

Introduction

The project ABSTRACTION NOW presented current tendencies of non-representative art, particularly focused on audio-visual media and interdisciplinary aspects. Classical artistic genres such as painting and sculpture were confronted with modern digital forms of expression in an interdisciplinary manner. In this context, the in art theory highly over-strained concept of Abstraction functioned as common denominator with respect to content, and it referred to so far hardly considered conceptual interrelations between individual disciplines. The exhibition was accompanied and extended by a historical film program entitled MATHS IN MOTION, organized by sixpackfilm.

The project ABSTRACTION NOW presented current tendencies of non-representative and non-figurative tendencies. All sorts of gesture-based, lyrical or expressive abstraction remained unconsidered, since mainly formal innovations and media-technological developments were centered.

One of the main tasks of the exhibition was to indicate how artistic strategies of image-making have changed and expanded with the help of the new media, which specific logic is inherent to them and what consequence is applied to put them into action. Of special interest was the process-related aspect within abstract creation. A further focus is put on the comparison of Austrian and international artists; foremost a younger generation was presented.

At the beginning of the 21st century, driven by a young artists' generation, the phenomenon of abstraction has been questioned anew with the help of all available means of expression, regarding its validity and significance. This broad spectra of different conceptual and media-related formulations was exhibited, in order to indicate in a sustainable way, the powerful quality of this current tendency. In order to comply with the timely art practices, it was necessary to integrate all media-based forms of expressions; no art works were excluded due to the used method. In this exhibition, great importance was attached to the works' "appropriate" presentation by the respective media.

Alltogether 85 works of 74 artists were exhibited. In the Künstlerhaus-Kino 27 actual, non-figurative video works were presented. In a specially for the show adapted Medialounge, 25 computer-based works on CD-Rom and DVD as well as selected internet projects were featured. On the ground floor of the Künstlerhaus, 33 contemporary works such as painting, sculpture, photography, graphics as well as video- and computer installations were displayed. In addition, the whole project in addition is presented and documented on the website <http://www.abstraction-now.net>.

For the present publication, authors from different faculties were invited to discuss the topic in the light of different perspectives.

Norbert Pfaffenbichler's contribution introduces to the subject and describes some strategies of contemporary art regarding the phenomenon of abstraction. With reference to Frederic Jameson's notion of "cognitive mapping", co-curator Sandro Droschl comments on the exhibition's display. The media theorist Marc Ries, among other things, relates to Clement Greenberg and centers the incident of conversion in his considerations. The art historian Marie Röbl, correlates the tradition of modernity with current tendencies, whereas she refutes simplistic continuity thesis. Lev Manovich confronts the, in its tendency reductionist gestus of modernist abstraction with an actual "representation of complexity". Miguel Carvalhais brings up the question of the specifications of online art. Christian Höller deals with the history of the experimental film and video in the context of pop culture.

The text contributions are complemented by a section of illustrations, by short texts on the projects selected by the artists themselves, and by detailed biographies of all participating authors and artists.

From Panel Painting to Computer Processing

Notes on the Phenomenon of Abstraction in Contemporary Art

In the arts the term abstraction refers not to a single, uniform style but a wide variety of phenomena, all of which dispense with the reproduction of an external reality. In the 20th century a number of different -isms arose, all of which more or less radically went beyond the function of reproduction, instead striving to establish a formal autonomy and extend the possibilities of representation. In principle applying abstraction processes is possible in any medium, although the final results vary greatly. The artist can have innumerable motivations, even conflicting ones, that range from spiritual and meditative approaches and the desire for purely formal visualization to an interest in mathematical concepts and experiments with computer programming. Because of the wide variety of manifestations, providing a universal explanatory model for all non-representational forms of expression is neither possible nor would it serve any real purpose.

In the following essay an attempt will be made to explain a few terms that are relevant to various aspects of contemporary abstract art. Accordingly, the text is organized in a series of short interrelated sections.

The abstract image

An image is a two-dimensional representation positioned within a confined flat surface. It is an object created for illustrative purposes. The manner of production (manual, mechanical, chemical, electronic or digital), the medium and any intended optical effects, such as illusions of perspective or apparent movement, are not relevant to this definition. A representational image pretends to be something else besides a mere image by imitating the visual appearance of some external object. This is in fact a kind of optical illusion. In contrast an abstract work is not intended to be an illusionistic reproduction of something else, absent or past; it exists for itself and is for that reason always topical and necessarily self-reflexive and anti-illusionistic.

The theme of all abstract art is relations, between individual elements within the image's surface (color and form), between the individual surfaces and between the surfaces and the space in which they exist, in other words the viewer/user. In the case of an moving image (film, video, computer animation) this is joined by the factor of the image/time relationship. Generative, interactive and reactive computer programs represent a relatively new category in the field of abstraction and will be dealt with in greater detail below.

Non-representational still and moving images have the following in common: The abstract representation always refers to itself and hence to the conditions of its own existence. In other words, what it negotiates is the conventions and, as a result, the states of representability in the various (visual) media. The artistic techniques that are employed can be more or less original or universal. An abstract work is characterized by insisting on its object nature and dispensing with symbolic functions. In this context it is also important to note that in the 20th century great efforts were made to overcome the panel painting in its traditional function.

Reference systems

As a result of its self-referentiality abstract art is also "art about art" and it has meaning in this context only. Yet beyond that, the means of abstraction also allow for cross references, quotes and so on. Neither a form of presentation nor a specific venue is neutral, and the same holds true for the production process, the format, the material, the forms and their colors, etc. The heyday of abstract art was dominated by the ideal of the complete autonomy of both the artwork and its means. All interpretations regarding history, psychology, content, etc. were rejected. A few contemporary artists are taking a different path by consciously attempting to create many-layered reference systems and associative spaces with abstract means.

In addition to the work's relationship to art history, it is primarily mass media, the urban environment, and the various user interfaces in digital technology that are addressed and dealt with. Undogmatically and with notable esthetic sensitivity and formal intelligence, these artists turn to the canon of abstract art to thematize the relationship between modernism and contemporary art. This is no longer abstract art per se, but "art about abstract art." Accordingly abstraction represents both the method and the theme of these works. A past ideal path to non-representationalism was defining the visual "means as an end." Through the deliberate contextualization of non-representational art described here, these means become "means to an end", or in other words "visual symbols." Abstraction is therefore expanded by the moment of the intended interpretability, though on the other hand it also loses one of its original constituent pillars, namely the artwork's absolute claim to autonomy, which is in no way symbolic. Instead of the work referring to itself exclusively (and therefore the conventions of reproducibility), it also refers to a number of factors not visible in the work itself that must be considered for a reasonable interpretation to be possible in accordance with the artist's intentions. As part of this perfidious game the canon of abstract art is also employed for the purpose of criticizing institutions and representation. The strategic contextualization of abstraction described here – a typically post-modern tactic – is primarily utilized by visual artists and only rarely in the field of New Media.

Machine esthetics

While the avant-garde movements of the first modern period idealized the machine, mechanical dysfunction is now often the focus of artistic interest. This strategy involves both analog and digital technologies, both of which are expected to disappear eventually. The typical characteristics of the putatively authentic and material aspects of the mechanical and electronic such as the crackles and pops of vinyl records or dust and scratches on film stock are gathered for artistic use in an almost meticulous fashion. Yet also the function of computer systems is far from error-free, so that the aftereffects of crashes, bugs in software, etc. have served as a starting point for many examples of artistic expression. The underlying code is inadvertently revealed in an error, and in an esthetically useful form. After these more or less randomly occurring phenomena have been localized and archived, they can be processed according to the artist's intention and methods. No matter the nature of the results, this approach implies criticism of the medium and its means, both from within the medium and with the aid of its means. In this case abstraction is an inevitable product of machine dysfunction and physical phenomena such as wear and tear and decay.

The conceivable

It is worthy of note that a revival of non-representationalism is taking place at the historical juncture when digital simulation technologies have nearly been perfected. Hypothetically everything conceivable by the human mind can be visualized with the aid of digital technology. The area of technical practicality no longer contains any limitations, the only borders are posed by human imagination and intellect. At the beginning of the century, abstract art brought an abrupt expansion of the conceivable. While a comparable and similarly radical development in the 21st century would be desirable, it seems to be rather unlikely at this moment.

Play / interaction / abstraction

Play involves voluntarily submitting to a predetermined system of rules, accepting it as a blueprint for action, and engaging in an activity which has no specific short-term goals – at best it is considered enjoyable by the players. Play, especially for children, also represents a learning process and a method of processing reality. Playing implies a certain form of interaction which does not necessarily involve other human participants. As we know a player can play against him or herself or against autonomous (analog or digital) sets of rules. Considered in this way, playing and art are related phenomena.

In itself playing is not the sole purpose of abstract interactive or reactive computer applications. This participatory method potentially involves an aspect of anti-individuality, in other words the idea of a universal artwork which does not include an individual's signature. The artist produces formulas of possibility, the work is actualized only by being used. Interactivity could also be considered as recognizing in principle modern art's procedural character in the form of a concrete work. Non-representational interactive applications are in addition vivid and practical models for one of the constituent paradigms of modernism according to which a work becomes a work of art only after being seen. The viewer is transformed into a user and at the same time practically and in fact a co-creator. Whether, when and in which state such a work is finished remains a question which can be answered only in connection with a concrete example and in light of the number of possible formulations.

The possibilities offered by interactive and reactive applications are in principle independent of whether their visual elements are illusionistic or abstract. As conventional user interfaces are normally absent from non-representational applications, navigation itself becomes a component of the composition. The existing conventions relating to the utility of digital data and the logic behind them are thematized and subjected to experimentation. The events and modulatory parameters that can be triggered as a result are often unpredictable for the user. Trial and error is the only method available for eventually

comprehending a complex work. The moment of the work's intended mutability through the user's input represents a paradigm change in artistic production. Artists now provide a certain framework for action and define the esthetic parameters within which the user can operate; the work itself is a variable.

Generative programs

The situation is similar with generative applications, though they do not require an input signal. Specific programs control themselves and therefore their visual output autonomously. In fractions of seconds innumerable updates of images can be computed. In many cases this involves applications that operate with calculated randomness, mathematical formulas, growth algorithms, etc. for the purpose of excluding all repetitions of images. In other words each fresh image presented to the viewer is unforeseeable and uniterable. The range of possible optical variations is potentially infinite, or at least wide enough that innumerable human lives would not be sufficient to see all possible permutations that such applications are capable of producing. These digital images are in constant motion and are subjected to a continuous process of generation. Despite the illusion of movement, such algorithmic works are in no sense "filmic"; they are neither linear nor illusionistic; a time period has not been defined for them, and the calculated sequences of images cannot normally be repeated. The visual output of generative applications are normally abstract *tableaux vivants*, virtual visual vitalities. The image has entered the status of an autonomous, self-contained process.

Sound / image / movement

At present moving images appear almost exclusively in combination with sound. Music is a special kind of sound, by definition the deliberate organization of sound over time - and in space - in the same way that moving image is the deliberate organization of forms on a flat surface - and over time. Music is considered the most abstract of all art forms, and it would also seem to have the most immediate effect on the listener's subjective state. Music has long served as an important source of inspiration for non-representational forms of portrayal, whether in the frequent attempts to translate sounds into color or the adoption of various sequential patterns and rules of composition, etc. The artistic act lies in the interpretation, the transcoding of the audible into the visible, the materialization of immaterial sound, the transformation of noise sequences into moving images. The visualization of sounds, acoustic characteristics and arrangements thereof normally results in abstract visual formations as products of a synesthetic process.

Abstraction processes in media involving moving images

As is well known, the art of moving images now involves a great deal more than the medium of film. The transitional medium of video, and digital technology in particular, has increased the possibilities for producing and presenting animated images exponentially. While the various media have changed, the principle problem remains the same, namely structuring time through the arrangement of visual elements on a flat surface. An attempt will be made below to explain and categorize abstraction processes in the media that involve moving images, namely film, video and computer animation. Hybrid forms comprising combinations of the methods described below are quite common in practice. The order will follow the individual groups' status of autonomy and refers exclusively to the method of production rather than aspects of the esthetic effect.

A Photographic abstraction / abstraction as effect

In works of the first category real-life photographs are used as a raw material for various abstraction processes. (The designation "photographic" is used to refer to the "real" raw material, despite the fact that primarily digital video and various algorithmic filters are employed in current works.) Both photomechanical, photochemical and photo-optical techniques and all kinds of electronic and digital methods are applied to moving images as part of a process of manipulation which creates abstractions. In this case abstraction serves to make something unrecognizable through distortion, in other words conceal, hide and mask as far as possible through strategies such as blurring an image, geometrizing it, and so on. Optical special effects are employed for the purpose of producing abstract images intended to have certain esthetic effects.

B Graphic abstraction / abstraction as end in itself

This method of abstraction involves graphic animations that are based on autonomous, non-mimetic visual elements and created in a conscious act. Regardless of the methods employed, the creator controls the final product to the greatest extent possible. The spectrum of suitable techniques ranges from drawing directly on film stock and the classic animation film to advanced computer animation programs. The visual elements and movements are already autonomous and are not based on photographs. At the same time the production process can be termed manual regardless of the fact that mouse and keyboard have replaced brush and pencil. Color, form and movement represent themselves. This method of abstraction involves calling attention to and applying universal formal laws.

C Techno-syntactic abstraction / abstraction as machine language

This category involves production strategies that (re)translate the machine code, as unfiltered as possible, into an event which can be perceived by humans. To function at all, analog and digital machines must follow certain

rule systems and command structures that are normally not directly accessible to the user. Various interventions – most of them destructive – reveal these techno-syntactic structures and employ them artistically. This is a machine esthetic “on the inside”: Rather than the superficial appearances and surface characteristics of machines, motors and similar devices being made components of artworks, the internal, “abstract” logic of information-processing devices is employed for artistic expression.

D Algorithmic abstraction / abstraction as a program

This group comprises moving images created entirely with digital means which cannot be produced through any of the methods described above. In contrast to the category of graphic abstraction a computer program controls the esthetic output. Algorithms (mathematical formulas, random number generators, chaos simulations, etc.) produce visual worlds and forms of movement of a kind which humans would not be able to create intentionally without a computer. The programs involved are written specifically for this purpose (or existing programs are modified), which is why this method differs from those in the category of techno-syntactic abstraction. The artist, who in this case is also a programmer, develops an independent (visual and machine) language. The newest method in the group of suitable abstraction strategies is certainly the most consistent and progressive, as both the visual elements themselves and their production has become autonomous and abstract. Animations created with generativesoftware represent for now the end and high point of the formal efforts to achieve autonomy in the art of abstract moving images.

Abstraction now

Abstraction is rightly considered one of the greatest intellectual achievements in 20th-century art. Thought and work processes have been initiated, and they are still in progress. Innumerable artists have explored the many formal possibilities offered by this phenomenon in all media, regardless of whether the particular style or movement is currently popular. The ABSTRACTION NOW project has supplied proof that the principle of abstraction remains significant and topical and that it is being employed with unchanging frequency in various media and with a range of techniques, and on the basis of a spectrum of motivations.

Translation: Steve Wilder

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mapping on abstracts / no true maps

displays, images, spaces

"If one notices one's immediate visual field, what is seen? Neither order nor disorder. Where does the field terminate? In an indeterminate peripheral zone, non the less actual or unexperienced for it's indeterminacy, that shifts with each movement of the eyes. What are the contents of any given sector of one's visual field? A heterogeneous collection of substances and shapes, neither incomplete nor especially complete (...). Some new art now seems to take the positions of the visual field itself (...) and uses these as a structural basis for the art." Robert Morris¹

The starting and end points of the project ABSTRACTION NOW remain the opening up and surveying of real and imaginary spaces in current non-figurative image/arts, whose anchoring points may be seen in the juxtapositions and overlaps of "abstract" art and New Media. Beside the "classic" disciplines painting and sculpture, graphic/design functions as mediator towards the new media, since it draws on related design-based technical and procedural parameters. The selection and position of the works mainly follows an interest in interdisciplinary process-oriented approaches, although, in fact, most of the works are conceived as self-referential. The repeated confrontation with real present-day structures and conditions gives rise to a visual rhetoric of the simple that also shows on the material level (which is, in general, strikingly reduced). By manifesting their self-reliance regarding materiality, stylistic idiom and design, the individual works can also stand on their own – the objects turn into signs of themselves; they manage to do so in a sustainable way, because the works "surveyed" assume a reconfigured capacity for connecting with other positions in the exhibition and within the extended reference/space. In the chosen arrangement of its more than 80 works, the exhibition display takes up the controversial attempt to productively construct relations between different formal positions. With an open debate on questions of the autonomy, formal integrity, and discursive connectivity of each position, the exhibition tries to establish a structural *dispositif* similar to a "cognitive mapping"², which offers links between individual fragmented artistic positions. The given terrain, fraught and burdened with art history, is restructured and newly circumscribed according to an artificial, content-related logic. In suggesting and outlining imaginary relations on the basis of underlying real art-historical conditions³, a rich set of ultimately subjective "cognitive mappings" is offered. The interplay of the individual positions within the offered "mapping" results first in a multiplication of fragmentation, which allows for surveying and ordering the conditions of current "abstract" formal languages. It is only after a continuous "clearance process" that individual works begin to stand out in their unwieldiness, or else offer possibilities for reading them contextually within a broader *tableau* in order to establish surprisingly coherent and connectible "pictures of an exhibition". In achieving this, the convincing exhibition architecture – convincing precisely in its simplicity – plays a crucial role. It manages to partition and order the given confusing body of perceptive options within a complex spatial structure; using linear markings on the floor, the architect's office Pretterhofer/Spath in co-operation with the art design studio re-p.org (who were also in charge of creating a project-adequate graphic design for the catalogue and the web site) developed a flexible cartographic system, outlining and suggesting spaces for each position, spaces that, in their graphic delicateness and efficiency of design, enable the viewer to establish relations between adjacent works as well as entire spatial structures. The individual works give shape to the spaces;

the given spatial structure is transformed into interwoven, many-layered image/spaces; the exhibition space transcends its possibilities. The many-voiced (solitary) "noise" of the individual positions and disciplines is condensed in the attempt to elaborate a sustainable set of options, which encourages the development of adequate senses for dealing with present-day abstraction.

Like a variety of approaches, the viewer is offered different sections of a display, whose common focus always also looks at the fragile position of current "abstract" art that is capable of developing in terms of a "future past"⁴ motivated by modernism. For despite all its complexity, the historically fraught concept of abstraction must be continually discussed against the backdrop of the past to obtain useful blueprints for setting up vanishing points capable of further development.

The many-layered exhibition display thus offers a possibility for raising questions about the location, status, and connectivity of individual works in the context of a broader discussion of present-day abstraction. Artists working on the concept of the "abstract" image are creating a wide variety of representations by submitting to the project of an extended image production⁵, without disregarding demands for formal consistency in their use of means and forms – assigning active reception to a situated subject⁶. The exhibition and the project ABSTRACTION NOW are ultimately designed to invite viewers to "abstract", from a wide interdisciplinary range of artistic positions, their own maps⁷ on current issues around productions of "abstract art" that are neither figurative nor representative.

Translation: Helga Droschl

- 1 Robert Morris: *Notes on Sculpture 4: Beyond Objects*, in: *Artforum*, April 1969, 50 April 1969, 50
- 2 Frederic Jameson: *Postmodernism, or, The Cultural Logic of Late Capitalism*. Verso, London – New York 1991, 51
- 3 Louis Althusser (ed.): *Ideologie und ideologische Staatsapparate: Aufsätze zur marxistischen Theorie*. VSA, Hamburg – Berlin 1977, 135
- 4 Mark Godfrey: *Future Past*. in: *Art Monthly*, no. 273 / 2004, 7
- 5 Dierich Diederichsen: *Visual Culture – Ein Projektbericht*, in: *Texte zur Kunst*, no. 36 / 1999, 30f
- 6 Rosalyn Deutsche: *Evictions: Art and Spatial Politics*. Graham Foundation / MIT Press, Cambridge / Mass. 1997, 195
- 7 Gilles Deleuze, Felix Guattari: *Tausend Plateaus: Kapitalismus und Schizophrenie*. Merve, Berlin 1997, 696

Media and Abstraction

At first it would seem reasonable to approach the exhibition ABSTRACTION NOW with one of the arguments employed by Clement Greenberg in the late 1950s with regard to "modernist painting" which was based on that of Moholy-Nagy in the 1930s: Modern artworks can be categorized according to the nature of their *medium*, and the predominant aspect of painting is its *flatness*. Therefore self-critical art must refer to this quality. A modern painting's image should be regarded primarily as an image, a flat surface, before a search for its content or statement begins.¹

If art defines itself in relation to its medium and artworks are included in an exhibition such as this as paradigms, Greenberg's imperative would seem to be confirmed, as the qualities of a digital image that relates to medium determine its appearance, at least in an art context. These qualities – again as they pertain to the image – are the flatness of the monitor/interface, then the electronic "matter", the pixels, then the modification strategies made possible by the parameters of the software being used, and finally a unique choreography of movement. In other words abstraction could be described by the following equation: art = medium = flatness = pixels = software parameters. But this desire, which is made topical in retrospect here, is presumably too formalistic. I would like to contrast the *abstraction* and the *now* with a few other ideas. By the time the art of the first modern period began to be regarded as abstract and labeled as such, the entire world had become abstract. The industrial age offered goods manufactured with machines, and virtually no one was able to comprehend the logic behind their production; the web of socialization anonymously administered its middle-class subjects, forcing everything opposing it into an instrumental exchange of communicative rationality; and the self-definitions of individuals were the products of scientific, categorical descriptions of states which resisted comprehension by the individual. The process of producing de-objectified art was motivated primarily by the extra-artistic field of productive and administrative forces which held up an opaque mirror to society. And so as a result *abstract* was synonymous with the entire culture of the first modern period, in the compulsive submission, in the resistance and re-presentation through art, whose answers, as we know, varied greatly.

A century later this development underwent an odd kind of fracture. With the advent of a service society the disappearing concretion was stopped by a machine which inspires a great deal of ambivalence. While the computer is successful at making its computing processes totally opaque, it enables at the same time the

creation of a wholly autonomous world of unique objects which can be operated and manipulated by nine-year-olds with no difficulty. In other words experience is again becoming increasingly important, though on the ruins of old-fashioned sensuousness. This world offers new heroes named Lara Croft, Lord of the Ring, Pokémon, creating new environments and realms of experience – and as the world of data becomes more "objectified", the more urgent will be reflexion on its foundations. It is in the peculiar tension between abstraction and re-concretion, highly compressed form and rich fullness that art and computers enter into a complex and sophisticated alliance. But how? I suggest no longer defining the cybernetic world exclusively as abstract in its esthetic arrogance or criticizing it as having lost its meaning, instead examining it more closely and attempting to introduce other terms, especially those which better describe the new visual phenomena.

I would like to begin by familiarizing my readers with the "mystery of the mathematical" which now accompanies all artistic work performed on a computer. This will be done with the aid of the wonderful description formulated by Max Bill: "[...] a space which begins on one side and ends on the other, which is simultaneously the same, in altered form; the limitation without a concrete border; variety which still forms a unit; [...] the vibrations and radiance of adjacent particles of color; the force field made of nothing but variables; the parallels that cross; and the eternity which doubles back upon itself as the present; and with them once again the square in all its stability; the straight line which is not obscured by relativity; and the curve which forms a straight line at all its points."²

This assertive report could be directly associated with work performed within the graphic environment of imaging software. The paradigm change which lies at the base of this work could possibly be summed up in that the analog photographic process is replaced by a *photogenerative process*, in other words a process which creates visuality not as an imprint of reflected light but as an expression of programs that "deterritorialize" the subject, removing it from its natural environment and "re-embedding" it in an artificial one where it appears in a new light according to foreign laws of evolution. Light now radiates from the pixels themselves. One could say that the old paradigm of *photographic identification* coupled with certainty and reconciliation is expanded upon and presumably mutates through the paradigm of *photogenerative transformation*.

A new equivalence, a new equivalent was created along with the digital code. A kind of unifying process is taking hold in which all things can be recorded and made comparable thanks to various kinds of "translators" (cameras, scanners, etc.). In their binary translation a switch or exchange is possible (sound files are controlled by picture files and vice versa). But everything is made not only exchangeable (or mistakable?), the binary combinations also permit direct alteration, modification and creating a code of a totally different artificial thing on the basis of digitalization. "As digital images comprise discrete pixels with

specific mathematical values, a digital image can be altered by modifying its pixels' definition."³ Equivalence and modification are therefore the two basic operations of the new regime. The digital equivalents are being used to create a parallel world, and the modification strategies are employed to make this world heteronomous, subjecting them to laws that are foreign to mankind's "original nature".

When a photographic image is digitalized, it undergoes a conversion into both a new form and a new "system space".⁴ In terms of software this new system space is a graphical user interface which subjects the image involved to a wide range of modifications. The "nature" of computer graphics makes it possible to "morph, clone, overlay, filter, soften or sharpen edges, mirror, invert, rotate, scale, compress, stretch, colorize and add grid effects"⁵ to a picture. This brings us to the structural similarity between genome and photograph. Both can be cloned and made *identical but separate*, in both cases thanks to the fact that their codes are known. Equivalence and all kinds of modification are inscribed in the system space of digital photography as paradigms, and therefore exchange and deception, transformation and abstraction.

In one of his texts, which are modeled after Platonic dialogues, Paul Valéry deconstructed, one could say, the esthetics of representation. Three learned men observe a dancer as she performs, and one of them postulates that this dance is presumably intended to *represent* something. Socrates responded by negating this desire for representation, claiming that the performance is the "pure process of transformations". The pure process of transformations. Transformation is therefore contrasted with representation. In place of abstraction Valéry suggested in light of the medium of dance's high level of mobility, or to be more precise in light of dance as a medium with a wide range of movement processes, the simple but powerful concept of *transformation* for the purpose of describing the nature of dance and the dancer, and possibly also in reference to how the various art forms themselves are subject to great changes, and how the panel painting, in the same way as sculpture, is being replaced by moving images, objects full of vitality, dynamic installations which demonstrate change and transformation as their constituting agent. Many of the works in this exhibition (but do they really *exhibit* something in the sense of a representation?) are able to convey this mutability, this ability and desire to transform and possibly make the viewer forget about abstraction, which is still a component of production and expression. No, transformation can be termed the other side of the coin, possibly the dark side of contemporary abstraction to which we are always witnesses.

Dance as a model, a new paradigm for a second modern age!? When hearing the term transformation, one might think of the pretty and venerable word *metamorphosis*. It is however superficial to assume that this entails nothing more than a change in external appearance, pixels entering into new configurations. No, a great deal more is involved, and when exploring the roots of the term transformation in

Greek, you will find *metabolé*, which is translated into English as *metabolism* and refers to a more complex process of transformation rather than a mere change in form. And to my mind this fact is of extreme importance, because a form of metabolism takes place when, for example, found footage is digitalized, i.e. recreated in a photogenerative process according to the laws governing an abstract equivalent, then altered, transformed in various ways in the "drunkenness of action", as Valéry would have said, in other words through programming and the editing and destruction of images. The final product is a completely new and luminous body taking shape in a state of constant flux.

A body, an object? I would like to attempt a differentiation in this case also: Color palettes, lines, patterns, etc. do not give shape to conventional objects. I would prefer to speak of "quasi-objects", as Michel Serres and Bruno Latour suggested for all groups of things that do not permit equivocal categorization, following their own rhythm between nature, technology and society.

What can be termed "abstract" is the non-illusionistic, non-representative and non-transcendental tendency of quasi-objects, of conglomerations of sounds and images that initiates an indeterminate kind of metabolism, to one extent extremely rigid and to another extremely chaotic, in other words scenarios of transformation, metabolisms ritualized with the aid of software, metabolisms that demand the same thing of the viewer, namely continuous self-transformation, self-mutability - and therefore they reflect in fact and in an ambivalent manner contemporary post-Fordist society and its talk of a "multiple personality", a universal "flexibilization" of humankind!

I would like to conclude by examining a quote from one of the last texts produced by Clement Greenberg in which he attempted to discuss the concept of "intermedia", though he would have preferred to continue on the subject of modern visual art. In this instance he ran up against his own previous ideas and nearly succeeded in producing the same or a similar line of reasoning: "It is part of the nature of visual art that the time factor is of no importance, as against all reason, so much can be compressed into in a single or a few moments (as if innumerable angels were made to dance on the head of a pin)."⁶ Well, the time factor of course plays a substantial role in contemporary art, whether as a historical phenomenon and one of memory, as a technical image of time and movement, or as a period of transformation and metabolism. At the same time the media and digital aspects seem to be searching for a new *space*. Erwin Panofsky, in a noteworthy text, pointed out the fact that all artworks are subject to the discourse between "fullness" and "form".⁷ The ontological opposition of fullness and form has a correlate in the methodological opposition of "time" and "space", whereby the *fullness of time* includes perception, the optical and fusion, while the *form of space* addresses order, the haptic and physical, flatness and adjacency. The artwork evolves solely in the interaction and balance of the two. I would like to argue that many of the works in ABSTRACTION NOW describe a certain space according to the model of the *system*

space mentioned above which is constructed on the basis of the computing and simulation processes' topological orders, and which at the same time produces a tactility not commonly found in the visual arts, neither as the movement of a cursor when exploring an interactive CD-ROM nor as the visual and acoustic shock produced by installations which have a profound effect on their viewers, nor as a challenge to set art itself in motion, to interact with it. At the same time the spatial includes a certain temporality, namely that of the transformation process.

I would like to reformulate Greenberg's sentence according to my ideas:
Abstract art can now make innumerable quasi-objects dance on the head of a pin, also known as an interface – and that is a good thing!

Translation: Steve Wilder

- 1 For example see Clement Greenberg: *Modernistische Malerei*, in: Karlheinz Lüdeking (ed.): *Die Essenz der Moderne. Ausgewählte Essays und Kritiken*. Verlag der Kunst, Dresden 1997, 265 - 278
- 2 Max Bill: *Die mathematische Denkweise in der Kunst unserer Zeit*, in Jürgen Claus: *Kunst heute. Personen - Analysen - Dokumente*. Frankfurt am Main - Berlin 1986, 67
- 3 Peter Lunenfeld: *Digitale Fotografie. Das dubitative Bild*, in: Heita Wolf (ed.): *Paradigma Fotografie. Fotokritik am Ende des fotografischen Zeitalters*, Suhrkamp Verlag, Frankfurt am Main 2002, 165
- 4 See Erwin Panofsky: *Die Perspektive als "symbolische Form"*, in: Erwin Panofsky: *Aufsätze zu Grundfragen der Kunstwissenschaft*. Wissenschaftsverlag Spiess, Berlin 1985. The system space of analog photography is subject to optical and chemical rules.
- 5 Lunenfeld: *l.c.*, 165
- 6 Clement Greenberg: *Intermedia*, in: Karlheinz Lüdeking (ed.): *Die Essenz der Moderne. Ausgewählte Essays und Kritiken*, op. cit. 450
- 7 See Erwin Panofsky: *Über das Verhältnis der Kunstgeschichte zur Kunsttheorie. Ein Beitrag zu der Erörterung über die Möglichkeit "kunstwissenschaftlicher Grundbegriffe"*, in: Erwin Panofsky: *Aufsätze zu Grundfragen der Kunstwissenschaft*. Wissenschaftsverlag Spiess, Berlin 1985

Abstract Heritages and Legacies

Fleeting Looks at Backgrounds, Categories and Grids

The nineties were said to be characterized by an intensified desire for reproductions of authentic life, a hunger for realistic representation which was manifested in the popularity of photography exhibitions and video, the latter of which was the subject of a great deal of commentary. It would seem that this trend reached a zenith with its broad commercialization, which was made possible by the transmission of digital images (whether in the form of reality TV or video clips on a cell-phone display). At the same time art discourse seemed to find a new focus of interest in contrary trends such as Conceptual Art, which is critical of mere representation. A variety of projects began to deal with artistic phenomena that in certain senses could be described with the term abstraction. A juxtaposition of "realism" and abstraction resembles the earliest understanding of the term by Kandinsky and Worringer¹ and now requires a relatively low common denominator such as a definition of abstract visuality as being merely non-representational. A number of these projects are accordingly broad and unspecific, some of them demonstrating deficient knowledge of the range of meanings possessed by certain terms and antitheses which varied greatly in the course of the 20th century.

The exhibition entitled ABSTRACTION NOW has managed to circumvent this problem by dispensing with the numerous potential historical examples, thereby avoiding at the same time a misleading suggestion of continuities. The central modern and post-modern discourses which are inherent to the subject and its history are nevertheless reflected in a number of ways – the majority critical or ironic – in this collection of works, all of them of recent provenance. The rise of abstract art is closely linked to the development of modernism and was initially regarded as a liberation from a mimetic reproductive function, as a result of which references to contemporary social life were to be cast off in their arbitrary nature. The formal elements of realistic representation (such as perspective space, the illusion of lighting effects and the use of drawing to produce representational forms) were replaced by new methods. Consequently abstraction also turned against representation per se, against a graphically and visual idea of the absent or referentiality, whether in the form of a symbol, icon or index.

The diverging meanings taken on by abstraction over the years were manifested in the variety of form-giving principles and the spectrum and contradictory nature of the attributes characterizing its positive ambitions: biomorphic, inorganic, constructivist, concrete, generative, absolute, *informell*, etc. While early abstractionists attempted to visualize universal laws of nature or metaphysical concepts, the artwork, as an autonomous organism, was regarded as a model and the artist, as the creator of a *natura naturans*, enjoyed genius status. The relevant categories in art theory are originality, autonomy and self-referentiality. With the advent of Abstract Expressionism the concept was expanded to include the subjective. A particular high point of modernist abstraction was linked to the category of medium specificity, as demonstrated in the way Greenberg chose the famous term "flatness" to define it. Minimalists regarded abstract images as expressions of pure visibility, their visuality, materiality and object nature having advanced to the foreground. "Primary structures" were supposed to inspire a holistic manner of seeing figures, an experience of form (which was presumed to be based on anthropological constants rather than the artist's genius). "Non-relational forms" represented attacks on principles of European abstraction such as balance and hierarchy. Post-minimalist abstraction, such as in Conceptual Art, must be understood as a criticism of previous conceptions, which were rejected as elitist estheticism or formalism devoid of social relevance. There was seen in the strategies of Minimalism and their link to mathematic rules and mass-production methods of an affirmation of industrial society and a capitalistic product esthetic.² ABSTRACTION NOW focuses in particular on audiovisual moving images and New Media; one sub-focus is interactive Web sites and offline computer projects. These software, DVD, video, film and Web works were presented at a media lounge and the Künstlerhauskino, while the other spaces used for the exhibition were devoted to the classic genres of painting, sculpture, photography and installations. The variety of media and the interest in relationships between the individual disciplines were necessary for the show's primary intention, namely "showing how visual artistic strategies have been changed and expanded with the aid of New Media, the specific logic inherent to them and the consistency with which they are implemented." (press text). This goal makes the fact clear that this project is not an investigation of the "medium specificity of New Media" in the sense of a Greenbergesque kind of modernism. Efforts in this direction are currently being made in the field of photography in particular, abstraction being regarded primarily as an "uncompromising self-reflexion in the medium" which reveals the representational structures of photography without binding them to a specific purpose.³ Instead the idea behind ABSTRACTION NOW leaves no doubt that the "pure" medium has long been a mere utopia and that reducing a work to the physicality of its medium can no longer provide meaningful information about it.

Many of the works in this show reflect the status of a "post-mediality" which characterizes contemporary art in numerous ways. Almost without exception a variety of media, some inextricably interconnected, are employed, and electronic or digital techniques are nearly always involved, if not in the development process, then in their final production or publication. A reflexion on this prerequisite is not an end in itself, being at best implicitly obvious. This fact is demonstrated for example by the geometric paintings of Doris Marten, which were created on the basis of digital drafts; her motifs of colored bands and stripes create the illusion of a three-dimensional grid which has more in common with the esthetic of computer games than Mondrian's austere late work. Orthogonal forms and grid-like structures in particular are the elements of contemporary art's formal grammar revealed by this exhibition.⁴ Rosalind Krauss termed the grid or screen a structure which is emblematic for modern art and its claims to autonomy.⁵ Furthermore it is exclusively visuality in pure proportion, i.e., determined by the picture's square shape alone. As a mythic model it enables an avoidance of the contradictions between rational and spiritual values by seemingly satisfying both, and is at the same time closely linked to the optical infrastructure as a matrix of knowledge. But claims to autonomy are no longer voiced in this form and the myths of medium specificity and essentiality have been overcome. As a result work with the medium's microstructures can lead to a geometry firmly based on "representational" equivalents such as screens, pixels, lines on the computer monitor and Photoshop color palettes. This is illustrated by the works of Norbert Pfaffenbichler/Lotte Schreiber and Günther Selichar, which deal with the elementary circumstances of digital visuality. Placing them in an artwork in an absolute manner, so to speak, qualifies the media conditioning. The abovementioned contemporary status of media conglomeration is manifested in Selichar's works, in an exemplary way and in a reflexive refraction.

The works of Liam Gillick and Sarah Morris refer to standardized grids taken from the context of modern architecture. The latter photographed International Style buildings and transposed details into colorful paintings showing nothing more than elemental structures and grids. More interesting than formal (or formalistic) alliances is the point at which the abstraction process becomes autonomous and a type of abstraction characterized by collective mass-media images of urbanity is born. Gillick's multicolored objects made of plug-in modules address a central idea of modern art: In an art context a wide range of connotations is available for suggesting such things as usability, thematizing the esthetic and display hierarchies or shifting the focuses of form or secondary effect. The three-dimensional grid serves as a framework, storage shelf and billboard. In a manner resembling Duchamp's oeuvre Gerold Tagwerker on the other hand employs ready-made mass-produced goods such as grid-shaped shelves, subjecting them to a fresh look in an art context.

Shifts of another kind, namely geometric deviations from austere orthogonal forms, populate the works of Margit Hartnagel and Esther Stocker. Recent paintings demonstrate a particularly subtle development proceeding from classic abstraction in the tradition of Mondrian (and Constructivists of a similar bent). In their grid-like structures individual elements leave the pack, thereby taking the constellation of forms to the very edge of realistic representation. As explained by Martin Prinzhorn⁶, most important here is "differentiating and exploring relationships at their very limits, (...) such as the differences between regularity and irregularity..." and not, as in modernist abstraction, "isolating individual aspects of perception such as color, contour or three-dimensionality". The result is a "shift from the objects of perception to perception itself" which emphasizes the procedural and dynamic character of the perception of visual representation. This also addresses problems of a "general philosophical and psychological nature" such as the allocation of explicit content to representations or symbols. At first glance Stocker's painting seems most closely linked to the modernistic tradition, suggesting at best a continuity through linear heritages and legacies. But precisely works such as these raise questions concerning the simple and straightforward dichotomy between realism and abstraction which can no longer serve as a tenable model for categorizing (visual) artworks on a simple grid.

Translation: Alan Smithee / Marie Röbl

- 1 Wassily Kandinsky: *Über das Geistige in der Kunst* (1910), Bern, no date
- 2 Jutta Held: *Minimal Art – eine amerikanische Ideologie* (1972), in: Gregor Stemmrich (ed.): *Minimal Art. Eine kritische Retrospektive*. Verlag der Kunst, Dresden 1995, 453, 458
- 3 Lambert Wiesing, *Abstrakte Fotografie. Denkmöglichkeiten*, in: Gottfried Jäger (ed.): *Die Kunst der Abstrakten Fotografie / The Art of Abstract Photography*. Arnoldsche Art Publishers, Stuttgart 2002, 84
- 4 This text focuses on some examples of this kind which are in the tradition of Constructivism. Apart from the monochrome works in the exhibition (which can be seen as a subdivision of the first group) there could be also registered a second group which show a more organic or expressive-biomorphic style. From a formalistic point of view this division represents the two major genealogical lines of abstraction.
- 5 Cf. Rosalind Krauss: *Grids* (1979), in: Herta Wolf (ed.): *Die Originalität der Avantgarde und andere Mythen der Moderne*. Verlag der Kunst, Dresden 2000, 51–66
- 6 Martin Prinzhorn: *Bilder der Vermessung, Zeichen, die sich selbst bedeuten*, in: *Esther Stocker, Malerei / Painting / Pittura 1997–2002*, Triton Verlag, Wien 2002

Abstraction and Complexity

If we take abstraction and wire it to software, do we get anything new and useful beyond what already took place in the first part of the 20th century, when the new abstract visual language was adopted by graphic design, product design, advertising and all other communication, propaganda and consumer fields? Do the elegant algorithmically driven abstract images which started to populate more and more web sites since the late 1990s have a larger ideological importance, comparable to any of the political positions and conceptual paradigms which surrounded the birth of modern abstract art at the beginning of the 20th century? In short, is there some common theme that can be deduced from the swirling streams, slowly moving dots, dense pixel fields, mutating and flickering vector conglomerations coming from the contemporary masters of Flash, Shockwave, Java and Proce55ing?

Modernistic reduction

When we compare the years 2004 and 1914, we will in fact realize a similar breadth of abstract styles: the strict northern diet of horizontal and vertical lines by Mondrian, more flamboyant circular forms of the Paris-based Delaunay, the emotionally charged fields of Russian Kandinsky, the orgy of motion vectors of the Italian futurists. The philosophical presuppositions and historical roots which have led to the final emergence of "pure" abstraction in the 1910s are similarly multiple and diverse and result from a variety of philosophical, political and aesthetic positions: the ideas of synesthesia (the correspondence of sense impressions), symbolism, theosophy, communism (abstraction as the new visual language for the proletariat in Soviet Russia), and so on. And yet, it is possible and appropriate to point at a single paradigm which differentiates modernist abstraction from realist painting of the 19th century and simultaneously connects it to modern science. This paradigm is *reduction*. In the context of art, the abstraction of Mondrian, Kandinsky, Delaunay, Kupka, Malevich, Acp and others represents the logical conclusion of a gradual development of preceding decades: from Manet, impressionism, post-impressionism, symbolism to fauvism and cubism, the artists progressively streamline and abstract the images of visible reality, until all recognizable traces of the world of appearances are taken out. In general, this reduction of the visual experience in modern art was a very gradual process which began already in

the early 19th century.¹ At the beginning of the 20th century, however, we often see the whole development being replayed within a single decade – such as in the paintings of a tree created by Mondrian between 1908 and 1914. Mondrian starts with a detailed realistic image of a tree. By the time Mondrian has finished his remarkable compression operation, only the essence, the idea, the law, the genotype of a tree is left.

This visual reduction that took place in modern art perfectly parallels with the dominant scientific paradigm of the 19th and early 20th century.² Physics, chemistry, experimental psychology and other sciences were all engaged in the deconstruction of the inanimate, biological and psychological realms into simple, further indivisible elements, governed by simple and universal laws. Chemistry and physics postulated the levels of molecules and atoms. Biology saw the emergence of the concepts of cell and chromosome. Experimental psychology applied the same reductive logic to the human mind by postulating the existence of further indivisible sensorial elements, of which the combination would account for perceptual or mental experience.

The gradual move towards pure abstraction in art during the same period follows exactly the same logic: similarly to physicists, chemists, biologists and psychologists, the visual artists have focused on the most basic pictorial elements – pure colors, straight lines, and simple geometric shapes. Kandinsky, for instance, advocated in *Punkt und Linie zu Fläche* (*Point and Line to Plane*) the "microscopic" analysis of three basic elements of form, claiming that there exist reliable emotional responses to simple visual configurations.³ The titles of the articles Kandinsky published in 1919, equally account for his program: "Kleine Artikel zu großen Fragestellungen. I. Über den Punkt" (Small Articles About Big Questions. I. About Point) and "II. Über die Linie" (About Line).⁴ Within the first two decades of the 20th century, various artists in many countries simultaneously deconstructed visual art into its most basic elements and created simple combinations, which echoes similar developments in contemporary science. In some cases, however, the connection was much more direct: some of the key artists who were involved in the "birth" of abstraction were closely following the research into the elements of visual experience conducted by experimental psychologists. As experimental psychologists split visual experience into separate aspects (color, form, depth, motion) and subjected these aspects to a systematic investigation, their articles begin to feature simple forms such as squares, circles, and straight lines of different orientation, often in primary colors. Many of the abstract paintings of Mondrian, Klee, Kandinsky and others look remarkably similar to the visual stimuli already widely used by psychologists in previous decades. Since it is documented that at least in some cases the artists have followed the psychological research, it is appropriate to suggest that they have directly copied the shapes and compositions from literature in the field of psychology. Thus, abstraction was in fact born in psychological laboratories before it ever reached the gallery walls.

Complexity

Beginning in the 1960s, scientists in different fields gradually have realized that the classical science which aims to explain the world through simple universally applicable rules (such as the three laws of Newtonian physics) cannot account for a variety of physical and biological phenomena. Soon after, artificial intelligence research that tried to reduce the human mind to symbols and rules, also stagnates.

The new paradigm begins to emerge across a number of scientific and technical fields, eventually reaching popular culture as well. It includes a number of distinct areas, approaches, and subjects: chaos theory, complex systems, self-organization, autopoiesis, emergence, artificial life, neural networks, the use of the models and metaphors, borrowed from evolutionary biology (genetic algorithms, "memes"). Although they differ, most of them share certain basic assumptions: they look at complex dynamic and non-linear systems and model the development and/or behavior of these systems as an interaction of a collection of simple elements. This interaction typically leads to emergent properties – an, a priori, unpredictable global behavior evolves. In other words, the order that can be observed in such systems emerges spontaneously; it can't be deduced from the properties of elements that make up the system.

According to the scientists working on complexity, the new paradigm is as important as the classical physics of Newton, Laplace, and Descartes, postulating the assumption of the "clockwork universe". The significance of the new approach, however, is not limited to its potential to describe and explain the phenomena of the natural world that were ignored by classical science. Just as the classical physics and mathematics perfectly fitted the notion of a highly rational and orderly universe controlled by God, the sciences of complexity seem to be appropriate in the world which on all levels – political, social, economic, technical – appears to us to be more interconnected, more dynamic, and more complex than ever before. As Rem Koolhaas has put it recently, "globalization is about connecting everything to everything else".⁵ So in the end it does not matter whether frequent invocations of the ideas of complexity in relation to just about any contemporary phenomenon – from financial markets to social movements – are appropriate in every case.⁶ What is important is that having realized the limits of linear top-down models and reductionism, we are prepared to embrace a very different approach, one which looks at complexity not as a nuisance which needs to be quickly reduced to simple elements and rules, but instead as the source of life – something which is essential for a healthy existence and evolution of natural, biological, and social systems.

I can now name the larger paradigm I see behind the visual diversity of contemporary software driven practice – from stylish animations and backgrounds which populate commercial web sites to the online and offline works which are explicitly presented by their creators as art. This paradigm is *complexity*.

If modernist art followed modern science in reducing the mediums of art – as well as our sensorial experiences and ontological and epistemological models of reality – to basic elements and simple structures, contemporary software abstraction instead recognizes the essential complexity of the world. It is therefore no coincidence that time-based software works often develop in a way that is directly opposite to the reduction that over the number of years took place in Mondrian's paintings – from a detailed figurative image of a tree to a composition, consisting of just a few abstract elements. Today, we are more likely to encounter the opposite: animated or interactive works that begin with an empty screen or a few minimal elements that quickly evolve into a complex and constantly changing image. And while the style of these works is often rather minimal – pixel patterns rather than an orgy of abstract expressionism⁷ – the images formed by these lines are typically the opposite of the geometric essentialism of Mondrian, Malevich, and other pioneers of modern abstraction. The patterns of lines suggest the inherent complexity of the world that is not reducible to some geometric phenotype. The lines curve and form unexpected arabesques rather than traversing the screen in strict horizontals and verticals. The screen as a whole becomes a constantly changing area rather than a static composition.

When I discussed modernist abstraction, I pointed out that its relationship to modern science was two-fold. In general, the reductionist trajectory of modern art that eventually led to a pure geometric abstraction in the 1910s parallels the reductionist approach of contemporary sciences. At the same time, some of the artists actually followed the reductionist research in experimental psychology, adopting the simple visual stimuli used by psychologists in their experiments for their paintings.

Since designers and artists who create software abstraction are our contemporaries and since we share the same knowledge and references, it is easy for us to recognize the strategy of direct borrowing at work. Indeed, many designers and artists use the actual algorithms from the scientific publications on chaos, artificial life, cellular automata and related subjects. Similarly, the iconography of their works often closely followed the images and animations created by scientists. Some people actually manage to operate simultaneously in the scientific and cultural universes, using the same algorithms and images in their scientific publications and art exhibitions. One example is Karl Sims who, in the early 1990s, created impressive animations based on artificial life research that were shown at the Centre Pompidou in Paris and were also described in a number of technical papers he published. It is less evident that *the aesthetics of complexity* is also present in the works that do not directly use any models from complexity research. In short, I argue that just as it was the case with modernist abstraction, the abstraction of the information era is connected to contemporary scientific research both directly and indirectly – through a direct transfer of ideas and techniques and indirectly as being part of the same historically specific imagination.

Here are some examples, all drawn from the online section of the exhibition ABSTRACTION NOW.⁸ I decided to test my hypothesis by systematically visiting each online work in the exhibition, rather than selecting only a few works that would fit my preconceived ideas. I have also looked at all the accompanying statements – of which none, as far I could see, explicitly evoke the sciences of complexity. My experiment worked even better than I had expected, since almost all pieces in the online component of the show turn out to follow the aesthetics of complexity, invoking complex systems in a natural world even more often and even more literally than I had expected.

Golan Levin's *Yellowtail* software amplifies the gestures of the user, producing ever-changing organic-looking lines of constantly varying thickness and transparency. The complexity of the lines and their dynamic behavior make the animation look like a real-time snapshot of some possible biological universe. The work perfectly illustrates how the same element (i.e. a line) that in modernist abstraction represented the abstract structure of the world, now evokes instead the world's richness and complexity. (A similar effect is at work in the piece by Manny Tan.) In other words, if modernist abstraction assumes that behind sensorial richness of the world there are simple abstract structures that generate all this richness, such a separation of levels is absent from software abstractions. Instead, we see the dynamic interaction of the elements that periodically leads to certain orderly configurations.

InsertSilence by James Paterson and Amit Pitaru starts with the few tiny lines moving inside a large circle; a click by the user immediately increases the complexity of the already animated line cob, making lines multiply, break, mutate, and oscillate until they "cool down" to form a complex pattern which sometimes contains figurative references. While the artists' statement makes no allusions to complexity sciences, the animation in fact looks like a perfect illustration of the concept of emergent properties.

As I already noted, software works often deploy vector graphics to create distinct biologically looking patterns. However, a much more modernist looking rectangular composition made of solid blocks can also be reworked to function as an analog to the complex systems studied by scientists. The pieces by Peter Luining, Return, and James Tindall evoke typical compositions created by students at Bauhaus and Vkhutemas (Russian equivalent of Bauhaus in the 1920s). But again, with a single click of the user the compositions immediately come to life, turning into dynamic systems whose behavior no longer evokes the ideas of order and simplicity. As in many other software pieces which subscribe to the aesthetics of complexity, the behavior of the system is neither linear nor random – instead we are witnessing a system which seems to change from state to state, oscillating between order and chaos – again, exactly analogue to complex systems found in natural world.

Some of the software pieces in the Online Project part of ABSTRACTION NOW adopt the combinatorial aesthetics common to both early modernist abstraction and

minimalism of the 1960s (in particular, the works by Sol LeWitt). This similarity only makes more apparent today's very different logic at work. For instance, instead of systematically displaying all possible variations of a small vocabulary of elements, the *Arp* code by Julian Saunderson from Soda Creative Ltd constantly shifts the composition without ever arriving at any stable configurations. The animation suggests that the modernist concept of "good form" no longer applies. Instead of categorizing right and wrong forms (think for instance of the war between Mondrian and Theo van Doesburg), we are in the presence of a dynamic process of organization that continuously generates different forms of equal validity.

If the works described so far were able to reference complexity mainly through the dynamic behavior of rather minimal line patterns, the next group of works uses algorithmic processes to generate dense and intricate fields, which often cover the whole screen. Works by Glen Murphy, Casey Reas, Dextro, Meta, Ed Burton (also from Soda) all fit into this category. But just as with the works described so far, these fields are never static, symmetrical or simple – instead they constantly mutate, shift and evolve.

The aesthetics of complexity which dominates the online works selected for the show ABSTRACTION NOW is not unique to it; scanning works regularly included in other exhibitions such as *Ars Electronica 2003*, or *Flash Forward* festival demonstrates that this aesthetic is as central for contemporary software abstraction as the reductionism was for early modernist abstraction. This is the larger ideological importance of software-driven abstraction – at its best it quite accurately and at the same time poetically captures our new image of a world seen as the dynamic networks of relations, oscillating between order and disorder, always vulnerable and ready to change with a single click of the user.

- 1 See, for instance, the exhibition "At the Origins of Abstraction (1800-1914)", Musée d'Orsay, Paris, November 5, 2003 – February 23, 2004
- 2 For a detailed reading of modern art as the history of reduction which parallels the reductionism of modern science and in particular experimental psychology, see the little known but remarkable book *Modern Art and Modern Science*. Paul Vitz and Arnold Glimcher: *Modern Art and Modern Science: The Parallel Analysis of Vision*. Praeger Publishers, New York 1984
- 3 Wassily Kandinsky (1926): *Point and Line to Plane*. Solomon R. Guggenheim Foundation, New York 1947
- 4 Yu. A. Molok: "Slovar simbolov" Pavla Florenskogo. *Nekotorye marginalii* (Pavel Florensky's "dictionary of symbols" A few margins), *Sovetskoe Iskusstvoznanie* 26/1990, 328
- 5 *CONTENT – Rem Koolhaas/DMA/AMO*, section on Prada stores, exhibition at Neue Nationalgalerie Berlin, November 2003 – January 2004
- 6 For examples of works which apply the ideas of complexity to a range of fields, see Manuel de Landa, *Thousand Years of Non-Linear History*. MIT Press, Cambridge/Mass. 1997; Howard Rheingold: *Smart Mobs: The Next Social Revolution*. Perseus Publishing, Boulder/Col. 2002; Steven Johnson: *Emergence: Connected Lives of Ants, Brains, Cities, and Software*. Scribner, Princeton/New Jer. 2003
- 7 See "Generation Flash" for a discussion of this visual minimalism as a new modernism; available at www.manovich.net
- 8 <http://www.abstraction-now.at/the-online-project/>

Code Acts

Net-, Web-, Online-Art always seems to be something of a problem. As anything exists in a given media, how far does this media "contaminate" it's nature? Should all art that is online be classified as Online-Art? Or is this not clear?

Our view is that Online-Art, as a browser-centered general category, can be broadly applied to any piece that is distributed in the internet or exists through it, be it along the World Wide Web and its familiar protocols, be it through any TCP/IP-based system and the global network. However, this categorization should only be applied whenever such systems are not used merely as a vehicle for information or promotion of the art pieces, but they are rather at the very core of the piece itself, helping to define not only its form but also its inner essence.

If these distinctive characteristics are not fulfilled, what generally happens is a transposition to another medium, and so far as with any other media transposition in history, we can talk about reproduction of an art work and not so much about a genuine creation in and for the new medium.

So what's with the www and its protocols? We should of course start from the plain html, the code that builds up most of the browser-centered online experience, where we also have the standard file formats and programming languages such as Java, php, Shockwave, etc. We have other protocols in the internet, such as email, or artists are even free to implement their own sets of communication protocols driving new tools.

A conclusive definition for what can be defined as Online-Art is therefore more difficult to achieve than for more or less traditional art forms as cinema or painting. The core question in a broader sense is that if an art work is in the internet, if it (as we discussed above) exists online, then it is online art. When curating this section of ABSTRACTION NOW, we chose to select artworks that would fall within this definition. Not art that uses the web but art that is in the web.

In the broader spectrum of digital arts, a site of fusion and intersection, what is the role of Online-Art nowadays? After the likes of Jodi or Nullpointer deconstructed the medium's language codes or Mark Napier explored the rhizomatic nature of the network, the fuzziness of the flow of information and its organization within systems and their users as in *Feed:USA* in the exhibition or in *Net.Flag*¹, a subject close to the one chosen by Golan Levin in his *The Secret Lives of Numbers*². The connections made possible by having multiple users

contributing to a system, providing inputs that are simply collected or fed simultaneously to an algorithm are also strategies that emerge in such projects like soda's *constructor*³ or Lia's %⁴. Such projects create communities or search these communities for variables they can feed to the system. We find out however that more and more digital artists are not so much involved in creating these more complex systems but rather work on online pieces that may stand to these much like drawing stands to painting. Most of the pieces compiled in the ABSTRACTION NOW Online Project are smaller experiences, focused systems dealing with specific matters in interaction, reaction, code, ... We would not like to define them as drafts, because they are not sketches to other pieces, although they may provide the starting point or even be developed as part of a broader body of work. When not carefully analyzed, it may almost seem that the ultimate purpose of many of these pieces is not in the web but that it lies somewhere else. Somewhere in another context or media where they will merge, blossom and mature.

But maybe not.

These pieces are concise. Short. Immediate. Yet concentrating deep experiences. When thinking about Yugop's *Blackribbon*, Peter Luining's *traber 073* and *square 4_4 (sp 11)*, Dextro's *A/tulux-b/det* or Lia's *08*, to name just a few, we find that many times these artists push something else to the foreground.

The internet is electric at its core. As Samuel Morse said of electricity and communication, "intelligence may (...) be instantaneously transmitted by electricity to any distance", and these words on the birth of the electric communications, are not less true today, when we think about digital communication, even less when we choose to focus on such a medium where so much seems more and more to exist and to be valued based on parameters of intelligence, logic and process. We're not talking about the artist's theoretical approach in the conceptualization of the pieces, what we are stating is that among the main concerns and even pleasures of those artists creating art in the online medium, one of the strongest focuses that we immediately feel is on programming, on developing code and enjoying code, on laying out as much as on understanding the inner workings of a system, almost reverse-engineering it while simultaneously enjoying it on an aesthetical level.

By its very nature, code acts. When algorithms kick in, their nature is perhaps more understandable if and when they are open to user interaction and not built into closed systems. You can feel the same thinking process lying here: whenever you can be a variable in a dynamic system, it becomes far easier to grasp its logic, as you're (literally) at it.

The strength of the algorithm is often more relevant to the experimentation of the piece than the final audiovisual, or also interactive product with which we sensibly contact. Online-Art, even because of its formal evanescence, allows a greater approach to the realm of immaterial things. Maybe that is why often

it becomes clear that its ultimate goal is not formal. Yes, it is of course aesthetical, but the idea of beauty is not emerging so strongly from form, but rather showing through the structure and process.

This almost naturally leads to the great level of abstraction that we find in the pieces collected for this exhibition. It was not a difficult task to select abstract pieces by these authors, even if our criteria on how far we could go when defining abstraction was in most cases pretty strict, both in the formal level and narrative nature of the works.

It is clear that in many cases the form factors are determined by the code lying underneath, color or shapes are selected due to their adequacy to portray the logos of the piece. Not that the more direct formal aspects are in any way disregarded, they rather are, we dare to say, extremelly functional in the way they follow the content, or the programmatic structure of the code. *Yellowtail* by Golan Levin is a good example of this as well as the pieces shown from James Tindall's *thesquarerootof-1*.

The nature of this online work and the work process of these artists makes them very prone to working across different media and to experiment various working relations, therefore it's not surprising to find works from many of these artists also shown at the Medialounge of the exhibition, in the MATHS IN MOTION video programme or also in the main exhibition. The selected pieces range from software art that has either too high demands or is too specific for the web, to video works where processor intense software pieces are rendered to a more manageable media or audiovisual linear compositions. Some of them are even systems that easily slip from one media to another, shaping themselves to different contexts and still keeping their identity. Norm's *Sign Generator* is such a strong concept, one that equally found its expressiveness in their book *Norm: The Things*, in the *Sign Generator 1.0* online piece and in the homonymous installation in the exhibition.

Another noteworthy inclusion in the exhibition are pieces from artists that create performance-oriented systems, like Telcosystems, Lia or Return. These systems are sometimes not too different in their working principles from some other works presented online or in other contexts, however they differ from these by the double role played by the artist: at once programmer/composer and executant/user. This duality creates an unique experience for the audience of the performances, as in these cases it becomes possible not only to witness an interactive system being deployed but also the specific outcome of the interaction with a very particular user, one that has a deep inside knowledge of the piece's working system and that can maximize its potential. Most commonly these performances use systems not available to experimentation by other users, but sometimes they are built upon variations of pieces that are accessible to an interaction with a broader audience, like it is the case with Lia's live acts and the many contact points one can find between the systems used there and those on *re:move*⁵ or other pieces.

We hope that with the selection of pieces in the Online Project and the Medialounge of ABSTRACTION NOW, the visitors are allowed to approach the pieces in a context that makes their codes closer, more visible and articulated between their complementary manifestations and the diverse modi operandi from the selected artists.

- 1 potatoland.org
- 2 flong.com
- 3 www.sodaplay.com/constructor
- 4 www.museudochiado-ipmuseus.pt
- 5 www.re-move.org

TNK 7362

Affinities and Crossovers of Abstract Film and Pop Culture

There are numerous myths concerning the early years of contemporary electronic culture, especially with regard to the computer-generated synesthesias of sound and image that have become increasingly popular over the past ten years. Such myths include the death of the "auteur artist," the advent of anonymous production processes from which hierarchies have been banned, and a certain absence of history or the beginning of a new historical period in the production of sound and image on the basis of machine-language codes. All these aspects must be re-examined gradually as part of a praxis which euphorically supported them at first. After all the power of these putative anachronisms is still vibrant, and they have undergone a reformatting in light of history, which also involves the actors' increasing interest in experimentation.

At present few attempts are being made to mask the deep-rooted historicism of abstract electronic art. On the contrary, electronic culture as a whole seems to be increasingly open about its use of material supplied by archives of sounds and images that dates from the 1950s and even earlier.¹ This is facilitated by the fact that the treasures of the past are becoming increasingly easy to access and employ. Whether in the form of recycled audio or visual fragments, entire registers of sounds and images or entire methodologies are involved – the use of models which at some point were considered futuristic now dominates broad sections of this culture. As a result the future now functions as a kind of marker which has been brought out of the past and put to work as an identifier, and signaling a world or mode of perception *of tomorrow* has become to the same extent a kind of sample or even an entire battery of interfering visual and audio samples.²

One could pose a question here about which benefits and/or disadvantages are involved with the historicism described above: Is contemporary electronic culture moving toward a form of amnesia which will smooth out all differences, one which will spread in the form of a light-hearted sense of "being here now."³ Does the use of references which characterizes both abstract productions and representational examples in which content plays an important role contribute to advanced forgetfulness rather than encouraging an appreciation of the work done by pioneers? And can a culture's historical ballast be "worked off" when it constantly reappears, or is made to reappear, in fragmented form? One can only speculate as to the consequences of the pronounced or subtle use of past

modernisms:⁴ Will their continued presence in new works defuse the historical power they possess? Or could those advanced syntheses of music and images, which were far ahead of their time, enjoy belated validation after appropriately long periods of latency, retroactively so to speak?

A large number of such retroactive validations can be found among the abstract audiovisions currently dominating recent electronica. This is especially true of ground-breaking works created in the 1960s and early 1970s when a close relationship of a certain kind began to crystallize between sound experiments and new visual technologies or esthetic visual techniques. While the predecessors of these early synesthetic approaches can be traced back to the 1920s and 1930s,⁵ the currently valid prototype experienced its breakthrough within a specific cultural constellation. The particular environment was created by the meeting of minimalist and psychedelic sound experiments made possible by new electronic technology⁶ and increasingly common experimental methods in the production and processing of film. At the time both were part of a common subcultural praxis which was constantly striving for bold expansion in modes of perception and forms of consciousness. This constellation remains decisive in that – in both cases – the sudden quantum leap in music (minimal music, psychedelica, techno and electronica) represents a challenge for visualization techniques which approximates the way in which the radical reduction of images has opened up suitable latitude for innovative sound architectures. And the vibrant interplay resulting from these mutual challenges has been the source of numerous audiovisual structures which still serve as models.

One of the blueprints resulting from the interplay of abstract visualization and cosmic psychedelic sound is Pat O'Neill's 7362. Created in 1965-66, this film employs footage showing oil pumps and swaying body parts of a nude model. The rhythmic movements were altered in color, reflected along their central vertical and horizontal axes and combined with sequences of graphic elements which also rotate. This film's title refers to the special film emulsion O'Neill used for its production, which enhanced the stark contrasts and the overall effect of Rorschach inkblots.⁷ The source of 7362's kinetic dynamism is in part the constantly increasing complexity of the geometric patterns, which seem relatively simple at first, and the incredible richness of forms which develops on the basis of a single minimalist motif – an effect which runs through the electronic soundtrack in perfect harmony. Joseph Byrd, who was later one of the pioneers of experimental electronic rock music with the band The United States of America,⁸ and his partner Michael Moore produced a synthetic maelstrom for 7362 in which rising and falling drone effects alternate with minimal frequency modulations. The pulsing visual forms which develop on the basis of reflections mirror the throbbing electronic noise in which a variety of microtonal patterns appear. At the same time this film does not merely pile on layers of images and music as if they were subsequent adjustments; 7362 tries out all variations of

the branching self-reflections' structural moment in an exploration of the sounds and images' "inner self" on both levels simultaneously. The motifs are not only taken apart in their inner dynamic; the audio and visual elements "bend" together, creating a unique kind of space which is optically and acoustically entangled, even "orgiastic."⁹ Echoes of this process can be found in numerous current works, i.e. such as the video *live_fm_encoder_34:1* (1998) by farmersmanual, in which abstract audio and visual patterns are interlaced so as to resemble Rorschach tests and create the impression of a "bottomless depth." Another example is graphic programmer lia's video series entitled *hardVideo* (2002/03), in which undreamed-of levels of density are filtered out of geometric structures and mirror-image fractals.

A similar condensed fusion of graphic permutations and consciousness-expanding "sound drones" can be found in *Binary Bit Patterns* (1969), a film by Michael Whitney. Accompanied by a minimalist guitar motif with an Indian flavor (composed and produced by Whitney in cooperation with Charles Villiers), two-dimensional crystalline figures grow in a rapid sequence from their own centers, then collapse in upon themselves. The images, the chimerical brilliance of which is an excellent match for a sitar's buzz, were produced with an early programmable film recorder.¹⁰ Cosmic consciousness meets higher mathematics, and the spasmodic variability and precision of the geometric forms are very much products of digital technology. At the same time the pleasant vibrations of the soundtrack and the warm red and pink colors lend an almost "ecological" quality, as a result of which *Binary Bit Patterns* is the pop-culture counterpart of the films of John Whitney (cf. *Catalog*, 1961, which is accompanied by a jazz score) and James Whitney (cf. *Lapis*, 1963-66, accompanied by classical Indian music), and also the works of Michael's brother John, Jr. The peace sign with which the film concludes, resembling a vignette, is a reference to the subculture of the time in which protests against the Vietnam War played an important role. John Whitney, Sr.'s *Matrix* (1970) represents another jump forward, in the use of both advanced technology and minimal music. To a fragment of Terry Riley's ground-breaking song "Poppy Nogood and the Phantom Band" (1969), which consists of multiple layers of soprano saxophone and electric organ tracks, *Matrix* bravely explores the third dimension, if not the fourth and fifth. This film, produced by Whitney's company, Motion Graphics Inc., with technical support provided by IBM and the California Institute of Technology, begins with the motif of the Möbius strip. The loop begins to circle in and around itself in constantly changing patterns. The idea of the loop, which predominates in both minimal music and psychedelica, is taken to its visual extreme here: Bars, squares and cubes are added to the strip's structure, making it increasingly complex, a kaleidoscope-like reflection in which forward and backward, up and down apparently do not exist. The field of vision and the image's depth begin to dissolve into "pure" aspects of consciousness. Similarly confusing loop motifs

either entirely analog or animated at the time were employed by Mary Ellen Bute in her *Abstronic* (1954), in which the music of Aaron Copland and Don Gillis was translated into a "seeing sound film" (as it was described in the opening titles). Bute's synesthetic explorations of the film image's depths have provided early blueprints on the basis of which - "spelled out" so to speak and with the aid of increasingly advanced technology - "electronic abstracts" were later created. More recent works such as *cubica* (2002) by m.ash consistently follow the structural methods developed by Bute, the Whitneys, Jordan Belson and others since the 1950s.¹¹ On the basis of a reduced foundation - in the case of *cubica* the square or cube from the computer game Snake - the image's space is twisted and bent until all perspectives have been destroyed irreparably, even without the aid of the accompanying psychedelic soundtrack.

The way in which a rigid order of perspective can be transformed into hallucinogenic vibrations was demonstrated in Tony und Beverly Conrad's 1970 film *Straight and Narrow*. The picture, flickering at fractions of seconds or from one frame to the next, is made up of (slightly deformed) vertical and horizontal black and white stripes. Accompanying the stomping piano theme of John Cale and Terry Riley's "Ides of March" (from their joint record *Church of Anthrax*) an unexpected chain of perceptual effects is set off through minute changes in the picture. The result is impressions of color and imagined deformations in a space which is in fact subject to rigid geometry. In a similar manner artists such as Tina Frank (e.g. *iii*, 1996) and reMI (in a number of works) turned the matrix of the computer image upside down 25 years later, though with digital equipment. The only difference was that the music, which underlines this turmoil acoustically, was no longer taken from the analog arsenal of pop-minimalist crossovers - for example *Straight and Narrow's* soundtrack was produced by followers of LaMonte Young, to which both Cale and Conrad belonged in the mid 1960s. On the contrary the uprising of the pixels in works such as those by reMI is accompanied by simultaneously produced assaults of noise: homemade visionary techno excesses, straight and direct.

How "popware" with mass appeal literally can be traced back to electronic vibrations is demonstrated by Nam June Paik and Jud Yalkut in their joint work *Beatles Electroniques* (1966-69). Paik and Yalkut tackled the phenomenon of the Fab Four with a variety of interference effects and laid open the foundation of noise underlying all electronic productions and broadcasts. This is also an unconscious allusion to the fact that the music played by the Beatles around 1966, apparently quite simple and trivial, was of a technical standard superior to anything that had been heard up to that point.¹² With their humorously critical homage - reducing the high-tech moment in mass-culture to simple signals of interference - Paik and Yalkut seemed to cement the Beatles' advanced status even more firmly, as if they had intended to get the phenomenon into shape for the dawning digital age by means of a psychedelic electronic test. Visual and

acoustic distortion, filters and loops were employed to alter the original material: For example Kenneth Werner produced a hypnotically clacking electronic number for the soundtrack on the basis of microscopic Beatles samples. This is not only a game with the electronic alienation of undisputed popware, its suitability for an upheaval in perception which is able to liberate the consciousness is also underlined.¹³

The fact that, inspired by pop music and in combination with new visual-art techniques, some of the most sustained revolutions of the time would be the result is proven by several other examples.¹⁴ Along with the artists discussed above, Eric Siegel in particular deserves mention in this genealogy. Around 1968 Siegel not only experimented with video feedback, he also invented his own equipment such as a color synthesizer for video and later the so-called EVS (Electronic Video Synthesizer) in 1970.¹⁵ Thanks to the former two he was responsible for a still-stunning visualization of the Beatles' early psychedelic prophecy "Tomorrow Never Knows" (1966). This song, also known as "TNK," comprises layers of endless loops laid over a motif of a single chord, and Siegel gave it an abstractly pulsing space in which to resonate. A drawing or pumping movement is suggested, putting the viewer into a colorful mental whirl. In a similar way Steina and Woody Vasulka, in their *Noisefields* (1974), later explored the world of the video signal, and even recent video artists such as Michaela Schwentner make use of similar techniques (e.g. in *the_future_of_human_containment*, 2001). What followed these early works were stages in a process of growth in which sound and image increasingly became equal partners with a strong mutual influence.

Without a doubt "TNK" can be considered emblematic in this regard. Not just as a song which set new standards for the exploration of new worlds of sound but also as a generally applicable motto for the opening of unknown audio and visual realms. In this sense it represents unrestrained projections of the future which knock down doors to undreamed-of areas of perception, despite the fact they did not become relatively familiar until decades later. And so the affinities and crossovers of abstract visual techniques and psychedelic sound experiments over 30 years ago have created a cultural framework which is still vital. With the aid of computer technology this framework would be reduced to a structure of even greater density in the decades to follow.

Translation: Steve Wilder

- 1 Regarding the early history of abstract and synesthetic films see: Birgit Hein and Wulf Herzogenrath (ed.): *Film als Film: 1910 bis heute*, Verlag Gerd Hatje, Stuttgart 1978, in particular 36 f., 115 f. and 128 f.; and P. Adams Sitney: *Visionary Film: The American Avant-garde 1943-1978*, 2nd ed., Oxford University Press, Oxford, New York, Toronto, Melbourne 1979, 228 f.
- 2 Cf. Hodwo Eshun: *futurhythmachine*, Eshun: *More Brilliant Than The Sun: Adventures in Sonic Fiction*, Quartet, London 1998, 006 f.; and Timothy D. Taylor: "Men, Machines, and Music in the Space-Age 1950s", Taylor: *Strange Sounds: Music, Technology & Culture*, Routledge, New York / London 2001, 72 f.
- 3 For the sake of comparison: "Be here now" was one of the mottos of 1960s psychedelic subculture, a battle cry which the Beatles countered with the satire of "Tomorrow Never Knows."
- 4 Cf. Mark Dery: *Die Zukunft ist von gestern, springerin - Hefte für Gegenwartskunst*, 1/2000, 6 f.
- 5 Cf. Hans Richter's *Filmstudie* (1926), Oskar Fischinger's *Studien 1-13* (1930/31) and *Komposition in Blau* (1935), Len Lye's *Rainbow Dance* (1936) and Mary Ellen Bute's *Escape* (1937).
- 6 Cf. Thom Holmes: *Electronic and Experimental Music: Pioneers in Technology and Composition*, Routledge, New York / London 2002
- 7 Cf. Gene Youngblood: *Expanded Cinema*. E. P. Dutton, New York 1970, 99
- 8 Cf. their first and only album, *The United States of America*, Columbia Records, 1968
- 9 William E. Moritz: "Der abstrakte Film seit 1930 - Tendenzen der West Coast", in: Hein/Herzogenrath (ed.): *Film als Film: 1910 bis heute*, op. cit. 145
- 10 Cf. Youngblood: *Expanded Cinema*, op. cit. 234 f.
- 11 Cf. Moritz: *Der abstrakte Film seit 1930*, op. cit. 130 f.
- 12 Cf. Ian Macdonald: *Revolution in the Head: The Beatles' Records and the Sixties*, Pimlico, London 1995, 148 f.
- 13 According to Ian Macmillan the true revolution of the 1960s took place in heads rather than on the streets, as primarily an "an inner [revolution] of feeling and assumption" was involved, cf. Macdonald: *Revolution in the Head*, op. cit. 25
- 14 Many of these films, such as those by Bruce Conner, Jud Yalkut, Ben Van Meter, Bob Cowan, John Hawkins, John Rubin, Peter Ungerleider, Robert Nelson, Ronald Nameth and Andy Warhol (as well as numerous others), were screened from October 1999 to February 2000 at New York's Whitney Museum of American Art as part of the exhibition "The American Century."
- 15 Cf. the catalog entitled: *Eigenwelt der Apparate-Welt: Pioneers of Electronic Art, Ars Electronica*, Linz 1992, 116 f.