

THE NEW MEDIA BOOK

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CD and DVD

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Just as water, gas, and electricity are brought into our houses from far off to satisfy our needs in response to a minimal effort, so we shall be supplied with visual and auditory images, which will appear and disappear at the simple movement of the hand, hardly more than a sign, ... I don't know if a philosopher has ever dreamed of a company engaged in the home delivery of Sensory Reality.¹

Paul Valéry's 1928 forecast provides a stunning augury of contemporary telecommunications: images and sounds have become a utility; each household has a supply that enters the home via broadcast signals, cable wires, satellite reception, DSL lines, telephone modem hook-ups, delivering 'Sensory Reality' at 'the simple movement of the hand'. As the twentieth century ended, new systems of circulation and transmission began to replace the cinema's projection screen and to link the screens of the computer and television with the dialogic interactivity of the telephone. In this new media environment, the media of telephone, radio, television, films and the Internet interact among themselves and their cross-purposed interaction poses new questions about their technological specificities. 'Convergence', once merely a discursive buzzword, has become, by 2002, a literal description of the co-dependency of the movie screen, television screen and computer screen. Now, a variety of screens – long and wide and square, large and small, composed of grains, composed of pixels – competes for our attention without any convincing arguments about hegemony. Screens have become a pervasive part of daily experience: laptops, personal digital assistants (PDAs), GameBoys, cell phones add mobility to the screen's face. Desktop computers, CRT, LCD, and PDP television and computer display screens,² multiplex cinema screens, IMAX screens, Jumbotrons, expand the size and function of the fixed and mobile screen. As screens multiply in a proliferation of 'display technologies', an equally daunting number of 'delivery platforms' compete to supply images and sounds: videotapes, CDs, CD-ROMs, DVDs, MP3, 'streaming' audio and video on the Web.

The changes in screens and our 'interfaces' with them have occurred at the speed of fast-forward. In an essay written only a few years ago (1997), 'The End of Cinema: Multimedia and Technological Change', I explored the ways in which the then new

technologies challenged the discrete object of the 'film', placing 'the cinema' in an expanded field of screens, served by an expanded variety of production and delivery formats.³ In that essay, I argued that a 'convergence' of film and television technology began without fibre-optic cable, occurred before the digitalisation of imagery and preceded the advent of the home computer. The VCR, I argued, was the first technology to begin to erode the historical differences between television and film, altering as it did the terms of electronic and cinematic viewing. In addition, the technologies which transformed the media environment of the 1980s – the VCR, cable television and the television remote – not only changed our concept of film-going and television-viewing, but also prepared us for another 'convergence': the television and computer screen.

But now, by 2002, the material differences between cinematic, televisual and computer media have been eroded beyond recognition by the digital technologies that have transformed them. Televisions have become more like computers: hard-disk video recorders (TiVo, ReplayTV) record television signals onto an auxiliary hard-drive;⁴ HDTV-ready televisions use chips running mega-MiPs. Conversely, computers have become more like televisions: MPEG and QuickTime 'movies' and 'streaming' videos flash across and through Web browser pages. Multimedia home stations which combine the functions of telephone, television and gaming console (Microsoft's Xbox, Nintendo's Game Cube, Sony's PlayStation 2) further confound the technical differentiation of film, television and the computer.

The segregation of histories of telephony, moving image and computing technologies now appears – in post-familialist retrospect – as a set of arbitrary separations that disregard the inter-medial complexity of technological development.⁵ To write a 'history' of these new media formations is to encounter many familiar historiographical challenges. As Stephen Heath warned, in an earlier historical moment (1978) when the 'cinematic apparatus' seemed a dominant technological form:

Technological determinism substitutes for the social, the economic, the ideological, proposes the random autonomy of invention and development, coupled often with the vision of a fulfilment of an abstract human essence – and some of the wildest versions of this latter are to be found in accounts of the (then aptly named) 'media'. ... [Cinema's] history is a history of the technological and social together, a history in which the determinations are not simple but multiple, interacting, in which the ideological is there from the start.⁶

While careful not to overstate the determinations of technological development, Heath and other 'apparatus' theorists attempted to provide a rigorous account of the technological and social specificities of the cinema as a single medium.

In this way, we may wish to regard Marshall McLuhan as the first 'apparatus' theorist. Back in 1964, when McLuhan proclaimed 'the medium is the message', his sound-bite aphorism drew attention not only to the mediation that the media implied, but also to the specificity of each separate medium. He inveighed against a content-based study of the

media: "The 'content' of any medium," McLuhan wrote, "blinds us to the characteristics of the medium."¹⁷ Instead, he prescribed an analysis of the effects – "the change of scale or pace or pattern" – that each particular medium might produce. While McLuhan analysed the interrelatedness of media in an evolutionary scheme ("The content of any medium is always another medium"),¹⁸ he also insisted that each new medium would "institute new ratios, not only among our private senses, but among themselves, when they interact among themselves."¹⁹ How then do we account for the 'new ratios' produced by the rapid and recent changes in the screens and interfaces of moving image media?

Another McLuhan-styled media-prognosticator, Nicholas Negroponte, has suggested a counter-political aphorism, turning McLuhan's 'the medium is the message' on its head. "The medium is not the message in the digital world," declares Negroponte. "It is an embodiment of it. A message might have several embodiments automatically derivable from the same data."²⁰ For Negroponte, digital technologies have dissolved the specificity of individual media: digital imaging, delivery and display effectively erase the messages implicit in the source medium. Negroponte imagines a media world of digital images making their way to digital display endpoints, with little or no difference in content, only a subtle 're-purposing' for display. Negroponte proclaims: "The basic difference between today's TVs and PCs has nothing to do with location, social habits, or our need to relax. It has to do with how the bits arrive."²¹ If we follow Negroponte's axiom ('the medium is not the message in the digital world'), we arrive at a newfound determinism: digital technology inherently implies a convergence of all media forms.

German media theorist Friedrich Kittler anticipated this loss of media specificity when he wrote (in 1986): "The general digitalization of information and channels erases the difference between individual media."²² Yet Kittler predicted that the installation of fibre-optic cable, and not the phone-wires of the Internet or the wireless future of the Web, would be the technology to turn film, television, music and phone calls into a single medium.

But have we arrived at a convergent 'single medium'? Have the screens of cinema, television and computer really lost their apparatusal distinctions? One sales Web site for flat-screen monitors effectively conflates the multiple functions of the screen – television, film display, Internet browser – now displayed within the same electronic picture frame:

Hanging on a wall they look more like art rather than a TV set. When you're not watching TV, DVD videos, surfing the net or reading your e-mail, there is no need to switch the plasma panel off. It can be used as an electronic picture frame, with a continuously changing selection of artworks of your choice. An endless art collection!²³

Another advertisement declares: "He loves 19th century works. I prefer 20th. We agreed on a piece from the next century" (see plate 02). As the changing technologies of 'delivery' alter the effect of moving images in 'display', the histories here are all recent, in the cusp of the millennial turn. Whatever form a 'piece from the next century' will take, we still need to ask questions about the altered effects of screens that are mobile and fixed, that bring images and sounds

in varied sizes and shapes, that permeate our public and private spaces, sit on our desktops, in our living rooms, on our laps, or are handheld, accompany us on airplanes, in automobiles, to desert islands. Are we inching towards the 'homé delivery' of 'Sensory Reality'?

DELIVERY AND DISPLAY: THE NEXT NEW THING

We need a book about the failures of media, the collapses of media, the supercessions of media, the strangulations of media, a book detailing all the freakish and hideous media mistakes that we should know enough now not to repeat, a book about media that have died on the barbed wire of technological advance, media that didn't make it, martyred media, *dead media*. *THE HANDBOOK OF DEAD MEDIA*. A naturalist's field guide for the communications paleontologist.²⁴

In 1997, just as the VCR had nearly completed its 'penetration' of television households, the digital-video-disc (DVD) player was released into the consumer market. In 1997, there were 86 million VCRs in the US (89 per cent of households) and about 400 million world-wide (42 per cent of television-owning households). The first DVD players were released in Japan in November 1996 and introduced to the US market in March 1997. Players slowly trickled into other regions. By the end of 2000, there were 12 million DVD homes, 2.8 million of which have both DVD player and DVD-ROM computer.²⁵ Clearly, manufacturers hoped that the DVD player would replace the VCR and that just as audio CDs supplanted vinyl records in the 1980s, this new digital format would condemn the videocassette to the 'barbed wire of technological advance' and the martyred heap of dead media. The following account forms a chapter in such communications paleontology. 'New' media implies that the 'old' is forever obsolete. As Gramsci put it, 'the old is dying and the new cannot be born; in the interregnum a great variety of morbid symptoms appear'.²⁶

LASER DISCS,²⁷ CDs, LDs, CD-ROMs, CD-RW, DVDs, DVD-ROMs, DVD-RW

Audio compact discs (CDs) entered the consumer market in 1982. Relying on optical laser technology – a laser beam focuses on small spot of a non-magnetic disc to read digital information encoded in sub-micron 'pits' – the CD was thought to retain audio quality without degradation. As an initial CD promotional slogan, Philips proclaimed: 'perfect sound forever'. Despite early assurances to the contrary, sound quality is not forever: digital media can degrade. CDs can lose data as the foil substrate beneath the clear plastic coating oxidises when this happens, the disc becomes dull and unreadable by the CD player or drive. (Nor are CDs free from distortion: they have merely introduced new kinds of distortion, for example, digital 'jitter', time-based and phase anomalies.) Some experts estimate that the shelf life of the average retail music CD is no more than seven to ten years, after which some of the data on the disc will be lost. A 50-year-old vinyl disc may well be more playable than a 50-year-old CD.²⁸

But CD users were drawn to the playback features made possible by optical laser technology: one could easily skip tracks and control the sequence of audio tracks with the touch of a remote. As the CD began to replace its analogue predecessors, consumers replaced their existing album collections with a 'new' digital version of what they already owned on vinyl or tape.¹⁸

Like their audio relatives (CDs), video laser-discs (LDs) allowed the user to access specific portions of the disc (in this case, a scene of a film) in a nonlinear fashion. This was a considerable advantage over the playback of a videocassette, which required rewinding at the end of each tape and fast-forwarding to locate a sequence. The 12-inch platter LD was available in two different formats: CAV (which allowed for freeze-frame and slow-motion on playback) and CLV (which allowed for scan, pause and search on playback). LDs were packaged with materials not available on videotape releases: original cinema trailers, deleted footage, alternative soundtracks, voiceovers by film-makers and scholars, displays of script pages and other production materials.¹⁹ While a CLV laser-disc held one hour per side, a CAV disc only held half an hour. This meant that the user could not view an entire film without getting up to change discs. Despite some of the advantages of laser technology over magnetic tape, the video laser-disc and the dedicated laser-disc player, readily available throughout the 1980s, never took hold of the consumer market.²⁰ Pioneer Entertainment, the long-time champion of the laser-disc, finally abandoned it in June of 1999.

But the video laser-disc found a new format in the CD-ROM (compact disc with read-only memory). The CD-ROM did not require a dedicated player; it was readable in computers equipped with CD-ROM drives. Because they had the same size and format as audio CDs, CD-ROM drives were 'backward compatible' with CDs. The storage capacity of the CD-ROM (600MB) was large enough to hold video materials, but not large enough to hold an entire film on one disc. Hence, the CD-ROM replicated the same problem that may have doomed the laser-disc: the viewer could easily navigate the disc, but still had to 'change the record' mid-film. Yet, like other optical disc formats (CDs and CD-ROMs), laser-discs were marketed as 'read-only' for playback and did not offer recordable or re-writable features. But the important step here in a narrative film screen/computer screen convergence, was that the CD-ROM brought the display of films to the computer screen.

ENTER DVD

The DVD (digital versatile disc or digital video disc) expanded the storage capacity of the CD-ROM. With the help of MPEG compression technology, one DVD disc could hold hours of high-quality audiovisual content. This meant that an entire film could fit on one side of a DVD.²¹ The DVD had many of the same basic features as the CLV laser-disc and the CAV laser-disc, and some DVDs offer branching, multiple camera angles and parental control features. As with the larger LD formats, the user could access a different section of the disc in a near instant, with no fast-forwarding or rewinding required.

Because DVDs adhere to the same physical dimensions as CDs and CD-ROMs, the DVD player, whether stand-alone or in a computer, is 'backward compatible', which may

give it an edge in a consumer market wary of buying into the wrong format.²² Yet, as the forking paths of product evolution would have it, the DVDs 'backward compatibility' for CDs and CD-ROMs does not extend to the videocassette or laser-disc, which seem destined for extinction.

The stand-alone DVD player was introduced to the consumer market as a successor to the VCR, a smaller more efficient laser-disc player to play back pre-recorded films. In this regard, its playback features were developed well before its recording capacities, the reverse of VCR development. When the VCR was first introduced as a consumer appliance in the early 1960s, it was marketed as a means for recording broadcast and cable television. Hence it was deemed a video cassette recorder (VCR), not a VCP (video cassette player). The sale and rental of pre-recorded films and the playback of home videos was a secondary development as film studios realised that the videocassette not only extended the shelf life and play time of the theatrically released film, but also provided a venue to re-market film titles that were already in their libraries.

In the four years since its introduction to the consumer market in 1997, some form of DVD technology, such as a stand-alone DVD player, DVD-enabled game console, PC-based DVD-ROM drive, can be found in one-third of American households.²³ In Europe, the statistics show an equivalent growth curve: in 2000, the 'DVD video player base' in Western Europe grew nearly four-fold to 5.4 million homes, while the number of VCR households increased by a further 4 per cent to 124 million.²⁴ The growth curve of DVD ownership has occurred more rapidly than the growth rate of VCR households in the 1980s, a rate which already occurred at an acceleration of the rate of television households in the 1950s. (I am not certain how to read this statistic, although it seems to suggest that the consumer appliance market has grown quicker to declare successors and dispose of dead media.)²⁵

So where are we in a narrative of convergence of film, television and computer screens? As a delivery format, the DVD seems to be the golden disc that effectively transects the computer/television divide. The DVD can be played either on a dedicated DVD player or on a computer (many new PCs have DVD drives) and viewed on a television monitor - CRT, projection or plasma. In addition, as other appliances develop, the DVD may be playable on game consoles, Internet appliances, set-top boxes, car entertainment systems and portable players. New-generation gaming consoles such as Xbox, PlayStation 2 and Game Cube offer features that include DVD players, output jacks for HDTV, broadband connections and hard drives for storing music and games.

Here there may be a wrinkle in the story. As the DVD was originally conceived as a playback device, it is only recently that manufacturers have begun to develop its recording functions. The warring formats, recordable (DVD-R) and rewritable (DVD-RAM, DVD-RW or DVD+RW), and resultant market confusion about recordable DVD may replay the VHS versus Beta 'format wars' of the 1980s. Perhaps if manufacturers had begun by exploiting and thinking about the possible computer interfaces of the DVD, these format wars would not take a toll on a technology that may be rendered obsolete as the streaming of images

and sound goes online and as PVRs (personal video recorders such as TiVo and Replay TV) negotiate the set-top box acquisition of satellite and cable materials.

STREAMING: WIRED AND WIRELESS DELIVERY

What is the future of the DVD in a wired or wireless world? Once movies and video images are available to home screens via satellite or Web streaming, the delivery format of DVD joins the endangered species list. Wireless delivery via satellite to a home receiver confirms the format necessity of the DVD as a means of delivering moving images and sounds. The future of wired delivery relies on diastolic changes in bandwidth and compression; as the bandwidth of the digital pipe expands, images and sounds will stream through it slimmed down by ever-more efficient compression algorithms. The average user with a dial-up connection accesses the Internet at 56 Kbps, while 128 Kbps are necessary for fluid streaming media connections. At the time of writing, broadband access via cable, DSL (digital subscriber line) or fibre-optic cable is still limited by coverage area and price. Online game play requires high-bandwidth connections; movie files are still too large to be sent across the Internet.

If audio-streaming formats in any way portend the fate of video streaming, the case of Napster and its file-sharing protocols demonstrates how copyright and licensing become pivotal issues once a consumer-durable – a disc – is no longer the means for registering proprietary use or sale. Audio MP3 files are small and they can easily be transferred across the Internet.²⁷ While MP3 technology could endanger the market hegemony of the pre-recorded CD in the same way that the CD threatened the vinyl record in the early 1980s, this may not be the case. Currently, MP3 users are legally allowed to stream (that is, listen to songs online, but not download them to their hard drives). The survival of the MP3 format, still tangled in the courts, hangs in the balance.

BOX-TOPS AND THE CONSOLE-ATION PRIZE

In the ultimate living room, TVs and music don't stand alone; they interact with each other, with the Internet, with the PC in the home office or the electronic game equipment in the family room.²⁸

Auricles of convergence always suggest a teleology: some media are seen as transitional and others seem destined to evolve into the next species. A media paleontologist could examine the fossil remains: the VCR may have begun to erode the differences between television and cinematic viewing; the DVD may have served as the delivery format that serves the displays of computers and televisions alike. New-generation gaming consoles such as Xbox, PlayStation 2 and Game Cube offer features that include DVD players, output jacks for HDTV, broadband connections and hard drives for storing music and games. While this iteration of game console seems somehow poised to further bridge the gap between the digital world of the PC and the analogue world of television, one cannot predict what

delivery or display format will survive the vicissitudes of the consumer market. And yet amid these morbid symptoms, the 'home delivery' of a digitised 'Sensory Reality' seems somehow assured.

Notes

1. Paul Valéry, 'La Conquête de l'ubiquité', first published in *De la Musique avant toute chose* (Paris: Editions du Tambourin, 1928); 'The Conquest of Ubiquity', *Aesthetics*, trans. Ralph Manheim (New York: Pantheon Books, 1964).
2. PDP (plasma display panel) or 'flat-panel display' screens – which sandwich a neon/xenon gas mixture between two sealed glass plates and produce a crisp digital image – are about one-tenth the thickness and one-sixth the weight of CRT (cathode-ray tube) monitors.
3. See Anne Friedberg, 'The End of Cinema: Multimedia and Technological Change', in Christine Gledhill and Linda Williams (eds), *Rethinking Film Studies* (London: Arnold, 2000), pp. 438–52.
4. Alternatively called personal video recorders (PVRs), digital video recorders (DVRs) or hard-disk-drive (HDD) video recorders, these devices record television programmes onto a hard disk drive for playback.
5. For other recent accounts of an integrated history of media, see Siegfried Zielinski, *Audiovisions: Cinema and Television as Enfractures in History* (Amsterdam: Amsterdam University Press, 1999); Jay David Bolter and Richard Gushin, *Remediation: Understanding New Media* (Cambridge, MA: MIT Press, 1999).
6. Stephen Heath, 'The Cinematic Apparatus: Technology as Historical and Cultural Form', in *Questions of Cinema* (London: Macmillan, 1981), pp. 221–35.
7. Marshall McLuhan, *Understanding Media* (Cambridge, MA: MIT Press, 1994), p. 9.
8. *Ibid.*, p. 8.
9. *Ibid.*, p. 53.
10. Nicholas Negroponte, *Being Digital* (New York: Alfred Knopf, 1995), p. 71.
11. Nicholas Negroponte, 'Bit by Bit: PCs are Becoming TVs. Or is it the Other Way Around?', *Wired.com*, 1 August 1995.
12. Friedrich Kittler, *Grammophon, Film, Typewriter* (Berlin: Birkmann & Bose, 1986); 'Grammophon, Film, Typewriter', October, no. 41 (1986), pp. 101–18.
13. See <www.digitaldefinitions.co.uk>.
14. Bruce Sterling, *The DEAD MEDIA Project: A Modest Proposal and a Public Appeal*, 1995, <www.deadmedia.org/modest-proposal.html>.
15. Statistics and their sources vary: these statistics are from London-based *Screen Digest*, July 1997, 'Digital America 2001', Report by Consumer Electronics <www.ce.org> and CENTRIS Research and Information Service.
16. Antonio Gramsci, *Selections from the Prison Notebooks*, Quintin Hoare and Geoffrey Nowell Smith (eds and trans.) (London: Lawrence and Wishart, 1971), pp. 275–6.
17. The term 'disc' – as in compact disc, laser-disc, video disc – refers to a 'read-only, optical-storage medium that is generally round and made of nonmagnetic metal, coated in plastic, and covered with small pits designed to be read from and written to by laser'. The term 'disk', on the other hand,

- refers to 'small, flat, portable piece of plastic (a floppy disk) or a less-portable metal-encased storage disk (a hard disk) coated with a magnetic material'. Constance Hale (ed.) *WIRED STYLE: Principles of English Usage in the Digital Age* (San Francisco: Hard Wired Books, 1996), pp. 44-6.
18. Leah A. Levroux, 'New Media: Nonobvious Things About New Media: "Dead Media" and the Loss of Electronic Cultural Heritage', *JCA Newsletter*, vol. 28 no. 1, January 2000.
19. In the early 1980s, the pre-recorded audiocassette also vied with the vinyl LP as a delivery system for home audio. In 1983, sales of vinyl LPs were surpassed by the audio music cassette. Only ten years later, in 1992, CD sales surpassed audiocassettes.
20. Voyager's 'Criterion Collection' featured CLV laser-discs with letterboxed formats and ample amounts of additional material. In 1993, Criterion launched a series of CD-ROMs. In 1998, the Criterion Collection was launched on DVD.
21. Only 1 per cent of American households own them: 1.33 million units were sold between 1985 and 1993. When the DVD came out in 1997, there were about 3 million laser-disc players in the US.
22. MPEG (moving picture experts group) set standards for coding audiovisual information (films, music and video) in a digitally compressed format. A DVD holds a minimum of 4.7GB (gigabytes), enough for a full-length film and a maximum of 17GB, significantly higher than a CD-ROM which can hold 600MB. DVDs use MPEG-2 to compress video data. DVDs released in the US include Dolby Digital surround sound, which produces five discrete audio channels. This format allows software producers to include multiple language audio tracks, subtitling or multiple camera angles.
23. Backward compatibility is also a key issue in the current policy disputes about the introduction of high-definition television (HDTV). As a footnote to the early marketing history of DVD, Divx - the acronym for Digital Video Express - was a proprietary DVD format introduced by retailer Circuit City and a Los Angeles law firm. Divx discs required a special Divx player and could be viewed for one 48-hour period, beginning when the disc was first inserted into the player. If the disc were viewed again, the Divx player would automatically, via modem, phone into a billing office to bill the registered customer for another 48-hour period. While Divx players also played 'open' DVD movies, the format was the subject of strident criticism on the Internet and elsewhere. Divx officially stopped registering new customers in June 1999 and ceased all operations in June 2001.
24. This according to an August 2001 survey by the industry trade association Consumer Electronics Association (CEA). <www.cea.org>
25. Statistics from London-based *Screen Digest*. <www.screendigest.com>
26. Over two hundred models of DVD players are available from dozens of electronics companies. Prices for the first players were \$1000 and more. By the end of 2000, players were available for under \$100 at discount retailers. The price of DVDs is almost as low as its VHS counterparts and the demand for and availability of DVD rental films has increased exponentially. In 1997, in the US, 900 titles were available on DVD; in 1998, 3000. By the end of 2000, there were over 10,000 titles available on DVD in the US and over 15,000 worldwide.
27. MP3 is an abbreviation for the file extension for MPEG, audio layer 3. Layer 3 is one of three coding schemes (layer 1, layer 2 and layer 3) for the compression of audio signals. Layer 3 uses perceptual audio coding and psycho-acoustic compression to remove superfluous information. The result in

real terms is that layer 3 shrinks the original sound data from a CD with some sacrifice of sound quality.

28. Consumer Electronics Association (CEA), 'The Ultimate Living Room: 5 Technologies to Watch, 2001', <www.cea.org/pdf/5TechnologiesToWatchOct.011.pdf>