After Effects, or Velvet Revolution

Part II

Lev Manovich

[spring 2006]

This article is a second part of the series devoted to the analysis of the new hybrid visual language of moving images that emerged during the period of 1993-1998. Used first in film titles and television graphics, this language slowly came to dominate our visual culture. Today we see it in short films, music videos, commercials, moving images sequences which appear in interactive projects and media interfaces, and web sites. Because this fundamental shift in the aesthetics of moving images did not received any critical discussion while it was happening – in contrast to other aspects of Digital Revolution such interactivity and the Web – I have called it a "Velvet Revolution" in moving image culture.

My thesis is that this new language can be understood with the help of the concept of remixability – if we use this concept in a new way. Let us call it "deep remixability." For what gets remixed is not only of the content of different media, but their fundamental techniques, working methods, and ways of representation and expression. United within the common software environment, cinematography, animation, computer animation, special effects, graphic design, and typography have come to form a new metamedium. A work produced in this new metamedium can use all techniques which were previously unique to these different media, or any subset of these techniques.

In the first part I started the discussion of how the new software-based methods of production – specifically software such as After Effects - made this language possible. We analyzed compositing; we also discussed how the interface and production workflow in After Effects themselves mix the production methods of twentieth century cinema, animation, and graphic design. In this part I will look at other aspects of software-based moving image production, and then use this discussion to refine my anaylis of how *deep remixability* functions.

Three-dimensional Space as a New Platform for Media Design

As I was researching what the users and industry reviewers has been saying about After Effects, I came across a somewhat condescending characterization of this software as "Photoshop with keyframes." I think that this characterization is actually quite useful.[1] Think about all the different ways of manipulating images available in Photoshop and the degree of control provided by its multiple tools. Think also about its concept a visual composition as a stack of potentially hundreds of layers each with its transparency and multiple alpha channels. The ability to animate such a composition and continue using Photoshop tools to adjust visual elements over time on all layers independently indeed constitute a new paradigm for creating moving images. And this is what After Effects and other animation, visual effects and compositing software make possible today.[2] And while the paradigm of working with a number of layers placed on top of each other itself is not new – consider traditional cell animation, optical printing, photocollage, and graphic design – going from a few non-transparent layers to hundreds and

---

[1] Soon after the initial release of After Effects in January 1993, the company that produced it was purchased by Adobe who was already selling Photoshop.

[2] Photoshop and After Effects were designed originally by different people at different time, and even after both were purchased by Adobe (it released Photoshop in 1989 and After Effects in 1993), it took Adobe a number of years to build close links between After Effects and Photoshop eventually making it easy going back and forth between the two programs.

even thousands, each with its controls, fundamentally changes not only how a moving image looks but also what it can say.

But innovative as it was, by the beginning of the 2000s 2D digital compositing paradigm already came to be supplemented by a new one: 3D compositing. The new paradigm has even less connections to previous media than 2D compositing. Instead, it takes the relatively new media that was born with computers in the 1960s – 3D computer graphics – and transforms it into a general platform for moving media design.

The language used in professional production milieu today reflects an implicit understanding that 3D graphics is a new medium unique to a computer. When people use terms "computer visuals," "computer imagery," or "CGI" which is an abbreviation for "computer generated imagery," everybody understands that they refer to 3D graphics as opposed to any other image source such as "digital photography. But what is my own reason for thinking of 3D computer graphics as a new media – as opposed to considering it as an extension of architectural drafting, projection geometry, or set making? Because it offers a new method for representing physical reality - both what actually exists and what is imagined. This method is fundamentally different from what has been offered by main media of the industrial era: still photography, film recording, and audio recording. With 3D computer graphics, we can represent three-dimensional structure of the world – versus capturing only a perspectival image of the world, as in lens-based recording. We can also manipulate our representation using various tools with ease and precision which is qualitatively different of a much more limited "manipulability" of a model made from any physical material (although nanotechnology promises to change this in the future.) And, as the case of contemporary architecture makes it clear, 3D computer graphics is not simply a faster way of working with geometric representations such as plans and cross-sections used by draftsmen for centuries. When the generations of young architects and architectural students started to systematically work with 3D

software such as Alias in the middle of the 1990s, the ability to directly manipulate a 3D shape (rather than only dealing with its projections as in traditional drafting) quickly led to a whole new language of complex non-rectangular shapes. In other words, designers working with the media of 3D computer graphics started to imagine different things.

To come back to our topic of discussion: When Velvet Revolution of the 1990s made possible to easily combine multiple media sources in a single moving image sequence via digital compositing, CGI was added to the mix. Today, 3D models are routinely used in media compositions created in After Effects and similar software, along with all other media sources. But in order to be a part of the mix, they need to be placed on their own 2D layers and thus treated as 2D images. This was the original After Effects paradigm: all image media can meet as long as they are reduced to 2D.[3]

In contrast, in 3D compositing paradigm all media types are placed within a single 3D space. This works as follows. A designer positions all image sources which are two inherently two dimensional – for instance, digital film or digitized film, hand-drawn elements, typography – on separate 2D planes. These planes are situated within the single virtual 3D space. One advantage of this representation is that since 3D space is "native" to 3D computer graphics, 3D models can stay as they are, i.e. three-dimensional. An additional advantage is that the designer can now use all the techniques of virtual cinematography as developed in 3D computer animation. She can define different kinds of lights, fly the virtual camera around and through the image planes at any trajectory, and use depth of field and motion blur effects.[4]

---

[3] I say "original" because in the later version of After Effects Adobe added the ability to work with 3D layers.

[4] If 2D compositing can be understood as an extension of twentieth century cell animation where a composition consists from a stack of flat drawings, the conceptual source of 3D compositing paradigm is different. It comes out from the work on integrating live action footage and CGI in the 1980s done in the context of feature films production. Both film director and computer animator work in a three dimensional space: the physical space of

3D Compositing and The Logic of Reversal

In 1995 I published the article *What is Digital Cinema?* which was my first attempt to describe the changes in the logic of moving image production I was witnessing. In that article I proposed that the logic of hand-drawn animation, which throughout the twentieth century was marginal in relation to cinema, became dominant in a computer era. Because software allows the designer to manually manipulate any image regarding of its source as though it was drawn in the first place, the ontological differences between different image media become irrelevant. Both conceptually and practically, they all reduced to hand-drawn animation.

Having discussed the use of layers in 2D compositing using the example of After Effects, I can now add that animation logic moves from the marginal to the dominant position also in another way. The paradigm of a composition as a stack of separate visual elements as practiced in cell animation becomes the default way of working with all images in a software environment – regardless of their origin and final output media. In short, a moving image in general is now understood as a composite of layers of imagery. A "single layer image" such as un-manipulated digital video becomes an exception.

The emergence of 3D compositing paradigm can be also seen as following the logic of temporal reversal. The new representational structure as developed within computer graphics field – a 3D virtual space containing 3D models – has gradually moved from a marginal to the dominant role. In the 1970s and 1980s computer graphics were used only occasionally in a dozen of feature films such as *Alien* (1979), *Tron* (1981), *The Last Starfighter* (1984), and *Abyss* (1989), and selected

---

the set in the first case, the virtual space as defined by 3D modeling software in the second case. Therefore conceptually it makes sense to use three-dimensional space as a common platform for the integration of these two worlds. It is not accidental that NUKE, one of the leading programs for 3D compositing today was developed in house at Digital Domain which was co-founded in 1993 by James Cameron – the Hollywood director who systematically advanced the integration of CGI and live action in his films such as *Abyss* (1989), *Terminator 2* (1991), and *Titanic* (1997).

television commercials and broadcast graphics. But by the beginning of the 2000s, the representation structure of computer graphics, i.e. a 3D virtual space, came to function as an umbrella within can hold all other image types regardless of their origin. An example of an application which implements this paradigm is Flame, enthusiastically described by one user as "a full 3D compositing environment into which you can bring 3D models, create true 3D text and 3D particles, and distort layers in 3D space."[5]

This does not mean that 3D animation itself became visually dominant in moving image culture, or that the 3D structure of the space within which media compositions are now routinely constructed is necessary made visible (usually it is not.) Rather, the way 3D computer animation organizes visual data – as objects positioned in a Cartesian space – became the way to work with all moving image media. As already stated above, a designer positions all the elements which go into a composition – 2D animated sequences, 3D objects, particle systems, video and digitized film sequences, still images and photographs – inside the shared 3D virtual space. There these elements can be further animated, transformed, blurred, filtered, etc. So while all moving image media has been reduced to the status of hand-drawn animation in terms of their manipulability, we can also state that all media have become layers in 3D space. In short, the new media of 3D computer animation has "eaten up" the dominant media of the industrial age – lens-based photo, film and video recording.

Before moving forward, let us sum what we covered so far. I discussed a number of paradigmatic changes in how moving image design came to be understood differently in the course of Velvet Revolution. Although in production practice these different paradigms are used together, they are actually distinct ways of understanding an image, so they are not necessary conceptually all compatible with each other

---

[5] Alan Okey, post to forums.creativecow.net, Dec 28, 2005 < http://forums.creativecow.net/cgi-bin/dev_read_post.cgi?forumid=154&postid=855029>.

From a "Moving Image" to a "Media Composition"

This is a good moment to pause and reflect on the very term of our discussion – moving image. When cinema in its modern form was born in the end of the nineteenth century, the new medium was understood as an extension of already familiar one – that is, as photographic image which is now moving. This understanding can be found in the press accounts of the day and also in at least one of the official names given to the new medium - "moving pictures." On the material level, a film indeed consisted from separate photographic frames which when driven through projector created the effect of motion for the viewer. So the concept used to understand it indeed fit with the material structure of the medium.

But is this concept still appropriate today? When we record video and play it, we are still dealing with the same structure: a sequence of frames. But for the professional media designers, the terms have changed. The importance of these changes is not just academic and purely theoretical. Because designers understand their media differently, they are creating media that looks different and has a new logic.

Consider the conceptual changes, or new paradigms – which at the same time are new ways of designing – we have discussed so far. Theoretically they are not necessary all compatible with each other, but in production practice these different paradigms are used together. A "moving image" became a hybrid which can combine all different visual media invented so far – rather than holding only one kind of data such as camera recording, hand drawing, etc. Rather than being understood as a singular flat plane – the result of light focused by the lens and captured by the recording surface – it is now understood as a stack of separate layers potentially infinite in number. And rather than "time-based," it becomes "composition-based," or "object oriented." That of, instead of being treated as a sequence of frames arranged in time, a "moving image" is now thought of as a two-

dimensional composition that consists from a number of objects that can be manipulated independently. And finally, in yet another paradigm of 3D compositing, the designer is working in a three-dimensional space that holds both CGI and lens-recorded flat image sources

Of course, frame-based representation did not disappear – but it became simply a recoding and output format rather than the space where the actual design is taking place. And while the term "moving image" can be still used as an appropriate description for how the output of a design process is experienced by the viewers, it is no longer captures how the designers think about what they create. They are thinking today very differently than twenty years ago.

If we focus on what the different paradigms summarized above have in common, we can say that filmmakers, editors, special effects artists, animators, and motion graphics designers are working on *a composition in 2D or a 3D space that consists from a number of separate objects*. The spatial dimension became as important as temporal dimension. From the concept of a "moving image" understood as a sequence of static photographs we have moved to a new concept: *a modular media composition*.

Motion Graphics

Let me invoke the figure of the inversion from marginal to mainstream in order to introduce yet one more paradigmatic shift. Another media type which until 1990s was even more marginal to live action filmmaking than animation – typography – has now become an equal player along with lens-based images and all other types of media. The term "motion graphics" has been used at least since 1960 when a pioneer of computer filmmaking John Whitney named his new company Motion Graphics. However until Velvet Revolution only a handful of people and companies have systematically explored the art of animated typography: Norman McLaren,

Saul Blass, Pablo Ferro, R/Greenberg, and a few others.[6] But in the middle of the 1990s moving image sequences or short films dominated by moving animated type and abstract graphical elements rather than by live action started to be produced in large numbers. The material cause for motion graphics take off? After Effects running on PCs and other software running on relatively inexpensive graphics workstations became affordable to smaller design, visual effects, post-production houses, and soon individual designers. Almost overnight, the term "motion graphics" became well known. The five hundred year old Guttenberg universe came into motion.

Along with typography, the whole language of twentieth graphical century design was "imported" into moving image design. This development did not receive a name of its own, but it is obviously at least as important. Today (2006) the term "motion graphics" is often used to refer to all moving image sequences which are dominated by typography and/or design and embedded in larger forms. But we should recall that while in the twentieth century typography was indeed often used in combination with other design elements, for five hundred years it formed its own word. Therefore I think it is important to consider the two kinds of "import" operations that took place during Velvet Revolution – typography and twentieth century graphic design – as two distinct historical developments.

Deep Remixability

Although the discussions in this and the first parts of this series of articles did not cover all the changes that took place during Velvet Revolution, the magnitude of the transformations should by now be clear. While we can name many social factors that all could have and probably did played some role – the rise of

---

[6] For a rare discussion of motion graphics prehistory as well as equally rare attempt to analyze the field by using a set of concepts rather than as the usual coffee table portfolio of individual designers, see Jeff Bellantfoni and Matt Woolman, *Type in Motion* (Rizzoli, 1999).

branding, experience economy, youth markets, and the Web as a global communication platform during the 1990s – I believe that these factors alone cannot account for the specific design and visual logics which we see today in media culture. Similarly, they cannot be explained by simply saying that contemporary consumption society requires constant innovation, constant novel aesthetics, and effects. This may be true – but why do we see these particular visual languages as opposed to others, and what is the logic that drives their evolution? I believe that to properly understand this, we need to carefully look at media creation, editing, and design software and their use in production environment (which can range from a single laptop to a number of production companies collaborating on the same large-scale project.)

The makers of software used in production usually do not set out to create a revolution. On the contrary, software is created to fit into already existing production procedures, job roles, and familiar tasks. But software are like species within the common ecology – in this case, a shared computer environment. Once "released," they start interacting, mutating, and making hybrids. Velvet Revolution can therefore be understood as the period of systematic hybridization between different software species originally designed to do work in different media. In the beginning of the 1990s, we had – Illustrator for making vector-based drawings, Photoshop for editing of continuous tone images, Wavefront and Alias for 3D modeling and animation, After Effects for 2D animation, and so on. By the end of the 1990s, a designer could combine operations and representational formats such as a bitmapped still image, an image sequence, a vector drawing, a 3D model and digital video specific to these programs within the same design – regardless of its destination media. I believe that the hybrid visual language that we see today across "moving image" culture and media design in general is largely the outcome of this new production environment. While this language supports seemingly numerous variations as manifested in the particular media designs, its general logic can be summed up in one phrase: remixability of previously separate media languages.

As I stressed in this text, the result of this hybridization is not simply a mechanical sum of the previously existing parts but new species. This applies both to the visual language of particular designs, and to the operations themselves. When an old operation is integrated into the overall digital production environment, it often comes to function in a new way. I would like to conclude by analyzing in detail how this process works in the case of a particular operation - in order to emphasize once again that media remixability is not simply about adding the content of diffirent media, or adding together their techniques and languages. And since remix in contemporary culture is commonly understood as these kinds of additions, we may want to use a different term to talk about the kinds of transformations the example below illustrates. Let us call it *deep remixability*.

What does it mean when we see depth of field effect in motion graphics, films and television programs which use neither live action footage nor photorealistic 3D graphics but have a more stylized look? Originally an artifact of lens-based recording, depth of field was simulated in a computer when the main goal of 3D compute graphics field was to create maximum "photorealism," i.e. synthetic scenes not distinguishable from live action cinematography.[7] But once this technique became available, media designers gradually realized that it can be used regardless of how realistic or abstract the visual style is – as long as there is a suggestion of a 3D space. Typography moving in perspective through an empty space; drawn 2D characters positioned on different layers in a 3D space; a field of animated particles – any composition can be put through the simulated depth of field.

The fact that this effect is simulated and removed from its original physical media means that a designer can manipulate it a variety of ways. The parameters which define what part of the space is in focus can be independently animated, i.e. set to

---

[7] For more on this process, see the chapter "Synthetic Realism and its Discontents" in *The Langauge of New Media*.

change over time – because they are simply the numbers controlling the algorithm and not something built into the optics of a physical lens. So while simulated depth of field can be said to maintain the memory of the particular physical media (lens-based photo and film recording) from which it came from, it became an essentially new technique which functions as a "character" in its own right. It has the fluidity and versatility not available previously. Its connection to the physical world is ambiguous at best. On the one hand, it only makes sense to use depth of field if you are constructing a 3D space even if it is defined in a minimal way by using only a few or even a single depth cue such as lines converging towards the vanishing point or foreshortening. On the other hand, the designer can be said to "draw" this effect in any way desirable. The axis controlling depth of field does not need to be perpendicular to the image plane, the area in focus can be anywhere in space, it can also quickly move around the space, etc.

Following Velvet Revolution, the aesthetic charge of many media designs is often derived from more "simple" remix operations – juxtaposing different media in what can be called "media montage." However, for me the essence of this Revolution is the more fundamental *deep remixability* illustrated by the example analyzed above. Computerization virtualized practically all media creating and modification techniques, "extracting" them from their particular physical media and turning them into algorithms. This means that in most cases, we will no longer find any of these techniques in their pure original state.