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OF VIDEO IMAGE

Finally, there was a wholesome lesson in the discovery that vision is not a mechanical recording of elements but rather the apprehension of significant structural patterns. If this was true for the simple act of perceiving an object, it was all the more likely to hold true also for the artistic approach to reality. Obviously the artist was no more a mechanical recording device than his instrument of sight. The artistic representation of an object could no longer be thought of as a tedious transcription of its accidental appearance, detail by detail.

(Rudolf Arnheim 1974: 6)

The previous chapter discovered a considerable area of overlap between video and film in their shared aesthetics of sound. This is hardly surprising, since feature films had universally used tape for the recording of sound for well over a decade before the first portable video recorders were introduced in the west. The situation is very different when we turn to the video image, which has qualities and potentials very different from those of the film image. There are again some areas of overlap, but what is taken over – whether it is the filmic system of the look or the television direct address pattern – is radically transformed. Video is such a new and untried medium that it is perhaps presumptuous to attempt to define its aesthetics at this stage. But on the basis of the preceding discussions of video's historical and social contexts, a few – admittedly tentative – comments can be offered.

Video is perhaps best seen in terms of a polarity. On the one hand, it is immediate, literal, actual, and naturalistic; on the other, it is simultaneously contrived, distanced, synthetic, and analytic. This divergence is reflected in its costing structure: low for recording, high for processing and synthesizing the resultant images. The immediacy stems from the ease of shooting and the instant replay, which make it usable as an increasingly popular variant on (and supplement to) the still camera for domestic use: the home video as a medium to follow the home movie and the family snapshot. In a discussion on the uses of still photography, John Berger makes a distinction between 'photographs which belong to the private experience' and 'those which are used publicly'. This distinction is very relevant to video, which echoes photographic practice in its personal, private dimension:

The private photograph – the portrait of a mother, a picture of a daughter, a group photo of one's team – is appreciated and read in a context *which is continuous with that from which the camera removed it*. . . . Such a photograph remains surrounded by the meaning from which it was severed. A mechanical device, the camera, has been used as an instrument to contribute to a living memory. The photograph is a memento from a life being lived.

(Berger 1980: 51–2)

The contrivance and distance of video stem from the contrasting potential which always exists because of the nature of electronic recording for transforming the image. Post-production work involves equipment with a high capital cost and the services of a well-paid engineer, but it must form part of any consideration of video because, at the level of either personal exploration or independent production for Channel Four, it remains within the immediate control and direct concern of the video-maker. Even at its most sophisticated technical level, video remains a personal medium throughout the whole production cycle. This is an immediate difference between video and film, since, as Peter Wollen notes, at least since the coming of sound, the film laboratory

became completely divorced from the work of the director and cinematographer; it became an automated, industrial process with its own standard operating procedures. Anyone

who has made a film will be familiar with the opacity of the laboratory.

(Wollen 1982: 172)

The video image

There is a whole mythology of the video image which stems from Marshall McLuhan's celebrated definition of television in *Understanding Media*, which was published in 1967 on the eve of the appearance in the west of the Sony portapak:

> The mode of the TV image has nothing in common with film or photo, except that it offers also a nonverbal *gestalt* or posture of forms. With TV, the viewer is the screen. . . . The TV image is visually low in data. The TV image is not a *still* shot. It is not photo in any sense, but a ceaselessly forming contour of things limned by the scanning-finger. The resulting plastic contour appears by light *through*, not light *on*, and the image so formed has the quality of sculpture and icon, rather than of picture.

(McLuhan 1967: 334)

This kind of reasoning confuses rather than clarifies the true differences between video and film images. The unsubstantiated assertion that 'with TV, the viewer is the screen' is no substitute for an examination of the significant differences between, on the one hand, sitting in the dark in a public place in front of a huge cinema screen and, on the other, watching a small domestic television screen in one's own sitting-room. Although they enjoyed an immense vogue at the period during which video first became widely used, the particular distinctions which McLuhan proposes are largely spurious. The television image is no lower in data than 16 mm film, the notion of a 'scanning-finger' is no more than a metaphor (it does not make the medium 'audio-tactile'), the formation of the image occurs at too great a speed for the viewer to be aware of how it is assembled, and the distinction between 'light through' and 'light on' is meaningless, since there is no difference in the way in which film and video picture information reaches the eye (Miller 1971: 121–6; Winston 1985: 258–63).

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There is of course a valid distinction between the ways in which video and film colour images are *produced*, although both operate on the principle that a full range of colour can be produced from just three primaries: blue, green, and red (Curtis 1985: 22). A colour video image is formed by a system of *additive* colour mixing, whereby the sensation of white is produced as a result of combining the outputs of the blue, green, and red sources, and the complementary colours are formed by combining (in their correct proportions) just two primaries: green and red to give yellow, green and blue to give cyan, and red and blue to give magenta. For the past thirty-five years, film has used exclusively *subtractive* colour systems, whereby the original blue, green, and red records are printed as yellow, magenta, and cyan respectively. In the resultant projected image, blue is formed by the absence of yellow, green by the absence of magenta, and red by the absence of cyan. Black results from the concentration of all three complementaries, while white stems from the absence of all dyes.

This additive/subtractive division between video and film is not the reflection of some mystical hot/cool distinction between the media. Early film colour systems which preceded the introduction of the now dominant Eastman Color (subtractive) system in 1952 explored both additive and subtractive methods (just like early colour processes for still photography). The advantage of the subtractive process for film is simply that the filters needed for an additive process reduce the available light by a third, whereas the subtractive process gives a projected image of great transparency. This distinction in the production of colour images is, in any case, irrelevant to how the resultant images are received by the eye. At the point of reception, what is crucial is not how the colour was produced (the eye does not differentiate between additive and subtractive methods), but what the characteristics of the colour are in terms of such factors as brightness, saturation, or hue.

In fact many of the key technical aspects of the formation of the video or television image are clearly and understandably based on film precedents. As we have seen, 'high-definition' television involves at least 400 lines, because this allows it approximately to match the resolving power of the 16 mm film

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image (even in a 625-line system only 575 are needed for the picture information) (Winston 1986: 58). The choice of 25 frames per second stems partly from the desire to synchronize the television receiver with UK mains frequency (50 Hz or cycles per second): being half the mains frequency means that hum-related picture interference is stationary and hence less annoying. But it also approximates closely enough to the 24-frame-per-second speed of projected sound film for the difference to be ignored in telecine transfer.

The interlacing of the two 312½-line fields to form the single 625-line television frame gives a field frequency of 50 cycles per second (which exactly matches mains frequency), just as the double-bladed shutter of the modern movie projector gives a doubled frequency of 48 frames per second (and hence a total lack of flicker) without the film speed needing to be increased beyond 24 frames per second. Another crucial area of comparability between video and film lies in the shared optical system. The target image size on a typical video camera tube is similar to that of a single 16 mm film frame, so that (with correct adaptors) 16 mm movie lenses can be used with video cameras. Even lenses specifically designed for video give an image quality close to that of 16 mm film. Similarly, the aspect ratio of a video camera and television studio monitor is the same as that of 16 mm film (4:3), although domestic receivers are normally set for a ratio of 5:3 (Curtis 1985: 21).

Fundamental to the shaping of the image in video – as in film and photography – is the concept of perspective. The media do not offer us some brute, untouched reality, but a shaped and ordered representation or illusion of reality. As we saw in chapter 1, perspective is a fifteenth-century construct, a system designed to allow us to render a three-dimensional reality accurately on a two-dimensional surface. It is perhaps easiest to understand as the image drawn on a sheet of glass held up between us and reality. It is not – and does not pretend to be – reality. It is not a system of *trompe-l'oeil* deceit: we are aware of the surface (in this it is unlike both reality and a mirror image). Moreover it is a static, monocular rendering. As we also saw in chapter 1, perspective – like the nineteenth- and twentieth-century visual and audio-visual media that employ it –

is not neutral. It makes its first appearance at the very beginning of the European move towards world domination and finds its technological application at the height of European imperialism.

Perspective in painting is a system that allows 'corrections'. A much quoted example is the conventional perspective rendering of a column of pillars seen head-on, which makes no attempt to reproduce the optical truth that the pillars at both extremes will appear wider to the human eye (Gombrich 1960: 215–16). In a similar way, cameras and lenses have to be seen not as objective instruments, but as human artefacts designed to 'correct' anomalies in the same way, so as to render an acceptable perspectival image, not reality itself. It is also worth noting that the application of perspective to the film image at the end of the nineteenth century is parallel to the reassertion of linearity in film narrative. At the very moment when all traditional forms of representation (including perspective) were under particular threat as avant-garde art moved away from conventionality and towards the various new forms of artistic modernism, film reasserted all the old rules, thereby setting the pattern subsequently to be followed by television.

Perspective is best seen as a construct which satisfies our need to find order and coherence in the world. As Aaron Scharf has observed, the greatness of the discovery of perspective was not that it conformed literally to optical truth, but that it 'embodied something more fundamental: the need to see the world that way'. As we consider the video image, we need to bear in mind the extent to which human beings have invested credibility in their visual media. The various technical and personal factors involved in any act of shooting mean that we cannot define the photographic or video image as a completely true rendering of nature. Yet – as has been pointed out – 'we have *learned* to see the world as the camera "sees" it' (Scharf 1965: 31).

Immediacy

If we want to establish initial differences between video and film images we can, of course, begin with the question of dimension. Although, with the creation of ever smaller audience spaces in multiscreen cinema complexes and the simultaneous develop-

ment of video projection systems, the two media are coming steadily closer together (and there are already instances of overlap) (Wischmeyer 1986: 26), films have traditionally been shot for big-screen projection, while the video-maker customarily has to be satisfied with domestic-sized monitors. Whereas films have therefore dealt with literally larger-than-life figures, video's aesthetics are conditioned by a scale which, in general, moves down from the human proportion. The importance of dimension when one is dealing with reproduced images is very clear from photographic exhibitions. While painted miniatures stand up well to gallery exhibition, normal-sized photographs often seem totally dwarfed by the gallery walls, although they may look very impressive if reproduced exactly the same size in the exhibition catalogue. It is this discrepancy – rather than any spurious McLuhanesque division between 'light on' and 'light through' – which gives film stars their mythical dimension, whereas television players are consistently confused with the roles they play (there are even reports of television performers being sued by the organizers for turning up to open, say, a fête in their own appearance rather than that of their television series persona).

Other technical factors also contribute to the naturalistic literalness of the video image. The almost universal use of the zoom lens with video cameras implies an optical system which is capable of keeping the image in focus while the focal length is adjusted from wide-angle to telephoto close-up. To this extent it inevitably respects the real time continuity of a scene, even if there is some distortion of the space. This latter distortion, which allows foreground and background to be held together as the field of view changes with the operation of the zoom, is itself less disruptive of spatial continuity than the traditional film system based on the editing together of successive shots from different distances and angles. As we have seen, this tendency is supported too by the economics of video post-production, which offer significant savings (because of the operating cost of sophisticated editing equipment) in the assembly of a work out of a limited number of long takes.

The sense of a literal, unmanipulated video image extends far beyond the operation of a surveillance camera. A whole range of factors contribute to this impact: the flexibility with which a light-weight video camera can be manoeuvred; the instant replay facility; the synchronous bounding of sound and image (with, on occasion, the impression created in the audience that any imperfections of the sound track are marks of how 'real' the image is); the ability of video cameras to operate at very low lighting levels (rendering unnecessary the skills of the film industry's highly paid directors of photography who not only lit a scene but sculpted it in exquisite relief); and the maintenance, thanks to the zoom lens and the limitations of editing, of real time and (to some extent) real space relations. It is worth noting that these technical factors are best described as contributing to a sense of non-manipulation, rather than as serving as features of a positive realist style: video is literal and actual, but it is not necessarily realistic and never real.

The fact that video can effectively reproduce the systems of signification, styles, and modes of address of its two predecessors, film and television, does give it a certain freedom. As far as the film system is concerned, the intricate pattern of the look developed in feature film drama is obviously relevant (Mulvey 1975; Willemen 1976). Video, too, has the opportunity to create dramatic space and involvement through a patterning of the various looks. Like film, it can deny the camera's role in 'looking' at the action and the spectator's look at the screen, concentrating instead on the looks exchanged between the characters on screen. The effect, as in film, is to privilege the characters, who emerge as the apparent creators of the dramatic action, independent entities who 'tell their own story', without the need of an external narrator (Browne 1975–6: 26–38). Discussing, in the previous chapter, the continuing role of music in film drama, I have already questioned the extent to which, even at the height of Hollywood, the system of looks alone can be said to actually *position* the spectator. The ambiguity of the Hollywood visual system is, I would argue, far greater than most film theory allows (otherwise there would be no need of music), and in any case this (potential) ambiguity is undoubtedly enhanced when the system of looks is taken over by video, which lacks the advantages of both the big screen and the theatrical presentation.

The diminished power of the look in video is matched by video's relation to the 'web of words' characteristic of television discourse. Of course any television programme can be recorded on video tape, and the transmitted output and the video recording are superficially identical. But as Jorge Luis Borges's masterly story, 'Pierre Menard, Author of Don Quixote', makes dazzlingly clear, two literary texts may be verbally identical and yet it is possible to construct an argument proving that the second is 'almost infinitely richer' (Borges 1962: 45–55). The same can be argued of the live programme and its video recording. If credence is given to the proposition advanced earlier that broadcasting does not consist of a series of discrete works but of an (ideally endless) succession of abstract time-slots, then to stop the flow by means of video recording and replay is to make a crucial intervention. On the one hand, since the continual flow is vital to any definition of television, our ability to stop the flow transforms our relationship to that institution: recording gives us a new power and autonomy. On the other hand, the programming which occupies the time-slot is itself transformed. This is most evident when the programming is live: there is no comparison between watching, say, a football match as it happens and viewing the same material in subsequent recorded transmission. It is also arguable that any programming which is recorded, and so wrenched from its position in the flow, undergoes a change comparable in extent to that undergone by a film made for cinema release when it is transmitted on television. Certainly the whole system of television direct address is totally transformed when it ceases to be live and is made part of a video production.

The disadvantages of video as a medium relying on small-screen presentation are of course identical with those of any work shot for broadcast transmission, whether on film or tape. Often broadcast institutional practice demands that two video cameras are used simultaneously (television outside-broadcast unit style), but if the output of each camera is recorded separately for subsequent editing, video retains much of the freedom traditional to film. Indeed the small-screen domestic viewing situation renders the recording substance (film or tape) virtually indistinguishable to the general viewer, unless the

colour balance is distorted by the kind of standards change needed to show US video recordings on the UK broadcast system. A confirmation of this is offered by *Boys from the Blackstuff*, one of the BBC's most successful drama series, which was shown on BBC2 late in 1982 and repeated almost immediately, in January and February 1983, on BBC1. Few if any of the millions of viewers of the five-part, basically video-shot series will have noticed that Episode five, *Josser's Story*, was actually shot on film. At this level of professional broadcast production, the decision to shoot four episodes on video tape and one on film was essentially a costing one: the BBC's particular ways of budgeting meant that four video episodes could be shot for the cost of three film ones. But the indistinguishability of video from film for the general public in the resulting work – which is a triumphant expression by director Philip Saville of Alan Bleasdale's vision – shows the enormous potential power of video as a production medium for broadcast transmission (Millington and Nelson 1986). Video cannot rival film in respect of the powerful impact unique to projected big-screen theatrical film presentation, but it can match it perfectly if the outlet is television broadcasting and the domestic receiver.

Video, like film, has an advantage over still photography in that its images unfold in time. Discussing the limitations of photographic knowledge of the world, Susan Sontag notes that

> photography implies that we know about the world if we accept it as the camera records it. But this is the opposite of understanding, which starts from *not* accepting the world as it looks.
> (Sontag 1978: 23)

Although video, like photography, deals with 'how the world looks', its images are moving, not still, hence they are essentially narrative images and this is a potential source of real understanding:

> In contrast to the amorous relation, which is based on how something looks, understanding is based on how it functions. Any functioning takes place in time, and must be explained in time. Only that which narrates can make us understand.
> (Sontag 1978: 23)

Video combines narrative images containing precisely this potential for understanding with a unique ease of handling. The result is a powerful instrument which is particularly useful in situations where the intended outcome is not a product but a process. Just as no definition of video can ignore the 'home-movie' dimension, so no aesthetics of video can omit totally those applications in which the nature and quality of the work produced is secondary. One such area is community video practice where, to quote a committed practitioner, the main concern is

> not to develop a finished product. Tapes do get made and [in] almost every session there is a product; but the intended audience is usually the group itself, and the emphasis is not on the product but on the whole process of making the tape. It is impossible to understand the product without reference to the process and the two are inseparable.
>
> (Shaw 1986)

Here we have a social variant of Berger's definition (see p. 187) of the private photograph or video which must be appreciated in a context continuous with that from which the camera has removed it. The role of video in community work, especially in work with the disadvantaged, is to act as a catalyst for co-operative interation, giving people the confidence to take control of their own lives and encouraging them to see themselves as having ideas worth expressing. Co-operation on a video production of this kind can give an awareness of both how fruitful communal action can be and how it functions in terms of roles and responsibilities. To some extent it demystifies technology and leads to a better understanding of the media, but its main purpose is not to offer a training which produces video-makers (few will in fact work on a tape again). Instead its clear aim is to create the awareness which allows people to conduct their lives better. Concerns such as these are evidently peripheral to the aesthetics of video production which is being sketched here. But this particular dimension of video application is important as perhaps the ultimate expression of video's immediacy: the power of simply shot and lit images when backed up with recognizable synchronous sound and made immediately

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available on replay to those engaged in recording them and appearing in front of the cameras.

Contrivance

Footage showing forceful (particularly violent) images – combat scenes, plane crashes, urban confrontations between police and protesters – can have a direct and powerful impact on us. Whether shot on video or film, by professional reporters or amateurs using 'home-movie' formats, such images are experienced as immediate and 'real'. But in general the electronic image, however accurate in detail, does not quite possess the almost magical power of the still photograph. Looking at a video image, one does not have the feeling that provokes Susan Sontag to write that

> a photograph is not just an image (as a painting is an image), an interpretation of the real; it is also a trace, something directly stencilled off the real, like a footprint or a death mask.
>
> (Sontag 1978: 154)

A video image is actual, not real, and we remain aware that it is a rendering of reality, even when it gives us undigested segments of real time sounds and images. In this respect, video recording resembles sound recording more than photography: however precise it may be, it carries with it an awareness of possible contrivance, of artifice. In the case of the video camera this attitude is surely totally justified, since video is a technology symptomatic of the public role given to images in a capitalist society: it records aspects of the surface of life, but it embellishes, prettifies, as it records. There has been a lengthy debate within film theory about the ideological role of the movie camera and of the western system of perspective (Comolli 1977, 1986), but there can be none about the video camera. It is openly, transparently, both an instrument for celebrating what *is*, rather than what could be achieved by social change, and, at the same time, a machine for making life seem more pleasurable than it is.

We have already seen that recorded sound which appears natural – whether in video, film, or television – is in fact a shaped and highly contrived phenomenon. The edited video

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image, similarly recorded on electro-magnetic tape, is best understood in the same terms, rather than through any analogies with photography. Just as the sound track is customarily constructed in a dubbing studio from a variety of sources – synchronously recorded speech, separately recorded effects and voice-overs, looped atmos tracks, and music produced in a quite different acoustic environment – so too the video image track when handled in the editing suite ideally accommodates material from virtually any camera source: stills, film in any format, studio-produced multi-camera television, video tape shot with a single portable camera, computer-generated imagery. All this material is synthesized and homogenized, and the result is a system in which mixed formats (such as 'drama–documentary', dramatized documentary, and documentary drama) are common, and essential differences become blurred. In addition, because at the point of consumption all this publicly produced material is reduced to the same basic domestic format, the distinction established by Berger between public and private imagery also becomes blurred. Part of the hysteria about video 'nasties' is explicable in terms of an external invasion of essentially private space: the fact that the family video recorder and television set make up a system ideally suited for showing pornography is particularly troubling for moralists.

The ability to rework and recontextualize given images is at the source of the political claims made for video in general and for one important strand of independent work in particular – what is usually known as 'scratch video'. This is the attempt to turn the tables on television and consciously to manipulate and distort images from a medium whose output is so often felt to be insidiously shaping our lives. In one sense scratch video can be seen as a subversive extension of the attitude behind such prime-time television compilation programmes as *It'll Be Alright on the Night*, in which a collection of production out-takes featuring various disasters (actors fluffing their lines, scenery falling over, props failing to work, passers-by intruding into the shot) is used to mock gently the pretensions of the media industries and their stars. The significant difference is that the best scratch video operates on the finished, transmitted product (whether film or television programme). The first act is one of piracy: breaking

the law of copyright by appropriating the example of media output for a new public purpose. The second is the inversion of the intended meaning by a variety of simple editing methods, such as transposing parts of a speech so as to upset its political message, or using repeat edits to ridicule the gestures of a political leader.

The status of scratch video is open to considerable debate. For an advocate like Andy Lipman,

> scratch takes the broadcast media as its paintbox, the video recorder as its palette, and the TV screen as its canvas. Producing counter-definitions of reality, if only to say 'it's not like this', has always been the political meaning of art.
>
> (Lipman 1985)

The actual political usefulness of such a 'guerilla' approach is questionable. Scratch methods can deflate pomposity and expose the political rhetoric of a media event, but this falls some way short of taking a positive stance or offering the basis for a genuine critical analysis. Often its methods produce a slick surface rather than a profound statement, and the eagerness with which scratch methods have been taken over by the makers of advertising and pop promo videos points to the essentially pleasurable innocuousness of its procedures.

Equally important to a definition of video contrivance are the ways in which video equipment and procedures are liable to distort the image at every stage from production to screening. The flexibility offered by computerized control systems is in theory designed to help the video-maker. In fact such systems often intrude between the video-maker and reality in far more significant ways than is customary in either still photography or the feature film. In so doing, they deny the video medium its claim to be a simple rendering of the real world or an uncomplicated 'mirror image' of it. At shooting, the automatic gain and light controls can give a distorted image, since they shape the signal according to a reading of the average light level for most of the screen, often distorting the relationship of foreground figure and background. Bright lights moving across the image can leave a blurred after-image, like the trail of a high-flying plane. Colour can be added to the video image or

subtracted from it at either recording or editing stages. And when the work is finally viewed, there are likely to be significant differences in aspect ratio, colour balance, and luminosity between the monitors attached to the editing suite and the ordinary domestic television receivers used outside.

These inherent distortion factors, which can of course be used selectively for artistic effect but which generally need to be combated by the video-maker, are usually given less consideration in discussions of video than the almost limitless extent to which video images can be effortlessly processed – by design – in a conventional video editing suite. Current comparatively low-cost equipment can wipe and fade, dissolve and superimpose, stop-frame and colourize, overlay or key-in images, split the screen into a variety of shapes, patterns and configurations, or transform the naturalistic image into a mosaic pattern. When video is linked to specialist computer devices the range of manipulation is almost infinitely expandable.

To take just two examples, the Fairlight CVI (Computer Video Instrument), designed specifically for pop promos, has a wide range of live digital video effects: overlay of processed image on direct image; inbuilt stencil (key or matte) and chroma-key; digital cascading of units, providing multiplane and more complex combinations of effects; trigger and control of visual parameters by music/audio source; real time pan, zoom, stretch of still images; mosaic/pixelation; extensive colourizing capability; strobe or freeze function; variable trailing; multiplane effects (three apparent planes using one unit); mirrors – horizontal, vertical, and overlapped; smooth pans and continuous glides; double exposure, and so on. In a similar way, the Quantel Paintbox, designed specifically for designers, can carry out a whole range of graphic design functions: it can instantaneously resize and crop pictures to specific dimensions or grid references; convert colours; create original artwork in a variety of textures (paint, chalk, airbrush, wash); offer a range of graphic aids including lines, rectangles, circles, elipses, in any brush size; provide a stencil facility for easy masking, painting, or airbrush work, hard or soft edged; assemble pictures using cut and paste facilities where images can be masked, cut, rotated and pasted in full detail, and so on.

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Obviously not all of these effects have been available to (or demanded by) independent video artists, but such effects as are employed are within the total control of the artist: video special effects are not separated off behind laboratory doors, as is the case with film. Moreover, since many video artists have a second identity as makers of pop promos, an awareness of the full range of technical potential for image manipulation is a factor in their approach to independent work. One of the problems of evaluating video art is the extent to which it is dominated by the technology available at a given moment. In broadcast television we are all familiar with the way the designers of the credit sequence for virtually every new or revamped television series will turn to a particular video facilities house so as to have access to some new video processing device costing hundreds of thousands of pounds (such as a Bosch FGS 4000) and so employ its novel way of hurtling letters and objects through an apparently three-dimensional space. Similarly independent video work of a particular year often shows clearly which new manipulative devices have just become cheaply available, with the result that an initial novelty soon becomes a stale convention in a way that owes more to fashion than to artistic development.

Video art and its technology

This brings us to one of the most complex of questions concerning video as a means of creative expression: the relationship between video art and its technology. The 'entanglement of early British video with late modernism' has been excellently explored by Stuart Marshall. He notes that by the late 1970s,

> modernism had reached its zenith in painting and sculpture. . . . Painting had achieved almost total reflexivity; it spoke only the conditions of its own material existence. Conceptual artists working within the commercial gallery system began to focus attention on the processes of art production rather than the art object itself.
>
> (Marshall 1985: 67)

This was bound to influence video-makers, who came from

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very similar educational and artistic backgrounds, as they sought a specific video art practice. Their efforts could also not fail to be shaped by the current commercial art scene, in which artists 'claimed a political significance for this work by arguing that it challenged both the art historical and gallery definition of the work as a cultural and marketable commodity', while at the same time the gallery owners 'adapted their marketing strategies to recuperate these works as saleable commodities' by offering 'documentation of performance, site-dependent and conceptual art in place of the work itself' (Marshall 1985: 67–8).

In their attempts to match the reflexivity of contemporary modernist (and post-modernist) painting, video innovators also had a valuable model – as we have seen – in the efforts of the film avant-gardists working in such contexts as the New York and London Film Makers Co-ops. It has been stressed that video is a flexible medium which can be endlessly processed and modified. But it cannot be manipulated in the literal sense – that is, handled or treated by manual means – and the consequences of this become clear when we consider it in relation to the three areas of avant-garde activity set out above (pp. 148–9). If we look first at equivalents to the manipulation of celluloid and emulsion, we see immediately that all interventions on the tape have to be made electronically and that any transformations must be carried out during playback. Since video editing is not fully computerized and there is no random access to material, video-makers can only work sequentially with material available to them in a purely linear fashion. Therefore they need to bring outside ideas to a medium which, until set in motion at playback, is inert as well as inaccessible and has none of the concrete materiality with which the image track confronts the film-maker (or the block of stone confronts the sculptor). This makes video creativity a conceptual activity, but work with images has none of the tradition of abstract analysis to be found in music. Since connections between music and mathematics have traditionally been close, composers have often found it easier than image-makers to adapt to the abstract conceptual thinking required by an electronic system.

A discrepancy of a somewhat different kind is to be found when we consider video equivalents to the Co-op movement

members' development and printing of their own images. For the film-makers this was perhaps the key stage in their work, a very distinctive second opportunity to exercise control over the materiality of film. Peter Gidal captures very well the sensation of 'having access into and thereby through and thereby onto the possible processes of representation':

> You sit there with a machine and you are process, no more or less than the machine, because the handling is necessary yet does not cause an effect – quite a different matter from painting, for example. . . . When you loop a strip of master film material (threading) onto a printer and attempt to pull it through in order to 'see' how the reproduction will appear if the original is *not* led through automatically on the sprocket-wheel, you are attempting to set up a difference between image and its reproduction.
>
> (Gidal 1980: 152–3)

The sense of liberation felt by film-makers at this moment has, of course, to be measured against the technological history of the film medium: the fact that for fifty years or more such operations had always been carried on behind closed laboratory doors. The situation of video-makers could hardly be more different. While physical intervention is denied them, there is every opportunity to change and process the images and no inaccessible laboratory to confront. Their problem is rather to find reasons (aesthetic, social, political) for the use of any or all of the types of image transformation which are at hand and virtually effortless to achieve.

The third avant-garde concern – with performance space – looks at first sight more promising, since video can cope well with multiscreen projection and a variety of performance situations. But exploration of duration is difficult, since video lacks film's hypnotic power, and any video performance is in a very real sense peripheral, since it is impossible for the video-maker to intervene between the video recorder and monitor. Once more the video-maker is forced to interact from the outside. This comparison of divergent avant-garde possibilities indicates clearly the limitations of the video-maker's powers of

intervention on the (elusive) materiality of video. In so far as video can be expected to develop an independent practice this is likely to focus less on the specificity of video – a medium whose materiality 'consists of a complex pattern of invisible electro-magnetic charges on a reel of magnetic tape' (Marshall 1985: 69) – than on aspects of representation: image, sound, and perform-ance intermixed.

One area of likely development is the growing connection of video and popular music, although at present this is a somewhat murky area, using mixed media and combining inputs from advertising, avant-garde practice, and fashion within a blatantly commercial context. In a fascinating study of the 'conditions of music', Alan Durant sees video as working as an important catalyst in the changing audio-visual style of rock music on three separate levels. The first is the emergence of new music video genres 'stylistically based in gestures of performance at present recorded in rock documentary and musical, but gradually projected into more elaborate mime and scenario'. These are likely to lead to a marginalization of records and performance and a shift from the aural emphasis of early rock 'towards a new dominance of the visual, elsewhere promoted by the increasing cultural centrality of television'. But this new emphasis will in turn lead to the new techniques of relating and juxtaposing sounds and images becoming part of the general vocabulary and style of film, advertising, and television itself (Durant 1984: 232–3).

If the pop video is one pointer to the future another is the development of increasingly complex mixed forms of drama and documentary in television. Video with its unique range from actuality to contrivance has a clear role to play here. But it also has the potential to create quite new forms of dramatic and narrative organization. To take a tiny example, it has been argued above that video's narrative image, unfolding in real time, is one source of its power, its actuality. But equally importantly the flow of time can be arrested: video can deal with still images and freeze-frames. Also, since the tape containing the original camera material is not 'used up' in making the master copy (as a film's negative is used up when it is physically cut and cemented to provide the source of the master print), an

image, a gesture, a movement can be repeated in absolutely identical form.

These aspects of control of time – combined with its analytic potential – are currently limited largely to sporting events (to repeat goals, stumpings, and knock-outs) but they could serve as the basis for one aspect of video's untried narrative potential. The question immediately arises as to why this is not currently being realized, why in the late-1980s we still have to deal with essentially marginal forms when we consider the aesthetics of video. We need to explore why a medium which fits television's requirements so well and is now so firmly established as a domestic entertainment facility has still to find its individual position in the mainstream of commercial audio-visual production.

The future of video

I have remarked elsewhere on the fact that in writing any history of cinema the very vocabulary of development and progress is all-pervading, giving

> the almost inevitable creation of a fake but persuasive pattern based on some unarticulated biological model: the infant cinema . . . its first tentative steps . . . growth to maturity . . . decline in face of television.
>
> (Armes 1985: 1)

Equally all-pervading is the urge to end any study of media developments with a look into the future. I find myself drawn in this direction with the present consideration of video aesthetics, fortified (in my own eyes at least) by the need to justify the tentativeness of the preceding observations and by the view – to which I have continually returned – that video needs to be seen not in a void but in the whole spectrum of audio-visual media and, at the same time, must be defined not in terms of its past achievements but its actual potentialities.

Jeanne Thomas Allen has noted that the history of the invention of cinema needs to be seen in relation to wider aspects of nineteenth-century industrialization: the institutionalization of invention (for which the Edison laboratories at Menlo Park, New Jersey, were the prototype); the principle of standardization

(originating in the armaments industry and leading to the establishment of a machine-tool industry independent of any particular manufacturing interest); and the role of patents (dominant in a divisive way in the nineteenth-century media, but pooled by giant corporations to allow the growth of broadcasting and given free to the world by Philips in its drive to establish the audio cassette). Ignoring parallel developments in *sound* reproduction and replication, Allen observes that:

> mechanical production of visual images accomplished in the sphere of mass culture what was also occurring elsewhere in the economy. Photography, mechanical reproduction and industrial standardisation are related through the realisation of a mass market for less expensive and seemingly infinitely replicable products.
>
> (J. T. Allen 1980: 30)

Certainly one key to a (non-biological) understanding of media history is to pick out those pointers which allow the usually concealed substratum to be glimpsed. Two particularly revealing examples can be cited here. Firstly, Ben Brewster's observation that Etienne Marey's 'photographic gun' used the principles of the Gattling gun to obtain the succession of pictures needed for the study of animal locomotion (symbolically anticipating the links between communications developments and the US military-industrial complex) (cit. J. T. Allen 1980: 31–2). Secondly, Brian Winston's apt if surprising chapter title, 'Bing Crosby invents video tape, 11th November 1951', which underlines the extent to which media developments are driven by the needs of entertainment – the electronics division of the singer's company, Bing Crosby Enterprises, which had pioneered sound tape in the 1940s, commissioned from Ampex the prototype video recorder demonstrated publicly in 1951 (Winston 1986: 83). On a more personal note, Winston, who is unequivocal in his estimate of video cassette recorders as '*the* crucial device to expand entertainment television', which will have 'the most significant effect on all current and proposed systems for the mass distribution of audio-visual signals, including cable' (1986: 2), describes his own undisrupted career in a high-tech industry at the cutting edge of technological development:

> Twenty-three years ago when I joined the broadcasting industry, video tape was already nearly a decade old, yet here I am in the mid-1980s still happily working with film and teaching others to do the same.
>
> (1986: ix)

Just as the key factor to consider in attempting to understand the invention of cinema – as was pointed out at the beginning of the 1970s in a series of articles (Comolli 1977: 132) – is the *delay* (since the principles had long been known and the practicalities were easy to solve), so too the key question with regard to the future of video is to account for its continuing marginalization as a *production* medium. This situation is all the more surprising in view of the centrality of video to such processes as bringing together sound and image industries (the pop video), recycling existing material for resale (video versions of old films), and recording media events (so as to turn them into marketable commodities). Clues are to be found in Winston's work which is without doubt the most rigorously worked-out investigation into the technological development of the communication and information media.

He points out that invention is not the starting-point, but involves both prior scientific competence – leading to 'ideation' (the formulation of the technological idea) and the creation of prototypes – and an external 'supervening necessity' (particularly one which will make the invention seem commercially worthwhile). Winston also includes between invention and what he calls 'technological performance' (production, spin-offs, redundancies) a fourth factor which he terms the 'law' of the suppression of radical potential:

> Constraints operate firstly to preserve essential formations such as business entities and other institutions and secondly to slow down the rate of diffusion so that the social fabric can absorb the new machine. . . . Whatever the general perception, there has been no speed-up in the measurable rate of change. If anything, there has been a significant diminution in the cut-throat nature of the market place because the desire for stable trading circumstances, coupled with external restrictions and

monopolistic tendencies, works to contain the crudest manifestations of the profit motive.

<div align="right">(Winston 1986: 24)</div>

This model, although it offers a complex look at the nature of invention and development, takes us only as far as the emergence of the eventual product into the social sphere. There, as we have seen, the media undergo further transformations in their specific application and every subsequent technological change is also a site for a clash between the supervening necessity of transformation and the forces of the status quo harnessed under the banner of the suppression of radical change. The outcome is often stalemate, particularly as change throws up contradictions. To take the example of domestic video, the needs of the consumer in terms of an ideal system are coherent but wide-ranging: a spread of functions including the replay and duplication of purchased or hired material, the transfer of material available in other formats, off-air recording, and domestic production. These are comparatively easy to supply in a single machine from the point of view of equipment manufacture, and in their turn they create a profitable market for the sale of blank tapes. But for producers of broadcast or pre-recorded material the facility which allows personal recording (and hence duplication) raises all kinds of problems of ownership, copyright, and piracy (thereby threatening profitability).

Despite this fundamental clash the domestic video market has been exploited with exemplary thoroughness and offers a striking example of ways in which certain technological developments can overcome Winston's 'law'. In this case the contradiction is resolvable because the suppliers of blank and pre-recorded tapes are the same companies, and if they choose to make tapes available to the pirates they can still make profits and only their recording artists will suffer financially. However, the barriers to universal video production are more intractable and derive mainly from problems of standardization. There is at present a lack of compatibility between the UK 625-line system and the US 525-line format, and between the three colour systems (United States NTSC, British PAL, and French SECAM). At the crucial juncture when the systems emerged, there was no

single multinational force in video with the power (in terms of resources for equipment and materials manufacture, advertising, and world-wide distribution) to take on the role adopted with regard to film by Eastman Kodak, which first established the 35 mm format internationally for all feature film production at the turn of the century and then, in 1923, imposed 16 mm as the definitive gauge for all non-professional production (J. T. Allen 1980: 31).

The lack of standardization of video means that film remains, in the late 1980s, the more convenient medium for international production and marketing. To overcome its shortcomings video would ideally need to adopt, world-wide, a single standard, perhaps the 1,000-line high-definition system with stereo hi-fi sound for which prototypes already exist (Winston 1985: 259). But what is lacking is Winston's supervening social necessity, and again film offers an example of what is required. Although the 16 mm format was universally established in the 1920s, it was not until the 1960s that adequate, flexible synch-sound systems were introduced. The external necessity here was clearly the demand for location filming by television broadcast institutions. The 16 mm image was, in technical terms, perfectly adequate for their needs, and they could afford to buy the new system since they had no extensive existing investment in 35 mm film equipment. As a by-product of their decision the new system also became available to documentary and avant-garde film-makers, transforming the definition and scope of independent cinema.

From the point of view of video, however, the timing of this decision was disastrous. Had video been available then in its current form, it would in all probability have taken the place usurped by film. In fact the 1960s development of 16 mm film pre-empted the development of video which ought logically to have occurred in the 1970s. As it is, while there is no doubt that all broadcast production will *eventually* be made on video, there is certainly no immediate financial incentive for broadcast companies to undertake a revolutionary transformation. The cost differences between video and 16 mm are not sufficient to justify the upheaval involved in discarding film (and hence disrupting existing work practices and union agreements,

writing off expensive capital equipment, retraining staff or making them redundant, and so on). A more likely pattern for the adoption of video is an initial impetus in reporting (where coverage of special events like a general election increasingly demands a vast array of simple filming units), followed by a gradual introduction of video – in face of institutional and union opposition – into drama and documentary. It is only when this has occurred – and experience shows that such transitions take far longer than can be reasonably imagined – that video technology will begin to create its own independent and fully distinctive aesthetic and the full potential of the medium will become apparent in mainstream production.

Further reading

Much of the technical data here is taken from Curtis (1985). Winston (1986) is by far the most thorough chronicler of the invention and introduction of communication and information technology. Bolter (1986) is excellent on the computer and its relationship to our society. The views of McLuhan (1967) are contested by Miller (1971) and Winston (1985). Key articles on recent developments in film theory, including Mulvey (1975), Browne (1975–6), Willemen (1976), Bellour (1974–5), Doane (1980a), and Comolli (1986) are contained in the anthology by Rosen (1986). Original articles by Wollen, J. T. Allen, Doane, and Gidal feature in Lauretis and Heath (1980). For earlier material see Nichols (1976). Millington and Nelson (1986) is an excellent account of the production of a television series shot on video. There is comparatively little material of value on video itself, but see Marshall (1979, 1985) and Lipman (1985). For music videos see especially Durant (1984) and Laing (1985).

CONCLUSION
Video in
the computer age

Computer thought is wholly a matter of convention, of formal rules acting upon contentless symbols. Whether numbers or letters are represented as bit strings in the machine, the representation is one of pure denotation. . . . Bits within a computer are logical symbols that mean nothing more than they are deemed to mean in the context of a particular program.

(J. David Bolter 1986: 76)

This study began with a plea for a new perspective on the study of video. Its three main sections have looked at video in its historical and social contexts and as a medium in its own right. It remains now to consider the potential role of video in the computer age which we are now entering. First the transistor and then the microchip transformed the sound and image media during the period since the Second World War. Transistor radios, electronically equipped still cameras, solid-state video recorders, and so on have been developed and become part of our lives. The link between these new forms of media and computer technology is evidently close. But do the twentieth-century media – and particularly video – have something distinctive to offer in return?

In what is, to date, our most informative and illuminating study of the cultural role of the computer, J. David Bolter chooses it as the 'defining technology' of our age (1986: 8–12), drawing comparisons with the potter's wheel in the ancient