

New Media

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New media is everywhere in museums these days – in the form of hand-held information devices, information kiosks, installation art, display supports, and archiving systems, as a means to reorganize working practices, and to keep track of visitors.¹ It is used to make new kinds of museums, such as “virtual museums,” and to represent the things in existing museums. Most simply described as computer-based or digital media, it is the product of the convergence of mass-media practices and technologies with data-processing technologies (Manovich 2001: 23). In the context of the museum, it introduces changes in display, working practices, and in the museum’s relationship to its audience. New media involves the translation of older practices and representation into digital form. Media production, circulation, and consumption all become computer based. This means not just the emergence of new cultural technologies and practices, but the transformation of existing ones in a process that has been termed “remediation” (Bolter and Grusin 2000).

Each new technology is welcomed for its potential to change and improve the existing order of things, or, alternatively, distrusted as a threat to the status quo. This is very true of new media because of the way in which it remediates existing and well-established institutions such as museums. In the case of the museum, advocates of new media see it as a means to modernize, popularize, and increase the efficiency of a rather staid or old-fashioned institution. The film and media scholar Alison Griffiths describes the attraction of new media for museum directors and curators as its “promise to democratise knowledge, to offer contextual information on exhibits, and to boost museum attendance” as well as to “offer flexibility” and help represent “complex ideas and processes,” enlivening exhibitions, providing multiple viewpoints and encouraging social interaction between visitors. Skeptics see new media as threatening the authenticity of the artifact, the authority of traditional sources of knowledge, and as vulgarizing museums, turning them into commercialized sites for “edutainment” (Griffiths 2003: 375–7).

Though both positions are often grounded in experience, neither allows us to distinguish between different types of new media and their different uses. Both contain unexamined assumptions about museums and new media. For instance, hostility to the use of new media in the museum is shaped by the perception that the two are antithetical in character. New media is associated with technologies that are hi-tech

with historical permanence and materiality, and with education. In my view, these differences are less significant than they may appear and other similarities and differences are more revealing. Meanwhile, the notion that new media will improve museums overvalues new technologies, while underestimating the extent to which new media brings with it its own structures of knowledge and practices.

In this chapter, I argue for a different understanding of new media. I suggest that new media is best thought of as a means to organize and structure knowledge and visitor attention in the museum, not as a means of communication or set of devices. I attribute a transformative power to new media, but one that does not exactly match that envisaged by the new media advocates or skeptics in the museum. In my view, new media is most interesting for what it does to the hierarchies of knowledge in the museum, particularly in relation to the division between “front and back regions” of the museum (the phrase is from the sociologist Erving Goffman; see Goffman 1990). At the end of the chapter, I suggest how a return to ways of organizing knowledge that predate the modern museum offers the most promising possibilities for reinventing museums and new media. To begin, though, I want to lay the foundation of my argument by considering how exhibitions and museums have historically participated in the development of new media and how museums themselves can be considered media.

Historicizing New Media

Historians of computing and of new media trace the origins of this technology in Babbage’s analytical engine, the Jacquard loom, and Vannevar Bush’s concept of a Memex machine. New media developed in World War II, in Alan Turing’s code-cracking work, in the concept of military situation rooms, and the technology of the German Magnetophone (Kittler, 1999; Manovich 2001: 22). The new media theorist Lev Manovich sees new media as the merging of two histories: of computers and calculating machines and of analogue media (Manovich 2001: 21–6). We can draw another thread into this narrative if we trace the development of exhibition techniques in museums and international expositions. This history would include the introduction of *in situ* display techniques, such as tableaux and dioramas, to museums in the 1880s and 1890s. It would include the development of interactive display techniques in avant-garde exhibition design, beginning in 1928 with El Lissitzky’s Soviet Pavilion at the Pressa Exhibition in Cologne. Long before computers made it possible to synthesize different media into multimedia or produce “virtual” environments, exhibition design was a means to combine different media, to physically immerse an audience in artificially constructed settings, and to engage them in active, physical manipulation of their surroundings.

The techniques of immersion and interactivity, which we now associate with new media, developed in circulation across a number of exhibitionary sites and institutions. This process of circulation was also a process of translation and reinvention (Barry 2001: 139). Tony Bennett describes how new disciplines, discourses, and tech-

complex as “a set of cultural technologies concerned to organize a voluntarily self-regulating citizenry,” but it was also a circuit through which ideas and techniques of display and archiving were exchanged. For instance, in the United States, between the 1880s and the 1940s, theories and technologies of display circulated between department stores and museums, facilitated by the involvement of department store magnates in museum governance and the employment of the same architects and designers across both institutions (Leach 1989: 128). In the same period, theater design and window-dressing employed many of the same designers, and could also be considered as neglected but important practices in the development of new media. The view that new media might be brought into the museum as a modernizing influence is based on a too-rigid separation between the development of museum display techniques and the transformation of display practices across a wide range of cultural sites. Similarly, the view that new media vulgarizes the museum, bringing it closer to commercial entertainment sites, disregards the already intimate connections across the “exhibitionary complex.” The concept of a circuit through which display and archiving techniques were exchanged and developed allows for a different understanding, in which museums were sites for the development of the techniques of display and of archiving now deployed in new media.

Museum displays parallel the organization and modes of address of modern analogue media (“old media”) and new media. An excellent example can be found at the American Museum of Natural History (AMNH) in New York. In the famous halls of dioramas, dating from the 1920s to the 1940s, the darkened spaces recall cinema auditoriums. The backlit habitat dioramas are breathtakingly naturalistic. Taxidermy, painted backdrops, and wax modeling, though “multimedia,” are combined to give the organic coherence of narrative cinema, inviting us to momentarily forget their status as representations and imagine they are more than skin deep. They position the visitor as a voyeur looking into a scene in which his or her presence is not acknowledged. This position and the careful arrangement of the scenes according to Romantic compositional techniques, allow visitors to imaginatively identify with the animals. The dioramas are discrete scenes, each of a different species, but unified in a larger common narrative about African or American mammals, for instance. The insertion of the dioramas into the walls organizes the visitor’s movement through the space; though you may move around the space in any way you like, the display encourages visitors to walk in a loop around the room.

If you pass from the diorama halls into the Hall of Biodiversity, opened in 1998, it is as if you have wandered into a different media age. On the “Spectrum of Life” wall, among specimens in jars, taxidermy, pinned insects which flock across the wall and up to the ceiling, are interactive touch screens and screens showing video clips of animals in their habitats. Visitors are expected to navigate between very different kinds of information and modes of representation (the Hall was marketed as “interactive”). Poetic and visual connections and resemblances are just as possible as scientific comparisons. Many museums keep alcohol-preserved specimens out of public display, considering them unsightly and reserving them for scientific study. Here the hierarchy of representation is broken. The arrangement of the animals on the wall

twentieth-century natural history and conservationism, with careful boundaries drawn between each species, and animals organized by geography, and humans placed outside the natural world. The Hall of Biodiversity represents more recent developments in biology and environmentalism, with an emphasis on diversity and interdependence. In the same hall, an immersive exhibit places visitors in a simulation of a tropical rainforest – complete with sounds and smells.

Museums as Media

Museums are sometimes described as media in that they communicate messages to an audience. For those who adhere to a “broadcast” theory of media, this is contentious, since they define media by a separation or distance between transmitter and receiver. Yet, as the media theorist Harold Innis wrote in the 1950s, media communication may be thought of in terms of temporal as well as spatial distance. He distinguished between media which communicate across time (for example, a statue) and those which are relatively ephemeral, but mobile, and communicate across space (such as a letter on paper; Angus 1998). We can go even further and think of museums as media in respects other than their communicative role. Media studies has long prioritized communication and representation, but this emphasis is changing. Recent media theory deals in form and materiality as much as messages. The notion of media influence, which had become disreputable because it assumed that audiences uncritically absorb media messages, has taken on new life in studies of how media shape perception and manage attention (Crary 1999). From this perspective, media work on our bodies: organizing our movement and our time, soliciting different modes of attention and different viewing positions. In histories of modern transformations of perception, exhibitions play a special part because they develop techniques of “organized walking” and the choreography of spectators. Writers interested in contemporary perception look to the panorama, the diorama, and the wax museum for its origins (for example, Schwartz 1998; Griffiths 2002).

The notion that media transform perception and attention is not new: Marshall McLuhan argued that media should be treated as staples like “cotton and oil” and that the main impact of media was in the “change of scale or pace or pattern that it introduces into human affairs” (McLuhan 1964: 8). McLuhan saw technologies as the basis of economies and social organization, affecting “the entire psychic life of the community” (1964: 22). He emphasized the materiality of media through the concept of “material bias” which he takes from Harold Innis. “Material bias” refers to the orientation of specific media toward the production of certain kinds of knowledge and perceptions, and their material resistance toward the production of other kinds. In this way, media are constitutive of society, limiting what can be experienced and how it is experienced (Angus 1998). Questions of scale and temporality are not just about cognition or “psychic life” but necessarily involve bodies. To understand new media in the museum *and* the museum as a media form, we need to examine the

Hooper-Greenhill has looked at how museums "shape knowledge," using Michel Foucault's distinctions between different "epistemes," and suggesting that recent changes in museum practices may be indicative of the fact that the modern episteme, which began in the nineteenth century, is ending (Hooper-Greenhill 1992: 215). Media historians make a more explicit connection between the development of new media and an epistemic break. The media theorist Friedrich Kittler (1999: xxx) maps the media age of electrical and electronic systems onto a new postmodern episteme

Kittler also historicizes the different media in terms of their functions of processing information, recording, storing, and networking. These concepts derive from the study of computer-based or digital media. This approach brings museums within the purview of media studies because museums are also technologies for archiving, preservation, storage, and the construction of cultural memory. Museums find their place in the history of media, and new similarities between museums and media become apparent. For instance, in the late nineteenth century, at the same time as early photography and phonography were being deployed as memory/storage devices, preserving for posterity the traces of the dead and dying, new museums were engaged in preserving natural and "folk" worlds which were thought to be rapidly becoming extinct (Haraway 1989; Kittler 1999; Sandberg 2003).

Comparing New Media and Museums

The characteristic that distinguishes the museum from other media is its inability to detach objects, scenes, people, from their fixed place in time and space, and to allow them – or their forensic traces – to circulate as multiples and reproductions. Historically, at least, the museum is attached to things. One misconception about new media is that it threatens this attachment because it deals in information and data, in the virtual rather than the material. However, we can see that the priority of the object in museums has been declining for some time, and that an increased emphasis on information and communication predates new media. As early as the 1930s, a new emphasis on invisible, intangible processes and concepts in science led to the development of new display techniques in science museums. In the late 1960s, the San Francisco Exploratorium broke with the traditional model of a museum, which safeguards and displays a collection. Its only objects were temporary display devices intended to communicate scientific principles through "hands-on" methods. By the 1930s, curators began to use projected film to supplement artifact-based exhibits. In Otto Neurath's Museum of Society and the Economy in Vienna (founded in 1924), conventional museum displays were replaced with pictorial charts, graphs, and posters. In the 1950s and 1960s, in world fairs and international exhibitions, immersive and multimedia displays, such as Charles and Ray Eames's designs for IBM, or Le Corbusier's *Poème électronique* for the Philips Corporation, prefigured computer-based multimedia exhibits (Mondloch 2004). In the same period, art museums and galleries saw the beginnings of installation, media, and performance art.

the belief that new media is characteristically interactive, or that the defining characteristic of new media is that it is made of discrete units, digital samples, whereas old media was analogue and continuous (Manovich 2001: 49–61). Manovich has shown how old media is also "interactive" and also involves discrete units (such as the frames in a film). He sees the distinguishing characteristic of new media as its programmability, which derives from the translation of media into computer data ("numerical representation"). Flowing from this are principles of modularity, automation, variability and transcoding. Briefly, these describe how new media objects are assembled out of discrete units which can continue to exist outside the larger whole; how generic scripts or programs take over some of the operations involved in media production or use; how new media objects can "exist in different, potentially infinite versions" tailored to different users; and how the logic of computer data organization merges with cultural categories to produce a new "computer culture" (Manovich 2001: 27–48).

Manovich's principles of new media illuminate significant similarities and differences between new media and museums. Numerical representation makes it possible to store enormous amounts of data and digitized media, something that makes new media museum-like, on the one hand, and distinguishes it from museums, on the other, since objects themselves cannot be stored, only their encoded representations. The principles of modularity and variability allow for the production of different interfaces from the same data, and of personalized versions of the same media object. Similarly, museums can produce different exhibitions from the same collection, although not simultaneously. Transcoding describes how computer programming's own modes of organizing data become cultural forms in their own right. Many new media objects are fundamentally databases, accessed through an interface (Manovich 2001: 219). Their interfaces are modeled on existing genres and media, including the museum because of its archiving and classifying functions, hence the "virtual museums" which are not simply the websites of existing museums but websites which use museum metaphors, with "halls" instead of "pages." One example is the Kook's Museum curated by Donna Kossy with its Conspiracy Corridor, Hall of Hate, and Library of Questionable Scholarship.

In virtual museums, "visitors" may access texts, images, sounds, or movies that only exist as a collection in the database. The variability and modularity of new media even allow Internet virtual museums to create "museum collections" which do not exist together in one database, but as different pieces of data in numerous databases accessed through the Web. Since the museum only exists in new media form, and since digital media are so easily manipulated, the authenticity of the artifacts becomes questionable. Many virtual museums are humorous and playful, working as contemporary curiosity museums like the (real) Museum of Jurassic Technology in Los Angeles, and unsettling the visitor's ability to discriminate between the real and the fake.

Perhaps the most significant similarity between new media and museums is their twin functions of storage and display. Some museum writers and workers have described the museum in theatrical terms, with the display areas or exhibition halls

This approach has the virtue of conceiving objects as active and culturally shaping, once placed in a network of relationships (Bennett 2002). The analogy to the data and interface relationship in new media is equally useful. In modern analogue media, in the phonograph, the film, the photograph, we have a master (such as a negative) which resembles the multiple copies taken from it. In new media, numerical representation means a separation of storage and display. Data are stored as numbers and algorithms, unreadable except through specific kinds of software. The interface is not just a display, but a means of accessing the data, organized in a database. New media objects turn discrete pieces of data into coherent "texts." Museums also organize objects into displays, and into a coherent picture of the world.

All media produce problems of storage: an ever-growing archive of photographs, recordings, films, and so on, has to be stored somewhere. This is not just a crisis in storage, it is a crisis in knowledge – in how to make sense of the unmanageable mass of stuff accumulating in museums and archives. This crisis was felt early in the history of modern media and of the modern museum. As Friedrich Nietzsche observed, too many "indigestible stones" of knowledge, presented to people without regard for their own life experience, had produced a tendency to embrace new information "lightly," superficially (Nietzsche 1874: 78–9). Museums handled this through the separation of research collections and the public display (though the problems of insufficient space for the ever-growing collections continued to haunt them). This was the first step in addressing the problem of incoherence, and confused, disoriented, and distracted spectators. Next, they reorganized displays into clean, uncluttered exhibitions, marshaling objects into more coherent narratives, and using new techniques to direct visitor attention and encourage certain trajectories through the museum space (Griffiths 2002: 10–17).

A "storage mania" marks the early years of new media, like the early years of the modern museum. Anything that can be collected, digitized, and stored is, regardless of the amount of time it would take anyone to view or read every item in the archive. Manovich writes of how the Internet "crystallized the basic condition of the new information society: overabundance of information of all kinds" (Manovich 2001: 224 and 35). Computers are efficient storage devices, compressing enormous amounts of data, but produce the same problem for the user as all storage systems: how to quickly access the one piece of information you want. The principle of automation enables software to classify and search data, from software that can search for strings of text to search engines that can compare visually similar images. The problem with automatic searching is that it remains limited while computers are unable to engage with media semantics; the similarities they find are similarities in digital encoding, in computer data, as opposed to the cultural similarities and connections we might make (Manovich 2001: 33). Even so, computerized automatic searching drastically increases the possibilities of sorting through an otherwise unmanageable accumulation of data.

New media offers the museum a means to undo the separation of public display and research collection in the museum. Through new media objects, visitors are able to access far more of a collection, albeit translated into visual or textual data, than could possibly be placed on display. Thus, new media enables the exhibition to become like an interface, through which visitors may access different objects in the collection, according to preference, and make their own comparisons. This relates to the arguments about access and democratizing put forward by the advocates of new media in museums. New media, with its capacity for automated searching and its database structure, seems to promise that visitors' access to the collection will no longer be constrained by the mediation of curators, nor are objects limited to the part given them in the context of a particular narrativized display. Through kiosks and touch screens representing objects that are not on display and contextual information beyond that given in labels and exhibition text, it seems possible to produce a deeper and more diverse engagement between visitors and the museum.

One interesting and innovative example of the use of new media to access a collection was *Orbis Pictus Revised* made by Tjebbe van Tijen and Milos Vojtechovsky between 1991 and 1996. This art installation combined three-dimensional, "hands-on" experiences with computer touch screens, and was based on a seventeenth-century schoolbook, *The Orbis Sensualium Pictus* (The World Explained in Pictures; fig. 18.1). The original book contains a hundred and fifty pictures placing objects in naturalistic tableau-like scenes (such as still lifes and landscapes) with accompanying text defining the objects in various languages. The pictures consist of discrete elements that are then associated with words in different languages.

Orbis Pictus Revised exploited this similarity between the emblematic pictures and modern computer interfaces. The exhibition was made up of three parts: first, a chain of fifty objects linked by visual association to fifty of the pictures in the *Orbis Sensualium Pictus*, encouraging other poetic associations to be made. Secondly, an interactive computer installation showing changes in the way in which the world is pictured and described, from the seventeenth century to the present day. This allowed comparison with earlier and more recent books through a search system using only images and spoken word. Through touch screens and switches, visitors could link parts of pictures to related images from the different books, navigating through time or through the book's structure. Finally, a second interactive computer installation allowed visitors to place plain gray objects on different sensors, which responded with spoken seventeenth-century and twentieth-century definitions. In *Orbis Pictus Revised*, the analysis and comparison of repeated objects and motifs gave a meaning and direction to users' interaction, while the use of objects and sound introduced new dimensions of sensation.

Another example of new media used to access a collection is the COMPASS (Collections Multimedia Public Access System) project at the British Museum which began in 1997. The stated aims of the project include improving visitors' experiences, making the collection more accessible, and enabling an enriched understand-

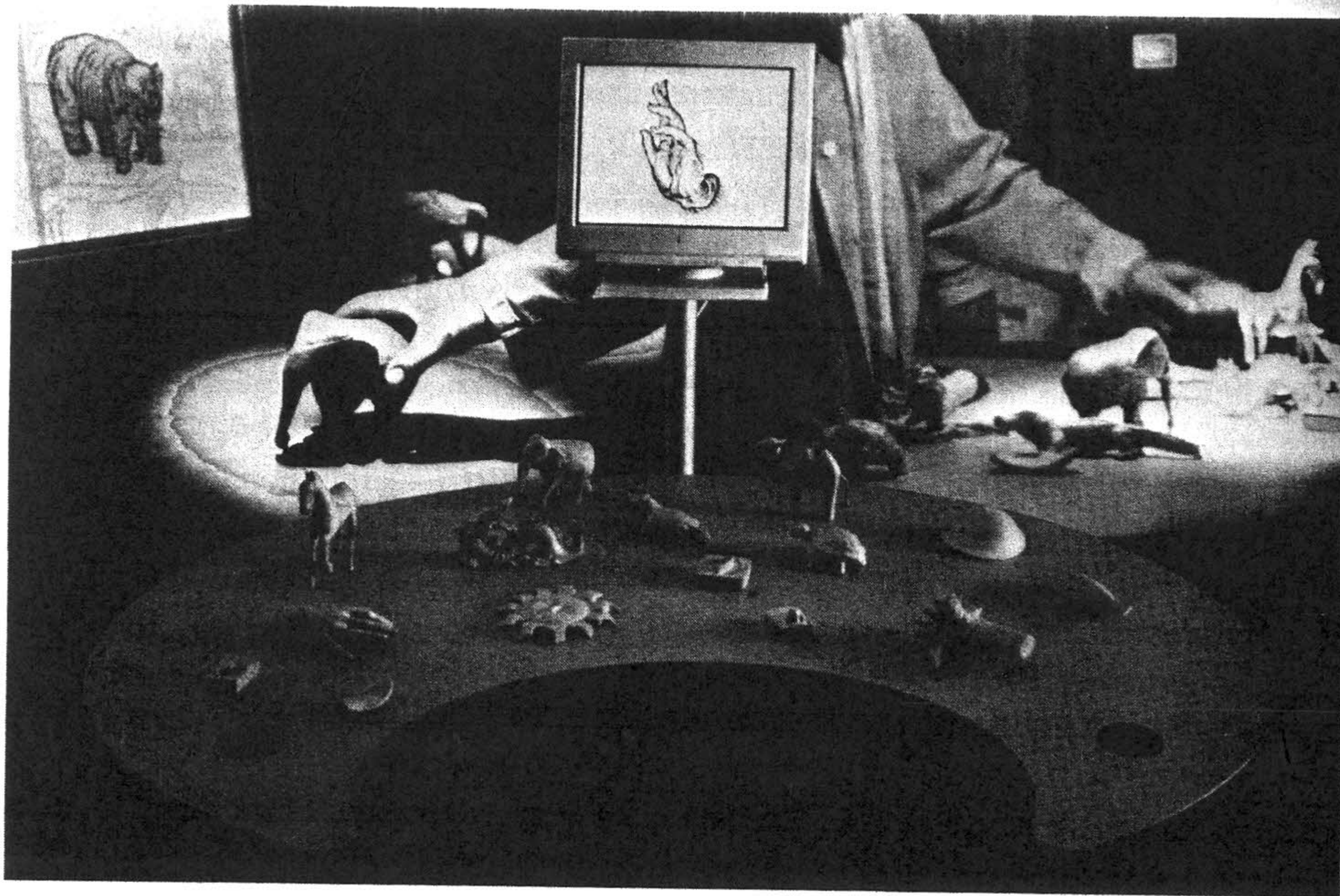


Fig. 18.1 “*Orbis Pictus Revised: Touching and Feeling*,” an interactive computer installation with symbol objects that can be placed in three different language areas on a table and thus will give sound icons and will speak (in English, German, or Latin) definitions for children of beings, things, and phenomena from both the seventeenth and the twentieth centuries. Simultaneously, tableau pictures from the *Orbis Sensualium Pictus* of Comenius and from similar twentieth-century books are shown on the monitor. Originally produced for Zentrum für Kunst und Medien-technologie, Karlsruhe, 1994. Reproduced courtesy of Imaginary Museum Projects/Tjebbe van Tijen.

ing of the objects’ original cultural contexts (Callender 2002a). As part of the project, kiosks were installed in the British Museum Reading Room in 2002. The terminals are designed to resemble open books, with a touch screen proportioned like a book, and a book-like interface. The system contains written text (contextual and descriptive), images, and other multimedia content. This content was partly drawn from the museum’s existing collections management system, but the text from that “was not considered suitable for a public system,” so new copy was created. This derived partly from existing publications oriented toward a visiting public, such as education packs, catalogues, and exhibition text, but was mostly produced anew by the museum curatorial staff in an easy-to-read format (Callender 2002a). This example shows how the new media interface does not straightforwardly give visitors access to the “back regions” of the museum, to its own archiving and data systems. New media only increases access by remediating the content of the museum. Interestingly, it is the concept of accessibility itself (based on the view that since visitors are non-specialists and often not fluent English speakers, they must have simplified text), which limits access to the workings of the museum.

Interactivity and Immediacy

Though the use of new media as a means to access the collection and archiving system opens up lots of interesting exhibitionary possibilities, it brings its own problems. Manovich questions the ethics of passing on the responsibility for selection and choice from the author to the media user, suggesting that it involves an abdication of responsibility on the part of authors/curators; he compares it to the way in which large corporations pass costs and labor from the company onto customers (Manovich 2001: 44). Other writers have questioned the social and philosophical implications of prioritizing individual visitor experience, and treating visitors as “clients” or “customers” invited to make personalized selections (Hooper-Greenhill 1992: 211–15; Hein 2000: 65–87).

The example of kiosks and installations providing access to a collection that is elsewhere also raises questions about interactivity. Interactive “hands-on” exhibition design originated in the attempt to disrupt traditional practices of aesthetic contemplation, in Marxist ideas of self-realization, and in radical and liberal theories of education (Buchloh 1987: 86; Hein 1990: xvii, 11–12). Interaction is not simply visible activity (button pressing and so on), but the invisible, cognitive links made between different pieces of information and different sensory stimuli. Manovich discusses interactive computer media as part of the modern tendency to “externalise the mind,” in which we follow the media designers’ own mental structure of links between information, rather than making our own associations. We are asked to treat pre-programmed links as if they were our own mental associations and to treat media as if they were simply, in Raymond Williams’s phrase, “intermediate substances” for the communication of pre-existent ideas (Williams 1977: 159; Manovich 2001: 55–61).

This is part of what new media theorists David Jay Bolter and Richard Grusin describe as the “desire for immediacy” which shapes new media. They write: “Our culture wants both to multiply its media and to erase all traces of mediation: ideally it wants to erase its media in the very act of multiplying them” (Bolter and Grusin 2000: 5). The communications theorist John Durham Peters argues that all media are shaped by a cultural desire for unmediated communication. This is why Victorian Spiritualists quickly adopted and adapted modern media in the séance. The dead spoke by imitating the tapping of Morse code down the telegraph wire (Peters 1999: 94). Also, “early radio history is inseparable from daring imaginings about the flight of souls, voices without bodies, and instantaneous presence at a distance” (Peters 1999: 104). Modern culture is dominated by this model of pure, disembodied communication, yet, as Peters shows, even the most intangible media interrupt our communications and conversations with an insistent materiality which takes the form of interference or resistance.

The anxious desire for transparent communication has shaped the deployment of new media in museums, in particular, interactive new media. Manovich describes the tendency to treat standard computer interfaces (such as Windows) as a transparent window through to the data held by the computer. Interfaces, he points out, have their own language and conventions derived from elements of older media and come with their own ideology or “bias,” shaping not just what it is possible to do with the

computer, but “how the computer user conceives of the computer itself” (Manovich 2001: 65, 71). This is evident in the British Museum kiosks and the *Orbis Pictus Revised* installation, which rework elements of older media forms (books). Commonly, interfaces are treated as gateways to access the collection, rather than as themselves cultural texts. There is also a supposition that visitor interaction is visible and readable, and it is reassuring to see visitors busily engaged with exhibits, as opposed to walking and looking, even if it is not evident that they are learning more from the process (Macdonald 2002: 240). While the pleasures and thoughts of visitors remain elusive, the economic need to keep visitors coming and the desire that the museum is successful lend a certain attractiveness to media which seem to make the visitor experience more measurable. In the British Museum, the COMPASS system allows the museum to monitor its visitors’ use. David Jillings, the head of new media at the British Museum, summarized:

We logged around 800 hours of unsupervised public use on five workstations during April this year [2002]. We recorded some 2,250 user sessions. The average user session was 21 minutes. The average number of museum artefacts looked at in each session was 18. Over 24,000 searches of the database were made, and some 66,000 records were displayed on screen in total. (quoted in Callender 2002a)

The attraction of being able to quantify visitor use in this way is evident. It is interesting to note, for instance, that visitors spend little more than one minute looking at artifacts on the workstations, which suggests that this new media object engages a channel-flipping form of attention. Faced with the mass of information available in the database, visitors, to use Nietzsche’s term, “embrace it lightly.” Yet, though the system can monitor time spent, it cannot make visitor pleasures more transparent. New media objects have become heavily invested with notions of transparency and immediacy – with making visitors readable, giving direct access to the collection, allowing visitors to follow their own mental associations – but this is misleading. Perhaps one of the reasons that new media seems to promise this to an even greater degree than old media is that the interface increasingly seems dislocated from any material presence in the world. There is a belief that new media objects are more “virtual” than other media, and digitization is associated with “dematerializing,” electronics with increasing miniaturization. Yet not only does new media have its own material bias and resistances, the real back regions of new media are resource-hungry and heavily polluting processes involved in the production of hardware and the laying of cables, the construction of an immense material infrastructure to support our virtual worlds.

The ability of new media to increase visitor access, and reconnect back and front regions of the museum, also needs to be seen alongside the impenetrability of computer processes to the user. According to Hilde Hein, this was one reason why Frank Oppenheimer was opposed to the use of computers as a means to construct the Exploratorium’s interactive displays. One founding principle of the Exploratorium was that the manufacture of exhibits should be a process open and visible to the public. The operation of computers is invisible, and watching someone use one

devices could actually undermine the principle of hands-on science on which the Exploratorium was based, because the point was to make invisible scientific processes visible and to demystify them. In his view, hands-on science should be empowering, demonstrating to visitors that modern science and technology were not beyond our comprehension and that we should not give up the attempt to understand the world (Hein 1990: xvi–xvii). More recently, science centers (including the Exploratorium) have abandoned this approach. In Explore, the successor to the Bristol Exploratory (whose founder, Richard Gregory inspired Oppenheimer’s Exploratorium), computer-based displays demonstrate bodily processes; for instance, how our bodies respond to certain kinds of images. What the display does not show is how the computer measures and represents back to us those physiological changes. What becomes invisible in the display is the computer itself. Computers, in this context, appear as almost magical technologies.

We could argue that there is nothing wrong with a touch of the magic show in the museum. The history of exhibitions and of media is also the history of magic: of spectacle, showmanship, of illusion and phantasms. Just because the invisible workings of miniaturized electronics do not easily give up their secrets, we do not abandon the attempt to understand them. However, what we learn from interacting with them might not necessarily coincide with the intended message of the display. The technology theorist and psychologist Sherry Turkle has studied what children learn from electronic and computational toys. If, as Jean Piaget showed in the 1960s, children use their toys to theorize their world, by taking them apart and seeing how they work, children in the age of electronic toys do the same. However, the invisibility of the workings of electrical components and computers means that the theories they develop through play differ from those developed by children with mechanical toys. They draw on a different body of circulated knowledge (such as knowledge of psychology and behavior) to understand their not-quite-alive animated toys (Turkle 1998). In the case of computer-driven exhibits, like the one at Explore just described, the explicit message of the display is presumably about the way in which physical changes in our bodies connect to psychological responses. But the display also teaches the power of computers to “read” us and respond to us. This is not just a question of explicit, articulated knowledge but also of bodily know-how, of habit and sensation.

In a discussion of IBM’s Information Machine display at the 1964–5 New York World’s Fair, Ben Highmore argues that “It is the form of the display that addresses an audience with a ‘content’ aimed not at the mind or the heart but at the body’s own potential for change” (Highmore 2003: 128). He reads the Information Machine as offering a bodily experience of the computer age, processing visitors as if they were pieces of data, and giving a taste of the magical power of technology, even whilst its explicit pedagogic aim was to demystify computers. The pavilion was like a giant ride that literally moved an entire audience into the air and then bombarded them with images on multiple screens. By lifting spectators out of their everyday bodily experience, the pavilion hooked consumer desire for IBM products to a sense of bodily transcendence. The pavilion recoded the traumatic experience of technological modernity as a magical (if momentary) liberation from one’s own body, and from

Many contemporary exhibits also use the mobile and sensational techniques associated with theme-park rides: for example, in the Earth Galleries of London's Natural History Museum, visitors enter via an escalator that passes through a giant sculptural globe. However, the new media exhibits that interest me here are much less sensational in their form. Kiosks engage visitors in corporeal and cognitive activities that are familiar: using a mouse and keyboard, making selections from a number of on-screen options are activities engaged in both in work and in leisure for many people (Manovich 2001: 65–6). Unlike the Information Machine, kiosks involve visitors in tasks that are habitual and banal. But the hi-tech production process of the museum and the apparent power of invisible but animate technology cement the position of the visitors as consumers of a finished product, and translate them into data to be processed. This orientation is explicit in the case of the British Museum kiosks, where feedback systems translate the activities of visitors into numerical data, and where museum spectatorship and economic exchange are part of the same system: the kiosk technology allows the museum to charge the cost of reproductions and information to users' credit cards (Callender 2002a).

Power Plays, Commerce, and Media Magic

This changed relationship between the museum and its visitors is not simply the product of the introduction of new technologies into the museum. It is largely a result of political and economic changes that began in the 1970s. The larger museums introduced structural changes in response to changes in their funding, in their relationship to other tourist attractions, and to a sense that they were becoming outmoded. Until then, museums produced most exhibitions and displays in-house, with natural history museums, for instance, employing their own taxidermists. In the 1970s, museums began to employ professional communicators and designers to mediate their messages to the public. By the early 1990s, this situation had inverted so that museums increasingly contracted out aspects of exhibition design to specialist firms (see chapter 25). Older skills like taxidermy were not so frequently required, and this work, too, they contracted out. A whole satellite industry has developed, specializing in museum exhibit design and production. Museums have become clients for new media companies, purchasing custom-built systems (the COMPASS system involved an architectural design company, hardware company, and software company).

In this context, questions of access, participation and interaction, democratization, and so on, though they may be real concerns for curators and museum educators, are also marketing terminology, overlaid on another discourse of profitability, cost, customer satisfaction. New media attracts corporate sponsorship too. For instance, the Science Museum in London received money from Toshiba for its kiosk system. In return, Toshiba get a "sponsored by Toshiba" inscription on each terminal, a Toshiba button on the menu which links to a screen full of information about Toshiba's products, a screen detailing their other sponsorship deals with the museum, and regular statistical information on the use of the kiosks (Callender

Advocates of new media celebrate its democratizing potential, its ability to make multiple viewpoints available, to turn visitors into authors, and to engage people in the production of their own stories. But it is clear that such expensive and technically impressive systems function as a kind of capital, a central means by which contemporary museums now compete with one another for prestige. They are deployed in what have been described as "power plays" at the museum (Luke 2002). One example, again at the British Museum, is the computer graphics simulation accompanying the display of the Elgin Marbles. This simulation shows the statues isolated and spun through three dimensions, completed, animated, and "repainted." In a conference paper, Gillen Wood interprets this simulation as an intervention in the debate about the repatriation of the marbles. He argues that, in place of actually returning the marbles, the museum has produced "a virtual restoration and a virtual repatriation," which implicitly denies the necessity for a real return of the Elgin Marbles to Greece, making the things themselves the justification for "a larger, virtual museum experience of cultures past" (Wood 2001). (Though one can also see how a virtual simulation might instead prepare a museum-going public for the absence of the real thing.)

Wood draws attention to the political function of new media objects in the museum context, as well as another instance of how new media technology offers magical transcendence. Resembling the commercial "virtual tours" of proposed buildings produced by architectural firms, the video offers a viewing position unrelated to any actual, possible, historical experience of the intact marbles and entirely the product of our own culture, shaped by the aesthetics of cinema and virtual reality. In the nineteenth and twentieth centuries, the actual Elgin Marbles elicited a Romantic appreciation of ruins, a meditation on the passing of time and the gulf between antiquity and the present, but also provoked anxieties regarding their deteriorated state, which play a part in the British Museum's argument against their repatriation. Wood reads the Elgin Marbles video simulation as a technological scrubbing-up of the marbles, obliterating the differences between past and present, replacing the Romantic experience with a technologically enchanted "eternal newness."

New Media and the Return to Curiosity

We could conclude that, far from democratizing, increasing access, and otherwise progressively changing the museum, new media is caught up in "power plays," furthering the museum's role in the production of an acquiescent citizenry who are now positioned as consumers of the museum experience. However, there is another side to the story, which suggests that new media objects can also work to undermine this, modeling ways of thinking and understanding which are non-hierarchical and decentralized, and privileging allegorical and arbitrary associations, correspondences, and resonances. This potential has been recognized and explored in a number of new media art projects, which explicitly link the structures and language of new media to Baroque allegory and to the seventeenth- and eighteenth-century cabinets of

For instance, the Baroque schoolbook on which *Orbis Pictus Revised* is based is closely linked to the allegorical emblem books of the same period. The way the installation links a Baroque cognitive structure to the structure of interactive new media as a precedent in Walter Benjamin's writing, which associates film's montage structure with Baroque allegory. His study of Baroque emblems underpins an understanding of film montage as an assemblage of discontinuous parts, which makes visible the lack of a natural or inevitable link between form and meaning (Bürger 1984: 68). Similarly, by drawing a parallel between the Baroque tableau and the modular and variable principles of new media, *Orbis Pictus Revised* enables past cultural forms to denaturalize contemporary ones.

Like the emblem book, the curiosity museum provides an historical model for contemporary new media projects. Online virtual museums, such as the Kooks Museum mentioned earlier, invoke the curiosity museum while exploiting one of the most scandalous aspects of the Web: the difficulty in policing the line between "good" and "bad" information. The modern museum operates as a technology to sort good from bad, true from false, and this distances it from both the curiosity cabinets and the popular curiosity and dime museums of the nineteenth and early twentieth centuries. Recent media art projects compare the Web to curiosity museums and cabinets, exploring how we collate and make sense of dispersed data using Internet search engines and dynamic systems of links. Examples include *Wonderwalker*, a project by Marek Walczak and Martin Wattenberg for the Walker Art Center in Minneapolis in which users produce a shared map of web links; *Information Tsunami Wunderkammer* by the Shiralee Saul, a text-based Web project which compares Web searching to beachcombing and colonial collecting; and *Encyclopaedia Mundi*, an installation by Tony Kemplen, using security cameras, software designed for the blind, speech recognition software, and an Internet search engine to translate a collection of thrift store tourist souvenirs into images, sounds, text, and back to images. All these projects draw attention to the Internet's status as an arbitrary accumulation of data, but also to the potential it has for the construction of new experiences.

The examples I have given here come from academic and art contexts. These are not the only contexts in which we may glimpse the potential for new media and the museum to creatively reinvent one another. We can find it too in recent museum displays which rework the exhibition medium. For example, in the Darwin Centre at London's Natural History Museum, the traditional separation between research collection and display collection is beginning to be unraveled, and in the Grande Galerie de l'Évolution in Paris, linear and naturalistic modes of organizing museum objects are replaced by decorative, symbolic, and non-naturalistic display. In a discussion of the "return to curiosity" in contemporary art exhibitions, the art historian Stephen Bann suggests that the curiosity cabinet allows us to view objects as "a nexus of inter-related meanings – which may be quite discordant – rather than a staging post on a well trodden route through history" (Bann 2003: 120). A similar thing can be said of new media, with its modular, variable structure. New media's greatest promise is to be found not in appliances and devices, kiosks and touch screens, but in the part it plays in a return to curiosity.

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Note

- 1 I am using the term "new media," as it is used by its principal theorists, as a singular term, although this is not strictly grammatically correct since the singular of "media" ought to be "medium." Used in the plural, however, it would refer to the full range of media that are new at a given moment, whereas in the singular it has come to refer specifically to computer-based, digital media.

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