

# Avant-garde as Software



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**Abstract:** The article analyses the uniqueness of the new media revolution by comparing it with the avant-garde revolution of the 1910s-1920s in the visual arts, design and film. The author argues that the 1920s avant-garde techniques were transformed into the conventions of modern human-computer interface and software, thus functioning as a foundation of post-industrial labour. He also claims that new media does, in fact, represent a new avant-garde for the information society, although it uses old modernist forms. If the 1920s avant-garde came up with novel forms for the new media of their time (photography, film, new printing and architectural technologies), the new media avant-garde introduces radically innovative ways of using already accumulated media. Thus, computer-based techniques of media access, manipulation and analysis are the new avant-garde.

## 1. From New Vision to New Media

During the 1920s a number of books with the word *new* in their title were published by European artists, designers, architects and photographers: *The New Typography* (Jan Tschichold<sup>[1]</sup>), *New Vision* (Laszlo Moholy-Nagy<sup>[2]</sup>), *Towards a New Architecture* (Le Corbusier<sup>[3]</sup>). Although nobody, as far as I know, published anything called *new cinema*, all the manifests written during this decade by French, German and Russian filmmakers in essence constitute such a book: a call for a new language of film, whether it was to be montage, *cinéma pur* (also known as *absolute film*), or *photogénie*. Similarly, although undeclared in any book, a true visual revolution also took place in graphic design thus making it *new* as well (Aleksander Rodchenko, El Lissitzky, Moholy-Nagy, etc.)

In the 1990s the word *new* re-appeared once again. But now it was paired not with particular media such as photography, print, and film but with media in general. The result was the term *new media*. This term was used as shorthand for new cultural forms which depend on digital computers for distribution: CD-ROMs and DVD-ROMs, Web sites, computer games, hypertext and hypermedia applications. But beyond its descriptive meaning, the term also carried with it some of the same promise which animated the books and manifests of the 1920s, mentioned just above—that of radical cultural innovation. If new media is indeed the new cultural avant-garde, how can we understand it in relation to earlier avant-garde movements? Using already noted parallels as a starting point, this article will look at new media in relation to the avant-garde of the 1920s. I will focus mostly on the locations of the most radical avant-garde activities of the 1920s: Russia and Germany.

The reader may wonder if it is legitimate to compare the revolution in technology with the revolution in art. Looking back on the 1920s from the viewpoint of today, we realize that the key artistic innovations of the 1920s were all made in relation to what was then *new media*: photography, film, new architectural and new printing technologies. *New vision* was the new

1. TSCHICHOLD, J. (1995). *The New Typography: a Handbook for Modern Designers* (trans. Ruari McLean). Berkeley: University of California Press.

2. Although the Moholy-Nagy "New Vision" exhibition took place only in 1932, it was a retrospective of the movement in photography which took place in the 1920s and which was largely over by the time of the exhibition.

3. CORBUSIER, Le. (1963). *Towards a New Architecture* (trans. Frederick Etchells). London: Architectural Press; New York: Praeger.

language for photo media; the Soviet montage school and classical film language were the new languages for film media; *new typography* (Tschichold) was the new language for print media, *new architecture* (Le Corbusier) was the new language for spatial media (i.e. architecture). What is being compared here is therefore new media at the beginning of the twentieth century and new media at the turn of the twenty first century.

But why the 1920s as opposed to some other decade? From the point of view of art, music and literature, earlier decades were probably as crucial. For example, painting goes abstract between 1910 and 1914. But from the point of view of mass communication, the key decade was the 1920s. Between the latter half of the 1910s and the end of the 1920s, all the key modern visual communication techniques were developed: photo and film montage, collage, classical film language, surrealism, the use of sex appeal in advertising, modern graphic design, modern typography. (Not incidentally, during the same decade, the designer, the advertising man, the cinematographer acquired professional status.) Of course, in the later decades of the twentieth century these techniques were further developed and refined: the quick cutting of such films as *The Man with a Movie Camera* (Dziga Vertov, 1929) is speeded up in music videos and commercials, while its experiments in compositing become the norm of digital filmmaking. The treatment of type as a graphic element, pioneered by the *new typography* of Tschichold and Lissitzky, has reached new intensity in both print and video media (stimulated largely by the availability of such software as Photoshop and After Effects). The all too classical juxtapositions of the surrealists acquire baroque intensity in modern advertisements. After the "sexual revolution" of the 1960s, the sex appeal pioneered by J. Walter Thompson's ads in 1922, as timid as Giotto's first attempts at representing a coherent three-dimensional space, reached Tintoretto-like mastery and aggressiveness. But no fundamentally new approaches emerged after the 1920s. The techniques introduced by the modernist avant-garde proved to be sufficiently effective to last for the rest of the century. Mass visual culture only pushes further what was already invented, *intensifying* particular techniques and mixing them together in new combinations.

In the 1990s, the technological shift of all cultural communication to computer media gets under way. We may think that finally the avant-garde techniques of the 1920s will no longer be sufficient and that fundamentally new techniques will start to appear. But, paradoxically, the "computer revolution" does not seem to have been accompanied by any significant innovations on the level of communication techniques. While we now rely on computers to create, store, distribute and access culture, we are still using the same techniques developed in the 1920s. Cultural forms which were good enough for the age of the engine turned out to be also good enough for the age of the "geometry engine" and the "emotion engine". ("Geometry engine" is the name of a computer chip introduced in Silicon Graphics workstations a number of years ago to perform real-time 3D graphics calculations; "emotion engine" is the name of the processor used in Sony's Playstation 2, introduced in 1999; it allows real-time rendering of facial expressions.) In short, as far as the cultural languages are concerned, new media is still old media. Why? If historically each cultural period (Renaissance, Baroque, and so on) brought with it new forms, new expressive vocabulary, why is the computer age satisfied with using the languages of the previous period, in other words, that of the industrial age? <sup>[4]</sup>

Perhaps we have to give it more time. When radically new cultural forms appropriate for the age of wireless telecommunication, multitasking operating systems and information appliances do arrive, what will they look like? How would we even know they are here? Would future films look like a "data shower" from the movie Matrix? Does the famous fountain at Xerox PARC, where the strength of the water stream reflects the behaviour of the stock market, with stock data arriving in real time over the Internet, represent the future of public sculpture? Or are we asking the wrong question? What if the historical logic of the succession of new forms no longer applies to the information age? What if our growing obsession with mid-twentieth century modernism (exemplified by the popularity of *Wallpaper* magazine) on the eve of the new millennium is not a temporary aberration but the beginning of new, very different logic?

4. Many modern critics, especially the Marxists, have assumed that a new socio-economic regime and a new cultural language go together. Usually this thesis is used to move from the economic to the cultural, that is, a critic tries to see how a new economic order finds its reflection in culture. But we can also go in the opposite direction, from culture to economy. In other words, we can interpret radical shifts in culture as indicators of the changes in the economic-social structure. From this perspective, if the new "information age" did not bring with it a revolution in aesthetic forms, perhaps this is because it is yet to come? Despite pronouncements about the new net economy from Wired<sup>[url]</sup> magazine, we may still be living in the same economic period that gave rise to *Human Comedy* and *Gone With the Wind*. In short, net.capitalism may still be the same old capitalism as before.

During its history, the identity of a digital computer kept changing almost every decade: a calculator (the 1940s); a real-time control mechanism; a data processor; a symbol processor; and, in the 1990s, a media distribution machine. This latest identity has very little to do with the original one, since distribution of media does not require much computation. As computing became equated with Internet use during the latter half of the 1990s, the computer, in its original sense, became less and less visible; its identity as a carrier for already established cultural forms, more and more prominent. Music and films streamed over Internet; MP3 music files to be downloaded and played using stand-alone MP3 players; books to be downloaded into stand-alone electronic book devices; Internet telephony and faxing—all these applications use the computer as a communication channel, without requiring it to compute anything.

The reader may ask how the computer's other new post-Internet role, that of a communication link between individuals (as exemplified by chat, newsgroups and email), fits into this analysis. In my view, we can understand "person-to-person communication channel" identity as a subset of "media distribution channel" identity. For what is being sent by email or posted to a newsgroup is simply another form of media—one's thoughts formatted as text, i.e. human language. If this perspective may appear strange, it is only because during the history of modern media, from photography to video, a media object was usually (1) created by special types of professional users (artists, designers, filmmakers); (2) mass reproduced; (3) distributed to many individuals via mass printing, broadcasting, etc. The Internet returns us to the age of private media—the eighteenth century literary salons and similar small intellectual communities where the messages travelled from one individual to another individual or to a small group, rather than being distributed to millions at once. Thus the computer is a new type of media distribution machine which combines public and private media distribution.

## 2. The Avant-garde as Software

The paradox remains: with few notable exceptions, like Frank Gehry's Guggenheim Museum, the shift to computer tools in architecture, design, photography, filmmaking did not lead to the invention of radical new forms, at least not on any scale which can be compared to the formal revolutions of the 1920s. In fact, rather than being a catalyst of new forms, the computer seems to have strengthened already existing ones. How should we understand this absence of radically new forms in a culture undergoing rapid and massive computerization? Is new media's avant-garde promise only an illusion?

Part of the answer is that with new media, 1920s communication techniques acquire a new status. Thus new media does represent a new stage of the avant-garde. The techniques invented by the 1920s left-wing artists became embedded in the commands and interface metaphors of computer software. In short, the avant-garde vision became materialized in a computer. All the strategies developed to awaken audiences from the dream-existence of bourgeois society (constructivist design, new typography, avant-garde cinematography and film editing, photo-montage, etc.) now define the basic routine of a post-industrial society: interaction with a computer. For example, the avant-garde strategy of collage re-emerged as a "cut and paste" command, the most basic operation one can perform on any computer data. In another example, dynamic windows, pull-down menus, and HTML tables all allow a computer user to work simultaneously with practically unrestricted amounts of information despite the limited surface of the computer screen. This strategy can be traced to Lissitzky's use of movable frames in his 1926 exhibition design for the International Art Exhibition in Dresden.<sup>[5]</sup> In this section I will further analyse the transformation of the 1920s avant-garde techniques into the conventions of modern human-computer interface (HCI) such as overlapping windows. I will also discuss how the avant-garde techniques now function as the strategies of computer-based labour, i.e. the different ways we use to organize, access, analyse and manipulate digital data (for instance, discrete data representation, 3-D data visualization, and hyperlinking).

### 2.1. Visual Atomism / Discrete Ontology

5. LISSITZKY, E. (1968). "Exhibition Rooms". In: LISSITZKY-KÜPPERS, S.; LISSITZKY, E. *Life, Letters, Texts*. London: Thames and Hudson, pp. 366-368.

The avant-garde of the 1920s developed a particular approach to visual communication which I will refer to as visual atomism.<sup>[6]</sup> This approach is based on the idea that a complex visual message can be constructed from simple elements whose psychological effects are known beforehand.

In the nineteenth century Georges Seurat was already using current psychological theories about the effects of simple visual elements and colours on the viewer to determine directions of lines and colours in his paintings. The next logical step, taken in the 1910s by Kandinsky and others, was to create completely abstract paintings. These paintings in effect were sets of psychological stimuli, similar to the ones used by psychologists to study human perception and the emotional effects of visual elements. Visual atomism acquired a new significance in the 1920s when the artists were searching for ways to rationalize mass communication. If the effect of every single element is known beforehand, so the logic went, it may be possible to reliably predict a viewer's response to complex messages put together from such elements. This approach was most systematically articulated in Soviet Russia. Left-wing artists and designers, who were in charge of State art schools and research institutes, set up a number of psychological laboratories in order to put visual communication on a scientific basis.

The atomistic approach to communication reappears with new force in computer media. But what was a particular theory of visual meaning and emotional effect grounded in psychology now became the technological basis of all communication. For instance, a digital image consists of atom-like pixels, which makes it possible to automatically generate images, to automatically manipulate them in numerous ways and, through compression techniques, to transmit them more economically. A digital three-dimensional space has a similar atomistic structure—an agglomerate of simple elements such as polygons or voxels. A digital moving image also consists of a number of separate layers, which can be separately accessed and manipulated.

Another example of atomistic (i.e. discrete) message construction in computer media is hyperlinking. Hyperlinking separates data from its structure. This makes the creation and distribution of messages extremely efficient: the same data can be endlessly assembled in new structures; parts of a single document can exist in physically distinct locations (i.e. a document has a distributed representation). Finally, on yet another level, computer software replaces the traditional process of creating media objects from scratch by a more efficient method. In computer culture, a media object is typically assembled from ready-made elements such as icons, textures, video clips, 3-D models, complete animation sequences, ready-to-use virtual characters, chunks of JavaScript code, Director Lingo scripts, etc.

When a computer user interacts with a Web site, navigates a virtual space, or examines a digital image, he is therefore fulfilling the wildest atomistic fantasies of Kandinsky, Rodchenko, Lissitzky, Eisenstein and other "atomists" of the 1920s. The digital image is made up from pixels and layers; the virtual 3-D space is made from simple polygons; the Web page is made up from separate objects represented by HTML statements; the objects on the Web are connected by hyperlinks. In short, the ontology of computer dataspace as a whole and the individual objects in this space is atomistic on every possible level.

## 2.2. Montage / Windows

The key feature shared by all modern human-computer interfaces is overlapping windows, which were first proposed by Alan Kay in 1969. All modern interfaces display information in overlapping and re-sizable windows arranged in a stack, similar to a pile of papers on a desk. As a result, the computer screen can present the user with a practically unlimited amount of information despite its limited surface.

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6. MANOVICH, L. (1993). "The Engineering of Vision from Constructivism to VR". Ph.D. dissertation, University of Rochester.

The overlapping windows of HCI can be understood as a synthesis of two basic techniques of twentieth-century cinema: temporal montage and montage within a shot. In temporal montage, images of different realities follow each other in time, while in montage within the shot, these different realities co-exist on the screen. The first technique defines cinematic language as we know it; the second is used more rarely. An example of this technique is the dream sequence in Edward Porter's 1903 *The Life of an American Fireman*, in which an image of a dream appears over a man's sleeping head. Other examples include the split screens beginning in 1908 which show the different interlocutors of a telephone conversation; superimpositions of a few images and multiple screens used by the avant-garde filmmakers in the 1920s; and the use of deep focus and a particular compositional strategy (for instance, a character looking through a window, such as in *Citizen Kane*, *Ivan the Terrible* and *Rear Window*) to juxtapose close and far away scenes.<sup>[7]</sup>

As testified by its popularity, temporal montage works. However, it is not a very efficient method of communication: the display of each additional piece of information takes time to watch, thus slowing communication. It is no accident that the European avant-garde of the 1920s, inspired by the engineering ideal of efficiency, experimented with various alternatives, trying to load the screen with as much information at one time as possible.<sup>[8]</sup> In his 1927 *Napoleon* Abel Gance uses a multiscreen system which shows three images side by side. Two years later, in *A Man with a Movie Camera* (1929) we see Dziga Vertov increasingly speeding up the temporal montage of individual shots, until he seems to realize: why not simply superimpose them in one frame? Vertov overlaps the shots together, achieving temporal efficiency—but he also pushes the limits of a viewer's cognitive capacities. His superimposed images are hard to read—information becomes noise. Here cinema reaches one of the limits imposed on it by human psychology; from that moment on, cinema retreats, relying on temporal montage or deep focus, and reserving superimpositions for infrequent cross-dissolves.

In a window interface, the two opposites—temporal montage and montage within the shot—finally come together. The user is confronted with a montage within the shot—a number of windows present at once, each window opening up into its own reality. This, however, does not lead to the cognitive confusion of Vertov's superimpositions because the windows are opaque rather than transparent, so the user is only dealing with one of them at a time. In the process of working with a computer, the user repeatedly switches from one window to another, i.e. the user himself becomes the editor, accomplishing montage between different shots. In this way, the window interface synthesizes two different techniques of presenting information within a rectangular screen developed by cinema and pushed to the extreme by the filmmakers of the 1920s.

### 2.3. New Typography / GUI (Graphical User Interface)

The 1920s saw a revolution in typography and graphic design. Traditional symmetrical layouts appropriate for the old age of slow reading and private engagement with the book were replaced by new principles: the clear hierarchy of type sizes, the economy of block type against clean white background, the energy of simple geometric elements designed to grab the attention of the viewer and then to lead him through the message, step by step. All these principles received further development in computer interfaces. On the most simple level, the graphical style of Windows 2000 or MAC OS perfectly follows Tschichold's thesis that "the essence of the new typography is clarity."<sup>[9]</sup> Thus it features clean dark type against a neutral background, clean geometry of window frames, clean hierarchy of pull-down menus. But GUIs also take new typography to the next level. The task of the interface designer is no longer to simply present a limited amount of information in the most efficient way, as it was for the designer of an invitation card, a

7. The examples of *Citizen Kane* and *Ivan the Terrible* are from AUMONT et al. (1992). *Aesthetics of Film*. Austin: Texas University Press. P. 41.

8. On the ideal of engineering efficiency in relation to the avant-garde and digital media, see my article "The Engineering of Vision and the Aesthetics of Computer Art". *Computer Graphics*. Vol. 28, no. 4, pp. 259-263. November 1984.

9. TSCHICHOLD, J. (1995). *The New Typography: a Handbook for Modern Designers* (trans. Ruari McLean). Berkeley: University of California Press. P. 66. The artist Rainer Ganahl made a reference to the continuity between geometric efficiency in modernism and in human-computer interfaces in a number of his projects, such as *Sample, wi. 95/opt.c*.

magazine layout or a poster. The new task is create an efficient structure and tools for working with arbitrary information, information which is always changing and always grows. Therefore if a modernist designer broke a message into a clearly defined hierarchy—main heading, sub-heading, and so on—GUI provides the user himself with tools for hierarchical organization of arbitrary data. The examples of these tools are nested folders and nested menus; outline display options of word processing applications; zoom and pan controls which can operate on any data, from 3-D spaces to text (Pad++ interface). In this way, the principles of new typography and modernist design have become the principles of what can be called meta-design: the creation of tools which are employed by a user himself to organize the information on-the-fly.

## 2.4. New Vision / 3-D Data Visualization

Here is another example of how HCI and computer methods of data analysis inherit aesthetic techniques developed by the European avant-garde of the 1920s. Putting into practice Russian critic Victor Shklovsky's notion of *defamiliarization* or *making strange* (in Russian, *ostranenie*), advanced originally in relation to literature, in the 1920s a number of photographers began to use unorthodox viewpoints in their photographs: aerial and "worm's-eye" views, diagonal camera positions, elimination of the horizon line, extreme close-ups.<sup>[10]</sup> The most outspoken defenders of this approach to photographic composition were Moholy-Nagy in Germany and Rodchenko in Russia. The latter wrote in 1928 that his task was to "photograph from all viewpoints except 'from the belly button,' until they become acceptable. The most interesting viewpoints today are 'from above down' and 'from below up,' and we should work on them."<sup>[11]</sup> These defamiliarizing points of view functioned in a number of ways, being promoted at the same time as the records of the experience of modernization and as the tools to help to bring modernization about. On the simplest level, they were recordings of new, quintessentially modern visual experiences—the results of seeing reality from a skyscraper, a moving car, an airplane. They were at the same time perfect metaphors for modernization, with its speed, chaos, new rhythms and geometric architecture (and it was new architecture which was a favourite subject of new vision photography). They were visual analogues of the revolutionary process of dismantling and uprooting all social structures, which was underway in Soviet Russia and which was sympathetically watched by the avant-garde Left in Europe. They were tools to "cleanse perception" in order to bring in a new regime of "visual hygiene", literally a kind of new biological vision appropriate for the *new man* and *new woman* of modernity. Finally, they were also instruments in a brave project of visual epistemology advocated most systematically by Dziga Vertov in *A Man with a Movie Camera*: to decode the world purely through its surfaces visible to the eye, its natural sight being amplified by a mobile camera.

The idea of visual epistemology received a new life in a computer age. It justifies a computer version of the avant-garde defamiliarizing points of view: interactive 3-D computer graphics. This technology allows a computer user to observe any object from an arbitrary viewpoint in order to understand the object's structure. Similarly, any quantified data can be turned into a 3-D representation which the user can examine in order to uncover the relationships between visualized data. From chemistry and physics to architectural and product design, from financial analysis to pilot training, 3-D visualization is an essential tool of the post-industrial labour of information processing. Defamiliarization now involves simply a movement of a computer mouse to change the perspective, thus producing a new view of the scene.

While the analogy between 3D interactive graphics and the defamiliarizing points of view advocated by Moholy-Nagy, Rodchenko and their fellow artists is the most direct way to connect new vision and new media, it is not the only one. In fact, all of the new vision

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10. It is relevant here that Shklovsky connected the origins of his concept of *defamiliarization* to a visual experience which retrospectively can be read as a typical new vision photograph. He recalled that for months he walked past a tobacconist's shop without ever noticing a sign above the shop—until one day the sign was turned 90 degrees.

11. Rodchenko, A. (1928). "Downright Ignorance or a Mean Trick?". In: PHILLIPS, C. (ed.). *Photography in the Modern Era* (trans. John Bowl). New York: The Metropolitan Museum of Art/Aperture, 1989. P. 248.

photographic strategies became standard software techniques for the visual analysis of data. In order to reveal the structure of the data translated into a visual image, a computer user may zoom in and out of this image, change a positive image into a negative one, re-map the colours, reduce and expand the contrast, and so on.

### 3. Post-modernism and Photoshop

To summarize: what was a radical aesthetic vision in the 1920s had become standard computer technology by the 1990s. The techniques which were harnessed to help the viewer to reveal the social structure behind the visible surfaces, to uncover the underlying struggle between the old and the new, to prepare for rebuilding a society from the ground, became the elemental work procedures of the computer age.

The transformation of the avant-garde communication techniques into the principles of HCI and computer-based labour, described here, is yet another and, as far as I know, previously unnoticed, legacy of radical avant-garde practices today. According to the standard art historical accounts, when the radical avant-garde vision of the European avant-garde came to America in the 1930s and 1940s, it was stripped of its radical politics and put to the service of capitalism as a new international style of architecture and design as well as being turned into a set of formal techniques for "artistic self-expression". It is not hard to debunk this story. For instance, since avant-garde artists of the 1920s, both in Russia and in Western Europe, ultimately wanted to participate in building a new modern rational society based on technology, the adaptation of their aesthetics on a mass scale in America can be seen as a fulfilment of this dream. (This would also explain why many radical German artists, architects and designers had such successful commercial careers in the U.S. after they emigrated there in the 1930s.) Art critic Boris Groys argued that the Russian avant-garde project logically moves from creating utopian plans for a future society (1910s) to implementing these plans in reality via collaboration with the new state (1920s) and then to Stalin's dictatorship (1930). Stalin became the ultimate avant-garde artist, building a new society according to aesthetic principles.<sup>[12]</sup> From this perspective, active participation of the European avant-garde artists in building American techno-society, whether through cinema (in Hollywood), architecture or design, can be understood as an equivalent of the Russian artists' collaboration with the new revolutionary state. But while the Stalinist state abandoned the techno-dreams of the Russian artists for a new society based on Taylorism, building a few showcase mega-scale projects such as the Moscow Metro instead of mass housing, American capitalism fully embraced Europeans' techno-utopia—which itself was originally inspired by European fetishism of American technology.

The notion of the revolutionary avant-garde later co-opted by capitalism can be further questioned if we note that already in the 1920s, left-wing avant-garde artists, both in Europe and in Soviet Russia, worked for commercial industries on publicity and advertising campaigns; in short, they "sold out" right away. Rodchenko created advertisements for new Soviet State enterprises; Lissitzky worked on design projects for European companies; Moholy-Nagy was writing about advertising while still a professor at Bauhaus; eventually he left the school to start his own commercial practice in Berlin. Also, already in the 1920s, many observers noticed that avant-garde radical techniques were functioning simply as a fashionable style, a convenient and easily decoded sign for what was to become a permanent feature of advertising since then: "being modern". In short, the standard account of the avant-garde's legacies does not stand up under close scrutiny.

The examples analysed in this section suggest a different history in which avant-garde theories and practices gave rise not only to modern and, later, post-modernist style (MTV montage-like aesthetics, for instance) but they also became "materialized" in human-computer interfaces through which post-industrial work is accomplished. To re-phrase the title of the article by photo historian Abigail Solomon-Godeau, the history of radical formalism does not end with style; it extends not "from weapon to style" but rather "from weapon to style and instrument of

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12. GROYS, B. (1992). *The Total Art of Stalinism* (trans. Charles Rougle). Princeton: Princeton University Press.

As that *and* suggests, it is possible to see this transformation of avant-garde visions into computer software as another example of the larger logic of post-modernism. Post-modernism naturalizes the avant-garde; it gets rid of the avant-garde's original politics and, through repeated use, makes avant-garde techniques appear totally natural. From this point of view, software naturalizes the 1920s radical communication techniques of montage, collage, *defamiliarization*, etc., just as it has done in music videos, post-modern design, architecture and fashion. Of course, as my examples here have already demonstrated, software does not simply adopt avant-garde techniques without changing them; on the contrary, these techniques are further developed, formalized in algorithms, codified in software, made more efficient and effective. A hierarchy of two or three subheadings of Tschichold's design for print becomes the hierarchy of practically endless sub-menus on a computer screen; the defamiliarizing viewpoint of a Moholy-Nagy photograph becomes a continuously changing viewpoint of an animated computer walk-through; two overlapping images from a composite shot in Vertov's *A Man with a Movie Camera* become a dozen windows opened at once on a computer desktop. But post-modern culture similarly does not only replay, sample, comment on and echo old avant-garde techniques; it also advances them further, *intensifying* them and overlaying them on top of one another. A few photographic fragments brought together in a Rodchenko photo-collage become hundreds of image layers in a digitally composited video; the quick film cutting of the 1920s is similarly speeded up to the extreme, with limits set by the temporal resolution of our visual system simply to register individual images (rather than by our mental capacity to make sense of the image sequence); the images which originally belonged to the incompatible aesthetic systems of constructivism and surrealism are brought together in the space of a single music video; and so on.

#### 4. The New Avant-garde

I began by promising to look at new media in relation to the avant-garde of the 1920s. I also noted that new media does not fit into the traditional history of cultural evolution as it does not use new forms. In contrast, the avant-garde of the 1920s invented a whole set of new formal languages which we are still using today. Given the transformation of avant-garde techniques into software, described above, are we to conclude that the only claim of new media to avant-garde status lies in its connection to the old, modernist avant-garde?

The answer is "No". New media does introduce an equally revolutionary set of communication techniques. It indeed represents the new avant-garde, and its innovations are at least as radical as the formal innovations of the 1920s. But if we are to look for these innovations in the realm of forms, the traditional area of cultural evolution, we will not find them there. For the new avant-garde is radically different from the old:

1. The old media avant-garde of the 1920s came up with new forms, new ways to represent reality and new ways to see the world. The new media avant-garde is about new ways of accessing and manipulating information. Its techniques are hypermedia, databases, search engines, data mining, image processing, visualization, simulation.
2. The new avant-garde is no longer concerned with seeing or representing the world in new ways but rather with accessing and using previously accumulated media in new ways. In this respect new media is post-media or meta-media, as it uses old media as its primary material.

As I will show shortly, these two key characteristics of the new avant-garde are logically connected. Beginning with photography, modern media technologies make possible the accumulation of media recordings of reality. Modernism (approximately from the 1860s to the 1960s; or from Manet to Warhol; or from Baudelaire to McLuhan), including the avant-garde of

13. SOLOMON-GODEAU, A. (1989). "The Armed Vision Disarmed: Radical Formalism from Weapon to Style". In: *The Contest of Meaning* (ed. Richard Bolton). Cambridge (Mass.): MIT Press, pp. 86-110.

the 1920s, corresponds to this period of media accumulation. The artists are concerned with representing the outside world; with *seeing* it in as many different ways as possible. In this they set themselves up in opposition to the "objective", "mechanical", "documentary" seeing and recording of the world made possible by new media technologies: photography, film, video recording, audio recording, etc. Yet they ultimately participate in the same project as media—reflecting the outside world. That the artists, competing with media machines, interject their artistic "subjectivity" between the world and the recording media, does not change the project. Surrealists put together samples of reality in illogical combinations; cubists chop up reality in small pieces; abstract artists reduce reality to what they think is its geometric "essence"; new vision photographers show reality from unusual points of view—but, despite these differences, they are all concerned with the same project of reflecting the world. Modernism's key concern is therefore the invention of new forms, i.e. different ways to "humanize" the "objective" and ultimately alien picture of the world served to us by media technologies.

In the 1960s Andy Warhol serves us hours and hours of un-edited film recordings of reality in his famous films, thus rejecting his "artistic subjectivity" in favour of the media machine's vision. He also attempts to rob other subjects of their subjectivity by making them face the disinterested camera in his *Screen Tests*. In 1961 the young East German painter Gerhard Richter moved to Düsseldorf. There, instead of expressing his new freedom in "subjective" abstract painting as one might expect, he starts to meticulously paint newspaper photographs. He also begins to assemble Atlas, a database of thousands of media images. Other artists such as Bruce Conner, Robert Rauschenberg and James Rosenquist similarly give up the idea of creating totally *new* images. Instead, their works come to function as research laboratories where existing media images are juxtaposed together in order to be analysed. (During the same years Roland Barthes publishes his articles on the semiotics of advertising photography.) And, a little earlier, in 1958, Bruce Conner creates his famous "compilation" film *A Movie* totally made from "found" media material. Such a movie would not have been conceivable just three decades earlier, when media society was still young and still excited about the possibility of accumulating media records (so even Vertov thought it was necessary to shoot his own material).

These artworks of the 1960s signal the arrival of a new stage in media history, which I will call meta-media society. The tremendous accumulation of media records by that time, along with the shift from industrial society concerned with the production of goods to the information society concerned with the processing of data (which was noted by the early 1970s) changes the game. It becomes more important to find effective and efficient ways to deal with already accumulated volumes of media than to record more or in new ways. I am not saying that society no longer has any interest in looking outside, in representation and new forms; but the emphasis shifts to finding new ways to deal with the media records obtained by already existing media machines. This shift is paralleled by the new economic importance of data analysis over material production in the information society. The new "information worker" also does not deal with the material reality directly but with its records. Importantly, both meta-media society and the information society have adopted the digital computer as their key technology to process all types of data and all types of media.

Post-modernism (the 1980s onwards) is one effect of this new historical stage. In evoking this term I follow Fredric Jameson's usage of post-modernism as "a periodising concept whose function is to correlate the emergence of new formal features in culture with the emergence of a new type of social life and a new economic order."<sup>[14]</sup> As had become apparent by the early 1980s, culture no longer tries to "make it new". Rather, there is endless recycling and quoting of past media content, artistic styles and forms, which has become the new "international style" of a media-saturated society. In short, culture is now busy re-working, recombining and analysing the media material already accumulated. So when Jameson notes that post-modern cultural production "can no longer look directly out of its eyes at the real world but must, as in Plato's cave, trace its mental images of the world on its confining walls,"<sup>[15]</sup> I would add that these walls are made from old media.

14. JAMESON, F. (1988). "Postmodernism and Consumer Society". In: *Postmodernism and its Discontents* (ed. E. Ann Kaplan). London and New York: Verso, p. 15.

15. JAMESON, F. (1988). "Postmodernism and Consumer Society". In: *Postmodernism and its Discontents* (ed. E. Ann Kaplan). London and New York: Verso, p. 20.

The computer's post-Internet identity as a distribution machine for older, i.e. already established media forms and content (since the 1990s) is another effect. Meta-media society has given up computation in favour of distribution.

Yet another effect is the absence of new forms in new media itself. Meta-media society does not need even more ways to represent the world—it has enough trouble dealing with all the already accumulated representations. Consequently, 3-D computer imaging imitates the look of classical cinema, complete with film grain; computer-based virtual spaces usually look like something which was already built in reality; Flash animations on the Web imitate old video graphics; the Web itself combines the layouts of pre-computer print media with moving images which follow the already established conventions of film and television; and so on.

The differences between the two stages of the media society can be illustrated by comparing two media technologies: the cinema and the computer. Just as cinema was central for the media society, the computer is central for the meta-media society. Cinema was the art of seeing (recall *A Man with a Movie Camera* one more time). The film camera was directed towards the world. Thus, of all our mental functions, cinema foregrounded perception. In contrast, the computer foregrounds the function of memory. Meta-media society uses computers first of all to store records of the world accumulated during the previous stage; to access these records, to manipulate them, and to analyse them. And when computers are used to generate new media material, it is made to look like old media.

So what is the new avant-garde? It is the new computer-based techniques of media access, generation, manipulation and analysis. Forms remain the same, but how these forms can be used changes radically. Here are some examples of these techniques:

#### 1. Media access:

Databases allow us to store millions of media records and retrieve them almost instantly. Search engines allow us to find the required data in the huge unstructured database of the Internet. Multimedia allows access to all the different media types using the same machine (i.e., a computer). Hypermedia adds hyperlinking to multimedia, allowing numerous paths to be created through the media material. Networks such as the Internet allow us to create distributed media representations in which different parts of a media object may exist in physically remote locations. Hypermedia authoring software (such as Director, Dreamweaver and Generator, by Macromedia) and languages (such as HTML and JAVA) allow the creation of dynamic media documents, i.e. documents which change as a whole or in part at run-time. To use the most basic example, HTML tables allow parts of a Web page to remain constant while other parts may change.

#### 2. Media analysis:

Data mining techniques allow us to search for significant relationships in large volumes of data. Image processing allows us to reveal detail which may be hidden in an image and to automatically compare sets of images. Visualization turns numerical data into 3D scenes for easier analysis. Various statistics can be obtained for a given media object in order to determine its authorship, style, etc.

#### 3. Media generation and manipulation:

3-D computer graphics technology allows us to create highly detailed navigable 3-D scenes. Mathematical techniques can be used to generate images with particular properties (for instance, fractal images display the property of self-similarity.) AL (artificial life) allows us to generate systems of objects which display emergent properties. Using scripts and templates, customized media objects can be automatically created from databases.<sup>[16]</sup> More generally, since a media object has a discrete structure on a number of levels (for instance, a digital image

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<sup>16</sup> For example, in 1998 Macromedia offered Generator software which can automatically create Web site graphics and interactive applications at run-time. See Macromedia Generator<sup>[url2]</sup>.

typically consists of a number of layers and each layer is made up of pixels), parts of the object can be easily accessed, modified, substituted by other parts, etc. (This is another benefit of an "atomistic" approach to data representation.)

## Conclusion

To summarize: from the *new vision*, *new typography*, and *new architecture* of the 1920s we move to new media of the 1990s; from "a man with a movie camera" to a user with a search engine, image analysis and visualization programs; from cinema, the technology of seeing, to a computer, the technology of memory; from *defamiliarization* to information design.

In short, the avant-garde becomes software. This statement should be understood in two ways. On the one hand, software codifies and naturalizes the techniques of the old avant-garde. On the other hand, software's new techniques of working with media represent the new avant-garde of the meta-media society.

### URL list:

[url1]:<http://www.wired.com>

[url2]:<http://www.macromedia.com/software/generator>

### Related links:

- ⇒ European Avant-garde (an international research project):  
<http://www.arts.ed.ac.uk/langgrad/rprojects/avant-garde>
- ⇒ Digital Constructivism:  
<http://www-apparitions.ucsd.edu/~manovich/Vertov/digitalconstruct.html>
- ⇒ Lev Manovich's home page:  
<http://www.manovich.net>
- ⇒ Review of Lev Manovich's *The Language of New Media*:  
<http://www.v2.nl/~arns/Texts/Media/manovich-review.html>
- ⇒ *Tekstura: Russian Essays on Visual Culture*:  
<http://www.press.uchicago.edu/cgi-bin/hfs.cgi/00/12371.ctl>
- ⇒ *Little Movies* (digital film project for the Web):  
<http://www.manovich.net/little-movies/>
- ⇒ *Freud-Lissitzky Navigator* (conceptual software for twentieth century history):  
<http://www.manovich.net/FLN/index.html>
- ⇒ *Anna and Andy* (streaming novel):  
<http://www.manovich.net/AA/index.html>
- ⇒ *Info-Aesthetics*:  
<http://www.manovich.net/IA/index.html>
- ⇒ *Soft Cinema* (digital film project):  
[http://www.manovich.net/cinema\\_future/toc.htm](http://www.manovich.net/cinema_future/toc.htm)

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