The Image in Art and 'Computer Art'

Richard Wright

ABSTRACT

In this essay the author takes a cursory look at the increasing range of applications of computers to art and design practice and questions some of the assumptions that have been made about their use. The proliferation of computer imagery in society as part of the video culture and its effects on our attitudes towards digital representation are emphasised. This leads to a redefinition of the intimacy of the relationship between artist and art object. Such issues contribute to the comparative study of digital media and physical/mechanical media and the computer's impact on the creation and apprehension of imagery.

DOES 'COMPUTER ART' STILL EXIST?

The term 'computer art' has begun to drop out of usage in recent years to be replaced by phrases such as 'computer-aided art' or 'computers in art'. This must partly be because the computer is now used for so many different purposes that it can no longer form a basis for comparison by itself. Early 'computer art' of the fifties and sixties was based mainly on ideas drawn from the European Constructivist tradition—that of system, precision, geometry and structure—and the rigours of computer programming lent themselves easily to this approach [1]. The term 'computer art' seemed to imply that the content of this art was the computer itself, or rather the computer's symbolic processing abilities. Since then, computer power has increased and methods of communication and interaction between human and machine have widened. New uses have mushroomed—image digitising and processing, animation, 3-D modelling, paint systems, digital video editing, computer-aided sound synthesis and editing, and even word processing. And artists that choose to take advantage of these facilities undoubtedly see their work as coming under such varied headings as conceptual art, video art, installations, or as some symptom of the Post-Modernist pluralism. One may now ask whether it still makes sense to talk of a 'computer art'. Can the computer be a medium that can help define a new art form, or is it only a tool?

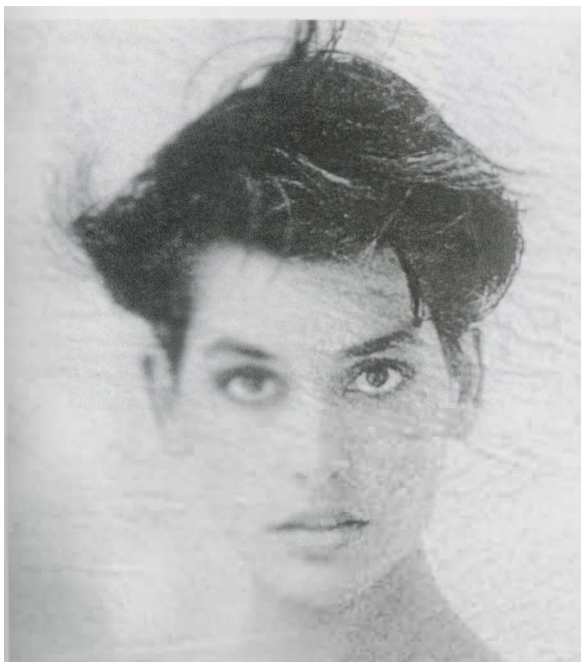

Fig. 1. Adrian Wilson, *Perspextive IV*, paintbox image frame-grabbed through Perspex, hand tinted and filtered, 1988.

Painting is a medium that has embraced many different subjects, forms and art 'movements' in its history: it has been used as decoration (Rococo), as experiments in light and colour (Impressionism) or fragmentary form (Cubism), as something akin to psychoanalysis (Surrealism) and simply as a record of the act of painting itself (Action Painting). But it is still possible to talk of an *aesthetics* of painting, the unique visual qualities of pigment applied with a brush, the dynamics of the physical effort it demands from a painter, its function as a wall hanging. Such descriptions are especially apparent in the early days of a new medium, for instance Van Eyck's development of oil painting, whose slow drying time and variability of consistency enabled him to produce finely crafted images rich in surface detail and finish. Though today any attempt to show an exhibition of painting as a medium would include such a variety of aesthetic and conceptual approaches as to render it a pointless exercise, it is still possible to talk of 'pure' painting—that is, painting that exploits the properties of paint itself, even if it is part of a much larger intention.

If we compare painting with art made with a computer, however, it is not inevitable that we should conclude that the term 'computer art' is equivalent to 'paint-brush art'. Art that uses computers is still at an early stage—is it possible to elucidate the aesthetics of the computer as a medium before its products become too diverse to submit to analysis; is it possible to define it as a separate mode of cultural production aside from its appearance as a subject, tool or accomplice of other arts?

THE ECLECTIC IMAGE

I will first try to elucidate some subtle but significant differences between digital and physical media in an area where

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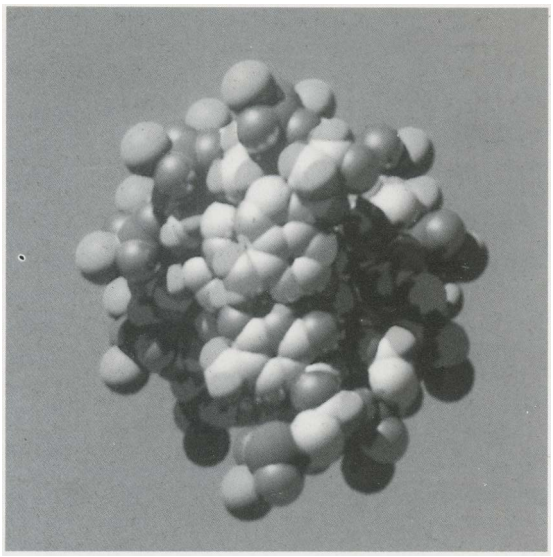

Fig. 2. Richard Wright, *DNA Molecule*, digital image, 1986. Data provided by Jane Burridge, Software Technolgy, IBM UK.

the computer is used toward apparently similar ends and exploits familiar skills—the use of electronic systems for painting and drawing. Apart from having fast graphic output in a form convenient for electronic reproduction and broadcast, the electronic paint system has the advantage of being able to sift through layers of menus to find, ready to be applied, almost all the graphic techniques one could think of. Paints, washes, delineated shapes, graduated shapes and typography can all be combined in rapid succession. Cutting and moving areas of the image, distorting, changing coulour and merging all contribute to the impression that the picture is an infinitely malleable entity.

An electronic image has a 'reproduced' quality to it—it seems to float behind the glass of the screen, seems to be unlocated at any unique point in space. The image itself is displayed on the monitor at a certain distance from the operator, emphasising its separation from the operator who labours on the touchpad and keyboard. A graphic designer does not have to wash his or her hands before beginning work on a paint system. Electronic images are *limited* by the screen but are not *on* the screen. In turn, the surface of the screen is often covered in smears, tends to accept distracting reflections from any light source in the room, and is prone to the adjustment of brightness, contrast and saturation control that we are accustomed to in our television sets. These all help to give any electronic image (not just images created by paint systems) a synthetic and transitory character, resulting in a loss of respect for the integrity the image would have had as a crafted object [2]. This effect is greatly increased in the case of digital media by the ability to store and retrieve previous versions and stages of work in a picture.

In the same way that the final image is viewed as flexible and immaterial, the drawing and painting functions of a system are all instantly available without regard to the practical difficulties normally associated with them. The operator can be a painter, draughtsperson, or typographer as the need arises. To use an airbrush to its optimum effect, for instance, would suggest heretofore the need to call in a professional airbursh artist, but its almost casual inclusion in the menu reduces its value to that of an 'option', to be employed as and when the mood takes us. And the loss of specialised craftsmanship carries over to a loss of 'aura' in the image itself.

The eclectic approach to image-making engendered by the varied available functions expands to include a vast collection of pictorial raw material that can be pressed into service. Many paint systems are exploited for their image digitising and processing potential, for photo-montage and collage as well as retouching (Fig. 1). A digitising camera is pointed at some area of interest in the visual world and made to take in what is confronting it. Once inside the electronic hardware, the information stored from the image is reduced to a range of digital symbols. Whether the source of the image is photographic, a thermal emission or live action, it is all converted to a single uniform representation. Even the terminology of the practice—'frame grabbing'—emphasises the visual world as being a storehouse of pictorial data, of 'frames', that is ready to be plundered and consumed. The special editing abilities of digital systems—such as squash and stretch, and shrink and expand—combine with the traditional tools of cut and paste to allow a high degree of visual 'violence' to be perpetrated on the original subject. One could not imagine slicing up an authentic Van Gogh canvas, or even an expensive reproduction of one, to provide material for an experiment in collage. But when the image is inside the 'library' of the paint system, it is downgraded into visual fodder; this in turn must affect the way in which we view the original, resulting in a serious loss of sig nification [3].

All the materials of the paint system user, whether digitised images or pixellated brush shapes and area fills, assume the same status and can be freely mixed and matched. Individual pixels can become the constituents of nearly any observable marks, lines, tonal graduations, patterns or textures [4]. Each element of the image can be processed equivalently with no respect for its semantic or perhaps even for mal qualities. With all these graphical modes of expression available, the artist can become a style compositor, the author of a pluralism that is as mannered as it is evocative.

SYNTHETIC PHOTOGRAPHY, REALISM AND SURREALISM

It seems as though it has always been necessary to have some branch of the plastic arts devoted to reducing our experience of the three-dimensional world to a flat surface. The short history of computer graphics has been no exception. Engineers first used computer graphics to visualise new designs, as did scientists to evaluate, interpret and conceptualise large amounts of data (Fig. 2) [5]. Although synthetic photography has been used by methodical research as well as commercial graphics, its perception depends partly on the way photographic images are regarded in general. Computer graphics takes on a function similar to that of providing photographic evidence, the image being almost identified with the subject itself. In the case of work involving the exploration of abstract mathematical structures, the computer assumes the role of an

'abstract camera', giving an intuitive representation of a mental object that is essentially of a different nature.

Like photographs, this kind of computer imagery can take on the status of being records of the world, but this does not mean that they are equivalent to our ordinary way of looking. If we look at the progress in image synthesis from the late seventies to the mid-eighties, it is quite startling how relative the perception of improvements is. During the early eighties a computer graphics 'naive' could easily be impressed by the finely highlighted and smoothly shaded geometry of colour rendered frames generated on the recently available frame-stores. Yet all this suddenly paled into insignificance once ray-tracing algorithms appeared; their clear reflective surfaces were like a new pair of spectacles to a near-sighted person—they revealed unsuspected visual delights in the surrounding world. Ordinarily, the closer one looks at an object the more sharply focused it becomes, but in a scene rendered by a computer each object can be as crisply defined as any other. One gets the impression that this kind of picture has a greater clarity than an ordinary photograph, as each object projects itself on our retina as forcibly as the next. With no depth of field or selective focusing functions our eyes can wander aimlessly over the pristine surface, unable to find any differentiated subject to catch our attention. Many pictures like this exist in the computer graphics universe. Sometimes they are a result of limitations in the software, but it is difficult to resist the feeling that the artist has tried to insist upon the superior reality of the computed image by giving all the elements in the scene an equal, idealised definition, that this is how things really look without the limitations of the human eye. It is of course a mistake to chastise the eye for failing to correspond to a mathematical model; the perception of a synthetic image is still only the beginning of an understanding rather than the acceptance of a definitive account.

Although the pursuit of realism in computer graphics was originally for the purposes of providing a more easily evaluated simulation of a computer-modelled industrial product or architectural scheme, by the early eighties synthetic photography had invaded the world of graphic design and advertising. Few fine artists have been attracted to this kind of imagery, however—not even those remnants of seventies hyper-realism who were more concerned with reproducing and editing rather than creating. Three-dimensional image synthesis simply did not seem to present or solve any artistic problems.

The perception of computer imagery by the design companies that provide the briefs that the production houses work to (as well as the perception of other artists who have avoided involvement with such techniques) is that this imagery is one of faultless presentation, accuracy, and a commitment to the myth of self-justifying technological progress. The objects in a computer-generated picture are crisply delineated, one *trusts* these images and feels sure one 'knows'—has knowledge of what one is looking at, even though one might not actually recognise what it is. It is not naturalism that these images seek, nor is it what architectural simulations might aim for. What they seek is a kind of 'realism' of an ideal sort, a realism that tries to describe the world with an insistent, even authoritarian, accuracy that is overwhelming. It is as though the corporate power of the media had joined up with the methodological rigour of the mathematicians and scientists to create some final, definitive and coercive depiction of the visual world [6].

The Japanese artist Yoichiro Kawaguichi is one of the artists who tries to use this power of synthetic photography, in a manner reminiscent of the *trompe l'oeil* style of Surrealism, to make vivid fantasy creations that compete with more familiar images of everyday scenes [7]. Another Surrealist technique, that of juxtaposing domestic objects in unfamiliar combinations and situations to release unsuspected associations, has become a stylistic theme of computer graphics (though often it is little more than a license for various forms of gimmickry).

Although as a graphic tool it was further developed for different purposes by other Surrealists such as Tanguy and Magritte [8], photo-Surrealism was first introduced by Salvador Dali when he joined the Surrealist movement in 1929. For Dali it was important as a way of realising the obsessive quality of his dreams and fantasies in a vivid and concrete way, of making them as 'real' as possible. It is this ability to create convincing

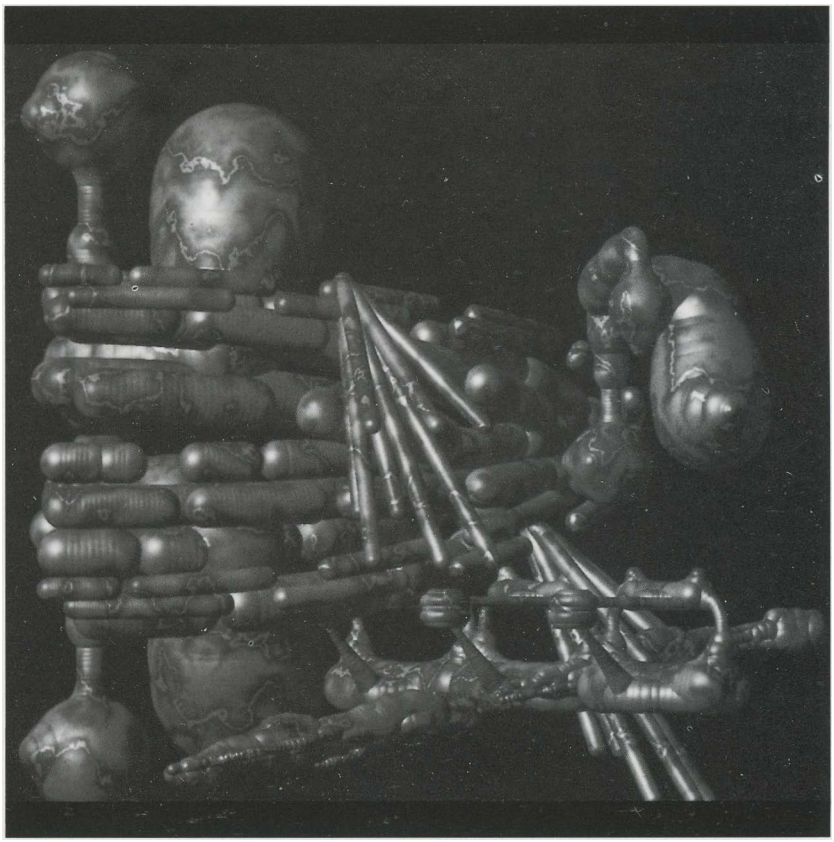

Fig. 3. Mike King, *Dock 1*, digital image, 1988. Modelling software: SCULPTOR, Mike King, City of London Polytechnic. Rendered by Ian Currington, Amazing Array Productions. Reproduced by kind permission of the artist. All rights reserved.

depictions of objects and scenes that computer graphics has sometimes been exploited for; it lends credence to the bizarre—seeing is believing. But an intrusion of the imagination into commonplace imagery was not the only aim of the Surrealists.

Surrealism was also a heavily political movement; it actively sought social reform and even upheaval and was intent on using art as a weapon. The Surrealists desired to break down art practice as an elitist activity by developing new techniques which would 'democratise' it. Artists like Miro, Masson and Matta tried to relinquish as much conscious control over their painting techniques as possible, aiming for a trance-like state of extreme physic sensitivity, in which it was hoped that the hand of the artist would be able to record instantly each random, irrational urge of the subconscious, the source of all creativity, without the ego intervening to censor the process. This technique was called 'automatism', or automatic painting. The point was that a method like this did not rely on mastering skills that could only be acquired by spending years at the traditional institutions; thus the average person would no longer need to feel excluded by the world of art. In the libertarian Surrealist world everyone could be an artist. The 'democratic' methods of the Surrealists were mostly dependent on their *physicality*—to be an automatist artist one needed only a piece of paper and a pencil; no training or preparation was required. Most importantly, it was an essentially organic process; the marking of the pencil on the paper was the result of unconscious spasms being transmitted directly through the physical body of the artist itself.

The contrast of this latter Surrealist practice with computer-graphics techniques is obvious and illuminating. Not only can the process of modelling and rendering be arduous and demanding, both in terms of the mental effort and the basic knowledge required, but the expensive hardware may, apart from its forbidding aura of technological insensitivity, be unaffordable.

Still, the hope of some writers on computers in art was that the boom in home-computing during the seventies would democratise art by transferring the burden of skills from the manual dexterity of the painter to the cerebral skills of the programmer and general computer user [9]. But it is naive to think that programming is an ability any less daunting than painting, and the arrival of the user-friendly, menu driven systems of the eighties has led to less rather than more intimacy between the computer user and the medium. Only by teaching formal computer language skills at the same time as basic reading and writing might we avoid this new form of illiteracy and create a new generation of informed and critical users.

The Creative Process in Symbolic Space

The idea that computer graphics can give an accurate visual interpretation of a 3-D computer model has given rise to the notion of 'computer sculpture' or 'sculpture simulation' (Fig. 3). Instead of using naturalistically shaded study drawings of projected sculptures, some artists now use graphics systems to help them visualise the final result. Some sculptors have been so impressed by the power of this approach that they simply leave their 'sculpture' in digital form and do not bother to build it. This of course means that they are now working in a different medium. It is not true that all the sculptor has to do is to express his or her concept in digital form, which can then be rendered physically: artists do not conceive of their work in its entirety before setting pencil to paper. The process of visualisation, whether on computer or with traditional tools, is also a process of further conceptualisation and development. Sculpture is, after all, a visual and tactile art form, not a cerebral one. Because of this the method of visualisation that the artist chooses will also determine the creative process: it will always control the kind of work produced.

It is widely considered that future computergraphics modelling tools will be so modified—to increase the ease of interaction, flexibility and precision and in general widen the whole domain of accessible forms—that their limitations will be the exception rather than the rule. But even then there will be subtle effects on the working practices of artists or designers that may not be appreciated immediately. These effects are due to the digital nature of the information stored in a computer, the symbolic form of all its constructs freed from the constraints of any physical manifestation, and its infinite reproducibility and storability as utilised by a creative process. One of the main advantages of computer-aided engineering (CAE) systems is that any rough 'sketch' or provisional draft can be analysed and a considerable amount of detailed information can be determined (information such as dimensions, weight, cost, compatibility with other components). Many alternative designs can be generated quickly, stored in the computer's memory and then compared to each other. The designer can—apparently—*explore alternatives* more efficiently, testing and perhaps perfecting the final answer to the problem in a sympathetic environment. This kind of activity has sometimes implied that designers are progressing in an orderly fashion towards a unique solution to their brief, that designing consists in searching for a 'solution space' for the correct answer. Yet it has been pointed out that this is a misleading view of the way designers work. It does not make sense to discuss the process of designing in terms of its final outcome [10]; designs are invented rather than discovered, and there can be many different solutions to the same problem.

Artists do not see themselves any more than designers as being presented with a problem that they then proceed to 'solve'. But much more importantly, where designers essentially communicate ideas, artists are concerned with generating meaning, with revealing the nature of their medium and their relationship to it. This is quite crucial when considering the effects of the computer on each of their working methods. A designer still tends to work *towards* something, however dimly perceived, while an artist works *out from* something. Many artists today have a preference for computer-'aided' art in terms of its helping them to 'try out' different variations, to explore alternative compositions and their 'effect'. This is in contrast to the aims of the Systems artists who like to fully work out and display a whole group of combinations and permutations for their own sake (a kind of symbolic action painting). These artists carefully store each stage of their work ready for instant recall should something 'go wrong' with the current process they are applying. But in what sense can a work of art 'go wrong'? Apart from the trivial case in which one might knock a pot of paint over

one's canvas (or suffer the contribution of a 'chance' occurrence), mistakes can simply be seen as a record of the process of getting from where one was to where one is now. They can be seen as 'wrong' only if the artist is pursuing a preformed vision, performing a task whose goal is the perfecting of an ideal form or the creation of the right 'effect'.

The knowledge that one can go back and start again, can redo or undo something, reduces tension and gives art practice a ceratin reliability. It provides a cushioning from the responsibility of having to perpetrate some irreversible act upon a physical object such as a canvas or block of marble. On the other hand, with all these different experiments and versions floating around in symbolic space, it becomes unclear as to where the work of art is actually located. When one adopts this way of working one creates many different works of art, and a decision to chose one of them above the others loses much of its meaning and significance. Like choosing a red candy bar instead of a blue one, the criteria of artistic merit can become trivialised. In addition, the artist is now released from the need to make decisions with commitment. As the computer reduces the 'risk' in making art, so it reduces the need for conviction in the creative process. But here the artist is in danger of floundering helplessly. An artist might revert back to an earlier stage in the work at the first sign of a problem rather than try to 'rescue' the picture, to struggle on and perhaps reach something that provides a new insight. Such an artist may become a timid creature indeed.

A painter who has made the decision to change part of a work, without knowing beforehand exactly in which direction he or she is heading, has to move forward and so is much more aware of art as a process of getting from one place to another. This can be reflected in the painting itself. By discarding as irrelevant the many formative stages experienced on the way to the final image, an artist using a digital medium will end up presenting a work that exists in a wholly artificial context. This artist will present a work as though it 'just happened like that', a work isolated from its artistic roots.

The effects described above are all consequences of the nature of the computer as a medium, in particular its non-physicality and the status of its symbolic processing functions. Until quite recently the activity of making things was always a manually based task, but now it can be a cerebral one instead, a more rationalistic activity that seems to come from a different place in our experience. Even with the most versatile interactive graphics, the dynamics of working in an electronic space would mould the nature of the result. The issues raised here can only be resolved by recognising and coming to terms with the computer's influence, however subtle, on the minds of those who use it. Computer practices will likely not improve art practices nor 'aid' them, but will create completely different practices and lend more shape to our growing notions of what a 'computer art' might be.

References and Notes

1. H. Franke, *Computer Graphics—Computer Art*, (London: Phaidon, 1971).

2. W. Benjamin, "The Work of Art in the Age of Mechanical Reproduction", in *Illuminations*, W. Benjamin, ed.(Great Britain: Fontana/Collins, 1970) pp. 219–253.

3. P. Virilio, Interview for *The Work of Art in the Electronic Age*, French television programme. Text published in *Block* No. 14, 4–7 (Autumn 1988).

4. This unified expression in a digital language is also an attractive property to those practising algorithmic aesthetics who seek a universal notation for pictures and who choose to ignore their identity as tangible objects.

5. R. S. Wolff, "Visualisation in the Eye of the Scientist", *Computers in Physics* (May/June 1988).

6. The perception of computer imagery is affected by its relationship with television images, particularly for computer animation. A still picture like a painting or photograph is inspected and pondered as an object meriting special interest. When we use our eyes to get around in our daily lives we tend to scan whatever is in front of us, pausing to concentrate only on the things that break through our apathy and impress themselves upon us. When we watch moving images such as those on television we are even less likely to notice the subtler but possibly still important features in what we see, willing as we are to allow ourselves to be guided by what the camera shows us. Computer graphics, whether still or animated, are electronic images of quality similar to television images, and it is unclear to what extent our perception of them is affected by the visual habits carried over from our passive response to broadcast pictures and entertainment. A related area is the possible conflict between the use of the computer as a tool for representation, such as in scientific visualisation, and as a tool for hermeneutics—as a generator of a multiplicity of interpretations and pragmatic conventions—which will also become increasingly problematic.

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