Cinema and the Code

What are the implications of digital imaging for the evolution of cinematic language? Since 1986, Peter Weibel, Steina and Woody Vasulka and I have been meeting to discuss that question [1]. We thought our talks might become a book, whose subject Weibel conceived as “the evolution of the image through the digital image”. What follows is an outline of our conversations, assembled for this publication from 200 pages of transcript. It is in every sense a first draft, a working paper. We are quite aware of the problematic nature of our discourse, especially in the cursory form presented here. Every conclusion is vulnerable to criticism, which we welcome. We are certain of only one thing: that these questions are important and need to be explored.

The subject of ‘digital imaging’, we agree, exists in the context of both video and the computer (different only in the source of the image and the possibility of real time operation) and covers the generic areas of image processing, image synthesis, and writing or organizing digital code in a procedural or linguistic fashion [2]. But in every case when we refer to the phenomenology of the moving image, we call it cinema. For us it is important to separate cinema from its medium, just as we separate music from particular instruments. Cinema is the art of organizing a stream of audiovisual events in time. It is an event-stream, like music [3]. There are at least four media through which we can practice cinema—film, video, holography and structured digital code—just as there are many instruments through which we can practice music. Of course each medium has distinct properties and contributes differently to the theory of cinema, each expands our knowledge of what cinema can be and do. Each new medium modifies and extends the linguistic possibilities of the moving image, subsuming the syntaxes of previous media without negating them.

Thus, the basic phenomenology of the moving image—what Vasulka calls “the performance of the image on the surface of the screen”—remains historically continuous across all media. Digital code, for example, has radically altered the epistemology and ontology of the moving image but has not fundamentally changed its phenomenology. There are no digital images that have not been prefigured in painting, film and video. With the code we can only summarize them, elaborate and unfold them or exercise modalities. Vasulka calls the code a variation machine. There are no new classes of images, there are only new variations and new epistemological and ontological conditions for generating and witnessing those variations. Each new medium of the future, says Vasulka, can only “play host to the phenomenology of the moving image”, which will evolve through that medium to the next, accumulating the language of each.

Weibel puts it this way: a medium is “a corpus of aesthetic strategies” inherited from previous media. In the 1920s mathematicians attacked the problem of foundations: What was pure logic? What was an axiom? Today the answers to those questions are implemented in the computer. Logical concepts have become instrumental, they have become parts of machines. And any machine element, says Weibel, is nothing but a physical implementation of a formal device. It implements mental strategies into something physical. (This is what Buckminster Fuller meant when he defined technology as “instrumented or documented intellect”). Similarly, aesthetic strategies invented 100 years ago in photography and cinema—scaling, perspective, positive/negative reversals, wipes, mattes—have now become machine elements whose operations are trivially invoked through the preset button. It is a question of primitives. The code is a metamedium: through it, high-level aesthetic constructs from previous media become the primitives of the new medium. This influences which aesthetic strategies will be emphasized. When a strategy that was possible but difficult in film becomes a preset button in video or a command in computer graphics, it tends to be used more frequently. But that does not make it more meaningful. The challenge is to turn ‘effects’ into expressions, into syntactical units of meaning.

This raises the question, How has the corpus of aesthetic strategies inherited in a medium like photography or film transferred over to electronic media and especially to the code? Things are possible in the code that were not possible, or at least not easy, in film and video. Only by comparing formal devices developed in one medium to other devices developed in other media can we arrive at criteria for evaluating artistic achievement. Have the syntactical and linguistic possibilities of the digital image been identified and elaborated in practice? We think not—at least, not very often. We rarely find them in the work that is otherwise admired in the name of the medium. People praise a particular work of ‘video’ or of ‘computer art’, and yet we find in this work no definatory elements of video or of the code. It may be great cinema but it is not great electronic cinema. We are not arguing for exclusivity or essence. We are not trying to be the Clement Greenberg of the code. The phenomen-
from optical instruments. Derer's vision, Weibel points out, has always been dependent on machines. We can influence the extent to which an artist articulates their achievement in the new medium. To this, Weibel responds: 'This is our criterion for artistic success.' Not only electronic cinema, he reasons, but film machines as well. "We are not free to invent the language of film, video, or computer," he says. "The language already exists in the system. Our task is to discover it, to draw it out and name it, to put a nomenclature on it." Weibel has built his machines in order to discover the "truth" in them, which could be found only through dialogue with the machines. He points out that this is not unique to electronic cinema. Film language also arose from a similar system of technological devices. For Weibel, there is a significant difference between the frame and the cut, and these require different kinds of metempsychosis. One moves us to a different point in time of a different space/time, and the other moves us to a different space and/or time. In Flashbacks (cinematic memory), either a scene is re-created or the frame is transformed. With the advent of electronic cinema images are available for articulation as narrative elements or linguistic primitives: (1) image transformation. (2) parallel event-streams. (3) temporal perspective and (4) the image as object.

**PARALLEL EVENT-STREAMS**

With the arrival of electronic cinema it became apparent that film grammar was not complete without a code of image transformation. Film grammar is based on transitions between fully photographed frames. It is defined primarily by the collision of frames called the cut. In electronic cinema the frame is not an object but a time segment of a continuous signal. This makes it possible to establish a syntax based on transformation, not transition. Analog imaging processes are one vehicle of this particular art form. (For example, scan processors. But it be-

**TEMPORAL PERSPECTIVE**

The "history of every art form," as wrote Walter Benjamin, is defined as epochs in which certain art forms aspire to effects which could be fully obtained only in another art form. The word "standard" is to say, in a new art form. [4] Weibel pursues this logic in reverse, starting from the digital image to find desire for its poetics in art history. He begins to notice that Renaissance perspective was almost at eye-level with one point of view and one vanishing point. By 1945, photographers were climbing onto Parisian rooftops and shooting down into streets. Twenty years later, in the 1960s, a photographer suspended eye moving up into the sun. Perspective as no longer bound to the post-cinematic space. It had become free-floating. In the same period, the German Romantic painter Caspar David Friedrich painted moody, lion-like shadows falling at an angle different to that of the sun. The image is free-floating. In the work of El Lissitsky and the Cubo-Futurist move- ment, painting, influenced by photog- raphy and cinema, introduced multiple points of view and implied time.

And what did cinema do with perspec- tive? Not much. Bound to psycho- logical realism, it exploited it only sparsely, mainly through deep focus (Eisenstein, Welles, Renoir), never temporally. Only in experimental cin- ema was temporal perspective ex- plored in any serious way at all. The outstanding example being the work of Michael Snow, such as La Regn滑 and Buck and Ford. But with the advent of the code, the emphasis on perspective retells. Moving-image space can now embody in it not only a single event, but also an entire story. When the image is a three-dimen- sional database, perspective becomes an issue as well as spatial properties of the image. It is a strategy that is intrinsic to the code. Painters, photographers, and filmmakers could not realize the full potential of this desire. Now we can unfold and elaborate that which could only be indicated in earlier work.

Weibel notes that, if we remove the two cinematic vectors from earth to future, one of the two cinematic vectors, a non-linear one, which could only be indicated in earlier work.

Vanuksa calls "the aura of truth." We note that it is cumbersome to establish one image-plane as 'present' with other time frames visible simultaneously within the same frame. There is always an im- plusibility of transfiguration (metempsychosis) into a narrative space com- posed of layers of time, either as multiple or as single. vanuksa's Sonatina was one of the first works to explore these possibilities. In it the image of the moving frame is disintegrated and framed up parallel event- streams.

When an image becomes object in a stream of parallel events, the realm of rational perception and psycho- logical realism goes out of the frame. Framed photographic image brings us to the realm. But three images on a single frame would make a psychological image. This is what Weibel refers to as "the aura of truth." We refer to this as the "aura of truth." We refer to this as the "aura of truth." We refer to this as the "aura of truth."
fundamental challenge to the metonymic nature of cinematic language. He invokes the name of Roman Jakobson, who argues that there are only two fundamental operations in language: metaphor and metonymy. And the language of cinema is not metaphorical, it is metonymic. It is the language of the part for the whole. All cinematic images are contingent. The frame, said Jakobson, is always part of an unseen whole. At its fundamental syntactic level—the level of cutting, of editing, of bringing spaces together—the filmic language game is metonymic. In the service of psychological realism, conventional editing restructures ‘real’ time and ‘real’ space, following logical causal chains by metonymic association. Experiments like Last Year at Marienbad were attempts to transcend that limitation within psychological narrative. But in the electronic image there is no need to make a Marienbad, because it is clear that we no longer have that constancy of time and space. Once an image-object is set against a reference, the metonymic tension is lost. Objectifying the image within the frame puts it in a different time zone. Metonymy becomes problematic. On the one hand, such constructs are not metonymic because the space they occupy is not ‘natural’. The image-object is not part of the whole; it is no longer contingent. But it is not metaphoric either. It is something new. We do not know what it is. It might still function metonymically, but in a different way. This is an important area that is wide open for aesthetic exploration.

The second level of the image as object is achieved through digital image synthesis. Here, because it is a three-dimensional database, we can control not only the location of the image-object within the frame but also its perspective, its angle of view, its geometry. As a result, the synthesized image becomes truly an object, the witness becomes a ‘user’, and the relation between them becomes not observation but interaction. Jean-Louis Baudry argues that, in the cinema of psychological realism, the primary identification of the spectator is not with the characters but with the camera itself [5]. But in interactive image synthesis, the spectator is the camera. Since it is not separate from the scene it surveys, the virtual camera is neither a voyeur nor an instrument of surveillance. “It is a point of view that is active within the scene”, writes Catherine Richards. “Not only can this camera (the user) direct its own looking, it can be sensed, responded to, and represented in the scene: it sees and is seen” [6].

The third level of the objectification of the image is realized through three-dimensional display. Whether through holography or binocular (stereoptic) technology, cinema is moving from the two-dimensional image on a screen to the three-dimensional object in space. Today cinema represents reality; tomorrow it will be reality. Already with stereoptic technology, the image becomes an object. And in Scott Fisher’s virtual environment project of the U.S. National Aeronautics and Space Administration (NASA) (combining a three-dimensional database with stereo vision in a wraparound head-mounted display), cinematic space becomes a place to live. An unframed image is not an image, Vasulka points out, it is an object in space: “It forces you to deal with air.” It is no longer a representation but the thing itself. Vasulka notes that different understandings of reality and truth are implied by the representational image and by an object in space, no matter how insubstantial that object may be. Three-space cinema, he suggests, is more like theatre. In two-space cinema there it is true but no reality. In theatre there is reality but no truth.

References and Notes
1. Peter Weibel is a filmmaker, mathematician, art historian, writer and professor of art and electronic media in Austria and the U.S. Steina and Woody Vasulka are internationally known video artists who founded The Kitchen in New York City in 1970 as one of the world’s first presentation centers for electronic art. Gene Youngblood is author of Expanded Cinema (1970), the first book about video as an art medium.
2. Both real-time video machines and computers operate on the same structure of digital code. ADO, Quassel and Fairlight are digital computers. The only difference is that they take their ‘model’ from camera input and they operate in real time. With the exception of extremely fast computers, most digital image synthesis, or ‘computer graphics’, is not done in real time. Other than this we make no distinction between them, except in reference to the source or model of the organization of the image—one through camera input, the other through algorithms. Also, we regard the process of writing or structuring the code as part of the digital-imaging procedure. It is the craft of digital imaging in computer graphics. You do not ‘write the image’ in video.
3. My colleagues have found the concept of the ‘event-stream’ problematic. Vasulka defines it as “every scheduled change”. He points out that there is always an invisible technological level to every perceived event, like the event of line-forming in video, or computations and logical operations in image synthesis. The key is to realize that the event does not have to be consciously perceived. In music, for example, a listener would be incapable of naming each sonic event, but music is nevertheless a system of parallel event-streams.