toward abstraction, toward visual "music," and toward visual "language."

This interest in the image medium motivates the third tendency, the "image technicians" in video. Of course, when looking at the early phase, we start from a situation of parallel work in video and film. Whereas early experiments in video have a close connection to developments in experimental film—also aiming at displaying the differences and the capacity of the new audio-visual medium in relation to filmic possibilities, video only receives, in contrast, conditional and very limited notice from the film direction for the reasons discussed here.

The conjunction of experimental film and experimental video also figures institutionally, for example, at the State University of New York, Buffalo, where important experimental filmmakers like Paul Sharits, Tony Conrad, and Hollis Frampton worked simultaneously in the Center for Media Study alongside the video pioneers Steina and Woody Vasulka (1973–1979) and Peter Weibel. These filmmakers are comparable to the Vasulkas, even if in another medium, and they are investigating structures of the moving image right up to the limits of perceptible changes in movement.[45] In this phase, the Vasulkas are experimenting with manipulating different zones of the image and with processes of the image in real time, something made possible by the use of the digital image articulator. It has become possible with this machine, which Jeffrey Schier and Woody Vasulka constructed in 1978, to change the format, scale, resolution, and size of the image field and the color values of what the video camera records in individual programmed steps in two directions—before and after. At the level of digital processing, on which the electronic signal is sampled and can be constructed in discreet units, allows displaying how the results are transformed in pictoriality itself. The conceptual premise is comparable to the structural tendency in experimental film (for example, Sharits), because both media

are concerned with visualizing an aesthetic-analytical discourse on pictoriality, which brings into view structural phenomena from the medium in question. "The concept of 'image' was replaced by the concept of 'image field.' Inside of an image not only abstract image fields could float in that image's various layers, but individual image surfaces with a variety of picture mapping could float freely in the image field and be spatially distorted with the aid of digital effects devices like ADO and Quantel. The various zones and surfaces of the image were soon expanded, and they led to multiple—channel video pieces."[46]

We should not neglect to mention in this context those experimental and documentary filmmakers, who, like Shirley Clarke, Ed Emshwiller, and Jud Yalkut, shift from film to video and in that way construct a counter position to the purist demarcation of film art, as can be found with Stan Brakhage, Jonas Mekas, and Peter Kubelka, to name only a few main proponents in experimental film of a strict division between the media. That filmmakers later give up their reserve and either work themselves in video or understand video as a possibility of distributing their own works on film more easily, is something not at all counter to the general rejection of video and presumes a wearisome and stubborn confrontation between the competing image media.

Shirley Clarke counts among the most prominent exceptions. In the 1950s and 1960s, she contributed to the American avant-garde in a semidocumentary style and is a cofounder with Jonas Mekas of the "New American Cinema Group."[47] Her film *Bridges-Go-Round* (USA, 1958) converts a camera mobility derived from Maya Deren's filmic choreography and intensifies it with overlappings, image reversals, and loops until it irritates perceptions.[48] In contrast to it, stands the film *The Skyscraper* (USA, 1959), which, in the tradition of the rhythmic big-city films of Dziga Vertov or Walther Ruttmann, follows the construction of the Tishman highrise in New York from its design to its completion. Clarke also shoots "pure" documentary films, like the controversial confession-portrait of a black, male homosexual prostitute (*Portrait of Jason*, USA, 1967), who recounts his life story in front of the camera in the style of cinéma vérité and with that reaches a point, where the setting in the media, which had not been perceived until then in the critical resonance to this film, becomes visible and audible as the actual catalyst of a depicted performance. This film conceives of itself as a commentary on the ambivalence of cinéma vérité, because the presenter becomes recognizable as an actor, who is offering details from the intimate life of an African-American homosexual for the camera. Thus, it is made clear by radicalizing the technical means allowed in cinéma vérité that the filmic reality is constructed, a presenter is taking on a role in front of the camera and pretending something. "But the point of *Portrait of Jason* is that in a situation where a single character knowingly does an emotional striptease for public consumption, the reality of his confession is hollow.... As one writer has suggested, the film articulates Jason's game of 'exploit and be exploited' with the off-screen but cinematically inscribed director, with the camera and with the implied audience."[49] Clarke is not just running counter to film styles with this

escalation when she unmasks the facticity of the cinéma vérité approach with its own methods—that is, by displaying its instruments—instruments, which here serve a fiction produced for the camera and which initially come across like unscripted, documented reality.[50] Finally Clarke shifts media to increase her means of expression and founds in 1970 the artists' collective "T.P. Video Space Troupe."[51] Subsequently—after the group broke up—she worked in the area of experimental video and theatre (e.g., on the video drama *Tongues*, USA 1981/2, together with the dramatist Sam Shepard). Clarke was interested in the possibilities of swapping between film and video and understood video—in contrast to film—as a medium that is not dependent on a camera lens and does not produce a product but a live process.

Ed Emshwiller is important for the transference between the media in a further dimension. With *Sunstone* (USA, 2:50, color, sound) he develops in 1979 one of the first computer animations at the Computer Graphics Lab New York, which alters filmic images of movement and interval through mapping. By means of 3-D animation, an electronic image of a face unfolded into a special image in the form of a cube, which is additionally represented in motion. Finally, an image on one side of the cube is seized and shown via animation. This involves a delay effect, which means that the outlines of the figure running through the image are frozen and take on a sculptural form when overlaid on each other. The image's form itself is reminiscent of the chronophotography of Etienne-Jules Marey, who developed a recording technique for registering movement around 1880 and from 1888 on transfers changes in the form in space onto movable filmstrips.[52] Emshwiller's schematic sequence of movement at the end of *Sunstone* should not be understood as merely borrowing a motif from Marey. Rather, both pioneers in investigating movement are linked by the interest in a visual solution to enable showing the process of time in space. Emshwiller, therefore, already used scan processors and computer animated background for the electronic landscape in the preceding video film *Scape-mates* (USA, 1972, 28:16, color, sound), in order to generate a computer-assisted impression of three-dimensionality in this early work with analog video. In a chroma-key process, he here manipulated the bodies of dancers, which were inserted and only visible as fragments and can be also seen only in a particular image layer in the multileveled image spaces. In this way, the electronic image space seems to be in permanent transformation: an effect produced by the creative techniques of manipulating time, movement, and image formats typical of Emshwiller.

Emshwiller, whose films *Relativity* (USA, 1966) and *Image, Flesh, and Voice* (USA, 1969) belong to the core of American avant-garde filmmaking, occupies himself with video in such a manner that he explores the technical possibilities of an electronic language by using image processors and computers. Added to this is his pronounced interest in perspective, that culminates, without a doubt, in *Sunstone*, yet contains further facets, which are related in *Crossings and Meetings* (USA, 1974, 27:33, color, sound) to the virtual movement and superimposition of people. Three-dimensional figures or their outlines are mul-

tiplied in a scanning process (i.e., they apparently "step" on each other or after each other on exactly the same position in the image, through which complex compositions produce a concatenation of people, which is displayed in a graphic density). What initially represents a synchronization of movement in series (repeating the same thing on the position without progressing in time and space) is increasingly dissolved in desynchronized movement, by which seemingly sculptural feedback effects appear. Emshwiller works with a "magnet deflection system" and actually uses a "hybrid graphic animation computer" developed by Lee Harrison: "*Scanimate*" (1969).[53] Emshwiller uses a video switcher for creating the various levels of image, in which the resulting images, on one hand, adopt the serial principle of film and, on the other, show the possibilities of three-dimensional computer animation in an early stage of development.

Jud Yalkut stands between the media for the reason that he worked together with Nam June Paik on video film projects from the mid-1960s to the beginning of the 1970s. In the joint works, *Film Video Works* (USA, 1966–1969) and *Video-Film Concert* (USA, 1966–1972)—to name only a few important ones—Yalkut is not simply concerned with using film to record television and video experiments and Fluxus concerts with the cellist Charlotte Moorman (*TV Cello*, USA, 1971). The experimental filmmaker is more interested in comparing and mixing the media languages through editing and montage. Yalkut's multimedia "Expanded Cinema Environments" expand into the same format as they interpolate the thoughts on social interaction from texts by Fuller and McLuhan into the film. Yalkut works in a direction, which brings film together with performance and further media in multimedia installations in space. His purposes can be compared in this perspective with the film and computer works of Stan VanDerBeek and the group "Experiments in Art and Technology."[54] For the spatial installation *USCO* (1967, performed again in 2000 in the Whitney Museum of American Art), Yalkut uses two 16-mm films and projectors, loops, and display devices, as well as semitransparent weather balloons hanging from the ceiling and powered by motors, which reflect the film images projected onto them (see ill. 136). By overlaying levels of projection, to which the silver-metallic lined walls of the space contribute by throwing back image particles into the space, a hallucinatory experience of perception arises, which extends the usual forms of film kinetically.

The techniques of kaleidoscopic film praxis are continued in the video works and in the cooperation with Paik, above all when overlayering, or multiple superimposition, and fragmentations come together with the electromagnetic dissolution of television images contrived by Paik. "These distortions were filmed and re-edited to create hybrid forms that Yalkut terms 'videofilms.' In other videofilms made with Paik, including the *Cinema Metaphysique* films of 1966 and 1967, issues of scale, framing, and screen are explored in juxtapositions of film and video screens, one large-scale, the other a small square in which images are sometimes split in two or appear running along the bottom edge of the screen."[55]

Yalkut's close connection to Paik ought not to be taken as the sole yardstick for assessing experiments in imagery, both with film and with video. To the discussion of the interrelation of film and video belong also questions of scaling (i.e., of determining and changing of the yardstick, of enlargement and reduction of image information represented in an image field). These factors have—for example for Vasulka, when he initially worked with video and computers—a primary importance as regards being able to set the image parameters in the digital image articulator. They concern the horizontal and vertical shifting, respectively, in such a way that the dimension of electronic image surfaces represented can be variably manipulated (reduced or enlarged) through compression or decompression (of the image density).

It would be equally inappropriate to regard Yalkut's experiments in expanded cinema with projection systems as one-off arrangements. They stand rather in a wide context of works, which aim at linking film and action in space. Stan VanDerBeek works prominently with multiple projection, partially on portable screens, and in the mid-1960s used this technique for expanding his earlier collage films in his live shows with film, video, and computer graphics. With that he achieves a density of information, which gets close to the rhythm of music videos and is developed by VanDerBeek himself toward computer animation. Transferring image material between media—from film to video and computers—comes in VanDerBeek's case initially under the heading of multimedia and multisensing, with which he corresponds to Yalkut in the concept of expanded cinema. In the last analysis, VanDerBeek is concerned, however, with intensifying the collage-like form, for which recognizable details are less important than the ideal of endless variation on the pattern of multiple projection. This is a concept that tacitly confirms Umberto Eco's diagnosis of the "Limitlessness of Variability" in aesthetic praxis. In his goal of visual intensification, VanDerBeek also realizes the notion of networking, which exists in virulent form in the then current reception of Fuller and McLuhan. Finally, this branching component acquires the function of being able to indicate the impending transition in the media from video to computers.

Also apparently in need of explanation at this point is the way digital technology later integrates into film widely and so essentially uncritically as to appear euphoric. That is because, for the group of so-called video opponents among the experimental filmmakers, it is here a case of expanding what is filmic within media, something not to be confused with the interest among video filmmakers in the digital medium. Their intentions either aim at merging the media (which the film purists reject), or (and here there does arise a parallel to film) they understand computer images as enriching aesthetic arrangements in the media, which contribute to video's stylistic and formal variety. Even if film and video do contain a tendency to include computers and their uses into the work at hand, we are still a long way from deeming the two original media to have merged structurally in the digital. This presumes that the vital differences in the media video and computers (here linear processuality, there programming) can be contrasted in their respective other-

nesses, in order to be able to draw technical-aesthetic conclusions from comparing their capacities.

In this context, Pat O'Neill's films are interesting because they manipulate natural elements like clouds and water in their speed of movement through using the optical printer (a reproductive process working photographically, image for image) and transfer them into a mechanical rhythm. In this way, he achieves a fluid character to his images with film, which marks an important position in the development of both electronic and also digital image forms. O'Neill occupies himself with abstract film in the 1960s and is interested in how composite film images come about (i.e., in single-image photography and rephotography). Combined forms of image result from this, which draw their dynamics and rhythm from the apparently seamless transitions of manipulated elements inside an image field and less from montage, editing, and camera movement. This preference for creating within the image also prefigures—with the technical means of film—those sorts of combined forms of image, as can be found decades later in music videos and computer animation, albeit displaying there distinctly smoother surfaces.[56] The aesthetic image apparent in the combined forms of image with O'Neill can be clearly categorized retrospectively under film, where the transitions and seams are created with conventional materiality. The seamless aesthetic combination in the digital differ, by contrast, as the impression of materiality and the marks of production have first of all to be simulated through a computer program.

At the juncture of filmic processes and computer design stands O'Neill's later work *Water and Power* (USA, 1989, 60:00, 35 mm, color), where space, paradoxical image-objects and more complex combinations arise as the product of various images, which are combined into the unit of one shot. "In this way a specially prepared, computer-controlled camera permits, for example, the combination of long regular camera movements with time lapse photography, and the optical printer ... allows melding of parts of one image seamlessly with parts of a further image as a completely different space."[57] Noel Carroll writes specially about the best-known O'Neill film, *Saugus Series* (USA, 1974, 18:00, 16 mm, color), in the chapter "Film" of the *Handbook of Contemporary Innovation in the Arts* as follows: "Thus in O'Neill's work the viewer attends to a flow of images, remarking upon the arresting and unexpected way in which O'Neill qualitatively characterizes the objects he depicts. Water may suddenly appear metallic or a piece of paper organic."[58] The flexibility in the pictorial, "in which," as Carroll quotes from Paul Arthur, "the natural and the mechanical are conflated," signal, together with the openness of the aesthetic manifestations, O'Neill's signficance for the medium of film. These ways of working denote him also, however, as a precursor of video experiments related to computers, which explore the creative process in the collaboration of "artist" and (programmable) imagery machine.

In this context Stan VanDerBeek's film-computer experiments deserve greater recognition. VanDerBeek participates definitively in developing the electronic medium pictorially and experiments with image processors at the juncture with computer graphics at a

time when—with the exception of the chroma-key experiments of Emshwiller and the computer films of Larry Cuba[59]—neither the area of experimental film nor the video scene, obsessed either with its claim to art or, however, with alternative television, show significant interest in the processes of image technology. That is why not enough light has been shed in this context on how VanDerBeek already developed in the 1960s, with the support of Bell Telephone Laboratories multimedia performances and computer animation, which correspond to his interest in linking art and technology and are continued in the project *Movie Drome*. "In the 1970's, he constructed a 'Movie Drome' in Stony Point, New York, which was an audiovisual laboratory for the projection of film, dance, magic theatre, sound and other visual effects. His multimedia experiments included movie murals, projection systems, planetarium events and the exploration of early computer graphics and image-processing systems."[60] VanDerBeek adopts the aesthetics for these performances from his early collage films, together with which the speed of the image sequences in the Movie Drome theater comes up to that of today's videoclip montages. His experiments with imagery in *Strobe Ode* (USA, 1977, 11:00, color, sound) conform more strongly to the forms and structures of the experimental film, where stroboscopic effects, as they are familiar from films, are generated with video feedback in analog images. The process is similar in visual effect to Tony Conrad's *The Flicker* (USA, 1966), which increases the alternation of black and white image frames in the stroboscopic interval to such a degree that a flicker rhythm is invoked, which in turn affects the eyes unpleasantly. In VanDerBeek's video experiment, pulsating rhythm and concentric arrangement in the feedback images give the self-reflexive process a form, which comes across as the "content" of the dynamic and processual character of creating electronic images. A possibility for video praxis is instituted and is extended further in this direction by subsequent experiments with feedback.

It remains to be noted that "video-feedback" represents a widespread process in the video scene and does not go back to an "inventor" by name. As Vasulka comments, "Everybody believed deeply that he had invented feedback. Feedback was invented simultaneously not by five people, like electricity, but by five thousand."[61] Yet feedback also has its perfectionist: "Video Feedback is a dynamic flow of imagery created by the camera looking at its own monitor. It was often (and still is) the first phenomenon that seduced users of video by its sheer beauty. Although everyone who discovered feedback was transfixed by it, feedback seemed an uncontrollable, roiling effluent byproduct of technology—one of those natural mysteries, appreciated but untameable. The acknowledged master of feedback was Skip Sweeney, organizer of the first video festivals and founder of Video Free America in San Francisco. To Sweeney feedback was 'a religion—a wave to ride.'"[62]

The experimental filmmaker VanDerBeek has gained great significance in the development of forms specific to video not exclusively because of his feedback experiments. Deserving equal importance is the fact that his work with image processor systems in analog

video marks transitions to early computer graphics and is from these viewpoints aimed at correspondence and transformation in the media. This outlook applies equally to the interrelation of image and sound. For example, *Color Fields Left* (USA, 1977, 7.47, color, sound) works on mixing electronic image and sound in the analog image medium and uses moving color elements and electronic sound in increasingly complex displays, which demonstrate various layers. The video work *Color Fields Left* seems like an analytical study in the visibility and invisibility of electronic processes, where the varying colors and surfaces overlay each other on two levels, until electronic flicker effects appear again, which are characteristic of *Strobe Ode* as well. *Color Fields Left* also shows solarization effects from moving objects, and in the course of the video film intercalated elements of images solidify into complex patterns. With such figurations, the linear structure of the electronic image comes out particularly at the points where surfaces are shifted vertically.

VanDerBeek focuses his video work *Vanishing Point Left* (USA, 1977, 9:30, color, sound) still more strongly on the pictorial potential of the electronic medium. There, the experiments with movement, layering, and flicker generate a constant flow of moving pictoriality in incessantly transforming forms, referring back to the projection surface and defining video clearly as "flow of images." The short pieces of the computer animation *Micro Cosmos 1–5* (USA, 1983, each part 3:27, color, sound) transform VanDerBeek's previous experiments with pulsating images in the digital mode, where the constant graphic structure of the image in a closed circular form—which contains an orbital image—permits various parallel forms of manipulation within the surface image. Implementing videographic images of movement in, or alternatively on the raster structure of the calculated image needs special mention here. In this way, then, various image surfaces are combined in the field of the image so that the unity of the image, as it exists in the frame even under experimental manipulation of the material, is abandoned in favor of a multilayered graphic collage. Already in the earlier computer film *Poem Field No. 1* (USA, 1966, 6:00, 16 mm, b/w) and *Poem Field No. 2* (USA, 1966, 6:00, 16 mm, color), the computer serves as a graphic instrument to animate collages or the acceleration of abstract images, respectively.[63]

Further experiments with orbital images[64] show up in VanDerBeek's film *Euclidean Illusions* (USA, 1980), in which he endlessly spins interleaved images (image within image within image, etc.) with relocated edges in accelerating motion, with which an effect of depth arises. In the same way, spinning cubic forms creates spatial volume and configures an intermeshing of image levels stretching itself infinitely. By using orbital images for these experiments, VanDer Beek underlines the expression of spatial extension in a metaphorical, as well as physical, dimension, as he also seeks it in other works. His chosen process of multiplying the same image schema resembles three-dimensional computer graphics in this conceptual premise. The forms arising are just as similar in aesthetic expression, however, to the opening out of a moving figure's outlines as this is endlessly repeated in video feedback.

With Emshwiller, Yalkut, and VanDerBeek, an area is addressed in video's experiments with image technology, which leads on to the third grouping of the "image technicians." Without claiming to cover everything or even seeking to give a representative survey of the experimental film scene—which describes the setting for video experiments from a conceptual, structural, and technical viewpoint including the equipment—the examples drawn from the film direction are here nevertheless meant to denote important positions taken up in dealing with pictoriality in video, developed further and also formulated anew.[65] A strictly chronological survey of the introduction of certain technologies and machines, not least because the transfer between film and video is not self-explanatory, does not essentially help in investigating how a specific language of video develops. The starting point has to be, much rather, the parallel developments based in film and video and also within the video scene.

The complex situation is denoted by the fact that video pioneers, together with engineers, simultaneously develop various synthesizers,[66] apply them, and design processors alongside them. Because a lack of precision in definition exists in the debate on video as to differentiating synthesizer from processor, where synthesizer mostly stands as the general heading for processors as well, I would like to suggest a definitive coinage for the following discussion. With an audio synthesizer it is first a matter of a device with which sounds can be synthesized. The source of audio can be used to synthesize and govern the video signal (because of the basically electronic relation of *video* and *audio*). Synthesizers are essentially used for compositional processes, where the concept refers in a narrow sense to all sorts of processes, which happen inside the machine and generate video. In contrast to this internal composition of audio and video, a scan processor works with an external input (by a camera) and represents an analytical procedure intended to process electronically the information coming in from outside. Elements, which cause a drifting and shifting of the signal processes in time and manipulate them, are usual in both systems, synthesizer and scan processor.

This definition of working concepts comes to the result that, strictly speaking, only the devices of Eric Siegel (electronic-video-synthesizer, 1970), Stephen Beck (direct video synthesizer, 1970) and Dan Sandin (analog image processor, 1972) should be called "synthesizers." But here a further differentiation can also be introduced, in accordance with which only Beck and Siegel have, in fact, designed synthesizers, which generate a signal. By contrast, the devices of Dan Sandin and Paik/Abe fall, from this viewpoint, into the category of scan processors, because they do not generate a signal but depend on an input signal, an external source of imagery. In the synthesizer, various modules are processed, all of which have input and output connections, so that the electronic signals pass through various interlinked modules and can finally be received and transmitted. What is important is that the color channels (red, green, and blue) are processed individually, which increases the variety of processes and possibilities for monitoring.

As far as the Paik/Abe synthesizer (1969) is concerned, it is, in contrast to the synthesizers named above, not a question of a process for generating audio and video internally. As with scan processors, Paik works with camera input and external image material. Of course, he is less interested in the area of analyzing and manipulating signal processes (for which a scan processor serves as a rule), but Paik works much more with the premise of composition or decomposition of television images, which is typical of synthesizer applications. The Paik/Abe synthesizer, which Paik uses in *9/23/69 Experiment with David Atwood* (USA, 1969, 80:00, color, sound), produces a visual collage from manipulated electronic impulses, recorded material from television, and images of the production process in the studio, which are cut up, rendered unfamiliar, and compressed into an abstract, colored texture in the recorded interaction between camera and processor. Here—and this denotes the basic structure of Paik's aesthetic program—the factors of decomposition and deconstruction are dominant.

Robert Moog's modular audio synthesizer (1964)[67] can count as a model for the synthesizer functions in video, because manipulating of forms and colors of images in devices also designated as "video synthesizers" can result on the basis of audio impulses. For example, Steina and Woody Vasulka use the audio synthesizer as an interface in early video experiments (1970–1972), in order to transform the video signal and to make audible the energy field arising. "And by that time we were very much involved in changing the image in sound or controlling the sounds with images, and generating images from sounds and vice versa."[68] It turns out, however, that the Vasulkas' video work is more strongly organized toward analyzing the microstructures of a new aesthetic, for which the Rutt/Etra Scan Processor developed in 1973 by Steve Rutt, Bill Etra, and Louise Rutt is better suited than a synthesizer, which works in principle to compose, not to analyze (like the scan processor). This scan processor is an analog system, which is used in video in order to modulate the deflection of signals (i.e., the bending of the individual scan lines, through controlling the electrical voltage in real time).

If the precise understanding of synthesizers is that they transform (*audio* and *video*) and synthesize electronic signals, then processors with program functions should be more accurately categorized as analog computers. Analog computers work principally with variables, which are set by the electrical voltage and vary across a certain spectrum. Dan Sandin already developed the first program functions in the direction of digital computers with the Analog Image Processor (1972; see ill. 87), in that the video signal is modulated in various processes and sequences are set up on the programming level. "In brief, the Image Processor (I-P) is a patch programmable general purpose analog computer, optimized for the real time processing of video images. . . . The I-P accepts naturalistic images, modifies or combines them in complex ways and displays or stores the result. A television camera, film chain or video tape recorder or similar device can be used to encode moving images into a form, which the I-P accepts. A television monitor decodes the signal and

displays the modified image. The instrument is programmed by routing the image through various processing modules and then out to a monitor or video tape recorder. The modules are designed to maximize the possibility of interconnection, thereby maximizing the number of possible modifications of the image. The I-P is designed to accept external signals from such devices as biological and environmental sensors."[69]

With the video work *Triangle in Front of Square in Front of Circle in Front of Triangle* (USA, 1973, 3:00, b/w, sound; see ills. 90 and 91), Dan Sandin demonstrates the programming function in real time particularly clearly, when he demonstrates with simple geometric forms how the spatial relations in video diverge from the logic of perspectival arrays. Through their arrangement in the image processor, the geometrical objects display logically incompatible layering situations. "A demonstration of the fact that thinking of video keying as putting one thing in front of another is inaccurate and limiting. The Analog Image Processor was programmed to implement the logic equations if triangle and square show triangle, if square and circle show square, if triangle and circle show circle."[70]

It follows that such processors are analog computers, not synthesizers, because of their specific functions. In light of the developmental steps toward computers recognizable in Dan Sandin's Analog Image Processor, the Paik/Abe synthesizer should also be included with this type of machine (and with that removed from the misleading category of synthesizer). "Basically, the Paik/Abe synthesizer is a device designed to accept 14 different inputs from either black and white video cameras or audio tone generators. It translates these images into color video images and/or patterns which may be displayed on a color video monitor or recorded on videotape. Controls are provided for mixing up to 7 inputs at one time and for altering the character and color of the final image which can range in tone and color from exaggerated black and white through pastels, to highly saturated electronic colors found nowhere else in nature. Alterations in strength and character of any of these inputs or changes in setting of the controls will produce obvious changes in the whole output image."[71]

Using image-processing devices on an analog level—such as the video sequenzer (field flip/flop switcher, 1972) and multikeyer (1973), both from George Brown; dual colorizer from Eric Siegel (1971); and the Rutt/Etra Scan Processor, marks the central transitions from analog to digital devices—that is, from switching to programming, in the realm of video. Such analog computers, which display programming elements and possess basic storage capacity, can be generally described as devices with possibilities for digital control. George Brown's Horizontal Drift Variable Clock (1972) belongs to this type of device as an impulse generator, which determines and modulates the horizontal drifting and, therefore, the deflection of the signal from the fixed raster image of the television format. This variability is enabled by the function of the clock and means that the signal impulses can be demonstrated in every display system, which can be rendered visible through the raster of the television format (NTSC or PAL). Through this clock function, Brown's variable clock belongs to the category of programmable instruments. The deflection of the signal

from the synchronized linear mode in the television format represents a step toward processing smaller units; these are the waveforms in video and the bits in computers. The latter define the information of a pixel, which possesses a localizable address and a definable content/color. The more bits a pixel has, the more detailed the information. It should be remembered that it is here a question of analog devices with programming functions, which operate on the basis of plug and socket and switch connections.[72]

In contrast to this, the attribution "digital" has to apply to such devices which, like the Digital Image Articulator (Vasulka and Schier, 1978, see ill. 130), have numerical functions and operate with algorithms.[73] Synthesizers, but above all processors and further analog computers, form the technical core of the early video experiments, which work explicitly on an abstract audiovisual language in video and are guided by the analytical interest in exploring the possibilities for manipulation of the video and audio signal in a combination of various devices. The input signal is, with that, generated either within the machine itself (synthesizer) or, alternatively, the sound and image signal is alternately transformed or it is a question of an externally recorded camera image, which is processually modulated in various ways.

Experimental Video

The concept of "experimental video" is intended to comprise the third grouping. It understands the new medium dialogically in the interrelation of technology and aesthetics and undertakes experiments in images technology as a possibility of reaching a new language of imagery by taking issue with the form of the medium. The notion of the "new" is here carried by the avant-garde idea that other technical devices than those offered by film will necessarily also produce a different visual and particularly audiovisual aesthetic, which diverges from the preceding camera-obscura perspective. Gaining a genuinely electronic vocabulary comes under the heading of the specifics of media, which, for the main representatives of this direction—the Vasulkas, Nam June Paik, and Gary Hill—can be made out partially in the basic constellation of video (camera, screen, recorder) and partially appears only in the process of the experiments (as, for example, in the discovery of horizontal drift).

In finding out what video technology allows, types of devices like synthesizers, signal processors, and computers are, of course, included predominantly into these works. Tom DeWitt describes the synthesizer as an instrument that "frees" video from optical recording devices because the synthesizer generates a signal: "To free the video artist from the confines of the real camera-recorded world, it is necessary to develop instruments which generate a television compatible signal from raw electronics. A synthesizer is the paint and palette of the video artist, a device which lets the artist construct spaces from the dictates of imagination." In comparison to the existing audio synthesizers, the video synthesizer developed a good decade later is considerably more complex. "Video signals cover

a frequency spectrum 100 times greater than audio and must be constructed according to a precise timing synchronization which does not exist in the one-dimensional audio signal."[74] The technical process is decisive, because with it the waveforms generated in oscillators can be connected in modules and generate new forms in the synthesis. As DeWitt explains, "Existing video and audio synthesis systems use a building block called the oscillator. The most common technique for generating forms is called *additive synthesis* in which the output waveforms of oscillators are mixed to form a wave form which is the sum of their combined outputs. It is theoretically possible to duplicate any natural waveform by summing sine waves of different frequency. This approach has led to the construction of synthesis systems with dozens of oscillators."[75]

The video synthesizer built by Eric Siegel functions, for example, like an electronic kaleidoscope, which mixes constantly new configurations by manipulating the size, form, and color of the waveforms. A colorizer such as, for instance, the dual colorizer Siegel built in 1971, permits manipulating color and adding color to a black and white video. A high degree of image density and correspondingly complex forms can be synthesized by multiple layerings. The video images in layers and collages are realizable only because such synthesizers as were built in the context of video praxis are based on modular processes. They allow the discreet treatments of individual segments by several oscillators, which means the execution of various elements keyed into a basic image structure. "The artist designed synthesizers are 'modular,' that is, specialised devices are linked by patch cords which are manually inserted to complete a complex program. Modular design is essential in video, because it permits parallel and simultaneous processing of high frequency signals. The chief drawback of the general purpose computer in video synthesis is that it performs one operation at a time and cannot keep up with the video clock."[76]

Proceeding from this, problems result concerning the control of the processing steps, which initially can only happen singly and in sequence. The Vasulkas find a solution in a further technical step, where they use a field switcher and, in fact, George Brown's video sequencer. With this it becomes possible to control two different video sources in a sequence simultaneously and separately—that is, to follow them in a graphic recording. The sequencer, an instrument based on oscillators, depicts the structure of an electronic image in the waveform, which can be arbitrarily varied in its frequency. A programmer (George Brown, 1974) is in a position to monitor the arrays from the video sequencer digitally, because the device possesses a storage function. Decisive in achieving a switching effect is the speed of alternating between image sources, which can be raised as far as causing a flicker effect, making the vertical synchronization of the image fields almost invisible. The resulting geometrical forms resemble distorted screen surfaces, the outlines of which can represent, among other things, rectangles, ellipses, cubes, and cylinders. A further advantage of graphic systems, and especially of the Rutt/Etra Scan Processors, consists in the ability to reposition the image exactly after recording. This technology extends the spectrum of variations into the electronic zoom, rotation, and reversing of the right-left

and upper and lower relations in the image raster. Bill Etra's description of the analog scan processor of 1973 rehearses the pioneer spirit in developing these machines, which were not successful commercially or in the mass media:[77] "I knew almost nothing when I started. I knew you had to sum the waveforms. That was obvious from the oscillators. I knew you had to attenuate them, which is multiplication. Steve [Rutt] knew about diodes, resistance networks, etc. The first machine we built was really deflection on a regular oscilloscope, . . . I thought it was going to cost under $5000 and be sold to artists and schools. . . . The price went up because we tried to sell it to broadcast engineers who couldn't use it anyway. They didn't have the initiative to use that sort of complex equipment."[78]

Analog scan processors enable visualization of the electronic signal, presenting the scan lines in waveform, then, where the Rutt/Etra scan processor can produce forms in three-dimensional configuration. A scan processor manipulates the information (available through camera input) in real-time processually and electromagnetically, as a process divorced from the raster form of the frame by the monitored manipulation of the electrical voltage allowing the signal to deviate from the usual linear sequence. In the scan processor, the brighter parts of the "image" are lifted up by which the horizontal lines deflect vertically and create sculptural forms. We could here talk about how an absolute "image" arises in the electronic medium, as it is a question of a reflexive progression making video's generic nature as process visible. Similarly, using feedback technologies is also suited to demonstrating the medium's reflexivity, in the course of which the difference lies in the video image not being, with feedback, bound to a recorded image from a camera but instead being able to arise from the circulation of the audio and video signals without external input. This case shows that the circulation of the signal in video takes on plural manifestations and can work with both an externally and also an internally generated signal process. As a whole, both processes make the use of the term "pictoriality," meaning the capacity for transformation and process, seem more adequate than using the word "image." In addition, the work with processual video signals underlines the structural incoherence of the image's field and of its surface, particularly when the image's field is modulated in the video sequencer and with that has become so multiple as not to be produced as a bounded surface any more.

The new forms of image in video, which deviate just as much from a unity in the image as from the premise of a coherent carrier layer, receive further expressive possibilities through the use of George Brown's multikeyer (1973), with which as many as six different sources of video can be laid across each other in one single video output (multiple layers). In this way, an impression comes about as if the image's various elements and levels actually referred to background and foreground, which is not the case. The multikeyer is a real-time processor, which permits arranging a keyed element onto the same position in the image, because the device has a digital building block, which works like every other programmable tool with a built-in clock and possesses elementary programming and

storage applications. In the early 1970s, almost every device was analog, whereas the multikeyer, with its integrated microchips and storage function, meant the introduction of a digital type of device: "An example of elaborate digital control of an analog video keyer is the George Brown Multikeyer. It consists of a programmable digital sequencer wired to an analog processing rack, where a digital 'key priority encoder' combines with multiple analog keyer/mixers. . . . The analog keyer/mixer prioritizes the six video sources, sorting them into multiple image planes, which are routed to a single output. . . . This multi-level keyer was built for the Vasulkas in the early 1970s. . . . A computer interface was appended in 1977 to allow remote storing, loading and control of the program sequences."[79] What was new for analog video procedures was the possibility of defining a hierarchical arrangement of the layers in the various sources of input and of changing these priorities as well, from which an apparently coherent yet multiply varied "image" results. The digitally encoded key element determines the appearance of the image's various layers through their respective brightness values. "This stacking and sequencing of image priority and key, makes for an image layering not easily attained in conventional video mixers, without using multi-generation tape loops."[80]

Outlining the technical setting for video experiments in the seventies here is meant to clarify the structural premise of a grouping, for which such digital processing machines, which are only available in later years and which Paik, the Vasulkas, Hill, and others have a hand in developing, do not represent a fundamental change in their approach to their work. That is because synthesizers, sequencers, scan processors, and multikey devices, which permit synthesis, sequence shifting, the modulation of the image's lines, and the separate processing of several discreet elements first of all analogically and later digitally, correspond closely to the interest of these experimental video artists[81] in nonphotographic imagery. Experiments in the technology of images count as one possibility of achieving a new visual language by working on the forms in the medium of video. Looking back, it is above all Nam June Paik who has wave lines arising through magnetic manipulation on television screens in the 1960s; Gary Hill, who works on the expressive capacity of electronic language on the basis of spoken, textual, and visual language; and Steina and Woody Vasulka, who conceive of electronic pictoriality as a signal process and something other than the concept of an image as the unit of a frame limited in space and time.

In differentiating the electronic medium, the relinquishing of "photographic thinking of images" is significant (which rests on a relation of similarity qua analog recording technology and the cohesion of impression and expression), in order to be able to grasp "imagery" as energy and as linear, or as a waveform, respectively. "So these images are not made through camera, but they are television frames and each of these pictures is made of 525 lines,"[82] as Woody Vasulka defines the basis of a new type of image that has from the very first the directional qualities and takes on three dimensional characteristics in displaying the information given in an image's field (525 lines) by processing both horizontally and vertically and can present the image's information as a curved image. A pos-

sibility often used in the early phase to achieve this effect of spatial curving and shifting in time, consists in the visual display of (oscillator generated) waveforms in the image's field. The waveform arises through deflection from the straight line, whereas the line of a video image is being inscribed. In the first place, it is a question of bending the scan lines vertically and horizontally. As the waveform generator develops further, it becomes possible to use the waveform itself as input and to produce a multiplicity of displays through the factors of time and energy. "Waveforms are normally an acoustic product, but when you create them as frames you can deal with them as image of objects."[83]

In the context of these analytical experiments, Paik is concerned with disassociation, collage, and the recombination of television images (for example, in *9/23/69 Experiment with David Atwood*). In principle, he converts the Fluxus concept of "interference" with his electromagnetic manipulations of television or electronic signals, respectively, as he understands television and performance as cultural forms, which have to be deconstructed. Leaving side the early television experiments, which were carried out *live* and recorded on film (*Early TV Experiments by Nam June Paik. Filmed by Jud Yalkut*, USA, 1965–1971), Paik's strategy consists essentially in remediation of television programs, whose levels of image and sound are decomposed, varied, and mixed anew. His concept of decomposition is grounded in music and finds its realization in the "endless" variation on the schema of television as program. This concept includes remediation of his own video works, which are newly composed and transmitted on several channels as "material" for video sculptures (*Four Decades* contains two sources of video processed by Jud Yalkut from 40 years of working together, Dayton Art Institute; see ill. 81).

Differing from this goal of interfering and intervention in existing principles of electronic media, the Vasulkas follow a dialectical process, which comprehends deconstruction *and* construction as necessarily interwoven components of the same occurrence. The tendency in image technology promoted primarily by the Vasulkas, Gary Hill, Skip Sweeney, Stephen Beck, Dan Sandin, Eric Siegel, Ralph Hocking, and Sherry Miller (*Experimental Television Center*, founded in 1971 in Binghampton, N.Y.), Patty Nettles, and Jean-Pierre Boyer (*L'Amer-Tube*, Canada, 1973)[84] denotes, in structural difference to television and also to conceptual video art, which flourishes in the art scene with videotapes and installations, the common interest in the nonrepresentative, synthetic "image" as realized by the "pure" abstract video. "Only a few people tried to develop the so-called 'abstract' genre. It failed in the first decade entirely. We and other people dealing with early synthetic images used tape primarily as extended studio material (input), and secondly as a method of documentation of these new processes and phenomena unexpectedly popping up in front of our eyes."[85] Working with video—with regard to synthetic pictoriality but also to the nature of audiovisual transformation—links programmatically to preceding experiments in imagery and perception, as they had been undertaken in the area of abstract experimental film by the West Coast filmmakers[86] in the 1940s, 1950s, and 1960s. Particularly noteworthy are the film experiments with graphic notation and computers from James

and John Whitney, where the latter pursues in his works from the 1970s an approach for exploring parallels between linguistic and musical systems with image programs in computers. From 1962 onward, John Whitney was realizing computer films, first of all with analog computers capable of performing typographic animation. (IBM [International Business Machines] only in 1966 made available to Whitney a digital computer, with which computer graphic experiments not requiring—like the mechanical analog computer—an input any longer but rather a mathematical code, can be carried out and transferred onto film.): "Yet I began to discover the dynamics of graphic pattern arrays and their harmonic interrelationships. I began to detect the subtle charge and discharge of tension related to order/disorder dynamics in these arrays. The problem now seemed to define itself in such terms. I was beginning to conceive of the basis for a graphic 'scale' evolving from harmonies, and I saw there was a way beyond the monolithic emotional stasis of so much abstract film and video with which I was familiar."[87] In the works *Matrix I–III* (USA, 1970–1972), Whitney develops an abstract film from a system of moving graphics through programming on a computer. Whereas these works by John Whitney, together with James Whitney's film *Lapis* (USA, 1963–1966, using an analog computer), John Stehura's *Cybernetic 5.3* (USA, 1965–1969), and Stan VanDerBeek's studies *Poem Fields* (USA, 1966) establish the computer film, the questions about an abstract, systematic language for images in the area of video are being asked where the primary interest lies with developing a "lexicon of electronic vocabulary" (Woody Vasulka).

Nevertheless, the difference of principle lies in the fact that the integrated assistance of computers for abstract film happens in principle within the closed system "film" and sounds out its graphic expressive potential (as film language) in the direction of 3-D computer graphics. The proposition of an electronic vocabulary is based, by contrast, in the interest in systemic video noise as *the* raw material, which is generically open-ended, tends to abstraction, and, as a result, prefigures chaotic, interactive, and transformative processes and systems seen dispositively as open. On the basis of the fundamental processing (construction/reconstruction of the signals) and of the audiovisual transformative capacity, closed circuit and finally feedback also belong in the umbrella category of the open system. Understood this way, video permits (in contrast to the computer film) a direct interactivity between person and machine, which affects how video noise is governed and monitored and generates abstract audio and video forms from signal processes.

Of course, if we wanted to limit the video experiments of the circle interested in image technology to the concept of abstraction and understand it in the sense of a counter model to narration, this would be a one-sided, factually inaccurate viewpoint. In Steina Vasulka's works, there can doubtless be established how the point of departure in the electronic vocabulary is more strongly guided by musical ideas and non-narrative formal language on the basis of her artistic background as a trained concert violinist. In a complementary fashion, Woody Vasulka, whose interest in machines proceeds from the study of engineering and film, understands narrative forms as an additional level of articulating with electronic

vocabulary. Particularly in the video film *Art of Memory* (USA, 1987, 36:00, color, sound, see ill. 124), he manages to link visual and narrative elements closely and thematically in remembering images of war, in the course of which abstract waveforms, three-dimensional objects, and syntactic organization produce the impression of "leafing through" images of memory through an electronic "wipe" reminiscent of film.[88]

By integrating historically precedent technology (photography and film) into the fluid movement of electronically processed landscape images, Vasulka makes the transformation of history into discourse (typical of the media's treatment of events as information) visible on two levels of display: the first concerns the historical distance of the media used and points to the storage function of older image and sound media. Actualizing (deploying in space and time) their stored information through the different discourse of video images (fluid movement) translates them back from being a container for memory into remembered history. On the second level, the historicity of the technological progress is transferred into a dynamic discourse of criticism of the military-industrial context, which steers the development of such technology in a destructive direction. This aspect of the "memory" of older technology is all the more clearly emphasized in *The Art of Memory* the more strongly the video technology intrudes into the landscape images recorded in the present and processes images of nature or respectively transfers them into a technological landscape.

Vasulka converts the critical distance in the display of image as memory, which is marked by the technology of war, especially by the technologically underpinned combat strategies in World War II, into wave-pattern surfaces in imagery. With this self-reflexive reference to video's technology as a medium there arises a discourse, which reveals the development and use of technology for military purposes and the application of such technologies in an aesthetic context as technically two sides of the same thing. In the free-moving image space of an American landscape changed in color and form, the "surface" of which as video technology shifts its form and shape, narrative and written elements are applied neither linearly nor to determine form. This landscape, the deserts and mountains of New Mexico, do not make a background but, rather, a creative level for the transformations intended, in which firmly established complexes (historical facts such as mountain wildernesses) are "liquefied" through electronic processing and so set in motion. The potential for flexible, unfixed image processes in video is applied structurally to the displayed "content" to allow the possibility of another technological perspective also to appear in such deconstruction of the destructive technology of war following the paradigm of the flexibility afforded by video aesthetics.

Landscape images of rock formations, which seem to dissolve in the fluid process of the videographic wave movements (Rutt/Etra Scan Processor), mark the style of the "curved images." To the extent that the technical dislocation has a recursion effect on the display's content, the visually represented instability functions as a strategic procedure for critical commentary in this videographic theater of memory, which exhibits monumental and

traumatic war images derived from documentary films and newsreels. The nature of the process illustrated in the wave form displayed not only shows the result of a dissociative treatment of the "image" but also provokes thinking about disassociating the technology of war, because the decay of the visual landscape made visible in video can also be understood as anticipating a landscape destroyed by war, at the moment of this technology's "victory." These elements of deconstruction, history, and landscape are joined in the linear syntax of the *Art of Memory* with the construction of iconic forms of cultural memory.

They arise through the Digital Image Articulator in the sequence of individual motifs from the imagery, which either succeed each other or are multiplied and organized into abstract geometrical forms and present the preservative aspects of history and memory. Because both the fluid waveform and the layered object as image partially endowed with inscriptions are, however, integrated into the self-reflexive form of presenting the electronic process, the *Art of Memory* also declares that (in remembering) quite different images can enter in place of historical documents. The viewpoint of construction, which essentially connotes thoughts of mutability, is underlined in addition, when the original material from filmic records (newsreel, documentary film) is transferred into other media and translated into the state of electronic pictoriality. In the same way, the inscriptions in the images (for example, "Ufa") lose their timeless, thetic expressivity by becoming elements of a dissociative movement of image and text. Linguistic and visual "narrative" elements appear in this work in the form of thoughts about the use of technology permitting inscription and visibility, in which the video technology can present the notion of dismantling the machinery of war not only metaphorically but also through the apparatus' technical features.

Related to the Vasulkas' initiative, Gary Hill is primarily interested in abstract forms of video and understands the articulation of electronic language as a necessary deconstruction and construction on all technical levels possible. His accent lies more strongly on the combinations of image and sound and differentiates itself in that way from Paik and Steina Vasulka, who offer structural interrelations between music and video on the basis of their own experiences (Vasulka as a trained concert violinist and Paik as a musician with Fluxus). That is because Hill develops his electronic vocabulary on the basis of language systems. He derives his understanding of an electronic language from reflecting on linguistics, from which an analytical procedure (marking the style and form of his video works) of dismantling, stretching, compressing, and reversing image and sound sequences arises. The linguistic metaphor of "languages" serves Hill overall as a link between image and electronics. He is concerned with the possibility of transcribing electronic scan lines into forms, results that can denote both "image as object" and also "writing as object."

Hill has been working with video since the beginning of the 1970s and uses not only the Rutt/Etra Scan Processor but also Siegel's electronic video synthesizer to break up the photographic type of image and the concomitant notions of reproducibility into new forms, which are created from recombining disassociated elements (text, image, and lan-

guage). Here new "languages combinations" arise on a communicative level of speech and text in videotape and installation, which correspond as a metalanguage to the dismantling of scan lines, to feedback and layering. Showing how a linguistic system is translated into the audiovisual display system involves, among other things, reversing words and reversing reading from left to right and speaking forward and backward at various speeds (as an analogic equivalent of electronics' flexible and transformatory image structure). Hill's stress on the linguistic level of reference, which begins with semiotics and experiments with linguistic insertions, sounds, syllables, and spoken words in video, aims to bring out new contexts of meaning associatively on the linguistic level. For Hill, developing an electronic vocabulary comes primarily under the heading of dealing with language, because he understands video's writing process in time as paralleling the succession of thought processes and their enunciation. What is specific in video that achieves this translation lies for him in the movement of feedback: "I first used video in 1973.... Video allowed a kind of real time play, the possibility to 'think out loud.' Here was a process immediately accessible and seemingly a much closer parallel to thinking.... Time, this is what is central to video, is not seeing as its etymological roots imply. Video's intrinsic principle is feedback. So it's not linear time but a movement that is bound up in thinking—a topology of time that is accessible."[89]

Exemplifying this concept is the strict formal structure of the videotape *Electronic Linguistics* (USA, 1978, 3:45, b/w, sound; see ill. 45), which essentially translates electronic sound signals into a "language of imagery" and presents the result of this transcription process visually. "In this early work, Hill explores structural and organic relations between linguistic and phenomena and translates audio signals into a visual semantics. The images here appear as visualizations of the electronically generated noises. At the beginning, small pulsing pixel structures appear sporadically on the black screen. The monadic structures become bigger, finally filling the screen and pulsing ever more intensively. They are accompanied in this by high-frequency tones, which shift to a deeper tone as soon as a bright freeze image fills the monitor.... In constructing an electronic language encompassing images and sound material, this work is a predecessor of later, more complex findings."[90]

The time progression of the tape *Primary* (USA, 1978, 1:40, color, sound) works still more obviously with language and speech and makes speaking the primary creative method dominant in the image. The videotape of speaking lips, which form the words "red," "blue," "green," and so forth shifts the color in correspondence with the linguistic naming of these colors. The colors changing on the screen surface in synchronization with the language underline the process of finding visual and textual connections in a linear succession. From an electronic-linguistic viewpoint, it is noticeable that these connections appear arbitrarily and without motivation and that they connote abstraction on both levels of media. In this way, linearity is underlined, in addition, as a fluid process in the spoken and in the electronic movement, so that no obvious caesuras are made. The

spoken expression shifts into unintelligibility, and the lips, which become abstract forms through polarization, merge into the colored context of the image's surface. Image and word reach expression in their respective temporary states of movement, with which Hill seeks to make visible what language and thinking have in common and realizes in essence the mode of nonfixed, electronic writing.

Insofar as an intermedial interrelation of particularly linguistic and visual vocabulary in the electronic sphere goes, Hill is interested in how associative fields of meaning and their superimposition arise. These are fields in which the linguistic vocabulary interacts with the visual through electronic manipulation and vice versa. "Hill writes that *Picture Story* [1979] is 'structured' upon a hierarchical ladder of meaning, starting with the mechanistic and ending with a vision which pinpoints an *insignificant* intersection of image and language concerning the d-r-a-w-i-n-g.' Using letters as his visual and textual source, he 'draws' relationships between linguistics and video via the mapping of a short narrative that ends with a structural joke."[91] It is above all the interaction of image, writing, and language that determines how Hill understands an electronic language of imagery and how he analyzes the audiovisual forms of expressing a temporality, which is based on a videographic, linear inscription of its lines.

Exploring how writing, sound, and pictoriality translate into each other has a central status in this entire experimental video group. But, whereas Hill and the Vasulkas regard the technical premise of dependence in video on an interrelation of machine and medium also as a possibility for achieving a conceptual understanding of delay and feedback (time and movement), the structure of interrelations presents itself differently to Paik. He uses and deliberately reinforces the possible effect of multiplication in his video-television performances to present a multimedia spectacle, which is meant to connect television and video on the basis of the "timeshift" displayed. The differences between television and video persist; however, whereas the former represents a preprogrammed medium of transmission, the latter distinguishes itself as an open form for audiovisual experiments. Even if the common technological basis of video and television leads to comparable realizations of flow, Paik's remediations of the television program as a medium actually do differ clearly from the approach of the Vasulkas, who use the discovery of structures specific to video to achieve more complex effects as they work with the variable arrangement of various machines. For this reason, application of a single effects device—for example, the synthesizer—is less interesting than experimenting with a succession of differing instruments like keyers, colorizers, sequencers, and scan processors, at the end of which must sit a processing amplifier, which reestablishes the broadcast signal or stabilizes it, respectively.

The differing approaches in experimental video praxis are already revealed by early works: in Paik's demonstrations of the electromagnetic *Demagnetizer* (1965), he manages to bend the scan lines on a screen by applying a strong magnet from outside, which gives the television image displayed on the screen a *massage*. Paik applies this process to the

television broadcast of an interview with McLuhan in the work *McLuhan Caged* (1968, "Machine Show" exhibition, Museum of Modern Art, New York). Whereas McLuhan is explaining his key concept of the new medium's *message*, which takes as its content the languages of preceding media, Paik gives the television image of the leading theoretician of the media a magnetic massage so that his portrait dissolves into whirling spirals. Presumably it is not only the *message* of the new but also other media's *massage* vis-à-vis McLuhan's theory that is to be demonstrated here. Deforming the television image visually should also be seen as an ironic comment on McLuhan's understanding of the media, which makes a nondifferentiating reading Paik criticizes for not clearly distinguishing between the electric and the electronic.[92] So regarded, *McLuhan Caged* becomes an electronic massage of the objectified author, whom Paik brings closer to the characteristics of the electronic in this way.

Whereas this demonstration of the *message* as the *massage* is applied to television's existing program structures, the Vasulkas are, by contrast, working on demonstrating the new medium's internal, transformative, and "massaging" capacities. Their work concentrates on the structure and the fundamental matrix in the video medium, beginning with the extreme form of the television format when emptied of any message, the video void. The *massage* of the *message* here acquires a double meaning: the new medium's construction processes necessarily connote the deconstruction of these processes (as works with scan processors exemplify). The massage of the medium denotes a process spanning the media, in which the new medium of video establishes its relations to the existing media, particularly to music and film, then, through a dialogue aimed at bringing out video's specifics.

It becomes obvious that experimental video embarks on at least two directions: one consists in interference, in deflecting and distorting pictoriality with regard to the basic electronic signal; the other constructs an electronic vocabulary that starts off with video's manipulative potential to prove itself extensible and not limited to particular arrays of the apparatus. The more video praxis frees itself from dispositive constraints, the more a dual approach asserts itself: freely applying the open structure of the apparatus, on the one hand, supports electronic pictoriality's flexibility, instability, and exchangeability with sound; on the other hand, it allows arranging the machines in a nonfixed and variable way, enabling expansion. In this regard, the performative forms of video praxis and also the transcendence of pictoriality toward the object build logical steps in video's self-reflexive development. Woody Vasulka explains the dual principle, which prompts the notion of coherence through construction as well as deconstruction of audiovisual signal processes, as follows: "Making involves deconstruction of technological devices." By reformulating McLuhan's now famed (and often misunderstood) statement (in which the *message* means explicitly the *massage*), Vasulka describes his interest in investigating video's peculiarities with the sentence: "a medium contains previous media as language."[93]

For the Vasulkas, video forms a starting point different from a camera's image, and it is one where the new potential consists centrally in its processual nature and in feedback.

Steina Vasulka sums up her interest in abstraction, in working with the form of lines and the format of the videographic surface image as follows: "Feedback was the first true image not related to pinhole."[94] At the same time, this interest is directed toward the way the processual electronic form of image takes on characteristics of the photographic/filmic image, given that video belongs to this development in media. This research approach to investigating the specifics of media, of "generic behavior," includes both transformativity and immediate presence. With these, the bases of a way of working are named, which is concerned with systematically developing a vocabulary for video finally to define video's form and style specific to the medium. In this sense, video artists from the experimental tendency should, in fact, be called "image technicians" who work contrary to whatever are the familiar forms of electronic creativity (in artistic video as well as in television) by using abstraction and new technologies. Pictoriality is not regarded as carrying out a production any longer—nor of the recording process either (as is the case with Man Ray's photograms and Stan Brakhage's handpainted films). Electronic pictoriality means, in contrast to these forms of representative images, nothing other than a signal process.

Declaring that "the electronic image is processed," Woody Vasulka links the research interest of this grouping to technical signal processes and synthetic forms of image. In the final analysis, to find out what makes video different from other media. For the Vasulkas, television plays no role in this, whereas Paik, by contrast, sets out from where video first appears as a technology—namely, in television. The differing attitudes do not merely reflect preferences but rather denote different strategic paths for differentiating television and video. This includes the media strategy Paik pursues in inserting video and media art into television. Just as using new machines allows more complex and complicated transformations to be displayed, which distinguish the aesthetics and the specifics of video as a medium, so the step into the digital is also a further processual building block in experimental video: "The major contribution of the digital is the power of transformation."[95] This implies an openness towards systems, cocreative interaction with machines, and the convergence of media forms on a level of higher complexity.

Video Cultures

The three groupings discussed have a common understanding of video as a new medium and as a culturally yet-to-be acknowledged field for experiment, which has been realized in various ways. The first tendency proceeds from a radical form of television and also goes into alliances with television broadcasters in a process of further technical development and of the increasing institutionalization of the television market in the United States. In contrast, the second tendency views itself decidedly as video art, which claims gallery space and later museums as the appropriate places for the presentation and reception of its works.

The third tendency takes a position located, in a sense, between the actions and performances explicitly showing media politics and video art. Experimental video proceeds from what is specific to media in its materials and apparatus—something that also underpins the first tendency conceptually, above all when it seeks to define alternative television's distinguishing mark politically.[96] At the same time, the experimental works are guided by the interest in developing a language for the video medium, which includes the interdependency of electronic image and sound signals. Whereas the first direction finally changes the institutionalized television landscape under the impetus of a euphoria about the media and establishes formats for alternative reporting, which have differentiated themselves still further, the second grouping does not leave the art sector and is essentially uninterested in provocation via deconstructed imagery from the media. Interfering (in part aggressively) in the established art business describes another course of action common to video art, Fluxus and happenings, which aims to set other yardsticks deriving from specific genres in the realm of art.

One important goal consists in deliberately (by use of video images and television sets) removing the ideological separation of art and the media, a separation, which has manifested itself historically for decades in not recognizing film as an art form. This video art can be retrospectively deemed successful to the extent that it contributes to expanding the art genres into the media. Apart from exceptions, this tendency sets a specific discourse on video aesthetics going, which the debate on media art, originating in the discussion on video, is continuing.

Video's particular avant-garde is founded in experimental video, because various forms arise from this tendency, which display transitions primarily to the media of music, film, and performance. In self-reflexive video performance, this transfer is undertaken from various directions. In Steina Vasulka's performances of *Violin Power* (1970–1978) the recorded sound of her playing a concert violin is fed into a frequency shifter (Harold Bode, 1975), into a keyer, and into the Rutt/Etra Scan Processor. The audio signal simultaneously manipulates this performance's video images as recorded with two cameras, and the result of the audio modulation is reproduced on a screen.[97] In Joan Jonas's case, for instance, the video work forms an integral component of a comprehensive performance concept, which includes various levels of live action, actions presented on video monitors and scenic objects, staged spaces and masks. The videotapes used in the performances form not only a component in the multimedia presentation but are also individually conceived video works that stand alone and can be shown independently of the performance. On one side of the video performance stands, therefore, an approach to self-reflexion in media, which brings the cocreativity of artist and machine together and synthesizes it in audiovisuality. On the other side stands a process of artistic self-reflexion, which relates expressive forms from media to each other in dialogue, as elements (action, film, video) are set off against each other and appear in various contexts and variations. Altogether, the thematic

spectrum of self-reflexive video praxis takes in the cornerstones of an intent to criticize the media: an artistic-aesthetic concern and the experiment in image technology. The reflexive medium video in a sense manages to become visible in its basic forms.

The three tendencies set out to intervene in the cultural setting of media (of film, television, multimedia, and concept art) for various reasons. For the pioneers of guerrilla television, video represents a space for political action, which is determined above all by strategic interventions in the media's public arena.[98] One of the most prominent examples was the series of interviews, secretly recorded at that time and broadcast from a television station, with leaders of the Black Panther movement, through which this militant grouping gained a wider audience for its self-promotion. In another way, the artistic tendency in video regards what it does as an intervention, yet its intent aims at extending what can be called art and at new uses for the White Cube. Provoking the viewers is also intended here, above all when they are addressed directly. When, for example, Vito Acconci attacked the dividing line in the media between the audience and the monitor, or John Baldessari ironically presented a parody on the self-referentiality and monotony of conceptual art, then these performances in video realized, on one hand, the technological aspect of an electronic live medium, and on the other belong historically to the media's tradition of futuristic live actions, which remove the division between stage and auditorium. Criticism expressed in both cases over the inflexibility of socially recognized cultural institutions (theatre, museum) becomes clear in aggressively or ironically staged transitions from *live* to *life*, where literally realizing the live medium of video brings the as-if character of simulation (pretense) into question and stresses how the way the media treat reality (life) produces its own form of media reality (live).

The third tendency's intervention differs from these approaches because it is less concerned with interfering in contexts of media politics, institutions, or society with the available technology. The main accent lies, rather, on manipulating the technology available on the market. This tendency claims to generate images and sounds capable of being realized in the electronic medium but neither considered nor welcomed in the predominant applications of video. From its viewpoint, intervening in the setting of the media means interfering in regular production and especially in perceiving and receiving media images as the ways of doing that come about through the self-reflexion of forms of presentation in media. Here the general factors in determining culture through treating it in media are revealed—in a technical-aesthetic regard—because the ways media images function in a deconstructive-constructive, analytical video praxis are demonstrated. In the aesthetic approach, it is a question of generating new possibilities for images free of systemic constraints—that is, of visible forms of the nonvisible matrix and of an utopian potential in video allowing "new" images never seen before to come about. From this viewpoint of investigating and realizing new media images, the technical direction of image making coincides finally with the television activists' utopian understanding of the media.[99]

The initial site for producing technological experiments spanning the media is "The Kitchen" in New York. In mid-1971, this location for production and presentation, cofounded by the Vasulkas, came about as an embryonic form of media theatre and as "a place where people can come in *freely* and *experiment* the possibilities of electronic sound and image, or meet those who are making videos."[100] The basic idea of the Kitchen rests on installing an "electronic lab," which makes technical and artistic resources in the area of video available to a large circle of interested parties. The divisions usual in the marketplace between the branches of the arts and the sectoral delimitations—for example, toward experimental film—are considered unproductive obstacles. Instead of that a collaborative context develops, which permits open-ended experiments (in the narrower sense of test runs). This becomes clear when audio artists working in multimedia, like John Cage, Laurie Anderson, and Nam June Paik, come together with artists working visually and with filmmakers as well as with technicians and engineers in a "think tank."[101] The interplay of media in the audio-video area develops particularly diversely, when, for example, at one point, musicians such as Phil Glass, Robert Ashley, and LaMonte Young experiment with audio synthesizers and, at another, Paik and the Vasulkas try out similar ways of working with feedback and delay effects in video. From the general interest in the experimental field of video, a close bracketing of music and video arises in this practical area. This connection to electronic music can be seen as preparing the connection between video and computers, where computers are applied initially as control stations and effects machines in both media (video and music). The birth of video as a medium can be observed in fine focus in this environment, because the setting of the media involved in the Kitchen reflects representatively the general scenario of the "integrating birth" of video.

As Gaudreault and Marion have established in their analysis of the genealogy of the media, the birth of a new medium represents a complex procedure not only because of the competitive situation with existing media. A further viewpoint derives from the developmental process itself, which contains various successive steps from integration to establishing differentiation between the media. This means that these steps display both diachronic (vertical dynamics) and synchronic (horizontal expansion) components. That is why the following discussion of those positions, which—for example, in the environment of the Kitchen—participate in shaping video, cannot deal either with presenting a historical-linear succession or with enumerating parallel developments. Central to the discussion of video aesthetics are some salient positions, which are here brought into a conceptually ordered presentation to make structural proximity evident and to stress common factors and links. In this discussion, the "distinguishing birth" as level of reference helps both to attain a delimiting differentiation, with which video as a medium makes itself an institution, and to elucidate the spectrum for distinguishing a medium's specifics (alongside other media).

If video culture means dealing with the possibilities of electronic language (*audio* and *video*) and with the dispositive categories of a developmental context of intermedial

relationships between the media in film, performance, and event, then the self-reflexive investigations of body performance for a video camera by Vito Acconci and Dennis Oppenheim belong to this tendency's beginnings. Both work with the parameter of duration in such a way that the camera records single actions without moving or interruptions (i.e., without cutting). At the screening, Acconci conducts an imaginary dialogue with the viewers, with female viewers for choice, in order to "seduce" them into changing to "his side," something that is factually impossible. Oppenheim shifts the experience of limits in perceiving a live action in a video image, as he expects the viewer to join in watching on a monitor various stress tests of how the body and pain are sensed in real time.

Conceptually both approaches to video performance are concerned with clarifying how the status of imagery changes through video as a medium, the simulative potential of which is challenged (or, with Acconci, appears completely questionable) in the emphasis on authenticity here staged. In the fundamental relation of image and representation, the latter denotes in these works an empty place, which is replaced by a media image pointing self-reflexively to its own temporary conditionality (live). This shifting from the representation and double to immediate presence in video becomes clear in the temporal limitation—Acconci's performance is finished when the tape is used up—and in changes to speed—Oppenheim varies the speed in presenting an action. This reflexion on the character of pictoriality in media is intensified with Acconci as far as the media of video and performance reflecting themselves, when in the imaginary dialogue the interface of the projection surface/screen seems permeable in both directions.

Given the reflexion on the level of media representation, a parallel exists to the video performances by Ulrike Rosenbach, Joan Jonas, Valie Export, and Friederike Pezold, which concentrate self-reflexively on the female body and particularly integrate prescriptions for female poses from the history of painting into the above discourse on image and representation. These video artists' critique of imagery and media is motivated by feminism and treats social phenomena of repression, like sex discrimination and sexual enmity, through the "investigative object" of their own bodies. The (authentic) experiences communicated in the video are meant to contribute to a political understanding of the personal. Criticism of the putative character of media imagery as representation combines as closely as possible with performative forms in video, because a balance between the culturally dominant representations of femaleness (as in the reproductions from the media industry) and their own deviating sense of their roles and gender can happen on this level as a dynamic process. A contradiction between two levels of display takes shape: between, on the one hand, the way public images function as representation (from television as from painting), where the nature of the object presented qua media is meant to become transparent, and, on the other, the presentation of the level of mediation, as video art acquires it for displaying one's own body. Going back to precepts of femaleness from cultural history accompanies intervention in the ways media technology itself works, including both interference in transmitting images and investigating video's presence in public spaces.

In the phase of video's "integrating birth," television plays a role less as an institution than as a normative form of production and distribution, because it is in a position to bracket these areas publicly and privately in such a way as not to allow the character of the medium's products to come through. From the position of video, Dara Birnbaum's *Videowalls* and further works manifest criticism on this media model, because in them she subjects the formats of television shows and series to a deconstructive analysis and makes redundant program structures in television visible. Paik's deformation of broadcast television images with a magnet seem only at first sight more radical, because he is aggressive in plundering available media images. With the abstract quality of wave forms, Paik does indeed want to show that in the media we are not dealing with images but with mutable processes; this, however, denotes only one side of his intention. On the other side, he expands the television instrument into spatial sculpture by using it affirmatively as a medium and he uses satellite television in order to enable global participation in the local television events he stages. With *Good Morning, Mr. Orwell* (1984),[102] a television broadcast transmitted simultaneously *live* in various countries, Paik gets close to his maxim that video can produce art only for a mass audience: "Art for 25 Million People." In the presence of the audience, he analyzes video's display possibilities in television with such live transmissions. This work in particular investigates the relation of private and public in television/video, as the two presenters in New York and Paris are also shown when they think they are not on air and are holding private conversation. It concerns a dramatic love story, in which he (in New York) threatens to drink a poisonous liquid *live* in front of the camera (to take his *life live*) if she (in Paris) will not marry him.[103] Communicating the private in the public, as here demonstrated, presents *one* possibility of making clear through video how the mediation of information happens, formatting live events into news. A second consists of contrasting various program formats from television and of letting the fundamental construction schema of the medium's methods become visible through repeating and retarding the material (TV series, advertisements, and shows).

There are structural analogies to these interventions by video in television in video montages by Klaus vom Bruch and Marcel Odenbach, who proceed from the photographic-filmic material level and—by decontextualizing and recontextualizing existing image material—invoke new circumstances. In videographic montages, fragments of newspaper photos, documentary film, and photography, as well as advertising film, are assembled, so topics on war and violence (with vom Bruch), the Second World War and the dropping of the atomic bomb on Nagasaki (with Odenbach) and RAF (Red Army Fraction, a political terrorist group in Germany) terrorism come across like untreated aspects of German and world history. The effect arises, through the contrast between media, from video as the level of recording and manipulation to the various reference media, that the media's reality levels (here the topical video image, there the documentation of an air raid or of victims of terrorism), which are also separated historically, point in turn to each other.[104]

On the level of displaying images, a similar method for going through montage into the specifics of video's material as media comes into its own with Peter Campus in the tension between the levels of image and object. With blue screen and key effects, Campus creates a virtual space for action (between the image level recorded live with a camera and the object or operative level reproduced with another camera), which he uses in order to present visual deceptions. In the simultaneous presence of two different surface images—when Campus dissects the projection surface limiting the image spatially, penetrates it and in this way can be seen from both sides—the self-portrait comes to be multiplied in the videographic "surface image," which in this arrangement displays multiple surfaces organized into a relation in time and space. The principle of multiplication of mirror images presented by Campus for the video camera in various live actions, results for the spectator in the differentiation of the two levels (keyed-in "image" and action/object) being frustrated. "Dissecting" the images surface expresses—linking to Umberto Eco's postulate on the "variability of the schema" (and in correspondence on the breaking up of the intact surface of the image in Modernist avant-garde painting)[105]—an overlapping of "doubles," where the factual (the subject referred to) and the simulated (the mirror image) merge together and the keyed-in levels of the images are difficult to locate.

Ko Nakajima works in a three-dimensional direction with the problem-complex of an "image" not being explicitly locatable in relation to a surface. In *Mt. Fuji* (Japan, 1986, 20:00, color, sound; see ills. 72–74), he mounts levels of an image drawn from identical information about it (Mt. Fuji) but separated from each other in the simulated hollow interior of a cube, where multiplying the "image fields," which are shifted along the horizontal and vertical axes, moved singly and in series, rotated and finally combined into cube shapes, is related to the first computer animations (particularly the rotated cube in Ed Emshwiller's 1979 *Sunstone*) in this display of the video format's basic surface forms. At the same time, a tension arises between the fluid movement of the computer-animated image fields, which correspond to the principle of "flow" in video, and the static-photographic "image content," used unchanged as an endlessly reduplicated, standing element. In the contrast of the seemingly photographic "images," clearly definable as framed surfaces and their dramatic function of being visual elements in a geometrically arranged, computer-animated space for simulation, there arises a tension between the surface image in media as a representation and the surface of the image as a mobile building block in three-dimensional spaces of simulation and in images as objects.

With such experiments, turning points in media from signifying montages based in time (as familiar from film) to collages coalescing in space (as appearing in computer animation) become evident and in principle duplicate the same building blocks endlessly. Changes in the development of the media concern, as this example indicates, not as much the level of what is depicted as image or representation as it is much more the extended dimensionality in depiction through variability (in the schema of pictoriality).

When, in forming the fluid features of surfaces in video visually, Nakajima opens up the electronic image program toward three-dimensional spaciality in computers, then, in contrast to his work and much rather from within the media and referring to the material level of historically precedent media, there results, the transcending by vom Bruch and Odenbach of the media model of how electronic processes work. Nakajima's expansive enlargement into space, which creates multidimensional perspectives, corresponds in another structural arrangement to the internal perspectives on the "stored" information in existing media images. It is "liquefied," as it were, in the video medium (i.e., brought into an immediate relationship, by which it opens up new perspectives and dimensions if not on a technical level, then on an intellectual one). Because the analytical attention with both of them (vom Bruch and Odenbach) is directed at historical reality, dealing with the materiality of film and documentary photographs implies, from video's standpoint, reference to the media history of fixed images of reality, which leads over, respectively, into the prevalence of the electronic in media and are, for that reason, brought into a fluid motion.

In this context, film and photography are not significant because they are quoted, but in the process of electronic flow there comes about in the source material, understood as specific to media, a mediation, in the course of which the process of manipulative contextualizing in the media is demonstrated reflexively. A structural intent can be made out in the reference to the politically relevant constitution of meaning (of "purely documentary" image material). Another one finds expression where it corresponds to structural experimental film. The latter consists of treating media images (from film, advertising, and newspapers), which are understood completely differently because of their origins, as if they were indistinguishable—that is, formally equal—in montage. With these examples, the renewed mediatization of imagery in video denotes a cultural media initiative directed simultaneously at commentary on reality stored in media (in existing documents) and at the self-reflexion within the potential of electronics to manipulate. In realizing the features of the nonfixed video image, the various strategies of reflexion on mediation can be summed up essentially under the heading of an increase in dynamism.

As salient examples, Jean-François Guiton's videotapes, drawing on a conceptual praxis in art, belong to such formal experiments, which are interested in the dynamics of image elements and where he contrasts the structural and material difference of recorded exteriors (wood, wallpaper, etc.) by editing the visual material together in staccato and rapidly changing rhythms and intensifying the impression of abstraction through this "musicalization." Guiton uses video's multiple layers for a (compared to film) heightened compression of the contrasted, differently structured material. Michael Langoth presents a further procedure, where the dynamics and the compression of the "source material" intensify in the video process, as he integrates the same field within the image. This comes about, when, in a constantly speeding up feedback mode, the same "shot" is repeated (image within image within image, etc.), until what is being displayed recognizably has dissolved

into electronic flickering (deflection from the synchronization of both half images). With Langoth, there is added to comparable procedures of remediation the window motif into media by electronic layering, a standard application in video, the special effect of intensifying the speed of the event so drastically that the limits for perceiving what is being displayed are reached and an electronic effect of permanent flickering, like that in film, sets in.

In a counter-movement to compressing video's pictoriality and making it more dynamic—and so challenging the viewer's perceptions—Les Levine (like John Baldessari) counteracts the dynamism in these processes of media reflecting themselves by presenting himself in a documentary monologue. In front of a camera, Levine walks through New York's streets declaring of himself, "I am an artist" (*I Am an Artist*, USA, 1979, 16:50, b/w, sound), and deliberately reduces the ubiquitous media presence at art events to zero, as he advocates a language about forms and cleansed of all influences in order to set it off against any conventionalized and institutionalized terrain. Video is applied here as a direct, immediate communication medium, where Levine—against the medium's character as reflexion—maintains the neutrality of the apparatus in his performance, which at the same time becomes recognizable as a pretense (simulation). Levine instrumentalizes one medium in order to criticize the other. In the performance, employing video for self-referential, artistic purposes ("I am an artist") goes as far as Levine not wanting to see the homeless on the streets of New York, with whom he is sharing the footpath. The media reality—that is, what is critically underlined in this experiment in self-reflexion—is a reality sufficient unto itself.

This horizon of reflexion comes still more clearly to the fore in Richard Serra's video works, when, in *Boomerang* (USA, 1974, 11:00, color, sound), Nancy Holt is cut off audiovisually from the outside world in a television studio and gets to hear her own voice as feedback over headphones and comments on this, causing a closed circuit of self-referentiality. With delay in the feedback, an electronic echo effect is produced that, on one hand, distinguishes video as its own form of (media) reality and, on the other, is reminiscent in this live situation of the closed-circuit process in video, which historically precedes the application of videotape.

Because they do not need the live performance of a person in front of the camera, Dieter Kiessling's experiments with the apparatus emphasize video's directness, in contrast to the works of Serra and Levine. Instead, Kiessling puts the camera and monitor into a closed circuit, where, for example, the pendulum swing of a monitor hanging from the ceiling leads to the image in the camera and the monitor being dislocated. The intention is to have the simultaneously recorded and transmitted image, with a black circle in the center of the monitor's image as "content," synchronously separate. This closed array of the apparatus demonstrates structurally that in transmission in video it is not a doubling that happens, but rather the permanent construction of the image, or its reconstruction, respectively, which can be observed in the incoherence of recording and reproduction.

On the level of the apparatus, what Kiessling invokes through movement as discontinuity, the film and video artist Robert Cahen, influenced by music, shapes in fluid transitions from narrative information in imagery to abstract wave forms of this imagery, into which initially visible story and landscape feed and are dissolved to make the display medium's structure visible. Cahen's organizations of forms for video's pictoriality are close to the Vasulkas' works in aesthetic-conceptual terms, above all as far as the musical conception of the audiovisual medium goes. On the whole, Cahen's interest is more strongly directed to developing a tension between narrative linearity and processual visuality, as his core themes rest with travel motifs, beginning with the train trip, which has been used since the early phase of film as a medium to let perception ease into recollection. In modifying the filmically understood train trip with video technology, Cahen realizes a difference between the media, which transcends a homage to film. The increase in speed is visualized in the separation of the image lines, by which the perceived impression of fluidity is reinforced on the image level.

In contrast to this, Peter Callas deals with the video image's inner dynamics, as determined by horizontal-vertical signal processes, on the level of the object. He separates single elements from each other by making them silhouettes and sets them into a thinly spread (almost flat) yet sequential array, which makes the image field appear as a mosaic-like structure. Callas is concerned with realizing the videographic flowing motion as it relates to a source in a surface limited in its coordinates (and not with how spatiality happens). An instability in the image field itself is intended, brought about by the surface forms, is constantly kept moving multidirectionally, and does not demonstrate motionlessness or a fixed location, which could regulate the movements. On the contrary, the ceaseless passage of elements and configurations forms a heterotopian complexity, which seems particularly compressed, because it remains on the surface level and intensifies its themes by setting off pictorial documents originating in the completely different cultural spheres of Western and Asian (particularly Japanese) history against each other. A structural possibility for laying out an intercultural field of reference defined heterotopically (i.e., in the way spaces in a form relate as locations) lies for this Australian media artist in stressing the character of surfaces. The elements from various cultural spheres come together here as a collage in the field of the video format's imagery.

Raphael Montañez Ortiz also works with documents of visual culture, albeit related to Western media culture and particularly to film history, when he extracts short sequences from existing feature films and, image by image, puts them together using video film, videodisc, and computer laser animation in a completely new temporal structure. In a scratching process, the actual film time is expanded from a few minutes to many times the extract's original length. Film frames, multiplied and copied in, compressions and reductions of the speed of imagery, as well as reversals of the running direction (partially in rapid alternation), produce a staccato rhythm with an undoubted comic effect, but above all bring out depth structures in the social behavior of the characters "analyzed" in

this way. Ortiz presents the clearly visible disquiet, the fear, and the panic among the figures in the modified film extracts in a manner specific to video. That is because, given how the linear alternation in video accomplishes a shift in the signal's position but does not describe moving forward, as in showing a filmstrip, the movement the characters (film figures) execute does not really progress in the unstable—and, as if running on the spot—"film image" based on the electronic movement.

In video scratching of film material, Ortiz has perfected a procedure, which Martin Arnold applies in a similar manner to American feature films, in order, for example, to manipulate the image and sound of a family scene at the dining table (*Passage à l'acte*, Austria, 1993, 16 mm, 12:00, b/w, sound) and put the disharmony between parents and rebellious children on view in the body dynamics and the sounds allotted to each person through elongating short scene. Such experiments are oriented according to the film material and investigate in a process of dissection, image for image, the characteristics of film language's internal structure.

From a perspective specific to video, attention attaches to yet another viewpoint, which concerns the massage of film's message. In video scratching, the open structure of the electronic process is applied, to a certain extent, to the fixed sequence of film images in order to make something visible in this difference between media that lies between the individual images of the film and cannot be seen when projecting at normal speed. Video scratching denotes, in this respect, a process just as radical as Paik's manipulation with magnets. Both prove suited to thus transforming the structural features of an existing medium (here film, there television) by formal remixing, so that depth structures in content become recognizable in video, which explains more fully the elements presented and modified from the other medium.[106]

In the computer media, forms of scratching are carried further, in which, as in video, forms of media subjected to transformation via a massage become visible and audible in their basic (technical, formally aesthetic, and specifically generic) structures specific to media. For an example, we can turn to the works of Jodi (this is Joan Heemskerk and Dirk Paesmans), who scratches computer games and desktop arrays with graphics programs —that is, wiping (out) aggressively with "her" own software, so that anyone using "her" "applications" might have to reformat their computer subsequently. The aim is to subject commercial programs produced for the market to a deconstructive analysis, which draws attention to matrix phenomena and computer programs and negates (via dissimulation) representative forms in favor of affirming (via simulation) or respectively presenting the way software art functions. What is provoked in these applications is a reversal of the construction of simulation in computing. The double coding (simulation—pretense and dissimulation—disguise) is deliberately disrupted to emphasize on the dissimulation side what separates computers' potential for display from other technical media: the negation realizable through computing. As regards choosing to affirm or negate, Jodi deactivates the aspect of affirming linked to simulation (simulation is negated), to take dissimulation

to extremes, where deactivating (negation) goes so far, that it interferes with the processing level the user needs—making it, therefore, difficult in certain cases to shut the program down. (See Jodi OSS/. . . [1998] and *SOD* [1999], Spain [http://www.jodi.org.]; ills. 57 and 58).

In the discussion of computer technology's interrelation with video praxis, which—comparable to scratching with Ortiz and Jodi—pushes display potential to the limits of visibility and with its radical approach aims at completely emptying out the information from an image, David Larcher's video works have a central position. Larcher's approach is marked by adopting the formal vocabulary from the structural praxis in experimental filmmaking[107] for work with electronic media and digital effects machines. The technologies used—such as blue screen, optical prisms, mirror balls, synthesizers, and computer graphics—work together in an overall concept of visuality, which is radicalized essentially in two directions: the one leading to the limits of visibility (multiple keys, layers, and reflections) and the other about emptying out the image's field (in the video void). Larcher is interested in the matrix phenomena of electronics, beginning with recorded image material, which is modified in such a way as to remove the representative level and render it unrecognizable. The processes used for deconstructing or alienating image content, respectively, consist, among others, in intensifying (multiplicity), stretching (figuration of the linear structure), and negating communicative information from an image (dissolving contrast and color values). With blue screen and key processes, Larcher aims to multiply individual segments with the intention of changing recognizable (thematic) contexts in an image into free-moving forms organized like a collage. "Imagery" becomes clear through realizing various states of pictoriality, which wind up reducing the visibility of electronic signal processes. Larcher tries to say something about the way media compare with the "emptied" image and, in his video void, to bring the level of presentation (of the deconstructed, constructed material) closer to the white noise on a screen. Minimal formative structures remain recognizable, which testifies to the video artist's presence and manipulations, in league with the devices. Overall, the accent of these works is less a transcendence of the boundary to the "pure" electronic signal (as it circulates in the devices and appears in the empty form of white noise) than a question of how visualizing this boundary is possible (defining a level of display, then, on which matrix phenomena can be made visible) with the minimal formative means necessary for that.

Nan Hoover also goes to the limits of visibility with video, yet here it is less the technical concept than much rather the aesthetic aspect of visibility that is interesting. In her videotapes, Hoover works mainly with macro views onto individual sections of the body and onto folded paper that seem like foreign bodies in their unfamiliar magnification and perspectival positioning toward the camera, look abstract, and can easily be taken for mountains or sand dunes. Parts of a hand or the backs of a hand or fingers illuminated in hard contrasts take on a life of their own and seem like objects separated from the human body in color reflections and with minimal movement on a neutral, flattened background

(which deliberately seeks to avoid differences between plane and space). Moving slowly contributes to erasing the dividing line between body and background almost completely, or at least partially, in perceiving this. This demands that the viewers observe precisely, as they are dependent on the presence of the video images as flat as well as on an image quality, which manages, in contrast to film, with few contrasts. This means that perception is confronted with the nature of video as a medium (dark/light contrast, sensitivity to light, instability of the "fixed" image). With Hoover, video presents, at the level of the images as well as of the object, nothing more than moving surfaces.

Larcher and Hoover intervene differently in the surface structure of video and, in doing so, both have features specific to video that appear patently at the limits of what can be presented. One approach makes visibility its topic where a form arises through light and shadow (Hoover); the other intends setting a zero point, which makes the difference of the signal process and its treatment with respect to a reflexive image structure comprehensible (Larcher). Gary Hill's video works can be seen from these two poles: they extend this problem area of visibility in a contextual dialogue with other media languages. Hill's investigations of how surface relates to structure in the videographic matrix image are linked conceptually to an overarching engagement with linguistic aspect in image, text, voice, and sound. Language in the medium and the languages of the medium denote Hill's analytical instruments, which find their application in his conjunction of image and sound. The experiments often also mark open interfaces between the media or bring into the foreground the chance element in organizing the material brought together in an installation or for a videotape, with Hill signalling an experiment clearly to be understood as a process. Here he also makes plain that the technical side and the semiotic analysis of language have equal status, when it concerns articulating text and image anew and breaching and shifting context (for example, with speaking in reverse and aleatoric sequences of image, text, and sound).

These forms of an electronic vocabulary established by Hill link his video work with the "translations" of media languages from the Vasulkas, who orientate themselves according to music and film. From this perspective, the technical aspects of electronic creativity stand out mores strongly, which, already in the early stage of video's development, include how far analog and digital parameters can be translated and differentiated. The systematic investigation of the electronic vocabulary undertaken by the Vasulkas (partially with computer application) denotes, above all, the phase of cultural semiotics in video's development, in which marking out the specifics of the medium by engaging intermedially *and* differentially with other media (particularly film, television, performance, music, and computers) is the concern. This second genealogical phase of video coincides with the first, technological phase of development in the digital media. We can say that, in the video medium, the Vasulkas engage with computers as tools in the period of the "integrating birth" (of the digital media), which is equivalent to the not-yet-completed stage of the "distinguishing birth" in video.

Lynn Hershman understands this delineating of an aesthetic specific to video, which profiles itself through the institutionalized forms of related media, from the viewpoint of the manipulative possibilities in video as a basis for shifts between fiction and reality. She chooses the reference medium television with its documentary forms, which are analyzed for their fictional and realist content as media. The interview and the self-interview form Hershman's preferred genres for role playing and identity shifts. As a rule, these interviews are conducted in front of and for a self-reflexive video camera, set up like a mirror or an apparently transparent screen. Hershman multiplies her presentation into multiple identities in videotapes and installations, reversing television's declared authenticity in its live presence into a fictionality (which in many cases makes up the actual reality of such "apparently authentic" documentations), and she subjects the self of her (fictional) persons and other (fictional) "persons" to questioning as to credibility, proof of realness and "truth" or, alternatively, authenticity. Interviews shown, testimony on themselves by "witnesses," experiential reports, and a couple's robust row over their relationship in front of the camera seem, by appearing "staged" events and performed identities—in a style deliberately resembling documentary—neither unequivocally real nor indubitably fictional. In each of her videotapes, Hershman defines and constructs the intermingling of reality, fictionality, and, finally, virtual reality anew, with which the stress always rests on the media's reality, which cannot be subverted.

Hershman's discourse on media reality culminates in the form of a video diary (*Electronic Diary*, USA, 1984–1999), which invents her own biography suitably for the media and extrapolates with that the widespread interest in the commercial television in superficial details of private lives. Her (self-referential) "reporting" is fixed exclusively on problem areas such as body weight, beauty, and age and, in fact, radically eliminates external factors, through which the metaphor of tele-vision (seeing afar) undergoes an ironic inversion to engy-vision (seeing near). In this critical adaptation of television standards in video, a directional difference in media is evoked: if television means the immediate presence of the outside world in private, interior space, then video opposes this tendency with the subjective interior perspective. As Hershman turns the interview format back on itself (a fictive person), she draws attention to a decisive difference in the media between the public (institutionalized) television and the private (alternative) use of video.[108]

Hershman makes the connection between video and television, as relating to the way the media are used, with her interventions into the media's public arena through "restaging" of live and interview reportage. These are analyzed as to how available technologies in an institutional context (television) so structure perceptivity, that what is presented establishes itself as credible for the viewer (regardless of the information's verifiability). In this format, Hershman's engagement with questions of identity shifts into the hybrid area of virtual reality and is conceptually extended in interactive works, which present virtual relations between people (but also the construction of virtual [multiple] patterns for personality). On this level, Hershman intensifies the inquiry into a posited "identity" as

initially deemed biographical. In the hybrid combination of reality and fiction, the concept of identity appears as an optional design parameter. Thus, declaring identity in relation to fictional and virtual reality problematical also brings into the discussion, apart from components specific to gender and to media in the construction of a "self" (in television, in video, in virtual reality), the fact and the way that so organizing reality in the media is bound up with how certain representations function, the construction of which in the media remains veiled. In revealing the level of media, Hershman's way of working is related to Dara Birnbaum's approach, given that both offer a contrast to the display principle in television by means of video, as they counter an ostensible objectivity in imagery/information presented by media from a "subjective" perspective.

With her extension of the video medium into virtuality, Hershman belongs to a tendency interested in the new media, which, like Bill Seaman's, proceeds from a developed vocabulary of video aesthetics and tries out dimensional expansions of video on this basis. This separates the initiatives of the 1980s and 1990s from the historically precedent combination of video and computers by the Vasulkas and from Hill's development of a vocabulary derived from imagery and language. The further development concerns, on one hand, applying video to visualize virtual identity (Hershman) and, on the other, using video elements in hypermedia arrays (Seaman). Exemplifying the transition from video to hypermedium is Seaman's process of recoding and recombining, which arises on the basis of the linear videotape and produces various contexts by reorganizing individual elements in various forms of media output (videodisc, CD-ROM, interactive installation). In the end, they designate the transitions from the space of the image to the image as space, that is, from electronic pictoriality to hypertext. In this transfer to digital creative options, video's (audiovisual) languages are displayed by comparing the media, in contrast to the binary machine logic of computer simulation.

With Seaman, passages from text to image in a simulated space-of-the-image to an image-as-space present a consistent design feature, to create structural links between video and computers as media. Seaman translates the concept of an electronic image's fluid movement into retardation: gliding camera movements and slow-motion/video stills stress the unstable character of the pictoriality being presented. Recorded movements of bodies and further sequences of images seem put together by chance and are combined with independent text and music elements. Seaman works with a combinatory process for word, image, and sound, which rests on alphanumerics and anticipates the structures of criteria for interactive selectivity.[109] In the videotape *Telling Motions* (USA, 1986, 20:10, color, sound), features of musical composition (theme and variation) offer the structure of a montage in which elements of imagery vary in repetition so that, in principle, an "open-ended" movement comes about here. Without completing the step technically, Seaman's passages indicate between the media the sort of pictorial forms that, with the constant mobility of the electronic type of image, point to metamorphotic processes.

The combinatory system forms a further characteristic allowing the structure of video to be differentiated on the basis of its capacity for expansion and its border phenomena. In interactive installations (anticipated by the linear version of a videotape), the structure of hypertext brings about the linking of videodisc and computers. It coordinates the fluid "movement" of image, sound, and text—that is, multimedia correlations. The system for combining individual "sets" follows the logic of the machine, of computers. In simulation, it produces such sorts of repetition as carry out the principle of repetition in variation on a basic model (computer) and precisely not in—as regarded critically by Eco—infinite variability of a pattern. This arrangement refers self-reflexively to both media, video, and computers, to the extent that the interlinking function of hypertext displays an ambivalence, which makes visible and shapes borders between machine logic and meaningful combination. Seaman's notion of a "conceptual machine" marks the transformative step from electronic to computer simulation, where it is not only possible to transform one system of signs into another. Rather, mechanically paradoxical states and open systems (here, artificial language systems) can actually be generated through (as Kittler says) affirming something that does not exist.[110]

As the positions outlined are meant to demonstrate, the discussion of media's characteristics does not necessarily relate to adjacent, structurally linked media forms like film and television: it must equally fix a close intermeshing of video and computers at the center of investigating the reflexive character of video. This dual focus cannot refuse delineation from the ways video is used, which contribute in a more comprehensive framework to the entire spectrum of video culture yet do not contribute definitely to formulating an electronic vocabulary in the suggested discourse on the specifics of media. Bill Viola's videotapes and installations should be mentioned, which deal narratively with the cycles of human life and with that interweave personal motifs from family histories with thematic areas from the history of religion and art. Although symbolic narrative forms, using video technology as a vehicle, have dominated since the early videotapes, some tapes, which are significant for video aesthetics, remain to be cited. *Reasons for Knocking at an Empty House* (USA, 1983, 19:11, b/w, sound) shows how Viola spends three days sleepless in an almost empty room being constantly monitored by a video camera that "oversees" his state as an immediate presence. In contrast to this video performance stretched to extremes and only replicable conceptually (in contrast to Acconci's aesthetic of unedited tapes) on the edited tape and in installation, *The Reflecting Pool* (USA, 1977–79, 7:00, color, sound) presents the editing process of a live action in video successively and differently in two image fields. On view is how Viola jumps into the water from the edge of a pool, as within the two image fields—inside and outside of the pool—the event is displayed with a time delay and at different speeds. Even if Viola is here investigating pictorial phenomena (surface and coherence) with video technology's capacities, his decision to use a certain technology conforms to the imagery's symbolism and to the visual metaphors.[111]

Differentiating video cultures,[112] however, takes other paths: expansive steps in a multimedia direction follow the establishing of the video medium and its aesthetic languages. In this spectrum of installations, video projections, and works on several projection surfaces, I would like to elucidate three positions as examples that, on the one hand, might confirm the completed "distinguishing birth" and, on the other, testify to the topical relevance of video in a culturally, politically, and technologically differentiated media culture. The examples denote salient sites of today's video culture, that is, they figure on the reflexive horizon of complex, intercultural, and hybrid media praxis.

Eija-Liisa Ahtila chooses several projection surfaces for her video installations in space, in order to display people's perceptions, memories, and experiences, which cannot be seamlessly combined into a whole owing to intervals, omissions, shifts in perspective, variations, and further gaps in what is being displayed. Ahtila conducts a multivoiced discourse on displacements in media perceptions, which seems particularly blatant, because she set it up in an apparently realistic style, which does indeed "gloss over" gaps but in doing so makes them all the more visible. Multiple perceptions and homogenous news, as television still delivers them, fall apart into a multitude of parallel levels of information and experience. On various screens, they correspond to the net-based particles of information and to the splintering into subjective horizons of experience, as allowed by the multiple possibilities of identity in Internet communication.

This phenomenon from contemporary media culture occupies Chantal Akerman in relation to the political background of migration. Akerman investigates the various dimensions of borders and the experience of them, using the example of the illegal Mexican immigrants into the United States—beginning with images of the infrared surveillance cameras that catch the immigrants and that she contrasts with a live feed on the freeway to Los Angeles, where the experience of the border lies some way back in time and space. Inserted ahead of these are (in another space of the installation) the video recordings of the Mexicans in the border region, as they undertake personal rituals of farewell before the border crossing. This work, extending over three spaces and eighteen monitors, *From the Other Side* (Documenta 11, Kassel, 2002) takes up the motif of live surveillance in a new perspective. Akerman brings out a central problem area of intercultural society in the way she observes movements of migration. The reflexive quality of the video medium is here given a context relating to the approach of guerrilla television in criticizing the media, and it is integrated from a present day perspective into an analysis of the use of "surveillance devices" as military technology.

With Gillian Wearing, the topic area of surveillance is directed toward the internal perspectives of power relationships. Her video work focuses on relationships between mother and daughter and in couples, approaching the relationships in a documentary way and making the structural violence in the social interaction impossible to ignore by enlarging it onto projection surfaces. Wearing deals in the same way with the theme of alcoholics and the homeless, situations incapable of change and without escape, confes-

sions, and repeated actions, so the structural factors come into the foreground. Wearing is not so much concerned with documenting on video as with recording, but she is more interested in the way a situation becomes a video document by being repeated serially, enlarged and, for example, manipulated, when, for instance, the voices of mother and son are swapped in visually displaying their mutual criticism. Producing the videotape follows a concept of hybridity with Wearing, which rests on an initiatory level staged as documentary, which in turn becomes recognizable as media reality through manipulative alterations. In putting together paradoxical components, the self-exploitative depiction of people (as occurs not least in the Internet with live feeds from web cams) can, in the end, become evident as a demand from the media already conditioned by television. Between these "documentary" scenarios and a clearly recognizable media treatment of such extracts from reality, video's immediate, flexible character comes forward: it serves to criticize the hybrid character of self-presentations suited to the media.

In such initiatives, video's potential for simulation is so exhibited that the medium's reflexive structure is used to deconstruct the mechanism of hybridization, where simulation and dissimulation are inextricably interwoven. What Wearing investigates in her deviations from such amalgamations, she shows in the demonstration of a tension between *life* and *live*, in which video's considerable potential for reflexivity comes through via its aesthetics.

3

Video Aesthetics

If the system of the media does behave as Marshall McLuhan has suggested, then yardstick, speed, and pattern change in relation to existing media when a new medium is introduced. Consequently, video must, in the scale of its image form, in the tempo of its display, and in the schema of its manifestation as equipment, distinguish itself, on one hand, diachronically from related technical analog media and, on the other, synchronically from computer media.

The yardstick changes in relation to film because video's form requires, as argued above, signals that are discontinuous, shift linearly, and are synchronized into image forms by horizontal and vertical scanning gaps, which are simultaneously written and broadcast and do not form a series of image frames separated in space and time, which become, through mechanical movement in the projector (in which the interval between the discreet images, the image frames, is bridged), moving images seen successively. Whereas in video the interrupted and synchronized signal processes proceed simultaneously and linearly in transmission, their progression does not depend on linearity in computers; it denotes instead the result of program functions. In film, speed is defined through the interval between the images but in video through constructing and reconstructing the transmitted video signal.

In digitalization, both functions, both communication (interval) and transmission (signal) are eliminated and replaced by the direct and arbitrary random access to data. In contrast to film's schema of difference (represented by the dispositive), which is removed in projection and guarantees continuity, the open-ended and transformative audiovisuality in video enables multiple variations on a schema of "image" and pictoriality and the modulation of the video signal in (analog) real time. Only with computer media does a synthetic simulation image become technically possible, which can simulate and dissimulate optionally and realizes both, the manipulation of real as well as virtual elements, in

paradoxical situation (and in digital real time). Digitalization amounts to the unconstrained simulation of the schema, not its variation (film) and not the, in principle, endless manipulation using the schema (video) either.

In digital simulation, logically incompatible situations appear in the form of interacting real and virtual elements. This happens particularly conspicuously in the "seamless" metamorphosis of physically possible sequences of movement into calculated ones. "Metamorphosis is not unique to digital imaging; it is a familiar strategy in hand-drawn animation. What is unique is the special case of *photoreal* metamorphosis. . . . It is possible digitally, because the code allows us to combine the subjectivity of painting, the objectivity of photography and the gravity-free motion of hand-drawn animation."[1] For example, image forms arise, which merge image positions different in time with each other into sculptural, spatial forms and at the stage of video indicate the transition to a new form of media, which distinguishes itself by hybridization. The hybridization, as it is understood in the theory of the media on the basis of interactivity and virtualization, sets itself apart from video on the criterion of complexity and especially of optionality in a technical and aesthetic dimension.

The criteria for a debate on media aesthetics specific to media emerge in this discourse from defining the capacity of signal processes, which establish the yardstick for video's formal manifestation (i.e., the visibility and audibility). Added to this is the factor of speed, by which the ways the signal processes are transmitted and synchronized are addressed, defining the category of tempo in video. For the discussion of parameters of video specific to media, it is also crucial what possibilities exist in electronic media for registering deviations and shifts from the schema of image, or, alternatively, pictoriality as manifesting themselves in space and time in other media. How processes and transformativity progress technically determines, in this case, a type of image that is not fixed, unstable, and discontinuous and can be endlessly varied, modulated, and manipulated (simulated), therefore, following the schema laid down by the apparatus. Where audiovisuality manifests itself aesthetically, its forms arise from electronic simulation, can be extended, because further devices and effects, proceeding from the basic technical condition set by the apparatus, can be integrated, and designate the specific operationality in video.

In a comparative discussion of different media, operationality is the conceptual category for how far media components can maneuver in shaping aesthetically what finds expression when video realizes forms of audiovisuality. Speed denotes the category of discourse for the conditions in space and time, that are indicated in video through a sort of discontinuity essentially expressing instability in the generation processes. Capacity describes the fundamental specifications when developing forms in media and takes in all components in the area of scale (like form and format). It is decisive in video that the format rests on an agreement (the format of the television raster image), but the form does not. In short, video engenders, like every new medium, a new setting of capacity, speed, and operationality.

These categories determine the syntax of an electronic vocabulary, which shapes itself into the medium's language of forms in a mutual process of experimenting with the technical possibilities and further developing or, alternatively, constructing new devices. The video praxis, which shares in developing the syntax of the electronic vocabulary, shows up the diverse forms of perceiving instability specific to media. What is realized here substantiates an aesthetic specific to media.

As with every technical medium, technological development marks the peculiarities in the way video aesthetics develop. They have changed since the early 1970s in parallel with technical differentiation. What is to be understood under an aesthetic specific to video is the conjunction of audiovisual forms of expression with regard to the conditions of production available technically from the apparatus, where video's experimental sector shows clearly how technical factors and creatively realizing pictorial concepts coincide in electronic media. Here it is not a question of a perspective from technological determinism, but of understanding technology and aesthetics dialogically, as experimental video artists avail themselves of the technical apparatus and discover new phenomena, which they try to present in their works in a way susceptible to control (for example, horizontal drift and feedback).

Moving toward an electronic language is motivated by an interest in expanding, differentiating, and systematizing the possibilities for audiovisual expression. In the area of experimental video deploying image technology, this manifests itself in the investigation of an electronic vocabulary and the concomitant need to develop new devices. Where the aesthetic concepts of video artists arrive at limits on what they can realize, close cooperation with engineers and technicians works at constructing machines that permit more complex procedures and controllable steps in video (prominent examples are the Rutt/Etra Scan Processor and George Brown's Multikeyer).

In works using these devices, opening up new and also surprising possibilities for imagery and regimes of variability in audio and video creativity and, in turn, stimulating further experiments, which challenge the capacities (course, number, and complexity of functions) of these devices, a process of development reveals itself, in which technical progress increasingly necessitates the integration of programmable components and computers. Here unexpected and recursive effects arise, which do indeed deploy and extend video's potential for aesthetic expression, yet cannot necessarily be controlled and governed at every stage. In the fact that the desired effects are subject to the machine's own jurisdiction, a degree of co-creativity with the machine already reveals itself, which increases with computer use and becomes particularly apparent in digital image creation. Co-creativity means the more complex the devices and the programming functions become, the clearer it becomes that the control over all individual modular steps (for which special devices are developed) sought in video experiments is only possible in as far as the envisaged effects are actually calculable. For example, arrays, hierarchies, and time factors are calculable—

perhaps through a built-in clock—where dismantling and controlling individual elements in the video process leads to discovering further factors in the technology's workings, which in turn are supposed to be made manageable by new functions from the devices.

How the form of video's images arises from the interplay of various devices and the building of modular wave forms, variously generated by oscillators, has belonged from the start to the open character of video as an experiment, and it deviates, on the one hand, from the raster format and, on the other, can be made both visible and audible. These possibilities do not denote any additional, subsequent effects: they are, rather, constitutive factors in generating video as an audiovisual medium with an aesthetic capability, which distinguishes the forms of realizing reflexive processes.

Categorizing video as a reflexive medium means understanding it as a discontinuous process of construction and reconstruction of signals. The basic quality of electronic signal processes lies in audiovisuality, understood as the interchangeability of audio and video signals. These are media technology's preconditions for the nature of processes and for transformativity and denote video's open structure, which does not possess any fixed dispositive. On the one hand, the video signal can be generated in various ways (externally through a light impulse, internally through a broadcast signal generator), and, on the other, signal processes can be altered multiply and modularly with various devices (synthesizer, scan processor, keyer, field switcher), by which several sources of audio and video can be integrated. Finally, the output of the video signal does not depend on a particular setting: video appears on the internal monitor of the processors just as it does on the television screen and in big-screen projection. Video also does not have to have recording and storage on magnetic tape or on videodisc, respectively; the signal can also circulate in the devices themselves (closed circuit and feedback loops).

Using these technical prescriptions in video's structure, the yardstick, speed, and pattern of its fluid (transformative and processual) pictoriality can be described in the specifics of media. They denote categories, which shape style and form and display their parametric functions clearly, when, for instance, electronic media's capacity—as deriving from open-ended transformation—is made visible in the processual operations of video and audio. In addition, video's operationality figures in plural, dispositive arrays, when the variations on the schema of pictoriality acquire a visible and possibly audible expression (through feedback, delay, layer, key, reduction/enlargement, horizontal drift, etc.). The variable speed of audiovisual processes—including the variable directionality and dimensionality of scan lines—permits different ways of dealing with the image's lines, field, and format.

In the area of video aesthetics, the parameters of audiovisuality, reflexivity, and the plural dispositive represent consistent measures for reference, which are realized and analyzed in various ways and from various sides (signal process, dispositive structure, image form and format, audio/video) and shifted or extended, respectively, through involvement with other media. One concern in video praxis is denoted by an approach critical of the media

and is sparked by television's forms of mediatization. A further interest concerns the analysis of the matrix and structure of various written, optical, and audiovisual media, in order to establish conjunctions and transformative possibilities. The direction of investigation in working with video is, however, apparent in the comparison and incorporation of analog and digital devices and culminates in the notion of a technological synthesis of imagery from elements of landscape/nature, three-dimensional objects, and multiple configurations.

The video experiments directed toward the medium's technical development *and* its aesthetic articulation have a common interest in establishing video as an independent medium. This posits that video "inherits" and transforms certain aspects of organization in space and time from image media such as painting and film, but also elements of live presentation from enacting art forms such as theater and performance—and is ranged alongside comparable, open-ended forms of expression, particularly in happenings and in Fluxus. Engaging with television as technically related also belongs to this understanding, as well as the attempt to make the transitions from analog to digital media with video's specific means and from the perspective of enriching and extending the electronic medium. On the basis of this technological determination, video aesthetics extends out from the interaction of factors belonging to the technical apparatus and to media languages, existing in the media systems and becoming available once again through video's emergence. This includes realizing programming functions and hypertextual arrays, introducing coding systems and interactive elements, and developing conceptual transitions from electronic to digital simulation.

Finally, the aesthetic recursion to video's reflexivity in the matrix phenomena here becoming visible also illustrates homologous structural features of video and computers, which are founded in the common basic principle of abstraction. In the one case, this means the mathematical structure in computers, in the other, the tendency to musicalization in the electronic media, which indicates an audiovisual capacity for expression, where *audio* and *video* can be exchanged on a technical level. It is a question of a synthesis anchored in audiovisuality, with which the (intermedial) relations, as structured differently according to the media's aesthetics, are removed on the technical level of the signal processes.

At the stage of technically realized mediatization in the computers as media, these aesthetic forms of interrelation are simulated on the basis of binary codes (i.e., equalized, standardized digitally). In this regard, electronic writing and numerical coding can be referred to a common structural model of abstraction; however, it must be remembered that processual operation means programming in computers and writing processes in video (i.e., linear succession of signals). In what form the video signal is written—for example, layered in feedback or continuous in the image line—depends then on the experiments or on the standardized definitions of format. The technical realization of calculated and

line-written "images" remains reserved for computer synthesis. In this model, video achieves the level of mixing the visual with the auditive.

We can assume that the starting point of every aesthetic arrangement in video must be found in the interconnected signal states: *video* and *audio*. They define video in noise: the video signal can produce video noise both aurally/auditively and visually. The signal processes do not only originate in noise; noise (white noise) also plays a part in the recording process of audio and video on a magnetic tape. Abstraction in video is based on this unstructured level of noise.

Where theory on media declares that this abstraction within noise reveals a tendency to musicalization, its claim can be verified in terms of the theory of music. In his historical outline of the concept of sound in the arts as culture, Douglas Kahn emphasizes the meaning of noise for the origins of the European avant-garde movement, which deliberately introduces machine noise as a counterforce of radical modernity in European societies. Noise is defined here as follows: "Noise is the forest of everything. The existence of noise implies a mutable world through an unruly intrusion of an other, an other that attracts difference, heterogeneity, and productive confusion; moreover, it implies a genesis of mutability itself. Noise is a world where anything can happen, including and especially itself."[2] This is where the transformativity of audio and video noise links up, as the mutability can be shown on the level of self-reflexion in media.

Video's birth out of noise points to a matrix, insofar as noise describes a formless, unstructured context. "But noise is not a simple metaphor. It serves as raw material for artists working on electronic signals. Two tendencies meet head-on here, in a confrontation similar to that between the supporters of concrete music versus electronic music in the 1950s—the one being iconic, the other abstract. The illusionism of the analog image comes face-to-face with the realism of the material conditions imposed by the electronic basis of the image."[3] As Jean Gagnon maintains on this question, noise means, as raw material for video, establishing a new condition for media, which connects video to music but which it does not share with other visual media. "For the first time in art history, visual forms were being created by methods closer to those employed in music than in painting, sculpture, or even cinema. From this point on, technology would have the capacity to generate visual forms, bringing about a relationship between image and image-maker characterized by instrumentation and the directness of instrumental creation."[4]

The formal premises for the origin of video aesthetics in audiovisuality and abstraction are set out in this structural model. From this viewpoint, electronic processes for imagery, sounds in music, and co-creativity with digital machinery (computer-generated processes) are linked closely and almost generatively. Seeking the smallest unit capable of being manipulated or governed, respectively, in the video signal and the computer signal connects the electronic and digital experiments. When we postulate that the signal means a superordinated descriptive category for dynamic processes, the signal's structure can

occur in video's waveforms just as well as in the bits of computer-generated images.[5] This interest in signal processes leads to investigating the computer's integrative possibilities and to modifying analog and digital processes. "The process of analog-to-digital and digital-to-analog conversion envelopes the internal digital-code operations, the state of the world, which is exclusively man-organized and cross-disciplinary. The unity of the coding structure has laid down an astonishingly versatile material from which codes are constructed and from which the hierarchical order of codes can originate."[6]

The basic transformativity of the audiovisual medium, as it exists in noise, denotes the starting point for all video-aesthetic creativity: video's zero point. Reflexivity, as laid down in the structure of signal processes and expressed (in purest form) in technical self-reflexion, indicates the technical premise for realizing video in linearity: video as signal process. From both premises, audiovisuality (transformativity) and reflexivity (processual operation), the definition of video's basic aesthetic characteristic as a medium comes out of noise: it forms video aesthetics' basal category of abstraction.

This technological horizon reflects in the structural video and its relations to other media (like structural film and conceptual art), but also in processes, which interweave the level of reflexion in the media and self-reflexion in the artist. Creating abstraction in the direction of computers does not only involve engaging with image, writing, text, voice, and music, it also lays down how the visual media such as painting, photography, and film are involved through plural dispositives. Machine performances originate with this initiative, because, in the integrative interaction of various devices and actions, early video performance reveals a performativity in electronic media, which continues in the human-machine interaction of later computer-performance and of self-modifying software. Video reflects on other forms of media and so conveys, in the final analysis, an aesthetic anticipation of what is technically feasible in an expanded media setting of hybridization via interactivity and virtuality. For a discussion of positions in video aesthetics, the following stand as examples for multiple deployments specific to media, which establish video as a reflexive audiovisual medium.

Apparatus, Self-Reflexion, and Performance: Vito Acconci and Dennis Oppenheim

The generic bracketing of reflexion in media with the artist's self-reflexion forms a pervasive feature of video performances from Vito Acconci. In *Theme Song* (USA, 1973, 33:15, b/w, sound; see ill. 4), Acconci generates an intimate eye and body contact with the personified camera and conducts a "dialogue" with it as if the video camera were a real interlocutor and the medium's interface were permeable in both directions. Acconci takes up this "person-to-person" contact to a virtual "girl," as he looks at and addresses her/it (camera/girl): "Why don't you come here with me? . . . Look, my body comes around you.

Come on, put your body next to mine. I need it, you need it." He plays music to "her" and shifts his body as close as possible to the location of the recording, in order to provoke a response to his sexual approach both verbally and physically.

The real dialogue situation is simulated in this video work, because the physical presence of the imaginary girl is replaced with an apparatus, which presents the interface to the viewer. Simulation means pretense, where Acconci seems to deny the distance from the apparatus and makes the camera image become as transparent as a window in his performance. At the same time, the camera image, which is recorded and broadcast on a monitor and can suggest intimate closeness of the performer-portrait and the viewer through the equalized scale, functions reflexively like a mirror. It serves the artist's self-reflexion, who is monitoring his own image and removing the separation of image and representation. Simulation has a further effect, which negates this function of representation, as it becomes clear in a dispositive sense that—as with Narcissus's reflection—removing the distance between image and simulated image is factually not possible (the limits of the media cannot be crossed). The self-image in this construction takes on the location of an image position, and both components (self-reflexion and image) merge in simulation—that is, in pretending the self is an other.

On the basis of its ambivalence in pretending to offer a "real" dialogue and immediately negating this possibility, the electronic image here becomes visible under conditions of simulation. The reflection in the medium is ultimately only simulated: recording, with the video camera in the place of the mirror, does not return an image, it broadcasts rather a presence, where its immediacy is further reinforced by the duration of the unedited videotape. The video work *Theme Song* links the two components of a reflection, the mirrored self-image (narcissistic situation) and the self-reflexion of a video image (reflexion in media) in a pictorial unity, the video image of the performer Acconci. Because Acconci combines the reflexion of his own image and of the medium, the self-reflexion presented is ambivalent and contains the constitution and construction of imagery as reflection (broadcast image on the monitor) in contrast to the image function of the window and of the permeable projected image/photo frame of film. This model of self-reflexion confirms video as a medium of reflexion.

McLuhan's theoretical interpretation of media through the narcissistic mirror situation proves enlightening for the media's thematizing of itself, as he formulates a general principle of media. McLuhan observes that, when media's amplifying effect reaches a magnitude that oversteps the perceptive capacity, a numbing as counter-measure, more precisely an "amputation" of just this sensory function sets in so that registering what is visible is here blocked. In the Narcissus myth, however, there is established, according to McLuhan, not only the media's narcotic function; this basic situation describes, rather, the process of self-reflexion in media—that is, a mirroring of three-dimensional bodies on a two-dimensional surface. "The youth Narcissus mistook his own reflection in the water for another person. This extension of himself by mirror numbed his perceptions until he became

the servomechanism of his own extended or repeated image. . . . He had adapted to his extension of himself and had become a closed system."[7] McLuhan stresses that it is a matter of false recognition, as Narcissus had not by any means fallen in love with himself, but rather a mechanism of self-amputation was at work here, which counters an excessive stimulus, that is to say extension of the senses. "Such amplification is bearable by the nervous system only through numbness or blocking of perception. This is the sense of the Narcissus myth. The young man's image is a self-amputation or extension induced by irritating pressures. . . . Self-amputation forbids self-recognition. The principle of self-amputation as an immediate relief of strain on the central nervous system applies very readily to the origin of the media of communication from speech to computer."[8]

In place of the numbed senses, Acconci, in the reflexive video performance, puts the imagining of a girl, who assumes the position of the self as an other. Nevertheless, vestiges of the basic narcissistic relation remain in the way the I fundamentally engages with the image (i.e., the false recognition of the re-presentation as the image), because the image appearing (or, with Acconci, mentally envisaged) on the level of reflexion remains linked back to the originator and surveyed and governed by the I (Narcissus). Consequently, it does not exist unconstrained and for itself (like a real other person). In this connection, which relates back to the media, the mirror situation and the video image's reflexion correspond, in that the input on the part of the physical presence of the actor generates, governs, and monitors all parameters of the display like duration, process, and reaction. This describes a fundamental mechanism of the adoption of video by Acconci, who uses the starting point specific to media of a circular structure in recursiveness to reinforce through repetition the presentation of his own self-image with a sort of closed circuit (simulating a closed system is a part of the reflection simulated in the medium). On the level of visual presentation, the first-person narrative here corresponds to support this as the narrative form of a constant, incessant monologue (which simulates dialogue and in that, communication with the virtual interlocutor), which goes on as long as allowed by the tape length usual at that time—approximately, thirty minutes—reinforces the structure of repetition as specific to video. The narrative, which repeatedly begins anew with redundant elements, corresponds auditively to the endless recursion of the same thing when the video signal repeats in feedback. That means Acconci's video performance realizes the videographic principle of open-ended variation on the schema of recursion through its thematic and dispositive structure.

In *Turn-On* (USA, 1974, 21:52, color, sound), Acconci builds the factor of delaying and stretching time into the simulation of a dialogue with "her"/the viewer, as he repeats the events standing with his back to the camera and waiting in each case for the "right" moment to turn round. In this circular repetition of the same schema, it is not only a question of simulating a "person-to-person" relationship between his image on the monitor and an actual viewer of this videotape. Acconci concentrates rather on addressing the other to talk about his self-doubt as an artist. This presentation should be understood, like other video

performances from Acconci, as ambivalent, because he does indeed reveal his wishes, desires, and also his self-doubt as if mirroring his inner self but at the same time addresses the viewer outside of this self-reflexion and integrates a level of reflexion in the media, on which he in the last analysis, involves the viewer "personally" and (as in *Claim*) can provoke direct actions on both sides. This happens, above all, in works, which lay bare interpersonal patterns of behavior in an aggressive manner (*Pryings*) and destabilize cultural connotations of identity and foreignness in calculated exaggeration and, with that, unsettle the basic patterns of American myths.

Making the boundary in the media between "I" (Acconci) and "you" (viewer of the video performance) provocative reaches its high point with *Shoot* (USA, 1974, 10:18, color, sound), when, to a sound mix of war noise, Acconci delivers a monologue about stereotypes from American culture and in the course of it presents for viewing his naked belly and sexual organs as a form of reality: "I have an Italian name. My father is Italian. I am not American at all. . . . Now, my Italian background does not count. It's America. It's open here. I can take everything. Sure, I am an American. Enjoy it." Acconci goes further in confronting the way American myths are acquired in the figure of the Westerner, whose story, as well-known from filmic myths (particularly John Ford's film *Stagecoach* from 1939), he performs as a pantomime finger play on the "landscape" of his face in *Face of the Earth* (USA, 1974, 22:18, color, sound). In this miniature theater for the size of screen in a monitor, Acconci identifies himself and the viewer with the "cowboy-hero"—that is, with the topography of a story of immigration—with the typical stages of taking land, struggle against the Indians, and urbanization. In contrast to classical film reception, in which the viewer is offered a (closed) identification with the male hero via an idealized self, Acconci used this structure in the reflexive media setting of video such that his ironically punctuated narrative corresponds to the construction and deconstruction of the link to the observer. That is because Acconci is playing on both levels: the simulated removal of the distance from the viewer's reality (level of reflexion in media) and stressing the physical boundary in the image of the other simulated as a mirror (level of self-reflexion).

Other works contrast with the self-assertion of physical reality by extending it into media reality as they cast doubt on the reality of reproduction in an audiovisual medium qua medium or, respectively, display constructing the level of media, on one hand, auditively (*Face-Off*) and, on the other, visually (*Undertone*). Bending over a tape recorder (*Face-Off*, USA, 1973, 32:57, b/w, sound; see ill. 1), Acconci listens "live" to previously recorded statements about his "life," which he plays for himself and to the video audience as if the tape playing back were a real interlocutor, in whose speech he could intervene. *Face-Off* underlines the life character of the live performance, as Acconci does not turn the recorder off at points, which are embarrassing to him and reveal intimate secrets, but he tries rather—as in the situation of a real conversation—to "talk round" the tape: "No, no, don't tell this, don't say it. Keep it out. Leave it out." As in the video works, which bring in a real interlocutor beyond the media boundary, Acconci does not intervene in the tech-

nical course of events but depicts the process's form in a constructed media setting with its own legitimation, the presence and duration of which he cannot avoid. Here the aspect of the response on video is underlined as a control and surveillance medium.

In a similar fashion, Acconci sits down in *Undertone* (USA, 1973, 34:12, b/w, sound; see ill. 5) with eyes closed at a table and has himself observed by uninterruptedly present video, how he mentally imagines images of a "girl," who is not there but is carrying out sexual acts on him under the table.[9] Here, Acconci's verbally reproduced imaginings swing between the presence of a female person on the level of his display, the presence of the viewer addressed as "you" (who is involved in the events, in the light of the position of the girl, on the display level), and the absence of any observer/viewer, by which the recording as media in its pure presence as a form of attendance on itself is demonstrated, which is not turned off and cannot be evaded. Acconci's statement on the medium as presence can be summed up in the displayed compulsion to respond: the presence of video provokes reactions on both sides.

This concept of video as a responsive medium also comes, with Acconci, from his concern with behaviorist theories of forms of social conduct and control, which in the 1970s investigate spatial and corporeal relations between people in given surroundings and movements over a distance (in space, in architecture).[10] Acconci refers explicitly to Edward T. Hall's *The Hidden Dimension*,[11] which explains that distance from and proximity to people does not depend only on individual psychological factors, but, on the contrary, is subject to social and cultural norms of behavior. Acconci demonstrates this dimension when he understands video as a medium as a form of realizing an intimate space and wants to go from there to exercise control over people in this space and also over what is outside it (the viewers), by which he thematizes or dramatizes in specific media terms the "eruption" of television into private space. Against this background, his video performances are simultaneously investigations and interventions, that is, reversals of the conventional relation of performer and observer. "The ambiguity of this perpetual attraction/distancing pattern is never more pronounced than in his video work, which consistently addresses the medium as an 'embodiment of . . . intimate space'." . . . The video work must be understood not only in relation to avant-garde issues, but also in dialogue with deeply imbedded characteristics of commercial television—particularly the illusion of intimacy with which television programming intrudes into the private home environment."[12]

Acconci uses criticism of the media to analyze dynamics in space conceived of as both physical and psychological,[13] where the aspect of duration, emphasizing the inescapability of the media's presence and their influence on behavior, above all in aggressive acts, plays a decisive role. The performance of *Pryings* reveals this, when Acconci violently tries to open the eyes of his partner Kathy Dillon in a designated "action space" and also demonstrates with this, that it is not possible to escape the visual presence and the surveillance of the electronic media, television, and video. In displaying further extreme situations of media's (television/video) control of private space, Acconci, with the media level he himself

personifies, penetrates so provokingly into the personal, intimate area of the other that he succeeds with his directives in triggering actual reactions. The real response to stimulus from the media also points in these works to the way media reality and its apparatuses have entered the physical and psychical reality of social norms of behavior. Acconci is drastic in his presentation of both the monitoring function of video surveillance and of the media's functioning as amplifier, when, in *Remote Control* (USA, 1971, 62:30, b/w, sound, two channel, video installation; see ill. 3), the instructions conveyed by him verbally to Kathy Dillon via video transmission are converted directly into action and are performed exactly as if by objects under remote control (like cameras). At the same time, this reflexion on media offers a discourse on the gender-specific occupation of space or, respectively, the restriction of freedom of movement: "The two-channel piece *Remote Control* is an exercise in manipulation and control between artist and subject, male and female. On separate channels, the viewer sees Acconci and Kathy Dillon sitting alone in wooden boxes in different rooms, each facing a static camera. Although they can only see and hear each other on separate monitors, they attempt to interact and respond to one another directly, as if their communication were unmediated. Through language and gesture, Acconci tries to manipulate Dillon's actions from his box, as though by remote control. He instructs her to tie herself up with rope, gesturing as though he were actually in her presence, cajoling her to perform his commands, convincing himself that he is in control."[14]

In engaging with the video or the television presence, respectively, Acconci succeeds in making apparent the paradox that electronic media can present an absence that nevertheless, seems to strongly present that a response follows to the mediated reality without the difference being further reflected. "Video installation, then, places placelessness: video installation is an attempt to stop time.... The difference is: in the home, the TV set is assumed as a home companion, almost unnoticed, a household pet that can be handled and kicked around; the viewer doesn't have to keep his/her eyes focused on the TV screen, the TV set remains on while the viewer (the home body) comes and goes to get something in the kitchen and brings it back to the TV set. Once a TV set, however, is placed in a sculpture installation, the TV set tends to dominate; the TV set acts as a target—the rest of the installation functions as a display device, a support structure for the light on the screen (the viewer stares into the television set, as if staring into a fireplace)."[15] At this juncture of realities, Acconci's reflexive (specific to media) *and* self-reflexive (narcissistic) procedure begins, which stimulates patterns of behavior on the other side with the impossible crossings of the media boundary, as if the realities were not clearly separated and locatable.

For Dennis Oppenheim, the level of engagement with video performance lies more strongly on the side of an action he carries out in front of and in relation to a video camera and finally, at a distance in space from the performance, imagines as immobile and not interactive. It is using first film and later video for experiments with the materiality of his own body in relation to various objects from the physical world that describes Oppen-

heim's concern. Here the level of media is indirectly addressed: it defines an "objective" (uninvolved but ceaselessly present) observer position for the experiments with the diverse materiality of objects from physical reality as displayed. This includes Oppenheim's understanding of his own body as a material entity and results in him not calling off stress testing of his body in front of the recording camera, like tearing a fingernail on the edge of a piece of wood and rubbing a fingertip on a wooden surface until splinters are driven into his skin (*Material Interchange*, USA, 1970). He is, rather, interested in communicating the entire course of such actions. By dint of its coding as a live medium, video here takes over primarily a monitoring function, which consists of reflexively documenting interventions in the material (like fingernails) and changes in the form (pressing the fingers together in *Identity Transfer*, USA, 1970; and "deforming" of hand and face by a jet of compressed air, *Airpressure*, USA, 1971, b/w, sound; see ills. 75 and 76). The aim is to underline the presentation's character of being present in the mediated transmission of this live event.

Video as medium here receives the task of producing a closed space against all other influences, as in a laboratory situation. In the opposite direction to Acconci's definition of media's boundary as permeable and including the imaginary space of the observer as in a mirror situation, Oppenheim uses the video camera for a unidirectional observation, which documents his person and action in real time. This aspect of direct performance for a video camera links Oppenheim to Acconci's addressing of the medium; both video artists' works also convey the understanding that video as medium carries a cultural connotation of surveillance and of live transmission because of the ways it is used publicly and institutionally. The criterion of real time, as emphasized through the unedited tapes from Acconci and Oppenheim, also means in video performance that the category of duration confirms the authenticity of what is presented, asserting real time in real time.

Oppenheim convincingly achieves this result above all then, when he does indeed inflict pain on himself but consequently and scarcely less intensively inflicts on the viewer direct participation—that is, in the direct transmission through video—in this experience. What is meant here relates not only to the medium's capacity as a system of capturing the present. Critics have also read in these body performances the attitude of a shaman, who, however, does not become, in this case, himself only a medium in a process of healing (as he "suffers" and internalizes the experience of pain and border phenomena of life and resurrection).[16] What is decisive is how inner, psychic processes in the mediated form of presentation are revealed through the "material" and transferred through duration and pressure into categories of a video performance. Oppenheim's self-reflexion on the body provokes through being present in a way specific to video, which is stressed in the display and is defined as that comparative level on which the concrete realization of various material forms can come about.

Oppenheim's material performances in the early 1970s, recorded on film and video, bring into focus the thematic complex of the physicality of objects from nature, like stones, ferns, and leaves, in relation to the human body. Here it is a matter of the varying

"hardness" of the material, the effort needed to "tolerate" stones falling on the abdomen (*Rocked Stomach*, USA, 1970, color) but also of demonstrating how a fern plant and twigs from an oak can be crushed with one hand, so that in the end completely squashed leaf and stick debris remain (*Compression Fern*, USA, 1970, 16 mm, color). From the viewpoint of video, dealing with real time in the direct and uninterrupted action for a static camera position should be emphasized. Action/performance takes place for a technical recording, not for an audience. The category of real time is defined from within the media in the correspondence of physical action and mediated presence and does not strive in this arrangement toward any representational function.

In the performances, Oppenheim "tests" the circumstances of his own and the nature of material, where the "comparison of material" comes about essentially through pressure and duration. This shows, on the one hand, in performances, which encompass the body in its material qualities in comparatively applied pressure between hand and plant, abdomen and stone. On the other hand, Oppenheim realizes the comparisons through duration, when he tries to speak underwater or scrapes down his fingernails with a nail (*Nail Sharpening*, USA, 1970). Treating body parts like material culminates in *Disappear* (USA, 1972, 16 mm, color, sound), when, in front of the camera, Oppenheim tries to shake his hand off like a removable part of his body. A continuous monologue accompanies the action, in which Oppenheim describes his hand as a foreign object ("my hand is not acceptable") that he wants to get rid of ("I want this part of me to leave"). In one respect, it is a question of abandoning his own body ("I want to go somewhere else now"), and, in another, of a transformation that would allow him to see himself ("I really want to die. I want to be able to see myself").

In this performance, the body as medium is at once a transmitter, as in shamanism, and then again an amplifier, as in McLuhan's understanding of the media. Adapting McLuhan's dictum of the apparatuses being extensions of sensory functions, in which it has to come to an anaesthesia through superstimulation and necessarily to relieving the pressure through "autoamputation"[17] of those senses that have been amplified through media, Oppenheim is concerned, in his body performance in front of the camera, with translating experience into physical action. His own painful experience is to be amplified and externalized with the direct presence of the media. Oppenheim (concurring with McLuhan's theory of the media) demonstrates his reaction to superstimulation of the senses amplified by the media, when, in *Disappear*, he makes the wish for "self-amputation" into the content of the media's presence, as he explains that he would like to shake off his hand and get rid of it like an object which does not belong to him or has, alternatively, "expired."

In this performance, the categories of duration and of self-reflexion correspond formally to Acconci's monological self-reflexions. The difference, however, lies in the fact that Acconci maintains his reference to a (female) person in the here and now and builds up a sexual tension in the transmission, where in Oppenheim's case, by contrast, engaging with his own self possesses a circular structure and provokes a discrepancy between a state

of being (the physical presence) and the imagined possibility (of another materiality/immateriality). This reflexion receives yet a further component from Oppenheim, when he takes video's specific process of feedback literally and adapts it into the interaction of a recording body and a resonance body being recorded. In the videotape *Feed-Back* (USA, 1971, 12:00, b/w, sound; see ill. 77), Oppenheim writes single letters onto Kristin Oppenheim's back with his finger, as she tries to translate the sequence of letters received into words and to reproduce them verbally. An equivalence in the understanding of the media used also exists in this recursive loop and is, at one point, related to the human body, which becomes the medium of the feedback's "message" and, at another, related to the technical apparatus of the video medium, with its structure of reflexion lying manifestly in feedback. Consequently, the video performance is doubled: with its reflexive structure, video appears like an additional amplifier of repetition.

Engaging with the form in the medium appears yet more important with Oppenheim. As in recursive repetition with a technical feedback loop, Oppenheim creates various feedback effects qua media presence: in displaying the formal modification of "material" (hand, face) by material, in the transmission of the qualities of the material "body" as media on the electronic medium's immaterial level of presence, and in directing the amplifier function of the apparatus onto a source material. In *Whipping into Shape* (USA, 1975, 30:00, color, sound), Oppenheim hurls pieces of wood from outside the image frame (*hors-cadre*) at a wall and onto the floor so that they break, in the course of which Oppenheim from offstage underlines the "whipping" of the material into deconstructed, fragmentary form with instructions as if addressed to a person ("You're afraid to show your face, turn around"). The concept of materiality is demonstrated in the aggressive reappropriation of sensory functions anesthetized ("amputated") by the media, which Oppenheim had presented with other works in internalized pain experiences. In the demonstrated control function exercised by the artist here, the interaction with the medium (doubly encoded with Oppenheim) counts as nullified. In the end, this decomposition means something else, namely, extending the action space itself.

Picture, Reproduction, Media Images: Ulrike Rosenbach, Joan Jonas, and Valie Export

Video performances by Ulrike Rosenbach, Joan Jonas, and Valie Export testify to the adoption of the electronic media as a level of expression and control for reflexions on their own body images to disassociate them from attributes of femininity (here, stereotypically in images from the history of painting and in the media imagery of film, of television, and of the advertising industry) historically determined by culture. In the foreground to these video works stands an initiative in self-reflexion, which shares with the feminist tendency in film theory and praxis the judgment that these dominant depictions of femaleness in the area of production (as in reception) overwhelmingly correspond to an unquestioningly

assumed neutrality of the media's apparatus. By contrast, these artists emphasize a subjective, female perspective in thematizing the conditions of construction themselves in video images. They refer thematically to a fundamental questioning of the poses and the spaces of performativity, with which pictorial depictions of women, particularly in the history of painting, are associated representationally. The level of mediated reflexion is used formally, to demonstrate how seeing and hearing through the apparatus depends on subjective interventions in reality presented by the media (Valie Export's *Split Reality*), to inscribe the presence of your own person visibly into the way the apparatus works (Joan Jonas in *Vertical Roll*), and to point out the discrepancy between identities determined by oneself and by others by contrasting live action and projected images from painting (Ulrike Rosenbach's *Reflexionen über die Geburt der Venus*). These initiatives create a public for a discourse that hones criticism of the apparatus of media and of imagery by bringing the gender dimension concealed in the ostensible neutrality of the apparatus into discussion in the reflexion set out here on the phenomena of video's imagery.

Rosenbach, Jonas, and Export consider the live medium's character as reflexion as a source, which allows, through the immediate control or transmission, respectively, of recordings (also with a mobile camera fastened to the body), emphasizing what is ephemeral and exemplary in pictoriality, and claims relevance in the here and now. As the technically imperfect video image is further emphasized in contrast to the mass media's prefigurations, these temporary displays of video performance contrast with the extratemporal validity of centuries-old depictions of female grace and natural beauty. This also happens in a comparison of the media, as video's unstable depictions evoke the possibility of changing image forms and functions of representation (particularly those reproductions that negate their status as image and want to appear natural). Reflecting on their own image has a reinforcing effect in several respects, when the performance includes the action in a videographically captured space just as much as linking the presentation and control monitor with the live action through the installation. Finally, mobility of perspectives, which are dependent on the multiple positions taken on by the subject before and behind the video camera, belongs to this concept of performativity.

In this composition, the mobility and multiplicity of perspectives intends to draw attention to the fact that every technical recording and reproduction with the apparatus rests on criteria of selectivity. Emphasizing how action and control are simultaneous (in front of and behind the video camera and through the control monitor) denotes a political intention to intervene with video into an existing public context of surveillance, news broadcasting, and advertising in such a way that the media side of the image forms becomes evident. Ulrike Rosenbach describes the situation in the 1970s: "Our age's highly sensitive technical apparatus extends in its political dimensions into video technology as well. . . . That is a strange situation. It makes it clear that, when you use the medium of video, it always has to be done in a political context. . . . In this sense, it is a political medium a priori. It is not loaded art historically, like painting, it is loaded politically."[18]

With the live performance for video, *Die einsame Spaziergängerin* (1977, Museum Folkwang, Essen, see ill. 82), Ulrike Rosenbach modifies the theme of self-analysis through comparing media, by which she can elucidate artistic creativity and also present the relation of a complete body display in space and its limitation to segments in the monitor image. "A huge photographic reproduction of Caspar David Friedrich's *Mountain Landscape with Rainbow* (1809/10) provides the ground for her performance. The artist moved continuously to and fro on the rainbow's section of a circle, which had changed in the reproduction into an arch of light, and with hands raised, using a long rod, directed a video camera about in the middle of the circle, of which the rainbow in the painting formed a part. She had fastened a torch to her wrist, which illuminated her hand brightly, and with her fingers she formed the sign of the snake—equally a reflection of the form of the circle."[19] On this "stroll," the circular form of the movement reflects the closed circulation, which the circular structure of the simultaneous recording and reproduction of her hands forms on the monitors positioned in the space. A media dialogue arises from "craft" aspects of artistic creativity in drawing (presented by the element of painting) and technical features of recording in the focusing on the hands on the screen. In this way, the artist can layer various discourses performatively—that is, in a performed process of appropriating and producing the image—and can present the resulting pictoriality in video and the product both of her subjective control and also of a videographic tracing of the creative process in painting.

In the same way, Rosenbach creates a contrast of static images from painting and dynamic embodiment of the representations of femaleness represented in them, when, in *Reflexionen über die Geburt der Venus* (Germany, 1976, 15:00, color, sound; see ills. 85 and 86), she steps as a contrasting figure into Sandro Botticelli's painting *The Birth of Venus* (around 1460) projected life size and tries to become congruent with the body position as given. Rosenbach's performance, situated in a space between the recoding camera and the image of Venus projected on the wall, completes an ambivalent move to conform and to reject, as she several times turns on her own axis displaying a white side at the front and a black side at the back. In this way, a two-sided commentary of the relation of image and representation in a media image arises: whereas the white side still superimposes itself on the Venus, the video presents and seems to confirm it in its pose, the diametral effect of the black side causes a darkening and a total negation of the image by the real presence of the artist. Rosenbach as performer steps exactly into the place of the Venus display projected life size and removes the spectacle's visibility. The critical commentary on the image consists in making reference to the character of an iconic presentation anchored in cultural history as a representation appearing as a double of reality and not as an image right as far as the products of the advertising industry. Rosenbach turns this mechanism around, as she reveals the construction of the image so that her own image in the video "visibly" negates the representation, which the pictorial depiction of Venus has become by remediation, which has made its character as an image invisible.

Here self-reflexion comes into play with both factors relevant to the mediated mirror functions. On the one hand, Rosenbach realizes the lengthening and broadening of her own body through mediated amplification; on the other, she thematizes the border to the media and the interruption in the media's projective function, by which the anaesthesia and amputation of the senses as demonstrated by McLuhan is erased and the typical process of false recognition within the narcissistic mirroring can be deflected. As soon as Rosenbach shifts from the (white) amplification to a (black) emptiness, abandoning the I-ideal of the reflected image (white side), here connoting self-criticism, can happen. In the media's typology, this process means criticism of the continuing inclusion of Venus representations in contemporary media images goes together with correcting the display of a narcissistic mirroring.

With this understanding of self-reflexion, Rosenbach formulates a clear criticism of the ostensible neutrality of technical apparatus. This is further reinforced when, in the video event *Glauben Sie nicht, dass ich eine Amazone bin* (*Don't Believe I Am an Amazon*, Germany, 1975, 15:00, b/w, sound; see ills. 83 and 84), she shoots arrows from the image-controlling position at the image of the Madonna (*Madonna im Rosenhag* by Stefan Lochner, 1451) recorded on video and broadcast on a monitor and superimposes on this her own image recorded by a second video camera. In this construction of a reflection, the representative functions of her own and the foreign image are equally attacked, and, in fact, on the media level of the appearance they share (as Madonna *and* as Amazon). The possibility for false recognition (in the framework of self-reflexion) is prevented on the pictorial level by the double presence (on her own and of the foreign image) of a reflection opening up a possibility for choice. This does not, however, eventuate in the narcissistic reflection, from which the misunderstanding of image as representation results. With Rosenbach, a clear division is made between the Madonna image, which is attacked in the videographic reproduction as an iconic vehicle carrying an unacceptable version of a role and the video image of the actor shooting arrows, which, by dint of the superimposition, hit the image of her self and of the Madonna simultaneously. Doubling the video images this way deconstructs the possibility of an image functioning as representation/double of reality as it becomes evident through the dynamic layering that the pictorial reality was constructed for a media presence.

Joan Jonas also shows by means of video, how the image of her own body is linked to a reflexion on the mediated level of presence. The viewers of the videotape *Vertical Roll* (USA, 1972, 20:00, b/w, sound; see ills. 61 and 62) are confronted with a double game of seeing and loss of it as the seeing comes in for technical interference through manipulation of the imagery's frequency. The video signal of the recorded image is not synchronized with the frequency of the television's raster image in reproducing it, so the effect of a vertically scrolling image results, as with faulty tuning. The consequence of this means that we do not see the black and white images of the twenty-minute tape in continuous,

linear flow, but rather a black band constantly scrolls vertically across the image as a rhythmic interval and is acoustically amplified as a visual caesura by a noise of percussion. Because the image is not justified, it seems to run endlessly across the monitor. On the level of the image—that is, in the image on the screen—not only a representation is conveyed, therefore, but the linear structure and the signal transmission of the electronic image are also made visible, as if they were not arrested.

Interfering with the synchronization between recorded and reproduced image shifts the observer of the tape into perceiving it from a doubly structured situation. On the one hand, the performer Joan Jonas appears in front of the camera intending to make views of her body visible exhibitionistically (above all, when the camera shoots her close-up in her bikini trimmed with glass beads, calling to mind a revue girl or a belly dancer). On the other, the black and white contrast of nakedness and clothing, which comes across like a mask, underlines the impression of displaying a fetishization of the female body. Individual parts of the body are also exhibited like erotic display objects, as when her legs skip through the image like marionette's, reminiscent of the mechanically dancing legs in Fernand Léger's avant-garde film *Ballet Mécanique* (*Mechanical Ballet*, 1924). With this interplay of baring and masking or veiling parts of her body, Jonas draws attention to the way a recording with technical devices, which she controls, is being staged. Above all, when at the end of the tape she steps between the gaze of the observer and her self-display in the video, a previously undiscerned media boundary is exemplified.

This is possible because the actual video image and the representation reproduced rest on different levels of presentation. By dint of the author of the video work appearing in the space between the video camera and the taped monitor image, it is indicated that the vertically scrolling image, which was consistently to be seen as a full image, actually has the status of an image within an image and as an object marks a level, which can be, but is not necessarily, congruent with the level of the recording as an image. Deviating from the synchronization of the video image, which turns out finally to be a manipulation of the image as object and, therefore, of what is being represented or reflected, respectively, allows in *Vertical Roll* inserting between the performance in front of the camera and the broadcasting medium of the screen a further reflexive level, which is not anticipated in the normal course of events. This contains the engagement with the self-image from technical and thematic viewpoints, which altogether display reflexion as a construction. Noel Carroll writes, "This enables Jonas to focus on what might be thought of as an esthetic interrogation of the conditions of representation in video. Her video imagery is predominantly representational, but her treatment of it bypasses a concern with the referential or representational power or scope of that imagery. That is, Jonas seems less concerned with what the imagery represents and more involved with how much it represents."[20]

Jonas makes the status of the video image in terms of its constitutive function in a mirror effect evident as soon as image level and mirror-image level do not coincide. To this

belong effects of doubling and reversing, for example, when directional ordering (right-left relations) are swapped round, and Jonas writes the word "moon" so it can be read in the mirror but appears in the monitor as a mirror image (*Left Side Right Side*, USA, 1972, 8:50, b/w, sound). The image composition in *Left Side Right Side* defines a vertical division, in which the artist's portrait in the left half of the image, as seen from the observer's viewpoint, appears on a monitor and in the right section of the image as a mirror effect. Both halves of the image behave with each other like a symmetrical mirror effect on a common axis, although both images are recorded with different cameras and do not reflect into each other. Jonas, standing outside of this mirror-monitor arrangement, demonstrates the relation of the sides when she raises her hand to her eye: "This is my right eye. This is my left eye." By comparing the mirror and the monitor images as media, this spatial organization gives the impression of a laterally reversed monitor image in contrast to an apparently "real" mirror image.

The irritation provoked by insertions of image within image, image splitting, and reprojection (reproduction of the monitor image by a second camera) contributes as a whole to making the visual representation of recordings (these are predominantly performances by Jonas for the camera) become visible as a construct, which brackets in its upshot (that is, in the image we see) the artist's reflexion with the medium's self-reflexion. An important element of this method lies in video's character as performance, as the videotape *Vertical Roll* presents the recording of a previously rehearsed action, which is enacted as a component of a live performance (see ill. 63)

The video work *Disturbances* (USA, 1974, 11:00, b/w, sound) generates comparable interference in perception by reproducing, in the place of the real person, the relation of image and representation as mirrored on the surface of some water. The woman in white seen in the video is already an image reflected by mediation and displays itself on the combined water and screen surface. The camera's image never shows her "unmediated" but, rather, exclusively in the mirror effect, accompanied by the original soundtrack of her noises in the water. This playful assertion of the duplicated self as an image contains a further dimension still, because Jonas does not leave it at observation, in contrast to the narcissistic starting situation. Jonas simulates, on a second level of display, which she overlays with the first, a direct intervention in the existing media image, when, in the repetitions, she swims on the spot and, in this way, twice through the water/image and finally jumps from a diving board into the image and with that "rips open" the sealed surface of the image. Presenting her image in this way breaks through the apparently self-contained representation of her in duplicate (on the first video level). As the camera, then, initially records a mediated level of reflexion, which seems to be congruent with the level of display, Jonas dissolves the conjunction of image and representation in her performance by taking the interstitial space between the depictions as an action space. As in the other works as well, criticism of the media begins where Jonas opens up the surface of pictorial presentation into an action space and demonstrates that taking several levels simul-

taneously represents an extension of the subjective possibilities for controlling reflexive processes.

Following this principle, layerings and mirrorings come about in *Glass Puzzle* (USA, 1973, 17:27, b/w, sound; see ills. 59 and 60), in which, in contrast to other works, two presenters, Joan Jonas and Lois Lane, act before the camera at the same time so that, as they reflect themselves, the position of the other is, in fact, embodied by a second, other woman. The constellation of image within image undergoes a radicalization, because the reproduction of the broadcast monitor image as a full image is only recognizable, when the image is switched off (that is, the videoed monitor is switched off). This happens at a moment showing from behind the presenter Jonas in a silk kimono bending forward, so this erotically simulating perspective is abruptly withdrawn from sight, making it clear that she has this process under control.

Jonas prefers dividing the image, inserting images into images as well as integrated projection surfaces running through the forms of image and calling attention to the structural instability of the video image and, consequently, of the media's boundary (exemplified in *Vertical Roll*). The fact that the image appears as image refers to the narcissistic mirror situation and underlines the media premise, by which the separation of image and mirror image cannot be removed. This construction, which counts with Jonas as an integral component of the mediated merging of performance and video, indicates at the same time how presenting herself in front of the camera links into the mediated presence's control of itself. For this reason, the image's vertical tracking may be felt as "interference" yet does not convey anything but the presence of the video medium. "The rhythmic roll of the image, as the bottom of its frame scans upwards to hit the top of the screen, causes a sense of decomposition that seems to work against the grain of those 525 lines of which the video picture is made. Because one recognises it as intended, the vertical roll appears as the agency of a will that runs counter to an electronically stabilised condition. Through the effect of its constant wiping away of the image, one has a sense of a reflexive relation to the video grid and the ground or support for what happens to the image."[21]

Valie Export realizes the approach of acquiring the self-image through combining video and performance art as she adapts the form of her body experimentally to prescribed forms and, both in closed interior spaces, in urban space and in landscapes, tests out various media's visual forms of expression (photography, film, performance, video, and installation). With *Raumsehen und Raumhören* (*Seeing Space and Hearing Space*, Austria, 1974, 20:00, b/w, sound) and *Sehtext: Fingergedicht* (*Visual Text: One Finger Poem*, Austria, 1973, 2:00, b/w), it is a question of intensifying perception of what the media conveys, where, at one time, the impression of a synthesizer sound moving through space is presented and, at another, the semiotic character of pointing is indicated with soundlessly signing fingers. In *Hyperhulie* (Austria, 1973, video documentation, 6:39, b/w, sound), a performance recorded on video, however, the existential engagement with the unprotected body in a defined action space takes center stage. In the boundaries of an electric fence set by Export

herself to define the performance space, she tries to move in such a way that she, to the extent possible, does not feel the boundaries.

Mediated experience of boundaries, converted into real experience of pain, characterizes Export's treatment of her own body against the background of looking for a possibility to aggravate gender-specific and generally conventional moral concepts by demonstrative displays in the 1960s as the only woman artist in the group the Vienna Activists. Her main concern consists of the deconstruction via media, like film and video, of existing representations, in which Export's strategy of constructing reality visibly and audibly aims at, on one hand, pushing the audience's willingness to watch to its limits and, on the other, equally taking the physical experience of her body into border situations. In a conceptual correspondence to the senses declared by McLuhan as extinguished and amputated because of intensified stimulus, Export's video performance *Asemie* (Austria, 1973, 9:00, b/w, sound; see ill. 35) begins with the "incapacity to express yourself through facial expressions" (subtitle of the performance). If the media have so severely "anaesthetized" the perception of reality that, as Export claims, no language can be found in the art sector any more either, which might be able to provide a critical perspective on this media—reality (and, for instance, define the role of women and their sexuality differently)—another level of expression has to be found that is so real that it at once breaks through the mediated constructions of reality. For Export, the blocking of reality by the media's reality taking its place is so overwhelmingly prevalent that she considers it necessary to kill a small bird in her live performance, not just symbolically but in actuality.

The video actions combine criticism of the media and of society in ways meant to focus on expressing transitions from reality and mediated amplification/duplication. Export conceives of her understanding of reality in the paired concept "reality and its double," verification that means the action cannot be subsumed under a particular reality or its representation respectively. "The medium alone is not the message, or, put another way, the medium is not ONE message. . . . I am concerned to investigate the concept of representation and the concept of the real, in connection with the questioning of the real, the changing of the real in the course of history: not seeing a unity, an explicitness, but mutability in the identity of the real."[22] The concept of *Split Reality* (Austria, 1970, 3:00, b/w, sound; see ill. 36) makes visible how Export deals with the insight that mediated realities do indeed exist in parallel, but impair or restrict each other in interaction or reinforce one tendency. In this "reproduction of reproduction qua directness," Export takes on the position of the "direct" reproduction, as she can be seen and heard on a video monitor singing along with a song from a record, which is being played simultaneously under the monitor but cannot be heard by the viewer of the installation. As in other body performances, Export makes her concept obvious in this work as well, to the effect that an "expressive language" from a partner, from a "double," needs, in brief, a counterpoint. In the video performances, this counterpoint lies in the directness of the videographic reproduction of a live action, which cannot really reproduce the reality of what is being displayed.

Video/TV: Nam June Paik and Dara Birnbaum

In the discourses on video and television, Nam June Paik and Dara Birnbaum occupy a position that questions the status of the public sphere in the electronic media. They begin with the proposition that mediatization of reality figures in video surveillance of public spaces, as in the transmission of events in the television format, but does not reveal itself as such and seeks much more to produce an impression of direct reality. Their methods—that is, Paik's conceptual deconstruction of television's forms and his deformation of electronic pictoriality, as well as Birnbaum's analysis of the ways public images are constructed in both television and video-monitored spaces—demonstrate that video can counter the normative impression conveyed by public images in television.

In the installation *Transmission Tower/Sentinel* (1992, Documenta 9, Kassel; see ill. 16), Birnbaum uses documentary image material in a bricolage form and contrasts George Bush's speech at the convention of the Republican Party in 1988 with Allan Ginsberg's antimilitary counter-position. The installation, "eight screens hanging from the ceiling and equipped with stereo systems throw an arc, a descending line, which is reminiscent of the trajectory of a bomb from the plane transporting it,"[23] combines the image material like readymades in a new context. In transforming television into video sculpture in an art space, gaps appear in the mediated presence of what is presented, when the electronic movement reaches out to a "movement" between the various monitor images. In the technical simulation, the parallelism in the presentation demonstrates how incompatible the contents are. With her works in public spaces, Birnbaum locates video as medium still more clearly at the juncture of reflexion and transformation. With *Rio Videowall* (USA, 1989, Rio Shopping/Entertainment Complex, Atlanta, Georgia; see ills. 12 and 13), she shifts the effect of the technical feedback up to a level critical of the media, when the two live surveillance cameras record the passersby on the shopping center's site and feed these images back into television images, which are keyed into the image field of the passersby as transformed into figures. With this, the relation of image as representation to the body image of the people recorded is dissolved, and the figures in the images are integrated into a digitalized natural landscape (an image database) on twenty-five monitors (the video wall consists of 5 × 5 monitors) and become abstract silhouettes: "The body is dematerialized through the live surveillance cameras and rematerialized as an image on the shopping center's site: at the same time, the outline of the body is filled up with live satellite broadcasts from CNN—Atlanta is familiar as the headquarters of Ted Turner's media empire."[24] Despite their tending to abstraction, the forms of image keyed in do, however, contain information about the people.

With the transformation of representation into image, what Birnbaum presents relates, on the one hand, to reversing the mechanisms of the media industry to negate the character of the image as constructed and to present the image as the representation. On the other, her deconstruction of this process also points to how "image" in electronic

surveillance represents a data set, which is compared with other image data. In this monitoring situation, the relation of representation or of similarity is irrelevant, as the pictorial forms of the people recorded, who have become carriers of CNN information, make clear. Displaying the fundamental constructedness of this media reality (in processing television images through video) is, above all, possible, because video, like television, has features of flow and instability, which are made evident in video as the conditions governing the apparatus's functioning.

In his collages with extracts from television, film, advertising, recorded Fluxus actions, and live television events (particularly satellite broadcasting), Paik makes clear how all aspects of the everyday reality artistically staged and commercially conveyed in the television medium are homogenized and coalesce into a globally applicable medium of communication, which filters our perception of reality. Corresponding to McLuhan's vision of a "global village" networked via media communication, *Global Groove* (USA, 1973, 28:30, color, sound) combines extracts from various media genres together formally, as it adapts these different elements with an aesthetically unifying videographic configuration and renders them strange, particularly through magnetic manipulation, feedback, and the scan processor. Among other elements, a dance performance, Korean and Navajo drummers, Korean Pepsi-Cola advertising, the poet and cultural critic Allen Ginsberg, the cellist and Fluxus performer Charlotte Moorman, as well as film extracts, among others from Jud Yalkut's documentary film *Paradise Now with the Living Theater* and a further documentary film showing ritual dances from Nigeria are combined. In the rapid alternation of the elements qua video, this kaleidoscope reinforces the possibilities of television for broadcasting various images and sounds from the entire world on the television screen. At the same time, by means of video Paik opposes the unordered structure of the program flow in television with an external perspective, in which the television elements are interwoven contrastively and electronically deformed. The visible and audible intervention into existing "material" demonstrates video's more diverse possibilities in contrast to television and its program structures, where Paik realizes the aesthetic category of decomposition and recomposition of signals, closely borrowing from the neo-Dadaistic Fluxus actions, in which deconstruction equally forms an aesthetic core category.

Paik uses excerpted material, which has been deformed with the Rutt/Etra Scan Processor and the Paik/Abe Synthesizer, multiplied and processed modularly. With image-sound collages set hard up against each other, an overall aesthetic context of recombination arises through various modifications of frequency, changes in voltage, and transformations of black and white into color values and deviations from the linear form. It is preceded by a mediated self-reflexion on the combinations of information material anchored in television's program structure. Paik includes the process of dissection into the new combination in video, when he does indeed assemble the elements rigorously and, at the same time, lets them merge gently into each other on the newly established level of videographic fluid movement. In this way, *Global Groove* generates a cross-sectional impression of media

culture as it is conveyed as mass media via the filter of television, by making collages of music and dance performances from various cultural contexts and having various media appear simultaneously as carriers of information. Paik's method of aesthetically bringing together thematically disassociated material through the videographic process not only forms a video commentary on television, in which the permanent flow is interrupted, in order to combine elements into one form. In his remix, Paik also takes a discursive stand on a media landscape on the global level (as television reveals it), in which he tries not least to combine his biographical relation to Korea with displays in Western, American television.

Paik's video work has been engaging with the real existence of a reality formed by the media since the early electromagnetic signal manipulations of television images, where Paik can make technically clear, with magnets in *Magnet TV* (1965/1969) and with the electromagnetic *Demagnetizer* (1965), that television's reality describes a level of reality equivalent to a secondary level of mediation. This becomes visible when the electronic material is so presented by means of a signal amplifier that the television raster image generates abstract forms (by which television creates its own "reality") and when these signal processes are applied to already existing "television images" (so that a deconstruction of and referring to the characteristics of electronic construction results). The early experiments with signal amplification, which initially appear live in real time on the screen and are recorded by Jud Yalkut on 16 mm film, *Early Color Manipulations* (USA, 1965, 5:18, color), in their abstract, spiral-shaped linear forms verify a dual concept, which intensifies the studies with the Paik/Abe synthesizer in *9/23/69 Experiment with David Attwood* (USA, 1969, 80:00, color, sound). On the one hand, it aims at deconstructing the technical conditions for realizing television by means of electronic processes, which deform pictoriality (*McLuhan Caged*, 1968); on the other, it aims at recombining mediatized material, which is removed from its context and assembled anew. This material, above all when it comes from television and advertising, equally undergoes a deconstructive level of processing (as in the abstract experiments with signals), but, from the confrontation of mediatization (television) with secondary mediatization (Paik's electronic remix), it then generates abstract forms, which follow a musical principle in their rhythm and repetition (and confirm the audiovisual medium's tendency to abstraction).

Paik's strategy aims at displaying these processes visibly and audibly. This comes about, as he uses processors to apply a further level of meditated modification in addition to the collage of existing media images—for example, from film, musical performance, and theater—which are subject to a renewed (secondary) mediatization. The intended effects of modulating *audio* and *video* (through feedback and changes in voltage, frequency, and luminescence) mean, together with dismantling and recombining image and sound from television material (including film and advertising), two things: the program structure of television is deconstructed, and, at the same time, the image structure of the electronic media is deformed.

These two occurrences of the media reflecting itself, which combine in dispersing "image" into process, lend the creative process in *Lake Placid* (USA, 1980, 3:49, color, sound) exemplary expressiveness. *Lake Placid* consists essentially of a remix of *Global Groove* and presents a commentary on *Global Groove* in the same way that *Global Groove* can be seen as a commentary on the television. Elements from *Global Groove*, together with new television extracts, are compressed down to the length of a video clip, by which the speed of the manipulating on the basis of the schema of electronic display is raised further. The later work manages technically to decompose the elements already used in *Global Groove* at an advanced stage of computer graphics. The newly included material from the televising of the winter olympics in 1980 is taken up into the deformation of the entire image structure in the remix of media elements from television, video processing, and computer graphics presented here. As already accomplished in *Global Groove*, *Lake Placid's* aesthetic concept of re- and further working shows itself in aiming at an aesthetic homogenization as end result, where the procedures of remixing (decomposing and recomposing) of Paik's "own" material (from *Global Groove*, 1973) and the "new" television material (from 1980) represent inseparable processes. This has become possible, because both references recur, in the last analysis, in the television images, which are technically and aesthetically produced all over again on the level of video (once as process with *Global Groove*, and then again in combining video and computer technology).

Birnbaum equally understands video as taking an outsider position relative to television, allowing it to illuminate critically the processes of mediatization in this core medium of networked communications. This happens, on one hand, with the intention of setting out the constructed character of the media's systems via video presentations using television forms as examples, which, like series and quiz shows, reveal the redundant regime of repeating the same schema. On the other, Birnbaum contrasts these constructions in television with a further level of reality, which either inserts street scenes or uses another display format from television, by which a discrepancy appears between the public images from television and the making public of the character of the construction itself.

With formats, which mix television images, her own image material, which alludes to advertising aesthetics, lines of text, and pieces of music in video clips, Birnbaum manages to produce commentaries on television as a media industry, on advertising, and on pop music, which have a critical impetus through the contrasting of the reflexivity specific to video with the segmentation and fragmentation specific to television. Her video and music clips emphasize particularly the interchangeability or the arbitrariness of the material respectively, as that appears in television but do not necessarily contain any statement and meaning for all that. *Fire!/Hendrix* (USA, 1982, 3:20, color, sound) brackets everyday scenes on the street with the number "Fire" from Jimi Hendrix through a formal use of various image formats. As this aesthetic process is presented, successive fragments are intensified, and changing image formats express abbreviating stylistic devices. As a result, the song's contents withdraw behind an apparently showy visual surface, which renders

the text banal,[25] by which it is indicated that video counts as a commercial amplifier of the musical number in the genre of the music clip.

Pop-Pop Video: General Hospital/Olympic Women Speed Skating (USA, 1980, 6:00, color, sound; see ills. 10 and 11) contrast repeated segments of an installment of the American soap opera *General Hospital* with equally segmented and repeated extracts from the live broadcast of a women's speed skating race at the Olympic Games. Because the information conveyed is shortened and appears in variations (without sound, with original sound, instrumental music, and finally the song "Disco" by Donna Summer) on the same schema, Birnbaum is underlining what is also redundant, arbitrary, and banal in this commentary on the mass media. It becomes clear how, in these program structures of television, communication is not understood as exchanges and development but is reduced much more to repetitions of individual, discontinuous particles of information divorced from their context. The doctors' conversation in *General Hospital* remains as superficial statements in the repetition of the same sentences and does not penetrate to the theme of what is being said. The parameters of ephemerality and speed, which Birnbaum analyzes in television's program structures and brings together with the generic redundancy (of the series) on a presentational level, which displays the flow specific to the medium, are emphasized by contrasting them with the women speed skaters, above all when the time code is running visibly in the image. With this processing of television material, Birnbaum applies a perspective that understands the programming of television, deviating from information and communication, as producing commercial entertainment culture.

Technology/Transformation: Wonder Woman (USA, 1978, 7:00, color, sound; see ills. 14 and 15) engages with an icon of this entertainment culture, when it shows how an office worker changes into the imagined figure of Wonder Woman by pirouetting under her own power (accompanying the explosions displayed on the image and sound levels). A difference also arises here in the repetition of a process (the pirouette) by dint of an intervention in the television image's permanency. "Because it is not only the rigidity of the identity that is exposed as an optical illusion in *Technology/Transformation: Wonder Woman*, but also the way a "new woman" materializes through technology.... In *Technology/Transformation: Wonder Woman*, the 'technological ruthlessness and thoroughness' of typifying gender this way becomes visible through Birnbaum's double strategy of acquisition and repetition."[26] She interrupts the schema of endless repetition: in deconstructing and by introducing a double. Consequently, *Wonder Woman* destroys the flow of electronic images. Because "other" images also set "new" interfaces between the medium and the image, which remove the function of the narcissistic mirror image as representation.

On the whole, Birnbaum is interested in analyzing the mechanisms of mediatization in television, to do which she begins by assessing how images constructed by media obviously do indeed refer self-referentially to the media system but seem on this level of secondary mediatization "natural" and can take the place of images of an external reality. With her interventions in the media's structures for constructing (television) reality

through transformation—deconstructing the media image, which looks like a representation, therefore, down to an "image" constructed by the media, which displays the characteristics of image as image—Birnbaum discusses the manipulative status of public images (in television, on video walls, in the surveillance of streets and buildings). For this approach to a critique of the media through pictoriality, video represents an excellent possibility for reflexion by means of transformation, above all when Birnbaum presents the technical process of constructing and reconstructing pictoriality in video in reverse.

The electronic technology (here, video) can be applied to another electronic medium (here, television) in such a way that, when the common discourse of flow is made clear, television's characteristic as medium of fragmenting and segmenting comes to light. The dialogue of video and television also serves to criticize the unidimensionality of television in its function as a cultural core medium and in the light of its constructedness. "By turning the medium of video/television on itself, the real dislocation took place by altering the iconography of television through changing its original structure and context. At a time when there were no VCRs available, I could capture Wonder Woman and disassemble the 'her' from a seamless flow that provided viewers with the Pop glorification of her red-white-and-blue democratic iconography. Before the onset of home video recorders, that type of imagery was only coming one way to you. TV was strictly controlled.... I wanted to place the work anywhere that it could permeate back into the culture. It was a way of talking back to the media."[27]

By clarifying mediatization in this way, Birnbaum can in video treat the reality of a quiz program or a soap opera series constructed by the media like external reality, which, in reverting to its constructedness, is not produced as if naturally but much rather artificially and appears schematically repetitive. This method exhibits a political dimension, because by displaying the mediatization of media images, Birnbaum renders visible the fact that the more these images self-referentially repeat the media system's formats, the less they refer to an actual existence reality. The index of a level of secondary mediatization exemplified in the video work contributes to understanding how video can be used for public monitoring and surveillance. Birnbaum points out that such images, precisely because they appear immediate and, with that, "real," allow their status as images to be easily overlooked and can similarly be considered "unmediated" reality, a perception television consistently suggests to its viewers. If, by contrast, the segmented form of presenting pictoriality is not to be misunderstood as an image of reality, it is necessary to recognize the sovereignty of such media images, the traits of whose construction are analyzable in the videographic process of reflexion.

Birnbaum constructs her own form of media reality in the trilogy *Damnation of Faust* (USA 1984/87, 22:00, color, sound, see ill. 9).[28] As with the analyses of the public images in the television programs, making a discrepancy visible stands, with *Will-O'-the-Wisp*, in the foreground. Its course runs between the repeated schema and transforming the schema in carrying through the processes of repetition: "*Will-O'-the-Wisp* is a media landscape,

which devotes itself to the development of Gretchen, the main female figure of the Faust legend. . . . I wanted to give Gretchen an active voice again, both as an individual and as the main female figure of the Faust legend. That is because the female voice is what has been denied in the centuries-old history of the myth."[29] Even if the public discourse on the reference medium is replaced by a personal one in this work, the method remains consistently focused on the way media images are constructed. Momentarily freezing individual images breaks up the imagery's fluid structure so that individual segments become discernible. These segments, like the inner monologue of the Gretchen figure and the street scenes with Italian youths (which connote masculine behavior in contrast to the Gretchen monologue), seem in the mutual commentary different from the surface-phenomena of television's serial images, which this videographic analysis seeks to exhibit through the processual nature of pictoriality. With *Damnation of Faust*, it is a question of emphasizing the imagery's character, through which a passage becomes visible, which reflects the difference in the adopting or, respectively, the fluidifying and repetition (schema) of pictorial phenomena on both levels, images structure and narrative structure. If the motif of the window in *Will-O'-the-Wisp* is used as an insert to include intervals—interruptions in the fluid structure, therefore—in the transformation displayed, this interruption brings simultaneously, then, other information, situations, and perspectives into view. This sort of "reconstruction" of various pictorial issues does not only deconstruct (in fulfilling the method of constructing) the surface structure of the electronic image: it brings "imagery" as representative system fundamentally into question.

The structural features of both media forms, video and television, as the video works of Paik and Birnbaum present them, denote a particular form of remediation.[30] Whereas "immediacy" of process applies overwhelmingly to the effect of directness intended in television, video's reflexive structure lends itself more strongly to categorizing under the second process of "hypermediacy." Starting from this disposition, the self-reflexive components in remediation can be reinforced still further in video's special relation to television, based on shared technical fundamentals. What is meant here is the relation of media to media, in which the relating medium (video) simultaneously describes the process (videographically) by which the medium related to (television) is transformed and modulated technically.

Video, Photo, and Film: Klaus vom Bruch and Peter Campus

Klaus vom Bruch refers in his videotapes to the technical process of construction and reconstruction of fluid pictoriality in media to reflect from this standpoint a difference as media between filmic images, to which he has recourse in his videotape, and the sequential structure of repetition in video. Together with images of historical or contemporary photographs likewise recorded on video, film, above all in using scenes from historical documentary film, stands for what is past, the thetic and (immovably) documented (shots

of allied tanks, airplanes, pilots, and destroyed cities in World War II). Vom Bruch contrasts this mediatized arrangement, which historicizes discreet events and has the material from television programs on the kidnapping and murder of Hanns Martin Schleyer in October 1977, on the hostage drama of Mogadishu, and the death and burial of the RAF members (Andreas Baader, Gudrun Ensslin, and Jan Karl Raspe) in *Das Schleyerband/The Schleyer Tape* (Germany, 1977/78, 60:00, color, sound) coalescing into facts, with video's possibility of integrating the historicity of events once again into a "fluid movement" and in this way transferring them into a discourse.[31]

The discourse level of video, which vom Bruch establishes using existing images from documentary and advertising film, seeks to deliver a commentary on the existing mediatization of images as something staged; for instance, the self-presentation of the heroic, soldierly, and warlike is clearly shown to be a propaganda strategy inscribed on the images. The images of war are, and this is what concerns the artist, intended, like imagery from present day advertising, to "convince" and represent a particular message. In this way, they function in the framework of intelligence and combat strategy. In today's battlefield deployments, as shown live on television with infrared systems, this overlapping has become still more acute. Vom Bruch analyzes this circumstance with video in the 1970s and 1980s, because he can apply the media's specific means of continuous repetition (writing image lines) and interruption (line skipping) in such a way that video presents a discontinuous praxis of deconstructing and dismantling other media images.

In *Duracellband/Duracell Tape* (Germany, 1980, 10:00, color, sound; see ills. 18–20), a harmless advertisement for batteries determines the basic structure of the commentary on the war images, as in his video vom Bruch exposes only the short split-second shots, where the battery, divided into halves by special effects, snaps back together again with a hard, metallic sound. This image motif deconstructs the composed character of the film frame as an interval made materially visible and audible and, in addition, traces the basic principles of film montage (according to which a third element, a symbolic meaning, results from the combination of two others) back to its individual components. The syntax of *Duracellband* has here a double function: the individual elements (the American pilot giving commands over Tokyo, Japanese children in 1945, Nagasaki in ruins, victims of the Nagasaki bomb, the outline of a Jean Cocteau head, stuffed drummer rabbits, and vom Bruch covering his eyes with his hands), which enter into a contiguous relationship in a conventional film montage and combine to give meaning, are abbreviated in the continuous repetition at ever-increasing speed to such an extent, that the overall impression is that of an exploding bomb. "The battery gradually takes on the dimension of a death symbol. That becomes particularly clear, when vom Bruch alters the rhythm. When the battery suddenly snaps shut four times in quick succession, that is the dramatic turning point. The snap sounds like the detonator, which sets the mechanism of disaster in motion. After that, the film stills of burned children appear directly."[32] As the pace quickens, it is not only video's pulsating agitation that asserts itself as different from film. In video, all elements are also

transformed aesthetically into an audiovisual context, which embodies, in "shooting," the metaphorical meaning spanning film and war through multiplying the snap of the Duracell battery in series and, in principle, into infinity (intolerableness). In this context, the reference to Cocteau in *Duracellband* has a deeper meaning, as from this French film director comes the saying: filmmaking means watching death at work.

Vom Bruch, as demonstrated prominently in *Duracellband*, works with very short (sometimes scarcely perceptible) sequences of images, which are rhythmically arranged, continually repeated and, in the process, interrupted by other contexts of imagery, where the speed of alternating sequences of images varies and also produces staccato effects, which are not dissimilar to fire from antiaircraft guns and carpet bombing. With regard to the engagement with the technology of warfare, the media artist shows a parallel between the military's strategic application of cinematographic image technology in the Second World War and video's use of a greater range of possibilities for imagery when intervening in the filmic effects. Video is here used as an external medium to take a standpoint of critical reflection on a double attack: with bombs and cameras, which, fastened to aeroplanes, document these bombing raids. In video, vom Bruch changes the perspective of the filmic material and translates the military's technological attack on "hostile" territory into an attack on the perceptions of the viewers, who are "bombarded" audiovisually with a multiplicity of small details. The exact control of the rhythm and the organization of the individual elements, in turn, reflect the military necessity for control and organization of all details. On video's level of presentation, the "cinematic" technologies of warfare in World War II are displayed in the mechanistic precision and implacability, precisely to the extent they link these technologies of imagery with weapons systems. Vom Bruch makes the historical connection of technologies of imagery and warfare in the Second World War recognizable in the source medium of cinematography, yet he extends these latter into the present by applying the electronic technologies as instruments, which increase the speed, repetitiveness, and intensity of the "bombardment." The potential of electronic media appears, in the final analysis, from the perspective of their potential for application to military purposes, where the difference from film is described as lying in the greater operationality.

In his lucid structural comparison of war and cinema, Paul Virilio concludes, "Only recently has it been realized that the Allies' victory in the Second World War was at least partly due to their grasp of the real nature of Nazi *Lebensraum*, and to their decision to attack the core of Hitler's power by undermining his charismatic infallibility. They did this by making themselves the leading innovators in film technology."[33] Developing electronic technologies of imagery further confirms the organization of control over circumstances in space and time, the modulating, that is, for purposes of exploitation. "Already evident in the flashback and then in feedback, this miniaturization of chronological meaning was the direct result of a military technology in which *events always unfold in theoretical time*. As in cinema, what happens is governed not by single space-time principle but by its

relative and contingent distortion, the capacity for repressive response depending upon the power of anticipation."[34]

Vom Bruch's works, like *Duracellband*, intensify this structural context. The more the explanation/prognosis of the "sight machine" (the bomber pilot's order to drop the bomb) and the execution of the "hit" (represented by the battery) coincide in the audiovisual staccato and culminate in the immolation of Nagasaki by the atomic bomb, the less it is a matter of chance in this perspective, that the images of the immolation by the atomic bomb, because they are all but motionless, appear static and like filmed photographs. Unlike the ephemerality of film images, passing by "like memories," an "unexpected event touching me," as Roland Barthes has shown, is essential to what is the vital point of the photographic. The subjective closeness, which photography can engender despite historical distance from what happened, Barthes calls *punctum* and he differentiates the way of reading photos from *studium*, the general, contemporary interest in historical photographs.[35] Referring to the war machinery of cinematography, the mechanism of a "relative and accidental distortion" (Virilio) in its lethal targetry does not appear simply as a further document in the contrast of the filmic (dynamic) with the photographic (static) made visible by vom Bruch. Much rather, the quality of the *punctum* in the images of the Nagasaki victims can be intensified by the media by putting these images into a videographic context, where, on the one hand, their potential for breaching the continuum of time and space like a "stab" (Barthes) fades out of the continuous process of the filmic motion, which is equally set out in video, even if it is also deconstructed there. On the other, the discontinuous quality of the (filmic) photographs receives reinforcement by being presented through discontinuous video images, so here a reinforcement (video) of the reinforcing function of the medium (photography) appears, in McLuhan's sense, from events, which are based on what happened in real history. In this process, the video images of the film/photography (they are not photograms, but film images, in which victims are to be seen as if immobilized) acquire the position of a "raging standstill," a position Virilio attributes to the headlong quickening and retardation in the technologies of imagery through the increasing commercialization of them.

In vom Bruch's *Duracellband*, the photographic element resists these two extremes, while the war and the advertising images are identified with the strategies of the media industry by being repeated and interrupted in video, which means they are attributed to the same mechanism of commercialization. This is a mechanism that Virilio has pointedly described further for the present day: "Those American TV channels which broadcast news footage around the clock—without script or comment—have understood this point very well. Because in fact this isn't really news footage any longer, but the raw material of vision, the most trustworthy kind possible."[36]

Vom Bruch proceeds to make this visual raw material visible in his harshly contrastive video montages: by revealing related informational strategies in war reporting and product advertising, the intention is to show how the "raw material" is formed and made func-

tional by the media. Vom Bruch equally applies the aesthetic process for videographically analyzing media images' communicative function to media images of the film and photography variety and to video self-portraits, to be able to indicate overlapping features of construction. On the part of electronic creativity, it is a question of configuring visually and audibly the technical difference between the fluid motion in video, by which, on the one hand, transformativity/mutability are connoted and, on the other, discontinuity/interruption, and film, as it is defined by successive frames and editing sequences, which homogenizes its intervals in projecting apparently "seamless" and continuous images of motion. To this end, the videotapes and installations films made in the 1970s and 1980s employ a rhythm that realizes the filmic concept of intervals synthetically and performs them at differing speeds.

The context of using war and cinematographic technologies for propagandistic purposes appears clearly in the montages of source material from documentary films with apparently insignificant product advertising for battery and tissues: in *Softyband/Softy Tape* (Germany, 1980, 19:00, color, sound; see ills. 21–23), the harmlessness and softness of a pack of paper tissues of the "Softis" brand floating on a cloud represents just another form of the "attack" on the viewers' perceptions. The permanent repetition of the advertisement is interrupted by shots of a bomber pilot from the Spanish Civil War: "An open pack of 'Softis' plays the main role in the advertising cartoon lasting only a few seconds, as it floats in a deep blue sky escorted by white clouds. There a single tissue sails into the open pack. A girl's singing accompanies the ad: 'heavenly soft softies in the tissue pack, take softies every day' to the melody of a children's song 'Catch a falling star and put it in your pocket, save it for a rainy day.' . . . The analogy of the floating tissue pack and an aeroplane appears patent. 'Catch a falling star . . .': sporadically, scarcely perceptibly, and flashing on just for a split second, a shot of a cluster of bombs being dropped follows the image of the pilot."[37]

This video work plays with the semantic field of "softy" on yet another level, as the contrasting portrait shots of Klaus vom Bruch present the artist as a "softy" who plays with his hair or with his scarf as if with a tissue. These self-portraits show poses that elevate National Socialist and generally military imaginings of the "soldierly" man into parody and are accordingly commented upon self-ironically with counterconcepts of the seemingly "soft" and "effeminate" man. Because the floating tissue and the "floating" bombs are equated visually and semantically, however, vom Bruch unmasks, in the phenotype of the (German) "softy" from the postwar generation, a latent hardness, which—the historical comparison with the bomber pilot is certainly to be understood like this—is in principle "revocable" or "replaceable" at any time. This is staged programmatically under the title *Die Harten und die Weichen (The Hard and the Soft)* as a polarizing opposition. The video technology, with which this discourse on fixing of history in filmic images is, in the final analysis, conducted, promotes on the basis of its fluid structure the understanding vom Bruch arouses of "fluid" transitions from history to the present, of newsreels reporting war and "other" advertising films.

It must be remembered that in his work with video vom Bruch is not concerned with presenting the technical processes, but certainly with exploiting the instability of the videographic type of image for interrupting and fragmenting filmic images (whether historical documents or adverts) being apparently repeated endlessly. The mediatized difference is meant to express a different understanding in dealing with "images as documents," the destructive messages of which—in the case of war images—is subject to a deconstructing analysis through media. In the first place, it is not a question of a critical commentary on the presentation of wartime events on film but of the attempt to give the timeless expressive power of film images a more flexible form, which—in what would be the implicit utopia—would not have to culminate in the destructive context of intensification resulting from warfare coupled with image technologies.

At this juncture of historicity and discourse on utopia, arise the "war tapes" and the "communication tapes," which equally begin by analyzing the technology. *Azimut* (Germany, 1985, 6:36, color, sound; see ill. 17) shows a full-screen shot of a parabola antenna, which has the form of a flat hemisphere, but covers the 360° radius, because it is constantly rotating around the axis of its lowest point. This rotation has a breathing human ribcage superimposed punctually on it but performing a different rhythm. In contrasting this mechanical, standardized technology for satellite broadcasting with the soft, living body, vom Bruch once again makes it clear through the "material" how the technology extended by the media determines the "rhythm" and, in the end, the form and the principle of communication (sender and receiver). The territory is organized to this end, as is also necessary in warfare.

The videotape's title already points to the geographical analysis of space through cartography, because that represents the basic condition for every military operation. In azimuthal projection, it is a matter of a form for presenting a three-dimensional surface that, however, can encompass only one hemisphere of the globe—represented in the videotape *Azimut* by the satellite dish.[38] In this regard, its hemispherical form also offers a metaphor for the mediatized communication of such geographical and, therefore, cartographical images. Bomber pilots need this pictorial information, before they drop their bombs over a defined target and then record this process through media/film.

Reflecting on the condition of a material image surface as medium and on its production process is related by vom Bruch, above all, to media forms that do not correspond in time, and it is motivated by history. Peter Campus, by contrast, presents the production process of a material image-surface spatially, countering simulated image surfaces with his live video actions, with closed circuits and using overlapping camera images. The levels of objects and of the image belong to different places in time and are made to coincide in the video monitoring. Campus arranges his reflexion on his model from the media comparatively; it comprises the contrasting of performance and video, of single image (photography) and image space (video), and the self-referential directing of video onto video. In this way, irritations result on the image level as presented, which consist of several layers of

recording: on one, the action and the modification of the material by Campus comes about and, on the other, the projection of the same "image" at another point in time or from another perspective.

In the three sequences of *Three Transitions* (USA, 1973, 4:53, color, sound), Campus works with two synchronic video recordings that are isometrically superimposed on each other in the transmission. Campus follows the coincidence of the setting and his movements on both levels of the image on a monitor outside of the image field. In the first *Transition* (see ill. 32), two video cameras are directed at each other but separated by a paper wall. As Campus slits the paper open and climbs through it, he can be seen simultaneously from front and back. The actual and the virtual images are unified, when Campus seems to be climbing through his own body in the projection. Overlapping various levels of the image, all relating to the same level of the object, also appears when Campus rubs blue coloring over his face to key in a second video recording of the face successively into the "blue"-colored spots using blue-screen technique (and Chroma-key technology) in the second *Transition* (see ill. 33). In this spatial difference, a temporal discrepancy also arises at the same time and reverses the time sequences of before and after: finally, Campus's actual "facial image" disappears (on the blue screen) and brings his underlying, projected "facial image" into view, which has to be recorded before the actual modification. In the third *Transition* (see ill. 34), the actual facial image is projected live onto paper, as if mirrored. Campus views his own image with the video camera (as if in a photo) while it is burning up and, as with a real reflection, does not give any "reflex" any more. The trick lies in there not being any reflection but rather video's reflexive quality is demonstrated through a (simulated) mirror image.

Campus has tried out further irritations of spatial order in video works operating with two camera systems that "survey" the same space simultaneously and independently of each other and can induce vertigo in the viewer through more-or-less acute isometric deviations. *Double Vision* (USA, 1971, 14:45, b/w; see ill. 31) consists of various segments, which reproduce the same space in dislocative, multiple perspectives with several overlapping layers of imagery.[39] Campus's interest in the physical states of the body, of its perceptions, and in the variability of space through video layering becomes still clearer, when he relates himself, for example, in the first video work (*Dynamic Field Services*, USA, 1971), as performer to the pictorial features of videographic "perception" of his surroundings. In the first segment, Campus points the camera at his feet as he paces off the parameter of space, placing the viewer in a subjective position as the plane of the floor tilts and turns. Campus then lies on the floor, his body appearing to advance, recede, and spin as he raises and lowers a camera suspended overhead from a pulley. The viewer is subjected to a dizzying spatial disorientation as Campus seems to revolve.[40]

The video experiments are aimed essentially at expanding the possibilities for perception, where the temporal aspect is also drawn into the irritation of the actual and the virtual image space. It is centrally concerned with multiplying the spatial dimension in

the live process, which permits the constant adaptation and control by the artists in a different way from static media such as painting and photography. Reference to the self, and generally to the dimensions of the human being, here sets a necessary, stabilizing counterpoint to the visual dislocations of the spatial coordinates. Above all, the video installations showing this are those following the concept of multiple pictoriality and, with that, demanding interactive engagement from the observer. John B. Ravenal writes, "Campus was interested in bridging the distance between the spectator and the spectacle. But in contrast to commercial television and film practice, he rejected the idea of a seamless identification between viewer and image. Campus's disorienting installations introduced multiple images of observers who interacted with the installation components to produce and reconcile various representations of themselves."[41]

Structural Video: Michael Langoth, Les Levine, Jean-François Guiton, Richard Serra, and Dieter Kiessling

Under the category of structural video, a formal tendency is to be understood, which is connected to concepts and operated in correspondence with conceptual art and structural film in such a way that the aspects of the production process structuring the material essentially determine form and expression and not elements of content relating to representation. In contrast to a comparably formal concept of material in formalism, where signifying factors are defined as constructive and allotted to the formal process, the approach of the structural experimental film understands the question of form from the perspective of operationality and not from composition.[42] This understanding is shared in the area of conceptual art, insofar as the "idea" (the conceptual project) does not just define a point of departure but fixes all plans and decisions, which are carried out in praxis.[43] In his discussion of conceptual art's basic principles, Alexander Alberro lists the main categories: equality of all elements used while turning away from craft aspects, "closed work" and "original," abandoning of the character as an object in favor of dematerialization[44] of art, by which the observer's participation is demanded in a contextually organized concept of perception; extensive negation of any expression through contents—that is, a position comparable to the structural film and its maxim: *against narrative* in emphasizing presence in the place of formalistic composition. This results in the place of presentation becoming important, which leads to the conventional presenting and exhibiting locations becoming generally problematic and culminates in the inclusion of architectural surroundings and localized works. It is here a question of reflecting on the capacity for communication of an artistic process and on its character as product.[45]

Altogether, in both approaches—conceptual art and structural film—tendencies to abstraction become noticeable. They are anchored in thematizing basic material or, alternatively, in the media's preconditions for aesthetic production and mean a preference for open, incomplete forms and processual praxes for display or performance, respectively.

They come together with the programmatic dematerialization in the mode of presentation of conceptual and performance art and with direct processing of material in film and, for instance, manipulating projectors in film performances. These procedures provoke creative interaction or interactive participation respectively, as these are demanded with Fluxus actions.[46] All these strategies reflect the contemporary location of aesthetic production in the media, defined by mechanical, serial, and processual features, which have linked the areas of advertising aesthetics and the media industry (above all, television) since the 1960s and the 1970s.

While experimental film claims a special public presence in the field of tension within the art action and the film show (and asserts the recognition of a separate arena for the noncommercial film), the merging of production (process) and consumption (product) happens in both conceptual art and structural video. This does not present a contradiction, because the conceptual work is seen in the context of what McLuhan identifies as increasing the mediatization and connectivity of various social subfields. The understanding of the close interpenetration of aesthetics and media economy in the communications and information society, as this is pointedly discussed in postmodern discourses of the 1980s from the viewpoint of the aesthetisization of all areas of life, may explain the commercial success of the abstraction in conceptual art associated operationally with the product, "art."[47]

At the same time, establishing a new current in art, which ties the "new" into a market and media concept,[48] determines structural video's horizon of engagement with advertising and television. For example, when Les Levine makes his own presence in front of the camera absolute or Michael Langoth does the same with the electronic possibilities of the endless, in principle, seriality of pictoriality. In this way, your own person or, alternatively, the media's presence is "marketed" self-referentially in and by means of video. In this structural approach from video praxis, as it is related to the preconditions of processual operation and abstraction specific to the media, an artistic maxim of modernity comes to bear, which is characterized with the slogan *form follows function*. Form in video, which primarily presents the operationality of mediated processes—and, in fact, includes self-reflexion on the location of video in the media setting—and employs composition only as something of subsidiary importance, verifies the interdependence of form and function in the technical terms of the apparatus. In the technical and, therefore, the audiovisual medium of video, we must proceed from the fact that the mechanical functionings of technical self-reflexion (simultaneity and synchronization in constructing and reconstructing the signal) determine the medium's form. If the basal form of self-reflexion in video is indicated, with feedback, as a circular structure, this function is exemplarily displayed by Michael Langoth in the form of the media image, when he deploys the form of the television set as redundant "image information" in *Retracer* (Austria, 1991, 3:45, color, sound; see ill. 68) and makes the serially intensified composition of image within image within image, etc., seem circular.

A space can be seen full screen. A man enters, sits at a table, opens a bottle of beer, turns to the television, and switches it on. The same subject matter can be seen on its screen, during which the speed of the feedback loop rises until the imagery's recognizable contents disintegrate, and it culminates in "white noise." The shift performed here from self-reflexion into self-referentiality comes across as an ironic commentary on the way television markets its program structures (above all, in series, to whose redundant flow of uniform information Dara Birnbaum's video clips refer tellingly). When feedback culminates in a flicker effect, as with Langoth, this has a clear parallel in the concept of "art," as the presence of the process (invoking seriality by turning on the television) correlates with the location of the staged performance (here the spatial relation of viewer and television set) and this execution of a conceptual idea coincides with the "product" (here television).

With Langoth, the recursive demonstration of this marketing strategy takes place, differently from conceptual art's correlation of industrial production and seriality with the location of presentation and distribution, in the tension between two media, video and television. His intention is to deconstruct this strategy by identifying television as a "meaningless" system. The criticism of television manifests itself by repeating only the internal, instead of the external, world (the viewer's living space), as if mirroring it. Auto- or, alternatively, self-referentiality means the structure of repetition seizes on a schema that is endlessly generated without changing. Through the mechanism of turning on the television set, the level of media is made visible as such. Subsequently, it serves to enact the implosion of medium and message at the observer's location, so the direct presence of the electronic transmission at the observer's location "outshines" the medium's "content" completely. As with the technical implosion of television sets, a zero point of media communication appears with this recursive display. This presentation underlines how television "markets" its programs (and their repetitive pattern, that is) by transmitting the same schema and repeating the same building blocks.

In a distinctly more aggressive and notably monological manner, Levine substantiates the conjunction of "art," "product," and "market" from the perspective of video as a live medium, when, in the videotape *I Am an Artist* (USA, 1979, 16:50, b/w, sound), in front of a running camera on the streets of New York as if at a directly recorded (i.e., neither manipulated nor processed) interview, he advocates a notion of art, which is supposed to be a release from any distraction by reality external to art and a concentration on "pure" art. What is interesting in this position is the inherent tension Levine builds up, on the one hand, with the marketing of conceptual art and, on the other, to the character of the video medium as reflexion. Levine presents himself in the video as an artist, who does not want any relation to the surrounding reality. With this viewpoint, he promotes the claim of conceptual art—namely, that formal and nonrepresentative elements are important—so far into extremes that the idea of high art takes shape through parody. As a notion, with which art and artists abandon communication and engagement in social reality, conceptual art is crystallized out in its nature as product.

The idea of conceptual art possessing a compatability with the market not to be risked by disturbing influences from "unlovely reality," as Levine unmasks it auditively in exaggeration, is underlined on the visual level superficially. His statement, "I don't want to be involved," refers to the homeless surrounding him on the streets, who could disturb the video interview. Video progresses to criticizing the nature of conceptual art as product in as far as Levine presents a way of working, where the exclusion of reality is described as necessary, if the idea of art is to be promoted. In the way video as medium thematizes itself, Levine makes it evident that stressing presence and location, however, also makes those factors decisive, which in turn determine the nature of the place. That the process of excluding the homeless brings them into the image, to be able to verify the statement at all, cannot be avoided. This means that when he "struggles" in front of the camera in vain against the homeless getting into the image he simultaneously exemplifies critically the gesture of the conceptual artist not to allot any meaning to factors from the external reality and to make them simply into functions of the performance. With his focusing of the conceptual idea in the marketing concept of production or of the product, which Levine presents as an idea, he intensifies questions as to the status of "art" in the public sphere and in reality under the mediatized conditions that have increased in relevance.

Just as Levine displays how futile it is, within the politics of media, to produce an art cleansed of all influences, so he takes the position toward video and television as it becomes evident on the level of the media he addresses directly in the interview form that between idea and application there are shifts, lying beyond the control of the artist/producer. Carrying out the idea is, therefore, not technically neutral but must be understood much more as a transformative process that, as Levine highlights, does not, in fact, go on within art or media but has, by contrast, cultural connotations. Therefore, Levine uses the structural feature of the flow of information to emphasize, through demonstrating video's live character, that realizing an idea provokes every time a communicative operation that extends to the processes of production. The possibilities of structural praxis in video are seen to be delimited from the commercial success of conceptual art.[49]

Another variant of structural video denotes the setting to rhythm, varying and restructuring of insignificant material into a "poetics of the everyday" with Jean-François Guiton, when, in rapid sequences of imagery and sound, he deploys pieces of wood falling onto each other, banging doors and further vertical and horizontal movements of surfaces in the image's field, to generate the overall impression of an abstract choreography.[50] The sequence in time is, however, compressed differently from the presentation formats of an installation in space or a live performance, and individual elements are retarded or accelerated, by which the bulky elements given dynamism (for example, wood) seem anthropomorphized in the serial movement of "elementary forms" (simple planks). The main accent of these videotapes lies with transforming a concept of abstraction, which derives from the way the equality of elements seems alive because of the rhythm of the montage and, in the prominent position of being "actors" in the video, do not point to anything

else but their own presence under mediatized performance conditions. Here it also comes—similarly to the striving after dematerialization with Langoth and Levine—to referring what is depicted to how it is depicted. The noise of pieces of wood clattering together (*Holzstücke/Pieces of Wood*, Germany, 1982, 6:00, b/w, sound), banging doors, windows opening and blinds (*Partitür*, Germany, 1983, 10:00, color, sound) and shoe soles squeaking on the floor (*Fussnote/Footnote*, Germany, 1985, 5:00, color, sound) receives the same attention with Guiton as what corresponds to this process visually. His video pieces form experiments in audiovisuality set to rhythm, in which the emphasized shift foregrounds the discontinuous process of producing video.

This approach is denoted by the material (like wood, wallpaper, and other surfaces), taken apart rhythmically and deployed in artificial stages of movement, which underlines how the mediatized procedure has a processual nature, is not fixed, and behaves diametrically to the heavy, ponderous, and stable qualities of the material. From the discrepancy in the characteristics of the material used and the medium applied, there results, on the one hand, a coincidence in the abstraction and, on the other, a noncoincidence in the form of the object level (or, alternatively, in the image's space) with the variable presentation of this form on the level of the image (or, perhaps, in the image's field) in video. The seriality appearing on both levels points to openness and freedom from constraint as conceptual constants and precisely not to a compositional scheme generating coherence.

The precedence of abstraction is also underlined by Guiton's contrasting of two sequences of movement in *Handle with Care* (Germany, 1984, 11:00, color, sound; see ill. 37); on the one hand, the wooden laths, which jump around as if by themselves; on the other, the artist, who clears the laths out of the image field and, as if he were a further material "building block," jumps around among the pieces of wood. What counts is the functional interplay of all elements, where idea and performance are finally connected together, when Guiton, sitting at a table, follows the manipulation on the image level in the mode of a video recording on a monitor.

If Levine is to be understood in such a way that his videographic reflexion on material and medium describes a process of externalizing, then we could categorize Guiton's engagement with abstraction in video and Michael Langoth's with the implosion as structural procedures, which intensify the tendency to internalizing. This happens with the intention of showing while focusing on the mediatized internal structure, equally how the video form derives from the function of the material, which is structurally anchored in another media context. The form results, at one time, from the videographically demonstrable dematerialization of wood (and other materials) and then again from the function of television, which is confronted with the structure of repetition specific to it as a medium.

As set out in such works, the mutual character of idea and its execution as implosion finds concrete expression in the video tapes of Richard Serra, where feedback is employed, and in the closed circuit video installations of Dieter Kiessling, which tie together both

video's structure of reflexion and the mechanical, serial aspect of conceptual art. In the foreground stand the conditions of processual function and operationality in video as well as the creativity determined by a machine—as Sol Lewitt had, for instance, already envisioned it: "the idea becomes a machine that makes the art.[51] Serra realizes video's operationality in a closed space, a television studio, where a speaker is subject to the auditive feedback loop of her spoken thoughts on this situation, while the observers are drawn into this circular performance virtually, that is, are imagined in their reactions by the speaker. In *Boomerang* (USA, 1974, 11:00, color, sound), it comes to a doubling of the recursion effect, where this structure (as with Langoth) can be further multiplied.

"In *Boomerang*, Serra records Nancy Holt's experience of having her words fed back to her with a delay (an electronically produced echo). The viewer, like Holt, hears both her direct speech and the delay. Listening to the delayed audio over headphones seems to confound Holt's ability to speak; she speaks slowly and deliberately, stating that she has 'trouble making connections between thoughts'. She observes that 'the words become like things . . . and they're boomeranging back', a reference to the aesthetic shift from the production of objects of an elucidation of process."[52] An intensified feedback process is presented, which subjects the dialogic interaction in the communication situation to a mechanical process (delay) and is, in addition, isolated from a "real" external world, which has logically to be bound, all the same, into the reflexion on the mediatized structure, because the feedback does not represent a purely technical element but a component of the shared technology of the television and video media. Just as Serra integrates the technical self-reflexion in *Boomerang* into the mediatized reflexion-level, the conceptual notion of the machine, which generates the creative process, is further extended to the audience's participation, which exhibits a "building block" in the production process. The conceptual understanding of television as a medium of presence necessarily culminates in recursion, which expresses how television reinforces the concept of presence because of its mediatized characteristics, until it comes to blocking, technical interruption, or technical self-reflexion.[53]

Serra intensifies his interest in structural repetition, when criticism of commercial provision of information through television is included in this area of reflexion. In *TV Delivers People*, a joint work by Serra and Carlota Fay Schoolman (USA, 1974, 6:00, color, sound), McLuhan's analysis of the media is applied to the viewer as the reference medium, when McLuhan's "the medium is the message" shifts into "the product of television is the audience." The videotape functions like a scrolling text running across the screen and, leaving out any representational pictoriality at all, "informing" the viewer with an analysis of their position as consumer. The operational handling of the structure of reflexion in video, as Serra and Langoth demonstrate, can serve in the conceptual integration of idea and its execution to formulate a critique of television as medium, as the common processual functioning of video and television can be made, by means of video, to contrast structural video and commercial television (with its parameters commerce, information, entertainment).

The sculptural thinking, transferred by Serra into video and expressing itself in the spatial constellations, has a comparable basis in Dieter Kiessling's closed circuit installations. In Kiessling's work, the point of departure is closed forms, within which cameras focus on one another and monitors standing on plinths are filmed by cameras and are brought into a three-dimensional array. It can be observed how form in video appears in feedback, which describes a circular structure in the visible constellation of the devices as well. In addition, these machine performances can be endlessly repeated recursively in a stable sequence, which includes certain dynamics capable of being performed inside this sequence.

A *Pendelnder Fernseher* (*Shuttling Television Set*, Germany, 1983; see ill. 65), which is hung from the ceiling and recorded by a camera positioned opposite the television, can be moved to and fro horizontally, by which the static camera records the "image" of the shuttling television and transmits the signals to the broadcasting monitor. Because the camera is, however, standing on its head, the reconstruction of the video signal happens in the reverse direction, by which the shuttling of the television is somewhat compensated for virtually. Kiessling, in a further reductive step based on basic forms of circulating electronic information, installs two cameras (*Two Cameras*, Germany, 1998; see ill. 66), which observe each other as both recording systems try to achieve a sharp "image" with autofocus. "The distance of both cameras from each other is, however, too small to enable a sharp representation. Whereas with both cameras the autofocus function is switched on, they, nevertheless, try constantly, to bring each other into sharp focus by modifying the lens settings. The constant variation of the lens settings causes the camera images in the monitors to alter their focus and also their size constantly."[54] This variation of a mediatized self-observation, endlessly transmitted to two monitors, creates, in parallel to the noise of the cameras' autofocus function, a tension between the concept of an installation in space and a critique of the mechanical surveillance systems in public space, which cannot pick up an external object here and "represent" it but is primarily thrown back on technical functions.

Kiessling pursues this viewpoint, with which the condition for realization becomes tendentially congruent with the form re- or presented, respectively, making further use of the structures of rasters and tubes. For example, he projects the continuous television image from the back—that is, into the opened television set, with which the direction of broadcasting the monitor image is reinforced. In another work, the camera shoots the raster from the monitor's surface and transmits this enlarged raster onto the screen, which allows its own image structure to become visible in this way. In a variation, projector and camera stand opposite each other (video installation without title, 1993; ill. 67): "There is a transparent surface in front of the camera lens. The part of the projected image visible on this surface is shot by the camera, enlarged and transmitted to the projector. The projector projects this image and with that a part of the images it is currently projecting. The projection raster becomes visible."[55]

In a different way from these video installations, which put the internal structure in transmitting electronic pictoriality into a circular form and in that way enlarge it, Kiessling also works on the dialogic interaction of electronically broadcast, immaterial imagery, and the reflection on a surface. *Eingeschalteter/ausgeschalteter Fernseher* (*Switched On/Off Television Set*, Germany, 1988; see ill. 64) means that a video camera scans the reflection of the space from the surface of a switched-off television screen and transmits this reflection to the switched-on television, which broadcasts this reflexion image (reflection) in the form of the electronic reflexion (broadcast video image). The circular impetus to repetition is also contained in this polar pictoriality (reflexion and reflexion image), as this applies to feedback. Kiessling has also shown how feedback functions in the gradations of reduplication and variation in a 1994 installation, as—once again in a closed array—the videographic process is committed to the immobility of a sculptural form. In front of the television, a red light bulb is fastened to a plinth, which is shot by a camera and transmitted to the television. As Kiessling further declares, "The representation appears directly alongside the light bulb and is simultaneously shot and transmitted. This sequence continues until 6 generations representing the light bulb appear next to each other. Through the blue light of the television, the representations of the light bulb are coloured somewhat more strongly blue with each transmission."[56]

Duplicating pictoriality by using electronic energy finally culminates in an installation in which a candle is illuminated by the broadcast video image: "The video installation is shown in complete darkness. The representation of the candle taken by the camera shines onto the real candle, which, in turn, makes it possible to represent it."[57] With such multiplications in projection and reflexion, these video installations take a position that thematizes the difference between actual and virtual "imagery" and there contrasts the materiality of the apparatus (supported by the positioning on plinths) with the fluid structure of the electronic medium video. Using the plinth, which traditionally emphasizes a work's originality, has in this context the divergent function of allowing the contrast of apparatus as a technical device and the ephemeral, nonfixed forms it generates to become that much more obvious. These video works refer to the mode of presentation in the reflexion medium and—in an unmistakable affinity to the structural film—to the relations of the elements, that is, the interaction of the camera's recordings with the possibilities of presenting this "image."

Musicalization in Video: Robert Cahen

Robert Cahen's video works come about against the background of his studies of electroacoustic composition with Michel Chion and Pierre Schaeffer at the Conservatoire Nationale Supérieur de Musique (CNSM) at the end of the 1960s and the beginning of the 1970s in Paris. They are, in addition, anchored in a specifically French production context,

which is marked by the support of a national institution and the development of new technologies in an experimental direction. (The Institut National de l'Audiovisuel [INA], where Cahen also realized video works, should be particularly mentioned.) In this context, Cahen works on a video aesthetic that involves time structures on a musical basis and, above all, includes the ambivalence of static and dynamic imagery, when he immobilizes video images like photographic images in his simulation or, alternatively, arrests them for a specific temporal instant at the same place in *Cartes postales vidéo* (F, 1984–1986), something that leads to the effect (as familiar from film), *l'arrêt sur l'image*.[58] According to Sandra Lischi, "His research is profoundly influenced by his musings on temporality (authentic time and supernatural time), on ways of recounting (an eternal balance between narrative and abstraction), on movies (which he admires and to which he willingly alludes), on image and sound (in constant mutual feedback), and on reality both familiar and deformed."[59]

Cartes postales vidéo apparently concerns a series of photographic images, which are modeled on tourist postcards and inscribed with locations, but are each animated after a few seconds, so that the passersby fixed in the "image" do actually move across public spaces, swans carry on swimming, animals, trees, plants, and finally the sea move briefly. The impression is deceptive: Cahen's optical illusions from these one-minute video recordings consist of a videographic moving image, which is frozen for an instant (electronic freeze frame), to express the photographic status of the image on a postcard as an effect of the *arrêt sur l'image*, of a photograph which never existed. What is most disturbing about the photograph (as it is produced, it fixes a moment in time, which has just become the past) Cahen counters with the live medium video, as what is ostensibly past (freeze-frame) forms the prelude to a forward-looking presentation of movement, which the photographic image can never capture, because it necessarily dissects time and has to divide it up into intervals. By contrast, Cahen emphasizes video's fluid movement as a form of presentation functioning in the present, which is capable of rendering "stored" information from other recording media fluid (this concerns photography and film) and, in this process, drawing past and future together in putting the here and now on show. If, as Barthes has demonstrated, a photograph comes alive for the observer only as an image of the past and, if it is true, that, as Jean Cocteau determined, film is also death at work, then Cahen comments technically on these features of optical recording in media. He understands the electronic restlessness of signal processes as an act of enabling these images to come alive.

While placing the accent on forms expressing time in visuality encompasses photography as a dialogical pole to video, the musical understanding of linear structures for time supports an abstractly inclined conception of the pictorial elements, which are overlaid, distorted, compressed, and deconstructed with scan processors. A linear videotape results from this and is constructed according to compositional viewpoints and generates a complex perceptual impression from heterogenous processes of imagery and sound (discrete elements, motif chains, variations). Cahen's interest pursues transformativity, de- and

recontextualization and abstraction of electronic pictoriality. For preference, he applies scan processors and keyers to be able to handle visual and auditive processes alike as, akin to concrete music, noises, and clusters. As Sandra Lischi demonstrates in her study, Cahen's work with noisy sounds in concrete music explains the use of mixed synthetic and "natural" sounds and images: "Processing disparate sounds and images, decontextualising and abstracting them, ultimatively produced a new way of listening to 'and therefore also looking at' things. 'Everything that's done in concrete music can be done with electronic imagery'. That's why the shift from musical composition to visual work occurred with relative ease. 'I wanted to do to images what I had done with music.' . . . The encounter of concrete music with the vast field of electronic music led to an extensive exploration in which the possibility of reworking natural sounds melded with the electronic production of completely artificial sounds."[60]

With Cahen, mixed forms in video feature explicitly on the auditive level, which does not simply correspond to the visual transformations like superimposition, manipulation of wave forms (enlargement, condensing and stretching of the image's lines), chroma-key processes (segmental color changes according to the light/dark values), and slow motion/fast forward. These auditive and visual processes alike structure the video works equally: not only on the audio but also on the video level, noises recorded in real time (sounds and images of physical reality), and synthetically (by means of noise generators or waveform generators) produced sounds and images interact with each other.[61] Audio effects from phase shifting of closely related, layered sounds (in *L'invitation au voyage*, F, 1973) testify just as much as aural flashbacks (in *Juste le temps*, F, 1983)[62] to an interest in complexity in electronic media, which Cahen pursues further in the visual. To this belongs, for example, a reference to photography, which does not so much focus on a comparative analysis of the photographic image as render its forms as image dynamic instead, that is, to use Lischi's phrase, "photos that move." Setting out from time's flow, this aesthetic concept for that reason also favors forms of journey: for example, the notion of journeying through postcards in *Cartes postales vidéo* or of landscape images and railway stations, which are, in *L'invitation au voyage* (F, 1973, 9:00, color, sound; see ill. 25) combined in phases and are in their colors so modified with chroma-key effects that a shift appears from nature images recorded in real time to imaginary ones. The title's programmatic invitation to a journey is meant at once concretely and abstractly. A multisensory, electronic experience in video and music, similar to attending a multimedia performance, is offered to the viewer, whereas the visual depiction of landscape shifts into an abstract composition of colors and surfaces. Cahen has described this tendency toward artificiality: "I offer the images a sort of interior life, certainly an artificial one, in as far as we do not see this sort of colour in nature, but one apt for translating an impression all at one blow."[63]

The railway trip in *Juste le temps* (F, 1983, 13:00, color, sound; see ills. 26 and 27) describes another sort of journey. Image lines bent apart in a scan processor render the passing landscape horizontally dynamic and with that vertically stress those points in the

image's information, which display strong brightness values. These changes in the image's field through the landscape shot from the train window—dramatic "mountain and valley forms" in colored distortion with irregular contours—are rendered in various speeds, which cannot be attributed to the perceptions of the two people (the woman and the man in the train compartment). They form instead a visual intensification from various compositional elements, which show a structural relation with the flashbacks in the music/sound compositions. "For *Juste le temps* it was the position of the seated traveller. The impression this traveller has of what is passing by. I wanted to show how, when you look into the distance, you don't remember the same things as when you look closely."[64] The tension—which the image processes invoke by modifying the scan lines, and yet a woman is recognizable in the compartment, who is seen by a man in the corridor, who is entering the compartment—is not motivated narratively and does not perform any interaction between people. What Cahen intends is to present a contrast of *défilement*,[65] the passage of individual images (as this exists in film and to which the plot elements here allude) into a process, into the transformation of various segments in the electronic simulation of images.

Traveling, in the form of a metaphor for temporal dynamics, determines the urbane, poetic portrait in *Hong Kong Song* (F, 1989, 21:00, color, sound; see ill. 24), where the motifs of traveling and landscape merge into each other in the flow of uninterrupted image impressions and in the retarded rhythm (slow motion). The mutable and the immutable components balance each other out in the flow of images and with the sound collages made from music/song and original soundtrack. As with *Juste le temps*, the transition from optical recording to its deconstruction denotes this work, which bears the subtitle "interlaced visual and sound messages."

Cahen has extended the synthetic function of the audio and video elements to a synthesis of photographic and videographic expression and equally to a synthesis of poetic and musical expression in the fictionality of what is being displayed. That means that narrative elements, like delay and tension, montage, and condensing are applied as building blocks of a musical composition, which has a structural function in governing (because the video works do indeed contain texts spoken in the off, but no dialogues).[66] Just as using fictional elements and allusions on film contributes to abstract compositions, the documentary image material also fits into a rhythm, which is related in *Hong Kong Song* to the urban architecture and the patterns of movement in cityspace.

With Cahen, the impression of complexity results from the structural homology of video and audio. It arises in the auditive and visual processes themselves and ties in fictional elements nonnarratively. Even if literature is quoted, poetic texts are spoken and plot elements appear that are reminiscent of narrative cinema, elements referring to literary and dramatic qualities do not integrate into a narrative structure. On the contrary, "Cahen has demonstrated lively interest in a type of fiction described as 'anti-narrative.'"[67]

Strictly speaking, on the level of text as well as of imagery, narrative structures only mean further "voices/instruments" in a musical composition, which contributes to the constitution of an aesthetic overall concept. It advances musical thinking in images and allows (as Flusser has characterized the audiovisual medium) a "musicalization of the image" and "pictorialization of music."[68] Cahen determines these perspectives from concrete music, where a tendency to abstraction is prefigured, which gains support with the electronic impulses. Within audiovisual noise, it is, in the last analysis, pointless to want to differentiate between music and image.

Layering and Condensing: Peter Callas

For Peter Callas, the thematizing of the site of cultural production means a critique of that internationalization of video art, which sets the Western horizon, mostly without reflection, as the point of departure for a universal media language. The Australian video filmmaker develops an aesthetic of the collage from multiple image layers and elements of movement laid over each other, which drift apart in various directions. Doublings, graphical modifications of video images, and computer-animated segments connote instability, and the constant restlessness of the visual makes perceiving the individual elements difficult, which move "freely" through the image field at different speeds and are, beyond that, contrasted with other dynamics of further layers moving in the image and simultaneously appearing in its field. In this way, focusing on an "image" becomes impossible.

In the openness of this visual process, Callas demonstrates a tension between adopting Western (American and European) media images and culturally determinant stereotypes and their foreignness—of cinema, of television and of advertising—which he relates to the iconography of Japanese films and cartoons and to symbols and stories from Australian culture. It becomes clear in these works how investigating a media culture specific to Australia cannot avoid dealing, on the one hand, with influences from the language of images out of the Japanese context and, on the other, with European colonialism and the "Americanization" since the Second World War.

Callas claims that the complexity of the media's cultural field is a not inconsiderable factor in the situation of its perception and reception, which he does not want understood universally but rather linked to time and place. This extends beyond reference to stereotypes and symbols (like Uncle Sam, the U.S. flag, Japanese *manga* cartoons, extracts from Japanese film and television, Australian "cowboys") and historical sources (American troops in Papua-New Guinea during the Second World War), which are, in a permanently varied flow of information, combined into emblems via collages out of fragments and quotations. The notion of video as a fluid, immaterial artefact, which can constantly change its form, connects Callas initially with the basic aesthetic principles of the Vasulkas, who are equally interested in video's nonfixed, "fluid" qualities. Callas, however, works with

markedly contrasting "cuts" and uses sharply contoured key elements and fixed forms in his image field, which—unlike the Vasulkas and Cahen—are not deconstructed and reconstructed processually but, rather, represents a stable quantity.

The combination of diverse image symbols, which shape with keyers new emblematic forms in transit amid mutual contamination, is so sharply contoured with Callas, because he wants to bring out cultural comparisons. To do this he needs a solid form, with which the ephemerality and the fragmentation of the floating signifiers (the image's elements) can be contrasted. Callas also proceeds from a difference in culture, as he observes that the flow of images from television in Western culture is regarded as intruding into the private sphere and as expressing control and power over information. By contrast, television in Japanese culture is understood as a form of public space, access to which is open to all (by which Callas explains the presence of screens everywhere in the Tokyo cityscape).

With this basic conviction in mind, Callas reacts to both patterns of behavior: he exaggerates the flow of information into the private and personal realm with an endless chain of motifs and emblems, which reinforce still further the geopolitical dimension (as it is seen in the endless transfer of information globally) through technically intensifying the fragmentary element (capable of connecting everywhere and nowhere) as imagery. The video work *Neo-Geo: An American Purchase* (USA/Australia, 1990, 9:17, color, sound; see ill. 30), which came about during a stay at the PS1 Studio in New York, symptomatically converts this Western perspective: "In this wild and crazy, multi-layered videotape with lively music by Stephen Vitiello and John Zorn, Callas explores American codes and mores, especially around war and the economy. Juxtaposing images of the Pentagon and Smokey the Bear, a crucified Santa Claus, weather maps, soldiers and Japanese and American businessmen shaking hands, Callas is looking at global power. . . . His images are disjointed yet connected in the same way that we all seem to lead fragmentary lives in a very fragmented world."[69]

Then again, this aesthetic concept of an emblematic montage of disjunctive elements of imagery in *Kinema No Yoru/Film Night* (Japan/Australia, 1986, 2:30, color, sound; see ill. 29) is reinforced using a Japanese card game for children (called *menko*) in such a way that, as a condition of perception, the integrative treatment of iconic elements in the Japanese cultural context counts as a given. Subsequently, "bothersome" historical information is faded into the playful flow of the card images and allots the individual fragments, in fact, a decidedly political message. In Rachel Kent's words, "Disjunctive images of war and territorial conquest (human bombs, brave feats, gas masks) thus convey more about Japan's colonial aspirations than of the game's competitive nature in the simple winning and losing of iconic cards."[70] The "harmless" flow of images, here being recontextualized and put into a contemporary discourse, charges the fragmentary emblem with concrete meanings, which Callas does not "produce," but takes up with existing images.

His working approach aims at the graphic treatment of pictorial resources, which he "clips" electronically, modifies in color, multiplies and overlays with other elements, par-

ticularly using colorization, luminance keyers[71] and the Fairlight Computer Video Instrument (CVI, by Kea Silverbrook, 1984).[72] The computer enables the mixing of drawing with videographic forms so that Callas can paint over the collected and recombined video material (comparable to the collage of found footage in film) directly and endow it with his handwriting. The collage made from disjunctive elements of imagery (with which static images become moving shapes that are laid over/onto an electronic movement in imagery so that varying dynamics of movement can extend the imagery's field virtually in several directions) culminates in the video work *Double Trouble* (1986), which also uses the way the imagery's possibilities drift apart, in order to make contrasts in western and Asiatic cultural forms visible. Quotations, as Callas makes clear, are not "neutral" building blocks, which might be de- and recontextualized at will; in contrast, they connote rather, as extracts, aspects of various cultural contexts, which address more basic problems of the "clash of cultures" through—appearing fortuitously, as it were—contiguous relations.

It is less a question of the dialogue rather than of the tension, of a rent in an image, which expresses an abrupt collision. However, body languages differ in cultures and do not communicate with each other when they "collide," as Callas shows with the animation of two combined halves of the image in *Double Trouble* (Japan/Australia, 1986, 5:45, color, sound; see ill. 28). Callas divides the surface of this work's images, which was conceived for the format of a large-scale projection in the Tokyo cityscape, vertically into two segments, in which the same pattern of "people" are moved at varying speeds upward and downward. What is interesting are the doublings of the same person to the left and right of the image, whereas in the half of the image where Western postures, gestures, and facial expressions are adopted, the same figure performs a corresponding Asiatic repertoire of gestures and movements in the other half. Contiguity does not lead here to communicative forms or reactions.

Callas's point of departure lies, conversely, with analysis and deconstruction of aspects of Western and Asiatic culture, which are scarcely noticed any more in their fundamental constituents through the flow of information from worldwide television images, which removes difference. To that extent, his video work emphasizes the status of the fragment, where points of friction occur with a source text (your own history) and with the new context (West-East interaction, in which condensing signifiers does not absolutely lead to an understanding of the transported "languages") and seeks to make a contribution in a media perspective, which sees cultural contexts as constitutive for forming of aesthetic forms. "Video art has, on this last count, experienced more than any other medium a pressure to 'internationalise' its language so that it might somehow miraculously unreliant on the problems of translation and somehow overcome the enigmas of cross-cultural confusion. This pressure to internationalise video art can still be attributed to the long lasting effect of the early prophets of video art such as Nam June Paik and Marshall McLuhan who spoke in the 60s of the potential development of a 'Global Village' tubed into a culturally neutral audio-visual 'sensorium.' . . . Inevitably any audience brings to the viewing of video

art a certain set of expectations based on many hours of viewing television. Perhaps there is some truth in the idea that a television set viewed in the context of a tatami room is seen in a significantly different way to a set which is viewed in the more fixed situation of a western 'living room' in the sense that the domestic context in which we receive images from the world outside has more than a little to do with how we interpret those images."[73]

With the work *Lost in Translation* (Australia, 1994–1999), based on computer animation, Callas programmatically sets out his perspectives on the hybrid mixing of cultural fields. He contrasts the observed merging of iconic elements with different cultural provenance in the artifacts of the cultural industries with a way of seeing migration and circulation in the Third World, which technically interweaves as imagery what is fragmentary in the digital process of simulation with colonial history and can make clear with that, how the fragment is "translated" into an ahistorical, formal quotation in the postcolonial discourse of the Western media institutions.

In his "protocolonial history of Latin America" lies also criticism of the universality of electronic culture, which often remains outside of precisely defined locations, particularly when envisaging a human-machine hybridization, and consequently reduces the problematic area of the translatability of the cultures to a technical procedure. As he points with the animated figure of a cartographer (who surveys the real world) to the construction of the so-called Third World, the viewpoint of Callas as media artist coincides with a discourse in critical theory on migration and globalization, which focuses on the geopolitical perspective. In his analysis of the debate, Nikos Papastergiadis has identified two poles of the paradoxical meaning of hybridation: "Whenever the process of identity formation is premised on an exclusive boundary between 'us' and 'them,' the hybrid, which is born out to the transgression of this boundary is marked positively—to solicit exchange and inclusion—then the hybrid may yield strength and vitality. The value of the hybrid is always positioned in relation to purity and along the axes of inclusion and exclusion."[74]

An intensification results out of both directions, including and amalgamating, on one hand, and excluding and fragmented contexts, on the other—as we could understand Callas's stance on video in contrast to hybrid culture. Video work is far from being neutral, particularly not when it apparently concerns *only* recombining existing material. In the initiative, presented as if playfully, toward reorganization of image forms videographically modified after the event, a political stance toward television's flow of information, therefore, finds expression, because Callas's open aesthetic of imagery can demonstrate how the building blocks of such a flow can indeed be combined into formal patterns but not to explanations of what is being presented. In this regard, his contrasts reveal, above all, how a historical-political level of meaning, with which video could reproach television, is missing. As Callas has already explained in an early statement on video, "Should I address myself to social or political themes I do so only during this period of recombination. All of my work to date began from personal desires, as 'self portraiture' if you will, but as

in our lives the personal becomes the political, political themes will always discover themselves in this type of video.... If no one possessed a television set it would not be so."[75]

Video Scratching: Martin Arnold and Raphael Montañez Ortiz

Video scratching in the works of Martin Arnold and Raphael Montañez Ortiz denotes a video or, alternatively, computer-graphic process of modifying found-footage films. Arnold dissects short—approximately twenty second—scenes from Hollywood films into individual frames, which he multiplies, during which process doublings and leaps in the movement are generated by repeating the film and running it backwards. For the repeated images and movements, Arnold employs the optical printer (*Pièce touchée*, 1989), electronic postprocessing (*Passage à l'acte*, 1993), and computer programs (*Alone. Life Wastes Andy Hardy*, 1998). The scratching process manipulates reversibility and variability in the forward and rewind speeds of the visual movement (by which the film's sound also seems scratched) and becomes a dissecting process revealing sexuality and structures of violence in apparently harmless film scenes. In contrast to these perspectives, which, with Arnold, remain related to the deconstructive analysis of the internal structure of the classical Hollywood narrative cinema—even when computers are used alongside the optical printer—Ortiz's works with computers, laser, and video aim at fundamentally criticizing the mediatized forms of representation in North American culture, which he experiences as a history of repressing indigenous cultures.[76] Ortiz thematizes his own ethnic roots with the Mexican Yaqui, when he explicitly attacks the stereotypical depiction of ethnic difference in linear narrativity both in European modernism as well as the classical American narrative film with the techniques of cut up, a method that auditively and visually breaks up the homogeneity of such artifacts, the aesthetic of which means excluding other cultural praxes.

Ortiz makes this clear when he approaches collage in such a way, that a Dadaistic approach of shifting and redefining contexts of comprehension and objects here coincides with presenting aspects of a shamanistic ritual, in which the staccato "hammering" of image and sound in scratching with computers, laser, and video is reminiscent of the drumming and song of tribal rituals in native cultures. Ortiz employs the method of cut up, scratching with the waveform generator and deconstructing and compressing images and sounds in real-time processing by computer, so destructively, to exhibit in their own, different rhythm and through dismantled units the Indian and Hispanic cultures not shown in Hollywood cinema. As Ortiz describes it, "I would chop the films up with a tomahawk and put them into a medicine bag. I would shake it and shake it, and for me the bag would become a rattle, and I would chant with it.... I was imitating indigenous ritual to find my place in it. When I imitated it long enough, and felt comfortable in it, *then* I would reach into the medicine bag, pull out pieces of chopped up film, and splice them

together."[77] This procedure, which applies from outside a rhythm coming from another cultural context to an existing aesthetic form (film), forms the aesthetic of Ortiz's video-computer films: "My esthetic concerns, the form and content of my video-film, computer-laser-animation, these past fourteen years, revolves around my use of the micro-computer, with a variety of sound and image technologies: my computer programming design, making possible real time computer interactive non-linear editing, through interface with a video-laser player, creating works comprised of a single, or bri-collage of deconstructed clips. The sound layers of my work are the outcome of manipulation with a sound-waveform generator. Image, layers, have been manipulated, with a special effects generator. Since 1982, my video-film-animation work, has formed in a larger esthetic frame, including shamanic-ritual, dadaism, and post-modern-deconstruction."[78]

The stringency of this approach is underlined in Ortiz's performances, in which he chopped up pianos with an axe in the 1960s, in the course of which—in contrast to the Fluxus performances happening at the same time with a prepared piano destroyed subsequently—the expression of a shamanistic ritual is also understood here as an intervention.[79] In his works with video/computer/laserdisc, Ortiz wants to make clear how scratching film material gives access in culture to the unconscious, the structure of which is contained in the electronic cut up form and, above all, in the reversed movements of the modified films. In a similar fashion, Arnold's dissecting and stretching of film time also works on the denotative explication of basal structures of communication—or, alternatively, noncommunication—in partner and family relationships. In both forms of scratching, it is (in contrast to Paik) not a matter of applying further processing from outside onto the images and sounds of the found-footage film but rather of structural work on the material, which is closely related to the structural/materialist film and undermines the representational function of individual shots detached from the film's overall context by figuring the speed and direction of movement as reversible so that, between the images, something becomes visible and audible that cannot be perceived in the normal course of projecting the film. Video technologies and computer graphics here provide the level of "fluidification"—that is, of flexibility. Because the film's composition is being interfered with, scratching represents a violent method: with Ortiz, it makes evident the repressed "voices" of the excluded, the losers and of women, and with Arnold the brutality in everyday norms of behavior.

Arnold's collages belong to the context of the experimental tendency in recycling film, where video and computer processing also represent a possibility of intervening in the scenic composition of narrative Hollywood films. In filmic recycling with the optical printer, the sublimated sexual act of a couple, which does not really touch each other, becomes visible in the staccato rhythm of his film *Pièce Touchée* (Austria, 1989, 16 mm, 16:00, b/w, sound) as he uses an eighteen-second shot from *The Human Jungle* (USA, 1954) by Joseph M. Newman. Extending the electronic modification of frames from *To Kill a Mockingbird* (USA, 1962) by Robert Mulligan, Arnold's *Passage à l'acte* (Austria, 1993, 16 mm,

12:00, b/w, sound) gives a precise analysis of the constellation of power in an American family at the breakfast table, which expresses the "revolt" of the children against the parents' "dominance" with rhythmic knocking sound from cutlery and with gestures and facial expressions distorted by running forward and backward, accompanied by the parents' "commands" shifted into grotesque noises by scratching. According to Stefan Grissemann, "The first shock, the first flight, the fear at the beginning of the film: the son jumps up from the table and throws open the door which gets stuck in an Arnoldian loop of hard, hammering rhythm. He is compelled to return to the table by the mechanical repeated paternal order, 'Sit down.' At the end, when the kids spring up, finally released from their bondage, Arnold is again caught at the door; at the infernally hammering door, as if it were completely senseless to try to leave here—this location of childhood and two-faced cinema."[80] The "war zone" at the family table is essentially achieved by stopping the forward motion and going back a few frames. With *Alone. Life Wastes Andy Hardy* (Austria, 1998, 16 mm, 15:00, b/w, sound), Arnold shapes this process in a more complex manner, as he compiles scenes from various Busby Berkeley films and produces the transitions and the changes of direction by computer. In contrast to *Pièce Touchée*, where symmetrical realizations in a structural film concept are investigated by the alternation of left and right, the splintered moments of Judy Garland singing, as condensed in the collage in *Alone. Life Wastes Andy Hardy*, have a mediatized parallel in the rhythm of distortions and layers in the VJ/DJ performances of the nineties. They also form a reminiscence on the technology of the silent film, as the films projected in those days by hand-cranking used to cause static frames that quivered.

For Ortiz, deconstructing cinematographic structures certainly has a constructive side, which applies to demonstrating social and patriarchal hierarchies in his "choreography" of images running in reverse from Orson Welles's *Citizen Kane* (USA, 1941). Ortiz's video film *Dance No. 1* (USA, 1985) modifies ten seconds from a key sequence in the Welles film, which shows how Kane's rise to power begins with him single-mindedly taking over publishing the *Enquirer* newspaper without any regard for the existing staff. As the scratched scene in a staccato rhythm is to be seen backward, Ortiz can display how the takeover is anchored in the synchrony of body movements, which interconnect the movements of the staff with Kane as the new boss. Electronically synchronizing the flow to express the synchrony in the "dance" of the bodies also reveals how everyone has to move in the same rhythm, because they (want to) belong to the same social level.[81] In this formal treatment, Scott MacDonald reads an unmasking of how power is concentrated. As Ortiz points, with the electronically generated uniformity to the way the outside world, which does not conform to such ritual, is excluded, he criticizes at the same time the homogenized behavior of the world within, which Welles's film represents: "Indeed, Ortiz's introduction of an electronic 'spasm' into the passage can be read as a deconstructivist's revenge on the privileged class's tendency to ignore those outside their offices."[82]

In a series of scratched *Dance* video films Ortiz produced by the same process, *Dance No. 22* (USA, 1993, 7:19, b/w, sound; see ill. 80) stands out particularly, as it translates an already highly complex, dynamic scene from the Marx Brothers film *A Night at the Opera* (USA, 1935), into new formations of movement, which (because they run backward) suddenly bring into view behind a door a person who cannot actually have been there. What here becomes visible denotes a reinforcement of the Dadaistic-anarchic nonconformity, with which the Marx Brothers frustrate the social norms of behavior presented in Hollywood films. Using the reversibility of the course of acrobatic-choreographic sequences of movement in the film, Ortiz's scratching fosters the absurdity of the intention to behave "properly," as apparently shown by the Marx Brothers.

This comes through more acutely in *The Conversation* (USA, 1996, 12:00, b/w and color, sound; see ill. 79), when it inserts a woman seen in color, who is clearly frightened of something that is equally not there in the video's field of image, as a collage right in the middle of the black-and-white, shot-countershot film shots of an argument between two men about an absent woman from another film. Ortiz has two different film genres implode in on each other as if in a test tube, by which one film seems to destructively supplement the other. Just as the woman seems to react in horror to the violence of the fragmented combinations of words and images in the scratched dialogue of the men, so it seems just as plausible to identify the horrified woman as the "prey" of the men's jealous greed.

Scratching creates a structural level of comparison for arrays of images and sounds, with which Hollywood films reproduce quasi-mechanically the same pattern of a gender-specific, repressive subject-object difference. "The history of all culture," as Ortiz concludes his critique of representation, "is the shift from the expressed to the repressed, from matriarchy to patriarchy, from the all inclusive, to the all exclusive, from the libertarian to the authoritarian, from nonlinearity to the linearity of all narrative, of all form and content."[83] Ortiz's opposition to what he feels is the forced acculturation to such repressive forms uses the media, as in video, computers, and laser discs, for a process of revolt at once playful and liberating and for an unmasking revelation of the restrictedness and uniformity of the stereotyped patterns of "society."

His recycling avails itself of surreal collages to express the deconstruction from the perspective of those who are not positioned on the level of action and at the center of the constellated gazes in Hollywood films. In *Beach Umbrella* (USA, 1985–1986, 7:30, color, sound; see ill. 78), a realistic beach scene is "attacked" from the air with a scenic motif of imagery from another Walt Disney animation film in such a way, that cartoon figures—Donald Duck and his relations—"pursue" running women in bathing costumes using a flying carpet and force them to the ground in such a way that it looks as if the women were performing a sexual act with the sand they are lying on. In this surreality, where the figures of the women from a film are related psychically *and* physically to another film and to the staccato rhythm set from outside (with which the scratching "dominates"

both films), the ambivalence is demonstrated of the power structures incorporated in Hollywood cinema.

Video Void: David Larcher

In video film, David Larcher undertakes a radicalization of those approaches from experimental film (as with Ken Jacobs, Paul Sharits, and Michael Snow) that are interested in the limitations of visibility and in dynamic and multiple imagery.[84] In *Granny's Is* (UK, 1989, 1:18:36, color, sound; see ill. 69), Larcher "extends" the personal portrait of his grandmother, who scarcely leaves her room at the end of her life, with new spatial dimensions by using keyed-in blue screen elements, optical prisms, and mirror balls. The keys also serve to complete the live portrait of the grandmother temporally by adding her life history, as photos are used, which show her at different ages. By setting single images in motion as if in a centrifuge, the grandmother (whose image is reflected on the surface of a revolving mirror ball) seems to orbit endlessly like a planet in the universe of the electronic medium. This metaphor on the cycle of life and death is supported by the distortions of the original soundtrack. In his modifications, Larcher stretches or dismembers individual words to set an echoing rhythm that signals the transitions from comprehensibility to incomprehensibility in an analogy with the permanent alternation between visibility and its erasure.

With these works, segmenting and generating dynamism in video comes up against the limits of visibility, as soon as image forms with a recognizable "content" are shaped into freely moving objects, which distort themselves (take on waveform) and rotate as miniaturized mirror balls in a circle around a central axis. With the two works *Video Void, The Trailer* and *Video Void, Text* (both France/U.K., 1997), Larcher investigates the electronic transmission of information videographically and makes the signal processes visible on cartographically displayed flat images. If it is a case here of denoting "transport paths" of telecommunication (symbolized by a television antenna), Larcher goes yet another step further. He translates what is electronic into models of computer graphics,[85] in which generic developments dissolve these abstract forms (with a picture map covered with rings, spheres, and cubic forms) finally into the abstraction of noise: video void.[86]

What Larcher intends with video shows up in the multiplication of internal electronic possibilities for imagery by applying external computer graphic processes, because the vocabulary (of keys, layers, and reflections) can be supplemented in this way with algorithmic surfaces, parallel collages with paradoxical layering, and three-dimensional computer modeling. With *Video Void, The Trailer* (color, sound; see ill. 71), this condensing is brought to a level of satiation, which marks the shift from recognizable information into the basic elements of iconic display via signals in the digital medium, which define how pixels are located and colored by the number of bits. Because the function of this binary-coded information as a governing mechanism depends on the number of bits, a structural

convergence of the media video (waveform) and computer (bits) comes about on the level of the signal processes.

At the beginning of *Video Void, Text* (28:40, color, sound; see ill. 70), Larcher demonstrates what he wishes to understand by the texture of an evacuated image field. What can be seen and heard are noises of tape running, traces of electromagnetic recording, "faulty" reproduction on tape and particularly the wave movements, which perform the abstract linear structures, interrupted by image defaults caused by tinkering with the video machines, with video void sound added at the same time. As the tape runs further, text appears as commentary spoken off screen by Larcher himself, who deals self-referentially with video void as "vacuum," "machine error," "image byproduct," and "pixel." Larcher underlines his "desynchronized vision," as he consistently performs "drop out" and "lack of information" on the video track, while he explains the procedure: "This machine can contextualize line and field blank and black."

What particularly fascinates Larcher about the matrix states of the electronic image and the digital manipulation of audiovisual information is how they denote the possibility of endlessly repeating the same schema ("start again from scratch"). All the same, this process is not as much related self-reflexively to parameters of pictoriality in electronic systems (synchronizing signals, therefore, and transformative processual functions) as fundamentally motivated self-referentially. Larcher does not generate and show anything else apart from video noise, and, in fact, it is the sole content of the imagery, which he understands as a "hidden" process of writing electronic information. As this process transpires mechanically, "text," or, strictly speaking, texture, results from the structure of repetition in video, which—in contrast to the digital—does not mean reduplication but endless variation in the feedback mode.

The concern for "originating an image from noise, feedback properties" also describes the transition exemplified in the videotape to three-dimensional computer graphics. The latter is employed as a generic continuation of noise. The geometrical forms, which arise from themselves in endless reduplication, are connected with the electronic signal processes and integrate in such a way that the entire "content" of the image's field is shifted into the state of pulsating signals (video and computers). In this overall aesthetic context of generating image and sound from visible and audible signal states, *video void* and *computer void* merge into each other, and the qualities of video noise merge into the wider possibilities of *digital noise*.[87]

These points in the continuing evacuation of pictoriality into signal structure make clear that Larcher applies computer graphics to videographic processes of flow to demonstrate a capacity of options, which includes reversing and dissolving video forms in the digital. In this respect, *Video Void, Text* works in both tendencies: signal movements and moving computer graphics arise from the "raw material" of video noise, with which this pictoriality is brought back, in turn, to the "zero point" of pulsating signals/pixels, which is kept in a dynamic mode of tension with the configurations in *Video Void*. Radically con-

centrating on these states means, on the one hand, reducing and removing visibility and, on the other, multiplying and simulating/manipulating optical imperatives. Larcher's concept of video void has a double structure: reduction/evacuation and multiplication/condensing. Displaying the "empty raster image" here denotes a structural limit, at which the matrix phenomena of video and computers can be exhibited in their homologies as characterized by noise.

In this dialogically conceived contrasting of video and computers, which brings out what the multiple and dynamic creative processes have in common, film as medium acquires another function more suited to including a relation to reality derived from documentary in the audiovisual experiments. In this regard, *Granny's Is* can also be understood as an essay comparing the media as it deals with the modalities of film, video, and computers in time and space. Larcher initially connects film and video, when he follows his grandmother with his restless handheld camera from the house door into her house. This documentary trait in his style exhibits the personal, experimental approach and reflects seismologically the uncertain steps of the old woman walking with her stick.

Once arrived in the living room, the image's field is split up into multiple segments: Larcher employs various key forms to contrast, in blue-screen process, other information from the image with the static living room, which, once keyed in, dynamically pluralizes the image's entire field. It arrives at the correlating of elements of the image, which display photographic (static), cinematographic (dynamic), and vidcographic (simulated) characteristics. Abstract electronic signal formations, which circulate in the video void, supplement the videographic portrait of the grandmother. David Larcher himself can be seen in this video film as he carries technical devices and cables through the image or (as he goes on filming) twists the camera lens to open or close it so that his grandmother's living room seems to revolve as if in a washing machine. In a similar fashion, the sound (original soundtrack of conversation between Larcher, his grandmother, and other persons, who cannot be seen in the image) merges with the "noise" of tools and machines (e.g., a vacuum cleaner).

Bringing these auditive and visual creative elements together culminates in noise, when Larcher broadcasts the video's RGB colors such as a beam from his grandmother's eye. This mixing of a concrete relation to reality and electronic abstraction leads to a doubly structured metaphor, in which elements of things living and dead are diametrically connected. The image of the immobilized eye uses pyramidal rays leading from the eye to the viewer, and it now anticipates the moment of death and then again activates notions of a magical eye functioning (as a borrowing from antique notions about the eye broadcasting sight beams) as an active sender of light signals. Broadcasting, however, carries mediatized connotations, as the eye has become a purely videographic instrument with the RGB coding. With this simulation of a sight pyramid—which grows from the eye of the grandmother, who, in death, no longer possesses this capacity to see—Larcher translates the filmic level of reality into electronic broadcasting. This is because, unlike the

presence of the film camera, which always brings with it the moment of death, the video form is not linked to optical seeing and signifies the open-ended circulation of signals.

This inherent dynamism in visual technologies (like optical prisms and mirror balls) is woven into a complex mesh of synthesizer effects and computer graphics, by which the grandmother's documentary "image" is, on the one hand, multiplied and rhythmically composed, and, on the other, this material "manifesting" as documentary can become an element in the apparently spiraling and elliptical revolving of spherical segments. Such connections, with which recorded, electronically manipulated, and computer-generated image forms find themselves constantly transforming their forms, cause an expression of liveliness, which sets a measure to the grandmother's slow fading away in the video film. *Granny's Is* observes the final phase of the grandmother's life and ends with her death, presented as a "space for imagery" without the grandmother, but not without movement. At one point, Larcher counters life's coming to a stop with video as a live medium, when he shifts a single image field, which reproduces his grandmother sleeping into waveform using an oscillograph, reduces it, and has it float like a waving flag toward a monitor within the image, where it takes on the size of a full-screen image. Here the unstable, fluid nature of the video image becomes the vehicle for a message with an ethereal content. It looks as if the pictorial appearance of the sleeping grandmother comes directly out of the ether and that her person has no physical presence any more.

Transcending in this way into immateriality, Larcher sounds out the image technology's possibilities for forming an image field around an object: this involves rendering an image's elements dynamic, as well as shaping them differently according to their segments, fluid transitions of simulated movements (for instance, with an animated image sequence, through which "image" behind "image" behind "image" and so on arises in series), keyed-in photographs from the grandmother's life, and abstract forms generated from pulsing signals.

Whether in evacuating or in condensing, Larcher draws a parallel between the flow of images and the "flow of life." Consequently, the experiments are, on the one hand, abstract, in order to be able to show the various formats of media and the incorporation of computer graphics in a setting specific to video (a linear videotape). On the other hand, treating live video as an instrument itself alive integrates the grandmother's "image" into the multiple keys and layers: a form of image, therefore, that is reminiscent of the photographic image (of a past) and appearing in the videographic flow as if anthropomorphized. It displays, however, the opposite direction of transmission, going from what is alive (film) to the static memory image (photo). In this videotape's facing of death as a reality with humor, the live medium dominates because, as Larcher makes clear, it enables video, allied to three-dimensional computer graphics, to "liberate" the individual "image" from both the photographic and cinematographic prescriptions for representing the present-become-the-past and to let it instead "fly to and fro" in the raster format like a free-floating vehicle for various stages of dynamism and immobility.

Micro/Macro Dimensions: Nan Hoover

For Nan Hoover, video means a medium for displaying light, movement, and space. Decisive here are the pictorial qualities of linearity and two-dimensionality, which Hoover emphasizes in a temporal dimension through very slow movements of a finger, a hand, the face, and further parts of the body recorded in close-up, which is why she prefers movement in real time in front of the video camera, eschews editing and montage, and manages for the most part without sound. This approach obviously derives from her artistic background in painting, where interruptions in time are not imposed on the observer of a tableau (differently from in film). Her concentration on light and movement follows the concept of demonstrating the limits of visibility in video, and, in fact, with works, which are deliberately shot in the macro range to present the almost imperceptible transitions of "figure" and "ground," of subsurface and background, of object and surrounding space (*Movement in Light*, the Netherlands, 1977, 3:00, b/w, sound; see ill. 55). The concomitant quality of the poorly contrastive image in 1970s video serves Hoover's purpose, because it is not primarily a question of sharply contouring objects and forms but, rather, of visualizations, which leave it up to the viewer to make out spatial structures, mountains, and landscapes in sections of the body and in folded papers.

This macroaesthetic links perception to the way minimal changes in the situation of the light are enlarged—through also changing the situation of the "objects" constantly while keeping the camera still. Pictoriality emerges both at the limits of the visibility of the forms presented and in the alternation of movement and the impression of immobility in the image's field. With that, Hoover achieves an almost complete coincidence, although not an image actually at a standstill in video. Here the use of light sources illuminating the objects from outside the image's field and with that varying the position and the intensity of the light, functions to emphasize these transitions, and, above all, makes the expression of small movements appear dynamic and sculptural. In Hoover's words, "For me, video means light; also the interaction of light and camera or with the chip today. But in a quite specific sense. This concerns the luminous character, i.e. the manifestation of light as volume, as body. Here it is perhaps comparable to Polaroid—light as an independent body."[88] In this videography, which evokes the generation of form and movement, that is, creating a contrast between object and spatial surroundings, the enlarged depiction in the macrorealm correlates with a microaesthetic of small objects changing in small steps. She continues, "Perhaps I ought to also say, that each tape, which I have made, was shot with the macro lens. When you work, namely, with a form the size of a television screen, you have the chance, to achieve the highest intensity of visual clarification (close-up)."[89]

In this setting, it culminates in the video camera almost touching an object, which fuses in places and in phases with an undefined space, which also remains, for this reason, a diffuse field of perception because the overlay and the background planes seem to merge

into each other. In the second part of the black and white *Movement in Light*, the movements of a hand being seized by the fingers of another hand are essentially recognizable through the contrast in brightness. The situation of this illumination focuses the image's segment, where the movement is happening so that, depending on the hand's illuminated parts, the entire sculptural impression of this "figuration" changes, as its contours wash fuzzily into the neutral gray of the surroundings. Hoover develops this formal minimalism (which borrows, at the same time, from the treatment of the motif of the "hand" in chiaroscuro painting) consistently when she creates a sharp contrast of dark and light and the irradiation of the illuminated hand to stimulate irritation deliberately as the illuminated hand interacting with its shadow appears as if the light's track (of reflexion) adds another finger or lengthens one finger out from the hand. Because the light reflected from the hand onto an undefined subground/background creates forms as if carved with a knife, the impression of an interplay of material objects with immaterial states of light also arises in this staging of movement. The variations of contrast and form are combined through movement, which Hoover visualizes on two levels: one concerns the actual, slow change in small objects moved in real time in front of the camera, and the other refers to the flexible lighting of these objects, which can change their shape by means of light. On both levels of display (moving objects and light reflection), Hoover emphasizes a continuity coordinated by movement through the chosen setting (fixed camera, enlargement, and concentration on an uninterrupted process). As she avoids interruptions, video can appear like photography happening successively.

In the interplay of the macrolevel of recording with the microlevel of the image's objects, Hoover verifies her understanding of video as a medium for displaying continuous processes in time. Her way of working consists in transferring the discontinuous processes of flow in video into simulated tableaux bordering on the cessation of movement, by which the impression of continuity fixes itself, and the pulsating process of transformation in the electronic medium is used to guarantee the perceptual impression of uninterrupted linearity. The pulsating dynamics in the video medium are reduced as far as possible to exhibit a stable linearity in the transitions of surface and space and in the color values in the place of the medium's specific "restlessness" in image fields. What is supposed to be fostered is the slow emergence of objectivity from seemingly abstract, yet concrete, body shapes (as in developing a photograph).

Hoover varies her concept of perception, based on presenting uninterrupted time for the length of a video, so the recipient's eye can move over the image's field as if over a painting in *Halfsleep* (the Netherlands, 1984, 16:43, color, sound; see ill. 53). She shows her own face so close up that the skin's pores, the staring eye, and the breathing can be seen. As an exception, stop motion is used in this work for shortening time, which, given the almost immobile concentration on the face, expresses less a course than rather how long the presence[90] of the object lasts. The effect, produced by the stop motion of a successive series of "lasting image" after "lasting image," is further reinforced by the extreme

close-up of the unmoving face. The colors (white to yellow, orange, and black), which structure the volume of the body, also emphasize the objectiveness.

In the video works, where the matrix of what is material acquires visible form either through the volume of the bodies or through paper, which simulates volume, it also comes to a deliberate mixing of material and immaterial structures. As Rob Perée writes, "*Returning to Fuji* (1984) and *Desert* (1985) ... are significant in that here, Nan Hoover has not made use of her own body, but of simple sheets of compliant typing paper. Interestingly enough, these works have more of a physical effect than those that preceded them."[91] In the black-and-white video *Returning to Fuji* (the Netherlands, 1984, 8:00, b/w, sound, see ill. 56), the shifting of the light and synthetically generated wind noises intensify the impression of the course of a day formally compressed in time. In *Desert* (the Netherlands, 1985, 12:43, color, see ill. 52), the forms also change with the light conditions, where an erotic dimension emerges as well, when the forms and the colors complement each other to form the imaginary landscape of a body. "The lens does not adjust to changes in distance as the light moves," Perée continues. "Flesh-colored tones and porosity in the grain give the images a sensual, erotic substance."[92]

This ambivalence relating to the matrix of what is material and immaterial denotes the videographic process on which Nan Hoover works, paying particular attention to the linear course of time. Through the slowness of the changes shown, a form of linearity is revealed here, which simulates a continuity just as much as a corporeality by means of light. With that, Hoover exhibits an aspect of video as a recording medium at an extreme, as she simultaneously represses the processes of synchronization, which, in the final analysis, stabilize the visibility of pictoriality. In performing such structures of movement, which do not allow themselves to be attributed unequivocally to a material or immaterial vehicle, Hoover creates a tension between figuration and medium. This tension is staged on the moving surface, as it is the contrast between perceptible relations among surfaces, which, however, can appear sculptural, figurative, and material in simulation, that is, in the end, interesting. The preference Hoover allots duration over processuality is motivated by her presenting a linearly organized video aesthetic, which is not deployed narratively or performatively.

Picture, Text, Voice, and Writing: Gary Hill

Gary Hill belongs, like Steina and Woody Vasulka and Nam June Paik, to a tendency toward technical experimentation with video imagery. His approach to a new visual language rests on analysis of the abstraction originating in video's audiovisual technology. With this Hill understands the machines employed (Rutt/Etra scan processor, audiosynthesizer, analog-digital converter) as performing—by stretching, compressing, and reversing of image-fields—processes specific to video that have a parallel in language, when, for instance, palindromes are written or read, respectively, forward and backward in poetry,

and omissions, condensation, and the principle of "wheels within wheels within wheels" determine the form. For Hill the primary reference medium is language, against which he measures the processual possibilities of electronic writing, of combining and transforming elements, and of transcribing of imagery into text and voice. Hill, therefore, considers the linguistic system a meaningful correlate to electronic vocabulary, because it provides the necessary flexibility for determining various formal "language connections" in video. Among these are couplings, which produce complexity of meaning and relations of contiguity, generating (between different media languages) contingency and, finally, the recombination of disassociated elements (chiefly text, image, and voice).

Language becomes the core medium of structural work with video, as Hill sees a parallel between the circular, variable movement in electronic feedback and the movement in thought processes. For him the principle of succession is less linearly organized and more precisely means omnidirectional variations of electronic signal processes and language elements. From this premise, Hill works on developing an electronic vocabulary corresponding to video's technical character, reflexion. For the concept of reversing image-fields, movements backward and forward at varying speeds, dismantling of scan lines and disassociation of audio and video signals, text, voice, and writing are included comparatively to bring out video's visual matrix phenomena. His concern is to display the basic structural principle of video's forms of expression contextually on various levels of media. In the final analysis, the structural parallels Hill discovers in language and in the electronic writing process serve to reinforce medially via spoken texts, voice, and writing those qualities in video imagery, which designate video's specificity.

The elements of the other media have an amplifying function to the extent they are suited to presenting matrix phenomena in video visibly and audibly. The characteristics of video's structure, like reversal of the direction of writing in constructing and reconstructing transmitted video signals, are exemplified auditively in speaking forward and backward (*Why Do Things Get in a Muddle?* USA, 1984) and are made visible as text in composing and decomposing letters in text constructs (*Happenstance*, USA, 1982–1983). With this auditive-textual demonstration of video's capacities, it is by no means a matter of diluting a medium's specificity. On the contrary, the intention aims to deploy the audiovisual capacity for expression using amplification of individual components in such media forms as can be considered structurally related in this regard.

To explicate the peculiarity of synchronization, Hill employs speed variations, in particular stretching and condensation of the spoken word. He looks to underline his videographic forms of asynchronicity and of reversing the left-right relations on a level of display, which, because text appears as a context of meaning, is marked by interruption and distortion of understanding. It will be indicated how understanding changes through shifts in the organization, variations in rhythm, and combination of elements. Symptomatic of this approach are the irregular rhythms of image and text sequences in *Between Cinema and a Hard Place* (USA, 1991).

One video work demonstrates video's operationality, as defined in simulation, where it keys in respectively two separate yet similar or reflecting image-fields parallel into monochrome color surfaces. In *Primarily Speaking* (USA, 1981–1983, 18:40, color, sound; see ill. 48), a text spoken by Hill corresponds to the process of the visual succession of image segments, where the relations of contiguity are in permanent flow and reflect the transformativity specific to video. This videotape, with the two alternately congruent and contrasting image segments, not only reinforces the open character of the capacity for discontinuous forms to maneuver in the audiovisual medium but also indicates that the correspondences between media languages—which can be used to reinforce aspects of video's specificity as a medium—have more than a stabilizing and condensing effect. They can equally transport destabilizing and disintegrating tendencies—when image and text no longer have any points of connection—that indicate the areas of friction and tension between the media, which in turn differentiate the specificity of one medium from that of another.

In this comparative experimental array, audiovisuality comes in for particular attention. It turns out that the structureless context of noise is brought with Hill into a form, where the electronic raw material's specific conjunction of video with music is preserved. This process toward form is what generates abstract video aesthetics. On this level, we can agree with Hill that a correlation of image, text, voice, and writing is possible and that, motivated specifically by video, it can convey the capacity and the operationality of the medium in a language context. With this intention of seeking to present the transformation of noise into image-sound combinations self-reflexively, that understanding of electronic language, which maintains as a system, formal correspondences to other languages systems, develops. The main accent lies with the transferability of textual systems, which concern themselves with understanding,[93] over to governing audiovisual sequences (single-channel-video) and to organizing "multiple voice" video systems (multichannel video installation).

This approach originates in the transcription of electronic scan lines that can produce objects both as imagery and as writing in the visual form of presentation. *Happenstance* (USA, 1982–1983, 6:30, b/w, sound; see ill. 46) presents arrays of letters and words in geometrical forms (square, circle, triangle), which are modulated and pulled apart with the Rutt/Etra scan processor and an audio synthesizer so that an abstract graphic figure emerges from a readable text. In an alternation between constructing, deconstructing, and reconstructing—which reproduces video's signal process with letters—the individual letters are written, organized into readable words, distorted in their form through manipulation of the scan lines, set on a new image level as individual "objects," and finally combined into a new form, a tree structure, which is "open" at the top and bottom for new combinations of signs and, with that, describes the multiplicity in electronic vocabulary. "It is on the level of text that the ephemerality of linguistic meanings as a basic characteristic of language is in any way addressed. Musical and spoken elements underline the

respective character of the individual passages and the complex intertextuality of the work."[94] On this basis, the denotative character of image and writing achieves the expression, on which more complex combinations of writing video with philosophical texts erect themselves and deal with questions of understanding from perspectives concerning a proximity to and an adopting of semantics.

In the video installation *Between Cinema and a Hard Place* (USA, 1991; see ill. 44), twenty-three monitors without casings are organized into groups in various sizes. The devices are linked syntactically through an irregular rhythm that governs the sequences of images, which appear on the groups of linked monitors and are themselves interrupted by sequences without any imagery (while other sequences of images are running on another grouping). This irregularity reflects discontinuous ways of articulating pictoriality in video; it reinforces video's general process of flow in a horizontal direction and is, with that, reminiscent of the horizontal drift, which has to be arrested at the end of the lines to produce the stability of an image's field in the raster format. These basic elements of videographic language, which include addressing the images as object in the array of the monitors, are tied into a second level of media, which is determined by spoken passages from Martin Heidegger's text *On the Way to Language*.[95]

The text that deals on the semantic level with the question of relations of proximity independently from circumstances in space and time, has a syntactical function in Hill's installation, as the rhythm of speaking, that is, the text transferred in the voice governs, like the supercode in computers, the sequence of images as a score, which shows essentially landscape and buildings in a country setting. The proximity, which is here transferred from a concrete into a structural contiguity—because it is not a question of distancing but of homologies—consequently becomes a metaphor for a mutual bonding of electronic and textual organizing of language. If it is not a matter of the distancing but of the understanding of the text's common traits, video's syntactical principle can be also deduced through understanding the text semantically, particularly in the processes of discontinuity that Hill highlights. As in the intertextual transposition of one system of signs into another, a web of shifts and condensations emerges from text and voice. This, however, becomes simultaneously a reinforcement of transformation in the other medium, video. Hill has converted the difference between media into video sequences with many voices, where text and image are brought together by common, but diverging, rhythms. In the final analysis, the videographic presentation's relations of contiguity, governed through the text, have a further dimension still, which originates in the radicalizing of the technical reflexion and also includes the option of the "empty" image.

With his *Remarks on Color* (USA, 1994, video projection; see ill. 49), as reflected onto a projection surface, Hill makes it plainer still, that he is interested in video from the viewpoint of its sequential nature and not its linearity. If the text-image-sound connection in *Between Cinema and a Hard Place* introduces an irregular rhythm, which differentiates parametrically between the function of a regular interval in film (cinema) and video's variable

frequency, then the claim to disautomating seeing and hearing through irregularity in *Remarks on Color* becomes the initial premise for presentation. In the linear video work, Wittgenstein's difficult text, "Remarks on Color," is read out haltingly by Gary Hill's daughter from a book.[96] Because the girl cannot understand the text she is reading aloud, she takes pains, above all, with the right pronunciation of concepts and parts of sentences, which she, therefore, articulates with a slight delay, because she cannot grasp the meaning. Feedback effects (words and concepts being repeated) appear in this discrepancy between reading and understanding. These effects refer, however, to Wittgenstein's text, which tackles the problem of expressing visible phenomena in 350 numbered sentences and—similar to a feedback loop in video—couples one deliberation with another and layers one thought on top of another. The entire process of reading, which makes up the duration of the video projection, exemplifies in the spoken language as it deviates from the understanding of the text, a variation that changes the schema of text. By radicalizing Wittgenstein's reflections on the rules of language games, Hill shifts the philosophical text's understanding of ideas through a critique of language into an attempt to acquire semantics through syntax; however, and this explains why a *child* is speaking, syntactical problems appear in speaking, which make the semantic acquisition more difficult. In this context, reading, seeing, and understanding are not processes capable of being completed linearly, but require cognitive knowledge about proximity and rules. *Remarks on Color* frames itself, therefore, also as a critical challenge to its audience, requiring familiarity with the foundations of electronic vocabulary to be able to follow the variations on the schema.

Hill perfects this approach with the video film *Why Do Things Get in a Muddle?* (USA, 1984, 32:00, color, sound; see ill. 51). Syntactical sound-sound, sound-image, and image-image combinations are transformed by moving forward and backward in the tape (passages spoken backward, which are played back in reverse) from a linearity capable of intensifying meaning into an open process, in which sequential series of signs flow and that seems to be comprehensible in parts but then collides with the reflected elements of the plot, setting a perspective on a reality like that originating in Lewis Carroll's *Alice in Wonderland*. According to Arlindo Machado, "In fact, Hill's work is based on investigation into the spectacular and labyrinthine aspects of language, into an audiovisual and media 'translation' of certain traditional poetic components such as palindromes (words or verses which can be read both from left to right and vice versa, such as *live/evil*), anagrams (the transposition or shuffling of letters in a word or verse, such as sword/words), and plays on words in general, with a view to exploring the ambiguities and paradoxes of language, as well as undermining the institution of meaning. In an interview given to Christine van Assche, Hill confesses that his main interest lies 'in the moment approaching meaning and the moment when meaning begins to fade.'"[97] In this process, *Why Do Things Get in a Muddle?* develops (like *Remarks on Color*) a didactic discourse on textual and visual understanding from the perspective of Alice, who asks her father about phenomena of reality

and how they get reversed. As speaking backward and playing the tape backward cause delays and disassociations, the events on the image level and on the sound level appear to be moving variably and not in a causally logical order. The variability displayed corresponds to video's nature as a medium and brings together spoken language of the level of a schema open to various tendencies within a sequential structure with delay and feedback: "In this way, the plot appears at first sight plausible, on looking again, the unusual mechanism of the bodily movements similarly becomes clear. Using phonetic notation, Hill has annotated the texts spoken in reverse by both actors. At the end of the tape, as Alice is standing in front of the mirror, the letters of the subtitle (*Come on Petunia*) form again and become "Once upon a time."[98]

The variable movement in electronic feedback sets into a circular structure the alignment composed from thirty monitors into a linearly consistent image in *Suspension of Disbelief (for Marine)* (USA, 1991–1992, video installation; see ill. 50). On this horizontal "monitor line," the sequences of the images of a recumbent male body and a recumbent female one are "written" both to the right and to the left, one after the other, shifted in time and merged. Figures take shape, running restlessly and irregularly across the horizontal line of the monitors and converting the electronic impulse. Because the bodies cannot "touch" each other, but both appear pictorially on the monitors' horizontal axis, a discontinuity is preserved, which points to the technical processes of linearity in the medium. This does, however, not remain with the pulsating line and the variations on this structure. The sequences of images occupy, respectively, several monitors so that it becomes a case (as with *Between Cinema and a Hard Place*) of sequential throughputs. The sequences of the image fields' movements vary with respect to the number of monitors reflecting them at any time, several monitors remaining inactive. Equally, the direction of events and their speed vary, making unstable the horizontal line ostensibly guided by the cathode ray used to record it. It does not seem to be arrested, but rather circulates in itself, so that medium and form implode in video like a time machine.

In the video installation *Learning Curve* (USA, 1993; see ill. 47), Hill incorporates the viewer in a concentrated way into this relationship of tension between a videographic flow of signals without any limitation and a form bounded by the constraint imposed by its apparatus on how video can appear. The perceptual circumstances are fixed by the apparatus as the position of the viewer is identified at the narrow end of a long table, at the other, broader, end of which a rising curve forms a projection surface on which the same wave movements can be seen endlessly. This model of perception also limits the feedback structure of pictoriality through the dispositive's sequential order, where the viewer in this installation is resolved into a function of the time machine. With this model, Hill wants, in the final analysis, to point to the nature of the electronic media, which equate as a technological development to a "second nature." Hill says, "Machines are not only a sign of the times but they affect our relation to time directly. Speed has infiltrated everything. One's sense of place, physicality, the body, communication, economy, and media are all

changing at exponentially faster rates. And yet this speed/time doesn't have much to do with being(s) in relation to the ontological questions of time. Nevertheless we are face to face with technology because we are technological."[99]

Video and Computers: Steina and Woody Vasulka

Steina and Woody Vasulka understand electronic pictoriality in a conceptually different way from the image as a unit. Their video images make clear the specific capacity of video in forms that express variable formats and present pictoriality through sculptural objects. In their video work, the Vasulkas radicalize the basic theoretical premise of a medium not fixed in its dimensions or directions. Their aesthetic statement can function as a counter-argument to such theories, which seek to determine video as having a surface character without spatial dimensions.[100] The Vasulkas' video works can be called experimental from various viewpoints: they use machines constructed for special tasks (Horizontal Drift Variable Clock and Multikeyer, both from George Brown; Digital Image Articulator from Woody Vasulka and Jeffrey Schier); and they connect together as many devices as possible in complex arrays, in order to exploit the capacity of the particular technology. The situation of the media in 1970, when video had not developed any specific vocabulary, forms the point of departure for their work with a "void medium" in both technical and technological terms. The Vasulkas were interested in developing video in contrast to film and television.[101]

Steina Vasulka's initiative with *machine vision* denotes a qualitative difference from other media dependent on technical apparatus. If she is concerned to release video from the camera obscura perspective and, with that, from other recording media, then this decision prepares the way for algorithmic generations of imagery. The reflexive praxes with video that follow this maxim necessitate a self-reflexive revelation of the building blocks and particularly of the smallest visual and auditive components capable of being governed. Setting out from this sort of zero point in electronic language, Woody Vasulka deals with categories for an electronic vocabulary and a syntax in video so that effects become controllable, repeatable, maneuverable, and, finally, storable. This attitude toward the medium of video, which produces extreme deviations in the video image, consequently includes the computer: "After we got the computer, the concerns became totally different. Before we could even perfect the control of analog tools, we plunged into digital ones where, in fact, everything is a product of control. It is in 'interactive real time' that I feel video becomes a category apart from the others (film on one side and computer graphics on the other)."[102]

In the six-part series *Six Programs for Television (Steina, Objects, Digital Images Transformations, Vocabulary, Matrix)*, WNED, Buffalo 1978, Woody Vasulka explains how he became aware of the phenomenon of the frame running through the matrix of several monitors while he was working on the tapes for the video installations *Matrix I* and *II* (1970–1972; see *Matrix I*, ill. 119). He connected the directly processed video signal with an

audiosynthesizer (Putney audio synthesizer) to present the energy in a frame additively and be able to demonstrate the interference of *audio* and video. This means "controlling the sounds with images and vice versa."[103] The forms of imagery can derive from feedback (*Distant Activities*, USA, 1972, 10:00, color, sound; see ill. 118), can be patterns generated with oscillators (*Heraldic View*, USA, 1974), or can be abstract (*Discs*). They are related to each other, so that pictoriality can run upward and downward and to both sides through a larger number of monitors.[104] In the segment *Discs* (USA, 1971, 5:30, b/w, sound; see ill. 117) from *Matrix I*, the video image's horizontal drift is investigated to see how this video phenomenon performs horizontal movements in contrast to film's verticality: "By time errors we could see that the frame was delayed, but we could never see its structure moving through any particular frame."[105] This function of imagery is used in *Discs* on the "image" of a spool from the videocassette, in order to convert it into continuous movement through re-timing of the horizontal frequency. Summoned by the reentry of the signal into the raster system, a delay effect arises, which delays and compresses the visual motif of the open spool at high speed so that repetitive, moving patterns fill the image's field but also run across a row of screens. With this video work, the concept of a frame is exceeded in a temporal and spatial direction. In a further segment from *Matrix I, Black Sunrise* (USA, 1971, 21:08, b/w, sound; see ill. 115), sound is, as in *Discs*, generated exclusively from the video signal and transmitted to an audio synthesizer. The visual forms of a recorded disc converted into horizontal drift, and the sound, which is produced by the drifting, is the expression of video noise, the raw material of audiovisuality.

Comparable arrangements in abstract film and complementarily in electronic music precede these investigations into image and sound. In this tendency to abstract experiments among the West Coast filmmakers, the *5 Film Exercises* (USA, 1943–1944) by James and John Whitney should be cited.[106] John Whitney, who has been realizing computer films since 1962 (initially with analog computers), investigates harmonious relations in the dynamics of serial graphic patterns. This approach to algorithmic imagery in his films *Matrix I* and *II* (USA, 1970 and 1972) denotes the way to a matrix image, which Woody Vasulka pursues further with his "lexicon of electronic vocabulary" by using video and computers. Despite the different operational nature of film and video, John Whitney and the Vasulkas set out in their respective *Matrix* experiments from comparable processes for generating synthetic images, and both achieve results in spatial display within geometrically abstract imagery. The computer-generated image forms by Whitney and the video installations by the Vasulkas' work with simple graphic forms to exhibit the mobility of the image field almost completely independently of the frame. That means, below the unity of *Matrix* in the title of the works, a homologous aesthetic conception can be read in it, where Whitney and the Vasulkas go into structural traits of the visual matrix in the processes of recording and reproducing. The filmic and the videographic *Matrix* works demonstrate the moving image's scale, pattern, and dimensionality as variable parameters.

In *Matrix* (1970, USA, 6:00, color, sound), John Whitney constructs squares and cubes out of layers interlaced into each other. The—in principle—endlessly repeated forms are multiplied by turning and increasing condensation to the point, where it comes to the dissolution of the abstract figures (cubes) that shift into basic linear forms and emerge again as multidimensional schema for configurations. The Vasulkas' audiovisual construction is structurally related to these filmic forms of dimensional inversion, when, in *Black Sunrise*, the camera's image of the disc (a black dot on a cardboard carton), and, in *Discs*, the shot of the video spool are converted into a repetitive movement multiplying the pattern and condensing it with increasing speed.

The Horizontal Drift Variable Clock impulse generator, developed by George Brown in 1972, governs these deviations in the video image, with which the flow of electronic signals appear as if badly synchronized on the screen by enabling (through the integrated programming function) the performance of every operation in time, which can be displayed on a screen. This principle of manipulating synchronization has a parallel in graphic notation in computer films. Whitney has demonstrated, when he transfers the articulation of the graphic concept from abstract film to programming in computers, that, even on the basis of film as a medium, incorporating programmable building blocks can be realized. When, consequently, a structurally different technology like computers is applicable for extending and manipulating film's capacity for abstraction, the conclusion can be drawn from the perspective of the media's history that the interrelation of video and analog computers (and other programmable devices) is not a step beyond video's specifics as a medium. In the later works with the Digital Image Articulator (1978), the focus on algorithmical functions takes this reflexive investigation of the matrix in the medium of video further.

In this concept of video aesthetics, which sets out from a variable setting of the apparatus and from deviations from the raster format in the functions of the imagery, Steina Vasulka's machine performances occupy a central position. *Orbital Obsessions* (USA, 1977, 24:30, b/w, sound; see ill. 109) shows various experimental arrays with two cameras alternately focusing on each other and investigating the multiple studio space in a closed circuit in which Steina Vasulka appears live and intervenes in this performance (as she maneuvers the machines in real time and changes effects). In *Orbital Obsessions*, various sources of imagery are superimposed and the variations generated by processors, the multikeyer (1973) and the video sequencer (field flip/flop switcher; 1972), are recorded and reproduced simultaneously. Steina installs two different camera positions through which the doubled studio space appears segmented and multiplied and seems, at the same time, to revolve around various axes. Spatial condensation arises, for example, through a camera pointing at a monitor, which is interacting with the zooming movement (in and out) of the second camera, which is, in turn, directed to its reflected images as a camera on the monitor. The video camera showing itself on the monitor is part of a feedback

structure, in which the multiplication of the image creates interference by the apparently endless "replication" of the same image.[107] This optical feedback is simultaneously presented auditively so that the interaction of the machines can be displayed self-reflexively in the circulation of the internal response from signals. Whilst this construction is reminiscent of the *mise-èn-abyme* in painting and film, spatial phenomena specific to video emerge in this structure by the video sequencer mixing divergent movements of the cameras revolving—one horizontally, one vertically—that, in turn, exhibits the electronic signal's omnidirectional potential.

In another sequence from *Orbital Obsessions*, the camera moving in space is fixed onto a tripod and placed opposite a second, stationary camera recording this first camera. The displayed pictoriality exhibits variable speeds in the interrelated presentations of the image fields by means of frequency modulation and keyer and alternates between positive and negative image. The video sequencer serves to change the voltage and to modulate the frequency of the frames' switching between two or more sources of imagery. By having various views of the same space coming together in the switching, special irritations and flicker effects emerge at the same time. The resulting video image culminates in instability in space and time.

George Brown's video sequencer allows rapid switching up to the point where the process of the interchange of images, which comes about technically during the vertical synchronization, becomes almost invisible. In addition to this dissolution of a coherent image, the cameras shooting one another generate a spatial disorientation even as far as vertigo, when one camera rotates around 360° (from the floor to the ceiling, and Steina Vasulka enters this setting—that is, can be seen almost simultaneously in various revolving movements). Incoherence is also intensified in the same segment (in which the positive image is alternating with the negative) as soon as the multikeyer keys in and layers vertical segments in real-time. The final sequence of *Orbital Obsessions* also uses superimposition as a technique of layering, so that Vasulka can be seen severally in scarcely differing positions. With its integrated clock, George Brown's multikeyer *permits* layering up to six different levels of the image, which can be manipulated in real time and organized once more into the same position in the image. From a technical-aesthetic perspective, *Orbital Obsessions* means that processual video involves image-making machines from the start; in this example, they are the multikeyer and the video sequencer. With that, video as experimentation has equal importance with regard to the transformation of audio and video signals.

Corresponding to the performances of the two cameras, the auditive part is equally processed in real time; it reflects the process of producing video. What can be called "experimental" is finally the modulation of the signal itself, because the signal's voltage and frequency and its translatability from audio to video influence the "content" of the imagery, which corresponds in these segments to its form. In the same way, auditive elements are merged with the noise from manipulating audio and video signals into layers, which also contain the surrounding sound in the studio, for example, out-of-shot conversations

the Vasulkas conduct about this experiment, classical music from the radio, and the telephone ringing. Because all these sounds appear as noise, they self-reflexively generate the aural "content," which (corresponding to the visual) illustrates the ambivalence between electronic space and real space on the indexical level of video noise in the various segments of *Orbital Obsessions*. The signal modulations of video and audio form the actual contents of this video performance, the meaning of which lies, by contrast, in video's specifics as a medium. Consequently, this video performance demonstrates the medium's self-reflexivity in its endless recursiveness.

With these audio/video experiments, the concept of video performance is meant to underline an activity tied into the medium, not added to it. What is meant is a performativity, which the artist shares with an array of technical devices, where Steina Vasulka, who has experience as a classical concert violinist, introduces the approach of performance from music into a new medium and a technical setting consisting of machines. Therefore, *Orbital Obsessions* forms only one example in a larger working context of videotapes and installations (among them, *Allvision*, 1975; *Urban Episodes*, 1980; and *Summer Salt*, 1982), in which she performs her notion of *machine vision*. Two aspects are central: on the one hand, disassociating the human viewpoint as observer, to the extent it is tied to the perspective of the eye (for example, the camera mounted on the car roof or on the bumper in *Summer Salt*), and, on the other, surveying space through the closed circuit of the machines.

In the early performances of *Violin Power* (USA, 1970–1978, b/w, sound; see ill. 112),[108] the sound of the violin is transmitted to the Frequency Shifter (Harold Bode, 1975), the multikeyer, and the Rutt/Etra Scan Processor. In the violin performance, its image, recorded by two cameras simultaneously and manipulated in the scan processor (or by keyer and audio synthesizer), is transferred to a projection surface. In two sequences, the sound of the violin is recorded with a microphone and conveyed to the keyer, which governs the priority of the two camera perspectives. In the four sequences that follow, by contrast, the scan processor comes into play and generates image forms, where the bow of the violin seems to merge with the raised scan lines of the curved image. To achieve this result, the violin's pitch had to be changed to a lower frequency with the frequency shifter (so that it sounds like a cello) because the higher pitch could not be processed in the keyer and the processor. The frequency has to be aligned with the standardized NTSC frequency of 60 half images/second with 60 hertz (alternatively 50 half images/second with 50 hertz in PAL) so that an effect of deviation can become visible in the scan lines. Only when the frequency of the modulation moves in the range of video or, alternatively, of television frequency can the deviation be displayed in an aesthetic form, which brings out the structure of the lines and does not produce unstructured video noise.

These two performative video works, *Violin Power* and *Orbital Obsessions*, exemplify the use of real-time and the interactive capacities of the video medium, which can be compared with the nature of the digital processes in computers (where interactivity and

reversibility illustrate the media's specifics). From this perspective, the performance, in which a musical instrument is played live, represents a decisive element that can be self-reflexively employed. The concept of interactivity refers to the interchangeability of audio and video noise and denotes the process of "playing the image" with instruments, which demonstrate how the character of image and sound as flow arises and fills the performance space. Finally, "playing video on a violin" represents a reversible process, when the sound of the violin coincides with the video process, which performs the sound of the violin in real time. According to Vasulka, "The tools we use, videotape recorders, cameras, etc., operate in 'real-time' as a time in which signals propagate from input to output. . . . One result of real-time system performance is that you can continuously modify the sequence such that it resembles the playing of a musical instrument, which also gives you a great amount of variations and immense capacity to discard unnecessary themes. So 'real-time' in our context does not mean the infinite take, but the observation of image-forming processes, which look to us perceptually continuous, yet interactive in all modes including the image forming."[109]

In the first closed circuit audio/video performances of *Violin Power* (1970–1978), the predominant effect was the way the movements of the bow on the violin's strings generated direct deviations in the position of this movement in the image. Steina Vasulka is, therefore, playing violin and video at the same time. The languages of the two media—music and video—converge in terms of their abstraction, when the sound stimulates the image's waveform. Music is connoted visually, insofar as video develops dimensions in time and space: the sound not only bends the scan lines apart so that these become horizontally visible and exhibit a temporal dimension. The *Video Violin* performance also uses the scan processor to modulate the sound's wave movement, until spatial forms of the image form themselves. By emphasizing the lighter places in the image, the horizontal lines deviate into the vertical and make sculptural forms. While Vasulka transmits sound in these performances with the acoustic violin through a microphone, she has been working since 1991 with a MIDI violin to increase the variability in her performance's interaction with the machine setting.[110]

In the performances of *Violin Power*, music as an input of video indicates the general interest in abstraction. In Woody Vasulka's *Time/Energy/Objects* (1975/76), the use of the scan processor aims to investigate the interplay of visual and aural abstraction in its essentials with various studies of line and raster processes and create objects exclusively from scan lines. Abstract image forms without any external source can be generated from the "electromagnetic material"—for example, from the signal of a rewinding videotape in *No. 25* [1975] and the test image patterns of the broadcast signal generator (a clock used in the early phase of television to produce the NTSC television signal) in *The Matter* [1974]. Vasulka uses the scan processor as an instrument to analyze the parameters of image structure in the electronic image. His electronic studies in *Time/Energy/Objects* are close to mu-

sical as well as scientific experiments in notation, as it is a matter of defining a syntax for organizing energy, where the process enacted and the manifestations in a syntactical order are related to each other.

The statement "Didactic Video: Organizational Models of the Electronic Image" explains how the functioning of a scan processor makes controlling these video processes possible:

> Emphasis has shifted towards recognition of a *time/energy/object* and its programmable building element—*the waveform*. . . . The majority of images, still or moving, are based on their capture from the visible world with the help of the *camera-obscura* principle through a process involving the interaction of light with a photo-emulsion surface. . . . Contrary to this, the conversion of light into energy potentials during electronic image formation is achieved *sequentially*, giving particular significance to the construction of the referential time frame. . . . The possibility of disregarding this organizational principle and realizing instead a total absence of such a process in certain modes of electronic image forming has interested me the most. The result has been an inevitable descent into the analysis of smaller and smaller time-sequences, a process necessary to understanding wave formations, their components, and the process of their synthesis and programmability. To me this indicates a point of departure from the light/space models closely linked to and dependent upon visual-perceptual references and maintained through media based on the *camera-obscura* principle. It now becomes possible to move precisely and directly between a conceptual model and a constructed image.[111]

The more the difference between pictoriality produced by a camera and that by a waveform generator reduces, the more possibilities emerge for controlling and governing in the electronic medium. Woody Vasulka's *The Matter* and *Explanation*, made with the scan processor, and (together with Steina Vasulka) *Noisefields* (all 1974) provide examples for these new forms of "image behaviour." *The Matter* and *Explanation* use points, grid structures, and the color-testing image of the broadcast signal generator. In *Noisefields* (USA, 1974, 12:12, color, sound; see ill. 120), a camera does indeed record a disk, but as soon as this circular form is produced, electronic snow is keyed into this abstract form, and the video sequencer converts the image's form into a positive/negative switching with varying speeds. This pictoriality mixes differing input—which originates externally from a camera and internally from the devices themselves—and processes this also with the dual colorizer (Eric Siegel, 1971) to vary the colors and the intensity.

Noisefields can be compared to *Orbital Obsessions*, as the video sequencer there serves to shift between different sources of video and produces similar flicker effects. But, whereas in *Orbital Obsessions* self-reflexive structures arise from the interplay of video material based on scenes shot in the studio, *Noisefields* indicates the origin of each electronic input. The pictoriality presented refers to the presenting of the electronic signals themselves and carries no other information, except that the colorizer is employed for variations. The circular

form introduces nothing more than a simple division into inner and outer fields, which pulsate in relation to each other, so that the entire content of imagery in this videotape consists of a modulation of video noise.

In *The Matter* (USA, 1974, 4:11, b/w, sound; see ill. 127), the testing images of the broadcast signal generator are modified (as also in *Explanation*) in form and size by processing the audio/video signal with the scan processor. Both signal states—audio and video—are here responsible for the transformation of the input form. The "image" (testing image) is inserted into an artificial context with the multikeyer and is transmitted to the "ramp processor," which alters the voltage in the synthesized image and is responsible for the simultaneous generation of sound and image from the same source.[112] The visual and aural structures in *The Matter* arise through the waveform generator, while the waveforms appear on the scan processor's internal screen. John Minkowsky writes, "In *The Matter*, as an example, generated sine, triangle, and square waves are used to reshape the display raster, and the image of the dot pattern alters accordingly into analogous waveshapes. The altered Rutt-Etra image must then be recorded by a second camera pointed at its display screen, in order to impart the proper TV timing information that allows us to review the image on a standard monitor."[113] The waveforms issuing from the vertical drifting of the horizontal scan lines present a possibility of exhibiting the variability of time and energy in video. They multiply video's demonstrable functions, above all with respect to presenting time as space. In Woody Vasulka's words, "Waveforms are normally an acoustic product, but when you create them as frames, you can deal with them as image objects."[114]

Woody Vasulka also applies these processes to real recordings. In *C-Trend* (USA, 1974, 10:35, b/w, sound; see ill. 125), recordings made live with the camera are scanned again and modulated to alter their line structure to achieve the effect of an image object moving freely in electronic snow. In this way, the image field gives up its connection to the X/Y coordinates of the raster image, which normally determine the scale of regular video images. The videotape reproduces the experiment, in which images and sounds from traffic are recorded with a camera pointing out of a window onto the street. Although the visual material is changed in form, size, and compression and is also divided into two differently formed segments through retiming and repositioning in the Rutt/Etra Scan Processor—so that it finally appears as a completely other form—the recorded sound remains unchanged as the real street noise. When in *C-Trend* the visual information as content is removed from the television image's raster and converted into a drifting, it exposes the frame itself to the horizontal and vertical blanking (the "empty" raster). By manipulating the raster, the image's content takes on the form of an object and switches directions from above and below.

C-Trend connects two different functions of the scan processor: manipulating the raster and deflecting the scan lines in an exemplary manner. By comparison, the processing of the scan lines in *Violin Power* only causes deviations from the usual course of time, not

from the raster. In the work *C-Trend*, this operation, together with raster manipulation, produces permanent tension between the live character of the street noises from the original soundtrack, which maintains the relation to the "real" world, and the image as an artificial object, which nevertheless points to the quality of displaying a recorded scene. For example, it is possible to discern the cars in the image object while they audibly drive through the image field. In these early video works with deflecting scan lines (as a technical explanation, by adding energy to standardized scanning, brighter areas can be lifted up or, alternatively, bent down), it was possible to make out the "real" objects of the recorded material by their movement. All the same, with *C-Trend*, and with the technology available at this time, Vasulka goes a step further and visualizes a tension between, as he calls it, the "frame-bound" and "frame-unbound image." If the modulation of the electromagnetic energy comes about with scan processors independent of the brightness, the resulting image object appears in three-dimensionality regardless of whether it was generated internally (waveform generator) or externally (camera input).

Altering the signal through the scan processor starts out in *Reminiscence* (USA, 1974, 4:50, b/w; see ill. 128) from another concept. The live material recorded by Vasulka with the portapak camera of his visit to a farm in Moravia (where he spent part of his childhood) is processed in such a way that this meeting with the past seems alienated; however, the image (in contrast to *C-Trend*) does not change its scale, so in this work the aspect of "frame-bound" pictoriality lets a permeable relation to the topography of material reality recorded with the camera be discerned. This approach fits into the Vasulkas' overarching concept, as their interest with video does not lie with the linear passage but rather in involvement and transformation. As a result, the deflections are meant to foster a tension, and they are, therefore, fundamentally incoherent and paradoxical.

For the Vasulkas, the investigation of the medium begins with the performative qualities of machines and control over the manipulative processes. Their experiments deliberately introduce interference and "defaults" in process and repetition to force the scan lines into structures, which are similar to abstract objects in motion and unrecognizable representative forms. For this reason, the human eye cannot set the yardstick of perspectives in video. "We were introduced to the alteration of video images through the basic equipment available. We could manipulate the scan lines by changing the deflection controls of the monitor, use the recorder to freeze frames, advance or backtrack tapes manually, and look into processes within a frame (*Decays, I, II*). We learned forced editing and asynchronous overlays in the first generation half-inch video equipment (CV) and practiced all methods of camera/monitor rescan, the only way for us to capture and preserve the violated state of standard television signal."[115] *Calligrams* (USA, 1970, 12:00, b/w, sound; see ill. 116) present such processes, when the horizontal drift in the rescanned images is deliberately maladjusted, by which the video image repeats vertically. While the horizontal interference of the stretched image sequence can be heard in this work's audio noise, the

camera for the new scanning, which is set up at a 90° angle to the screen, forces the electronic structure into the vertical, by which the frame's instability emerges in the transition to spatiality.

These investigations into video's syntax mark the Vasulkas' structural approach of going on relieving the signal of its "content" until the medium's matrix emerges. Special devices are needed for this, which are then connected to commercial standard devices (video camera, recorder, and monitor). Experiments with programmable building blocks, with which it is already possible in video to exceed linearity in the direction of an object, anticipate the development of a mechanical interface between video and computers. To be able to master the increasing complexity of the test arrays, Woody Vasulka works together with Jeffrey Schier on constructing a machine, which can deal with the image processes digitally. He describes the initial situation for the Digital Image Articulator (1978) as follows: "The system as a whole was unknown to me—I could not conceptualize an image through the system. But in various ways, by examining or violating certain rules of input or output, or by inserting certain unorthodox obstacles to the signal, eventually the signals, the images or sounds, started to display their own inner structure. I also understood, right from the beginning, that the systems I needed were not part of the available hardware."[116] One task for the digital processing machine consists in comparing the definitions in television's raster format with the mode of presenting the pixel structure with regard to the possibilities for compressing and decompressing an image object. A further interest involves positioning, monitoring, and governing of elements in digital space.

Now in the analog realization of *Vocabulary* and then again in analyzing the imagery of *Artifacts* digitally Woody Vasulka engages with artistic creativity in relation to machines. He uses his hand as a shaping element, in order to make visible the difference between manual and machine-generated aesthetics and a new form of cocreativity with computers. Video works display gradual changes in the hand's shape using multiple layering. They employ system feedback to cause the shape to disintegrate in its surface relations and in their transformation into an abstract object. In these modifications of the image, the co-creativity with the machine becomes clear as a decisive criterion of the transition from analog to digital.

Vocabulary (USA, 1973, 4:50, color, sound; see ill. 129) demonstrates (using the multikeyer, scan processor, and dual colorizer) how three-dimensional "objects" can be brought into new spatial relations by processing their pictorial forms while not actually changing their positions. Vasulka's hand is in the foreground of a sphere, but by changing the luminosity values in the keyer[117] and the modulation (and enlargement) of the scan lines in the fields keyed out, the effect arises of the hand and the sphere appearing to lie on the same level like two surfaces, which are no longer reorganizing themselves in space plastically but through their emphasized brightness values. System feedback in the dual colorizer generates new forms for conveying electronic information, which present spatial

structures diverging from the real arrangement of the two "objects." With the luminance key, certain light values are removed and replaced with another texture of electronic snow. By contrast, the scan processor has the job of manipulating the raster; it makes the "image" move forward and, in this case, also functions as a keyer, which changes the image's light and dark components in this process, diverging from the processor's usual function of only modifying brightness values.[118] The reflexions of the brighter areas form radiating patterns running through the whole image field. The texture of the rays in the form of lines and triangles results from the system feedback, which (unlike optical feedback) introduces delay into the form of the texture. The delay effect works to amplify the forms on the same spatial level.

Conceptually, *Vocabulary* presents the conjunction of keying and feedback, as exchanging luminance values makes the incoherent visual "surface" in electronics visible. In the same process, system feedback breaks up the distinct shapes of hand and sphere and changes the two spatial forms into a relationship of surfaces, the size and form of which results from brightness values coinciding across the entire image field. Interference on the object level is intensified by introducing electronic snow, and the process of dissolving the shapes of hand and sphere can be further multiplied, when the entire image field is processed in an extended operation of system feedback. This results in physically impossible relations arising between objects in analog video, which foreshadow from the aesthetic viewpoint the technical realization of "logically incompatible situations" (Couchot) on the digital level.

Extending the image field in *Vocabulary* exceeds the limits of the object displayed and signals an early form of controlling the electronic image, which may well be governable, but also contains components originating in the machines' internal processes. Vasulka investigates this aspect of co-creativity with the Digital Image Articulator in *Artifacts* (USA, 1980, 21:30, color, sound; see ills. 122 and 123), when he makes visible how digital technology constructs and deconstructs the course of electronic image material's functioning.[119] The videotape shows forms of processually restructuring analog into digital pictorialty. The structure of lines and of pixels are shown up as pictorial elements of digital "scanning." The electronics is processed in digital mode: modulating the X/Y signals generates horizontal and vertical stretching, and the gradual retarding and accelerating of image data make morphing effects emerge. With the deconstruction of digital pictoriality, by which the electronic vocabulary can be separated in the digital signal process from its algorithmic "material" basis, *Artifacts* presents a dialogue between analog and digital pictoriality.

The work arises, however, from a dialogue with machines, as Vasulka again uses his hand as a metaphor for creativity to display pictorially the binary processes in the Digital Image Articulator using this "creative element" "layer by layer" and "number by number." As a response to the artist's production process, which has control over its created image by hand, *Artifacts* shows that almost unstructured processes are possible (removing

the signal values and, vice versa, adding layers) when modifying this motif digitally. It follows that the aesthetic process necessarily presents a coproduction with machines: as Vasulka explains in the voice-over to the videotape: "By 'artifacts' I mean that I have to share the creative process with the machine. It is responsible for too many elements of this work. The images come to you as they came to me—in a spirit of exploration."[120]

In a further step, Vasulka guides the viewer to using the tape interactively and accordingly invites them to turn the video recorder on and off several times while opening and closing their eyes to experience interval effects. This instruction obviously does not intend to bridge the difference of video and digital machines as media, but it does underline the specifics of the technological development, which describes the situation of video at the end of the 1970s. On the one hand, differentiating it from film is intended, where the interval actually separates the individual images and connects them. On the other, this process indicates the prerequisite for extending the potential of the electronic vocabulary on another level. By including the Digital Image Articulator, the visual analysis of the electronic vocabulary is transferred step by step into a syntax of binary images. The interest in digitalizing audovisual material is focused on pictoriality in the early experimental phase, because, as Vasulka declares, there lay the greatest challenge.[121] The aesthetic in both works, *Artifacts* and *Vocabulary*, results from a dual process of setting up and control and from the "discovery" of visual phenomena.

Steina Vasulka, who investigates through various processes in her *machine vision*, how video and space can be connected, refers equally critically to the concept of creativity. Her particular approach consists, however, in including the presence of her own body in modulating audio and video signals (as she demonstrates in *Violin Power*) and in transforming the dialogue with the machine into an intermedial connection of body and machine. In the performances and installations of machine vision, she develops models for visualizing virtuality that reach into the research field of immersive environments in virtual reality, albeit with a decisive difference. While virtual environments relate to an interactive encounter with the viewer/user, Vasulka works more subtly and integrates herself completely immersively in the space of the machine setting surrounding her, where she observes and manipulates her own image in this situation live. "All my installation pieces have involved rotating cameras, explorations of space/time. . . . My pieces are an analysis of space, or even a surveillance of space."[122] The spatial relations in these immersive arrangements are a component part of video and not something that is added to video from outside. In the way Vasulka expresses space as an internal category of video, immersion becomes a critical concept for understanding the interactivity between the artist/author/technician and machines.

In a variation of this concept of machine-performance, *Bad* (USA, 1979, 2:00, color; see ill. 104) presents a programmed self-portrait of Steina Vasulka in which the command stored in the buffer of the digital image articulator performs various functions of speed, which become evident as the image breaks up—that is, in the stretching and compressing

and reversing of above/below and left/right. This work also gives an example of inverting sound and image. That is because, differently from the analog modulation of waveforms which produce audio or, alternatively, video noise—the auditive output in the digital rests on using the bits as input: "The tape starts with the register at Zero and adds One at a preprogrammed speed. For sound, the most active bits are selected, translated through a digital/analog converter to voltage controlled oscillators. . . . *Bad* is a play on computer performance. By a simple command: 'add one,' the machine scrambles for its pictorial and tonal expressions, succeeding at random."[123] This early work in complex calculation of imagery, which seems simple by today's standards, here in the digital exemplifies a way of working that understands creativity in exploiting the medium and its instruments up to the limits of what machines can do. In connection with digital machines, spatial expansions finally come about through transfiguration and reversibility, parallel events in the image field and synthesis of images.

One possibility of immersion consists in creating incompatible visual events through digital image processes and reversibility, which alienate the scale and the speed of pictoriality, at the same time expanding its directionality and maneuverability (in the works *Orka* [1997] *Mynd*, and *Bad*). A further possibility lies in multiplying elements of the image field by means of image synthesis, where multiple layering and parallel events indicate the image's omnidirectionality as object (as in *Lilith* [1987]). In *Warp* and *Mynd* (both 2000), incorporating video objects means an interactivity of body with machine and of machine with machine. A third approach, in which Steina Vasulka incorporates herself immersively (*Somersault, Warp*) and the viewer (*Allvision*) into the virtual space, produces the impression of a dent, a depression in the image's space, with which divergence from the basic premise of perspectival continuity in spatial perception is expressed.

In the five sections of *Summer Salt* (1982), a variety of various technologies are used to exhibit the divergence of machine vision from the human eye in applications of optical recording instruments. Marita Sturken writes, "Each section of the videotape builds upon the previous one to create an increasingly multifaceted sense of spatial dimensions. In *Sky High*, the camera is attached to the roof of a moving car with a mirrored lens that creates a 360-degree 'distortion' of the New Mexico sky, curved into a spherical merging of landscape and horizon. *Low Ride* takes the camera to the opposite extreme, with it strapped to the front bumper of the car as it drives through desert bush. . . . In *Somersault*, Steina playfully does gymnastics with her camera and its mirrored lens attachment as a means of producing a 360-degree image of a torso wrapped around the camera lens. . . . *Rest* allows the camera to rest in a hammock, exhausted, in effect, from its physical exertions, as Steina digitally refigures the surrounding trees. Finally, in *Photographic Memory*, seasonal landscapes are interwoven, shifted, and layered in sequences that insist on the tension between the moving and still image."[124] Above all, the section, *Somersault* (USA, 1982, 5:17, color, sound; see ill. 111) produces a paradoxical impression of movement, as, although Vasulka turns the camera (with one exception) on and around her body, her presence as reproduced

distortedly through the mirrored lens seems, by contrast, to express the movement of the image.

In the installation *Machine Vision* (1978), the observation system of the cameras is so altered in comparison with *Orbital Obsessions* that, instead of Vasulka the performer the two-camera installation *Allvision* designates the visual center.[125] On a horizontally turning axis in *Allvision* (USA, 1978; see ill. 103), two cameras are set up opposite to each other to record their own image as camera, instead of the other camera, because the axis of the image between the two cameras is "blocked" by a mirror ball that reflects back the "image" of each camera to each recording instrument. This circular structure differs from comparable self-reflections in the flat mirror, as the convex mirror ball also reflects the surrounding space in the wide but distorted camera angle of a turning movement. By chance integrated visually into this presentation of the same space, as seen doubled (by two cameras) as it is broadcasted onto two monitors in the same space—in front of and behind a camera—are the viewers of the installation: their mirrored presence is broadcast twice in the rotating monitor images. The mixture of image fields in *Machine Vision* becomes still more complex by the monitors superimposing other camera images onto the spatially distorted images of *Allvision*, particularly using the mirrored lens from *Somersault*. In the overall visual impression a dent arises: it bends the spatial coordination, which perception needs for orientating and localizing objects and spatial relations.

Through the interaction of machine images, which are directed at each other immersively and integrate their viewers as further image objects, dislocated perspectives arise that deviate from Cartesian coordinates and abandon particularly the notion of an image surface in the electronic media, which was tied to the concept of the surface image. As Vasulka underlines in her works, not only is pictoriality in video not an image, because electronics go beyond the limits of image field, but it is a matter, above all, of a pictoriality potentially introducing virtual space. *Allvision* exemplarily redefines space so that concepts like inside/outside, left/right, forward/backward, and above/below have no meaning: "The cameras alone scan the whole room. The idea was of course that the whole room can never be perceived or understood by human vision. Inserting the sphere in between emphasized the absurdity. When I mount the camera on the car, I define it as machine vision, but when I use the sphere, it is the concept of allvision."[126]

In the "constantly moving image" of *Lilith* (USA, 1987, 9:12, color, sound; see ill. 105), Vasulka achieves multiperspectivity by means of dislocated spaces and image levels. As she pushes various layers into each other, the incoherently composed portrait of the painter Doris Cross forms into a vibrating image surface. Not being fixed, it reinforces on the audio level the voice processed with a vocoder right up to incomprehensibility.[127] *Lilith* displays a process, not the result of a transfiguration. The constantly altered electronic image field switches in real time between forms of organizing the visual in time and space—comparable to digital articulation. The result denotes an "almost sculptural fusion of human figure and landscape."[128]

Orka (USA, 1997, 15:00, color, sound; see ill. 110) links both techniques—processed pictoriality and image synthesis—in a spatially condensed flow based on the principles of musical composition. *Orka* (videotape and video installation) expresses types of movement, which run counter to physical laws and validate frame-unbound video. The formal orchestration of pictorial events and their interrelations integrate into a visual symphony, which converts musical thinking into images: "Since my art schooling was in music, I do not think of images as stills, but always as motion. My video images primarily hinge upon an undefined sense of time with no earth gravity. It is like a duty to show what cannot be seen except with the eye of media: water flowing uphill or sideways, upsidedown rolling seas or weather-beaten drop of a glacier melt."[129]

In a reverse process to generating immersive images of space through disassociating and synthesizing perspectives, Steina Vasulka works on constructing digital space through compressing and accumulating parallel, logically incompatible events. *Warp* (USA, 2000, 4:44, color; see ills. 113 and 114) compresses and stretches the image segments in a digital, real-time process in the computer, while Vasulka turns around her own axis live in front of the camera. The software Image/ine (1997) used was developed by Tom Demayer and Vasulka and produces two different effects, in which sculptural forms arise from looped movement. "Time Warps" consist of segments rotated in the movement and are complemented by the endless multiplication of the slit-scan process.[130] The digital matrix not being fixed here becomes clear such that the process's visual structure seems frozen and fixed on point. This became possible, because the sculptural image forms do contain time and linearity but do not run their course in the digital. The digital concept of the image presents the possibility for stretching in time, albeit in another dimension (i.e., in space). In this regard, the theoretical concept of digital optionality (i.e., simulation in any direction and multiple dimensions) is transferred into an aesthetic of a perceptual environment.

The videotapes of the installation *Mynd* (USA, 2000, 38:20, color, sound; see ills. 106 and 107) use "Time Warps" and slit scan, where, in contrast to *Warp*, the incoming video signal is "reread" with the software Image/ine line by line from top to bottom or sideways (i.e., processed in real time). The material used (images of Islandic landscape, the Atlantic Ocean, and grazing horses) is identical in both processes, "time warps" and slit scan, resulting in divergent events in the same material bordering each other on various screens in the installation of *Mynd*. The "time warps" make the dividing lines of the original image sequences visible in the image lines running horizontally and vertically through the projected "image." By contrast, freezing the linear information with slit scan displays an image running endlessly yet as a freeze frame, which can be multiplied across the raster of the whole image format.

It seems paradoxical that a freeze frame should present its pictorial quality in a continual flow of running image lines and should seem like an uninterrupted take. The digitally simulated freeze frame actually consists, however, of segmented, discontinuous lines from the electronics. These processes define the new image's content in the digital. Similar to

the scan processor's available options in the 1970s, when the electronic signal was transformed either by manipulating the raster or the lines connecting video and computers, *Mynd* demonstrates how digitally processing video equally changes the line and raster structure. In the video installation *Of the North* (USA, 2001; see ill. 108), these changes in form are related to the format itself, when the entire visual field is bent around a central axis and shaped into a sphere (comparable to the supplanting of electronic information by the raster format in Woody Vasulka's study *No. 25* [USA, 1975]). Transferring the digital video image to the curved form of sphere also corresponds finally to *Allvision's* multiple and seemingly dented image forms. With this, digital optionality also asserts itself in the perceptual environment's reversibility.

Video and Virtual Environment: Lynn Hershman

In her videotapes and interactive videodisc installations, Lynn Hershman engages with questions of identity in mediated environments and includes fictional biographies of her own person into the concept of an *Electronic Diary*. In her long-term videographic observation from 1984 to 1996, she develops a presentation format of personal statement and control, in which she treats the video camera like a mirror of a public, to whom she entrusts staged, "private" (i.e., mixed documentary and fictional) information. Through the demonstrated "arranging" of these banal levels of communicating problems with weight and appearance, illnesses, and so forth as monologues, using the live medium video points to the media's boundary, that is, the dialogue with other active partners in communication as nothing more than simulation. This is particularly so when Hershman introduces herself in the video performances in the third person with her pseudonym Roberta Breitmore and undertakes the production and enactment of this, her other personality, in the style of a fictional documentary film. In the film ostensibly authentic actions and motives are explained (*Lynn to Roberta*) or, when she in *A Commercial for Myself* states her address for autographs, the empty place left by an absent addressee is clearly marked.

By demonstrating this media situation, which, as with television, evokes in the viewer a parasocial interaction yet not a real one, Hershman seeks to draw attention to how television and the electronic surveillance media in general change structures of communication, offer virtual relations to virtual characters (like *Roberta*) and, above all, through interactive programming arranged for participation and through outlining identity, extend themselves into being instruments for governing wishes and needs, which are organized, if not controlled. Hershman goes on to demonstrate how the electronic media surround their users with a pseudo-participatory structure: "Television is a medium that is by its nature fragmentary, incomplete, distanced and unsatisfying, similar to platonic sex. A precondition of video dialogue is that it does not talk back. Rather, it exists as a moving stasis, a one-sided discourse, a trick mirror that absorbs rather than reflects."[131]

Hershman understands the video medium as an instrument of surveillance, which she counters subversively with swapped identities, plural personalities, and dispelling the boundary between the real and the virtual. By contrast, virtual reality displays a technological level, which becomes interesting from the aspect of artificial intelligence and hybridization, because, as she determines, the interactions with the media forms of virtuality are as much tied into the relationship of tension between reality and fiction, as are the viewers' reactions to videographic simulations.

The interview film *Virtual Voice* (USA, 1994, 10:00, color, sound) achieves the transition from video to virtual reality. This is because, whereas theoreticians of the artificial worlds discuss the thesis that only virtual reality, but not television,[132] can create a communications network, Hershman processes the video images of her interview partners in such a way that the impression of a constant recycling of media reality arises by means of delay and feedback, stretching in height and width and compression image fields. In this way, it becomes clear that articulating media visions is also linked to a localizable media presence, which points beyond the medium and its internal, immaterial structures. Emphasizing dialogic interaction as a necessary basis for communication in electronic and virtual media and modifying imagery in this way, Hershman exhibits video as an active entity that forms and comments on information.

Establishing that electronic forms of communication are one-dimensionally organized and, like video and television, do not possess any response function is taken as the point of departure for interventions, which diverge from this premise. For instance, when the woman on the sofa in the video performances *Deep Contact* (video performances, 1984–1989; see ill. 39) invites the user fingering the touch screen to come through the screen to the other side and join her on the sofa.[133] This invitation is reminiscent of Vito Acconci's sexual address to his female audience, although here the focus lies somewhere else. This is because Hershman is primarily interested in shifting the discourse between the public and the private, where she understands the public presence of the video camera in private, intimate situations and also the person-to-person contact on the screen's surface (fingering the touch screen from both sides in *Deep Contact*) as a testing arrangement. Staging a virtual setting, which evokes real reactions, is related to the real setting with virtual reactions.

In this way, *Beautiful People Beautiful Friends* (USA, 1994, 1:15:00, color, sound; see ill. 38) brings the mere presence of a video camera observing from a distance as far as having (apparently) real effects on (possibly) fictitiously staged events. The couple's argument played by two actors in front of a camera is so far transferred into reality that, at the close, custody of the joint child is withdrawn from the woman, because she, as the videotape confirms as a document, became violent toward the man. The work is constructed like a long-term surveillance in reality television. After it is explained at the start that the couple intend to produce a videotape for friends and acquaintances, the presence of the medium

changes reality and it becomes the recording instrument for the facts, in a physical dispute, which comes before a court, where the video material counts as evidence. Here Hershman radicalizes video's surveillance function in private, when the woman complains at the end that her husband has installed cameras everywhere in their house. The critique relates, on one hand, to the permanent media presence destroying the human relationship and, on the other, to video itself as evidence, which—as the complaint runs—the husband has manipulated to his advantage, in order to document his "reality."

By contrast, *Room of One's Own* (USA, video installation, 1990–1993; see ill. 42) consists of a virtual living room made smaller, which the viewer can observe through a keyhole at eye level, but as soon as the real observer has prompted the video projection in the virtual setting, the "inhabitant" is activated by it and reacts aggressively as if to an actual intruder, feeling herself spied and imposed on. The virtual environment, in which an individual viewer can navigate to and fro with a joystick, serves, in one sense, as the voyeuristic view into the living-space of strangers. In another sense, this virtual world reacts differently from in the cinema situation and in television, directly and immediately to interactive sensors and rebuffs the voyeuristic desire. It seems, as if the woman in the video projection could actually react individually to the viewer, although she does not look directly at him or her.[134]

In these arrangements related to television, it is a question of directly and personally animating the individual viewer in front of the screen to interact and, for example, to reverse the "allotted roles" of user and medium in the interactive video installation *Lorna* (USA, 1983–1984). As Hershman writes, "Lorna, a middle-aged, fearful agoraphobic, never leaves her tiny apartment. The premise was that the more she stays home and watches television, the more fearful she becomes, primarily because she absorbs the frightening messages of advertising and news broadcasts."[135] In this work, the viewers are put in the real position of choosing for Lorna a selection from the chapters of the videodisc. They acquire the role of governing and controlling a fictional person, whose perceptual horizon is limited to information inputted by media, which have in this way replaced the dialogic, personal forms of communication. This concentration on passively receptive behavior is meant to provoke ways of reacting, to make the situation clear to the media user that increasingly interactive media systems reduce the gap between system and user but can also remove the difference of reality and fiction. "Lorna's passivity," Hershman continues, "caused by being controlled by the media, is a counterpoint to the direct action of the participants. As the branching path is deconstructed, players become aware of the subtle yet powerful effects of fear caused by the media, and become more empowered, more active."[136]

The formats Hershman chooses to bring video and interactive media closer together at the point where the effects of fiction and simulation coincide, are the performative video interview in private spaces (which shows how Hershman changes in *Roberta Breitmore*), self-

reflexive video portraits (of telephone sex providers in *Virtual Love*), video installation (in which the viewers of *Room of One's Own* and *Deep Contact* are drawn into seemingly intimate virtual environments actually staged by media), and the documentary video film, for example, *Beautiful People—Beautiful Friends*. In the foreground of her work with video is the question about the consequences of electronic surveillance and, further, about the possibilities available to her with existing electronic recording and control systems to construct in aesthetics a reality, which is neither real nor fictional, neither true nor false.

With staged observations of herself and with statements about herself, which are identified as performative acts but offer no information on any content determinable in reality, the works swap playfully between various forms of perceiving reality as presented through media. They are, according to Hershman's understanding, not traceable back to unequivocal attributes, to people, facts, and effects suggesting a reality. Understanding this reality as mediatized, one finds the expression by aspects of it (and plausibility) and of fictionality (and possibility) appearing in differently proportioned combinations. The video performances, *Roberta Breitmore* (USA, 1971–1979; see ills. 40 and 41), accordingly refer to a concept of an overall synthesis of the arts, where the concern is to construct multiple identities for an invented person, *Roberta Breitmore*, who is active in real contexts and is "played" by various actors, not only by Lynn Hershman.[137] *Roberta's* virtual reality is finally reconstructed in documents Hershman used to for confirmation in the video performances, where they are meant to prove how Lynn can turn into *Roberta*. All the same, this "document" is a simulation because there is no difference in what reality it contains: Hershman is as the performer of Hershman just as much a media construct as is Roberta embodied by Hershman.

At the beginning of the video film *Virtual Love* (USA, 1993, 1:20:00, color, sound; see ill. 43), Hershman gives insight into the setting of the simulation for her video works, when she demonstrates with the technicians in the studio, how personal statements can emerge from elements in combination. These reflexions on the technical level of media then lead to a thematic self-reflexion from women asked questions before the video camera. In the interview form, they give information about the difference between their personal reality and the feigned reality as telephone sex providers. In this tape, Hershman connects the form of personal information in the *Electronic Diary* with the dialogic conception of interactivity, as she marks various places, where virtual and real experience can come together. This comprises the technical arrangement of the media setting for *Virtual Love*, interview passages with women playing various roles in telephone sex, men talking about their experiences with telephone sex, and media theorists on this topic and the personal interview in seemingly "private" surroundings. These mixed forms are, however, in turn tied into a model of how reality and fiction interrelate so that what is being played, what is simulated, and what can be authentic must remain open. In the final analysis, the virtual people are also real characters.

Hershman reflects on the status of reality, fiction, and simulation in the media's electronic reality—she embodies the roles of author and performer in her own person—in the form of self-observation and with interviews. She begins with the border areas of reality and fiction and pursues with video a concept of destabilizing person-to-person contact: now she removes the identity figure from the recipients, when she appears in plural roles—and is interviewed, while an interview with her can be seen on the monitor. This makes clear that her existence amounts just as much to a hybrid construction as the impression of reality from television images (*First Person Plural*, USA, 1988–1989). Then again, she contrasts the nonpermeable media boundary of television and video. That is because, in light of the fictional interaction of the male viewer with the image of a woman on the monitor, it makes no difference whether, on the "side" of the medium, one person plays many "women" or many actors vary the same role. Above all, video works like *Roberta Breitmore* or *Virtual Love* purport to give "background information," staged in documentary style, on a person, her feelings and her thoughts, which seem to say more than the public level of the media presence (which Lynn as *Roberta* and the telephone sex providers take on in *Virtual Love* for Hershman's video camera), and they double the levels of reality and fiction. Constructions of videographic interviews are privileged where levels of representation identified as "public" and "private" finally become recognizable as effects of mediatization and where both indicate a possible form of staging. The interview form chosen—partially provided with an off-screen commentary by the author—describes only a further level of mediatized interactions, which cannot be referred back to a reality outside the media. In this structure fashioned circularly from various forms of presence—in front of and behind the camera, personal statements, apparently real as well as fictional ones—video becomes a form of virtual reality. What interests Hershman are the possibilities for interaction with the medium of video, when it is used like an uninvolved live camera or when it, in *Room of One's Own* and *Deep Contact*, enables observing a virtual setting, to which the "people" of the virtual environment react as if it were real.

Video, Poetics, and Hypermedia: Bill Seaman

Bill Seaman works with passages of text on images in a poetic structural context based on recombining elements according to formal, mathematical criteria. Recombining means swapping the elements in complex systems such as language, where new and other "original combinations" from auditive, visual, and textual elements can be generated through chance in programming (for example, in computers). They can deviate from the usual context of comprehension, create new contexts of meaning, and form poetic fields of association and disassociation or lead to absurd combinations. As regards mechanical recombination in computer-based virtual environments, Seaman is interested in new linguistic models. This does not concern the question of intelligent processes in machines, but rather

the use of mechanical combination in interactive forms of communication, where certain reactions in machines are translated by the author or artist into aesthetically shaping a computer-based environment so that users or viewers working with this system can become familiar with its program structure.

A Seaman writes, "My research explores computer-mediated, re-embodied 'intelligence' in the context of new forms of poetic construction and navigation that I call 'Recombinant Poetics'. Artworks which explore Recombinant Poetics are characterized by the interaction of a user with a system of content exploration which carries potential meaning constructed of language, image and sound elements, within an authored technological environment."[138] This means that elements interrelating through media evoke variable meanings in nonhierarchical contexts. What they denote functionally as well as nonfunctionally enriches dynamically and interactively the potential of connections in hypermedia with newly emergent meaning. Seaman pursues the principle of recombination in interactive processes on the production and on the reception side, by which a new definition of creativity is introduced into the open context of communication among "work," "author," and "recipient."

This approach is homologous to Woody Vasulka's concept of cocreativity with machines. If Vasulka investigates image behavior to determine the steps in the monitoring and governance of video and computers, then, with Seaman, the category of "behavior" in machines is crucial for the aesthetic conception of virtual space. With this, Seaman means an "authored space" in which the physical presence of the viewer is thought of as in a continuum of artificial environment and participatory activity. In this setting, the "behavior" of machines changes the whole structure of relations and influences how new, hybrid combinations are understood. In Seaman's terms, "For example, let us say I am interested in the computer listening for puns, and if the computer 'hears' a potential pun then it might build a media environment out of elements that are based on that pun. So here is a very different structuring notion about the potential of media."[139]

In the videotapes and interactive videodisc installations and with works on CD-Rom and with virtual reality technologies, this method proceeds from Seaman's reflections on a conceptual machine. With this, he understands an instrument combining different elements (text, image, music, and voice) mathematically mechanically in a hypermedium. In working with machine combinatorics—which have a conceptual predecessor in the logical and algorithmical combinations of chess and riddle-poems—it is a matter of demonstrating structural connections between the media of video and computers in an open process of organization and interactivity. They denote transitions from image space in video to spatial image in computers (i.e., from fluid pictoriality to hypertext).

What is above all interesting is the possibility for mechanical language games, recombining links between signs, words, and sentences on an algorithmic basis. According to Erkki Huhtamo,

A linear video forms the foundations of *The Exquisite Mechanism of Shivers*, which Seaman divided into 33 sequences (or "movements" corresponding to the accompanying music). Each of these sequences depends on a poetic sentence, which is divided into ten pieces, so that the work's basic raster consists of 330 words or word rows in all. With the help of a graphic menu, the users can choose the words displayed on a list and combine them into sentences. In this way the system receives the task of producing an audiovisual "sentence," where the words chosen overlay the images and are spoken simultaneously by a male voice. The users can press a random key causing the machine to make a chance selection. The resulting combinations of text/image/sound are, in the truest sense of the word, polysemantic, open for various interpretations.[140]

Seaman has been working since the late 1970s and early 1980s with linear videotape and goes on engaging with the electronic medium in installations, which link videodisc with computerized menu-systems. This means that he produces the same work for various media formats, for example, a CD-ROM (1994) with the material of the videotape (1991) of *The Exquisite Mechanism of Shivers* (Australia/USA, 1991, color, sound, 28:00; see ill. 94). Whereas slow motion, video still, and slow camera movements emphasize the discontinuous but fluid process of transformation in a videotape and seem to be connected to independent elements of music and text by chance, the CD-Rom exhibits the act of performing the arbitrary organizing process (applying equally to videotape as to CD-ROM), which is based on alphanumerics and structurally prefigures interactive selection criteria. Seaman understands this recombining of pictorial-linguistic elements through borrowing from Stéphane Mallarmé's image poem *Un coup de dés* as a linguistic challenge to the poetic potential of machine logic.[141] For this reason, the way the individual sets are combined to fix them on the videotape does not follow an associative montage but, ultimately, mechanical command structures. The computer program coordinates the fluid movement of image, sound, and text and creates multimedia interrelations and variations in repetition. In the interactive installation, this hypertextual structure produces the connection between video material and computers; for the videotape, this structure is linearly fixed in one variation. The works in both media formats are reflexively related to the particular specifics of media, insofar as hypertext's function as connector points to an ambivalence in which the boundaries between machine logic and meaningful combinatorics are uses in contrasting audio, video, and text to generate new models of poetic construction.

Video and hypermedium can be combined through the construction principle of recombinant poetics, which characterizes the form and organization of the mediatized elements in both forms of media. This also denotes the structure of *Passage Sets: One Pulls Pivots at the Top of the Tongue* (USA, 1995) as videotape (32:00, color, sound; see ill. 93) and as interactive video installation. In the installation, unlike the videotape's predetermined combinatorics, various videodiscs are connected through modules and individual sections of the linear video material can be played in diverse variations. *Passage Sets* functions as a navigable text for a poem with more than 150 image and text elements spread

over the projection surface and forming the interface. Navigation goes through the visually displayed text and through choosing a particular "passage," which invokes a video sequence and the spoken text with the music allotted to it. Seaman explains, "One could click on the word, which would take you to what I call the 'poem generator': I had literally taken every word from the text and put them into categories. I actually deconstructed the way I wrote the text and then built these categories based on how I wrote the linear text initially, with the idea being that the interactant could shift and generate new poems."[142]

In the virtual reality installation *World Generator/The Engine of Desire* (USA, 1996–1997; see ill. 95), Bill Seaman and his programmer Gideon May encourage the generation of virtual objects from a given menu system and the choice of interacting components—like movement, localization, and the behavior of objects toward each other. On the one side, the viewer/user participating in this interaction becomes increasingly the author and producer of a multidimensional virtual world, through which they navigate, while the visual material with its auditive determinants deploys itself in space and time across a large projection surface. On the other side, the processing of image, sound, and text depends on certain preestablished structural principles, of which some are more strongly defined (like digital video), while others are open-ended or associated loosely through hyperlinks and virtual proximity.

In the works with video and virtual environments, there are, at least, these two sides of creativity, which designate the encounter with machines. This approach is further reinforced in the video installation *Exchange Fields* (USA, 2000; see ill. 92), where the viewers/users interact physically with a computer program that governs selected video sequences projected onto a screen adjacent to the images from a linear videotape. Through the positions taken by one or more observers in contact with sculptures in space, which resemble furniture and are equipped with sensors, the movements of bodies in the audience become the instrument for governing the video sequences with the dancer Regina Van Berkel. Individual parts of the bodies are picked out in chiaroscuro and in them the same parts of the dancer's body, corresponding but in dance form, are activated (i.e., shown in movement), with which the viewer causes these sequences. The work comes together out of a choreography from the human body's different forms of movement, where the interacting participant has to shift from one sculptural object to the next to bring about in video other passages of dance movement through the direct physical contact. These projected movements by the dancer accumulate into transparent layers corresponding to the variety of the impulses various participants loose on the various furniture sculptures. According to Seaman, "This project does not seek universality in its application as an interface strategy but by its strategy of eliciting an 'action in relation' to evoke a universality of experience in interface (input) activity to system (output) activity. The work penetrates through some cultural barriers because it is prelinguistic. It does not rely solely on textual language and symbolic system but leverages kinesthetic knowledge that grounds the interpretations of

the dancer's movements that are observed in the vuser's (viewer/user: pronounced viewser) personal experience."[143]

Seaman coined the concept of the "vuser" to describe a process of interaction with media behaviors, where participants not only generate virtual settings from objects, which have behavioral components, but also where the participants are included immersively into the resulting surroundings because the perspectives, dimensions, and positions of imagery, sound, and music change. As organized through combinatorics in the linear video works and extended in the videodisc installations, the interactive encounter with various elements of media creates constant change in expression and meaning. In this context, the "vuser" shares in the process of recombination and the new meanings arising from it: "For me *The World Generator* empowers one to explore meaning as it is emerging, because one can form a dynamic context by putting a poetic piece of text next to an image and/or sound element, and one can experience how these fields of meaning act upon each other. I can put a sound into the environment and navigate through the environment, and I can also explore different levels of abstraction of the media elements to the very point where they might become completely chaotic."[144] These passages through images, sound/music, and text, which essentially structure Seaman's method in video and in the hypermedium, make clear how it is possible to deal with various media so that individual elements influence each other through combining together and, in fact, through a combining, which reaches beyond the diversity of the media and incorporates the viewer and participant in a netlike arrangement.

Video Installation: Eija-Liisa Ahtila, Chantal Akerman, and Gillian Wearing

A tendency comprising installational video works to engage with the media's current horizon (designated by presentations of multiple realities in computers) and critically illuminate the components of recording, surveillance, and assessment of aspects of reality in electronic media forms as a conceptual link to definitions of the video medium in its early phase. With regard to hybridation of real and virtual elements, which has become technically realizable in virtualization and, above all, includes the linking structure itself, the question of the position of media criticism arises anew. In a simulation, such as appears under the technical conditions of computing, virtual contact zones for paradoxical situations emerge. They designate the translocal site of hybridation, where interrelations in digital simulation occur without clarification of the contexts.

The video installations of Eija-Liisa Ahtila, Chantal Akerman, and Gillian Wearing engage with these questions under the premise of electronic media being in a position to present shifts from contextually determined forms of representation to open forms of presentation because of their structural qualities. These video works apprehend themselves as intervening in forms of media reality, which, like customarily television and public video surveillance, do not include their construction principles in the mode of presentation, but

instead purport to show an "image" of the recorded reality, which can count as a documentation and proof of events.

Ahtila's works are distinguished by her referring the problematic of multiple identities in computers and on the Internet into the electronic simulation of reality. By projecting onto several screens, she seeks to demonstrate how simultaneously incoherent statements on "facts" and "persons" become established. On the three projection surfaces of *If 6 Was 9* (Finland, 1995, 10:00, color, sound; see ill. 8), facets of a narrative unfold dealing with the sexual development of five young women and allowing the subjective descriptions of experiences, wishes, and fantasies to stand alongside each other. In this way, surreal situations emerge, when the women's statements cannot agree with the reports of the adults. The video work does not remove the splintering of the various perceptions of reality at all; on the contrary, subjective realities become consequently more complex, as processes are shown on the level of visual presentations, which display from very little to nothing in common with the auditively narrated "content."

In the spatial installation *Anne, Aki I Déu* (Finland, 1998, 30:00, color, sound; see ill. 6), using two screen projections and five monitors, the case is also *I am many*. The video material consists of interview passages showing women in casting for roles, where the levels of preplaying and playing (these scenes of the casting) cannot be separated. The boundaries between reality, fiction, and simulation are increasingly irrelevant as loosely joined narrative elements progress further, as at the same time on the monitors and the video screens various pieces of information are given about a figure, Aki, that originate in a discussion between her and her therapist but do not relate to each other interactively. No supplementary links as commentary come about through the accumulating information. Ahtila intends to demonstrate with video's open structure a flow of information, which can run on constantly and might not be linked to any plausible linearity and causal logic from events. In this setting, videographic constellations seem to come closer to self-modifying and self-generating computer systems than to the visual-narrative construction of filmic dramatization.

Still more clearly, Ahtila refers the double projection *Consolation Service* (Finland, 199, 24:00, color, sound; see ill. 7) to both the potential for multiple realities in computers and coexisting concepts of reality, which do not follow the same logic. The process of a couple separating is presented as if it accumulated out of itself and is initially split up onto two projectors that have differing dynamics, on the one side narrating events and, on the other, visual metaphors standing outside of time, like breaking through ice, which expresses the end of the relationship and dying under water. In contrasting the presentation in its various segments, a formal progression can, in fact, be discerned (the couple where they live, going across the ice to the restaurant and the end of the relationship), yet the structure of the video projection is arranged cyclically and refers more strongly to communicating metaphors from nature, which break up the continuum of a video film in space and time. When the camera is caught up in slow motion in its own movements under the

surface and, at the same time, the off-screen commentary provides reflections on transience and death, the process of flow in video condenses at a paradoxical point, where change and movement appear simultaneously with inertia.

Whereas with Ahtila logically incompatible situations, arrangements in time and space, and contradictory information on people's identity and history coexist in electronic simulation and complement each other in unstable media realities, Akerman relates the problematic of multiple identities to the political reality of migration. With the video installation, *From the Other Side* (consisting of eighteen monitors and two large-scale projections in three interrelated spaces, Documenta 11, Kassel, 2002), combining audiovisual material from various perspectives, the film and video artist seeks to comprehend the influence of the media's presence on the movements in migration on the border of Mexico with the United States.

She is also concerned with the diverse construction of facts through media: on both sides of the border, Akerman observes and interviews the Mexicans emigrating illegally into the United States, and she relates this, as her subjective "documentation" of this migration for economic reasons, to the surveillance technologies employed by the American military posts on the border, which are supposed to assist in preventing unsanctioned border crossing. With this contrast, she succeeds in describing, on the one hand, people's passage in the style of a film or television documentary, which gets by with improvised camera movements, off-screen commentary by the author and interviews, and shapes individuals' personal circumstances into a portrait with many voices by using these aesthetic methods. In the heterogeneity of the situation it presents of Mexicans—who feel forced to undertake the passage into the United States to secure their own existence and that of their families—this commentary composed of numerous individual perspectives stresses the status of cultural identity under the heading of hybridization and globalization.

Akerman makes the difference clear. That is because, if this media level claims authenticity and publishes aspects of private life in a political context, then, by contrast, using infrared devices as part of state policy treats the observed mobility of persons and groups on the border as data. It is assessed directly and transferred into command structures corresponding to the interests involved, which do not inquire into individuals' motives but registers and "corrects" their border crossing as a mistake in the computer system. Akerman feeds the video monitors arrayed in groups with video material relating the general leaving circumstances in Mexico to differences in the intercultural problematic. How this life experience recorded live is actual and heterogeneous is contrasted to the media's machinery of public control and selection, in whose schema communication and dialogue have been replaced by a structure resembling commutation between similar machines, even if it does involve human agency. This inhumanity in the surveillance system, which reacts mechanically to people's movements, links Akerman's installation into a critical before and after: because she not only initially shows the immigrants/refugees living before the border but also communicates, after the visitor has cleared the monitors with the bor-

der patrols, the report of a Mexican woman, from a neighboring space and recorded on the soundtrack of a live video connection to the Los Angeles Freeway, about going across. With these fluid, videographic processes, demonstrating spatial correctives to the state's use of surveillance technology, video appears as a medium enabling a difference in time to be brought into exhibition in space, which lends form to the simultaneity of contradictory media realities. A critique of the homogenizing tendency of hybridization finds expression through video in this concept of pluralization.

Wearing transfers the tension, which is inherent in video surveillance through an agency determined from outside and focusing in on an inner space, onto scenes played out in front of the video camera and addressed to an outside. The point of departure is video recordings staged as documentaries, which are arranged like personal statements or interviews, when, in *2 into 1* (UK, 1997, 4:30, color, sound; see ills. 134 and 135), a mother and her two sons criticize each other unsparingly in separate scenes. The presence of a video camera, which is not personified but stands for an undefined media audience (for example, that of television), brings out, in the permanence of the recording process, statements from the sons and the mother that they would probably never utter when talking to each other. The point of the video work consists, however, in Wearing swapping the soundtracks: the mother "speaks," then the sons' text about her, while the sons are simultaneously criticized in their behavior in front of the camera by the text spoken by the mother. In both sections, this simulation (pretense) of sound functions as self-reflexive reinforcement of the imagery, although both media levels are related to each other diametrically.

The emerging difference hones the awareness of the construction of audio and video, which is happening in private, yet, as Wearing can show, is directed to a media audience, for which the address to the camera does duty: "That strikes home a bit uneasily—the criticism of the children, and also the male-female thing, where the boys are being critical about her looks. It's very hard-hitting and quite painful, I think, in the way children view adults and the family. It's not just about children and parenting. The piece is about familiarity, closeness, breeding and contempt."[145] Consequently, in her video works Wearing radicalizes the permeability of "private" and "public" in family contexts: by using media realities (like television and video cameras), ruptures appear, which shift the private into the public.

This ambivalence reaches a high point with the video projection *I Love You* (UK, 1999, 60:00, color, sound; see ill. 131), in which a woman, for no discernable reason, gets into an existentially dramatic scene with a man, and loses control over herself and the situation physically and psychically. The work also implies that media presence governs the forms of self-presentation and causes an overload leading to a crisis. Using the live medium of video is, in this context, just what does not lead to live recording and reproducing. Wearing shows rather, how the reaction to an inescapable media presence is an overdetermined behavior, which can drive the life of the individual/the observed into borderline-situations

(something that corresponds to McLuhan's concept of the senses' self-amputation by dint of overstimulation).

This concept is based on a way of working with actors in scenes, which are meant to convey the most intimate situations possible and can, therefore, appear documentary in their directness and violence. In the video projection *Sacha and Mum* (UK, 1996, 4:00, b/w, sound; see ills. 132 and 133), the brutality of a power struggle fought out physically between mother and daughter is underlined through mediatization such that the tape also runs backward. As Wearing explains, "Yes, it's totally contrived from the beginning to end, it was heavily story-boarded. The volume is turned up far more to start off with. That aggression is something that people would never normally reveal to me. The woman pulls the girl's hair five or six times on many shots, so all in all she must have pulled her hair about thirty-odd times. It had to be far more aesthetically aggressive because the camera had to record it all in one go."[146] By hypostasizing elements of reality television and performing how the presence of cameras can exacerbate extreme situations, a critique of the media emerges, which takes the hybrid status of the omnipresent mediatization, through permanent observations with webcams and camera-phones, as a trigger for self-presentations, where "life" is transformed increasingly strongly into "live" for the medium.

Outlook: Complexity and Interactivity

Shifting localizable, material levels of presentation in the media (as in photography and film) and the writing of signals in transformative processes (as in video) across to translocal—that is, simulated, calculated forms of expression in time and space and on the level of hybridation—has repercussions on dealings with electronic sound-image combinations. It seems that video, just because it technically belongs, on one side, to the linear recording media and, on the other, maintains structural relations with the computer media as regards its processual nature is particularly appropriate for reflecting on what it means, when an aesthetic takes up simulation: an aesthetic of the media, that is, which does not perform (as in video) a variation on a schema any more but substitutes for that the endless, numerically identical repetition of sameness.

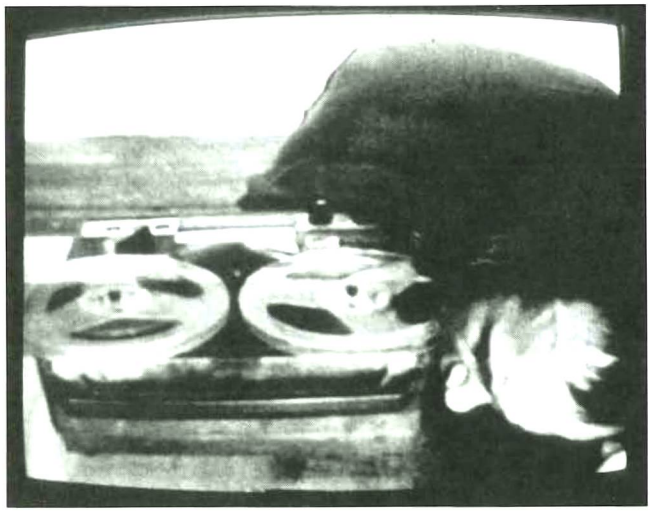
In interactive media forms, syntheses of dynamic pictoriality, music and audio elements, and machine performances are possible. Using feedback and closed circuit arrays, David Stout takes up the early videographic concept of noise on the level of digital manipulation of raw material in computers for his interactive video-noise performances. "My recent work in interactive installation and chaotic video performance shares a common origin in the use of video noise as the primary visual element. A simple definition of video noise is 'a random grouping of black and white pixels changing position every 25–30 times a second.' I have subjected this *visual noisefield* to a range of digital image processes to produce an array of images and sounds. One process common to all works shown here is the use of feedback. Those familiar with this technique will remember the early video experiments of the late '60s and early '70s, which produced a rich body of recursive visual phenomena that has been subsequently dismissed for its cheap hallucinatory allusions, nonetheless, feedback circuits have proven an important means of illustrating the dynamic principles of theoretical chaos and suggest the potential power of artificially intelligent sound-image engines."[1]

Comparable to the audiovisual transformations in video, the feedback processes in computers in Stout's works reach back to generating sound directly from the visual synthesis so that the signal processes manipulated with the Image/ine[2] software in computers produce feedback loops of interacting sound and imagery. According to David Stout, "This sound and any sound emitted from the 'viewer' in the immediate environment can be directed back into the system to effect various mutations of visual form, color, scale and movement. Consequently, the individual works are unpredictable and capable of affecting the visual and sonic behavior of each other, producing an ambient or environmental effect which transforms the viewer into a participant and the singular composition into a networked system. As these works grow in size they will more importantly grow in behavioral complexity."[3]

In the interactive video installation *Noisefield* (USA, 2003; see ill. 99) the raw material is activated auditively through a touch field and erects itself in graphic patterns, which are, in turn, transformed auditively. With Image/ine software, a line analysis is then carried out to use certain output volumes as input again. In the more complex video noise performance, *Signalfire* (USA, 2003, 60:00; see ill. 100), engaging with the black and white pixel ensues in audio and video loops, which cause variations of white noise with two networked computers in cascade switching. In these works, the way the system works depends on the intensity of audio input (through a microphone). This working principle—video noise as input, variation of graphic patterns through feedback, and digitally modulated waveforms—denotes the black and white aesthetic of graphic-abstract visualizations characterized by changes in scale and in speed and simulation or, alternatively, multiplication of the pattern. In this way, endless spatial formations arise in *Transit* (USA, 2003, 5:00, b/w, sound; see ill. 101) and simulations of horizontal and vertical movements in the image field of *Ziggurat* (USA, 2003, 13:45, b/w, sound; see ill. 102), which express abstraction in video through higher mathematical complexity and through programming, realize the musicalization existing in video.

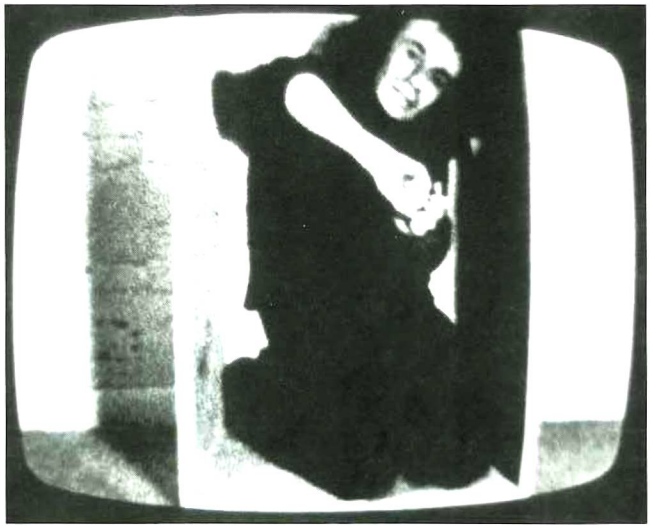
These live performances of interactive software processes broaden the vocabulary of the electronic media in terms of complexity and behavior, above all by using system feedback to evoke chaotic structures that are, nevertheless, linked back into control systems. The co-creativity with machines is extended by the manipulated recursion loops being able to run through various programming steps. Interactivity in video-computer-noise performance is, because of the audiovisual structure of the electronics determining the behavior of the elements in the computing process, a fundamentally chaotic creative method. In the digital system feedback, this machine performance reinforces video's reflexive character.

Illustrations



1 Vito Acconci, *Face-Off*, USA, 1973, 32:57, b/w, sound.

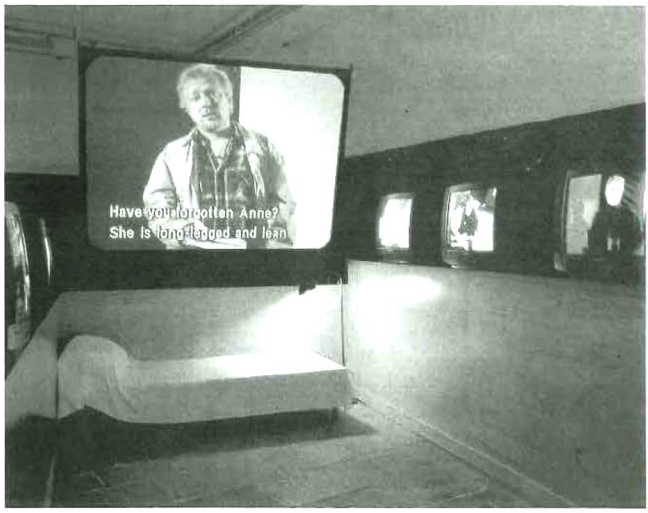
2 Vito Acconci, *Pryings*, USA, 1971, 17:10, b/w, sound.



3 Vito Acconci, *Remote Control*, USA, 1971, 62:30, b/w, sound, two-channel video installation.

4 Vito Acconci, *Theme Song*, USA, 1973, 33:15, b/w, sound.

5 Vito Acconci, *Undertone*, USA, 1973, 34:12, b/w, sound.



6 Eija-Liisa Ahtila, *Anne, Aki I Déu*, Finland, 1998, 30:00, color, sound, video installation.

7 Eija-Liisa Ahtila, *Consolation Service*, Finland, 1999, 24:00, color, sound, video projection.

8 Eija-Liisa Ahtila, *If 6 was 9*, Finland, 1995, 10:00, color, sound, video projection.

9 Dara Birnbaum, *Damnation of Faust: Will-O'-The-Wisp*, USA, 1985, 5:46, color, sound.

10 Dara Birnbaum, *Pop-Pop Video: General Hospital/Olympic Women Speed Skating*, USA, 1980, 6:00, color, sound.

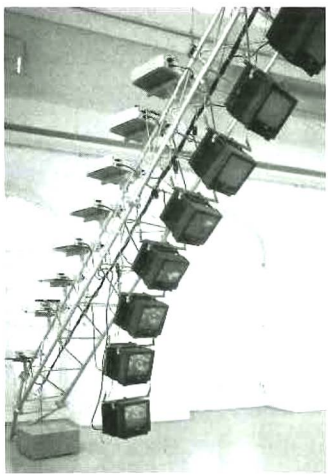
11 Dara Birnbaum, *Pop-Pop Video: General Hospital/Olympic Women Speed Skating*, USA, 1980, 6:00, color, sound.

12 Dara Birnbaum, *Rio Videowall*, USA, 1989, Rio Shopping/Entertainment Complex, Atlanta, Georgia, video wall installation.

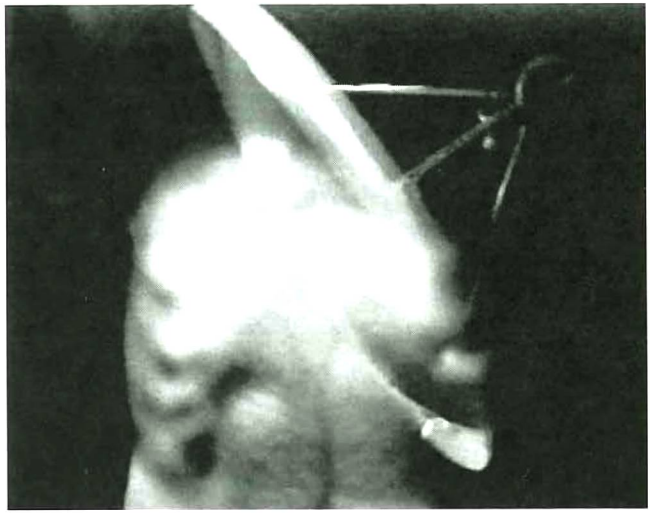
13 Dara Birnbaum, *Rio Videowall*, USA, 1989, Rio Shopping/Entertainment Complex, Atlanta, Georgia, video wall installation.

14 Dara Birnbaum, *Technology/Transformation: Wonder Woman*, USA, 1978, 7:00, color, sound.

15 Dara Birnbaum, *Technology/Transformation: Wonder Woman*, USA, 1978, 7:00, color, sourd.

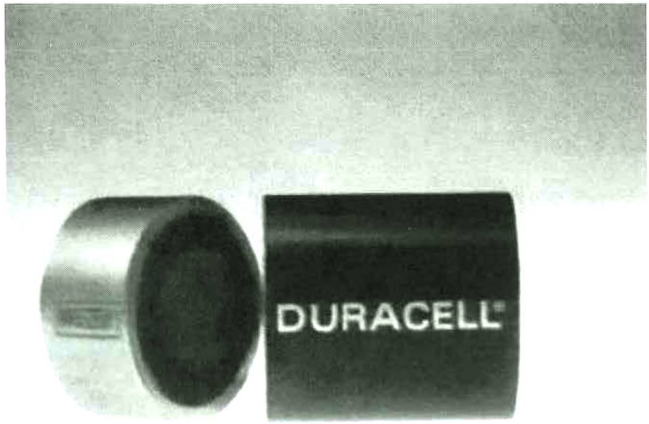


16 Dara Birnbaum, *Transmission Tower/Sentinel*, USA, 1992, documenta 9, Kassel, installation.

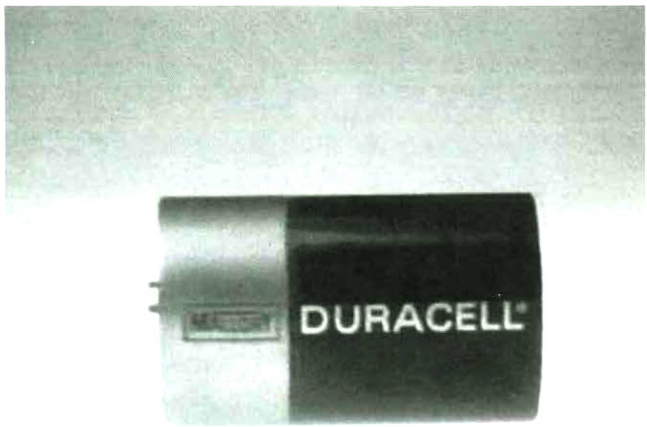


17 Klaus vom Bruch, *Azimut*, Germany, 1985, 6:36, color, sound.

18 Klaus vom Bruch, *Duracellband*, Germany, 1980, 10:00, color, sound.



19 Klaus vom Bruch, *Duracellband*, Germany, 1980, 10:00, color, sound.



20 Klaus vom Bruch, *Duracellband*, Germany, 1980, 10:00, color, sound.

21 Klaus vom Bruch, *Softyband*, Germany, 1980, 19:00, color, sound.

22 Klaus vom Bruch, *Softyband*, Germany, 1980, 19:00, color, sound.

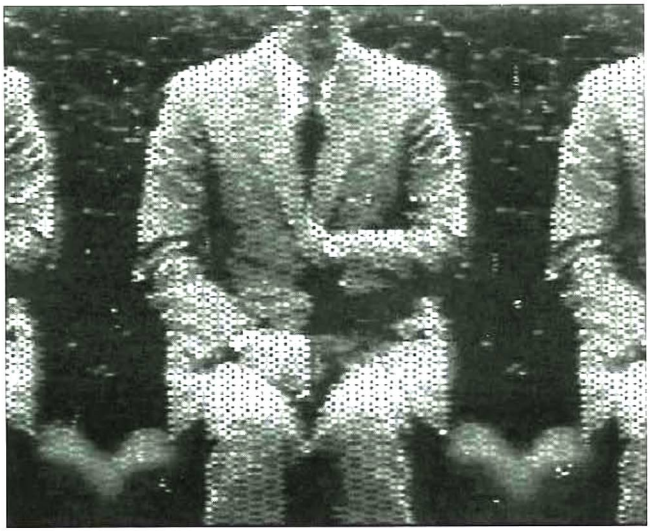
23 Klaus vom Bruch, *Softyband*, Germany, 1980, 19:00, color, sound.

24 Robert Cahen, *Hong Kong Song*, France, 1989, 21:00, color, sound.

25 Robert Cahen, *L'invitation au voyage*, France, 1973, 9:00, color, sound.

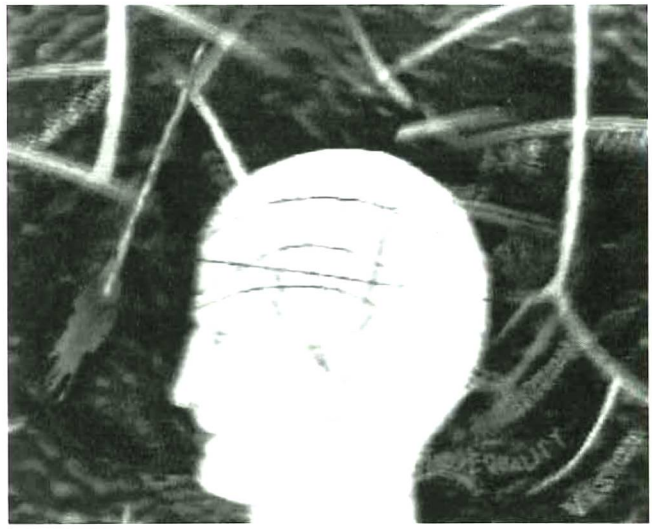
26 Robert Cahen, *Juste le temps*, France, 1983, 13:00, color, sound.

27 Robert Cahen, *Juste le temps*, France, 1983, 13:00, color, sound.



28 Peter Callas, *Double Trouble*, Japan/Australia, 1986, 5:45, color, sound.

29 Peter Callas, *Kinema No Yoru/Film Night*, Japan/Australia, 1986, 2:30, color, sound.



30 Peter Callas, *Neo-Geo: An American Purchase*, USA/Australia, 1990, 9:17, color, sound.

31 Peter Campus, *Double Vision*, USA, 1971, 14:45, b/w.

32 Peter Campus, *Three Transitions*, USA, 1973, 4:53, color, sound.

33 Peter Campus, *Three Transitions*, USA, 1973, 4:53, color, sound.

34 Peter Campus, *Three Transitions*, USA, 1973, 4:53, color, sound.

35 Valie Export, *Asemie*, Austria, 1973, 9:00, b/w, scund.

36 Valie Export, *Split Reality*, Austria, 1970, 3:00, b/w. sound.

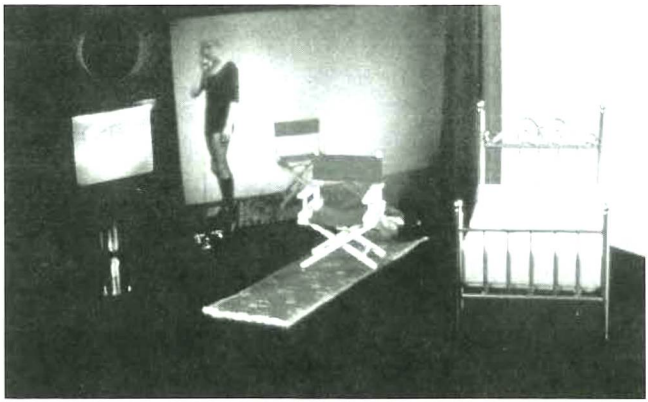
37 Jean-François Guiton, *Handle with Care*, Germany, 1984, 11:00, color, sound.

38 Lynn Hershman, *Beautiful People—Beautiful Friends*, USA, 1994, 1:15:00, color, sound.

39 Lynn Hershman, *Deep Contact*, USA, video performances, 1984–1989.

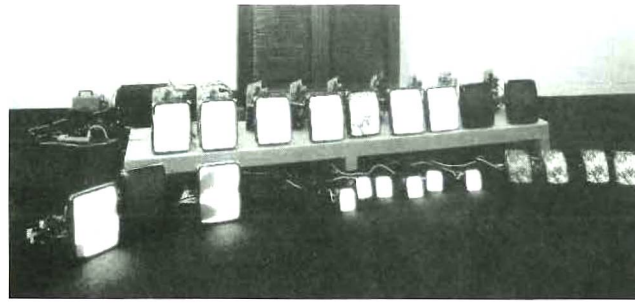
40 Lynn Hershman, *Roberta Breitmore*, USA, video performances, 1971–1979.

41 Lynn Hershman, *Roberta Breitmore*, USA, video performances, 1971–1979.



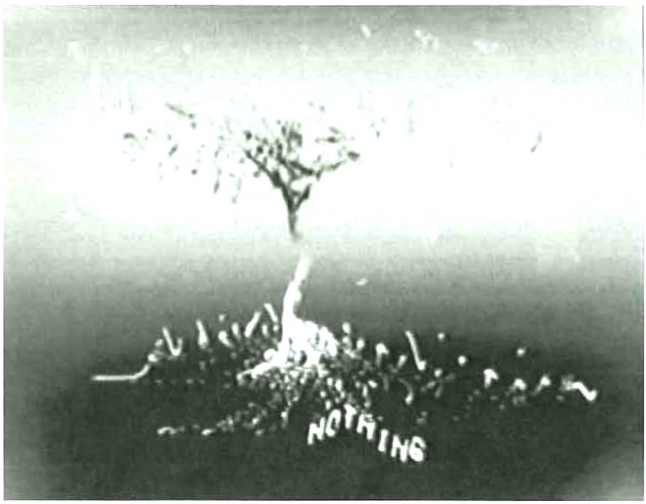
42 Lynn Hershman, *Room of One's Own*, USA, video installation, 1990–1993.

43 Lynn Hershman, *Virtual Love*, USA, 1993, 1:20:00, color, sound.

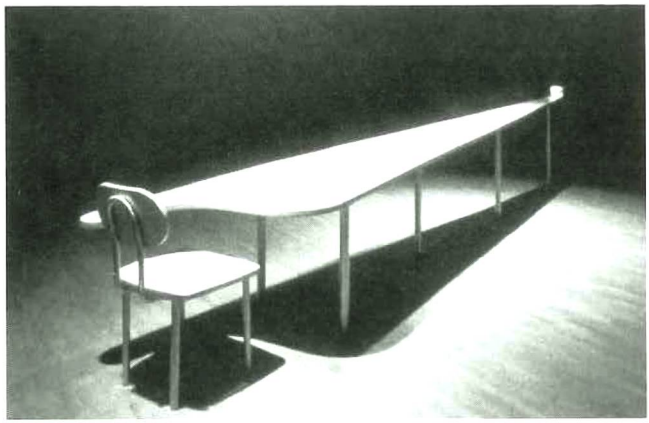


44 Gary Hill, *Between Cinema and a Hard Place*, USA, 1991, v deo installation.

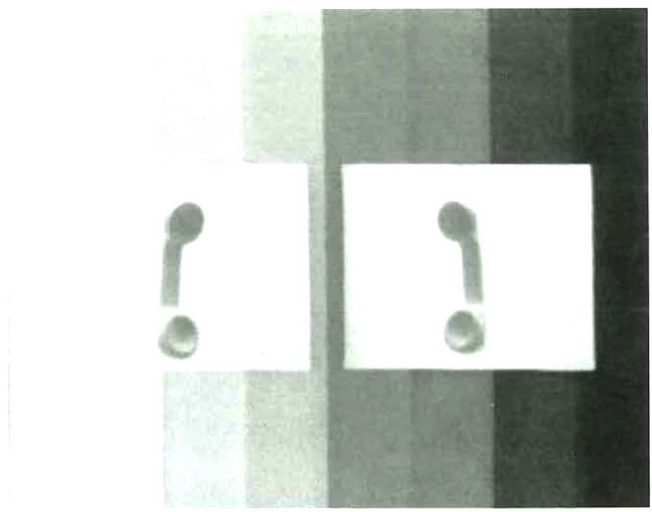
45 Gary Hill, *Electronic Linguistics*, USA, 1978, 3:45, b/w, sound.



46 Gary Hill, *Happenstance*, USA, 1982–1983, 6:30, b/w, sound.

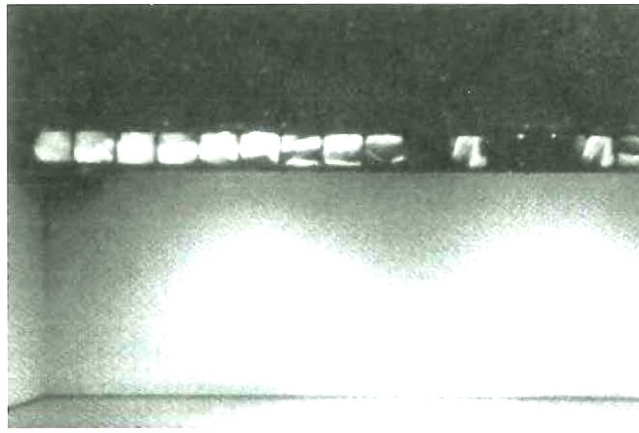


47 Gary Hill, *Learning Curve*, USA, 1993, video installation.



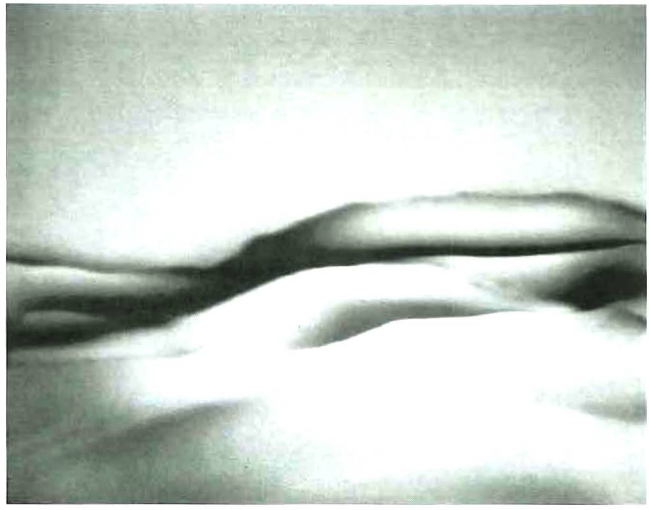
48 Gary Hill, *Primarily Speaking*, USA, 1981–1983, 18:40, color, sound.

49 Gary Hill, *Remarks on Color*, USA, 1994, video projection.



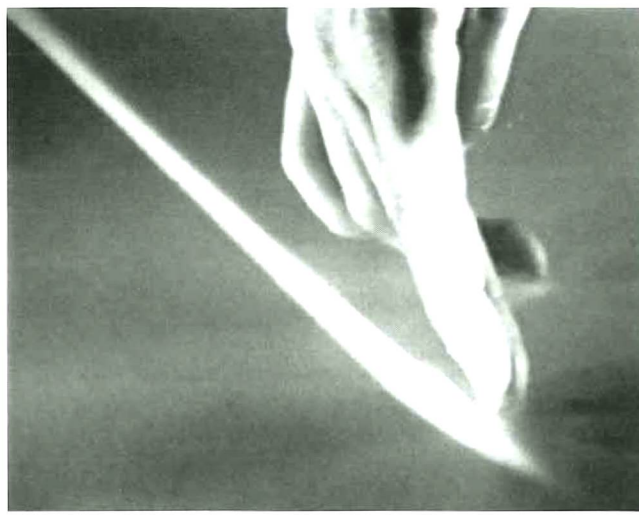
50 Gary Hill, *Suspension of Disbelief (for Marine)*, USA, 1991–1992, video installation.

51 Gary Hill, *Why do Things Get in a Muddle?*, USA, 1984, 32:00, color, sound.



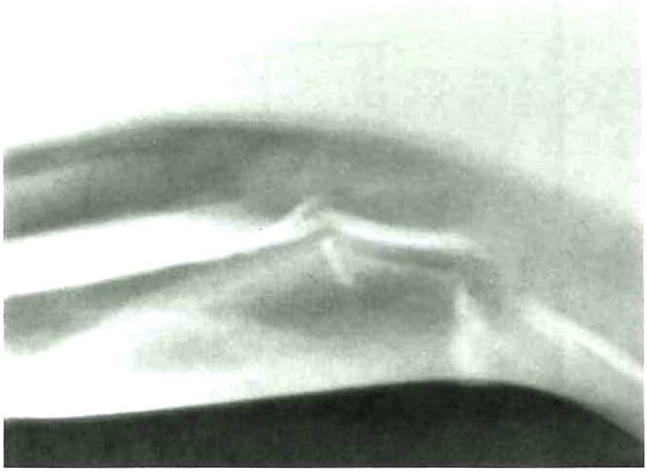
52 Nan Hoover, *Desert*, the Netherlands, 1985, 12:43, color.

53 Nan Hoover, *Halfsleep*, the Netherlands, 1984, 16:43, color, sound.

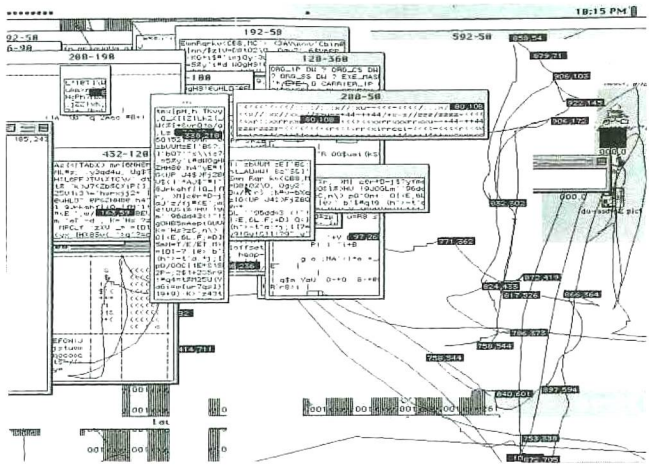


54 Nan Hoover, *Impressions*, the Netherlands, 1978, 10:00, color, sound.

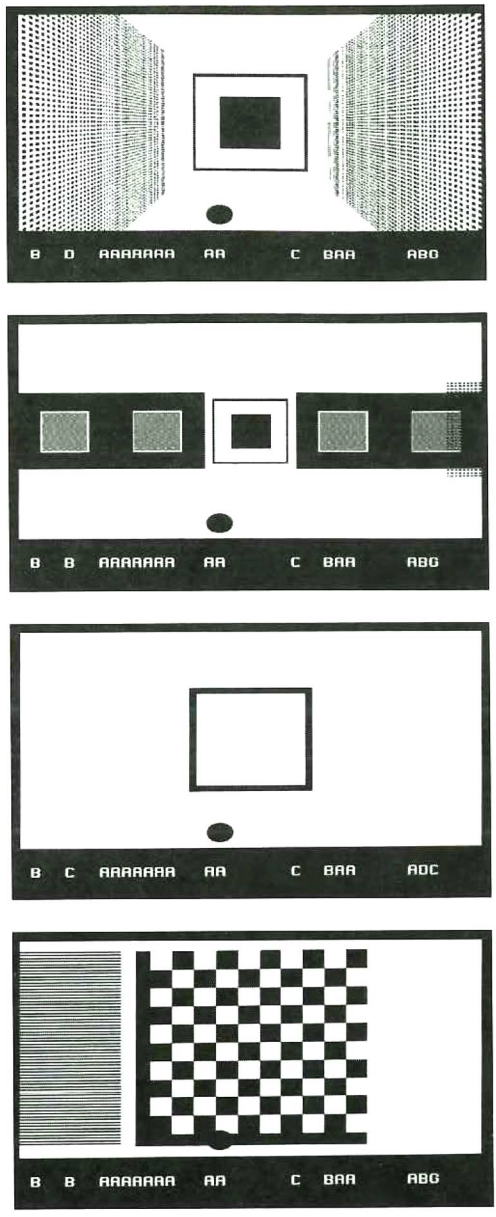
55 Nan Hoover, *Movement in Light*, the Netherlands, 1977, 3:00, b/w, sound.



56 Nan Hoover, *Returning to Fuji*, the Netherlands, 1984, 8:00, color, sound.



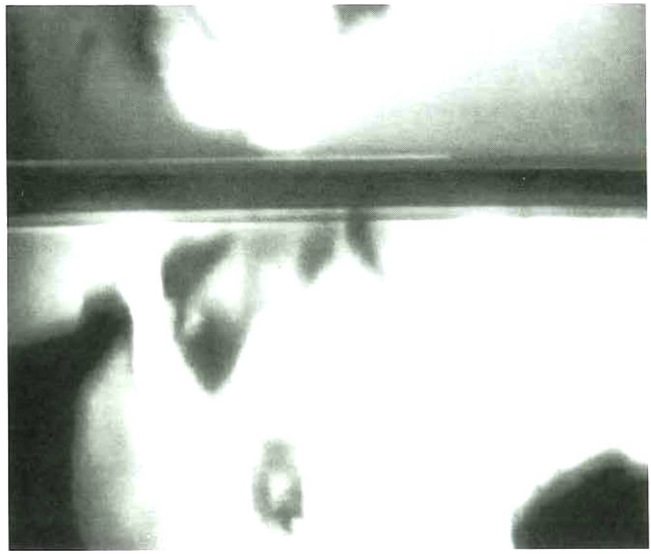
57 Jodi, *OSS/. . . .*, 1998, Spain, http://www.jodi.org.



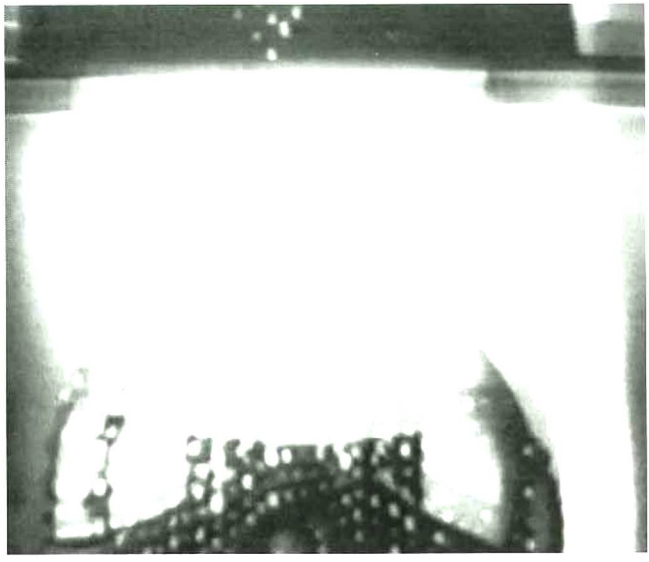
58 Jodi, *SOD*, 1999, Spain, http://www.jodi.org.

59 Joan Jonas, *Glass Puzzle*, USA, 1973, 17:27, b/w, sound.

60 Joan Jonas, *Glass Puzzle*, USA, 1973, 17:27, b/w, sound.

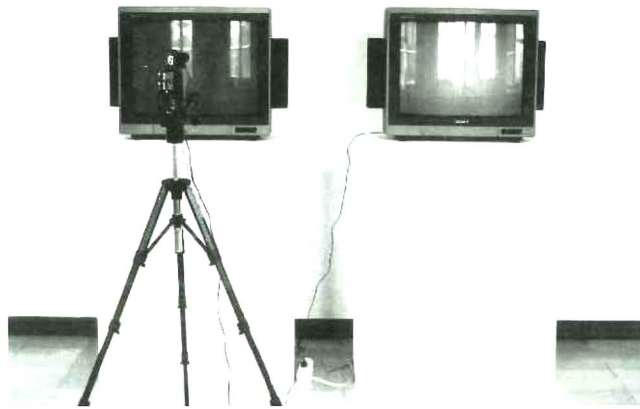


61 Joan Jonas, *Vertical Roll*, USA, 1972, 20:00, b/w, sound.



62 Joan Jonas, *Vertical Roll*, USA, 1972, 20:00, b/w, sound.

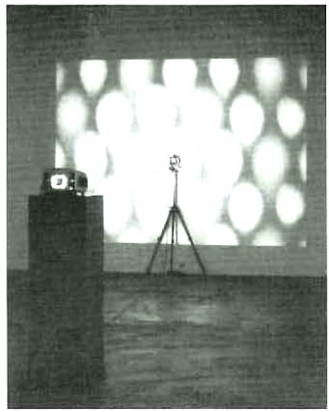
63 Joan Jonas, *Vertical Roll*, USA, 1972, performance view.



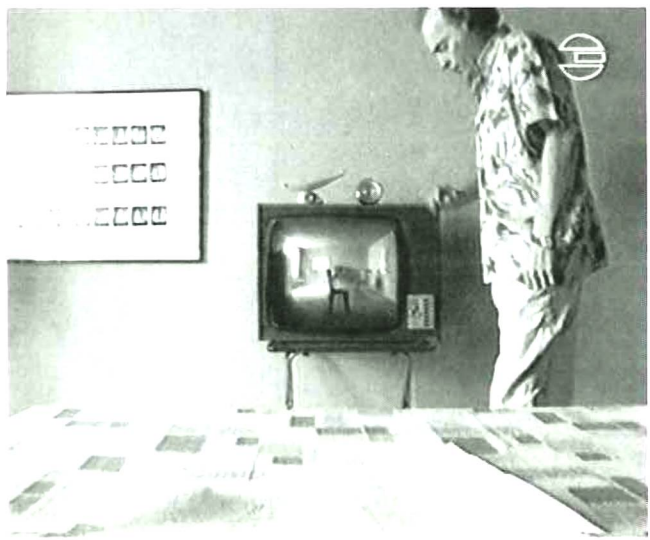
64 Dieter Kiessling, *Eingeschalteter/ausgeschalteter Fernseher*, Germany, 1988, video installation.

65 Dieter Kiessling, *Pendelnder Fernseher,* Germany, 1983, video installation.

66 Dieter Kiessling, *Two Cameras,* Germany, 1998, video installation.

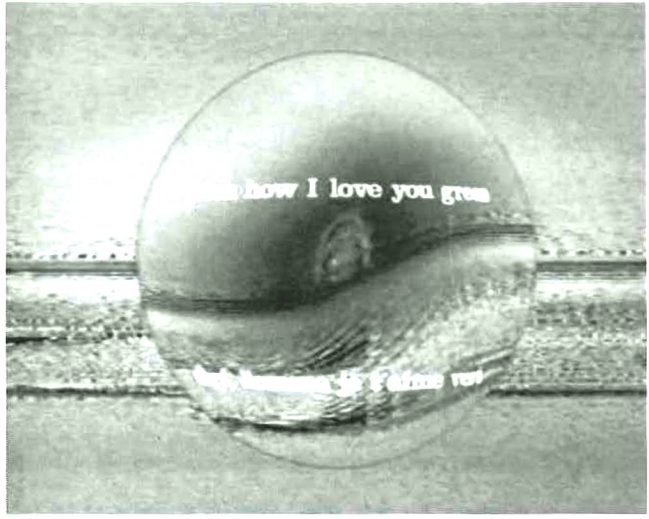


67 Dieter Kiessling, (untitled), Germany, 1993, video installation.

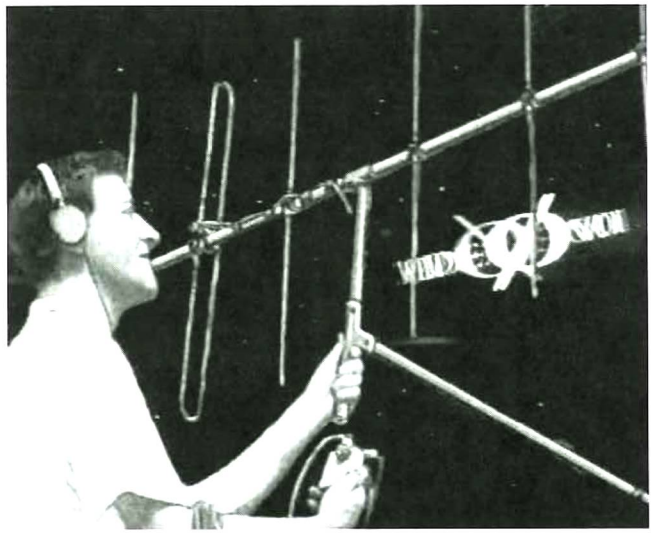


68 Michael Langoth, *Retracer*, Austria, 1991, 3:45, color, sound.

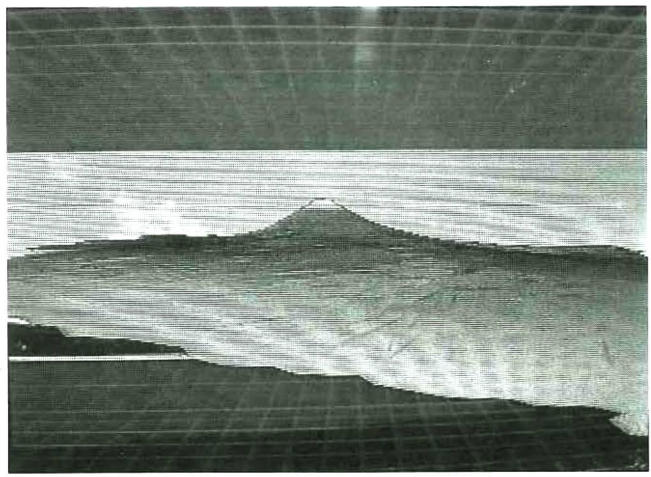
69 David Larcher, *Granny's Is*, UK, 1989, 1:18:36, color, sound.



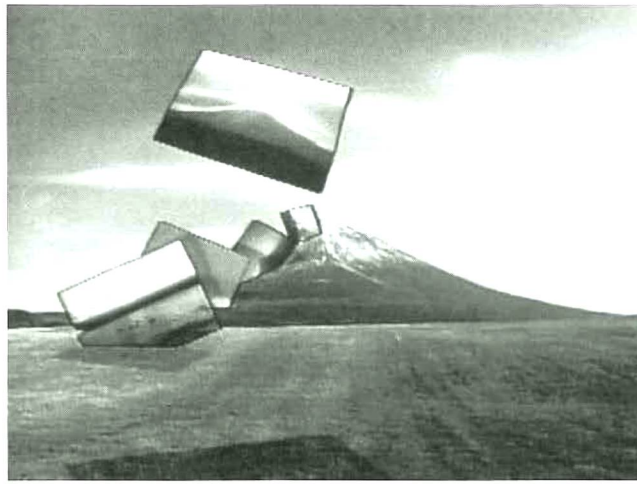
70 David Larcher, *Video Void, Text*, France/UK, 1997, 28:40, color, sound.



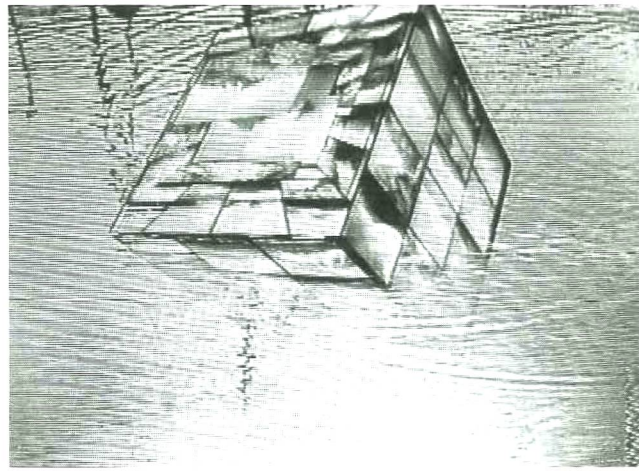
71 David Larcher, *Video Void, The Trailer*, France/UK, 1997, 32:34, color, sound.



72 Ko Nakajima, *Mt. Fuji*, Japan, 1986, 20:00, color, sound.



73 Ko Nakajima, *Mt. Fuji*, Japan, 1986, 20:00, color, sound.

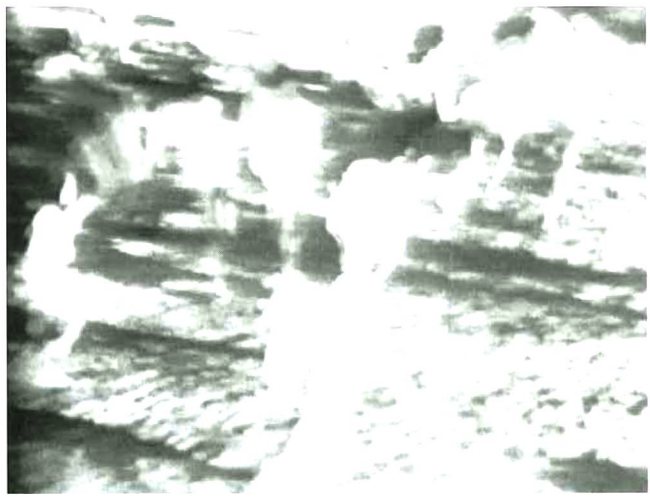


74 Ko Nakajima, *Mt. Fuji*, Japan, 1986, 20:00, color, sound.

75 Dennis Oppenheim, *Airpressure* (face), USA, 1971, 15:00, b/w, sound.

76 Dennis Oppenheim, *Airpressure* (hand), USA, 1971, 9:00, b/w, sound.

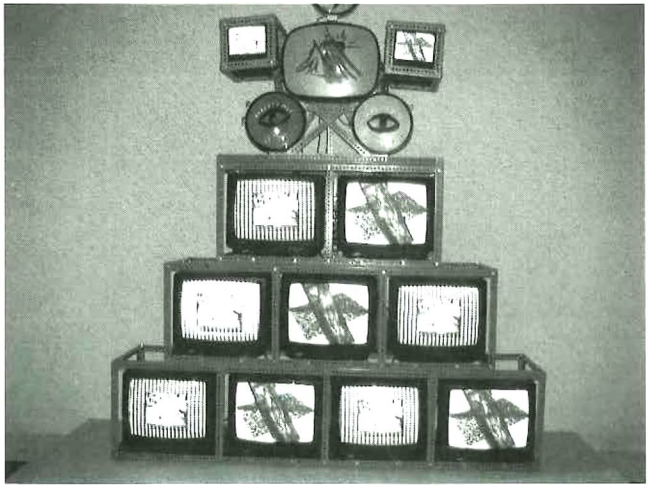
77 Dennis Oppenheim, *Feed-Back*, USA, 1971, 12:00, b/w, sound.



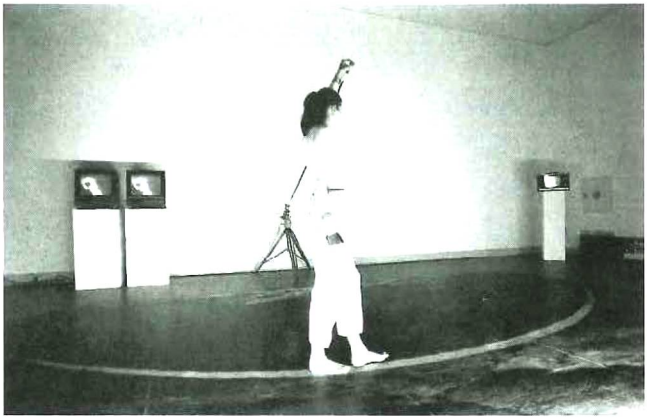
78 Raphael Montañez Ortiz, *Beach Umbrella*, USA, 1985–1986, 7:30, color, sound.

79 Raphael Montañez Ortiz, *The Conversation*, USA, 1996, 12:00, b/w and color, sound.

80 Raphael Montañez Ortiz, *Dance No. 22*, USA, 1993, 7:19, b/w, sound.



81 Nam June Paik, image of the Paik video sculpture *Four Decade* with the two channels of Jud Yalkut's edited video, covering examples from their forty years of collaboration, Dayton Art Institute.



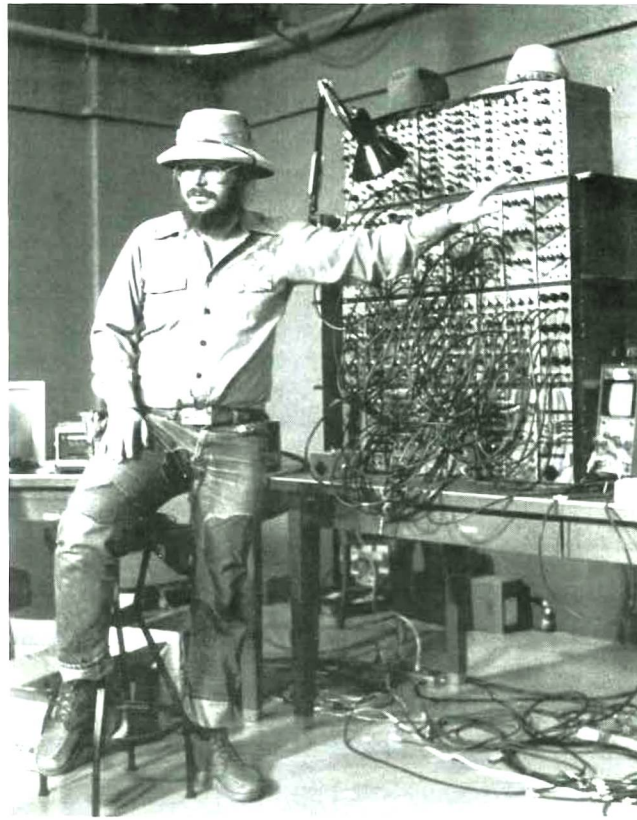
82 Ulrike Rosenbach, *Die einsame Spaziergängerin*, Germany, 1977, video live performance, Museum Folkwang, Essen.

83 Ulrike Rosenbach, *Glauben Sie nicht, daß ich eine Amazone bin*, Germany, 1975, 15:00, b/w, sound.

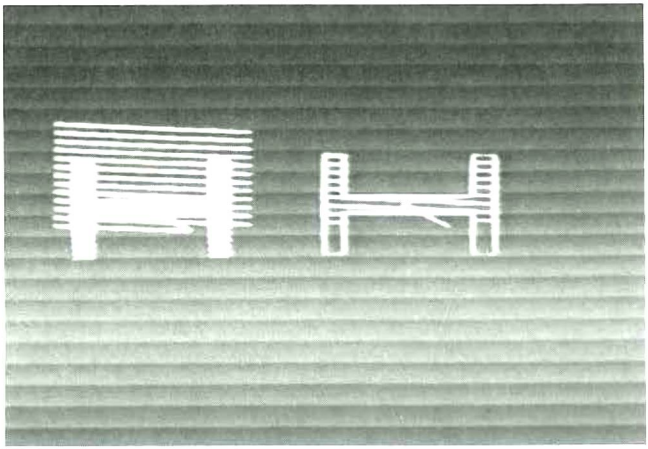
84 Ulrike Rosenbach, *Glauben Sie nicht, daß ich eine Amazone bin*, Germany, 1975, 15:00, b/w, sound.

85 Ulrike Rosenbach, *Reflexionen über die Geburt der Venus*, Germany, 1976, 15:00, color, sound.

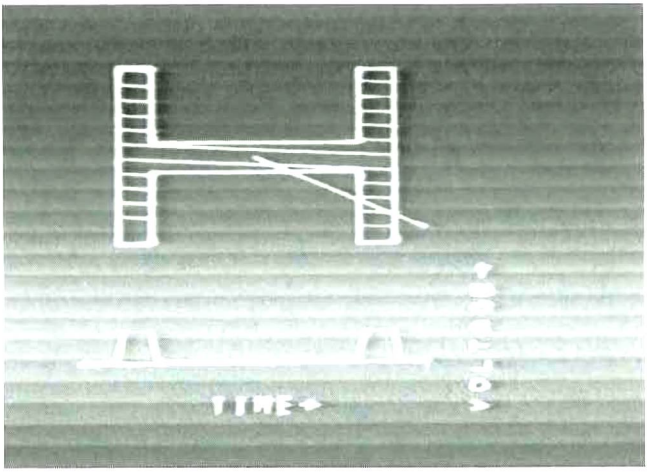
86 Ulrike Rosenbach, *Reflexionen über die Geburt der Venus*, Germany, 1976, 15:00, color, sound.



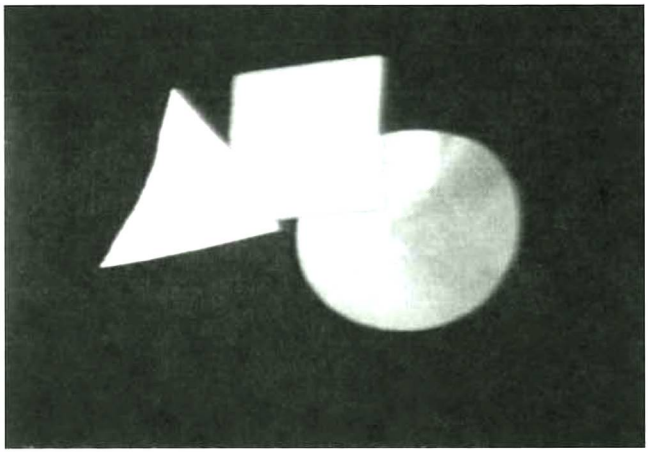
87 Dan Sandin, *Analog Image Processor*, USA, 1972.



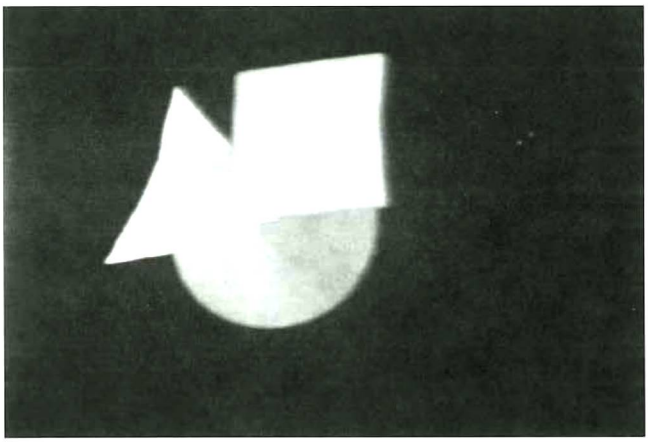
88 Dan Sandin, *How TV Works*, USA, 1977, 30:00 color, sound.



89 Dan Sandin, *How TV Works*, USA, 1977, 30:00 color, sound.



90 Dan Sandin, *Triangle in Front of Square in Front of Circle in Front of Triangle*, USA, 1973, 3:00, b/w, sound.

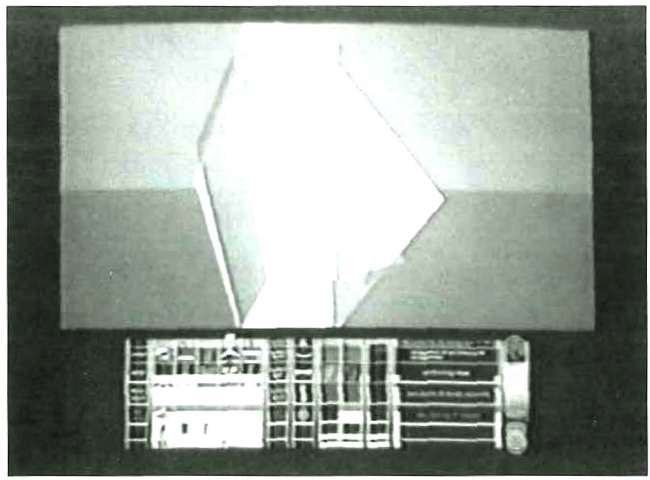


91 Dan Sandin, *Triangle in Front of Square in Front of Circle in Front of Triangle*, USA, 1973, 3:00, b/w, sound.

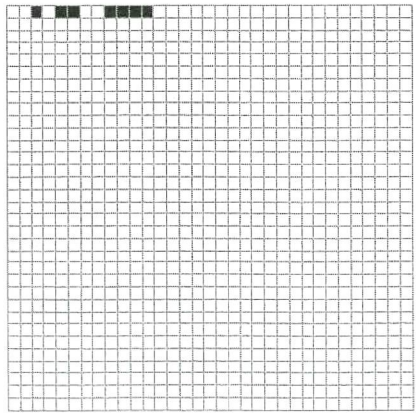
92 Bill Seaman, *Exchange Fields*, USA, 2000, video installation.

93 Bill Seaman, *Passage Sets. One Pulls Pivots at the Top of the Tongue*, USA, 1995, 32:00, color, sound.

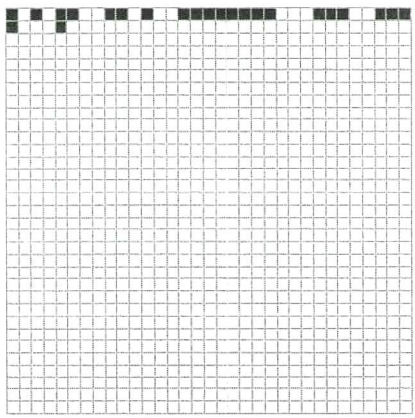
94 Bill Seaman, *The Exquisite Mechanism of Shivers*, Australia/USA, 1991, 28:00, color, sound.



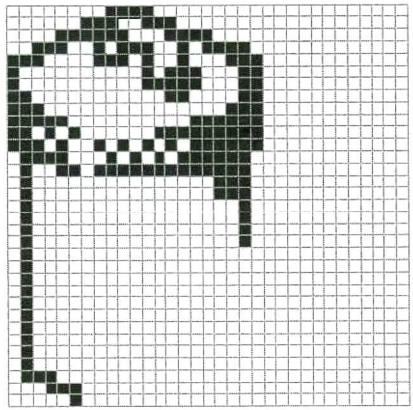
95 Bill Seaman, *World Generator/The Engine of Desire*, Virtual Reality installation, USA, 1996–1997.



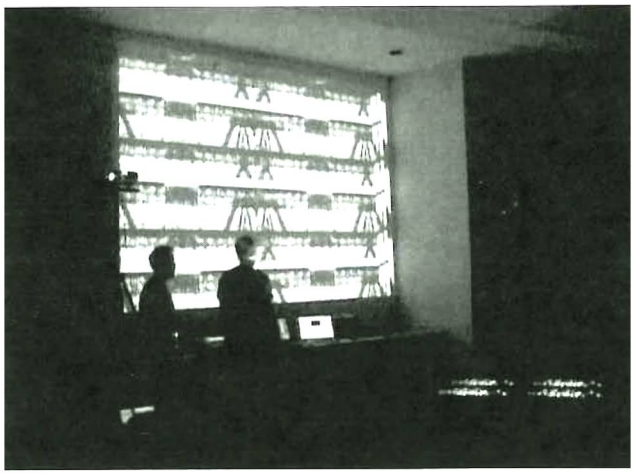
96 John Simon Jr., *Every Icon*, USA, 1996, http://www.numeral.com.



97 John Simon Jr., *Every Icon*, USA, 1996, http://www.numeral.com.

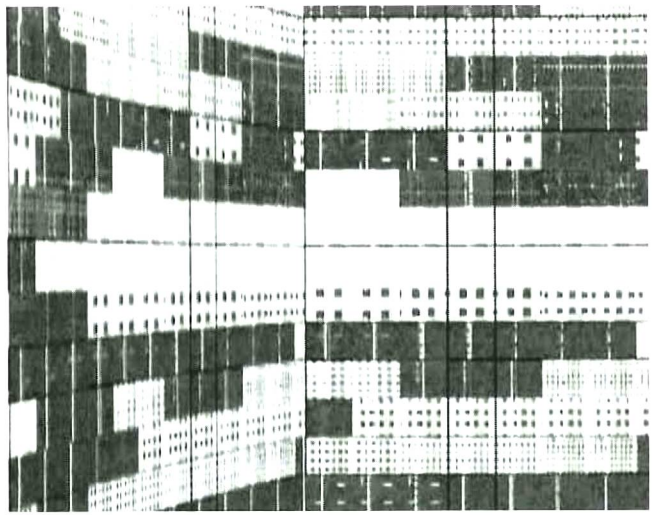


98 John Simon Jr., *Every Icon*, USA, 1996, http://www.numeral.com.

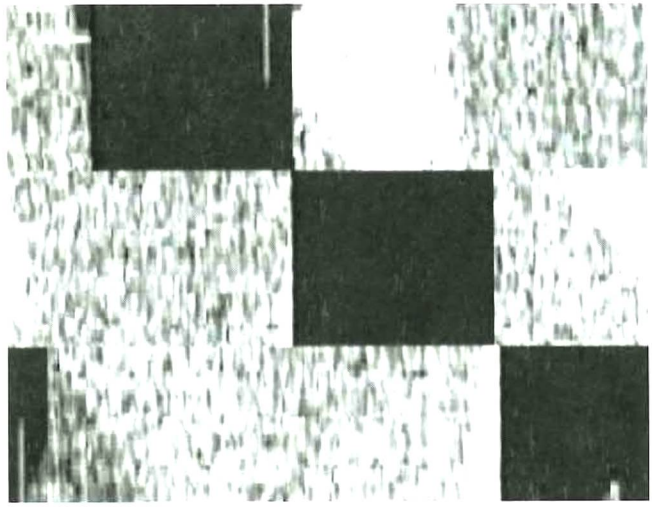


99 David Stout, *Noisefield*, USA, 2003, interactive video installation.

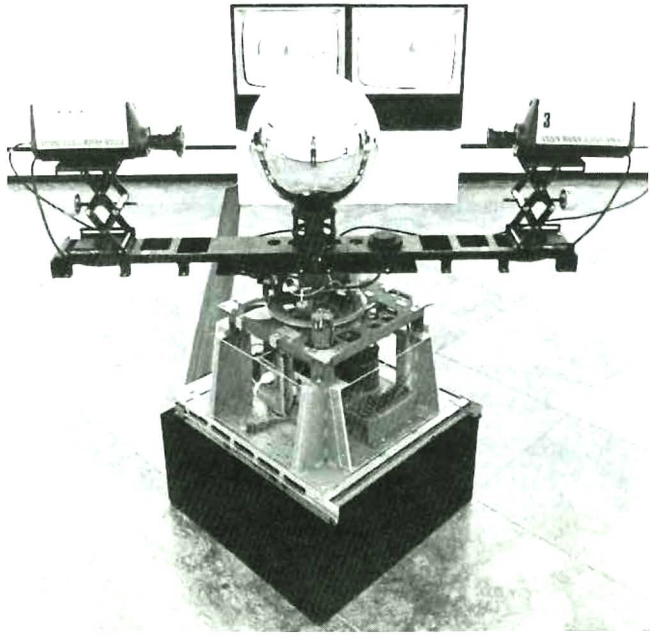
100 David Stout, *Signalfire*, USA, 2003, 60:00, interactive video noise performance.



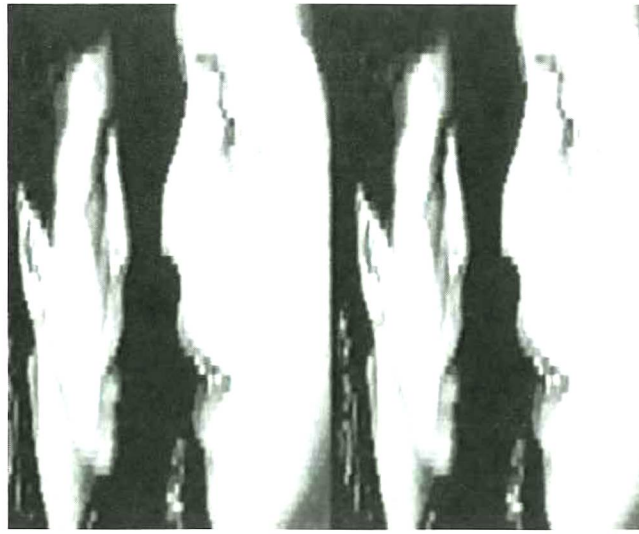
101 David Stout, *Transit*, USA, 2003, 5:00, b/w, sound.



102 David Stout, *Ziggurat*, USA, 2003, 13:45, b/w, sound.



103 Steina Vasulka, *Allvision*, USA, 1978, video installation.

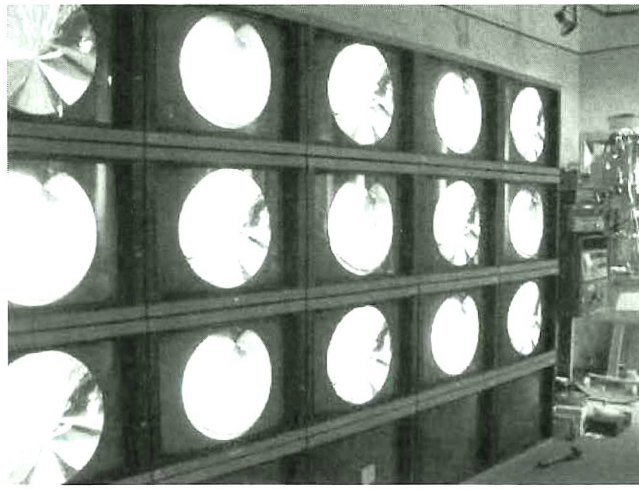


104 Steina Vasulka, *Bad,* USA, 1979, 2:00, color, sound.

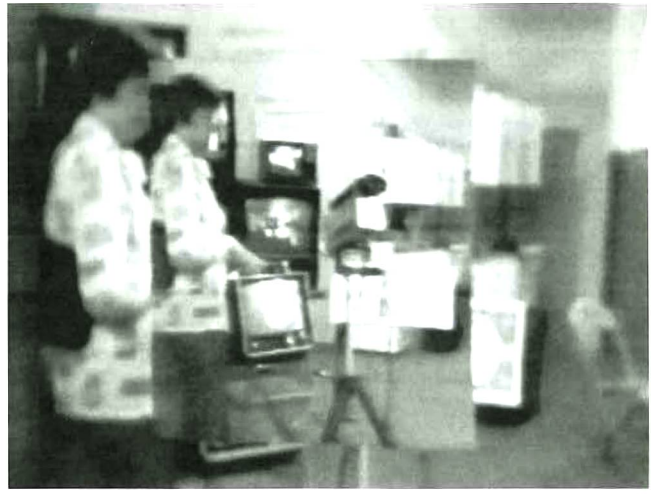
105 Steina Vasulka, *Lilith,* USA, 1987, 9:12, color, sound.

106 Steina Vasulka, *Mynd*, USA, 2000, 38:20, color, sound.

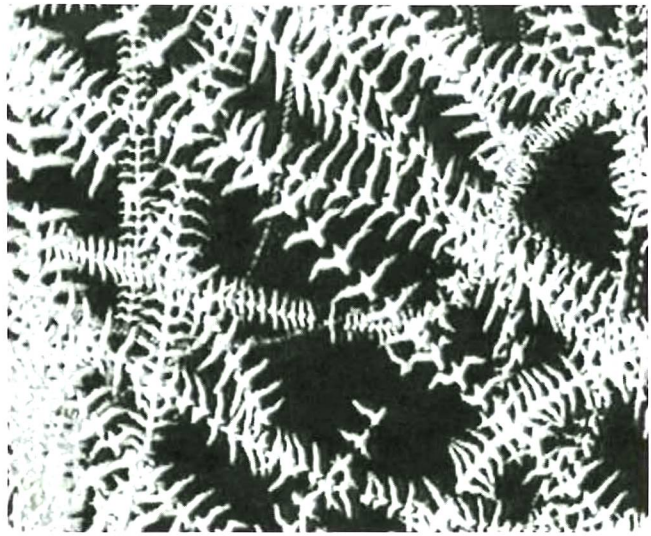
107 Steina Vasulka, *Mynd*, USA, 2000, 38:20, color, sound.



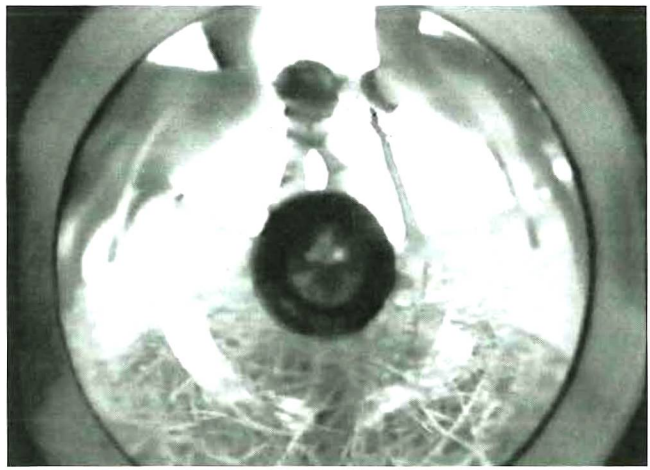
108 Steina Vasulka, *Of the North*, USA, 2001, video installation.



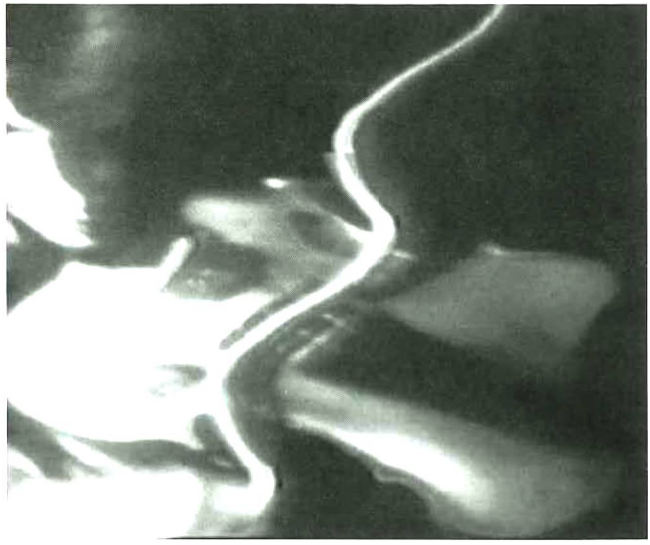
109 Steina Vasulka, *Orbital Obsessions*, USA, 1977, 24:30, b/w, sound.



110 Steina Vasulka, *Orka*, USA, 1997, 15:00, color, sound.

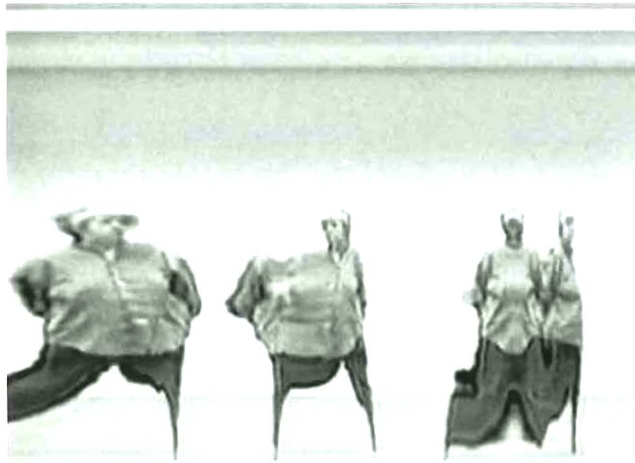


111 Steina Vasulka, *Somersault*, USA, 1982, 5:17, color, sound.

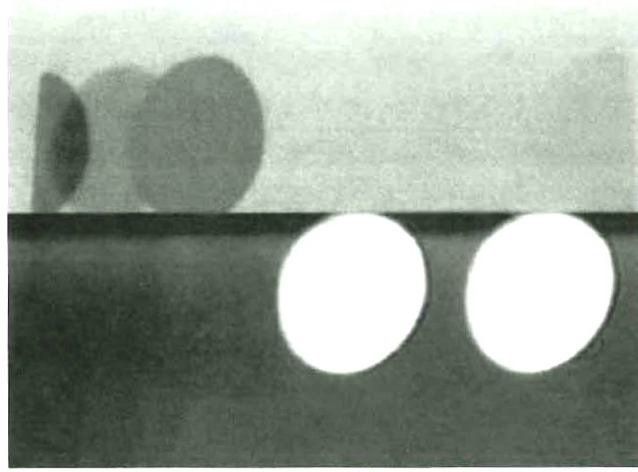


112 Steina Vasulka, *Violin Power*, USA, 1970–1978, b/w, sound, video performance.

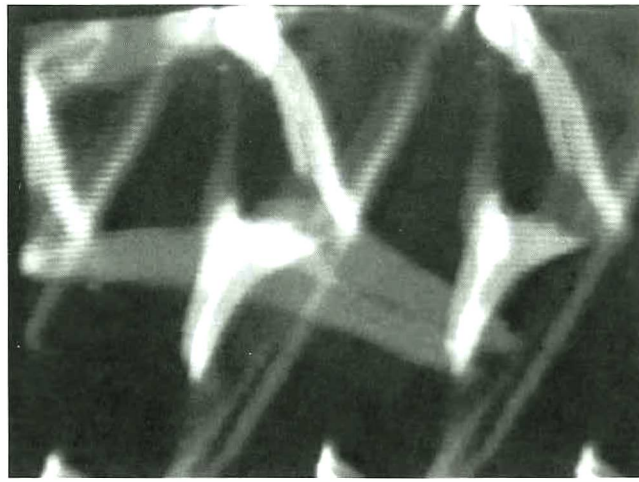
113 Steina Vasulka, *Warp*, USA, 2000, 4:44, color.



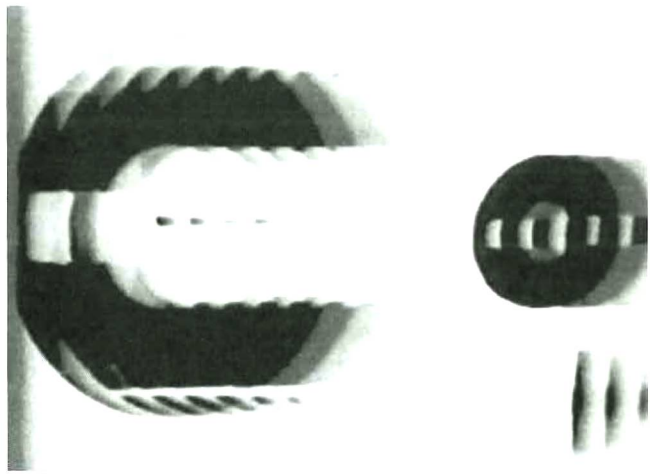
114 Steina Vasulka, *Warp*, USA, 2000, 4:44, color.



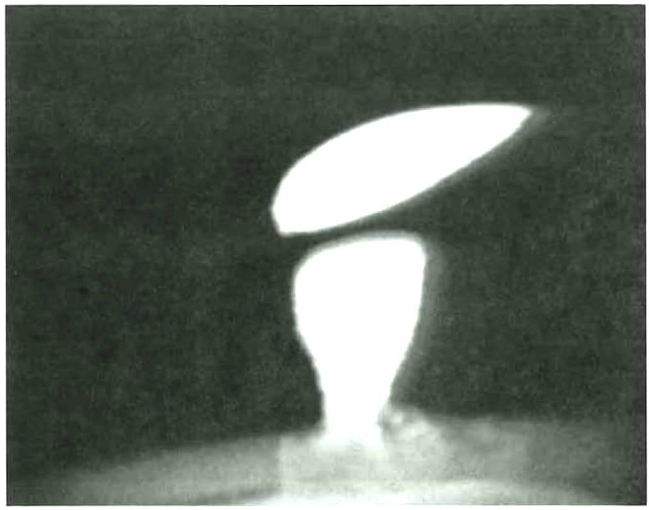
115 Steina and Woody Vasulka, *Black Sunrise*, USA, 1971, 21:08, b/w, sound.



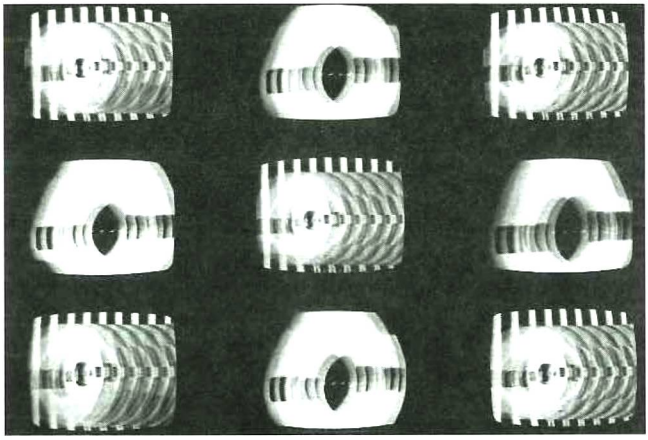
116 Steina and Woody Vasulka, *Calligrams*, USA, 1970, 12:00, b/w, sound.



117 Steina and Woody Vasulka, *Discs*, USA, 1971, 5:30, b/w, sound.

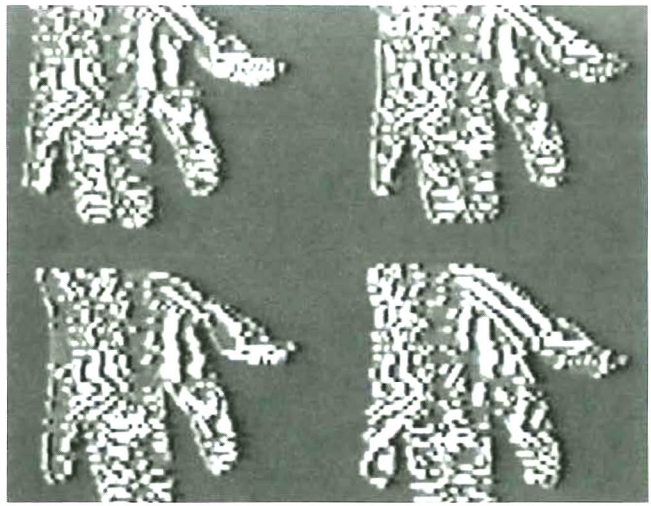


118 Steina and Woody Vasulka, *Distant Activities*, USA, 1972, 10:00, color, sound.

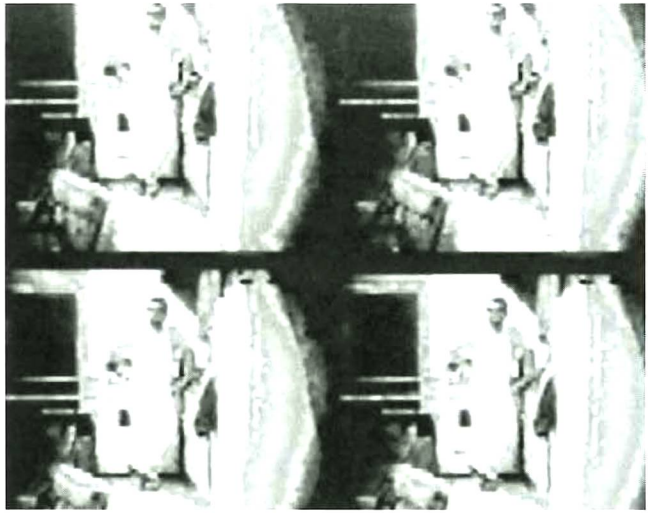


119 Steina and Woody Vasulka, *Matrix I*, USA, 1970–1972, video installation.

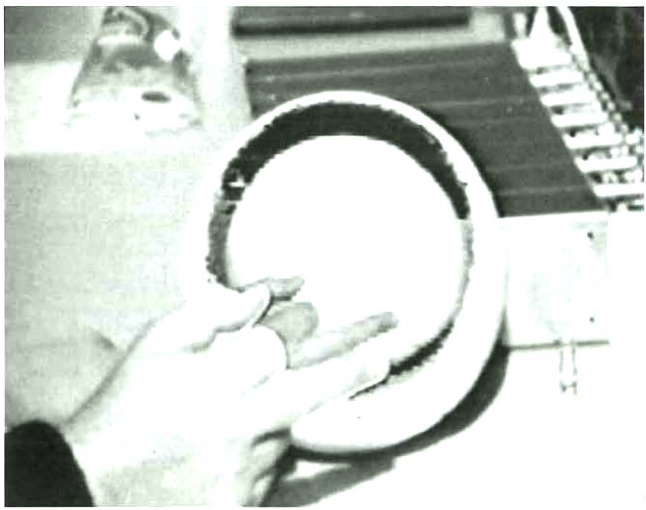
120 Steina and Woody Vasulka, *Noisefields*, USA, 1974, 12:12, color, sound.



121 Woody Vasulka, *Artifacts*, USA, 1980, 21:30, color, sound.

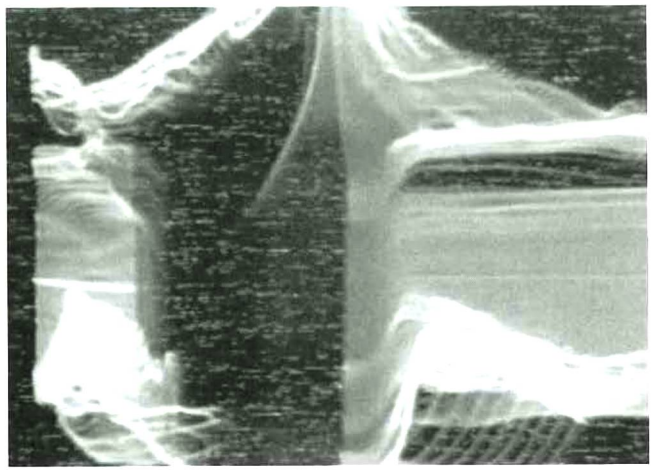


122 Woody Vasulka, *Artifacts*, USA, 1980, 21:30, color, sound.

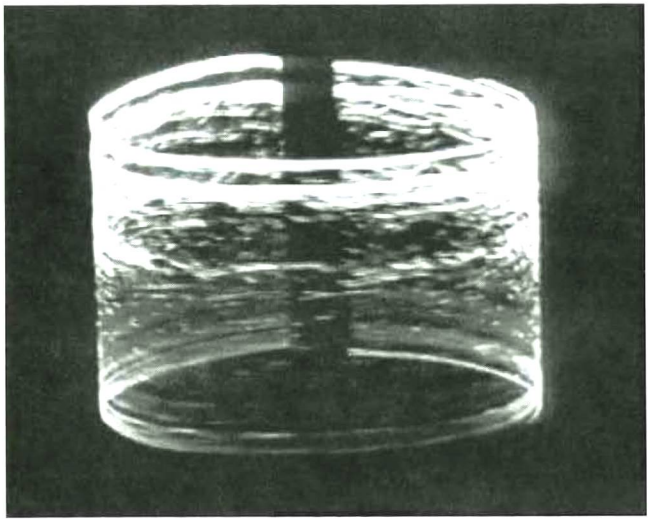


123 Woody Vasulka, *Artifacts*, USA, 1980, 21:30, color, sound.

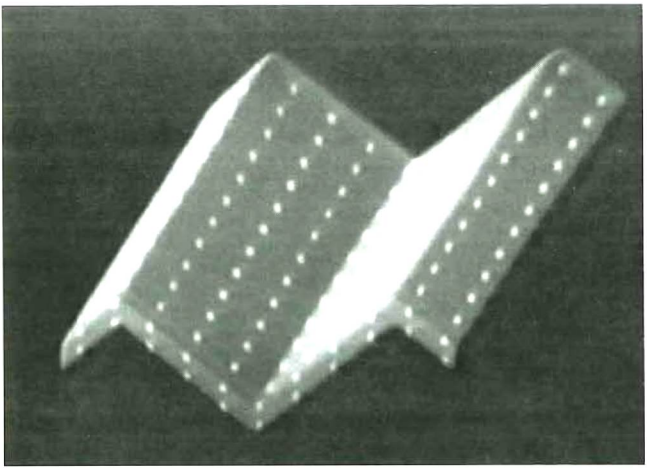
124 Woody Vasulka, *Art of Memory*, USA, 1987, 36:00, color, sound.



125 Woody Vasulka, *C-Trend*, USA, 1974, 10:35, b/w, sound.

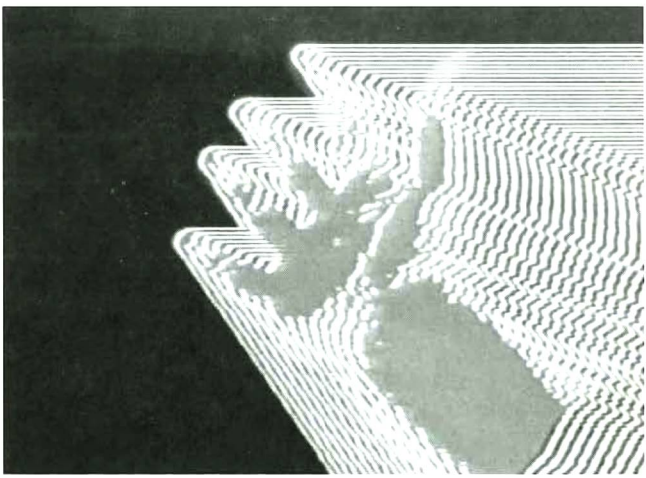


126 Woody Vasulka, *No. 25*, USA, 1975, 5:30, b/w, sound.



127 Woody Vasulka, *The Matter*, USA, 1974, 4:11, b/w, sound.

128 Woody Vasulka, *Reminiscence*, USA, 1974, 4:50, b/w, sound.



129 Woody Vasulka, *Vocabulary*, USA, 1973, 4:50, color, sound.

130 Woody Vasulka and Jeffrey Schier, *Digital Image Articulator*, USA, 1978.

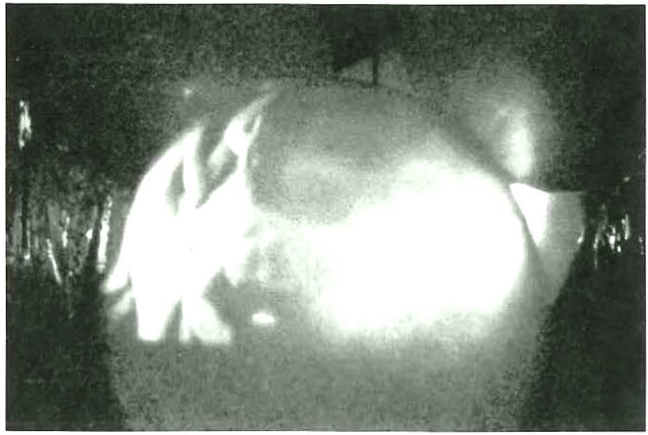
131 Gillian Wearing, *I Love You*, UK, 1999, 60:00, color, sound, video projection. (Courtesy Maureen Paley)

132 Gillian Wearing, *Sacha and Mum*, UK, 1996, 4:00, b/w, sound, video projection. (Courtesy Maureen Paley)

133 Gillian Wearing, *Sacha and Mum*, UK, 1996, 4:00, b/w, sound, video projection. (Courtesy Maureen Paley)

134 Gillian Wearing, *2 into 1*, UK, 1997, 4:30, color, sound, video projection. (Courtesy Maureen Paley)

135 Gillian Wearing, *2 into 1*, UK, 1997, 4:30, color, sound, video projection. (Courtesy Maureen Paley)



136 Jud Yalkut, *USCO*, USA, 1967, installation performed in 2000 at the Whitney Museum of American Art.

Notes

Introduction

1. The customary but discursively insufficiently differentiated terms "monitor" and "screen" are used synonymously in what follows, in which case I prefer "screen." This is because "screen" is, strictly speaking, the more precise term for defining this display format for video and corresponds to the English concept, which does, of course, apply to film, differently from the differentiation of "*Leinwand*" (film) and "*Bildschirm*" (television/video) in German. The debate in screen media differentiates still further into "big screen" (film) and "small screen" (television), in which process recent large format television and video projections contradict the categorization. "Monitor" in English denotes, by contrast, a regulatory device in the first place, for instance, an integrated monitor in an image processing device. In the same way, "monitoring" means a surveillance and checking process in which existing image forms are manipulated at will or technically simulated via computing applications.

2. The customary terminology "*audiovisuell*" in German ("audiovisual" in English) is just as imprecise in both languages because here the, respective, technical and aesthetic levels are confused. Strictly speaking, the pairing of concepts should run: *audio* (audio) and *video* (video) to denote the signal states and aural/auditiv (aural) and visuell (visual) to denote aesthetic processes and describe the media phenomena in relation to other media, which exhibit aural and visual forms of display in equal measure. Under this premise, the mutability of audio and video specific to the video medium can be better differentiated from auditive-visual displays, which video shares with other media. Because there is no uniform concept corresponding to the discursive allocations, the pairing of concepts is used according to the context and for the necessary comprehensibility, where referring to the audiovisual medium is always meant to designate the discursive level of the media and not the technical facts about the audio and video signal.

3. Electronic media must, then, be talked about in the plural (media) because they comprise image and sound, video and audio, something that is often overlooked in general parlance related to video.

This definition presumes that the concept of the medium embraces a technical, apparatus-oriented side and a cultural-semiotic one, which work together in shaping the specifics of media. It is only in this dynamic interaction of technological factors and various audiovisual levels of expression that the plural manifestation of electronic media appears.

4. Regardless of the differentiation into genres, film, by contrast, possesses a structure of display that may be termed "media specific" and involves its apparatus: a dispositive character. "The dispositive structure of the apparatus's display seeks proximity through distance. To this extent, the dispositive coupling of the observer's body with the object made visible is always a reverse coupling, which only produces the intended relation of proximity initially out of distance. It presumes that the apparatus and the dispositive function (the latter includes the observer-subject) form a systematic context, a system which asserts coupling as reverse coupling.... The 'dispositive structure of the apparatus display' serves the imagined homogenisation (overcoming) of experienced distance. Cinema is the exemplary institution at the close of the nineteenth century.... Identification as the imagination of proximity (to the person and situation represented) is, then, both a dispositive coupling of the body of the observer-subject to the projection on the screen as well as a reverse coupling of the projection to the viewer's body fixed at a distance" (Joachim Paech, "Eine Dame verschwindet. Zur dispositiven Struktur apparativen Erscheinens," in *Paradoxien, Dissonanzen, Zusammenbrüche. Situationen offener Epistemologie*, ed. Hans Ulrich Gumbrecht and K. Ludwig Pfeiffer [Frankfurt am Main: Suhrkamp, 1991], 777 ff.).

5. Duguet also favors the processual, in contrast to the systematic, aspect and credits video with plural dispositive features that distinguish themselves particularly by allowing with that a videographic treatment of other media's dispositive features to become evident, showing that the problem of representation cannot be dealt with solely on the level of imagery, for example, when video shifts the status of the image to that of an object. The concept of open, respectively plural dispositive features in video allows, in the final analysis, a definition of video's position as a place of transformation: "More than a simple historical transition between dispositive features and the functions of representation dominant since the Renaisssance and those which are expanding today, video is revealing itself to be a privileged place where passages and reprises are at work, a space of transformations, a critical threshold, flanking a multiplicity of models" (Anne-Marie Duguet, "Dispositifs," *Communications*, 48 [1988], 239). The transition to multiplying the manipulation in the digitally coded, synthetic image is also addressed in the function of video as a critical threshhold.

6. The discussion about the nature of a video image as surface without any spatial dimension mostly goes back to two sources: on the one hand, to the reception of Marshall McLuhan's theory of television; on the other, to the adaptation of Raymond Bellour's narcissistic mirror situation. McLuhan's statement, that the television image presents a "mosaic mesh of light and dark spots" that not only has nothing more in common with film but, above all, does not possess any third dimension, which can, all the same, be "superimposed," necessarily overlooks the dispositive plurality in the electronic medium in that way by taking the conventional television situation as a yardstick. Because it follows that heterotopic forms of presentation, which can reflect the construction and reconstruction of the signal, are not considered, McLuhan remains ultimately with a two-dimensional concept of the image susceptible to criticism (as he presents the third dimension in no more than the studio set), although he attributes to the scanning image: "and the image so formed has the

quality of sculpture and icon, rather than of picture" (Marshall McLuhan, *Understanding Media: The Extensions of Man* [Cambridge, Mass.: MIT Press, 2001; 1964], 313). For Bellour, the nature of the video image derives from the narcissistic mirror situation in such a way that the autoportrait is a multiple reproduction of the mirror image, and shows a doubling of the body and its reflection, in which the video projection denotes an intensive vibration of light released from this in an endless recursion, supported by a dialogic structure, which only evokes the autoerotic passage as a fragment any longer. Not only does the self-referential autoportrait replace the actual narcissist, the surface image of this reflection does not even require, as Ross demonstrates in a derivation from Bellour, any exhibition of a dimension of depth. The thesis that electronic images are not to be thought of as a window onto the world, but rather as vehicles for another dimension of depth, which develops internally and between the surfaces of recursive reflections, stands, as I would like to maintain, nonetheless in opposition to the realization of spatial relations in neither a dispositive nor a self-reflexive perspective. What seems to me to carry more weight is the observation that a self-reflexive procedure, which must be acknowledged as fundamental to video, as it figures in the mirror situation of Narcissus, and produces feedback in its technical realization, must be, therefore, understood in spatial (i.e., plastic dimensions). At one point, Bellour affirms the breaking up of the surface, when he takes a critical stance against Krauss's closely argued definition of video as the "aesthetic of narcissism" to the effect that the discursive structure of Vito Acconci's video autoportrait evokes a spatial encounter of the body beyond the borders of media. See Raymond Bellour, "Autoportraits," *Communications*, 48 (1998); Rosalind Krauss, "Video: The Aesthetics of Narcissism," in *Video Culture: A Critical Investigation*, ed. John Hanhardt (Rochester: Visual Studies Workshop, 1986); Christine Ross, *Image de surface: L'art vidéo reconsidéré* (Montréal: Artextes, 1996).

7. A good example of this appears with Krauss and is linked to the argument on conceptual directions in art, which erase genre delineations and bring the concept of art and material into question. In transferring it to the media debate and the discussion of video and television (Krauss does not deal with the difference between video and television as media) the problem arises that the technology, material vehicle, and apparatus are equated with the level of the medium in this perspective. Hence, the level of the material—respectively, the technical, equipment-based vehicle counts already as a medium and not as technology—from which grows the false assessment that, with the attack on materiality and apparatus—in conceptual art as in experimental film—a loss of media specificity is supposedly introduced. The monodimensional conclusion perforce results to the effect that a radical self-reflection of the apparatus-related conditions nullifies or destroys the medial ones so that, in the last analysis, no media specificity at all obtains in an intermedial merging of various media forms. From this finding, Krauss derives a "postmedial" condition of the media in the electronic age, which dispenses from the start with categories of media specificity. If the display, therefore, implodes with the displayed at the point where material vehicle and expressive forms converge, and the general "postmedium condition" of the transmitting media is declared, which Krauss identifies paradigmatically with television (Rosalind Krauss, "A Voyage on the North Sea," in *Art in the Age of the Post-Medium Condition* [New York: Thames and Hudson, 1999, 32]). Why is it then overlooked in this that a profoundly radical questioning of the material characteristics of structural film or of the forms of appearance of energy and light generated by the signal in structural video, in the media form of technically intact films and videos (on certain ranges of frequency respectively), has to be presented if these processes are to be at all perceptible, visible, and audible? Where

the possibilities of expression are reduced to photochemical/physical or electronic (signal interval, impulse strength) fundamentals, respectively, it is a question of representation of technological processes, which are being made aesthetically perceptible via media terminology using the respective vocabulary to hand (moving images of film, stabilized signal processes in video).

8. Suffice it to refer to recent investigations that proceed from communications theory in cultural studies and contribute to the debate on the globalization of Western media from the perspective of non-Western media, of their economic systems and social implications and essentially discuss the relationship of the state, politics, and media in various countries. See James Curran and Myung-Jin Park, *De-Westernizing Media Studies* (London: Routledge, 2000).

Chapter 1

1. Under phenomenon and concept in media aesthetics, I understand the context of formal creative principles and conditions governing the apparatus in relation to the connection to technical and semiotic-cultural factors, which predominate in the particular media system.

2. André Gaudreault and Philippe Marion, "The Cinema as a Model for the Genealogy of Media," *Convergence*, 8.4 (2002), 12.

3. Ibid., 15.

4. Gerry Schum, initiator of the television gallery (1968–70 and the video gallery 1971–73), had come onto the scene with the impetus of developing art works for television and thereby aiming at a new definition of television as an artistic medium. Ulrike Groos, Barbara Hess, and Ursula Wevers, eds., *Ready to Shoot. Fernsehgalerie Gerry Schum. videogalerie schum* (Düsseldorf: Kunsthalle Düsseldorf, 14.12.2003–4.3.2004).

5. The video collections of the Centre for Art and Technology in Karlsruhe, the Centre Georges Pompidou, Paris, the Art Museum, Bonn, and the New Berlin Society of Arts can be called representative. Christine Van Assche, ed., *Vidéo et après: La collection vidéo du Musée national d'art moderne* (Paris: Centre Georges Pompidou, 1992); Kunstmuseum Bonn, ed., *Video im Kunstmuseum Bonn. Die Sammlung* (Bonn: Kunstmuseum, 1992); Neuer Berliner Kunstverein, ed., *Video-Forum Berlin. Bestandskatalog* (Berlin Neuer Berliner Kunstverein, 1991).

6. I borrow the concept of parametric function from the neoformalist film analysis of David Bordwell, who defines "parametric narration" as a category in narrative cinema producing style and form (David Bordwell, *Narration in the Fiction Film* [London: Routledge, 1986]).

7. Jay David Bolter and Richard Grusin coined the concept "remediation" for a dual strategy in the relation of media to media. Whereas in process, transparent "immediacy" suppresses medial representation in the interests of an effect of directness and underpins ideas of a human-machine interaction in virtual reality without a "blocking" interface, "hypermediacy" stresses the medial, hypertextual, and hypermedial nature of computers, for example, in the desktop metaphors. The logic of the dual strategy means that both processes are not absolute and singular but are to be thought of as constantly in polar juxtaposition: "If the logic of immediacy leads one either to erase or to render automatic the act of representation, the logic of hypermediacy acknowledges multiple

acts of representation and makes them visible. Where immediacy suggests a unified visual space, contemporary hypermediacy offers a heterogenous space, in which representation is conceived of not as a window on to the world, but rather as 'windowed' itself—with windows that open on to other representations or other media.... In every manifestation, hypermediacy makes us aware of the medium or media and (in sometimes subtle and sometimes obvious ways) reminds us of our desire for immediacy" (Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media* [Cambridge, Mass.: MIT Press, 1999], 33ff.).

8. See chapter 3.

9. One of the few exceptions is Jacques Aumont, who comparatively discusses relationships between image forms in painting, photography, film, and also video genealogically and conceptually (Jacques Aumont, *The Image* [London: British Film Institute, 1994]).

10. For a criticism of the truncated representation of "visual culture" and the art historical appropriation of a terrain cleansed of film, see the essay by Lisa Cartwright, "Film and the Digital in Visual Studies: Film Studies in the Era of Convergence," *Journal of Visual Culture*, 1.1 (2002).

11. A discussion I cannot take up in the framework of this study, but which should be mentioned nevertheless, is that, with virtualization, it is a question of a new media paradigm, which comes into the category of hybridization.

12. Edmond Couchot, "Digital Hybridisation: A Technique, an Aesthetic," *Convergence*, 8.4, *Special Issue: Intermedia* (2002), 19.

13. Edmond Couchot, "Zwischen Reellem und Virtuellem: die Kunst der Hybridation," in *Cyberspace. Zum medialen Gesamtkunstwerk*, ed. Florian Rötzer and Peter Weibel (Munich: Klaus Boer, 1993), 347.

14. Ibid., 343.

15. Ibid., 344.

16. Whereas the discourse in media studies on hybridization is carried on under the heading of digitalization and, in that, touches on the realms of lifestyles and cultural technologies, the discourse on hybridization in cultural studies, which should be distinguished from it, falls under the heading of globalization and intercultural, postmodern syncretisms in postcolonial cultures. Unlike the discussion in the media on the merging of levels of reality, the debate in cultural studies deals with the alteration of schemes of subjectivity and identity, their multiplication and fragmenting under new global circumstances (Rogoff) and syncretic mixtures of tradition and modernity, for example, in Latin America (Canclini). In this sense, Homi K. Bhabha understands culture as the "in-between-space," where hybridity also means a phenomenon on the border of the simultaneous presence of the present and the past and an intervention, which, because of syncretic, not definitely localizable space-time structures (identities), is to be understood politically. "The intervention of the Third Space of enunciation, which makes the structure of meaning and reference an ambivalent process, destroys this mirror of representation in which cultural knowledge is customarily revealed as an integrated, open, expanding code.... It is that Third Space, though unrepresentable in itself, which constitutes the discursive conditions of enunciation that ensure that the meaning and symbols of culture have no primordial unity or fixity; that even the same signs can be appropriated,

translated, rehistoricized and read anew" (Homi K. Bhabha, *The Location of Culture* [London: Routledge, 1994], 37). See also Néstor Garcia Canclini, *Hybrid Cultures: Strategies for Entering and Leaving Modernity* (Minneapolis: University of Minnesota Press, 1995); Irit Rogoff, *Terra Infirma: Geography's Visual Culture* (London: Routledge, 2000).

17. Friedrich Kittler, "Die künstliche Intelligenz des Weltkriegs: Alan Turing," in *Arsenale der Seele*, ed. Friedrich A. Kittler and Georg Christoph Tholen (Munich: Wilhelm Fink, 1989), 196.

18. Gilles Deleuze, *Cinema 2: The Time-Image* (Minneapolis: University of Minnesota Press, 1995), 265. In a systematic discussion of the representative function of images in the media, Deleuze also sets out, like Couchot, a model of the circulation of real and virtual factors, which remains with Deleuze finally related to the temporally based actualizing of the "image" in the medium of film. The unity of the actual and "its" virtual image in film, as Deleuze conceives it in the metaphor of the crystals of time, cannot really grasp the "actual" simultaneity of "real" and "virtual" now become possible in technical simulation.

19. Edmond Couchot, "La mosaïque ordonnée ou l'écran saisi par le calcul," *Communications*, 48 (1989), 81.

20. See chapter 1, "Preconditions of the Technology and the Apparatus."

21. Edmond Couchot, "La question du temps dans les techniques électroniques et numériques de l'image," in *3. Semaine Internationale de Vidéo* (Geneva: Saint-Gervais, 1989), 19.

22. What is meant here are recursive repetitions in series—that is, feedback loops, which refer to themselves endlessly and, as they become weaker or shortened, respectively, return to a point of departure (schema, algorithm, program). The principle of repetition in the recursive loop sets out the behavior of the schema in computers, hence endless identical variations on one schema or program, which means the simulation of a schema (in contrast to the variation of a schema in film or the simulatory, that is, manipulatively altering the schema in video).

23. Edmond Couchot, "Die Spiele des Realen und des Virtuellen," in *Digitaler Schein. Ästhetik der elektronischen Medien*, ed. Florian Rötzer (Frankfurt am Main: Suhrkamp, 1991), 348.

24. Friedrich Kittler, "Fiktion und Simulation," in *Philosophien der neuen Technologie*, ed. Ars Electronica (Berlin: Merve, 1989), 64f.

25. Joachim Paech, "Der Schatten der Schrift auf dem Bild. Vom filmischen zum elektronischen 'Schreiben mit Licht' oder 'L'image menacée par l'écriture et sauvée par l'image même,'" in *Der Entzug der Bilder. Visuelle Realitäten*, ed. Michael Wetzel and Herta Wolf (Munich: Wilhelm Fink, 1994), 233.

26. Friedrich A. Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford, Calif.: Stanford University Press, 1999), xl.

27. Wolfgang Coy, "Die Turing-Galaxis-Computer als Medien," in *Weltbilder. Bildwelten. Interface 2*, ed. Klaus Peter Dencker (Hamburg: Hans-Bredow-Institut, 1995), 51. Observing the conceptual differences in the various understandings of computers as a medium, which reflect the disciplinary spectrum of a debate and which is joined equally from the direction of media studies as from information science, I suggest for the further discussion Coy's definition of computers as "machines that

integrate the media." "All written, optical and electrical media can, in the end, merge into a general digital medium via microelectronics and computer technology" (53).

28. Couchot, "Die Spiele des Realen und des Virtuellen," 347.

29. Terry Winograd and Fernando Flores, *Erkenntnis. Maschinen, Verstehen. Zur Neugestaltung von Computersystemen* (Berlin: Rotbuch, 1989), 145.

30. The status of representation becomes relevant in the digital as a whole only on the symbolic level of the production of meaning, on the metalevel of the ways of using it—namely, when mathematical operations have to be related to true outcomes, when programming has, then, to deliver exact data for a concrete area—in the circulation of payments, in the transport sector, in the construction of cars, houses, and airplanes, in medicine and news communications, and, above all, in warfare.

31. Paech, "Der Schatten der Schrift auf dem Bild. Vom filmischen zum elektronischen 'Schreiben mit Licht' oder 'L'image menacée par l'écriture et sauvée par l'image même,'" 231.

32. PAL for Europe, except for France (SECAM), and NTSC for North America and Japan.

33. Digital morphing is a technique of simulation in pictoriality, in which parts of the image can be changed in two different directions so that various moments of (real) time, before and after, inside a single (virtual) unit of an image run into each other, something that is not factually possible but can be conjured up via negation. Morphing between various positions of an image on a time line suggests movement inside of the image, which, in fact, never took place as real movement and change.

34. In this context reference should be made to the notions of change with McLuhan, when he conceives of the "message" of a medium also as the "change of the yardstick, speed or pattern" (McLuhan, *Understanding Media: The Extensions of Man*, 7).

35. W. J. T. Mitchell, *Picture Theory: Essays on Verbal and Visual Representation* (Chicago: University of Chicago Press, 1994), 15f. If one casts an eye over the sequence of the "turns," beginning with Richard Rorty's paradigm of textuality in the "linguistic turn" and raised by Frederic Jameson, in the light of the late capitalism of postmodernity with the "cultural turn," up to a new level of complexity, then an "audiovisual turn" can assert itself in this discourse since the appearance of electronic media. The purpose of this study consists, however, less in postulating new, epoch-making shifts in a paradigm considered at any given time dominant. Rathermore, the transitions, the untidy passages and obscure gray areas (conceptually comparable, yet discursively different from the "in-between spaces," as they figure as signs of "hybrid cultures" in the debate of cultural studies in the Anglo-American language area) are primarily what is interesting about the potential of the electronic media.

36. Nelson Goodman, *Languages of Art* (Indianapolis: Hackett, 1976), chap. 1, esp. pp. 3–44.

37. With Eisenstein's establishing of film montage in the "hieroglyph principle," the argumentation for a visual system of description (in which Mitchell includes visual and textual components in conjunction with Goodman) can, I argue, be traced back in the history of the media to the coupling of image and writing in a visual syntax of film. With hieroglyphs, Eisenstein is interested in the way they display a "figurative mode" and a "denotative purpose," which Eisenstein discovers

equally in calligraphy. Transferred to film, this means the filmic image appears as the image of writing and in that combines both concept and emotionality.

38. Sergej M. Eisenstein, "Beyond the Shot," in *S. M. Eisenstein: Selected Works*. Vol. 1: *Writings, 1922–34*, ed. Richard Taylor (London: British Film Institute, 1988), 139.

39. Skiagraphy denotes in photography and film the permanent fixing of shadow images onto a surface, which recalls the trace of what has existed in the epigraphy. Hubertus von Amelunxen, *Die aufgehobene Zeit. Die Erfindung der Photographie durch William Henry Fox Talbot* (Berlin: Dirk Nishen, 1988).

40. Vilém Flusser, *Ins Universum der technischen Bilder* (Göttingen: European Photography, 1985), 138.

41. Gottfried Boehm, "Die Wiederkehr der Bilder," in *Was ist ein Bild?* ed. Gottfried Boehm (Munich: Wilhelm Fink, 1994), 34.

42. Renate Lachmann, *Gedächtnis und Literatur. Intertextualität in der russischen Moderne* (Frankfurt/M: Suhrkamp, 1990), 31.

43. Characteristic for this way of seeing is how Baudrillard directly deduces out of the circulation in video, which no longer represents an image, a self-reference, in which there would be the "same immediately connected to the same." With this "end of aesthetic distance," video would admittedly be finished. Jean Baudrillard, "Videowelt und fraktales Subjekt," in *Philosophien der neuen Technologie*, ed. Ars Electronica (Berlin: Merve, 1989).

44. See on this topic the double logic of remediation, which, according to Bolter and Grusin, means on one side "immediacy" as a tendency in the transparency of the medium and, on the other, "hypermediacy" as a visible manifestation of the process of display (see chap. 1, note 7).

45. The dictum of the representational reference not only serves social stabilization in television; it also checks persons and their identities via video surveillance, a technique that continues with computer applications.

46. The technologies of visual re-presentation in television, video, and digital film, in the hypermedium, in virtual reality, and in cyberspace are also denoted by the concept of "electronic culture." In the history of the discourse, "visual vulture" arises from the expansions of art history into new media and form partial areas of "cultural studies," whereas "electronic culture" derives rather from the debate on technology and media, from cybernetics and the theory of communication. See Timothy Druckrey, ed., *Electronic Culture: Technology and Visual Representation* (New York: Aperture Foundation, 1996). A strict discursive division is nevertheless not maintained, as subsequent publications with interdisciplinary frameworks demonstrate. See Nicholas Mirzoeff, ed., *The Visual Culture Reader* (London: Routledge, 1998).

47. For the area of film, Chris Marker negotiates in an exemplary manner in *Level 5* (France, 1997) between analog representation and digital simulation in a fictional film, which functions as a computer game and, in an interactive setting demonstrated by means of a player character (Laura), analyzes the background issues of the "sacrifice" of the Japanese island Okinawa through administratively ordered collective suicide at the end of the Second World War. It is interesting that, on the

level of the analog film, the disappearance of the main character, Laura, is possible in the computer networks. That means: the film shows a passage between the real and virtual worlds. See Yvonne Spielmann, "Visual Forms of Representation and Simulation. A Study of Chris Marker's *Level 5*," *Convergence*, 6.2 (2000). In a comparable manner, Lynn Hershman experiments, in diary-like, narratively constructed works in video, with multiple identities, which she constructs for herself and asserts in a documentary mise-en-scène showing an assumed milieu so that the simulatory potential for identity transfer within the representation based on fiction is realized, as is typical for Internet communication in multiuser domains (MUD) (see chap. 3).

48. On the discourse on the disappearance of the electronic media, see Siegfried Zielinski, *Audiovision: Cinema and Television as Entr'actes in History* (Amsterdam: Amsterdam University Press, 1999).

49. Transcription of Dan Sandin's commentary on the videotape *How TV Works* (USA: Electronic Arts Intermix, 1977).

50. Ibid.

51. Sean Cubitt, *Time Shift: On Video Culture* (London: Routledge, 1991), 30f.

52. The discourse on television and video images as a "flow of images" goes back to Raymond Williams, who suggests a new paradigm in the debate over institution and technology as denoting the program character of television: "But it will then be all the more necessary to go beyond the static concept of 'distribution' to the mobile concept of 'flow'" (Raymond Williams, *Television. Technology. and Cultural Form* [Hanover, N.H.: Wesleyan University Press, 1992], 72). Leading on from this, Cubitt starts with the historical context of what the information flow and the technology of the telephone networks mean and suggests extending the metaphor of "flow" onto the possibilities for applying digital technology. It is a question of regarding aesthetic concepts, which stress the process of becoming and underline "in-between spaces," from the perspective of a history of "flow," which contrasts tendencies of standardization and homogenization in the system of culture. Cubitt understands the critical concept of "flow" via the contrasting of principles of universality, which form the overarching structural traits of the (globally) networked societies, in which the homogenizing flow of information in television plays an important role (Sean Cubitt, *Digital Aesthetics* [London: Sage, 1998]).

53. Roy Armes, *On Video* (London: Routledge, 1988), 84.

54. The characteristics of video as a medium are with that by no means equated with television, not to mention limiting video to the characteristics of television as a medium. If the onset of video is to be understood, as suggested, as the birth of a new medium and not as an extension of television, this proposition must anchor video in a given medial environment and necessarily results in the requirement for consideration of influences from the synchronic and diachronic development of media, which can be shaped not only by television.

55. "Whilst affirmation only assents to what is and negation only denies what is not, simulating means affirming what is not and dissimulation means negating what is." Friedrich Kittler, "Fiktion und Simulation," 64.

56. The Computer Museum at the University of Amsterdam has established a helpful definition of analog computers:

Analog computers are based on principles completely different form digital computers. Problem variables are represented by electrical voltages which can vary continuously within a certain range, usually −10 to +10 volts for a transistor-based machine. Electronic circuit modules allow the variables to be added, integrated (with respect to time) and multiplied by a constant. This makes it possible to solve a system of ordinary linear differential equations by properly combining a number of adders, integrators, amplifiers, and potentiometers using flexible cords and a patch panel. [...] The results of the computation can be shown graphically, in real time, on an oscilloscope or plotter, or be digitized for being stored or further processed by a digital computer in a hybrid system. Also the results can be used directly for the control of some physical process. (*Analog Computers* [Amsterdam: University of Netherlands, 2003]; available at www.science.uva.nl/faculteit/museum/AnalogComputers.html)

57. See chap. 2.

58. To observe how television forms events in the media out of those in reality and can in the process extend the expectation and, with it, the viewer's anticipation of the event happening into simply endless broadcast time, until the nature of media tips over into the negation of media in a "raging standstill" (Paul Virilio), see Lorenz Engell, "Das Amedium. Grundbegriffe des Fernsehens in Auflösung: Ereignis und Erwartung," *montage/av*, 5.1. (1996).

59. Margaret Morse's analysis of the media in the digital information society comes to the conclusion that the impersonal relations with and in the machines are fundamentally different from the parasocial interaction offered by the television setting:

Seen from the point of view of a developed electronic culture of human-machine relations, television is an interim phase in a process in which only part of the burden for the discursive maintenance and transmission of culture has been delegated to machines. Television has yet to master a full complement of pronouns in relation to the viewer: it is versed in addressing the viewer as *we* and *you*, and it is good at the present subjunctive mode of a fictively shared present, but it is left to the genres of cyberculture to develop the full implications of being immersed *inside* a virtual world—what amounts to appearing to enter inside the box and the screen. (Margaret Morse, *Virtualities: Television, Media Art, and Cyberculture* [Bloomington: Indiana University Press, 1998], 4)

60. Feedback is a concept from regulator technology and assumes a central place in cybernetics. Feedback is regulation with a circular structure, in which regulation operates in a closed circle with negative feedback. See Otto Mayr, *Zur Frühgeschichte der technischen Regelungen* (Munich: R. Oldenbourg, 1979). In electronics, we differentiate the cophasal signal of a positive feedback from the opposite phase or negative feedback signal when feeding back the output signal to its acoustic or optical input signal. Whereas with positive feedback, the input signal is boosted and used in the oscillator for generating circuits of oscillation (something that leads to the multiplication of the image's waveform in connection with scan processors, which possess oscillators, and video synthesizers), negative feedback causes an effect of stabilization and weakens the input signal so that distortions in the amplifier can be minimized. Feedback in video can be used in conjunction with other effect devices and can be varied at will.

61. Mixed realities means spaces, which mix dimensions simulated in media and actual physical ones in such a way that spatial surroundings are generated, in which the viewers interact coherently

with the physical reality and a digitally coded one. As Mette Ramsgard Thomsen describes this concept of virtual environments, "Mixed Realities are spaces that integrate mediated and physical dimensions. Defined as 'spatial environments where participants can interact with physical and digital information in an integrated way,'" ("Positioning Intermedia: Intermedia and Mixed Reality." *Convergence*, 8.4 [2002]: 37).

62. This direction of the audiovisual points to an abstraction, which has its foundation in a tendency toward the musicalization of the technical image, as described by Flusser, where distinguishing between media has ceased to be important and where *audio* and *video* interact on the same structural level. See Flusser, *Ins Universum der technischen Bilder*, 138.

63. Rosalind Krauss writes, "What I'd like to talk about here is a rhythm—a beat or an oscillation, a kind of pulsating On/Off, On/Off, On/Off—which in itself counteracts, in a destructive and degenerative manner, the stability of the visual space. For the beat possesses—as I hope to demonstrate—the power to subvert and dissolve the very consistency of form, on which, as one can imagine, visibility depends" (*Der Impuls zu sehen* [Bern: Benteli, 1988], 7).

64. Jean-François Lyotard, *Discours, Figure* (Paris: Klincksieck, 1971).

65. Rosalind Krauss, *The Optical Unconscious* (Cambridge, Mass.: MIT Press, 1993), 217.

66. Ibid., 221.

67. Just as McLuhan describes film as the medium and technology of transition, which he sees as "from lineal connections to configurations," by adapting this idea, video can be seen as the medium and technology marking a transition from analog to digital media forms, and, in fact, from linearity to bifurcation, particularly through modular components. See McLuhan, *Understanding Media: The Extensions of Man*, 12.

68. W. J. Mitchell (born 1944), professor of architecture and media art and sciences at The Massachusetts Institute of Technology, author of, among others, *The Reconfigured Eye. Computer-Aided Architectural Design, City of Bits. Me++: The Cyborg Self and the Networked City* should not be confused with the W. J. T. Mitchell (born 1942) also cited in this study, Gaylord Donnelley Distinguished Service Professor of English and Art History at the University of Chicago and author of, among others, *Iconology. Picture Theory*, and *The Last Dinosaur Book* and editor of *Landscape and Power* and of the journal *Critical Inquiry*.

69. William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era* (Cambridge, Mass.: MIT Press, 1988), 7.

70. Ibid., 8.

71. Couchot, "La mosaïque ordonnée ou l'écran saisi par le calcul," 83. Using the concept, "digital image" is to be seen more critically than the talk of the "electronic image," because, if it must be assumed that on the digital level of computers "all written, optical and electrical media" merge (see Coy, "Die Turing-Galaxis-Computerals Medien"), the concept of the image can only be restricted and has to be modified. In any case, Couchot's vocabulary of *l'image simulée* (the simulated image), *l'image numérique* (binary-coded, computed-written image; I attempt to circumvent the designation "numerical," because the binary alphabet is not necessarily prescribed by this), and *image de synthèse* (synthetic image), because here the criterion of optionality is included. If, in what follows, the term

"digital image" does, however, continue to appear for reasons of a simplified terminology, it does not mean an image, but consistently the technical simulation of pictoriality, which is why the talk is also about the digital category of imagery.

72. Edmond Couchot, *La technologie dans l'art: de la photographie à la réalité virtuelle* (Nîmes: Jacqueline Chambon, 1998), 134.

73. Ibid., 223.

74. Landow and Delany understand hypertext as an extension of the writing and reading process into a complex network. "We can define *Hypertext* as the use of the computer to transcend the linear, bounded and fixed qualities of the traditional written text. Unlike the static form of the book, a hypertext can be composed, and read, non-sequentially; it is a variable structure, composed of blocks or text (or what Roland Barthes terms *lexia*) and the electronic links that join them" (George P. Landow and Paul Delany, "Hypertext, Hypermedia and Literary Studies: The State of the Art," in *Hypermedia and Literary Studies*, ed. George P. Landow and Paul Delany [Cambridge, Mass.: MIT Press, 1991], 3).

75. Based on the appearance of nonsequential writing in literature, Theodor H. Nelson coined the term "hypertext" in 1965. To describe a system of branching out presentation of image and text and all other media in the computer, he introduced the term "hypermedium." Theodor H. Nelson, *Computer Lib/Dream Machines* (Redmond, Wash.: Microsoft, 1987).

76. Umberto Eco, "Innovation and Repetition: Between Modern and Post-Modern Aesthetics." *Daedalus*, 114.4 (1985): 179.

77. Mitchell, *The Reconfigured Eye*, 7.

78. Grahame String Weinbren, "The PC Is a Penguin," in *Bild-Medium-Kunst*, ed. Yvonne Spielmann and Gundolf Winter (Munich: Wilhelm Fink, 1999), 274.

79. John Simon Jr., *Every Icon* (1996); available at www.numeral.com.

80. John Simon Jr., "Work Notes," *Parachute*, 85 (1997): 25.

81. Weinbren, "The PC Is a Penguin," 274.

82. Edmond Couchot, "Medien und neue 'Medien': von der Kommunikation zur Kommutation," in *Bild-Medien-Kunst*, ed. Yvonne Spielmann and Gundolf Winter (Munich: Wilhelm Fink, 1999), 78f.

83. Couchot, "Die Spiele des Realen und des Virtuellen," 348.

84. Ibid., 346.

85. From a media-historical viewpoint using film as example, André Gaudreault and Philippe Marion have set out the two formative developmental steps, which here—as with everytime a new medium is born—need to be differentiated: "We might call the first birth a medium's *integrating birth* and the second birth its *distinguishing birth*." When the authors claim the birth of every new medium is problematical and paradoxical, a discoursive engagement with the steps of its development as medium is lacking for the digital medium:

What appears to be developing today is an immediate, willing and eager awareness of a medium's novelty. The label "new media" is quickly tossed around—too quickly perhaps. This no doubt is due to the cultural media-

centrism of the age in which we live. But each time we hail a new medium, this does not mean that the medium in question has managed to leave the cocoon of its first birth and to pass out of its emergent phase. The label "new media" has thus become disengaged from or is perhaps even out of sync with new production practices, which should work in concert with the potential of the new medium. In such cases, the concept of "medium" is reduced to a mere quality as "technological novelty," without any understanding of what sort of specific or even original content will be made possible by this technology once the medium determines its first identifying marks. (André Gaudreault and Philippe Marion, "The Cinema as a Model for the Genealogy of Media," 18)

Chapter 2

1. In the context of the video praxis here under discussion, I differentiate between dance, theater, action, and film performances, which are recorded with video or, alternatively, realized as multimedia and, strictly speaking, represent performance videos and video performances, where the aesthetic-technical potential of video—particularly in the interconnection of various devices—is applied performatively. These performances demonstrate, for example, cocreative processes in the interaction of humans and machines or show up self-reflexively the display potential of cameras "operating" with each other, monitors, and effect devices. The physical presence of an actor in front of the camera can contribute to this, but does not have to necessarily. "Machine performances" related to objects are also possible.

2. Paik claims to have first presented video (1965) and demonstrates in October 1965 in his studio in New York the "demagnetizer," an electromagnetic ring that manipulates the wave patterns of the television image. In Paik's first satellite broadcast for the opening of *Documenta* 6, he shows a live video performance with Charlotte Moorman (the contributions of Joseph Beuys and Douglas Davis are also broadcast live). For Paik, who develops the Paik-Abe synthesizer (1969) together with Shuya Abe, the primary interest lies in synthesizing audio and video sources (particularly found image material from film and television) from compositional viewpoints and in creating with that "1001 possibilities for spontaneous television" (Nam June Paik, "Video Synthesizer Plus," in *Nam June Paik. Fluxus/Video*, ed. Wulf Herzogenrath [Bremen: Kunstverein in Bremen, 1999], 137).

3. Among numerous publications, which establish the international discourse over art and video, there should be cited Bettina Gruber and Maria Vedder, eds., *Kunst und Video. Internationale Entwicklung und Künstler* (Cologne: DuMont, 1983); Ira Schneider and Beryl Korot, eds., *Video Art: An Anthology* (New York: Harcourt Brace Jovanovich, 1976).

4. "The principal technical function of the videorecorder is to store television signals, as it converts television frequencies into electromagnetic impulses, writes these onto a magnetic tape by means of one or more magnetic heads, reads them to reproduce them and directs them once again in the form of frequencies to the receiver device" (Siegfried Zielinski, "Audiovisuelle Zeitmaschine. Thesen zur Kulturtechnik des Videorecorders," in *Video-Apparat/Medium, Kunst, Kultur*, ed. Siegfried Zielinski [Frankfurt/M: Peter Lang, 1992], 91).

5. Half-inch video recorders for amateurs established themselves at the beginning of the 1970s, and the VHS format still in use today did not come onto the market until the end of that decade.

"However, a decisive advance was already being prepared by Sony, which in 1970 demonstrated its U-matic format, three-quarter-inch cassette system, introduced to Britain some two years later. Editing video tape recorders and portable battery-charged cameras were added to the system, and this format became for a time the industrial (non-broadcast) standard" (Roy Armes, *On Video*, 84).

6. Woody Vasulka, "Sony CV Portapack: Industrial, 1969," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. David Dunn, Steina Vasulka, and Woody Vasulka (Santa Fe, N.M.: The Vasulkas and Linz: Ars Electronica, 1992), 150.

7. "Groups like Videofreex at the end of the 1960s joined together in order to provide alternative models of television. Feedback was utilised, formally, as an alternative to the previous types of light shows at rock concerts. The attempt was to create a bioelectrical sphere. It was the amazement of being stoned through technology, and this also provided a sense of community" (Dara Birnbaum, quoted in Nicolas Guagnini, "Cable TV's Failed Utopian Vision: An Interview with Dara Birnbaum," *Cabinet: A Quarterly Magazine of Art and Culture*, 9 (2002/03): 36.

8. Statement by David Hall in an email message to the author, 24 May 2004.

9. Deirdre Boyle, *Subject to Change: Guerrilla Television Revisited* (New York: Oxford University, 1997), 9.

10. Ibid., 10.

11. Ibid., 4.

12. Johanna Branson Gill's analysis of the "state of the art" follows the same argument: "Consequently, the term 'video art' does not describe any single unified style; it indicates a shared medium" (Johanna Branson Gill, *Video: State of the Art* [New York: Rockefeller Foundation, 1976], 1).

13. The title arose in 1971 through *Guerrilla Television*, which was published by Michael Shamberg together with Raindance Corporation (pseudonym; actually Frank Gillette), in which he attacks commercial television and its deception of the mass audience in the style of a manifesto and calls for technological radicalism in the form of video, which should enable decentralized television and radical democratic channels of information in the hands of video collectives. "The term 'guerrilla' in conjunction with media was first used, as far as I know, by Paul Ryan several years ago, when he coined the phrase 'cybernetic guerrilla warfare,'" so Shamberg writes in his preface. Shamberg founded the video collective "TVTV" in 1972, which specialized in documentary form. As Deirdre Boyle set out in her detailed account of the history of the video pioneers, TVTV, Broadside TV, and University Community Video were replaced by a new generation of television makers, by new technology and other forms of documentation at the end of the 1970s. (See Michael Shamberg and Raindance Corporation, *Guerrilla Television* [New York: Holt, Rinehart and Winston], 1971).

14. Callie Angell, "Doubling the Screen: Andy Warhol's *Outer and Inner Space*," *Millennium Film Journal*, 38 (2002), 24. *Outer and Inner Space* was restored in 1998 by the Museum of Modern Art in New York and shown in October 1998 in the Whitney Museum of American Art, after the work had not been seen for more than thirty years subsequent to its first showing in 1966 at the Filmmakers Cinematheque in New York (and a few further showings).

15. Statement from Jud Yalkut in an email message to the author, 18 April 2004.

16. For example, Paik's *9/23/69 Experiment with David Atwood*, realized in 1969 in the WGBH studio together with the television engineer David Atwood and using the Paik-Abe synthesizer; the electronic landscapes in Ed Emshwiller's *Scape-mates*, developed with an early video synthesizer and produced in 1972 at TV Lab at WNET, and Steina and Woody Vasulkas's *Six Programs for Television: Steina, Objects, Digital Images, Transformations, Vocabulary, Matrix*, produced by WNED, Buffalo in 1978 (broadcast in November 1979).

17. The stylistic techniques of *cinéma vérité* and *Direct Cinema* are different through the presence of the apparatus, for, whereas *Direct Cinema* tries to conceal the presence of the camera, which, like a fly on the wall, is not supposed to be visible and to intervene in the action, cinéma vérité, by contrast, uses the camera openly as an instrument for stimulation, to which people are meant to react directly. Here the position of the camera finds expression in the metaphor of the "fly in the soup." The technological background of *Direct Cinema* is important for the documentary-political direction in video. The new possibility of the handheld camera with synchronous sounds is used in it as a stylistic technique to generate greater authenticity. The overall style is determined by a coarse-grained image, improvised lighting, and shots not being exactly aligned so that people being filmed are partially cut or wind up outside of the frame. All this underlines the desired impression of directness and nonintervention. The direction of ethnographic cinema, developing at the same time on the West Coast, is also significant for the context in which the documentary video develops historically in the media, because there too the principle of not intervening in the filmed reality predominates, with the argument of not wanting to interpret what is being filmed. In that vein, close-ups and editing are avoided as stylistic techniques in favor of emphasis on uncut long takes. The video pioneers espouse, in a way comparable to ethnographic film and *Direct Cinema*, the aesthetic of the free, hand-held video camera for so-called street tapes and produce hours of video tape, often uncut, in which, as is stressed, the ongoing process is more important than technical perfection. For these accounts I thank the Polish film scholar Miroslaw Przylipiak who worked on the study, "Between Ideology and Representation: American Direct Cinema," (unpublished manuscript).

18. Boyle, *Subject to Change: Guerrilla Television Revisited*, 8.

19. Armes, *On Video*, 7f.

20. "There was a considerable amount of 'guerrilla video' activity, resulting in videotapes which touched upon areas of life and politics avoided by network news: minority group problems, changing sexual practices, third party political campaigns, and more. TVTV was in fact the first public evidence of a direction that had been thoroughly explored and developed by Global Village in New York City, by the Videofreex in upstate New York and by Ken Marsh's Woodstock (New York) Community Video. A primary objective of all these groups was the telecast of their work over local television channels" (Allison Simmons, "Introduction. Television and Art: A Historical Primer for an Improbable Alliance," in *The New Television: A Public/Private Art*, ed. Douglas Davis and Allison Simmons [Cambridge, Mass.: MIT Press], 12).

21. "Women were allowed to serve the tea and granola bars but were asked to give up their chairs to the 'guys' when seating ran short," as Boyle describes the working situation at "Raindance" (Boyle, *Subject to Change*, 11).

22. The publishing organ of the American Video Community is the journal *Radical Software*, which dealt exclusively with independent video and the beginnings of video art. *Radical Software* (published by Raindance Corporation) appears in eleven issues altogether from 1970–1974 (all issues are archived online and freely available at www.radicalsoftware.org.)

23. McLuhan, *Understanding Media*.

24. Buckminster R. Fuller, *Operating Manual for Spaceship Earth* (New York: Pocket Books, 1969).

25. The *Whole Earth Catalogue* (appearing from 1968 to 1994) is a mail-order catalogue and operating instructions for do-it-yourself in one.

26. Fuller exemplified his suggestion on comprehensive thinking materially in constructing a transparent, foldaway dome, the *Geodesic Dome*, consisting of an open lattice of aluminum poles. For the world exhibition in Montréal in 1967, Fuller constructed a geodetic dome seventy-six meters across, the outer skeleton of which—after a fire—is still standing today. "The fascination, which the glistening 'bubble' exerted—it is difficult to define this object as a building—was the product of a refined network—geometry, of photosensors and computer control. Cables were laid through the tubular poles across the whole network, so that every facet could be steered individually" (Joachim Krausse, "Buckminster Fullers Vorschule der Synergetik," in Buckminster R. Fuller, *Bedienungsanleitung für das Raumschiff Erde und andere Schriften* [Dresden: Verlag der Kunst, 1998], 274).

27. In the tradition of the documentary-political videotape are the works of Paul Garrin, who, although he develops numerous effects as Paik's assistant, in his own works understands video as a direct medium and as "testimony" and "weapon" of oppositional public circles. In contrast to the state-controlled video surveillance, Garrin records in 1989 the violent confrontations between demonstrators and the New York police in Tompkins Square Park, something that, when the tape is shown that evening by CBS and NBC, shows up the improper conduct and the brutal excesses of the police.

28. The art critic Brian O'Doherty coined the term "White Cube" in 1963 for an attitude in contemporary art, which considers the gallery space as a framework for art, in which every expression is seen by definition as art and is subject to market rules. The art of the 1970s expands this border with processual works and favors an "uncertainty of context," even if the framing function of the art space is not necessarily questioned. See Brian O'Doherty, *Inside the White Cube: The Ideology of the Gallery Space* (Santa Monica: Lapis, 1986). The mediatization not further pursued by O'Doherty is not really substantiated in the critical reception of the work, for example in the afterword to the German edition by Markus Brüderlein—who corrects the unfortunate German translation of the title by Wolfgang Kemp, *In der weißen Zelle* (Berlin: Merve, 1996), and speaks more precisely about the "weissen Würfel"—so that there is no discourse concerning the question of space in the video scene. Although the video artists of this second grouping deal via media with the features of the White Cube and what makes it problematic within the art forms of this time and in doing that are striving for access and acknowledgment in the framework of art, there can be noted, in contrast, that the third grouping, with their technology-oriented experiments, pay greater attention to the light conditions in the exhibition sites and to developing display conditions specific to media. The Black Box now become typical for presentation of electronic media art is a direction recently taken

by video exhibitions, which propose both, White Cube and Black Box, but also semiblackout spaces as the mode of presenting for video in galleries and museums. Worth mentioning as examples are the exhibitions *Video Cultures* at the ZKM in Karlsruhe in 1999 and *Gary Hill* in the Kunstmuseum Wolfsburg in 2002.

29. See Eckhard Schneider, ed., *Tony Oursler: Videotapes, Dummies, Drawings, Photographs, Viruses, Light, Heads, Eyes, and CD-ROM* (Hannover: Kunstverein Hannover, 1998).

30. In this respect, too, Paik represents an exception, because he succeeds, as one of the first, in establishing the suitability of electronic media culture for exhibition.

31. The video works of Dan Graham in the 1970s are either recordings of performances or architectural situations in spaces with mirror walls (or mirrored walls) that are surveilled by video, where through mirror reflection, video recording, and transmission—with time delay—superimpositions confront the viewer with their own video image or with the video image of a second space. It is fundamentally a question of perceptual experiments with time delay in this application of video technology and shifting perspective between various video cameras and cameras mutually "observing" each other, the images from which are recorded in real time (*live*) and reproduced in other spaces subject to time delay and slow motion, as the case may be. For the debate in video aesthetics, these works orientated toward architecture and the experience of mirrored, televisually reflected installations in space are not significant. In principle, it is a question of using the form of the video medium as presence to experience spatial, architectural circumstances in time. See Dan Graham, *Video-Architecture-Television: Writings on Video and Video Works, 1970–1978*, ed. Benjamin H. D. Buchloh (New York: Nova Scotia College of Art & Design and New York University, 1979).

32. See Sol Lewitt, "Sentences on Conceptual Art," in *Conceptual Art: A Critical Anthology*, ed. Alexander Alberro and Blake Stimson (Cambridge, Mass.: MIT Press, 1999), pp. 106–108.

33. See Valie Export's versions of the Madonna in the video sequences of her film *Unsichtbare Gegner* (*Invisible Opponents*, 1976) and Ulrike Rosenbach's embodiment of the Venus of Sandro Botticelli (ca. 1460) in the performance videofilm *Reflexionen über die Geburt der Venus* (*Reflections on the Birth of Venus*, 1976/1978). Friederike Pezold follows another approach by distributing her own body-image in the videotapes "Schamwerk" (genital work), "Armwerk" (arm work), "Brustst ück" (breast piece), "Schenkelwerk" (thigh work), and "Mundwerk" (mouth work), which combine to produce *Die neue leibhaftige Zeichensprache* (*The New Corporeal Sign Language*, Austria 1973–1977), 60:00, b/w). Here the concern is with—diverging from "tele-vision" (seeing afar)—an extreme "close vision" (seeing near) of individual body parts, which reveal in this perspective abstract qualities in the forms of the body and take on graphic, two-dimensional qualities in the harsh black and white contrast. With these images, Pezold intends in the close-up video image a desexualized view of the female body, which opposes the reduction of feminity to sexuality usual in the mass media's depictions.

34. In the (then) German Democratic Republic as well, and especially on public spaces in East Berlin, movements of people are recorded on video and analyzed.

35. Dot Tuer, "Spiegel und Mimesis: Eine Untersuchung der Bildaneignung und Wiederholung in den Arbeiten von Dara Birnbaum," in *Dara Birnbaum*, ed. Kunsthalle Wien (Vienna: Kunsthalle Wien, 1995), 30f.

36. Lori Zippay, ed., *Video: A Catalogue of the Artists' Videotape Distribution Service of EAI* (New York: Electronic Arts Intermix, 1991), 159. *Blue Studio: Five Segments* is the title of the first part of the two-part work *Merce by Merce by Paik*. Such examples of video dance, which lay video over the dance performance as an additional element, will not be discussed further in the context of this investigation, particularly because Paik uses the same techniques in other video works, which refer more emphatically to the media forms of television and video.

37. Vostell develops in the context of Fluxus in the early 1960s *Decollage* as a working method, which means actively intervening into the television program via disruptive images and defamilarizations, with the intention of interfering with the communicative function of television anchored as it is in the dispositive process, to replace it with another, unusual form of organizing information.

38. Paik's installation *Beuys/Voice* for the Documenta 8, Kassel 1987, consists of forty-four monitors and three separate videotapes.

39. See Yvonne Spielmann, "Video: The Reflexive Performance of Media Images," in *Coded Characters: Media Art by Jill Scott*, ed. Marille Hahne (Ostfildern: Hatje Cantz, 2003), 209.

40. The substantial video documentation of performance art by Marina Abramovic and Ulay from circa 1975–1986 belongs to this category.

41. Nauman has been working with video in installations since 1967 and began in 1968 to record his performances on videotape and to exhibit these "action videos."

42. It is to the credit of the film historian, Annette Michelson, with her enlightening article "Rose Hobart and Monsieur Phot" in *Artforum* (June 1973) that the filmic work of Joseph Cornell becomes known to a wider public interested in the arts. Cornell influences the American experimental film scene because he is one of the first to compile Film Footage, above all Found Footage. See also the catalog item by Annette Michelson, "Joseph Cornell," in *Peinture: Cinéma. Peinture*, ed. Germain Viatte (Paris: Hazan, 1989).

43. As a representative instance, reference can made to the most important experimental film festival at Knokke in Belgium, where in 1949, 1958, 1963, and 1967 international artistic films can be seen. See the festival report Werner Kließ, Wim Wenders, and Edgar Reitz, "Knockout in Knokke. Porträt des 4. Experimentalfilm-Festivals in Knokke," *Film*, 2 (1968).

44. Birgit Hein and Wulf Herzogenrath, eds., *Film als Film* (Stuttgart: Hatje, 1978). See also Arts Council of Great Britain, ed., *Film as Film* (London: Arts Council of Great Britain, 1979).

45. The works on film by Paul Sharits should be singled out as he inscribes segmentally onto the filmstrip of S:TREAM:S:S:ECTIONS:S:S:ECTIONED (1971) twenty-four vertical scratches until, in place of the moving water displayed, the medium of expression, the filmstrip itself, becomes visible, which is running through the projector at a normal projection speed of twenty-four frames per second. Sharits works particularly with the intervals between the images in projection and is interested in the visible presentation of how various time zones interact in the flicker. See also Yvonne Spielmann, "Paul Sharits: From Cinematic Movement to Non-directional Motion," in *Avant-Garde Film*, eds. Alexander Graf and Dietrich Scheunemann (Amsterdam: Rodopi, 2007.)

46. Peter Weibel, "Steina and Woody Vasulka: Meister des Codes," in *Siemens-Medienkunstpreis 1995*, ed. Zentrum für Kunst und Medientechnologie (Karlsruhe: ZKM, 1995), 78.

47. According to Laurin Rabinovitz, "The New American Cinema Group represented a cooperative effort to advocate a low-budget, personal, or auteurist commercial cinema in the United States" (*Points of Resistance: Women, Power, & Politics in the New York Avant-garde Cinema, 1943–1971* (Urbana: University of Illinois Press, 1991), 119.

48. Rabinovitz also writes, "*Bridge-go-round* evokes a rich, dreamlike atmosphere through a number of formal techniques: low angles and backlighting that emphasize two-dimensionality, zooming in or out while moving through the structure, and sandwiching two of the same image in reversal so that four-way directional movement results" (102).

49. Ibid., 137.

50. As Shirley Clarke explains, "How about a film I once made called *Portrait of Jason*, which, by the way, I thought was a videotape. I thought when I finished it, I could hire myself out as the modern day portrait painter. You know, for $1000, I'll come to your home and do your film on you," in Jud Yalkut, *Electronic Zen: The Alternative Video Generation Talking Heads in Videospace: A Video Meta-Panel with Shirley Clarke, Bill Etra, Nam June Paik, Walter Wright and Jud Yalkut* (available at www.experimentaltvcenter.org/history/people/interviews.php3).

51. According to John B. Ravenal, "The following year, Clarke formed an experimental video and theater collective based at New York's Chelsea Hotel, where she lived for many years. Named after her apartment in the building's tower, the Tower Playpen (T.P.) Video Space Troupe reflected Clarke's cinema verité style.... Clarke documented her family, friends, and social life, producing hundreds of hours of unedited tape" ("Single-Channel Videos," in *Outer & Inner Space*, ed. John B. Ravenal [Richmond: Virginia Museum of Fine Arts, 2002], 64).

52. See Etienne-Jules Marey's "Chronophotography" from 1893. Reprinted as Etienne-Jules Marey, *Die Chronophotographie*, ed. Hilmar Hoffmann and Walter Schobert, *Kinematograph 2* (Frankfurt/M.: Schriftenreihe des Deutschen Filmmuseums, [1893] 1985).

53. Lee Harrison occupies an important position in the development of the first scan processors: "His idea was to view a stick figure as a collection of lines that could be independently moved and positioned to form an animated character. The figure would be displayed on a cathode ray tube (CRT) and be electronically generated and controlled through vector deflection of an electronic beam.... The entire figure is manipulated in three dimensions by passing the control signals through a three dimensional (3D) rotation matrix. These control signals are formed from horizontal and vertical sweep generators, with camera angle, size and position voltages run through rotation matrices contructed from adders, multipliers and sine/cosine generators.... In the late 1960s ANIMAC was converted into a transistorized version and numerous patents granted for it's underlying processes.... The XY display is now rescanned by a video camera with 5 levels of colorization and combined with a background graphic for recording on video tape. These modifications combined with it's new commercial function, were named in 1969: SCANIMATE." See Jeff [Jeffrey] Schier, "Early Scan Processors: ANIMAC/SCANIMATE," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. David Dunn, Steina Vasulka, and Woody Vasulka (Sante Fe, N.M.: The Vasulkas and Linz: Ars Electronica, 1992), 94f.

54. Billy Klüver advocates artists and engineers being equally involved in producing artworks and out of this conviction founds, together with Robert Rauschenberg in 1960 "EAT, Experiments in

Art and Technology." The group first makes an appearance in the presentation of Jean Tinguely's self-destructive, kinetic machine *Hommage to New York* in the garden of the Museum of Modern Art, New York.

55. Chrissie Iles, *Dream Reels: VideoFilms and Environments by Jud Yalkut* (New York: Whitney Museum of American Art, program leaflet, 4.11.–2.12. 2000).

56. In the 1980s, this discussion of music videos arises in the charged area between art, film, and television:

> In reality, music video's format is not only closer to a conventional narrative structure than is normally realized, it is a direct offspring of the television commercial. What distinguishes music video is its shift from a dialogue-directed continuity to an emphasis on a visual-auditory spectacle.... Granted, there are certainly "creative" individuals engaged in exploring the frontier of music video's structural devices. For example, Polish film animator Zbigniew Rybczynski continues to dwell on structure-content relations in his music video projects.... Other film/performance artists who have engaged in music video production include Laurie Anderson and Shirley Clarke. (David Tafler, "The Economics of Renewal. Music Video and the Future of Alternative Filmmaking," *Afterimage*, 14.2 [1986], 10)

57. Fred Camper, "Natural Industry: Water and Power," in *Europäisches Medienkunst Festival* (Osnabrück: Europäisches Medienkunst Festival, 1998), 111.

58. Noel Carroll, "Film," in *The Postmodern Moment: A Handbook of Contemporary Innovation in the Arts*, ed. Stanley Trachtenberg (Westport, Conn.: Greenwood, 1985), 124.

59. Larry Cuba belongs, together with John Whitney and John Stehura, to a generation of filmmakers who bring the languages of film into a harmonious union of abstract art with the programming languages of computers and produce the first computer films. Cuba works as a programmer on John Whitneys's last work to be carried out in film technology leading to the subsequent works on computers, *Arabesque* (USA, 1975). "He is the only artist I know, who is capable of programming his own films in a computer. In his film 'First Fig' he has simple geometrical figures modulating and interweaving in a generally calm tempo, which delights with the purity of its mathematical deployment," writes the expert on the West Coast filmmakers, William E. Moritz. See William E. Moritz, "Der abstrakte Film seit 1930: Tendenzen der West Coast," in *Film als Film*, ed. Birgit Hein and Wulf Herzogenrath (Stuttgart: Hatje, 1978), 138. The two-dimensional, black and white computer film *Two Spaces*, in which Cuba changes patterns in progress as well as performs the principle of reduplication using ornamental figures on a screen surface unchanged in its scale, follows *First Fig* (USA, 1971), which changes abstract image fields, geometrically structured as linear surfaces within an image, into cubic forms with a spatial effect and multiplies them within the image (Woody Vasulka achieves similar effects with the "digital image articulator" in video). On the concept of the computer film and the experiments of Whitney and Stehura, see the chapter on "computer films" in the standard work, Gene Youngblood, *Expanded Cinema* (New York: Dutton, 1970).

60. "Stan VanDerBeek: Biography," in *Online Catalogue*, ed. Electronic Arts Intermix. New York: Electronic Arts Intermix http://www.eai.org.

61. Woody Vasulka quoted in Gill, *Video: State of the Art*, 1.

62. Woody Vasulka, "Video Feedback. With Audio Input Modulation and CVI Data Camera," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. David Dunn, Steina Vasulka, and Woody Vasulka (Sante Fe, N.M.: The Vasulkas and Linz: Ars Electronica, 1992), 148.

63. In *Expanded Cinema*, Youngblood writes, "VanDerBeek has produced approximately ten computer films in collaboration with Kenneth Knowlton of Bell Telephone Laboratories in New Jersey.... Whereas most digital computer films are characterized by linear trajectile figures moving dynamically in simulated three-dimensional space, the VanDerBeek-Knowlton *Poem Fields* are complex, syncretistic two-dimensional tapestries of geometrical configurations in mosaic patterns (246). See also "Retrospektive Stan VanDerBeek," in *Europäisches Medienkunst Festival*, ed. (Osnabrück: Europäisches Medienkunst Festival, 1997).

64. The orbital images originate from the NASA Johnson Space Center.

65. Larry Cuba, Len Lye, Harry Smith, Dwinell Grant, Hy Hirsh, Doris Chase, John Stehura, and James and John Whitney doubtlessly belong to these positions.

66. The definition of a synthesizer used in the debate on video is imprecise and needs to be made more specific with regard to such devices, which, like the Paik-Abe synthesizer and Stephen Beck's direct video synthesizer, synthesize sound and image signals, where the synthesizer can generate image and sound with, but especially without, external input. (Beck's direct video synthesizer produces pictoriality from the signal impulse and generates forms, texture, and colors without camera input.) The *Dictionnaire des Arts Médiatiques* defines synthesis generally as "creating a complex sound wave from out of the elementary components of the electric signal, like amplitude, frequency and duration." In what follows, the analog synthesis in electro-acoustic music is differentiated from numerical synthesis. "This more recent procedure has brought a greater precision into calculations and above all the possibility of recording not only the sound resulting from a process but equally the process itself, making its reproduction in this way possible." If the synthesizer is an analog device, it can repeat a sequence, but, unlike digital synthesis in a computer, cannot store it. Synthesizers—that is, audio-synthesizers, can synthesize audio and video; special video synthesizers work in a larger field of synthesis: "An electronic apparatus allowing manipulation and transformation of colors and forms from a video image and of synthesizing them out of their components." The designation of synthesizer applies to the tranformation and synthesis of signals, that is, essentially compositional processes, where Stephen Beck's direct video synthesizer produces the image itself: "The device differentiates itself from synthesizers preceding it by the fact that it is an instrument for compositon and not a simple distorting apparatus. In the following year (1972), Beck completed *Non-Camera-Image*, a program produced without any camera, thanks to his video synthesizer." All quotations from Louise Poissant, ed., *Dictionnaire des Arts Médiatiques* (Sainte-Foy, Québec: l'Université du Québec, 1997), 321–323.

67. According to Robert Moog, "Most of our synthesizers are built out of standard modules, but we do some custom work. The module is the component of the synthesizer" (Robert Moog, "Moog Modular Audio Synthesizer, 1964," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. David Dunn, Steina Vasulka, and Woody Vasulka [Santa Fe, N.M.: The Vasulkas and Linz: Ars Electronica, 1992], 101).

68. Woody Vasulka quoted in *Six Programs for Television*, "*Matrix*."

69. Dan Sandin quoted in Phil Morton, Dan Sandin, and Jim Wiseman, *In Consecration of a New Space: A Color Video Process* (Information leaflet) (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B41-C16, 26. 1. 1973).

70. Dan Sandin, "Notes on Video Works," written communication to the author, June 2004.

71. Jim Wiseman quoted in Morton, Sandin, and Wiseman, *In Consecration of a New Space.*

72. The information stored in an analog computer is not transmitted as numerical values; the signal remains analog. "It is a case of a mode of presenting given values in the form of physical quantities (voltage, current) where the signal follows the same laws as the variations in the phenomenon studied. . . . With video, the signals are analog by nature and they were recorded in this form right up to the end of the 1970's" (Poissant, ed., *Dictionnaire des Arts Médiatiques*, 10).

73. In the *Dictionnaire des Arts Médiatiques*, the principle of the numerical video is defined as follows: "Conversion of the analog signal into discreet values processable by computer. The procedure implies the installation of an extension card reserved for converting the video signal. Rendering in numbers can be effected continuously or image by image" (ibid., 238).

74. Tom DeWitt, "The Video Synthesizer," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. David Dunn, Woody Vasulka, and Steina Vasulka (Santa Fe, N.M.: The Vasulkas and Linz: Ars Electronica, 1992), 165.

75. Ibid., 166.

76. Ibid., 165–66.

77. As Steina Vasulka confirms in a conversation with the author, the *Rutt/Etra Scan Processor*, and Dan Sandin's *Image Processor* were each only produced in no more than ten to fifteen units. From notes on the conversations between Steina Vasulka and the author in Santa Fe, September 2003.

78. Bill Etra quoted in Steve Rutt and Bill Etra, "Rutt/Etra Scan Processor (Analog), (1973)," in *Eigenwelt der Apparate-Welt. Pioneers of Electronic Art*, ed. Dunn, Vasulka, and Vasulka, 136.

79. Jeff [Jeffrey] Schier, *Description of the George Brown Multi-Level Keyer* (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B37-C2-3, April 21, 1992).

80. Ibid.

81. Steina Vasulka points to the special problem in naming this grouping. This is because the term "video artist" does correspond, on one hand, to their idea of themselves, yet the term is basically burdened through its use in the field of conceptual video art, which belongs to an artistic world not interested in this experimental video art, as Steina stresses. On the other hand, the designation "videomaker" is not suitable, because there was no direct connection for the film world in this group, where the designations "filmmaker" and "film artist" mean something else—namely, the area of production independent of the film industry—and also marks the difference from video. It is precisely the "filmmakers" who differentiate the medium of film strictly from video (from notes on conversations between Steina Vasulka and the author in Santa Fe, September 2003). With regard to the most uniform possible terminology for this study, I suggest taking into account the difference from the art scene and from film, for designating this experimental grouping, nevertheless, video filmers and video artists, to be used at will synonymously with video experiments and experimental

video and also because this group is denoted historically by the fact that they create the very first basis at all for developing an aesthetic specific to video and for articulating an electronic vocabulary.

82. Transcription of the off-camera commentary From Woody Vasulka while demonstrating electronic image forms in *Six Programs for Television.*

83. Quotation from Woody Vasulka in conversation with the author, Santa Fe, March 2001.

84. Boyer constructs a synthesizer ("Boyerthiseur") and he uses, like the Vasulkas, sound as input for video. In 1974 he organized a video exhibition in Montréal and introduced a new medium to an audience familiar with experimental film but not with video (Paik and the other activists on the New York scene were not known). See Jean-Pierre Boyer, ed., *L'image électronique* (Québec: Ministère des Affaires culturelles, 1974). In the exhibition catalog Boyer explains, as Dan Sandin's demonstrates in *How TV Works*, the way a television set functions and the possibilities for signal deviation.

85. Vasulka, "Sony CV Portapack. Industrial, 1969," 150.

86. Among the West Coast filmmakers interested in film abstraction are John and James Whitney, Harry Smith, Hy Hirsh, and Jordan Belson, to mention only the most important. They were influenced by Oskar Fischinger, who emigrated to Hollywood in 1936.

87. John Whitney, *Digital Harmony: On the Complementarity of Music and Visual Art* (Peterborough, NH: McGraw-Hill, 1980), 42.

88. Gene Youngblood sums up the syntactic structure:

There were three major sources of inspiration for the tape—Vasulka's childhood memories of newsreels of world conflict; historian Frances Yates' book *The Art of Memory* and the engravings of the 19th century Romantic illustrator Gustave Doré. Vasulka took from Yates not only the title of his videotape but also one of the tape's two organizing principles, that of "putting thoughts into a landscape." . . . The mnemonic architectures in Vasulka's tape are newsreels, photographs and texts as "memories" of major conflicts of the 20th century—World War II primarily, but also the Russian Revolution and the Spanish Civil War. The movies, photos and book pages ("leafing through history") do not fill the screen but instead are mapped onto shapes or objects that either flow above the landscape of the American Southwest or are continuations of it.

The second organizing principle was to display these image-objects in brief segments with openings and closings. Each segment is composed of three elements: the image-object that is to disappear, the image-object that will replace it, and a wipe that performs a syntactical operation of replacement or succession by masking one while it reveals the other. Gene Youngblood, "Art of Memory" (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds VAS B3-C4-1/2).

89. Gary Hill, "Inter-view," in *Gary Hill*, exhibition catalogue (Amsterdam: Stedelijk Museum Amsterdam and Kunsthalle Wien, 1993), 13.

90. Holger Broeker, "Gary Hill. Catalogue Raisonné," in *Gary Hill: Selected Works and Catalogue Raisonné*, ed. Kunstmuseum Wolfsburg (Cologne: DuMont, 2002), 68.

91. "Gary Hill," in *Online Catalogue*, ed. Electronic Arts Intermix http://www.eai.org.

92. Paik says, "But even McLuhan misuses and mixes up the words 'electric' and 'electronic', which have as much difference as tonal and atonal. In the electronic trade jargon, we distinguish roughly

two sorts of processes: (1) peripheral units, that is, various input-output units and gate circuits: and (2) central processing units, that is, the various data-storage and data-processing units, which have some similarity with organic unity, the animal and human machines" (Nam June Paik, "Art and Technology of Nam June Paik. Interview with Jud Yalkut," in *Nam June Paik: Video 'n' Videology, 1959–1973*. Exhibition Catalogue [Syracuse, N.Y.: Everson Museum of Art Syracuse, 1974], 51).

93. Woody Vasulka in conversation with the author, Santa Fe, March 2001.

94. Steina Vasulka in conversation with the author, Santa Fe, March 2001.

95. Woody Vasulka in conversation with the author, Santa Fe, March 2001.

96. Lucinda Furlong describes in retrospect how representatives of this group understood the new technology as an information resource applicable subversively: "Alternative television also meant creating images that looked different from standard TV. Thus, 'image processing' as we now know it grew out of an intensive period of experimentation that for some, in a vague way, was seen *visually* to subvert the system that brought the Vietnam War home every night." Lucinda Furlong, "Notes toward a History of Image-Processed Video. Eric Siegel, Stephen Beck, Dan Sandin, Steve Rutt, Bill and Louise Etra," *Afterimage*, 11.1–2 (1983), 35.

97. "The 'power' of the violin is its capacity, when electronically wired, to alter and generate video imagery—in effect to co-create Steina's electronic images.... The movement of her violin bow across the strings of the instrument disrupts and transposes the video image, causing the violin bow to appear to squiggle and snake into interlocking waveforms. The alliance of sound and image in the electronic signal allows the audio vibrations of the violin to create image disruptions" (Marita Sturken, "Violin Power," in *Steina and Woody Vasulka: Machine Media*, ed. Marita Sturken [San Francisco: San Francisco Museum of Modern Art, 1996], 26).

98. *Paper Tiger TV*, a weekly news magazine, comments on reporting in the print media. Newspaper reports are read out and subsequently discussed in front of a camera in order to generate in this way a critical awareness in viewers towards the ostensible neutrality of information treated by the media. See Martha Gever, "Meet the Press: On Paper Tiger Television," *Afterimage*, 11.4, (1983).

99. From reading McLuhan, Fuller, and Norbert Wiener's cybernetics, they devise utopian visions of a technological media culture, which is to be marked by open forms of communication and an environment where humanity merges technically with its surroundings. In his critique of McLuhan's social utopia, Raymond Williams rejected what appears here as a social utopia, born from a technological euphoria and not thought through much: "All media operations are in effect desocialised; they are simply physical events in an abstracted sensorium, and are distinguishable only by their variable sense-ratios" (Williams, *Television, Technology, and Cultural Form*, 121.) This sober assessment applies more to the self-image of experimental video praxis, where the approach as media culture is less aimed at a social than at a technical utopia, which, in its aesthetic forms, certainly feeds back into the canon of what is predominantly understood culturally as visual representation—above all relating to television—in order to change it. This group's intervention can be called visionary insofar as it brings the physicality of the medium into discussion.

100. Woody Vasulka, quoted by Marco Maria Gazzano, ed., *Steine e Woody Vasulka: Video, media e nuove immagini nell' arte contemporanea* (Rome: Fahrenheit 451, 1995), 21.

101. "In its entirety, The Kitchen provided a focal point for a variety of informal music, video, and other categorically elusive activities which would have otherwise remained invisible to a large public. Although a few of the names, e.g., LaMonte Young, Alvin Lucier, Nam June Paik, are now known outside of new music and video circles, most people involved remained part of a lesser-known downtown scene, but their contributions were nonetheless vital to The Kitchen's vitality" (Lucinda Furlong, "Notes toward a History of Image-Processed Video: Steina and Woody Vasulka," *Afterimage*, 11.5 [1983], 14).

102. *"Good Morning, Mr. Orwell* was the realization of Paik's dream to orchestrate a global telecast through satellite transmission. Although Paik had envisioned a global television since the 1960's and participated in satellite projects (such as *Documenta* in 1977), the opportunity to realize a full-scale live performance telecast was achieved first with *Good Morning, Mr. Orwell. Good Morning, Mr. Orwell* was broadcast live on January 1st 1984 and transmitted simultaneously to Korea, the Netherlands, Germany, France and the United States" (John G. Hanhardt, *The Worlds of Nam June Paik* [New York: Guggenheim Museum, 2000], 230).

103. In retrospect, this example can count as the ancestral scene of today's live events in front of television cameras, when *live* and *life* are allied, as is the case, for instance, in war reporting, hostage dramas, terror attacks, and so forth, when events are recorded on video and broadcast on television. For the television and video context in those days, however, the distinguishing feature stands more strongly in the foreground: Paik's initiatives, as well as Birnbaum's, come under the heading of applied analysis of existing ways of using public images.

104. In Marcel Odenbach's videotape *Sich selbst bei Laune halten oder die Spielverderber* (Keeping yourself happy or the Spoilsports) (Germany, 1977, 15:00, color, sound), Odenbach can be seen as he passes the time with various puzzles, while the inserted photos of RAF victims and perpetrators symbolize a different sort of "party game" in this interpretation. Both groupings—players and terrorists alike—are each caught up in their own frameworks, that is, in both cases no communication takes place; both "worlds" exclude others.

105. See chap. 1, note 76, Eco, "Innovation and Repetition," 179.

106. Formally, video scratching maintains a dialogue with musical sampling and can be regarded as an early form of VJ performance, where pictoriality (predominantly film and television) is treated in rhythmic perspectives. The media-cultural intentions in video and in VJ remix are, however, different. Whereas with Ortiz, motivated by his Spanish-Latin American background, the deconstruction of the products of European-American media culture, with Hollywood cinema at its center, form the focus of an analytical criticism of the social norms of behavior represented in them, what stands out in the DJ/VJ performance is that—even if audiovisual, historical, and intercultural references are merged—the points of friction intended lie elsewhere. They are less directed to setting the material in context, but arise instead from the interaction of live mix and the stimulating of the audience in a sector of the media rapidly turning commercial.

107. For a definition of the purist, "materialist-structuralist" tendency in experimental film, see the standard work, Peter Gidal, ed., *Structural Film Anthology* (London: British Film Institute, 1976).

108. This has been—with comparable clarity—indicated as acutely as possible by Rosenbach, Export, Pezold, and a few other video artists in the 1970s. The approach was marked not least by the political intent of countering the exclusion of women in the (media's) public arena.

109. According to Erkki Huhtamo, "This work fed into the video *Telling Motions* in 1986: here a key consisting of 26 image/music combinations was used, which were respectively designated after the letters of the alphabet (A–Z). This code formed the basis of a system, with which each statement in language could be translated into an audiovisual sequence made from movable image/sound modules" (Erkki Huhtamo, "Weich und Hart oder Bill Seamans emotionale Architektur," in *Der elektronische Raum: 15 Positionen zur Medienkunst*, ed. Kunst- und Ausstellungshalle der Bundesrepublik Deutschland (Ostfildern: Cantz, 1998), 117.

110. See chap. 1, note 55, Kittler, "Fiktion und Simulation," 64.

111. In *The Passing* (USA, 1991, 4:00, b/w, sound), using various cameras (light-sensitive night camera, super-low-light camera, and infrared camera) and reducing the size of the image field in relation to the image format both serve to underline a basic mood determined by the death of Viola's mother and centering on the course of life in time.

112. I borrow the term from the title of an exhibition "video cult/ures," which presents "multimedia installations from the 90's." "The 'slash' in the middle of the word 'cult/ures,' which separates the semantic segment 'cult' virtually, can be read at the same time as a pointer to the www configurations of international website addresses and in that way a stand-in for the principally global configuration of media culture. Its communicative strategies do not run via the aether or the screen any more, but have video recordings circulating directly in the network and make private spaces accessible to the network's audience through webcams and live feeds" (Ursula Frohne, "video cult/ures," in *Video Cult/ures*, ed. Ursula Frohne [Cologne: DuMont, 1999], 14).

Chapter 3

1. Gene Youngblood, "Cinema and the Code," *Computer Art in Context: ACM SIGGRAPH '89 Art Show Catalog: Leonardo Supplemental Issue* (1989), 28.

2. Douglas Kahn, *Noise. Water. Meat: A History of Sound in the Arts* (Cambridge, Mass.: MIT Press, 1999), 22.

3. Jean Gagnon, *Video Sonority: Video Born of Noise* (Ottawa: National Gallery of Canada, 1994), 3.

4. Ibid., 4.

5. The signal in video essentially generates various waveforms: they form the smallest and indivisible unit capable of multiple combinations, manipulation, monitoring, and, therefore, being governed. In computers, the signal's generic category appears in the bit, which defines the information (in binary code 0 or 1), which in turn generates the pixel. The definition of information in the pixel depends on the number of its bits. On this basis, the pixel denotes the smallest governable and definable "point," with the two basic elements: address/localization and content/color, for iconic presentations in the digital medium.

6. Woody Vasulka, "A Syntax of Binary Images. An Interview with Woody Vasulka, by Charles Hagen," *Afterimage*, 6.1–2 (1978), 20.

7. McLuhan, *Understanding Media*, 41.

8. Ibid., 42–43.

9. The gender difference in this discourse as shown involves a power structure, as the imagined female partner appears in the childlike form of a "girl" and has a correspondingly subordinated position in space, which, however, underlines what is objectionable in the hidden sexual acts.

10. The body performances, which Acconci has carried out in closed spaces, in public city spaces, blindfolded and confronting the audience present are documented in the special issue Vito Acconci, "Vito Acconci," *Avalanche*, 6 (1972).

11. Edward T. Hall, *The Hidden Dimension* (New York: Doubleday, 1966).

12. Florence Gilbard, "An Interview with Vito Acconci: Video Works 1970–78," *Afterimage*, 12.4 (1984), 9.

13. Acconci is here influenced by Kurt Lewin's studies of field theory, which set out a topological psychology of changes in place, processes of movement and events in three-dimensional space, and understand the person and the environment as one context. See Kurt Lewin, *Principles of Topological Psychology* (New York: McGraw-Hill, 1936).

14. Zippay, ed., *Video*, 14.

15. Vito Acconci, "Television, Furniture, and Sculpture: The Room with the American View," in *Illuminating Video: An Essential Guide to Video Art*, ed. Doug Hall and Sally Jo Fifer (New York: Aperture/BAVC, 1990), 132–33.

16. According to Jack Burnham, "Some of these works deal with feats of strength and endurance, others with self-inflicted wounds and the recording of fear-inducing situations. Interestingly, Oppenheim finds no significance in the masochistic aspects of these acts, but he does place some value on their longevity as signs or permanent aspects of his personal history.... In a number of ways, the methods of Oppenheim's art draws nearer to the traditional techniques used by the shaman in so-called primitive societies. Because of his unique ability to bring about social harmony and heal the sick, the shaman is regarded within his group as an extremely powerful, if not magical person. But he comes by these powers only after long periods of psychological sickness followed by stages of self-induced cure" ("Dennis Oppenheim: The Artist as Shaman," *Arts Magazine*, 47.7 [1973], 42).

17. McLuhan explains that, as a result of the media's accelerated development, humans are forced to "extend" various parts of their bodies "by a kind of autoamputation. In the physical stress of superstimulation of various kinds, the central nervous system acts to protect itself by a strategy of amputation or isolation of the offending organ, sense or function" (*Understanding Media*, 42).

18. Ulrike Rosenbach, "Video als Medium der Emanzipation," in *Videokunst in Deutschland 1963–1882*, ed. Wulf Herzogenrath (Stuttgart: Gerd Hatje, 1982), 102.

19. Klaus Honnef, "Der Kreis, der Mythos und die Medien. Stichworte zum künstlerischen Werk von Ulrike Rosenbach," in *Ulrike Rosenbach: Die einsame Spaziergängerin*, ed. Ursula Schönewald and

the City of Göttingen (Göttingen: City of Göttingen, 1998). The theme of the circle in this work encompassed a further space in which Rosenbach's daughter Julia was, in parallel to the action, sitting in front of a circular arch formed out of salt and setting steel balls rolling.

20. Noel Carroll, "Joan Jonas: Making the Image Visible," *Artforum*, 12.8 (1974), 52.

21. Krauss, "Video," 187.

22. Valie Export, "Mediale Anagramme," in *Mediale Anagramme*, ed. Neue Gesellschaft für Bildende Kunst (Berlin: NGBK, 2003), 7.

23. See the description of this work in *Dara Birnbaum*, ed. Kunsthalle Wien (Vienna: Kunsthalle Wien, 1995), 83.

24. Tuer, "Spiegel und Mimesis," 31.

25. "As he sings 'I have only one burning desire, let me stand next to your fire', we watch the woman drown her fire with alcohol" (Ravenal, "Single-Channel Videos," 42).

26. Tuer, "Spiegel und Mimesis," 28–29.

27. Dara Birnbaum quoted in Guagnini, "Cable TV's Failed Utopian Vision," 37–38.

28. The trilogy consists of *Evocation* (1983, 10:02), *Will-O'-The-Wisp* (1985, 5:46), and *Charming Landscape* (1987, 6:30).

29. *Dara Birnbaum*, 76.

30. See the theoretical model of remediation in the media from Bolter and Grusin with its double strategy of immediacy and hypermediacy, *Remediation*.

31. In *Video im Kunstmuseum Bonn: Die Sammlung*,

> Klaus vom Bruch reaches back with this tape (*Das Schleyerband/The Schleyer Tape*) for the first time into existing or, respectively, broadcast film material.... The reports of the freeing of the hostages in Mogadischu at the beginning of the tape are introduced by the painted image of a squad of soldiers boarding their plane. The ambivalent pathos of the image's motif, which is known from numerous later videotapes from the artist in the form of documentary film shots, relates here immediately to the deployment of the GSG-9 team in Mogadishu.... In a prominent position, marking the climax of the events and likened to the governmental statement on the murder of H. M. Schleyer or, respectively, before Helmut Schmidt's speech to the SPD (Sozialdemokratische Partei Deutschlands/German Social-Democrat Party), statements from the BKA (Bundeskriminalamt-Federal Criminal Police Office) are superimposed with wanted photos of terrorists being sought, into which a performance by Udo Lindenberg is edited. The tape ends with the shot of a sunset, which forms the background to Doris Day's 'Time to say Goodnight" (31–32).

32. Michael Stoeber, "Zurück in die Zukunft. Zu den Video-Bändern von Klaus vom Bruch," in *Klaus vom Bruch: Video-Installationen*, ed. Carl Haenlein (Hannover: Kestner-Gesellschaft, 1990), 15.

33. Paul Virilio, *War and Cinema: The Logistics of Perception*, trans. Patrick Camiller (London: Verso, 189), 59.

34. Ibid., 60.

35. "The second element which will disturb the *studium* I shall therefore call *punctum*, for *punctum* is also sting, speck, cut, little hole, as well as a cast of the dice. A photograph's *punctum* is that accident which pricks me (but also bruises me, is poignant to me)" (Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard [New York: Hill and Wang, 1981], 27).

36. Virilio, *War and Cinema*, 66.

37. For a description of the works, see *Video im Kunstmuseum Bonn: Die Sammlung*, 31.

38. In a conversation with Sylvère Lotringer on "pure war," Paul Virilio cites the azimuthal projection as an expression for a geography of speed. The translators into German explain, "The azimuthal projection is one of the cartographic possibilities for solving the problem of representing the (three-dimensional) surface of the globe on the (two-dimensional) level of a map. Whilst the regular maps are fashioned after a cylindrical projection (the map is wrapped around the globe like a cylinder), with the azimuthal projection the map (the projection surface) is a plane touching the earth at one point. The pole is mostly chosen for that. Such a projection can only represent one hemisphere of the earth" (Marianne Karbe and Gustav Rossler [translators], note 3a in Paul Virilio and Sylvère Lotringer, *Der reine Krieg* [Berlin: Merve, 1984], 172).

39. These experiments are entitled: (1) *Copilia*, (2) *Disparity*, (3) *Convergence*, (4) *Fovea*, (5) *Impulse*, (6) *Fusion*, and (7) *Inside the Radius*. They resemble in their approach the sources of imagery mixed in the keyer in Steina Vasulka's *Orbital Obsession* (1977), where two cameras record each other and the surroundings in the studio, then, however, execute rotations and are given a flicker rhythm in the field switcher. See chap. 3.

40. "Peter Campus," in *Online Catalogue*, ed. Electronic Arts Intermix http:www.eai.org.

41. Ravenal, "Single-Channel Videos," 85.

42. "The structural film insists on its shape, and what content it has is minimal and subsidiary to the outline" (Peter Adams Sitney, "Structural Film," in *Film Culture Reader*, ed. Peter Adams Sitney [New York: Praeger, 1970], 327). Peter Gidal has brought criticism of representation, or "documentation," respectively, of something by means of emphasizing the medium's material features, which govern the filmic process instead, into focus in his definition of the "structural materialist film": "An avant-garde film defined by its development towards increased materialism and material function does not *represent*, or *document*, anything. The film produces certain relations between segments, between what the camera is aimed at and the way that 'image' is presented" (Gidal, "Theory and Definition of Structural/Materialist Film," in *Structural Film Anthology*, ed. Peter Gidal, 1).

43. According to Sol Lewitt, "In conceptual art the idea of the concept is the most important aspect of the work. When an artist uses a conceptual form of art, it means that all the planning and decisions are made beforehand and the execution is a perfunctory affair. The idea becomes a machine that makes the art" ("Paragraphs on Conceptual Art," in *Conceptual Art*, ed. Alberro and Stimson, 12).

44. Lucy R. Lippard has coined the term *dematerialization* to denote a central movement of expansion, above all in performance. See Lucy R. Lippard, *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (New York: Praeger, 1973). Ken Jacobs similarly seeks to expand conventional performance praxes with his filmic "Nervous System Performances," as he maneuvers by hand two

film copies in parallel with an extremely retarded image frequency (approximately one image per minute), compared to normal projection speed, using two projectors, the beams of which acquire a new rhythm from a propellor mounted in front of them. As a result, the impression occurs that the image is moving agitatedly forward on the spot. This extreme dynamic generates a dematerialization of the pictorial process, as the actual speed of the imagery corresponds more to the arresting of the movement. See *Ken Jacobs*, ed. Freunde der Deutschen Kinemathek, vol. 70 (Berlin: Freunde der Deutschen Kinemathek, 1986).

45. See Alexander Alberro, "Reconsidering Conceptual Art, 1966–1977," in *Conceptual Art: A Critical Anthology*, ed. Alexander Alberro and Blake Stimson (Cambridge, Mass.: MIT Press, 1999), xxxiv–xxxvii.

46. Note the sequence "Participation TV" in *Global Groove* (1973), in which Paik calls on the viewers of the videotape to close their eyes, open them halfway and then open them again. In similar fashion, Woody Vasulka suggested in *Artifacts* (1980) that the observer might turn the video recorder off and on a few times when playing the tape. In both cases, it is a matter of interruptions in order to avoid the impression of a "closed" work and, by contrast, to emphasize what is experimental, unstable, and ephemeral in the video medium and particularly to make the observer conscious of media's boundaries.

47. "Many in the multinational corporate world of the 1960s likewise imagined ambitious art not as an enemy to be undermined or a threat to consumer culture, but as a symbolic ally. They welcomed the new art because they perceived in it a counterpart to their own pursuit of new products and markets" (Alexander Alberro, *Conceptual Art and the Politics of Publicity* [Cambridge, Mass.: MIT Press, 2003], 2).

48. The strategy for marketing art, which is founded in the idea of an execution, which does not want to display anything else but the execution of a marketing idea, shows up in the example of the artists' group, *General Idea*, which advertised their own idea with advertisement headers and pictograms and offer these "products" in a pavilion they designed. See Barbara Fischer, ed., *General Idea Editions, 1967–1995* (Mississauga, Ont.: Blackwood Gallery, University of Toronto at Mississauga, 2003).

49. Levine's critical radicalization can be described with the main categories Alexander Alberro analyzed in the case of conceptual art. Realizing structural video accordingly means that a reinforcement of the equality of the elements (the staged self-presentation and the homeless there by chance) appears, through which the difference of staging from "found material" seems to level out. This, however, proves to be impossible in the live medium of video and leads to emphasizing participation, insofar as it must necessarily lead to open communication, as this is set up, but not "desired," in the "documentary" street scene. Finally, self-reflexion on the presence of the media apparatus underlines the directness of the process.

50. With this approach, Guiton is closer to Minimal Art. This precedes Conceptual Art and is "overcome" by the latter in various concepts (among them Conceptual Art itself) in such a way that programmatic decisions conceal the aesthetic creativity. The decisive criteria of Minimal Art are "industrial materials and production systems, elementary forms and serial arrangement as well as a certain bulkiness, through which the art indicates its direct correlation to the architectural

'container' of the exhibition space" (Gregor Stemmrich, "Vorwort," in *Minimal Art. Eine kritische Retrospektive*, ed. Gregor Stemmrich [Dresden: Verlag der Kunst, 1998], 14).

51. See Lewitt, "Paragraphs on Conceptual Art," 12.

52. Quoted in "Video Program Notes," in Chris Hill, ed., *Rewind: Video Art and Alternative Media in the United States, 1968–1980* (Chicago: Video Data Bank, 1996), 46.

53. Critical commentary fixes the conjunction of Richard Serra's film and video works with his sculptures in the self-reflexion on fragmenting, reduction, and processual functioning and, with that, lines them up with the abandoning of Pop Art in conceptual Art and Minimalism. Overlapping characteristics are, for instance, in the emphasis of the everyday, of repetition, equality of components, and the notion that instructions are carried out.

However, if numerous artists in the latter half of the 1960's—Serra, Nauman, Dan Graham—became involved in the more "public" medium of film, this was not only out of reflection upon an inadequacy of certain traditional forms of artistic production. It was also because of a politically motivated desire to see the art work divorced from its predetermined character as a unique original with guaranteed commodity value, and to develop forms of production more in keeping with the available means of production and the public character of the art work. It is easy to see—especially now that McLuhanite optimism has been exposed as a sham and the general euphoria concerning media has evaporated—that another important element was involved in the transition from a traditional plastic medium to film and video. This is the insight that the new understanding of the nature of sculpture would translate most readily into the medium of film, which by its very definition permits the reproduction of the space-time continuum. (Benjamin H. D. Buchloh, "Process Sculpture and Film in the Work of Richard Serra," in *Richard Serra*, ed. Hal Foster and Gordon Hughes [Cambridge, Mass.: MIT Press, 2000], 4).

This description applies still more clearly to Serra's video works, which do not actually receive any mention in the art-historical discourse, in contrast to Serra's films.

54. Dieter Kiessling, Description of work quoted in Slavko Kacunko, *Dieter Kiessling: Closed Circuit Video, 1982–2000* (Nuremberg: Verlag für moderne Kunst), 2001, 97.

55. Dieter Kiessling, description of work in Dieter Kiessling, *Projektionen und Videoinstallationen* (Bremen: Gesellschaft für Aktuelle Kunst, 1995), 32.

56. Ibid., 40.

57. Dieter Kiessling, description of work quoted from Kacunko, *Dieter Kiessling*, 31.

58. "The earliest projectors were still separated from the source of illumination so that, when the filmstrip was fed in, a static image was initially projected, which was then 'set running' by a handcrank. The 'arrêt sur l'image', when the film is stopped with it, is only unproblematically possible again through electronic recording" (Joachim Paech, "Der Schatten der Schrift auf dem Bild," 222).

59. Sandra Lischi, *The Sight of Time: Films and Videos by Robert Cahen* (Pisa: Edizioni ETS, 1997), 8.

60. Ibid., 14–15. Quotations in the text by Robert Cahen.

61. Like the Vasulkas, Cahen works with waveforms generated in oscillators, which can be modularly combined with each other. In this regard, his images' aesthetic is comparable to the Vasulkas' works with the Rutt/Era Scan Processor. "'I didn't invent oscilloscope effects', he admits. 'In INA circles, there was a technician who discovered this effect—which the Vasulkas had discovered long before—and I immediately liked it'." Ibid., 43. Quotations in the text by Robert Cahen.

62. "Michel Chion composed the sound track once the editing was complete (perhaps he should be credited with 'acoustic design'). . . . He elaborated aural 'flash-backs' sparked by changes in direction of the landscape racing by. He imposed silence at a crucial moment of a key sequence, making it even more intense" (ibid., 41).

63. Robert Cahen quoted in Jean-Paul Fargier, "Entretien avec Robert Cahen," in *Cahiers du Cinéma, Hors Série: "Où va la vidéo?"* ed. Jean-Paul Fargier (1986), 39.

64. Ibid., 40.

65. This term originates with Thierry Kuntzel, "Le Défilement," in *Cinéma, Théorie, Lectures (Revue d'Esthétique, 2–4)*, ed. Dominique Noguez (1973).

66. "In Cahen's films as well as his video tapes, it is often the sounds that, in the absence of dialogue, provide clues to plot development" (Lischi, *The Sight of Time*, 33).

67. Ibid., 31.

68. See Flusser, *Ins Universum der technischen Bilder*, 138.

69. Barbara J. London, *Virtual States of Mind* (1992); available at www.anu.edu.au/ITA/CSA/callas/redu/CAN+LONDON_TEXT.HTML.

70. Rachel Kent, "Video Notes," in *Peter Callas: Initialising History*, ed. Alessio Cavallaro (Paddington: dLux media arts, 1999), 53.

71. Like the Vasulkas, Peter Callas uses a luminance-keyer, which changes the light intensity—that is, the gradations of brightness values. Unlike a scan processor (as the Vasulkas, Gary Hill, Robert Cahen, and others employ), which needs a voltage input, to change the image's bright values and its forms oscillographically (and control the horizontal drift), the keyer permits the "cutting out" of zero-volt values (black) and of one-volt values (white), which can be made transparent. Changing the color values then comes about with a colorizer.

72. "The CVI allowed you to paint directly over the top of video footage as well as 'with' video footage via an extensive series of effects. I/O was a realtime analogue composite or RGB video signal. . . . My strategy after using the Fairlight for a little while was to abandon the effects (aside from one or two which I utilised extensively) almost entirely and to concentrate on the CVI's ability to create moving stencil planes of still images over video footage, and then later over banks of Fairlight footage in a simulation, at least, of a purely digital domain. This strategy also led me towards a kind of emblematic approach to the use of imagery and further away from narrative structures" (Peter Callas, "Talk at Synthetics," *Powerhouse Museum*, Sunday, July 26, 1998; available at www.anu.edu.au/ITA/CSA/callas/redu/CAN_+SYNTHETICS.HTML).

73. Peter Callas, "Australian Video Art & Australian Identity: A Personal View," in *Continuum '83, Catalogue*, 1983; available at www.anu.edu.au/ITA/CSA/callas/redu/CAN_+CONTINUUM.HTML.

74. Nikos Papastergiadis, "Restless Hybrids," in *The Third Text Reader on Art, Culture and Theory*, ed. Rasheed Araeen, Sean Cubitt, and Ziauddin Sardar (London: Continuum, 2002), 166–67.

75. Peter Callas, "Personal/Political," in *Video Gallery SCAN* (1982); available at www.anu.edu.au/ITA/CSA/callas/redu/CAN_+SCAN.HTML.

76. "As a 'slum kid' who grew up on New York's Lower East Side in the thirties and forties, a member of the first Hispanic family in his neighborhood, Ortiz developed outside the centers of social power.... And even his own particular 'Hispanic' heritage can hardly be described simply: Ortiz's roots reach back through Puerto Rico not only to Portugal and Spain, but to Ireland and to the indigenous Yaqui people of northern Mexico" (Scott MacDonald, "Media Destructionism: The Digital/Laser/Videos of Raphael Montañez Ortiz," in *The Ethnic Eye: Latino Media Arts*, ed. Chon A. Noriega and Ana M. López (Minneapolis: University of Minnesota Press, 1996), 183.

77. Ortiz quoted in ibid., 184.

78. Raphael Montañez Ortiz, "Statement of Video Esthetic," (Archive Zentrum für Kunst und Medientechnologie [Center for Art and Media Technology] Karlsruhe, 1996). (Document with no further references). This differentiates Ortiz from the electronic remix by Paik, who dismantles existing film and television material in a comparable manner, for instance, in *Global Groove*: Navajo drummers and Nigerian dances. Even if these two methods of intervening seem to correspond formally, the intentions are different, as Paik is, otherwise from Ortiz, interested in producing a synthesis from the dismantled elements in a unifying overall concept. The conceptual difference, which is realized in the procedures of Paik and Ortiz, becomes clear when, in decomposition and recomposition, Paik gives form to the electronic flow of information from the New York media world and with that reinforces the inclusion of the Other. By contrast, Ortiz is differently concerned to define the forms of indigenous cultures as an "exterior," and to the extent they do, even if they are realized by the scratching method, remain irritants and cannot be merged with the existing film material on a new level of presentation.

79. "Sound is an important part of indigenous ritual, and the drumming sounds of the pianos that resonated when I chopped them apart were an expansion of their voice, so to speak: for at least a moment they had an indigenous voice" (Ortiz quoted in MacDonald, "Media Destructionism," 188).

80. Stefan Grissemann, quoted in Martin Arnold and Peter Tscherkassky, eds., *Austrian Avant-Garde Cinema, 1955–1993* (Vienna: Sixpack Film, 1994), 30.

81. "*Dance No. 1* begins at the conclusion of the excerpt and moves—in Ortiz's usual repetitive, cycling manner—back to the beginning. At first, we see Kane and Carter circling around each other; and near the end, Carter, Leland and Bernstein move forward in synchronisation, over and over, like a mechanized chorus line" (MacDonald, "Media Destructionism," 194).

82. Ibid., 195.

83. Ortiz, "Statement of Video Esthetic."

84. What, however, separates the British video filmmaker Larcher from the cinematographic experiments with perception from a Michael Snow, who creates a spatial image in *Wavelength* (1966–1967) from a frame through extreme overlapping and zoom and configures in *Back and Forth*

(1968–1969) a sculptural space eradicating any limits to the image using a camera swinging to and fro (see Catsou Roberts and Lucy Steeds, eds., *Michael Snow, Almost Cover to Cover* [London: Black Dog, 2001]), as equally from the formalism in the structural/materialist film, in which, for example, Ken Jacobs produces formal relations between two differently projected copies of the same film, or from Paul Sharits, who presents the structure of the individual film frame as visible material, is an almost genetic melding of filmic and videographic construction. Larcher, in the final analysis, fuses together computer graphics with video graphics out of his interest in the new possibilities of visualization at the limits of visibility.

85. Basic forms of computer graphics in video, as David Larcher has exhibited them in the *Video Void* works, are described in Mischa Schaub, *Code_X: Multimediales Design* (Cologne: DuMont, 1992).

86. The texts on a graphic ground run through the field of imagery in *Video Void, The Trailer* (France/UK, 1997) and programmatically denote the double arrangement of this experiment: "internal void" and "external void," "void of all elements," "void without any properties."

87. David Stout pursues his approach of carrying out signal processes and particularly feedback in computers and of creating a parallel to the experiments with video noise, as he uses video noise as raw material in his computer-noise performances. See Outlook.

88. Nan Hoover, "Für mich bedeutet Video Licht: Ein Gespräch von Friedemann Malsch," *Kunstforum*, 98 (1989): 126–27.

89. Ibid., 129.

90. "I regard myself as an object that I move" (Hoover, quoted in Rob Perrée, *Dialogue: About Nan Hoover* [Cologne: Salon, 2001], 30).

91. Perrée, ibid., 33.

92. Ibid., 36.

93. Among the sources of text, which Gary Hill uses in his video works as the audio component, should be emphasized Martin Heidegger's "Das Wesen der Sprache" (*On the Way to Language*) in the video installation *Between Cinema and a Hard Place* (USA, 1991) built up of twenty-three monitors, Ludwig Wittgenstein's "Bemerkungen über die Farben" (*Remarks on Color*) in the video projection *Remarks on Color* (USA, 1994); Maurice Blanchot's novel *Thomas l'obscur (Thomas the Obscure)* in the videotape *Incidence of Catastrophe* (USA, 1987–1988), and Jacques Derrida, who appears in the installation *Disturbance* (France/USA, 1988) and to whose *Grammatologie (Grammatology)* Hill makes repeated reference.

94. Broeker, "Gary Hill: Catalogue Raisonné," 102.

95. The text goes back to lectures held in 1957 and 1958 (Martin Heidegger, *On the Way to Language*, trans. P. D. Hertz [New York: Harper & Row, 1971]).

96. In the English-language version, Gary Hill's daughter reads the text "Remarks on Color," which appeared in English in 1951; in the German version, another girl reads the German text, "Bemerkungen über die Farben," in Ludwig Wittgenstein, "Bemerkungen über die Farben," in *Complete Works* (Frankfurt am Main: Suhrkamp, 1992).

97. Arlindo Machado, "Why Do Language and Meaning Get in a Muddle?" in *Gary Hill*, ed. Robert C. Morgan (Baltimore: Johns Hopkins University Press, 2000), 158–59.

98. Broeker, "Gary Hill: Catalogue Raisonné," 113.

99. Gary Hill, quoted from Christine van Assche, "Six Questions to Gary Hill," *Parachute*, 84 (1996), 42.

100. See Introduction.

101. See Yvonne Spielmann, *Video and Computer: The Aesthetics of Steina and Woody Vasulka* (Montreal: The Daniel Langlois Foundation, 2004); available at www.fondation-langlois.org/flash/e/stage.php?NumPage=459/461. (English and French) See also Yvonne Spielmann, *An Interview with Steina Vasulka* (Daniel Langlois Foundation, 2004); available at www.fondation-langlois.org/flash/e/stage.php?NumPage=416.

102. Robert A. Haller, *An Interview with Steina* (Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B4-C81, 28.10.1980).

103. Woody Vasulka, quoted from the videotape *Matrix*.

104. "*Matrix* is a series of multi-monitor works that explores the relationship of sound and image in electronic signals: sound as generated by the electronic image; sound that creates an image; and sound and image created simultaneously. Here the Vasulkas realize sound visually, generating abstract aural and visual images simultaneously. Shapes and forms skid, roll and metamorphose across multiple screens like sound travelling through geometric space to our ear. In these matrices, the Vasulkas reduce the image and sound to their bare essentials in order to examine the essence of the electronic image and sound—the signal. A phenomenological exercise on the construction of electronic image and sound, this series is also a playful study of movement in which abstract forms travel across multiple screens to symbolize the kinetics of electronic signals" (Marita Sturken, as cited in *Matrix*, 1970–72 (six loops of horizontal movement) Steina and Woody Vasulka [Description and technical specifications for the video installation *Matrix*, January 9, 1995], [The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B4-C10]).

105. Woody Vasulka, quoted from the videotape *Matrix*.

106. Similar to the way the Vasulkas understand the electronic image as energy and linear form, John and James Whitney already worked on formal solutions for depicting spatial relations through light, shadows, and movement in the *5 Film Exercises* they realized together. They here used colored circles and ellipses and generate abstract movement of form with an optical printer.

107. Steina Vasulka differentiates, on the one side, between the optical feedback of a camera pointed at a monitor and, on the other, two cameras connected to each other by a keyer and producing feedback loops as source of imagery from a system feedback, where the transmitted signal is fed back into the electronic system with a delay. Optical feedback denotes such works as *Orbital Obsessions* and *Distant Activities*; system feedback is notably employed in *Vocabulary*.

108. The performances from 1972–1978 use switcher, keyer (with a computer interface from 1977 on) and analog computer, whereas the later performances in the 1990s work with MIDI protocols to manipulate in real-time the elements of the image stored on videodisc. The performances are

reminiscent of the distortions of the violin by Laurie Anderson, who—by contrast—modulates the violin's sound through a vocoder and mixes it with her own voice, but does not link it to video.

109. Steina Vasulka, in Haller, "An Interview with Steina."

110. "The Zeta Violin is a five-stringed electric violin with a MIDI output. The assignment at the moment is that stops on A and E string point to frame locations on the disk. The D and G strings control speed and direction and the C string is a master controller assigned to address segments on the disk. In another programming scheme, the C string controls which upper strings get assigned their function, as I experiment to make the performance more musical" (Steina Vasulka, Violin Power: an Interactive Performance [description and technical specifications of the performance Violin Power, 1992] [Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B5-C2, 1992]). This performance setting was carried out first with a laserdisc player and, since the end of the 1990s, with a Power Book using the software Image/ine. She also uses this program, developed by Tom Demayer (Steim, Amsterdam) in cooperation with Steina Vasulka, in the video works *Warp* and *Mynd* (both 2000). And in addition, David Stout uses the same software in his interactive video-noise performances to produce auditively and visually comparable matrix effects with computerized feedback processing of noise as raw material—corresponding to feedback in video. See Outlook.

111. Woody Vasulka, "Statement," in Woody Vasulka and Scott Nygren, "Didactic Video: Organizational Models of the Electronic Image," *Afterimage*, 3.4 (1975), 9.

112. On this issue, the "Operating Manual" of the Rutt/Etra scan processor reads, "These waveforms are also used to reshape and animate external images being processed in the synthesizer. When used in combination with other waveform generators or ramp generators, it produces waveforms that are constantly moving, or ones that change from one state to another upon command" (Bill Etra and Steve Rutt, "Second Draft of Text for Section One (of 3 sections) of the 'R/E Video Synthesizer-Operating Manual'" (Unpublished manuscript, New York: Rutt Electrophysics), 7 (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B44-C3).

113. John Minkowsky, "Five Tapes: Woody and Steina Vasulka," in *Program Notes: The Moving Image State-Wide: 13 Tapes by 8 Videomakers*, programmed and distributed by Media Study, Buffalo, September 1978 (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B33-C9).

114. From the notes to conversations between Woody Vasulka and the author in Santa Fe, March 2001.

115. Steina Vasulka and Woody Vasulka, "Raw Tapes," in *Vasulka, Steina: Machine Vision, Woody: Descriptions* (Buffalo: Albright-Knox Art Gallery, 1978), 35.

116. Vasulka, "A Syntax of Binary Images: An Interview with Woody Vasulka, by Charles Hagen," 20.

117. The Vasulkas use the luminance key in their works and not the chroma key.

118. Usually, the scan processor can only manipulate the brightness values. To differentiate, a scan processor can only process the one-volt values (therefore, the bright, white areas) and not the

zero-volt areas (therefore, all black, neutral areas). By contrast, the multikeyer can remove both the areas with one volt as well as with zero volts—that is, make both the white and the black areas transparent.

119. In an unpublished 1979 handbook for the digital image articulator, Woody Vasulka, Jeffrey Schier, and Tom Moxon describe in detail the system's functions. In principle, the machine processes coded units of imagery. The numerical "content" of an image is scanned and stored with eight frame buffers by means of the particular luminance value of the individual image sectors. A numerical value is allotted to each luminance value. The numerical values capable of giving every value in the light/dark area determine the quantity of discreet possibilities for change, which can be carried out in the raster of 128 × 128. Two of four buses supply the frame buffers with information. "By controlling the two busses, reading and writing may be done to different locations in two different buffers. This gives the capability of various picture transformations, such as picture inversion, compression, expansion, edge extraction and outlining" (Woody Vasulka, Jeffrey Schier, and Tom Moxon, "The Articulator Manual" [unpublished technical manual for the digital image articulator] [Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B63-C1, 1979]).

120. Woody Vasulka quoted in Steina Vasulka and Woody Vasulka, *Steina and Woody Vasulka: Video Works* (Tokyo: NTT, InterCommunicationCenter, 1988), 44.

121. Vasulka, "A Syntax of Binary Images," 20.

122. Haller, "An Interview with Steina."

123. Steina Vasulka and Woody Vasulka, "Vasulkas Master Tapes: Tools and Technology [Printed lists of records from a FileMaker Pro database, 1999]" (Montreal: The Daniel Langlois Foundation, Steina and Woody Vasulka Fonds, VAS B1-C4).

124. Marita Sturken, "Summer Salt," in Sturken, ed., *Steina and Woody Vasulka*, 29.

125. The installation *Machine Vision* consists of seven parts: *Allvision, Rotation, Zoom, Pan, Tilt, Double Rotation*, and *Bird's Eye*.

126. Steina Vasulka quoted in Sturken, ed., *Steina and Woody Vasulka*, 44.

127. Dark areas in the face were removed with the luminance keyer and then reintroduced as a reversed image and shifted in time, so that the face presents itself like a dynamized image from a Futurist painting. The delayed "image" is, in addition, set against a "background," which shows windblown trees with shifting image focus and fuzziness, where this material is manipulated forward and backward and in real time but also slowed down.

128. Steina Vasulka, quoted in *Steina and Woody Vasulka*, 23.

129. Ibid., 27.

130. The segments twisted together into "Time Warps" mean inverting time into space. Time's progress can be seen in space so that time is immersively merged into space. The visual forms of slit-scan generate an endless replication of the compressed and decompressed body, which is stretched both in height and width as it runs across the image format (and spreads over several monitors in the installed version of this work).

131. Lynn Hershman, "The Fantasy Beyond Control," in *Multimedia: From Wagner to Virtual Reality*, ed. Randall Packer and Ken Jordan (New York: Norton, 2001), 301.

132. Among others, Jason Lanier, Arthur Krocker, and Allucquère Rosanne Stone are interviewed.

133. "The image of a woman with short blonde hair (played by Marion Grabinsky), who is dressed in a tight miniskirt, a plunging blue corsage in leather, and long-sleeved cloth gloves appears on the projection surface. Sitting on a red sofa, she leans forward and taps from 'inside' on the image and urges the viewer: 'Try to reach through the screen and touch me. Try to press your way through the screen'" (Söke Dinkla, *Pioniere Interaktiver Kunst* [Ostfildern: Cantz, 1997], 184–85).

134. "The visitor is received with the angry questions from a woman (played by Marion Grabinsky): 'How did you get here? Would you please look away! What do you expect to see? What are you waiting for? Do you want me to do something? Forget it! Look at the bed.' Then she stands up, goes to the telephone and picks up the receiver" (ibid., 190).

135. Hershman, "The Fantasy Beyond Control," 302.

136. Ibid., 302–03.

137. "She was played in turn by Lynn Hershman herself and by other actors . . . and without an audience was active in everyday situations—she rented a room in the Dante Hotel, opened a bank account and sought acquaintances through advertisements. . . ." Dinkla, *Pioniere Interaktiver Kunst*, 176.

138. Bill Seaman, "Emergent Constructions: Re-embodied Intelligence within Recombinant Poetic Networks," *Digital Creativity*, 9.3 (1998), 154.

139. Bill Seaman, quoted in Yvonne Spielmann, *An Interview with Bill Seaman* (Montreal: The Daniel Langlois Foundation, 2004); available at www.fondation-langlois.org/flash/e/stage.php ?NumPage=386. Seaman applies his poetic concept of recombination perspectivally to machine-machine interactions, when he strives for programmable formations of hybrids from existing machines in the project *Hybrid Invention Generator*. The point of departure is the analysis of the particular, genetically specific "behavior" of types of machines. "In *Hybrid Invention Generator* I might take a computer-based process and a machine that has a spinning wheel. The computer would say: what do I need to translate the computer code and make it talk to and control a spinning wheel? The computer will need to find those parts and will visualise them resulting in a new entity that might be called 'computerwheel'" (Spielmann, *An Interview with Bill Seaman*).

140. Huhtamo, "Weich und Hart oder Bill Seamans emotionale Architektur," 180–81.

141. In his video work and installation *Red Dice/Dés Chiffrés* (2000), Seaman extends the poem *Un coup de dés jamais n'abolira le hasard (Dice Thrown Never Will Annul Chance)* by Stéphane Mallarmé (1897; first published in 1914) into an intertextual system of references and adds new levels, which refer back to the source text, so that the linguistic arrangement in the text is lengthened into a mediatized experience. See Stéphane Mallarmé, *Dice Thrown Never Will Annul Chance*, trans. Brian Coffey (Dublin: Dolmen, 1965).

142. Seaman, quoted in Y. Spielmann, *An Interview with Bill Seaman*.

143. Bill Seaman, "Exchange Fields: Embodied Positioning as Interface Strategy," *Convergence*, 7.2 (2001): 68–69.

144. Seaman, quoted in Y. Spielmann, *An Interview with Bill Seaman*.

145. Gillian Wearing, quoted in Donna De Salvo, "Interview: Donna de Salvo in Conversation with Gillian Wearing," in *Gillian Wearing*, ed. Russell Ferguson, Donna De Salvo, and John Slyce (London: Phaidon, 1999), 19.

146. Ibid., 25.

Outlook

1. David Stout, "Introductory Notes on the Work of David Stout" (unpublished manuscript).

2. Steina Vasulka also uses the Image/ine software, for example, in *Warp* and *Mynd*. In addition, Steina Vasulka and David Stout cooperate in joint computer-video performances.

3. Stout, "Introductory Notes on the Work of David Stout" (unpublished manuscript).

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List of Illustrations

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1: Vito Acconci, *Face-Off*, USA, 1973, 32:57, b/w, sound.

2: Vito Acconci, *Pryings*, USA, 1971, 17:10, b/w, sound.

3: Vito Acconci, *Remote Control*, USA, 1971, 62:30, b/w, sound, two-channel video installation.

4: Vito Acconci, *Theme Song*, USA, 1973, 33:15, b/w, sound.

5: Vito Acconci, *Undertone*, USA, 1973, 34:12, b/w, sound.

6: Eija-Liisa Ahtila, *Anne, Aki I Déu*, Finland, 1998, 30:00, color, sound, video installation.

7: Eija-Liisa Ahtila, *Consolation Service*, Finland, 1999, 24:00, color, sound, video projection.

8: Eija-Liisa Ahtila, *If 6 was 9*, Finland, 1995, 10:00, color, sound, video projection.

9: Dara Birnbaum, *Damnation of Faust: Will-O'-The-Wisp*, USA, 1985, 5:46, color, sound.

10, 11: Dara Birnbaum, *Pop-Pop Video: General Hospital/Olympic Women Speed Skating*, USA, 1980, 6:00, color, sound.

12, 13: Dara Birnbaum, *Rio Videowall*, USA, 1989, Rio Shopping/Entertainment Complex, Atlanta, Georgia, video wall installation.

14, 15: Dara Birnbaum, *Technology/Transformation: Wonder Woman*, USA, 1978, 7:00, color, sound.

16: Dara Birnbaum, *Transmission Tower/Sentinel*, USA, 1992, documenta 9, Kassel, installation.

17: Klaus vom Bruch, *Azimut*, Germany, 1985, 6:36, color, sound.

18, 19, 20: Klaus vom Bruch, *Duracellband*, Germany, 1980, 10:00, color, sound.

21, 22, 23: Klaus vom Bruch, *Softyband*, Germany, 1980, 19:00, color, sound.

24: Robert Cahen, *Hong Kong Song*, France, 1989, 21:00, color, sound.

25: Robert Cahen, *L'invitation au voyage*, France, 1973, 9:00, color, sound.

26, 27: Robert Cahen, *Juste le temps*, France, 1983, 13:00, color, sound.

28: Peter Callas, *Double Trouble*, Japan/Australia, 1986, 5:45, color, sound.

29: Peter Callas, *Kinema No Yoru/Film Night*, Japan/Australia, 1986, 2:30, color, sound.

30: Peter Callas, *Neo-Geo: An American Purchase*, USA/Australia, 1990, 9:17, color, sound.

31: Peter Campus, *Double Vision*, USA, 1971, 14:45, b/w.

32, 33, 34: Peter Campus, *Three Transitions*, USA, 1973, 4:53, color, sound.

35: Valie Export, *Asemie*, Austria, 1973, 9:00, b/w, sound.

36: Valie Export, *Split Reality*, Austria, 1970, 3:00, b/w, sound.

37: Jean-François Guiton, *Handle with Care*, Germany, 1984, 11:00, color, sound.

38: Lynn Hershman, *Beautiful People–Beautiful Friends*, USA, 1994, 1:15:00, color, sound.

39: Lynn Hershman, *Deep Contact*, USA, video performances, 1984–1989.

40, 41: Lynn Hershman, *Roberta Breitmore*, USA, video performances, 1971–1979.

42: Lynn Hershman, *Room of One's Own*, USA, video installation, 1990–1993.

43: Lynn Hershman, *Virtual Love*, USA, 1993, 1:20:00, color, sound.

44: Gary Hill, *Between Cinema and a Hard Place*, USA, 1991, video installation.

45: Gary Hill, *Electronic Linguistics*, USA, 1978, 3:45, b/w, sound.

46: Gary Hill, *Happenstance*, USA, 1982–1983, 6:30, b/w, sound.

47: Gary Hill, *Learning Curve*, USA, 1993, video installation.

48: Gary Hill, *Primarily Speaking*, USA, 1981–1983, 18:40, color, sound.

49: Gary Hill, *Remarks on Color*, USA, 1994, video projection.

50: Gary Hill, *Suspension of Disbelief (for Marine)*, USA, 1991–1992, video installation.

51: Gary Hill, *Why do Things Get in a Muddle?*, USA, 1984, 32:00, color, sound.

52: Nan Hoover, *Desert*, the Netherlands, 1985, 12:43, color.

53: Nan Hoover, *Halfsleep*, the Netherlands, 1984, 16:43, color, sound.

54: Nan Hoover, *Impressions*, the Netherlands, 1978, 10:00, color, sound.

55: Nan Hoover, *Movement in Light*, the Netherlands, 1977, 3:00, b/w, sound.

56: Nan Hoover, *Returning to Fuji*, the Netherlands, 1984, 8:00, color, sound.

57: Jodi, *OSS/. . . .*, 1998, Spain, http://www.jodi.org.

58: Jodi, *SOD*, 1999, Spain, http://www.jodi.org.

59, 60: Joan Jonas, *Glass Puzzle*, USA, 1973, 17:27, b/w, sound.

61, 62: Joan Jonas, *Vertical Roll*, USA, 1972, 20:00, b/w, sound.

63: Joan Jonas, *Vertical Roll*, USA, 1972, performance view.

64: Dieter Kiessling, *Eingeschalteter/ausgeschalteter Fernseher*, Germany, 1988, video installation.

65: Dieter Kiessling, *Pendelnder Fernseher*, Germany, 1983, video installation.

66: Dieter Kiessling, *Two Cameras*, Germany, 1998, video installation.

67: Dieter Kiessling, (untitled), Germany, 1993, video installation.

68: Michael Langoth, *Retracer*, Austria, 1991, 3:45, color, sound.

69: David Larcher, *Granny's Is*, UK, 1989, 1:18:36, color, sound.

70: David Larcher, *Video Void, Text*, France/UK, 1997, 28:40, color, sound.

71: David Larcher, *Video Void, The Trailer*, France/UK, 1997, 32:34, color, sound.

72, 73, 74: Ko Nakajima, *Mt. Fuji*, Japan, 1986, 20:00, color, sound.

75: Dennis Oppenheim, *Airpressure* (face), USA, 1971, 15:00, b/w, sound.

76: Dennis Oppenheim, *Airpressure* (hand), USA, 1971, 9:00, b/w, sound.

77: Dennis Oppenheim, *Feed-Back*, USA, 1971, 12:00, b/w, sound.

78: Raphael Montañez Ortiz, *Beach Umbrella*, USA, 1985–1986, 7:30, color, sound.

79: Raphael Montañez Ortiz, *The Conversation*, USA, 1996, 12:00, b/w and color, sound.

80: Raphael Montañez Ortiz, *Dance No. 22*, USA, 1993, 7:19, b/w, sound.

81: Nam June Paik, image of the Paik video sculpture *Four Decade* with the two channels of Jud Yalkut's edited video, covering examples from their forty years of collaboration, Dayton Art Institute.

82: Ulrike Rosenbach, *Die einsame Spaziergängerin*, Germany, 1977, video live performance, Museum Folkwang, Essen.

83, 84: Ulrike Rosenbach, *Glauben Sie nicht, daß ich eine Amazone bin*, Germany, 1975, 15:00, b/w, sound.

85, 86: Ulrike Rosenbach, *Reflexionen über die Geburt der Venus*, Germany, 1976, 15:00, color, sound.

87: Dan Sandin, *Analog Image Processor*, USA, 1972.

88, 89: Dan Sandin, *How TV Works*, USA, 1977, 30:00 color, sound.

90, 91: Dan Sandin, *Triangle in Front of Square in Front of Circle in Front of Triangle*, USA, 1973, 3:00, b/w, sound.

92: Bill Seaman, *Exchange Fields*, USA, 2000, video installation.

93: Bill Seaman, *Passage Sets. One Pulls Pivots at the Top of the Tongue*, USA, 1995, 32:00, color, sound.

94: Bill Seaman, *The Exquisite Mechanism of Shivers*, Australia/USA, 1991, 28:00, color, sound.

95: Bill Seaman, *World Generator/The Engine of Desire*, Virtual Reality installation, USA, 1996–1997.

96, 97, 98: John Simon Jr., *Every Icon*, USA, 1996, http://www.numeral.com.

99: David Stout, *Noisefield*, USA, 2003, interactive video installation.

100: David Stout, *Signalfire*, USA, 2003, 60:00, interactive video noise performance.

101: David Stout, *Transit*, USA, 2003, 5:00, b/w, sound.

102: David Stout, *Ziggurat*, USA, 2003, 13:45, b/w, sound.

103: Steina Vasulka, *Allvision*, USA, 1978, video installation.

104: Steina Vasulka, *Bad*, USA, 1979, 2:00, color, sound.

105: Steina Vasulka, *Lilith*, USA, 1987, 9:12, color, sound.

106, 107: Steina Vasulka, *Mynd*, USA, 2000, 38:20, color, sound.

108: Steina Vasulka, *Of the North*, USA, 2001, video installation.

109: Steina Vasulka, *Orbital Obsessions*, USA, 1977, 24:30, b/w, sound.

110: Steina Vasulka, *Orka*, USA, 1997, 15:00, color, sound.

111: Steina Vasulka, *Somersault*, USA, 1982, 5:17, color, sound.

112: Steina Vasulka, *Violin Power*, USA, 1970–1978, b/w, sound, video performance.

113, 114: Steina Vasulka, *Warp*, USA, 2000, 4:44, color.

115: Steina and Woody Vasulka, *Black Sunrise*, USA, 1971, 21:08, b/w, sound.

116: Steina and Woody Vasulka, *Calligrams*, USA, 1970, 12:00, b/w, sound.

117: Steina and Woody Vasulka, *Discs*, USA, 1971, 5:30, b/w, sound.

118: Steina and Woody Vasulka, *Distant Activities*, USA, 1972, 10:00, color, sound.

119: Steina and Woody Vasulka, *Matrix I*, USA, 1970–1972, video installation.

120: Steina and Woody Vasulka, *Noisefields*, USA, 1974, 12:12, color, sound.

121, 122, 123: Woody Vasulka, *Artifacts*, USA, 1980, 21:30, color, sound.

124: Woody Vasulka, *Art of Memory*, USA, 1987, 36:00, color, sound.

125: Woody Vasulka, *C-Trend*, USA, 1974, 10:35, b/w, sound.

126: Woody Vasulka, *No. 25*, USA, 1975, 5:30, b/w, sound.

127: Woody Vasulka, *The Matter*, USA, 1974, 4:11, b/w, sound.

128: Woody Vasulka, *Reminiscence*, USA, 1974, 4:50, b/w, sound.

129: Woody Vasulka, *Vocabulary*, USA, 1973, 4:50, color, sound.

130: Woody Vasulka and Jeffrey Schier, *Digital Image Articulator*, USA, 1978.

131: Gillian Wearing, *I Love You*, UK, 1999, 60:00, color, sound, video projection. (Courtesy Maureen Paley)

132, 133: Gillian Wearing, *Sacha and Mum*, UK, 1996, 4:00, b/w, sound, video projection. (Courtesy Maureen Paley)

134, 135: Gillian Wearing, *2 into 1*, UK, 1997, 4:30, color, sound, video projection. (Courtesy Maureen Paley)

136: Jud Yalkut, *USCO*, USA, 1967, installation performed in 2000 at the Whitney Museum of American Art.

Index

new media/cinema/art

VIDEO THE REFLEXIVE MEDIUM

YVONNE SPIELMANN

WINNER OF THE 2009 LEWIS MUMFORD AWARD FOR OUTSTANDING SCHOLARSHIP IN THE ECOLOGY OF TECHNICS, PRESENTED BY THE MEDIA ECOLOGY ASSOCIATION (MEA)

Video is an electronic medium, dependent on the transfer of electronic signals. Video signals are in constant movement, circulating between camera and monitor. This process of simultaneous production and reproduction makes video the most reflexive of media, distinct from both photography and film. Because it is processual and not bound to recording and the appearance of a "frame," video shares properties with the computer. In this book, Yvonne Spielmann argues that video is not merely an intermediate stage between analog and digital but a medium in its own right. Video has metamorphosed from technology to medium, with a set of aesthetic languages that are specific to it, and current critical debates on new media still need to recognize this.

Spielmann considers three strands of video praxis: documentary, experimental art, and experimental image-making (which is concerned primarily with signal processing). She then discusses selected works by such artists as Vito Acconci, Ulrike Rosenbach, Joan Jonas, and Nam June Paik. Finally, Spielmann discusses the potential of interactivity, complexity, and hybridization in the future of video as a medium.

Yvonne Spielmann is Research Professor and Chair of New Media in the School of Creative Industries at the University of the West of Scotland. *Video* was also published in Japanese by Sangensha, Tokyo, in 2011. Spielmann is the author of *Hybrid Culture: Japanese Media Arts in Dialogue with the West* (MIT Press, 2012).

A Leonardo Book

"Available for the first time in translation, Yvonne Spielmann's *Video: The Reflexive Medium* provides us with a keen parsing of the specificities of video as a medium."

Anne Friedberg, author of *The Virtual Window: From Alberti to Microsoft*

"Spielmann's *Video: The Reflexive Medium* is a highly significant, well-researched, and discursive addition to the canon. It is illuminating on both the technological and aesthetical issues, as well as giving primary insights into the artist makers themselves."

Stephen Partridge, Dean of Research, Duncan of Jordanstone College of Art and Design, University of Dundee

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Jacket art

Nan Hoover, *Halfsleep*, NL, 1984, 16:43, color, sound.

Dieter Kiessling *Untitled*, 1988, video-installation.
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Steina, *Somersault*, USA, 1982, 5:17, color, sound.

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