Maxwell L. Anderson

Museums of the Future: The Impact of Technology on Museum Practices

RESEARCHING AND RECONSIDERING THE ORIGINAL OBJECT

ANYONE'S FIRST ENCOUNTER with the eminent classical archaeologist Dietrich von Bothmer is always memorable; I was witness to that of the lady who arrived in the Metropolitan Museum's Greek and Roman Department offices in the early 1980s with a small vase neatly wrapped in tissue paper. Dr. von Bothmer picked up the parcel and instantly handed it back to her. He explained that he had no need to unwrap the object since its weight revealed it to be modern.

In the early days of the digital age, many are concerned that there will not only be no need to unwrap the object thanks to the magic of networked technology and digital imaging, but that audiences in the future will become impatient with the static nature of works of art and material culture and seek nourishment elsewhere. Even in the preparation of this essay I found myself interested in pre-1993 (pre-Web) publications about technology and art primarily out of nostalgia, rather than out of a sense that they might hold indispensable wisdom. What was possible before 1993 and what is today possible are two entirely different propositions. The instantaneous retrieval of information globally, in authoritative and systematic ways, is transforming the experience of the original object as well as

Maxwell L. Anderson is director of the Whitney Museum of American Art in New York.

the prefatory and subsequent experiences of learning about it. While advanced research used to involve the uncertain courtship of a card catalog by a reader in a particular library, any end user anywhere is likely to resort to identical information from a limited number of databases, which are in turn communicating with each other. Thus, research, which used to involve searching, now involves a far easier combination of searching and linking—a much less laborious, thoroughly automated, and the cynical would say unintellectual enterprise at best.

It should be disclosed at the outset that while I am persuaded of the enormous potential of networked information for museums, and not fearful that it will prove a disincentive to visiting them, I am also leery of its impact on our attention spans and curiosity. Baby boomers now predisposed to using library resources on-line rather than in a reading room are primitives next to an emerging generation reared in chat rooms and accustomed to communicating with each other and with the rest of the world through their own home pages. The free time of today's youth is less often spent in what we defined as experimentation. The manufacturers of software-based games have defined the limits of interactivity, while the leisure-apparel industry has enough variety to render self-definition through clothing an effortless and uncreative act. Other traditional realms of teenage expression have been market-researched and tested to the point that patience is no longer required—if one is impatient with one thing, the marketplace offers a dozen instantaneously consumed alternatives, at the mall, on the set-top box (television-top computer box), or on the Web. We are all being converted into unwitting participants in focus groups simultaneously predicting and fulfilling our every need. Consumer society will be radically redefined by intelligent agents in the coming years, and museums have yet to grasp that the sanctity of the original object must be defended in the wake of a commercial tide created by comfort-peddling merchandisers.

In keeping with this larger order of change, today's potential museum-goers and lovers of art and artifacts will actually be less often bombarded with information, because that is the way mass communication works, but not the way robotic "intelligent agents" work. Instead, the "cookies" spawned by our

Internet address when jumping onto a site can be used to track patterns of interest and spending with cheerful but unnerving accuracy. Rather than pursuing every potential consumer, advertisers are learning how to identify the vulnerable, one consumer at a time. This turn of events is paradoxical: information is becoming more centralized and authoritative while the seduction of surfing the Web for its own sake makes centralized, authoritative information potentially stultifying. Thus, only five years after this intoxicating resource was introduced, it is too soon to tell if America Online is right to move away from its heavily filtered environment to a more open-ended one. The American consumer likes the appearance of variety without the increasingly aggravating need to choose. Museums will be forced to confront the fact that the competition for leisure time demands a more aggressive case for the experience of the original. If we increasingly paint ourselves as destinations indistinguishable from malls, we will be forced to compete with malls, and the absence of a price tag on our paintings, sculptures, and photographs will not always provide us with an advantage.

The reinvention of research and the consequences for examining objects are inseparable. Museum curators and administrators have struggled for a few decades to make the inscrutable more easily understood. The majority of museum professionals are deeply concerned about how to ensure the primacy of the visitor's encounter with the original object, and hope to engage the attention of the viewer without unduly prejudicing what he or she finds rewarding in it. The examination of an object in a museum is akin to an imagined conversation between observer and artist or context, mediated by the object. Among the most satisfying features of high-flying conversation is the effortless allusion to fact in order to support judgment. The wily individual equipped with a clear memory has the advantage. He or she may also be the person with greater quantities of the unconnected assets of imagination, creativity, or curiosity, all of which are essential to making use of memory to achieve something more fruitful than mere recitation, connectivity, or, in the phrase of the Internet, hyperlinking. If scientific discoveries are often arrived at partly by chance or

error, if artistic innovation is not always a reaction to what has gone before, and if great fiction is born of the circumstances of the present rather than laboriously referential to the past, then a different kind of memory may be required of us in an age of networked databases.

As children we were rewarded for exercising our capacity for memory. Young students today use pocket calculators to compute what we had to memorize, rely on the spell checker instead of a dictionary, use a keyboard instead of mastering good penmanship, and consult the Web rather than a card catalog. As the knuckle-rapped denizens of schools where long division, spelling bees, and index cards were the norm, baby boomers and our predecessors naturally bemoan the decline of our children's education, now seeming to be a form of socialization with diminishing expectations of rigor, discipline, and memory. But that sentimentality is typical of any generation that senses its raw deal being traded in for a better one.

An alternative to decrying changes in educational technology as the beginning of the end would be to concede that time previously spent learning how to perform functions that are increasingly made possible by networked technology might now be devoted more directly to problems of reasoning, development of independent judgment, language training, artistic exploration, and the like. If dissecting a frog remains a more fruitful enterprise than examining the living frog's biology through a microcamera the width of a catheter tube, we need to understand why. If the alphabetical acrobatics of algebra are an ideal path to reasoning, many boomers are still at a loss to reason why.

Memory is invisible, and what we today call technology will likely become largely invisible in the future. Not literally so—but figuratively. As the author and technology prognosticator Don Tapscott observed, his teenage children ridiculed his appearance on a nationally televised Canadian program in 1996 showing how to "surf the Web."[1] They asked whether he next planned to show how to inspect their refrigerator's contents. For the young, networked information is not a novelty or a luxury; it is a consumable like any other. As we move into a postwired era of air-fed Internet access, when switching on a

laptop, raising an antenna, and pulling down a connection to the network through the ether seems normal, the nostalgia of the baby boomers and our parents is out of place. We can choose to inhabit an indexed world instead of a hyperlinked one, but the penalties will be the compromised accuracy of our findings, their dated quality, and our potential absence from the consciousness of other researchers who ply their trade on-line.

The ways in which historical, art historical, and scientific studies are changing through the use of digital technology are legion. The difficulty of recalling past research on a given topic is problematic and mounts with each passing year. We are, as researchers, inured to the fact that a vast proportion of our time is spent in reconstructing the factual evidence of past discoveries. It is taken as axiomatic that a thorough familiarity with the history of history is a first step to membership in the company of educated men and women. Yet computerized memory should see to it that such information is easier to retrieve, which will reduce the amount of time we must spend recalling what others have discovered or ventured and will allow us to honor past research that had the misfortune to be published in an obscure journal or in Cyrillic.

The quantification of scholarly achievement in a networked world is ever more challenging. The "original" idea, observation, or conclusion appears to be both original and finite when presented in a bound volume like this one. But when scanned into a database, the constituent elements are separable and can be altered with dizzying ease. As future generations of scholars modify the findings of our teachers and our students through new discoveries, the autonomy of one scholar's achievement stands to be compromised. Implicit in the temporarily free-trade zone of the Web is a new form of currency, which values various kinds of resourcefulness over originality.

The demise of mass communication presages the arrival of a new communicative and intellectual milieu. The wired world promises to be more challenging and probably more rewarding than the relatively brief era of radio and television, and to return to us a framework of fewer prescribed certainties than that we have inherited from logical positivism. With voice-recognition technology, it is the spoken word, not the newspa-

per or even broadcast television, that will once again become the most powerful information broker—live and interactive, not spoon-fed. The re-villaging of our sensibilities, independent of physical location, will draw us toward an experience with which we are inextricably involved: no longer as passive viewers, but as, at the very least, "viewsers"—viewers and users of information.

Instead of sitting under an Athenian olive tree, students are today sitting in front of the Web, where questions lead to questions, as with Socrates, instead of leading to the pabulum of textbooks with prescribed certainties about the natural world and history. Fact comes into question as multiple information sources compete for an analytic mind, while previously single sources demanded fealty to single interpretations. Sitting under the olive tree or sitting before the screen, students have the whole world before or above them, whereas sitting in a conventional classroom, they have prescribed learning paths and rote. The challenge ahead will be to assure that the surfeit of easily retrievable information does not let students off the hook from mastering it.

Hyperlinking (digital), rather than indexing (analog), is changing the way that we conduct research. Indexing retraces countless closed circles of knowledge, whereas hyperlinking engages the infinite spectrum of fact and imagination. Similarly, we might claim that the Internet, in replicating, however reflexively, associative powers of the brain, has more promise than information organized in discrete publications. It is as unfettered as the human imagination, whereas books are convenient precisely because they confine speculation and information into prescribed routes—unlike conversation, which is the most natural way to learn. The apparent decline in the writing skills of America's youth began long before the Web, and it remains to be seen what effect this new world of voice recognition will have on the quality of thinking and of formal communication.

Museums as centers of research, experience, and publication will be reshaped by this world. With regard to research, the benefits are obvious: access to databases and shared postings, on-line inquiries, imaging techniques for identification, morphing to complete elements of damaged or incomplete works or con-

texts. Expertise will have a new character: intuition and relational thinking will play a larger role than experience. The academic world will face the inevitability that human memory will indeed be less highly prized than before, which will certainly have a profound impact on the motivation to acquire a command of a particular area. The nature of a museum visit will be palpably different, since the visitor will have at his or her command a massive database delivered at levels appropriate to schoolchildren or to scholars. The experience of the original object, at least, stands to be richer, relatable to other experiences, and more easily recalled.

The sorting and comparison of works of art and artifacts of natural history is an enterprise requiring a combination of memory, reasoning, and intuition. Were the scanning of images of artworks and their uploading to a centralized database of works of art to be undertaken by every museum in a position to do so, the first requirement, that of memory, would be answered in part. Until three-dimensional scanning is effortless, the results will be haphazard to some extent. But the advantage of even this fledgling effort is that a collective database can be established, accessible instantaneously and globally, and forever refined, rather than haltingly advanced in coincidence with new editions of scientific texts inconsistently available in various languages.

Reasoning involves the application of memory to the purpose at hand; it requires that we sort objects in such a database among like types and shapes, such as portraits to portraits, skull types to skull types, or found objects to found objects. It is also exercised in sorting by subject and period, or even by artist, if the attribution seems obvious. At this point, rank amateurs in the likening of objects can insert themselves with riotously implausible pairings, which is where intuition is certainly indicated. As conclusions are proposed for general review, the collective intelligence of the field may aspire to contribute to the task significantly. It is in the voids separating works of art where intuition is most in demand, and the provision of rudimentary animation tools will allow for a variety of rapid-fire potential solutions to millennia-old puzzles. The ex-

clusion of improbable or unhelpful associations can proceed with relative ease.

More significant than the networks' ability to sort categories of images by subject, as simple as that may sound, is the potential of image mapping and retrieval, which is the computer's version of intuition. With image mapping, the computer quite effortlessly reduces digitized images to their constituent ones and zeroes and retrieves them in combinations as required. Such opportunities for new kinds of research are already blossoming and would most naturally find their place in museums.

In the realms of publication and communication, museums must work to become centers more broadly based and community-oriented than universities, and more focused in content creation both for the educational community at large and for the mass audience. As we move toward the site licensing of images of artworks on the Web, the next issue confronting us is how willing we will be as a profession to share "unpublished" information. Publication has already been transformed by electronic communication. The stirring of a bear market in intellectual property—partly hastened by court decisions challenging the copyright of images—may threaten the most natural course of events in art history, which would favor the provision of data and images at the earliest possible convenience, so as to gain from the taxonomic skills of scholars in every field worldwide. The creation of chat forums should provide a jumbled but open path to consensus and accelerate the mid-course corrections of flawed assumptions, rendering vengeful book reviews a less frequently served dish. That will represent a privation of sorts, since, in the academy as elsewhere, the vindication of one's own divergent point of view is best expressed in the ostensibly objective forum of the review—although it is often a vehicle for self-rehabilitation rather than for the revelation of factual error.

Museums demand credible art historical and scientific inquiry and often turn to scholars in universities to bolster the research value of their own monographs and exhibition catalogs. That alliance will become increasingly problematic if museums are impelled toward greater openness through electronic publishing. We have seen of late the emergence of a

paradoxical standoff within the academy. Tenure committees continue to demand evidence of scholarly credentials and capacity through published books, while academic presses are increasingly declining to publish texts of such limited potential readership that their production costs can no longer be justified. The logjam will only be broken if university presses no longer have to be profitable (which seems unlikely), if tenure committees abjure the published evidence of candidates as the primary criterion of conferring entrance into the guild (improbable but perhaps moot in that tenure itself is coming under scrutiny as an outdated system), or if electronic publishing is deemed acceptable as a conduit for scholarship (which seems inevitable). The day is probably not far off when the young scholar's proving ground is electronic, and his or her research is no less easily retrievable by both tenure committees and colleagues.

The largest obstacle to realizing the full potential of electronic publishing is neither the tenure system nor our affection for books. It is the proprietary instinct of the scholar. Since St. Jerome the scholar's reputation has been that of the intelligent being at work in isolation. It is paradoxically when "on leave" from work that the scholar is believed to do his best work. But a networked world is challenging the logic of our approach to the enterprise of research and thus to the ways that museums can foster research and learning. If indeed a primary goal of scholarship in the museum profession is the uncovering of fact, followed by greater understanding and appreciation of the achievements of artists, then the prompt reporting of partly digested information, more akin to journalism, may increasingly replace solitary investigation undertaken in relative secrecy until a completely reasoned argument can safely be aired among one's peers.

This model of scholarly productivity is not consistent with the behavioral norms of the for-profit world, where innovation and creativity bring financial rewards when they are achieved in teams or in isolation and presented as a market-oriented, income-generating, and often unanticipated result. In that universe, collaboration would be fatal to competition, since there is a finite amount of disposable income to be invested in consumer-oriented products. The world of ideas, by stark contrast,

operates without such financial goals or cerebral constraints, and gains little from "cornering" a market of information outside of fulfilling the needs of a career-reward system prescribed by the academy today.

The gap between the first culling of information and the polished presentation of one's personal conclusions is the topic here in question. The matter is not trivial; that arena can sometimes extend for generations, as is the case with the Dead Sea Scrolls or with an artist's overprotective heirs. Thus, the true test will soon be upon students of the humanities with regard to their ultimate motivation in research. If the thrill of the chase is the stimulus for the life of mind, then surely openness on networks, even with partly digested evidence disclosed in hopes of a better purchase on the problem at hand, could ensue. Given the ineluctable accumulation of research, the "original" idea in a dissertation may well be original, but also spectacularly trivial. When an individual's originality is not necessarily more highly prized than his or her ability to distill the vast quantities of information contributed by many simultaneously, the likelihood is that a new reward system will have to acknowledge this shift to associative achievement and editing in place of innovation for innovation's sake.

It is all too easy to take such a position from the administrative recesses of a museum, and far harder to do so as a scholar implicated in the academy's reward system. But ultimately a technological imperative will likely lead us to adapt to new communicative norms, and this would constitute a truce in advance of our probable accommodation to one of the coming conflicts between the stewards of intellectual property *qua* property and the staggering permeability and informational elephantiasis of the Internet.

The first phase of networking among museums is now emerging. By way of example, the Art Museum Network (www.amn.org) is a resource that links the scholarship, educational resources, and interactive potential of art museums throughout North America. It operates on the premise that *networked* information is the greatest untapped potential of the Internet; amalgamates the exhibition calendars of dozens of museums in a single searchable database; hosts the web site for AMICO,

the Art Museum Image Consortium; and is exploring the potential of an on-line scholarly journal and public-oriented publications as well. Only by implementing a site-licensing approach to images, text, and multimedia encounters will the museum profession be in a position to achieve true collaboration of the sort that the *disiecta membra* of our collections demand. The joining of disparate objects stands to be accelerated by the Web and its successor's successor. The hardest part of the next phase of collaboration among museums is how to assure a financial return for licensing access to images and text purveyed by those institutions, a step that will move museums from being fledgling players in the world of intellectual currency to more significant ones. Museums are, after all, a field in which the work of the solitary scholar or the networked community of scholars has enormous potential visibility. There scholars may reap rewards from the presentation of their research results that can enhance their reputations among those in fields beyond their own, let alone in the public at large. A globally networked effort involving thousands of graduate students and scholars in museums and universities can accelerate the Herculean labors of the hundreds of scholars who have heretofore set the table at which learners dine.

The post-structuralist fashions of literary criticism long ago permeated the discipline of art history and even its older sibling, archaeology. Dressed up with exotic vocabularies, they often constitute a rejection of the primacy of the artist as a human agent with free will. Each variant will likely take its place among other theoretical seductions that seek to subsume the fertile creative act into a tidy biological, political, social, or semiotic schema. To ensure the survival of connoisseurship as a skill essential to the museum trade, the criteria that underpin it need to be made explicit and learnable. Only then can a new generation of scholars, more self-assured about methods of attribution and iconographical precedent, be encouraged to venture outside the comfortably unprovable purview of theory and into the risky enterprise of exposing a hypothesis to collective on-line scrutiny—with the intention of assigning a painting or intended allusion to an artist, a decorative element to a

building, a bone to a dinosaur, or indeed making any other association.

VIEWING THE ORIGINAL IN THE MUSEUM: TECHNOLOGICAL ENHANCEMENTS AND INTRUSIONS

Long before Warhol found rich irony in subverting the concept of the unique gesture through reproduction, art historians wrestled with the implications of replication for historical art. Ernst Gombrich, former director and professor of the History of the Classical Tradition at the Warburg Institute, University of London, speaks of the "beholder's share in the reading of the artist's image."[2] He also writes, now anachronistically: "One may admit that the creation of indistinguishable duplicates is of greater interest to the forgers of banknotes than to artists. . . ."[3]

A succession of nineteenth-century writers had a love affair with photographic reproduction. In 1860, referring to the twenty-year-old invention of photography, *Scientific American* made a bold claim about the potential simulacrum of experience to be obtained through this new medium: "With a pile of pictures by their side, which cost almost nothing, [even the humblest Americans] can make the European tour of celebrated places, and not leave the warm precincts of their own firesides."[4]

The critic Murat Halstead, writing in 1894, concurred, describing the "extension of picture galleries" as surpassing "all of the treasures of art in Rome and Florence and Paris and Dresden, and the feast is spread by the sitting-room window or under the fireside lamp."[5] Referring that same year to a series of photographs of the Chicago World's Fair, James William Buel described the portfolio accompanying the Columbian Exposition as follows:

> In some respects, this splendid portfolio is better and more to be desired than an actual visit to the Exposition, for through the magic agency of photography the scenes are transferred in marvelous beauty and permanent form to the printed pages, while the accompanying historical descriptions make plain and clear myriads of intricate and wonderful things, many of which were not comprehended by those who saw them.[6]

Against the backdrop of how the experience of objects has been framed by critics, technocrats, scholars, and museum professionals, we now turn to the visitor, who for all intents and purposes is detached from the aforementioned Swiftian battles among Marxists, postmodernists, connoisseurs, and wireheads. Museum-goers today are invited by the museums themselves to think of museums the way they think of other destinations intended to cajole and entertain. They have certain expectations of comfort and convenience, and unlike malls and amusement parks, museums often fall below their expectations. Thus the original object, cared for by the same people who subject the visitor to poor directional signage, infinitesimal and inscrutable labels, minimal restroom facilities, a shortage of elevators, inadequate seating, hard stone floors, and overpriced eateries, will suffer guilt by association. It may prove less remarkable than it appeared in the brochure, television program, or Web page, and that is among the first problems that museum administrators face in answering the needs of the visitor. The art historian and critic Donald Kuspit is unflinching on this topic:

> How do we get to see and really experience art? It is certainly not by going to galleries and art museums, in search of a direct relationship with original works. This is confirmatory, after the fact of the art we have known and come to love, a vindication and verification of it—the assurance that it exists, in however attenuated, objective form, i.e., as a specific, one might say terminal, object. To really see and experience art we look for it in its mass media image.[7]

The narrowing of the gap between expectation and reward in front of the object should be a primary quest of the museum professional. The temptation to animate the motionless object in a museum display for the general public is not new. It dates at least as far back as the Capitoline Museums, which were founded in 1471 but extensively renovated in the nineteenth century. Numerous classical statues there and in the Vatican Museums to this day have brass spindles that allow the visitor to turn the work on a cylindrical pedestal so as to see it in the best possible light. Few visitors today would think to avail

themselves of this mechanism, but it was originally of use to art students who sketched the masterpieces of antiquity. Today's visitors are more often led in forced march through sequences of galleries, with their eyes fixed not on the vanishing point of Ghibertian perspective but on the colored umbrella held aloft by their tour guide.

The visitor's increasing separation from the object has reached new proportions, to be sure. Larger numbers of museums are now shielding their most prized oil and panel paintings from the potential of accidental damage or vandalism with tempered glass. Railings are now the rule in major traveling exhibitions and often in permanent galleries as well. Light levels have been dimmed down at the behest of conservators who see incremental damage in exposure to ultraviolet radiation. Alert guards will usually caution the visitor who approaches a work too closely. Motion detectors sometimes emit piercing sounds when a gesture strays into an invisible beam. Visitors to major exhibitions are the beneficiaries of invisible tactics to move them through expeditiously, by avoiding long labels or handouts that might cause them to linger, the elimination of culs-de-sacs to assure free-flowing traffic, the careful orchestration of stops on recorded tours to impel them onwards, and the design technique of making the next gallery even more appealing than the one they are in.

All of these precautions are sensible, of course, and no one familiar with the travails of museums that have failed to make use of most or all of them would begrudge the museum administrator. But their cumulative effect is so far from the brass spindles of Italian museums that the uninitiated visitor may question how welcome he or she is. While the museum professional's ready response is that visitors are of course welcome, the messages inherent in the presentation of objects is a different one.

In stark contrast to this increasingly protectionist instinct, attractions like the Las Vegas casino Bellagio are being built as an alternative context for the enjoyment of great art. There the message is far clearer to the potential visitor: this art is being shown because it has value, and that value will not be hidden from you beneath layers of demanding information; if you

gamble here you are combining a seductive inner-directed experience with a rewarding voyeuristic one; you can wear what you want; and no one will expect you to be an expert on the paintings. Similarly, the Wonders Exhibition series in the American South has for the last several years promised blockbuster exhibitions packaged and sold as all-inclusive experiences in convention centers, with only the best art at fair prices, harnessed to recognizable figures in history (Ramses, Catherine the Great), bearing superficial resemblance to museum exhibitions but without their modest shops, arcane interpretive strategies, and intimidating ambience.

Concomitant with the visitor's increasing isolation from the original in the museum is a tendency to provide a place of honor for the replica. Not since the era of the plaster-cast-filled Metropolitan Museum of Art of the 1870s have replicas—albeit electronic ones—had such visibility in American museums. The problem that next presents itself occurs when museums seek to produce compelling virtual experiences as opposed to mere representations of objects. The cultural historian Walter Benjamin's simple formulation of the perils of reproduction is obsolete; the persuasive, trompe l'oeil simulation of objects or contexts in which objects are placed can now indeed become a substitute for the encounter with the original. We might single out two kinds of simulacra: the imitation of a dinosaur in a natural history museum and the visitor's immersion in a sensory environment that renders the original object inert by contrast.

The actual-scale reconstructed dinosaur is an example of the challenges that museums are setting themselves up for as they seek to respond to the dizzying growth of the entertainment industry. By changing observation from a contingent experience—one requiring that there be authentic bones admixed with plaster or plastic skeletons—to being an autonomous experience—one in which the simulation of an authentic context is seen as sufficient—museums are on a collision course with the monolithic entertainment industry. That industry has no shortage of marketing money, operating income, indifference to accuracy for its own sake, or appetite for competition. The technologies that enable large-scale reproductions of long-extinct creatures are no less valuable to Hollywood filmmakers

and theme-park executives—now one and the same—than they are to research scientists seeking to assemble puzzles of biology. A critical difference between the museum and the theme park is that the young consumer choosing between them knows where the better toys, faster food, state-of-the-art interactive games, and comforting amenities are. And the endgame for museums that have been forced to provide not only simulations of settings in natural history but settings akin to theme parks is not likely to be a happy one.

Younger visitors may become as impatient with the unmediated encounter as they are with an inadequately responsive interactive tool. In their disdain for those who would separate new media from old media, they warm to various enhancements to the museum experience. These might include physical contact with objects to see just how hard marble is, or whether a section of redwood is cool to the touch, at least as much as they expect a multimedia explanation of how objects may be situated in their culture or context. For the Nintendo generation, the immersive simulation of a real context—one in which dinosaurs roam or painted triptychs are situated in seicento chapels—is an autonomous experience, equally satisfying in a museum orientation gallery or a child's toy-packed room.

The situation need not be as bleak as we might fear. Just as slides, postcards, and posters of famous works of art have encouraged generations of college students and members of the public to visit art museums, the promulgation of digital images and information about works of art should encourage future audiences to visit art museums. No less importantly, the growing surfeit of "virtual" experiences in daily life is likely to result in a growing appetite for the authentic, and especially for encounters with those priceless touchstones of human creativity that cannot be adequately experienced in a virtual medium, provided that museums do not accede to the impulse to satisfy the lowest common denominator.

Of course, the commercial destinations offering only merchandise or experiences that are replicable at home through digital technology are finding themselves reinvented through the Internet. Whereas many of today's generic destinations—the shopping mall, movie theater, and even library—may be

challenged by the efficiencies of networked commerce, entertainment options, and communications, the hunger for social interaction in the attractive, safe, and unique settings provided by museums may well grow as a result of these efficiencies. Museums should be working now to make the museum visit the easiest and most attractive option possible, through networked collaboration, the use of webcasting, the availability of up-to-date information on activities in museums, and the provision of services including on-line ticketing, reservations, and interactivity, in preparation for and in the aftermath of a visit.

The impact of new media is already ubiquitous and barely discernible, like tiny meteoric depressions on the surface of the moon. It can be examined in isolation, but the visitor's experience is no longer one of different kinds of encounters ranging from seeing a slide in a classroom to browsing a catalog in the shop to glancing at an image in a brochure to planting him or herself in front of the original. In a digital environment, what were discrete encounters are no longer isolated from each other, and can be simultaneous with, prefatory to, or subsequent to the experience of an object at a laptop or desktop anywhere, any time. Because of the surfeit of communications sources everyone endures today, we now occasionally forget whether we learned something from a newspaper, book, memo, fax, voice mail, e-mail, Web page, or even conversation, and in a larger sense, as long as the information is retrievable, the conduit is decreasingly significant. The growing transparency of information technology will lead to its ultimate invisibility, and the conduit will be completely irrelevant. That is a laudable goal if one is hoping to encourage an encounter not with information about the original but with the aura of the original, seamlessly mediated by authoritative and rewarding information. But the younger visitor may lack interest in the aura, because an aura doesn't move, play music, or interact.

Those concerned about the potential demise of books are disconsolate about the resulting discounting of sources. Some of us may take the long view, according to which the oral tradition—here transmogrified into the innovation of voice-recognition technology—is the venerable one, and according to which books have for several centuries proved welcome but not indis-

pensable. The cultic creation of lavish temples to books in the form of marble libraries, beginning with that in Alexandria, began when the amount of information worth exchanging exceeded the capacities of human memory. Now that human memory is under fire from the potential of networked information, the pre-Alexandrian model of information exchange seems somehow more civilized than adapting to reserve lists, the absence of books from shelves, the heroic but time-consuming analog search for kernels of ideas, and the inconvenience of closing hours.

The ease of encountering didactic information about the object in a networked world is at the crux of our inquiry. The less motivated potential museum-goer—anyone in the majority of people—might find him or herself seduced into visiting a museum on the strength of a chance encounter with an image and associated information, and that is the hope of all museum professionals engaged with new media. Repeat visitors or museum members, on the other hand, may resort to networked information as a way of deepening their understanding of the works they plan to see or have seen, and this is a variant of the kind of experience had by a researcher. The converted, as we might call them, delight in making new associations, expanding their understanding of something about which they already have at least rudimentary knowledge. And they are more likely to see new media interpretations as an enhancement of rather than a substitution for the authentic object.

That, at least, is the hope of the museum administrator. The concomitant concern is that the potential visitor may elect not to make the pilgrimage described above, because of anecdotes from disgruntled peers who made the effort, a sense of intimidation at the perceived sanctity of the surroundings, or a genuine, heartfelt lack of interest. The last cause of nonattendance is the most difficult one for museum administrators to accept. As members of the body of the converted, we cannot imagine why someone would not want to project him or herself into another time and place, or experience the delight of being in the presence of a very precious, beautiful, or rare thing from the past or the present. But lack of interest on the part of nonvisitors

is a legitimate sentiment, like lack of interest on the part of an academic attending a monster-truck competition.

The experience of standing reverentially before the object is the primary construct in museological value systems that the staff seeks to protect in art museums. The passion with which we defend this construct is directly proportional to our belief that this experience actually occurs on a regular basis. We labor intensively to strike the perfect balance between labels brief enough not to detract from the experience of the object and long enough to provide the intelligent but potentially uninformed visitor with a metaphorical spindle with which to turn the object into something apprehensible. But we would do well to acknowledge that most museum administrators who toil to preserve the encounter with the original would never think of attending a major exhibition when open to the public if they can find a way around it. Having sat for an extended period on a bench in a museum in Los Angeles, weary from the demands of my two-year old and of the day, I was witness to what we all know in our hearts: that the reverential encounter is such a rare event as to border on a miracle. The vast majority of our visitors are pleased to be in the museum, relieved that the amenities are available even if below par, and may happen upon some combined experience of looking and reading that connects with a higher order of understanding—but we cannot count on it. The most the visitor obtains on a regular basis is the confirmation and elucidation of a fact that they were already privy to, or the discovery of something that is novel but not intrinsically connected to any other facts of consequence to them.

Although we of course maintain that the design of museum settings has a palpable effect on the experience of objects displayed therein and spend vast amounts of money and energy planning these settings, the results are no more predictable than those of an acoustician testing a music hall. The visual cues and notes may ring false in the finished product, and no end of baffles and muffling tactics may disguise the failed effort. The neutrality of the white wall is, for example, among the fictions in the story that museum professionals tell themselves.[8] The white wall is, of course, another interlocutor, masquerading as

an unobtrusive feature of the museum experience. The artist and scholar Brian O'Doherty speaks of the evolution of the white wall as "a sort of strip-tease, in which art in the white cell became more and more naked, while the wall became richer in meaning."[9] Museums showing contemporary art tend to favor white walls, not only because they are part of a Bauhaus-inspired modernist tradition, but because commercial galleries, where new art incubates, are slavishly committed to white walls and unfinished floors. The use of color on walls is seen as what separates the historical from the contemporary.

Multimedia kiosks were the first digital devices implanted in museums and continue to be installed. Those that are connected to the Internet are the newest variety, but the tried-and-true models of the late 1980s allow the visitor to retrieve information about collections in an environment reminiscent of a language lab. "Microgalleries," to use the term promulgated by American Express when subsidizing these high-tech reading rooms in London, Washington, Ottawa, and elsewhere, welcome the visitor into a world apart from art and culture, which might just as well be in a classroom or library. Studies undertaken by London's National Gallery suggest that visitors using the Microgallery spend more time in the art galleries rather than substituting time in front of screens for time in front of art. Other museums, like the Carlos Museum in Atlanta and the Minneapolis Institute of Arts, have taken the step of placing kiosks right in the gallery, allowing the visitor to glance up from workstation to pedestal without missing a beat.

Museums are today experimenting with digital audio players—a more literal interlocutor. These devices allow the visitor to tour a collection making random selections of desired information, and thereby level the playing field for the intelligent but uninformed observer. While they tend to be popular in conjunction with traveling exhibitions, sometimes reaching 30 percent of ticket-buyers, they rarely reach more than 4–5 percent of visitors viewing a permanent collection. This compares even less favorably with another sobering statistic: that only 5–8 percent of visitors to special exhibitions at American art museums buy catalogs. Although it is hard to speak of digital audio yet having a major impact on visitors to permanent collections,

most museum administrators are completely devoted to providing such systems to that small percentage of visitors that finds them useful. As museums experiment with universal distribution of such players attached to the ticket cost, and as Nintendo users grow up, the percentage may grow.

The next chapter being explored as of this writing is the portable tablet allowing the visitor to recall not only sound but also text and images. While the notion is heretical to some in that it risks taking more time away from looking at objects, others hazard the guess that with more information at hand than a label, the visitor is likely to spend more time gazing at the object in question. Since the device is only in its earliest stages of development, it is too soon to predict its impact. But it is safe to imagine that it might change the experience of visiting museums in the near future, and that this mention will be seen as a delightfully anachronistic reference like the observation that the Model T might have some impact on American society beyond providing an alternative to the horse.

The ways in which such innovations have changed or will materially change museum practice are difficult to measure. Each model has a traditional equivalent—the reading room or the docent—and in that sense, they have perhaps enhanced the opportunities for the visitor to retrieve information that might otherwise have eluded him or her. But whether they have altered the basic quality of the experience for the visitor is open to question. Only the curmudgeon decries these as intrusions into the art museum—and that curmudgeon is likely to delude him or herself into believing that he or she is adequately informed about every work on display and in storage.

Three-dimensional imaging is another innovation that holds promise in multimedia explanations of the context of the object. The projection of images in free space, which is now being used in the promotion of merchandise and for training the defensive forces of the United States, has potential in the visual arts and in museum orientation as well. The hologram has been surpassed now that the laser-projected object is liberated from the vacuum tube and can be seen as if in front of the viewer. Artists who are being commissioned to explore the potential of this technology will doubtless produce startling and rewarding re-

sults, and the concept of a floating docent will doubtless be explored by the more adventurous science museums.

It is essential to take the temperature of those experiencing museum-based technology on a continuing basis. Walter Benjamin famously prophesied where we were heading:

> Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be. . . . The presence of the original is the prerequisite to the concept of authenticity. . . . The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced. Since the historical testimony rests on the authenticity, the former, too, is jeopardized by reproduction when substantive duration ceases to matter. And what is really jeopardized when the historical testimony is affected is the authority of the object. . . .[10]

He was right to speculate that the authority of the object would be jeopardized but failed to predict that many contemporary artists, like their Dadaist predecessors, would revel in that jeopardy, which leaves his definition of art somewhat exposed. He also opined that "that which withers in the age of mechanical reproduction is the aura of the work of art. . . ."[11] Here we have yet to see much evidence. The assessment of the extent to which a work of art has an aura—through an aurometer, as it were—is a difficult task at best. The construct of an aura is under continuing fire from postmodern sophisticates, who find risible the proposition that a work of art has some overarching power independent of the biases of the observer. The rest of us, who would prefer to inhabit a world in which certain works of art are precious, others derivative, and yet others completely undeserving of our attention, may yet prevail, as a new generation of art-history students demand a renewed connection to objects.

Even after countless millions of reproductions of the *Mona Lisa,* there is an undiminished appetite to be in its presence. Whether this is a function of its being seen in reproductions or the power of the aura of the original, however, is unclear. For the visitor who is offered the choice of braving the crowds or flipping on the monitor, the museum's impulse toward

"edutainment" may unintentionally make the choice easier—and not in ways that the museum would celebrate. Thus, somehow museums must find a way to inspire or rekindle the potential visitor's belief in the power of authenticity. If museums find themselves seduced by the infinitely variable and ever-changing realm of electronic simulation, they risk draining the original object of its power. If they fail to exploit the potential of electronic simulation, they just as surely risk losing audiences drawn to the virtual experiences on screens and in theme parks. The only way out for museums is to pursue their original educational mission with determination while attempting to ride the rapids of multimedia innovation, staying as close as possible to the shoreline of their mission.

In 1923, Nikolai Tarabukin, flush with Bolshevik victory, adopted a critical view of museum interpreters at the moment that Paul Sachs was training Harvard's chosen few to carry out the fullest potential of curating:

> Museum workers are confronted with the task of sorting this material which was visionary in its time into an historical order and to bury it "beneath numbers" on inventory lists as dry as the "artistic storehouses." And for the art historians, those inexhaustible, dry as dust archaeologists, there awaits a new work in the writing of explanatory texts for this sepulchral crypt so that the descendant, if only he doesn't forget the way to them, can worthily evaluate the past and not confuse the landmarks of "historical perspectives."[12]

Tarabukin's zeal to prevent formulaic research and interpretation from stifling the power and joy of the original object is little different from that of museum educators who toil in the shadow of their more visible colleagues in curatorial departments. In the tradition of John Dewey, they are always at pains to avoid the imaginative sclerosis that attends fact recited for its own sake, connections of interest to the learned but not the many, and obscurantist vocabulary. Collections management vendors are now struggling to keep up with an ever-more sophisticated and demanding museum-based clientele, for whom Tarabukin's admonition is both legitimate and still fresh. As more museum staff become involved in creating collection-

related information, the tyranny of bean- or bug-counting is giving way to a still structured but more broad-based obligation to authoritative documentation. And that documentation is no longer available only to the registrar and occasional researcher, but increasingly to anyone with a modem. The consequent reshuffling of responsibilities will have registrars continue to care for the original objects while a team of experts—from curators to educators—will take on the preparation of collection-related content for broad public consultation.

Larger issues loom in the inquiry about how replication is affecting the museum experience. The critic Markus Brüderlin notes that in relation to the artist Sherrie Levine's works reproducing works by other artists:

> While . . . [the] strategy of "open piracy" [Don Cameron] was mainly regarded as subversive criticism of art-market mechanisms in the eighties, its effects are open to interpretation in broader terms today. As the reproductions "suctioned" from circulation in the media are placed in a museum context they find rest. This process of recycling turns out to be a loop leading to a potential encounter with the original. The duplicated artwork leaves the endless chain of simulacra and enters the circulation of a new recycling culture in which the burning issue is not only the recreation of the aura, but also the collective commitment of communication. . . . Hans-Peter Feldmann's "double and triple copies" and Sherrie Levine's recycling strategy lend themselves well to illustrate a closer look at the two main aspects of criticism about Benjamin's aura theory. One aspect is that the original does not lose its aura by reproduction, but multiplies it, with La Gioconda and its "déjà-vu" aura being a case in point. Some artworks have actually become unique through photographic reproduction and duplication. The second, more significant point of criticism tries to prove that the aura disappears in the copied and mass-distributed original, but is by no means lost because it re-appears in the reproduction. As pointed out above, this is especially the case when the original vanishes behind its multiplied versions. Adorno may have had this in mind when he criticized Benjamin in terms of a negative dialectic: "Every work designated for many is already a reproduction in terms of its idea."[13]

Artists using the Web are of course changing not only what art refers to and how it is experienced but how it is collected

and distributed as well. This area of art-making can put the museum to the side and reach the observer directly, with the only intermediary being an Internet browser. While the market for such work has yet to be defined, it clearly constitutes a challenge to both the art dealer and the curator, and if artists in this medium find a way to achieve acclaim and a market, we will have to rethink a great deal in the role of the art museum. Already museums have begun to move from just linking to Web art to commissioning and purchasing it, and the next two frontiers are to understand how the artist and museum negotiate the intellectual property implications of acquiring Web art and how increased bandwidth will affect the work of Web artists.

INTRANETS AND OPEN MUSEUM MANAGEMENT

The for-profit world has been swift to explore the full benefit of networked communication to the corporate environment. File-sharing and electronic mail have improved the productivity of the "road warriors" who stake out customers, connect with the home office several times a day, and are never out of touch with the basic information that keeps them competitive, on the road or back at their desks. Museums, by contrast, have predictably invested enormous resources in the microcomputing environment—the power of individual desktops—and the Internet-based environment: how museums connect with their (potential) audiences on-line. Thus, each staff member with a computer on his or her desk is likely to have a state-of-the-art software environment with a unique filing system on the hard drive, and the department responsible for managing the web site is likely to have reasonable support for its efforts. The missing step has been connecting museum staff members with each other to maximize the free flow of information and break down communication barriers among departments. But that should not surprise us. The museum culture is one of spirited competition, not only among curators, but also among departments competing for limited resources with little perceived reward for collaboration. While the corporate environment mandates streamlined planning and cross-departmental information retrieval, the museum environment leaves ample room for fiefdoms and fa-

vorites, a system that rewards individual entrepreneurship over teamwork.

Those museums that have been able to harness the potential of an Intranet-like environment have begun to see a shift in management style. Memoranda that were formerly sent to a select few are now available for browsing in a fileshare environment. Electronic mail that was formerly the preserve of "key" staff is now an indispensable tool for regular museum-wide communication. Standing and ad hoc meetings are more often prepared in advance or substituted with emailed updates and action steps. And access to the World Wide Web, which was in 1994 painted as a potentially devastating drain on productivity, has begun to be seen as a valuable resource that can connect staff with information not otherwise available, leading to a less isolated institutional culture. As a consequence, the staff at large now see an open information structure as an entitlement, not a privilege, and the hierarchical communication environment of un-wired museums is seen by staff already steeped in a networked culture as quaint at best and needlessly autocratic at worst.

The effect of this management change can be salutary for the public—once accustomed to the freer exchange of information within museum walls, staff members are likely to see less harm in making information more widely available outside. The pressure to make individual staff members and departments accessible to the public through e-mail is changing the traditional communications paradigm of the telephone operator as the museum's most accessible employee, with the remainder of the staff (apart from the guards—the second most accessible employees) cloistered in their offices. The results will of course provoke demands for more support staff to answer queries, while administrators will struggle to find less costly solutions. Among these are the provision of answers to frequently asked questions on the museum's web site and electronic newsletters aggregating and answering inquiries.

Other than cost, the primary obstacle to the widespread implementation of Intranets in the museum environment is the belief by administrators that information is best carefully controlled through a prescribed hierarchy. While that may be true

in various cases, including official publications and donor and budget details, as well as agreements in a state of delicate negotiation, like certain exhibitions, the vast majority of busy work in our museums is not sufficiently salacious to command the interest of hackers, even those on staff. And even hackers are not so difficult to track down in such a finite group of end users—easier, perhaps, than identifying those who abuse the privilege of the photocopier. Furthermore, if museum staff rejoice in publicly undermining the institution by means of computer networks, the problem may not lie with technology but with management.

COLLECTIONS MANAGEMENT: FROM THE CARD CATALOG TO THE WEB

The most impenetrable preserve of every museum has for many years been not the vaults, the storerooms, or the loading dock, but the registrar's office. There, long before the advent of automation in the 1970s, those records detailing the provenance, publication history, conservation treatments, and other essential information about the collection have been carefully guarded by the staff entrusted with their accuracy. The near-fetishistic care accorded these files was altogether appropriate before they became electronically replicated as well as available in a printed version. But since the invention of the microprocessor and the provision of easily accessible versions of authoritative data, the culture of the registrar's office has not always changed with the technology. If anything, the easy replication of collections data has created an understandable fortress mentality among some members of the profession.

In 1996 the Association of Art Museum Directors launched the Art Museum Image Consortium (www.AMICO.org), which has changed the dynamic of collections management in almost thirty of the leading art museums in the United States. Each museum formerly pursued its own approach to collections management and even tolerated proprietary solutions among curatorial departments. The premise of AMICO is that a central database of collection information culled from dozens of museums would allow for numerous improvements. These in-

clude enhanced educational opportunities by means of the Internet, greater record-keeping efficiency through the adoption of standard descriptive vocabularies, the possibility of shared income from a single licensed resource, and a diminished risk of obsolescent solutions.

The initial skepticism about sharing collection information was overcome by the logic of collaboration behind AMICO. Because museums have spent their history protecting their collections and information about them, the sea change implied by networked technology is just beginning to have an impact on their policies and procedures. The inter-institutional merging of information has changed museum culture forever. What was formerly the near-private preserve of the registrar is fast becoming the most widely available information furnished by a museum. This portends the beginning of several changes in how museums manage themselves and consider cooperating.

While the for-profit world organizes itself along clearly demarcated lines, staking out areas for competition (market share) and collaboration (lobbying), the museum community is new to the potential of thinking outside of its walls for any purposes other than mounting traveling exhibitions and comparing professional practices. Networked information will doubtless stimulate both more competition and more collaboration, in ways that can only be imagined today. The potential is likely to alter the landscape considerably. Just as the broadcast rights accorded network television prompted sports teams to find new opportunities in leagues and franchises, it is possible that museums will find themselves entering into new relationships in the coming years through the power of the Internet. These will be based not only on shared collection information but on many other aspects of the museum's mission as well, including educational outreach, publishing, marketing, and merchandising.

PROGRAMMING THE CONTENT FOR THE COMPUTER-TURNED-TELEVISION

The prevailing ways in which museums will connect with audiences over phone lines and airwaves in the future have yet to be determined. It is pointless to speculate about how computer

interests that have directed the audiovisual stimulation of the mass audience. With networked digital technology available through the set-top box, it will be a battle of wits to get our multiple messages across as well as to cajole audiences to communicate with each other through our museums by means of wireless keyboards and, soon enough, voice-recognition systems—which will require the advent not only of a sequel to this monograph, but of a new kind of museum.

E-COMMERCE: RESHAPING THE BUSINESS MODEL

The blurring of boundaries between the for-profit and nonprofit worlds will accelerate with the spread of electronic commerce. Museums are slowly coming to appreciate the ways in which on-line ticketing, merchandising, and the licensing of intellectual property might produce income that can help bolster their ability to serve the public. The results are going to transform museums' ways of connecting with their current audiences and open the possibility of connecting with new ones.

The American Association of Museums documents museum attendance in periodic surveys and routinely turns up the statistic that more people visit American museums than attend sporting events. This arresting fact is always surprising to those not in the museum community, and is taken for granted but not exploited by those in the community. The largest industry in the world is tourism, and among the largest tourist attractions in major markets are museums, but unless and until these museums harness their collective potential, the statistic will continue to be contested by the uninformed and only mentioned in passing by those in the field. The opportunities presented by electronic commerce are potentially powerful and should allow museums to assume greater control of their destiny. That control can be exercised by the extension of existing models of income generation on-line, and the development of new models of revenue creation for an on-line audience.

Existing models include the provision of access to museum shop inventory, whether through the museum's own web site, that of a commercial provider, or that of a consortium. The museum's own web site may attract tens of thousands of user

sessions (as opposed to hundreds of thousands of hits) annually. Even if a healthy percentage of end users elected to make purchases from the site, such as 5 percent, which would be a remarkable return on investment, the sales volume would not be enough to do more than provide incremental growth for the existing yearly sales average. If the museum resorts to a commercial provider, the skimming of income can erase whatever advantage the museum might otherwise realize from having its content more easily retrievable from a single known address rather than its institutional one. A consortium of museums, even one arranged in partnership with the for-profit sector on an equitable basis, is a surer strategy, since it puts the museums in the position of strength and control. Such enterprising efforts as exCALENDAR, an on-line exhibition calendar built on the Art Museum Network (www.excalendar.net), are developing as museums come to recognize the exploding market share of on-line commerce. There is also the discouraging fact that the millions of consumers on-line are no more likely to visit the museum's web site in the future than they are to pick up the phone today and find out what is potentially engaging about it.

CONCLUSION

The impact of the computer chip and networked databases is radically reshaping the on-site museum experience as well as providing remote access to information and commodities and inviting participation in the museum's mission. The museum community is slowly awakening to the potential of networked information, in merchandising, ticketing, and licensing content. It must pick up the pace, not only in order to prevent obsolescent experiments, but also to stave off commercial alternatives masquerading as educational ones. The only viable course is for like institutions in the museum community to come together and examine how these new tools can be used to collaborate. Spirited competition among web sites is a myopic approach to combating the tidal wave of commercial interests that are channeling their energies into the so-called leisure industry. Museums are places of leisure for the public, but behind the gallery walls they are an amalgam of research institutes, scien-

tific laboratories, storage facilities, educational facilities, community centers, and small businesses providing dining and merchandising alternatives. The sooner they harness their collective potential through new technologies, the better equipped they will be to serve their educational mandates while navigating through a world of diminishing attention span and free time. Let us hope that a considered examination of the impact of technology on museums in a decade is not a tale of splintered pilot projects but one of intrepid and collective self-preservation.

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