



Virtual Experiments

Reflections on the Museum in the Virtual Realm

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Virtual Experiments: Reflections on the Museum in the Virtual Realm

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In 2007 Elaine Gurian articulated a vision for a museum of the “nearly immediate future.” In her paper, “Introducing the Blue Ocean Museum,” Gurian describes a model for the use of internet technology in a museum, and creates an ideal for the integration of Web 2.0 strategies into onsite activities. In the Blue Ocean Museum visitors encounter exhibits which inherit their structure and style from an online interface, adapting to the speed, versatility, and self-direction people have come to rely on in their search for entertaining, social, and educational experiences through the internet. These “service strategies that mirror the way people have come to use the web to investigate and learn” are, Gurian argues, at the heart of that elusive quest for relevance that is at the top of museum agendas today.¹

A decade earlier, in 1996, the Smithsonian National Museum of Natural History launched its first web-based virtual exhibit to accompany the physical exhibit, Ocean Planet.² The website, developed by NASA oceanographer Gene Feldman, employed a design strategy that enacts precisely the inverse of what Gurian envisions. Rather than the constructs of internet-driven knowledge organization entering the galleries as in the Blue Ocean Museum, Ocean Planet imposes the structures and conventions of the traditional museum exhibit on a digital medium. Pages in the Ocean Planet site were organized into galleries, and visitors “walked” through content by means of a navigation bar that recreated the floor plan of the exhibit’s physical counterpart. Although the site did not dictate a strict progression through its content, the rubric of gallery spaces, tours, and the direct replication of some physical exhibit features constituted a presence of the museum translated into a virtual medium.³

Ocean Planet and the Blue Ocean Museum represent the oldest and the latest in design approaches to internet technology driven exhibition. And though the models diverge—the Smithsonian translates a museum framework into a website, while Gurian translates the internet’s information framework into a gallery space—both approaches are variations on a common theme. Both agree that the relationship between museum and internet should be one of transposition: the concepts of one institution reworked into the medium of the other. This relationship has some utility. It acknowledges that separate and sometimes contradictory conventions govern each realm. At the same time, it emphasizes the extent to which the virtual and physical museum have commonalities, and that

their collaboration might best be understood, at least in part, as a challenge of communication between divergent vocabularies, rather than as one of compromise between irreconcilable meanings.

In many ways it is hard to envision a museum’s use of the internet taking any other form. If a website is to be made, shouldn’t it be a museum website? And if internet technology is to figure in exhibit space, must it not also impose its unique structuring of information on the content of that exhibit? In negotiations between media as disparate as a display case and a web page, how can their integration be anything but an act of translation?

Despite its logic, this usual relationship of museum to internet sets up visitors for disappointment. In Ocean Planet, although I see the floor plan of the gallery exhibit in the footer of the webpage, I know I am not in the gallery, and am reminded of the discrepancies between the exhibit present on web pages and the exhibit at the National Museum of Natural History. Similarly, Gurian’s Blue Ocean Museum begs the question, “why not just stay home and surf the web?” Is there really anything social about interacting with databases in a communal setting as opposed to browsing them privately? The translation between museum and internet calls attention to the inability of either to sufficiently replicate the experiences of the other. In a “visit” to the virtual galleries of the Rijksmuseum, Lianne McTavish describes this uneasy circumstance: “Distinctions between virtual and real museums are blurred on many websites which employ spatial metaphors, encouraging visitors to enter and tour virtual galleries... Yet even as virtual and real museums are merged in rhetoric (including the term ‘virtual reality tour’), attention is drawn to differences between them.”⁴ To overcome the limits of this typical endeavor of translation, the museum is called upon to go back and reevaluate the purpose of internet technologies in their activities, and to identify ways in which these technologies might enhance and enrich rather than supplement the museum.

The goal of this paper is to think through these questions by reexamining the role of virtuality as it applies to a museum’s missions and goals and to discuss the possibilities of a new approach to an understanding of collections in a virtual context. A new paradigm for the interaction between internet and museums will, I conclude, bolster museums’ claim to relevance in an increasingly digital, network-driven social and educational environment.

The basis for rethinking the relationship between museum

and internet comes out of a project which, by virtue of its definition, provided some liberty from the paradigm of translation. The project, devised by the Vice-Provost for Academic Information at the University of Michigan, John King, proposed a virtual museum that would record and preserve individual memories of the history of Instructional Technology at Michigan, and share these memories with an audience of current students and faculty, partner universities, researchers on the history of IT, and alumni. According to the original assignment, the virtual exhibit should both fill “a critical gap in the university’s history” while serving as an “important affirmation to those working in Michigan’s I.T. community today about the potential significance of their contribution to the world.” The proposal should be directed inward towards local university constituents, as much as it projects a history outwards to a broader audience.

Implicit in this task of exhibiting innovation was a mandate to present these stories in a new and innovative way. An early idea for a project title was “A Frontier University,” alluding to the often-referenced image of the University of Michigan on the edge of American higher education’s westward expansion. “A Frontier University” would associate this cutting edge ideal with the pursuit of technological innovation. But as much as “the frontier” fits with the content of the project, it also references the edge that my collaborator, Jennifer Beyer, and I occupy in our experience with the theory and practice of museum studies. We approach this project having spent a year in the University of Michigan Museum Studies Program, in which we stewed in museum literature, met with a diverse array of museum practitioners, and experienced the behind-the-scenes at several area museums. Given this background, we saw this project as an opportunity to rethink the nature of a virtual museum in light of our new understanding of what a museum is, and whom it serves. This paper brings together these ideas that have been at the center of the Museum Studies Program proseminar in a technological environment that is increasingly informing museum practice.

What IS Virtual?

In his seminal essay, “From Being about Something to Being for Somebody: The Ongoing Transformation of the American Museum,” Stephen Weil shares his conviction that a museum “can, through its public-service orientation, use its very special competencies in dealing with objects to contribute positively to the quality of individual lives and to enhance the well-being of human communities.”⁵ This statement reveals a theme that weathered the storms of Museum Studies Program proseminar discussions over the past year: display, preservation, and collection are at the center of a museum’s mission, but so are community, education, and collaboration. There is both a material

and a social component to a museum project and, as Weil argues, each of these components contributes to the other. Determining the relationship between audiences and collections—people and things—is a central problem in establishing a museum’s identity.

At first glance, the idea for a museum on the history of information technology at Michigan fits in well with Weil’s conception. It sought to re-establish a group of information professionals at Michigan that would include alumni, former faculty, and staff who were no longer directly included in the university IT community, connecting people across generations with a shared history. Although it began with no firm set of collections per se, it aimed to make tacit or forgotten knowledge about this shared history explicit through stories, documents, sites, and artifacts—a “competency in dealing with objects” broadly defined.⁶ This project, like other museum projects, is about people and things.

However, the assignment to work on a virtual museum seemed oddly inconsistent with these goals. The associations summoned by the word “virtual” contradicted the centrality of both collections and communities in the museum project. The implementations of digital technology have also often promoted independence from artifacts and appealed to wide and ill-defined audiences. Virtual museums have made attempts to overcome these contradictions by defining their ephemerality in terms of traditional goals: calling digital objects “collections,” and attempting to engage visitors through an emphasis on distributed access and open authorship.⁷ Despite these efforts, virtual technology seemed fundamentally opposed to the tasks of documenting a history and creating a community around that history. We felt like we were working against the strengths of both museum and internet media.

The need to reconcile the abilities and constraints of virtual media with our ideals for a museum prompted us to experiment with a hybrid virtual museum concept which would allow for the rituals of the physical museum to be preserved without relying on the tactic of translation upon which many virtual museum projects have depended: A first step was to develop a flexible set of criteria defining “virtual museum.” This rubric would serve as a reminder of what virtual media should accomplish in our project.

1. Collections are independent of physical objects.
2. Exhibits are independent from physical places.
3. Exhibits facilitate distributed access.
4. Exhibits utilize digital technologies.

A main goal of these criteria is to encourage thinking about different kinds of virtuality, making room for technologies other than webpages in the construction of exhibits. Although the web is a very useful device for the

presentation and manipulation of virtual content, it should be one in a palette of design solutions which contribute to diverse techniques and which fit the thematic goals of the exhibit topic. Museologists are adamant that modes of display should be selected in line with rather than in spite of the objects and information they frame.⁸ Indeed, one of the few areas in which the museum literature is unanimous is that types of display contribute to the intent of an exhibit (whether it be to engage audiences, impart specific knowledge, or strengthen the museum brand).⁹ Display makes a difference in the conveyed meaning of a collection. A virtual museum need not dispense with this idea. Virtual technology enables an expansive set of media, opening up myriad strategies for displaying objects or conveying information. Audio, virtual reality, video, GPS, and digital projection offer approaches to exhibition which have under-recognized potential for creating meaningful experiences in virtual museums. Given the broad criteria we assigned above, a phone-in exhibit, or exhibit materials distributed by mail become feasible strategies for virtual museums.

A further broadening of the notion of virtuality for this project occurs in its approach to collections and space, which, as indicated above, are meant to exist independently from the physical realm. This is not to say that collections or spaces exclude physical objects or sites, but rather that a visitor's experience of the exhibit is not solely reliant on either. Each exhibit consists of an amalgam of digital, physical, archival, and web-based parts. Depending on its content, it may be visited online, through objects, through a physical location, in the archives, or through a telephone. These points of access do not provide equivalent experiences, but together they create the most complete experience of the exhibit content.

Understanding virtuality in this way is instructive to the project of the museum in a couple of ways. First of all, it divorces the effect of virtuality from virtual media, making room for different tools that can achieve a similar goal.¹⁰ Secondly, it emphasizes a close relationship between a virtual design project and a physical museum design project. The creation of illusion-based experiences is not unfamiliar to exhibit creators who have long been adept at manipulating digital and analog technologies to construct an environment that immerses visitors in a world of objects and themes. While the practical execution of virtual design certainly requires a unique set of expertise and understanding, at an abstract level, the design of virtual exhibits need not wholly diverge from the established creativity of museum practitioners.

Given these premises, the design of the Virtual Museum Project features a diverse set of media, digital and non-digital, site-reliant and site-independent, that work together to exhibit on common themes, and which are unified under a virtually created organizational infrastructure. Over the summer of 2008 I worked to put some of these ideals

into practice, designing virtual approaches for two out of three initial exhibits that will be included in the launch of the Virtual Museum Project. The goal of each design and its implementation is to connect a story with a virtual technology, and to connect these stories with physical sites and artifacts both within and beyond the university.

Design #1: MIDAC

Although it is difficult to cite one event as the beginning of computer research at the University of Michigan, construction of the Michigan Digital Automatic Computer (MIDAC) in the early 1950s was arguably the first serious development in the university's engagement with computer technology. In 1951, under collaborative sponsorship from the Wright Air Development Center and the United States Air Force, the Willow Run Research Center of the Engineering Research Institute, University of Michigan, began development of the MIDAC to assist with "the solution of certain complex military problems." The MIDAC was created according to the design standards established with the construction of SEAC, the computer at the National Bureau of Standards. MIDAC was the sixth such digital automatic computer at a research university, and the first computer of its kind in the Midwest. MIDAC would help the researchers at Willow Run to streamline design processes and "test" mathematical models that had been previously too complex to analyze manually. However, using the MIDAC was no simple task—a team of scientists and researchers were required to determine if a problem could be solved using the MIDAC. Even appropriate problems required complex programming and the results required expert interpretation.

Perhaps the most striking features of the MIDAC were its size and the extent of its mechanical components. Photographs of the Willow Run facility reveal that the MIDAC occupied two expansive rooms, dwarfing its operators. The MIDAC required 12 tons of refrigeration equipment to cool its 500,000 connections and tubes. Additionally, its main memory storage device was a rotating magnetic drum, which could store 6,000 words, or short segments of data. The MIDAC became functional in 1953, and was operated by Willow Run's Digital Computation Department under the leadership of John Carr III until 1958, when the Air Force removed it.¹¹

Discussions with former computer researchers and alumni at the university in the context of the 50th anniversary symposium for the Computer Science and Engineering program, held in May, prompted me to think about an exhibit design which would feature MIDAC's physical presence and its functionality, while also providing information on its use in the university environment. At the symposium, a panel devoted to the history of computing research focused primarily on nostalgic musings about

the particularities of the equipment former generations of scholars had used during their tenures at Michigan. Panelists told stories about the uncertainties of working with MIDAC (the acronym was re-dubbed: Machine Is Down Almost Constantly), the joys of the new IBM 360, and the durability of the Michigan Instructional Computer (MIC). Subsequent conversations confirmed that the physical aspects of these machines was an important source of identification between generations of computer researchers, connecting them to each other as well as to their time at Michigan.

Drawing on these observations, I developed a multi-virtual approach to exhibiting MIDAC. The main exhibit feature will be a 3-D virtual reproduction of a section of the MIDAC in the Cave Automatic Virtual Environment (CAVE), the virtual reality studio in the Duderstadt Center. The CAVE experience will give visitors a sense of the scale of MIDAC, and will demonstrate the mechanics behind its computational processes. It will also demonstrate what it was like to operate this enormous research device. The virtual recreation will be supplemented by a web-based exhibit component, which will feature more thorough text-based information. While CAVE will give visitors a sense of the totality of the MIDAC machine, the website will allow for an in-depth, detailed look at some of the key elements of its design. The website features animated 3-D renderings of MIDAC components which can be examined at 360 degrees. The site will also provide references for further research, allowing visitors with expertise or special interest in this area to more fully explore the MIDAC through archival resources at the Bentley Historical Library and published documentation available through DeepBlue, the university's repository for digital research files. The final component of MIDAC will make use of a pre-existing exhibit in the foyer of the Computer Science and Engineering Building on North Campus. The ENIAC rack, brought to the university by one of its original designers, Arthur Burks, will serve as a hook for the virtual exhibit components through engaging students and faculty who frequent the space. Because the ENIAC rack already has some interpretive text as part of its display, material relating ENIAC to the MIDAC will be supplemented, along with information on Arthur Burks and his important contributions to the research and teaching of computer science and engineering at the University of Michigan.

Design #2: CRISP

Throughout my summer practicum I gave presentations about the Virtual Museum Project to groups of faculty, staff, and alumni in order to start a conversation about how the museum might best serve the university community. In these conversations, the mention of CRISP, the university's first electronic course registration system, would almost always prompt laughs, snorts, sighs, and a flurry of stories

about eternal lines and malfunctioning terminals, or nostalgia for the routines that became ritualized rites of passage for students across departments and class years. CRISP stood for "Computerized Registration Involving Student Participation" and was designed in 1972 by students in Bernard Galler's graduate programming course in the department of Computer and Communication Sciences. The system relied on a network of computer terminals, operated by staff and student workers, which communicated with a central database system that stored information on student enrollment, courses and departments, and schedules. CRISP replaced the manual "arena" registration system, in which students would wait in Waterman Gymnasium at tables for each department, where they could punch cards for each course they wanted. CRISP automated the process of course selection, and enrollments, schedule changes, and requirements could be updated in real time. In the first twenty years of CRISP's operation students would line up at designated times in order to "crisp" with a terminal operator. In the 1990s the system was migrated to a dial-in phone registration. In 1999, after a nearly 25-year tenure at Michigan, CRISP was retired in favor of Wolverine Access, a web-based system.¹²

Perhaps because of its status as a homegrown student-authored invention, or the quiriness of its design and function, or the social aspect of its operation, or its long presence at the university, CRISP became a distinct cultural artifact: something uniquely Michigan. Its successes prompted pride in the university's abilities to find creative solutions for its own problems, while its breakdowns prompted reflections on the university's abilities to create its own problems. CRISP entered the campus vernacular, bringing words such as "to crisp," "entry restrictions," and "CRISP lady" into the conversations of students, faculty and staff. It continues to generate much enthusiasm (whether positive or negative) among its users—a persistent symbol of a Michigan experience.

Through discussions at presentations and meetings with CRISP alumni I developed a plan for the exhibit which focuses on three areas that seem to be of particular importance to the CRISP story. These thematic focuses will map roughly onto "galleries," or web-based platforms that will feature digital audio as the primary narrative medium. Some text, references to archival materials, and tours of CRISP landmarks around the university will connect the story of CRISP with the campus environment. The first gallery explores the teaching aspect of CRISP, and exhibits audio and visual materials relating to Bernard Galler's programming course and the student design phase of CRISP. The second gallery looks at the learning aspect of CRISP, concentrating on the active participation required of all university members to make the system function. This gallery displays how CRISP had an impact on spatial experiences of the university, including buildings, lines, and the flow of information through new and increasingly

electronic channels. The third gallery focuses on CRISP as a cultural icon, exploring its social aspect through alumni memories. It also features a simulation of the phone-in CRISP interface. Each gallery will be contained within a main exhibit website which will also include information on general resources and a timeline. Galleries will be visually distinct and discernibly unite all of their respective content, such that they may be visited out of sequence and make sense as independent units within the larger exhibit. Unlike MIDAC, the CRISP exhibit is not about the technology involved in the system as much as it is about the meaning of computerized processes for the social, spatial and academic experiences of the University of Michigan. Visitors should come away from the exhibit with an understanding of a larger picture of Michigan's uses of new technology, and changing expectations for computerized systems over a thirty-year period.

The design of these exhibits is intended to establish a presence for the Virtual Museum in the physical realms of the university: in its people, buildings, and existing collections. The idea of linking virtual media with physical sites and artifacts to create a hybrid virtual exhibit, as with MIDAC and CRISP, is not new. Martin Hall's essay "The Reappearance of the Authentic" points out that many different kinds of simulated environments often rely on the presence of physical objects to bolster the authenticity of the museum experience. Hall situates this idea in the context of museums' competition in an experience economy, in which they assert their value by selecting certain objects to be "authentic" cultural treasures, legitimating the simulated environment that all museums—physical and virtual—inevitably embody.¹³ However, while the sites, objects, and archival materials that the Virtual Museum Project includes in the matrix of its collections make its digitally presented stories more tangible and immediate, they also fulfill an important social function. At the beginning of this essay I asserted that a problem of the virtual museum is its diffusion and blurring of a traditional audience, whose physical presence is essential to the construction of a physical museum. The inclusion of objects and spaces that require the effort of a visit, eliciting participation in the content and structure of the museum, rather than passive viewing of a web page, helps to create an active and engaged audience for the virtual museum. The exhibits are designed to be interactive. David Bearman and Jennifer Trant have written of the necessity of interactivity in virtual media: "It is not sufficient that using and experiencing the Web becomes interactive. The objects and environments we encounter in the virtual world must expect our input, respond to our interaction, and be personalized and connected to us through our involvement with them."¹⁴ They describe the "Virtual Menorah" project at the Israel Museum which connects a web-based exhibit with classroom activities that produce materials to include in the virtual exhibit. This combination of virtual and real-life techniques foster an audience of active participants

in the exhibit content.¹⁵ Most recently, Nina Simon has written about "cross-platform experiences," in which an experience in one medium complements and engages with an experience in another—even glancing from a label to an object in a museum is, Simon argues, a cross-platform experience.¹⁶ The integration of one medium with another "engages you more persistently and completely with the content,"¹⁷ as well as creating a space for the museum in the lives of its visitors. For the Virtual Museum Project, which has no building, galleries, or permanent collections, this last achievement is particularly important.

Although the design of the Virtual Museum reconciles some of the disjunctures between physical and virtual museum practices, my practicum work demonstrated that there are still significant challenges. I was confronted with the first of these challenges when, in a meeting I was asked, "Why exactly is this a museum?" The question struck a particular vulnerability I had felt all along in a project that was conceived of and implemented outside of a museum environment in the conventional sense. Even now as the project designs are being implemented, the place of a "curator" in its organizational structure is unclear. So, what makes this a museum? Elaine Gurian's chapter, "Choosing among the Options: An Opinion about Museum Definitions, 2002" (in Gurian 2004) may provide an answer. When we read this piece at the beginning of the proseminar, it stirred debate. Some felt that the categorization of museums into discrete classes was an artificial and useless typology, and inconsistencies in her rubric were easy to point out. Who says an object-centered museum, for example, cannot focus on the cohesion of a community?¹⁸ Now, however, it seems as though Gurian's categories speak best to the question of what defines museum more generally and as a whole. She writes about commitment, both to communities and to objects, and this commitment—a deliberate and thoughtful attentiveness—is perhaps the best answer to the question of what makes the Virtual Museum a museum.¹⁹ There is a sense of specific and recognized agency on the part of museum practitioners that their actions have consequences for the collections they hold and the people they serve. The proseminar visit to The Henry Ford Museum, for example, prompted many of us to question the sense of salesmanship that pervaded the way the staff discussed their organization. This did not seem museum-like at all, because it ignored the effect of this attitude on the audience's experience of The Henry Ford, as well as its implicit challenge to the purpose of the collections within the museum. The Virtual Museum project will be continually called upon to legitimate its status as a museum, especially given its non-traditional media and structure. As much of this legitimation will rely on the perspectives of its administrators as on the appearance of its exhibitions and activities.

The issue of authorship poses a further challenge to the Virtual Museum Project. The threat that virtual media pose to the authority of the curator, and the opportunities

these media create for visitor contributions to exhibit materials has been well documented. Ross Parry writes, “Over the past four decades digital technology has moved increasingly towards greater levels of connectivity, mobility and personalisation...In particular it has been this dynamic content, this liquidity, of new media that has appeared (inviting addition and amendment), that seems to have been at odds with notions of fixity or closed authorship in the museum.”²⁰ Negotiating the interactivity that virtual museums must offer with the presence that it needs to gain authority in the university community will be a definite challenge.²¹ For now, the design of the exhibit does not allow for community input directly into exhibit materials, though discussion boards and comment functions will be included on the museum’s main site and throughout web-based materials. The content of the exhibits will also in large part originate from the university members, such as the oral histories featured in CRISP, and the technical expertise needed to mount the MIDAC simulation. Writing viewer contributions into the design of exhibits as well as into the structure of the organization will be central to the museum’s relevance to the university community.

An undercurrent in my work on the Virtual Museum has been a challenge to calls for conformity to what visitors want, expect and tolerate in a museum environment in this era of uncertainty about the museum’s future. Demands that museums define themselves in terms of their relevance to proven societal needs have dominated many of the proseminar readings on a variety of topics. Gurian, for example, forcefully iterates in her “Blue Ocean Museum” article the need to be attentive to visitor demands for open-access, shared content, and self-authorship, efforts that will determine the perseverance of museum institutions into the future. She muses: “Will museums be willing to respond to the consequences of shared content brought on by the new internet reality or will their inherently conservative natures prevail, rendering them marginal or even extraneous...?”²² This apocalyptic tone is perhaps warranted, and it is certain that museums must take part in the changing information society. However, change must not equate to the wholesale adoption of the modes and mores of the internet. I feel strongly that despite the current economic situation, where resources for all but the most essential are scarce, museums must continue to assert themselves as distinct and unique institutions, and must define their own goals. There is no doubt that digital media, and particularly socially driven tools such as those promoted in the developments of Web 2.0, can be crucial and interesting enhancements to traditional museum activities. We must, however, be attentive to the ways in which these media can be used in a distinctively museum-like setting, one that is different from the digital media experiences we encounter elsewhere in our daily lives. The Virtual Museum Project attempts to construct and strengthen a unique museum environment by amalgamating digital tools with physical museum practices, and by doing it differently every time. Diversity

of museum strategies and focuses, rather than homogeneity, can, as Charles Saumarez Smith asserts, be a guiding principle for museums in the future.²³ Museums’ use of internet technology should become a creative challenge, one that identifies and retains the strengths museums have as educators, preservers, and entertainers. It is through the legitimization of museums as something unique, profferers of specialized experiences and skills, that they can assert their relevance and, most importantly, endure.

Framed in this way, the future should warrant excitement rather than dread. Through my work on this project I found that the great opportunity of new technology is in the extent to which its purpose is yet unproscribed. As I enter the museum profession, I hope to be part of the exciting possibilities in shaping and defining what the internet will do to enrich and deepen the scope and purpose of the museum institution.

Notes

- 1 Elaine Gurian, "Introducing the Blue Ocean Museum: An Imagined Museum of the Nearly Immediate Future." (Unpublished typescript, 2008), 3.
- 2 The most extensive statement of this position is the Smithsonian National Museum of Natural History, 'Ocean Planet.' http://seawifs.gsfc.nasa.gov/ocean_planet.html
- 3 Helen M. Rozwadowski, "'Ocean Planet' at the National Museum of Natural History" *Technology and Culture* 37.2 (April, 1996), 335.
- 4 Lianne McTavish, "Visiting the Virtual Museum: Art and Experience Online," in *New Museum Theory and Practice: An Introduction*, ed. Janet Marstine (Malden, MA: Blackwell, 2006), 234.
- 5 Stephen Weil, "From Being about Something to Being for Somebody: The Ongoing Transformation of the American Museum," *Daedalus* 128.3 (1999), 231.
- 6 The replacement of objects with stories has not been a matter of simple substitution in the museum literature we have read. Writers such as Yves Mayrand, "The Role of the Exhibit Designer," in *The Manual of Museum Exhibitions*, eds. Barry Lord and Gail Dexter Lord (Walnut Creek, CA: Altamira Press, 2002), as well as Stephen Greenblatt, "Resonance and Wonder," in *Exhibiting Cultures: The Poetics and Politics of Museum Display*, eds. Ivan Karp and S.D. Lavine (Washington, D.C.: Smithsonian Institution Press, 1991), and Hilde Hein, *The Museum in Transition: A Philosophical Perspective* (Washington, D.C.: Smithsonian Institution Press, 2000).
- 7 Michelle Henning, "New Media," in *A Companion to Museum Studies*, ed. Sharon Macdonald (London: Blackwell, 2006), 309.
- 8 Yves Mayrand, "The Role of the Exhibit Designer" in *The Manual of Museum Exhibitions*, eds. Barry Lord and Gail Dexter Lord, (Walnut Creek, CA: Altamira Press, 2002), 406.
- 9 N. Kotler and Kotler, P., in Graham Black, *The Engaging Museum: Developing Museums for Visitor Involvement* (United Kingdom: Routledge, 2005), 271.
- 10 Michelle Henning, 303.
- 11 For more complete information about MIDAC and the exhibit design, refer to the "MIDAC Exhibit Manual," Alice Goff (August 2008). <http://www.umich.edu/~umvm/MIDAC/midac.html> from which the historical background presented here is excerpted.
- 12 For more complete information about CRISP and the exhibit design, refer to the "Involving Participation: CRISP at the University of Michigan, 1972-1999, Exhibit Manual," Alice Goff (August 2008). <http://www.umich.edu/~umvm/Crisp/Pages/crisp.html>
- 13 Martin Hall, "The Reappearance of the Authentic," in *Museum Frictions: Public Cultures/Global Transformations*, eds. Ivan Karp, Corinne A. Kratz, Lynn Szwaja, and Tomás Ybarra-Frausto (Durham, NC: Duke University Press, 2006), 94.
- 14 David Bearman and Jennifer Trant, "Interactivity Comes of Age: Museums and the World Wide Web" *Museum International* 51.4 (1999), 22.
- 15 David Bearman and Jennifer Trant, "Museums and the Web '99" *Bulletin of the American Society for Information Science* 25.5 (June/July 1999), 23.
- 16 Nina Simon, "Cross-Platform Experiences: Searching for Symbiosis," Museum 2.0 Blog, posted November 27, 2007. <http://museumtwo.blogspot.com/2007/11/cross-platform-experiences-searching.html/> (accessed December 28, 2008).
- 17 Nina Simon, "Cross-Platform Experiences: Searching for Symbiosis."
- 18 Elaine Gurian, *Civilizing the Museum: The Collected Writings of Elaine Heumann Gurian* (New York: Routledge, 2006), 50.
- 19 Gurian, *Civilizing the Museum*, 48-49.
- 20 Ross Parry, *Recoding the Museum* (New York: Routledge, 2007), 107.
- 21 Harold Skramstad, "An Agenda for American Museums in the Twenty-First Century" *Daedalus* 128. 3 (1999), 129-62.
- 22 Gurian, "Blue Ocean Museum," 2.
- 23 Charles Saumarez Smith, "The Future of the Museum," in *A Companion to Museum Studies*, ed. Sharon Macdonald. (London: Blackwell, 2006), 553.

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