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From Pen and Ink to Hyperlink: Transcending Museum Technology

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From Pen and Ink to Hyperlink: Transcending Museum Technology

Jason Marquis

**Submitted in partial fulfillment of
the requirements for the degree of
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From Pen and Ink to Hyperlink: Transcending Museum Technology

Jason Marquis

A forgotten scholar who conceptualized the Internet as early as the nineteenth century may be one source for rethinking the way museums present art collections online. Paul Otlet illustrated through the Mundaneum, an immense library and archive, that vast stores of information may be linked non-linearly with the help of a concept more recently known as hyperlink technology. Powered by typewriters and quick feet, his database conceptualized a non-hierarchical system for the distribution and exploration of relationships between centers of knowledge. Yet it was short lived. The grand project collapsed under its own success and choked on the sheer volume of material in its card catalogue stacks. The first museums, though they developed from the same enlightened concerns for the encyclopedic organization of all available knowledge in the eighteenth century, did not meet the same fate. It was in fact the aesthetic dimension of the museum that made it flexible. Still, the visual qualities of art complicated its enlightened systemization in the museum. Whereas categorization was for Otlet a simple operation of extracting content from data, the result of systemization in the museum was the secularization of art, its recontextualization within art historical frameworks, and subsequent politicization of display. Many argue the unwelcome side effect has been the marginalization or a complete obscuring of non-conformant histories. In response, museums have taken up hyperlink technology to refute such claims. The ability to store and transmit vast sums of data, to index, link ideas and retrieve them independently or in unique narratives, as Otlet conceived it, are the means by which online collections can transcend traditional hierarchical systemization. Thus the objective of this essay will be to illustrate the significance of rethinking access through network communication such as the Internet and hyperlink technology.

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“Once one read; today one refers to, checks through, skims.
Vita brevis, ars longa! There is too much to read; the
times are wrong; the trend is no longer slavishly to follow
the author through the maze of a personal plan which he
has outlined for himself and which in vain he attempts
to impose on those who read him.”¹

– Paul Otlet, Information Scientist

¹ Otlet, Paul. International Organization and Dissemination of Knowledge: Selected Essays of Paul Otlet.
Ed. Rayward, W. Boyd. FID Publication 684: Elsevier, 1990.

1. Introduction

a. The Rise and Fall of Paul Otlet's Mundaneum

On a quiet street in Mons, Belgium rests a small museum to the legacy of Paul Otlet, “one of technology’s lost pioneers.”² The Mundaneum, formerly a vibrant archive and library, collapsed under the weight of its own success. Revived as a museum, it displays a fraction of the institution’s original holdings; once enough to occupy an army of cataloguers. The few visitors that drop in from time to time rarely complain about the sparse reception, however. Most are happy to have simply found it. Yet the small collection and banks of card catalog drawers recovered from a warehouse of moldy, century-old documents belies the relevance of the Mundaneum to the history of museology and the advance of network communication today. In fact, museums may conceptualize the way they present their collections online through the example it set.

As early as 1895, Otlet and future Noble Prize winner Henri La Fontaine conceived of a monumental research facility containing all the world’s published knowledge in one master bibliography. Their enlightened objective was to gather a “universal body of documentation, as an encyclopedic survey of human knowledge, as an enormous intellectual warehouse of books, documents, catalogues and scientific objects.”³ “These collections,” Otlet declared optimistically, “will tend progressively to constitute a permanent and complete representation of the entire world.”³ Slowly, naively, the team began to amass data on every book ever published as well as journals, articles, photographs and even popular ephemera like posters that most libraries exclude. Gaining speed through the beginning of the 20th century, the collection of

² Wright, Alex. “The Web Time Forgot.” The New York Times. June 17, 2008: F1.

³ Rayward, W. Boyd. “Visions of Xanadu: Paul Otlet (1868-1944) and Hypertext.” Journal of the American Society for Information Science (JASIS), 45. 1994.

standardized catalogue cards eventually formed a formidable database of seventeen million entries—an average of 1,300 cards created each day over the span of 35 years.



A view of workers transferring data into catalog cards at the Mundaneum⁴

Within this database, catalog cards referred the reader to other entries in a potentially infinite network of linked citations and source material. In a romantic style akin to Jules Verne, Otlet envisioned a system of “electric telescopes” to peruse this growing bank of card catalogs, “where anyone in his armchair would be able to contemplate the whole of creation.”² Incredibly, Otlet outlined the first functional network to share a communal body of information and link centers of knowledge from remote locations—in short, the Internet. Without the aid of modern electronic communication or digital reproduction, the Mundaneum organized citations of published knowledge and made them broadly accessible by conceptualizing the mechanics of modern hypertext that makes the Internet possible today. In this way Otlet anticipated hyperlink technology.

⁴ From “Alle Kennis Van de Werld: Het Papieren Internet,” a documentary film created and directed by Ijsbrand van Veelen for the Dutch science series, Noordlicht, aired on Dutch TV Sunday, November 1, 1998.

It was possible for Otlet to theorize the Internet before the electronic age because network communication is a concept separate from the application of electronic media. To connect information in ways that exhibit the complex relationships of ideas, objects and the people that interact with them is an analog game of organization. It was through the lowly footnote (take for example the citation at the bottom of this page or the next) that Otlet saw a window unto a spectrum of human thought and creation. The citation functions to draw a connection to an idea formulated by another author. It represents a link between two different lines of thought: this one, with its assumptions, discussions and conclusions, and the other being referenced. Both are connected by a concept neatly packaged in bibliographic code. The referenced author no doubt referred to other authors and other ideas and so did those authors ad infinitum. Therefore the links made between articles served as a conceptual non-linear framework for the ordering and exploration of all knowledge. In one bibliographic reference, recognized Otlet, a pathway to the whole of all published knowledge was at hand.

As the Mundaneum grew during the first decades of the 20th century, information inundated Otlet's offices. His appreciation for, and anticipation of, the explosion of media at the turn of the century—photography, telephones, radio, film, television—swayed him to collect not only bibliographic material but also all kinds of data. However the reputation Otlet fostered with the Belgian government and nascent League of Nations to fund the project was perhaps too successful. He and his staff could not keep up with the demands from researchers, politicians, and those simply curious submitting queries via mail and telegraph, nor the growing number of published work arriving by the truckload. Boxes of bibliographic material pending review filled the hallways, staircases, and cramped storage spaces dotting the center's campus. Disappointingly, the encyclopedic project proved a colossal undertaking that exposed not only

Otlet's "intellectual hubris" in the age of optimism, but also the limitations of the most advanced analog technologies of that time.⁵ Ultimately he realized the tools of his age were too cumbersome to execute the breadth and detail of his task. The operation could not scale-up and ultimately fell from favor in the government and with its funders. Then in a dramatic turn, the partial destruction of his storehouses during the Nazi's march on Belgium obliterated his dream almost entirely. Otlet died a frustrated theorist in the closing stages of World War II having witnessed the ruin of his life's work firsthand.

b. Thesis Overview

Writing of the Mundaneum for the New York Times, Alex Wright asks, "Was the Mundaneum just a historical curiosity—a technical road not taken—or can his vision shed useful light on the Web as we know it?"⁵ The answer is in fact both. Paul Otlet's archive-turned-museum is an archeological site for tech enthusiasts as much as a schema for the limitations of technology. Moreover it is perhaps fitting that the Mundaneum has been reincarnated as a museum for those same limitations that existed at the turn of the century continue today in new forms. As museums push forward into the 21st century, a concerted effort to counteract the historicism of display and expand access to their collections online has brought a new dimension to Otlet's legacy. Though museums are largely rooted in the display of physical artifacts through the linear procession of art historical movements, new collection databases online aim to share information non-linearly over the Internet. In other words, the hyperlink technology pioneered by Otlet has the potential to link centers of knowledge to physical objects abstractly in the museum. Thus museums that publish their collections online are fulfilling a fragment of his

⁵ Wright, Alex. "The Web Time Forgot." The New York Times. June 17, 2008: F4.

grand objective. Using disparate data and objects in non-linear ways, museums elucidate new meaning and content. The ability to store and transmit vast sums of data, to index, link ideas and retrieve them independently or in unique narratives are the means by which online collections can transcend traditional hierarchical systemization. Therefore the objective of this essay will be to illustrate the conceptual paths museums have taken to organize their collections, the subsequent criticism of exclusion, and the significance of rethinking access through network communication and its digital manifestations such as the Internet and hyperlink technology.

It seems appropriate that the Internet, as successor to the Mundaneum's conceptualization of hyperlink, has been taken up by museums to organize and make use of the information related to their collections. Yet though the art museum and Mundaneum arose from enlightened patterns of systemization, the ways they stored and distributed such data set them on different historical courses. Whereas the types of knowledge Otlet pursued were abstract, the first museums set about cataloging material artifacts wrapped heavily in social behaviors and beliefs. For Otlet, the categorization of bibliographic references was a simple operation of extracting content from data, but art's aesthetic dimension complicated its systemization in the museum. The result was the secularization of art, its reinvestment with historical meaning, and subsequent politicization of the museum. A critique of this model questions the value of systematized history. Many argue the consequence of linear, streamlined historical accounts which draw concrete conclusions have the unwelcome side effect of marginalizing or completely obscuring non-conformant histories. Thus the museum, as the institutional agent of organization in art history, is often complicit in promoting the scarcity of information. In response, museums have revisited the fundamental ways in which they communicate with their audiences, and one important way in which they are doing this through the use of hyperlink technology and the Internet.

Yet in spite of the Internet's application in museums, warnings from Otlet's grand endeavor persist. Though the Internet opens a floodgate to an abundant source of information, the presence of technology does not automatically indicate the successful synthesis of knowledge. Rather the Internet exacerbates how impractical it may be for institutions to catalogue and synthesize all information related to their collections. As Otlet discovered, the sheer mass of information can be overwhelming and is often irrelevant. Moreover, though hyperlink should theoretically extend the institution's reach beyond the physical space it has traditionally occupied, in practice, attempts to link institutions over the Internet have met an aversion to compromised museum authority. Lastly, virtual technologies once heralded as the liberating force of the twenty-first century and the impetus for a wave of virtual museums have proven much more limited. Clearly the strength of the Internet does not lie in the visual capacity of digital display, but in the connective power of hyperlink technology. In this way, Otlet was a visionary. Network collection databases similar to the Mundaneum's system link ideas and physical objects directly without mediatory hierarchical structures. A prime example of non-linear exploration exists at the Brooklyn Museum's Visible Storage space that adequately balances both the value of network communication with the authenticity of museum experience. This is the pursuit the application of digital media should take as museums explore the Internet's potential.

2. The Flaws of Historical Systemization

a. The Foundation of the Mundaneum and Museum in the Enlightenment

The underlying factor that has persisted through the development of network communication is the enlightened idea that all information can be ordered and cataloged in an encyclopedic fashion to help humankind understand the world. This principle fundamentally ties the Mundaneum to the origin of the museum as a cultural institution given that both assume the same. Otlet's desire to catalogue, centrally organize, and make accessible the world's knowledge dramatized the closing act of the Enlightenment by putting philosophy to practice and fading tragically. Why is it that museums did not experience the same misfortune? The important difference to be made here is one distinguishing archives from museums. They escaped a similar fate due to the peculiarities of art display and representation in Western institutions. While an archive is valued for its ability to make everything available to the user at once, the museum is not held to such high standards of accessibility. In fact, most museums display only a small fraction of their collections. Hence the difference between the Mundaneum and museum draws from their practical use.

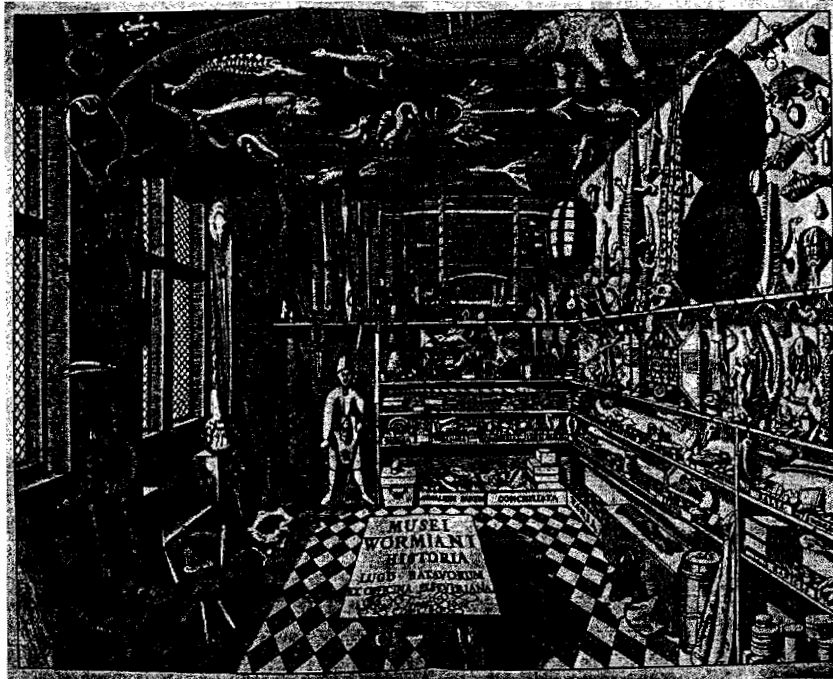
At any moment it was necessary for Otlet to have access to his cataloged citations, for without immediacy the system was ineffectual. Oppositely, the aesthetic dimension of the museum relieves it from the necessity of displaying each work of art in its possession. Unlike the reproducible data of primary concern to Otlet, artworks are unique objects. And as long as a museum can narrate the history of art with the collection it displays, it does not matter which objects are used toward that aim. The museum may have a body of work representing a given artist or particular style, but need only a handful to illustrate the curatorial program of the

institution. Barring issues of conservation, the museum therefore has a relative luxury to choose at will which objects to exhibit and is rarely impeded by the necessity to display an entire collection. For this reason, though both the Mundaneum and museums are structured through a system of classification, the framework is inevitably used for different purposes. An essential distinction is one between the all-encompassing nature of projects like the Mundaneum and the Internet on one hand, and the object-specific focus of museums on the other. Art is not solely composed of data to be “culled” leaving behind an empty shell. It moves the viewer through both the message it conveys and the aesthetic experience it creates. While there is merit in the pursuit to relate spheres of knowledge with objects, in one sense art resists definition. Though one may succeed in translating, storing, and relating data concerning cultural artifacts—the things external to them—their essence may only be captured fleetingly. Perhaps that is what is so enigmatic to art, and furthermore what draws us back time and again to that which is truly moving. No matter how in-depth our knowledge is or how efficiently it is communicated, at some level art is an indefinable experience.

Barring aesthetics, both the Mundaneum and the first museums were guided by a concept that the logical organization of knowledge will make comparisons more effective and divulge new meaning. This idea stems directly from eighteenth-century Enlightenment philosophy. A political and social movement in Europe that emphasized the universal rights of men and questioned the established political order of god-given-rule, the Enlightenment also introduced new forms of classification through the use of rationalism. Importantly, both the Mundaneum and museums drew on the popularity of scientific classification and an optimistic faith in institutionalism derived from rational thinking. Each sought to establish institutions for the compilation and dissemination of culture that originated in motives of categorization. At the end

of this era Paul Otlet developed his research facility concurrent with an explosion of collection building in the Western world. For instance, though the Louvre was founded in the eighteenth century, the burning of the adjacent Tuileries palace in 1871 made way for an expansion to its current size. Meanwhile in Britain, Sir Robert Smirke's new quadrangle building for the British Museum completed the first phase of its construction, the Elgin Marbles were in place, and work had begun on the round Reading Room. In the United States, the Metropolitan Museum of Art and the Brooklyn Museum of Art (then the Brooklyn Institute of Arts and Sciences) were erecting similar edifices in the Gothic Revival and neo-classical styles to house their growing collections.

It follows the museum may be thought of as a phenomenon of the Enlightenment where knowledge is gathered and linked specifically to artifacts. The museum has historically sought to systematize knowledge in relation to art to illustrate concrete truths in a variety of ways. The fact that the earliest scheme for the display of art in the West has come to be known by so many terms—aesthetic, decorative, princely—speaks to the varied manner in which early collectors organized their objects. August Hermann Francke, a German Lutheran minister and educator, founded a collection in Halle that survives in part as an example of decorative hanging and display. It is eclectic and filled with both natural specimens and art objects, arranged in ways emphasizing form, symmetry, and order.



"Musei Wormiani Historia," the frontispiece to the Museum Wormianum depicting a wunderkammer similar to the one built by Francke.

Like the Mundaneum centuries later, a similar collection to Francke's known as the Wormianum took a falsely Latinate name to articulate an imaginary, intellectual connection to the past. A whole host of objects were collected and displayed in a similar wunderkammer concept (literally: wonder cabinet) including and not limited to graphic arts, scientific objects, numismatics and ethnographica. Aesthetic presentation dominated wunderkammer display, yet many were also loosely ordered along the lines of German-born Samuel Quiccheberg's five classes of objects. Arguably the earliest known museological treatise, Quiccheberg's essay on display intended to guide the encyclopedic arrangement of princely collections into categories of naturalia and artificialia, the great chain of being, the four continents, and the four elements. The organization of objects into these categories, argued Quiccheberg, carried meaning through the creation of order from chaos. But perhaps more importantly, a well-stocked, diverse collection suggested the power of the owner to create his own microcosm. The early collection was thus understood

as a model of the world on reduced scale, and furthermore, afforded the structure for producing meaning.

The first public institutions dedicated to the display of art merged the curiosity of wunderkammer and private collections with the systemization of the Enlightenment. A 1780 painting by John Zoffany, titled *The Tribuna at the Uffizi*, portrays an outgrowth of the decorative style termed comparative hanging.



John Zoffany, *The Tribuna at the Uffizi*, Oil on canvas, 1780.

Displayed with aesthetic purpose, the Florentine Tribuna also invited the viewer to analyze works against one another; an activity closely associated with the art connoisseur. It is for this reason Zoffany's depiction of the space includes not only some of the most famous works in Florence at that time, but also the portraits of the many wealthy collectors who owned and enjoyed them. This painting stands as testimony to the phenomenon of idealization and historicism of the Renaissance as an age of reason, and the desire of the painter and subjects to be linked with its traditions. Curatorial display at the Tribuna, therefore, organized itself to

highlight the strengths of one artist against another in terms of color, line and composition. The result was an emphasis on comparison and the cultivation of a new class of connoisseurs who defined a growing vocabulary and talking points between the discussions of collecting. Early in the eighteenth century, Jonathan Richardson for example, an influential English drawings collector, published two discourses on the display of art: “An Essay on the Whole Art of Criticism as it Relates to Painting,” and an “Argument in Behalf of the Science of a Connoisseur.” Through both, Richardson idealized the connoisseur as a cultivated man with grounding in fine arts, and described the civilizing virtues of connoisseurship as “the reformation of our manners, refinement of our pleasure.”⁶ Richardson, among others, demonstrated how the development of the aesthetic appreciation and the value of arts-related knowledge propelled connoisseurship into the display of art during the Enlightenment. Subsequently, the display of the French King’s collection at the Palais du Luxembourg, one of the finest in eighteenth-century Europe, and many private collections reverberated with the comparative approach.

Yet from an early stage the forces of aestheticization and historicism were pitted against one another in public display. The tension between both in the wunderkammer setting was a prelude to larger drama among national institutions. At roughly the same time Zoffany painted the *Tribuna*, others were theorizing how Carl Linnaeus’s “Systema Naturae” might propel the organizational spirit of the Enlightenment in the opposite direction. Though specifically devoted to biological classification in the eighteenth century, Linnaeus’s system inspired the rational categorization and classification of everything, including art. While many oriented their collections to exhibit stylistic relationships, some were conceptualizing the historical systemization of art to illustrate stylistic progression. Beginning with the assumption that

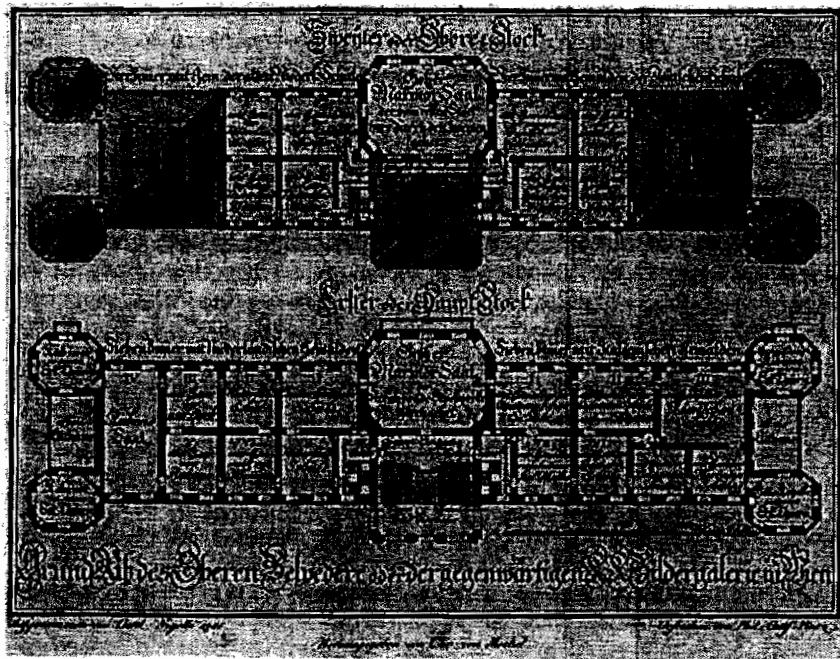
⁶ Brigstocke, Hugh and Harold Osborne. “connoisseur, connoisseurship.” *The Oxford Companion to Western Art*. Ed. Hugh Brigstocke. Oxford Art Online. 19 Nov. 2008
<<http://www.oxfordartonline.com/subscriber/article/opr/t118/e605>>.

anything could be codified and inserted into a map of all knowledge, collectors theorized a conceptual method that proposed meaning could be elucidated from structural rather than formal comparison. It was this chronological arrangement supported by the leanings of the Enlightenment that would take center stage in the first museums.

One of the earliest examples of chronological design was implemented at Belvedere Palace, Vienna in 1783. Organized by printmaker and collector Christian von Mechel for Emperor Joseph II, the museum was structured upon principles of chronological classification and ordered itself by school, region and artist. As the visitor strode through the gallery plan, examples of mannerist painting followed the work of Renaissance masters and preceded galleries dedicated to the French schools. Consequently, von Mechel defined the museum as a public site for instruction in the history of art; one “constructed as the succession of great masters and their pupils.”⁷ A concise history was retold through the series of paintings and sculptures by preeminent artists of each period and spatially defined by a sequence of galleries. Visitors were in effect swept along by the ‘march of time’ created through the progression of art historical movements. Evidence to its desirability, the Austrian model gradually prevailed in museums throughout Europe and more slowly in America. Fewer works were placed where one could study them in sequences that emphasized historical relationships over aesthetics.⁸ In this fashion, the Enlightenment shaped the display of art in the first museums by altering the structure of presentation.

⁷ McClellan, Andrew. Inventing the Louvre: Art, Politics, and the Origins of the Modern Museum in Eighteenth-Century Paris. University of California Press, Berkeley: 1994. 4.

⁸ Walsh, John. “Pictures, Tears, Lights, and Seats.” Whose Muse? Art Museums and the Public Trust. Ed. Cuno, James. Princeton University Press, Princeton: 2006. 92.



Plan for the Belvedere Picture Gallery, Vienna by Christian von Mechel showing a progression of structural movements separated by galleries

Not only did the presentation of art change through the Enlightenment, but the political and social upheaval of the 18th century also ignited a new public self-awareness. In essence the liberalization of the rights of man during this period called for the representation of those rights in the activities of government. The public space thus became a stage for the unfurling of the democratic persona and a very potent political tool. Of course art institutions looked to the most enlightened examples of curatorial expertise to order their collections for public education. The Louvre, to use the archetypal example of the museum, was both an outgrowth of the royal art collection displayed at the Palais du Luxembourg and the Parisian Salon. A biennial (later annual) event organized to showcase talent distilled from the Royal Academy, the Salon served to legitimate the expense of public funds to further the crafts of painting and sculpture in France. But tangentially, the arrangement of royal sponsorship entangled the exhibition of art with the public's view of government responsibility. For this reason, the Louvre is a prime example of

the politicization of the museum space since it marks “the clearest and most brutal transfer of authority to the art museum.”⁹

Because the French monarchy had for decades evaded the permanent establishment of a public gallery to view the king’s growing art collection, the revolutionary Louvre sought to prove to the public that the state had its citizens’ best interests in mind. However, a more covert motive to aligning the state with the museum intended to reinforce the perceived competence of the new French republic by placing it at the end of a great chain of artistic achievements. The government thus hoped the museum would confirm “the superiority of the new over the old regime” by embodying the grand ideas of the revolution largely derivative of Enlightenment philosophy.¹⁰ “Imagine Paris,” one believer wrote, “as the capital of the arts: imagine the inestimable advantages of it becoming the home of all the treasures of the mind...it must be the school of the universe, the hub of human science, and command the respect of the whole world through knowledge and instruction.”¹¹ But in spite of the ground that historical categorization had gained in Europe, the Louvre commissioners passed over von Mechel’s school-based curatorial pattern. They believed it contained royalist undertones that the revolutionaries tried frantically to eliminate after sentencing Louis XVI to the guillotine in 1793. Instead, the commission looked back on the Palais du Luxembourg and a model that expressed connoisseurship, linking objects through stylistic comparison.

“The arrangement we have adopted,” began James Lebrun, speaking for the Louvre Museum Commission, “is like that of an abundant flowerbed we have planted with great care.” He continues, “If we had separated the collection into schools, we might well have satisfied a

⁹ Wood, James N. “The Authorities of the American Art Museum.” *Whose Muse? Art Museums and the Public Trust*. Ed. Cuno, James. Princeton University Press, Princeton: 2006. 104.

¹⁰ McClellan, 92

¹¹ McClellan, 116

handful of scholars, but we feared being criticized for having ordered something which...would actually hinder the study of young artists, who, thanks to our system, will be able to compare the styles of the Old Masters, their perfections as well as their faults, which only become apparent upon close and immediate inspection.”¹² The choice to concentrate on aesthetics over a historical plan represented the clash between alternate models of exhibition at a time when the concept of museological display was fresh and untested. Though the commission acted in good faith by attempting to enhance the quality of art education in France as understood in the nineteenth century, the mixed-school, aesthetic arrangement was in fact more closely associated to the opulent style of the king’s court than von Mechel’s historical model. As Andrew McClellan explains, “the Commission’s likening of the museum to a cultivated flowerbed smacked of what had come to be seen as the leisured dilettantism of the Old Regime.”¹³ Connotations of luxury trumped the fear of reigniting royalist sentiment. Quickly they learned that the display of art in the museum could not contradict revolutionary ideology, nor that of the Enlightenment, and also expect the support of the new government.

As spoils of conquest deluged the museum, Louvre officials shifted toward the chronological system of classification they originally discounted as elitist. The presentation of artwork morphed room by room as the galleries were reinstalled in a fashion that followed the enlightened principles espoused by the revolution. Objects previously endowed with spiritual or royal significance (altarpieces, icons and ritual objects) now housed in the museum were taken from their original context and invested with art-historical meaning.¹⁴ For example, the famous Peter Paul Rubens cycle commissioned by Catherine de Medici to celebrate the French

¹² McClellan, 107

¹³ McClellan, 108

¹⁴ Duncan, Carol. “Art Museums and the Ritual of Citizenship.” *Exhibiting Cultures*. Smithsonian Institution, 1991. 27.

Monarchy was considered at the conception of the Louvre to be one of the greatest artistic achievements in history. However, its origin at the hands of the old regime and unmistakable iconography of the sovereign contradicted the republican sentiment the commissioners desired. Stripped of their connotations of social status and often older meanings, these objects were converted into repositories of collective state treasure. Whereas the Rubens cycle was once reserved for the pleasure of court members, the revolutionaries made it available to the public; a radical change difficult to appreciate fully today. Importantly, the commission's solution lay in the forces of secularization bestowed upon the museum by the government. The royal subject matter of the cycle was made less significant in trade for the paintings' place in history and course of the artist's career. The museum environment thus conveyed a new public wealth in which everyone, even those uneducated in the arts, could enjoy the sheer splendor of their national heritage in the grander course of art history.¹⁵ And this became the model, writes McClellan, "for all state art museums subsequently established."¹⁶

b. Favoring Genius: The Bias of Historical Display

Since historians and theorists turned their scrutiny on museums, it has become apparent that the museum is not an impartial or transparent space. "Museums are not neutral spaces that speak with one institutional, authoritative voice," Janet Marstine writes; "Museums are about individuals making subjective choices."¹⁷ Prime example being the choices the commissioners of the Louvre made when choosing which paintings and sculptures best represented the stories

¹⁵ Duncan, 95

¹⁶ McClellan, 108

¹⁷ Marstine, Janet. Ed. New Museum Theory and Practice. Blackwell Publishing; 2006. 2.

they wished to tell and the histories to present. The once prominent royal portraits were hidden away in storerooms and replaced by republican images of virtue. Emphasis was placed on object orientation within the overall scheme of school-based display rather than simply aesthetic purposes to instill the importance of historical movements in art history. The art was arranged purposefully in such a way as to show the “progress” of history; how it is the culmination of a series of achievements by “geniuses” that deposited great works of art in the present period. The ordering of artifacts in this fashion produced a system that valued history painting and portraiture over landscape and still life due to its propagandistic power. History paintings received the most attention because they often served the political purpose of inspiring morality and illustrating the virtuous deeds of a good citizen. The problem with this scheme is that historicism often purges the past of conflict and extracts the greatest examples of individual genius.¹⁸ Therefore the critique of art history, and by association the chronological methods of museum display, has been an acknowledgement of the structures that generalize, marginalize, or bury opposition and historical conflict.

Arguably, traditional museum display is flawed in that it presents simplified histories that highlight the relatively fixed and flat presentation of cultural artifacts in chronological systems. In other words the process of streamlining historical events for curatorial purposes often distorts the context that envelops art and thus the environment in which it is perceived. Treating works of art as “cultural goods,” ethnologist Jean Cuisenier contends, significantly modifies both their original intent and the meanings that the producers bestowed upon them.¹⁹ For instance, the reinvestment of objects with new meaning served a political purpose during the inception of the Louvre. The crown jewels of the Bourbon monarchy were elaborately displayed to the public as

¹⁸ Duncan, 92

¹⁹ Dubé, Philippe. “The beauty of the Living.” Museum International. Vol. 56 No.1-2. Blackwell Publishing: Malden, 2004. 125.

a symbol of equal right to a shared heritage. What was once the divine property of the king was now presented as the inheritance of the masses. But even at the foundation of the Louvre author Quatremère de Quincy accused the museum of distancing culture from its “true context in living history.”²⁰ The Louvre, and the many museums that mimicked its approach, consequentially systemized the outline of history to form a conceptual method of creating truth.

Leading the discussion surrounding electronic technology and how it was changing the way society shares information in the 20th century, Marshall McLuhan intensely scrutinized traditional establishments of learning at a time when network technology was emerging from the academic and military sphere. His seminal work The Medium is the Message dealt directly with the transition from mechanical to electronic communication that affects museums today as they establish a presence online. McLuhan argued electronic technology threatens the “isolated” mechanical patterns of the nineteenth century by introducing instantaneous forms of communication.²¹ Institutional authority—and therefore that of the museum—was directly linked to the ordering of communication in a structured yet fragmentary way. Like von Mechel’s chronological system, the museum depends on the presentation of sequential facts and concepts.²¹ It is a place where knowledge is fragmented and organized ideologically, as typified by the revolutionary Louvre. And when the model of communication is found biased; when it is identified that the pattern of presentation is weighted in favor of one interpretation over the other, the museum space becomes a stage for contradiction itself. Not only was the neutrality of enlightened classifications called into question, electronic communication further revealed the

²⁰ McTavish, Lianne. “Visiting the Virtual Museum: Art and Experience Online.” New Museum Theory and Practice. Ed. Marstine, Janet. Blackwell Publishing; 2006. 231.

²¹ McLuhan, Marshall; Fiore, Quentin. The Medium is the Message; an inventory of effects. Singapore: Hardwired, 1967.

nanced ways in which the institution instructs while contrarily promoting the scarcity of information.

McLuhan and later Douglas Crimp detected that the traditional systems of classification were in fact agents of constraint. Introducing Foucauldian theory to the museum through his 1980 essay “On the Museum’s Ruins,” Crimp injected into the discussion the idea that museums actually promote the scarcity of information. Contrary to their assumed role, museums limit exploration through carefully crafted ideological and visual hierarchies that define movements, artists and objects. Crimp compared Michel Foucault’s analysis of modern institutions of confinement—the asylum, the clinic and the prison—and their formulations—madness, illness and criminality—to his own profession. He continues, “There is another institution of confinement ripe for analysis in Foucault’s terms—the museum—and another discipline—art history.”²² Art history, its classifications and the related historical modes of museum display, argues Crimp, arise not only out of a need to manage knowledge but to also maintain its scarcity and the place of the museum at its fountainhead. Hence Philip Fisher calls the museum, “the first teaching machine” and an institution clearly engaged in the politics of hierarchy and exclusion.⁸ Thus reading museum parquet against the grain, visitors are found to follow a programmed narrative. This is what Barbara Kirshenblatt-Gimblett considers, “To move through the floor plan of older public museums is to walk a particular plot, whether evolutionary, revolutionary, or something else.”²³

On the other hand, it is clear the museum is not subversive. The crafting of histories in such a way that may be called ‘exclusive’ is the result of a reliance on traditional, conceptual

²² Fraser, Andrea. “Isn’t this a Wonderful Place? (A Tour of a Tour of the Guggenheim Bilbao).” Ed. Karp, Ivan. Museum Frictions: Public Cultures / Global Transformations. Duke University Press: Durham, 2006. 138.

²³ Kirshenblatt-Gimblett, Barbara. “Exhibitionary Complexes.” Ed. Karp, Ivan. Museum Frictions: Public Cultures / Global Transformations. Duke University Press: Durham, 2006. 37.

methods that promote and string together significant developments to retell a narrative. The breadth of information and the extent of museums holdings are often too great to communicate entirely in a liner narrative. Unlike the archive, the traditional museum is selective in presentation. Something must be cut to remain concise. But is such necessarily the path display must take? Indeed it is perhaps easier to display a collection in this fashion, but is there a more comprehensive method? In recognizing the limited scope of linear storytelling, museums have looked to address the claim of marginalization. By placing access to collections online and relating objects to ideas non-linearly, some conceive a path to counteract historicism in the museum.

c. A Solution Through Hyperlink

While the term ‘hyperlink’ did not enter popular vocabulary until the invention of the web browser in 1993, the concept was long established as an objective of network communication. Coined in 1965 by Ted Nelson, hyperlink took its cue from a lineage of information scientists. Paul Otlet first illustrated how a modern network could move data more efficiently than traditional means of ordering information in hierarchies. By relating topics conceptually, Otlet’s system connected disparate centers of knowledge with one another in a potentially limitless web of linked citations. Bypassing the structure of institutional interpretation, this system emphasized the context of related entries. The opening scene of a 1998 made-for-TV Dutch documentary concerning the Mundaneum shows Otlet’s biographer W. Boyd Rayward demonstrating how the system worked. Dusting off a hardcover numerical

catalog based on the (then new) Dewey decimal classification system, Rayward vocalizes for the camera the procedures used to access the Mundaneum's once expansive database. Thumbing randomly through the pages of the directory, he stops and runs a finger down the page. "617.39, congenital malformations: flat feet," Rayward says. "If I was interested in that subject I would go to the file and find all the citations related to this topic."⁴ Like hyperlink today, the catalog entry would suggest to the user where to find other entries that addressed similar topics. In theory, a path through the database could contain every citation in a web of linked subjects and areas of interest. "The connections are limitless," Rayward continues. "[It is truly] a map of all knowledge."⁴

In 1944, the year of Otlet's death and two decades before Nelson's coinage of networked communication, Dr. Vannevar Bush published an influential essay in the *Atlantic* entitled "As We May Think." Through the article Bush describes an imaginary machine called "memex" that uses microfilm to link pages of information together in a chain of related data and images. Late in his career during the 1930's Paul Otlet conceived and built a comparable yet rudimentary version of microfilm to compress the bulk of paper-based information. However Bush pictured a machine that could not only condense the size of data in photographic form, but also permit scrolling back and forth along the trail of pages assembled by the user as if it were a single document. Though the premise seems obvious to anyone familiar with the Internet today, at the time it was a revolutionary idea. "A memex," Bush goes on to explain, "is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility."²⁴ Applied to both data and images, Bush theorized each entry would enrich the next and serve to contextualize a particular topic. Whereas hyperlink in the nineteenth-century was analog and required actually walking the stacks

²⁴ Bush, Vannervah. "As We May Think." *Atlantic Magazine*. July, 1945.

to find a citation, Bush's imaginary database recognized the immensity of information in existence and postulated how electronic media might condense it. With a memex, Bush writes, "The Encyclopedia Britannica could be reduced to the volume of a matchbox. A library of a million volumes could be compressed into one end of a desk. If the human race has produced since the invention of movable type a total record, in the form of magazines, newspapers, books, tracts, advertising blurbs, correspondence, having a volume corresponding to a billion books, the whole affair, assembled and compressed, could be lugged off in a moving van."²⁴ At the time Bush was considered even more unrealistic than his predecessors. Whereas Otlet had dedicated an entire city to the task of information management, Bush proposed to put it on wheels. Yet he qualifies his statement with the assertion that mere compression is not enough; "one needs not only to make and store a record but also be able to consult it."²⁴ This was a prime lesson of the Mundaneum and it appeared to Bush that new electronic media would ameliorate the issue.

Over the subsequent fifteen years, Ted Nelson took the task of translating Bush's concept of automated cross-referencing into the digital realm. Expanding exploration from a linear format and local machines, Nelson theorized a much grander worldwide computer network. In one sense, he returned to Otlet's attachment to universities and museums as centers of knowledge by arguing that the network should be accessed from places of learning. But instead of centralizing the body of information in a single location as with the Mundaneum, Nelson turned the plan on its head. He argued for a network of dispersed information centers that could be accessed and augmented remotely. This would make the data more manageable and still offer the ability to consult what Otlet could not control at high volume. In the end, however, theory yielded to funding. It was not until the Advanced Project Agency (ARPA) stepped in under the authority of the United States Department of Defense that the vision was brought closer to

fruition. Independent of, but indebted to Bush's and Nelson's work, the successful establishment of digital communication between two research facilities at Stanford University and the University of California, Los Angeles in 1969 was perhaps the most salient demonstration of the new digital era. It was this first exchange that evolved into ARPANET as university research centers plugged into the growing network. The following two decades constituted a refinement and expansion of the network of computers that comprised ARPANET until it was supplanted by the Internet and commercial browsers in the early 1990's. It was only at this most recent point in time that individuals and larger organizations such as museums began to use the Internet and digital hyperlink technology in great numbers. Similar to how analog hyperlink technology employed by the Mundaneum potentially gave access to every citation in the database in a web of references, digital hypertext today has the potential to contain links to every website on the Internet. By merging the pursuit of collecting, organizing and disseminating knowledge with electronic compression the global network advocated by Bush and Nelson, the Internet consummates Otlet's objective—to provide access to a large body of information in a relatable context.

As a response to the realization that the classification systems once believed to be firm are in fact flawed, the Information Age museum has attempted to set a new stance through the use of hyperlink. A 1992 report from the American Association of Museums (AAM) outlines that self-made challenge to reinvent the museum as an institution that can integrate new relationships and perceptions of art. The main goal of which is to break free from traditional hierarchies and organizational forms that typify the exhibitionary complex.²⁵ “Museums must become more inclusive places that welcome diverse audiences, but first they should reflect our

²⁵ Kirshenblatt-Gimblett, Barbara, 59.

society's pluralism in every aspect of their operations and programming...Dynamic, forceful leadership from individuals, institutions, and organization from within and outside the museum community is the key to fulfilling museums' potential for public service in the coming century." Though careful in language, this paragraph is evidence to the communal awareness among museums of the way in which their relationship to the public has changed. It typifies what Gail Anderson calls the "reinvention of the museum" and the desire to be relevant to society.²⁶ Yet it seems somewhat ironic that an institution meant to preserve artifacts and transmit timeless ideals finds itself in a position of potentially constant reinvention to remain contemporary. This is symptomatic, however, of the realization that museums are not the stalwart purveyors of knowledge they were once assumed to be. Quite the opposite, museums are edited, calculable and transitory manifestations of the ways in which cultural authorities agree history should be valued. Like the book exposes the leanings of its author, so too does the museum reveal the peculiarities of the public taste it serves.

The conflict is one between the traditional authority of the institution and the aspiration to be more inclusive and transparent. On one side, critic Michael Kimmelman argues, "The crisis of confidence on the part of museums can only be solved...by less equivocation, less democracy...and a reassertion of authority on the part of the museum."²⁷ However the shift museums have taken in favor of the Internet and hyperlink technology to combat criticism of narrow interpretation illustrates how this view is marginal to the ethos of the museum community. Less democracy and greater authority in the museum would be reactionary to the

²⁶ Anderson, Gail. Reinventing the Museum: Historical and Contemporary Perspectives on the Paradigm Shift. Rowman Altamira. 2004. 1.

²⁷ Lowry, Glenn D. "A Deontological Approach to Art Museums and the Public Trust." Ed. Cuno, James. Whose Muse? Art Museums and the Public Trust. Princeton University Press, Princeton: 2006. 131.

criticism, not conciliatory. It is at this point where Paul Otlet's theories concerning networked communication and the purpose of exploration in the museum rejoin.

Though the Mundaneum failed in part due to the limited infrastructure of the nineteenth century, digital communication has given new life to a century-old pursuit. As Otlet proved with simple index cards, context may be reconstructed with the help of network communication in a non-hierarchical framework. Over-simplified interpretations of history can be "altered by engagement with pluralistic narratives, validation of alternative views of collections, and a shift to self-perception and analysis through interactivity."²⁸ Although the makers of the artwork on display in the museum are long gone, such does not discount the prospect of conceptualizing the nebulous ways in which they interacted or how we ourselves interpret their work. Context, we now know, may be retrieved through the complex arrangement of social and economic relationships. Inheritor to the methodology of the Mundaneum, the Internet is therefore primed to assist in retooling the museum's discredited systemization of history by linking collection-specific plans to centers of knowledge non-linearly. "The tools of cyberculture," as one author puts it, "create a veritable ontological revolution."²⁹ Whereas information was once restricted to a physical form, electronic technology liberated it from the necessity to be embedded in a piece of paper, hard disk or on a computer screen. The Internet abstracts information from its materiality and reduces the primary cause for the scarcity of information. Consequently, the ability to store and transmit data, to automatically link and retrieve it, has turned the paradigm on its head. Education is shifting from instruction and the imposition of structure to discovery and exploration, as McLuhan insists.²¹ This model will involve greater audience participation and scrutiny of the museum's role in shaping culture.

²⁸ Cameron, Fiona. "Digital Futures I: Museum Collections, Digital Technologies, and the Cultural Construction of Knowledge." *Curator*. Vol. 46, No 3. July 2003. 325.

²⁹ Wark, McKenzie. "Cyberculture Studies." *Critical Cyber-Culture Studies*. NYU Press, New York, 2006. 71.

Through the Internet suddenly the Mundaneum is seen as something quite prescient. Otlet is vindicated by his anticipation of a framework to process information, make it practical, and draw connections between distinct areas of study. Museums placed hope in the Internet that it would not only combat the criticism that institutions act as containers for “dead” art, but also the notion that they screen or destroy original meaning by eliminating context through biased techniques of display. Institutional websites sponsored by an international array of museum, as well as their joint efforts, exemplify how museums have incorporated hyperlink technology programmatically. Museum websites not only revive the ideas developed by Otlet, but also apply network technology in a fashion that attempts to link museum collections to centers of knowledge non-linearly. These are strategies to link objects with the larger circumstances in which they are formed, participate and subsequently reshape.

3. Online Museum Methods

a. Transcending the Grand Narrative

The transcendental element to the pursuit of networked information has been a desire to collect information, distill its significance and redistribute the findings through an effective medium. Otlet's project, the Enlightenment, and museums newly established on the Web illustrate the aim to extract substance from objects, pull content from experience and make it broadly available. Hyperlink, as the latest formulation of this pursuit, draws upon the strength of the Internet as a malleable, non-linear source of finding and distributing information. Contrary to the linear fashion of history typified by the timeline and historical categorizations common to the museum, the method of digital communication is one that uses not a single but multiple modes of exploration. "The technique of suspended judgment is the discovery of the twentieth century," Marshal McLuhan writes, "as the technique of invention was the discovery of the nineteenth."²¹ This type of historical investigation values a composition of traditionally pivotal moments and ideas with equally valuable and interconnected failures and banalities of art making. "Grand narratives," proclaims Fiona Cameron, "can be logically disrupted in favor of new styles of postmodern texts in which pluralistic narratives arrange information into galaxies of relationships and links."²⁸ Equally, history is not a linear pattern as it is most frequently taught. Whether intentional or not, artwork is created in relation to the past (as the museum insinuates), the present and the future.

belief and behavior that compose culture. This web looks different from every angle and is the counterpoint to the aesthetic dimension of art. Graphically representing information in this way, as opposed to linear hierarchy, is a strategy to represent multiple shifting relationships between concepts. With such, Cameron notes, “Knowledge has the potential to become customizable rather than remain tethered to a single fixed standard.”²⁸ It is presented in packets that may be assembled by the user in an infinite set of ways. This supports Adorno’s point that an object’s unity is not static; it is “processual.”³¹ Rather than reducing art to purported fundamental elements, hierarchical categorizations, or aesthetic features, analysis should grasp the relationships of these elements to one another in a manner of constant reevaluation. It is toward this pursuit that hyperlink in the museum should be applied.

b. A Closer Look at the Louvre

The Louvre museum online (louvre.fr) has made great strides to digitize and make accessible its considerable collection of art. Like most museums today, the Louvre has used computers to convert images of objects and related data into the digital format for storage purposes and ease of sharing. The French national museum, which displays more than 35,000 works of art, has published this database online in an attempt to contextualize every object on exhibit. The Atlas database (similar in concept to Otlet’s “map of all knowledge”) combines both the basic information found on gallery labels and “authoritative commentary” from the

³¹ Adorno, 176

curatorial staff.³² It is a familiar arrangement that piggybacks on the systemization previously established in the museum community. The usual biographical information is presented with each entry as well as a contextualizing element—in text—that seeks to draw upon other objects in the collection or conventional views of art history. Critique of this format has concentrated on the text-heavy, academically oriented narratives that downplay aesthetics. So as to meet the desire for a more visual interface, the Louvre created a comprehensive program entitled “A Closer Look.” Located under the “Eye-Openers” tab of the website’s homepage, this application greets the visitor with a sleek display that is stylistically unlike the museum’s object database. And whereas Atlas is collection-wide in scope, “A Closer Look”—as implied—focuses on one object at a time. Thus the databases represent two distinct experiments in the online museum: the first is oriented to search deductively from the larger collection to find specific objects, and the second is its opposite. “A Closer Look” starts with a single object and expands topically outward, linking other objects of interest in relation to the context of the first.

The database and the interactive feature serve different purposes, but are valuable and appropriate for their respective use. For the researcher, the a priori database is practical for topical searching. The top-down system is efficient when exploration begins with a category and deduces down to specific objects in the collection. Though it has been the traditional instrument of historicism in the museum, academic awareness of potential misuse as a vehicle of simplification and marginalization is a safeguard. Nevertheless the opposing a posteriori viewpoint is refreshing. Beginning with the artwork and building concepts upon it, this approach is more flexible for the casual user. Relying less on the abstract quality of categorization, it links objects with one another by first establishing specific relationships. Arguably, the constructive

³² Quoted from the institutional description located on the museum website at www.louvre.fr

A snapshot from “A Closer Look” at louvre.fr with contextualizing material

Commencing with a three and a half minute narration, an image of the marquise sitting at her bureau is cleanly presented to the viewer without textual distractions. Time columns of bibliographic information and a glossary of art historical terms flank it as the narrator explains their use. From this point the visitor is given the option to peruse a traditional timeline, zoom in closer than physically permitted in the actual gallery space to examine details, and even view a scale that measures the size of the painting in relation to human height. Finally, but most importantly, thumbnail images connect the portrait to other artwork located within the museum and place it in the context of the social and political atmosphere of the eighteenth-century French aristocracy. All elements combined, this tool is a well-planned and comprehensive application of digital media that extends the reach of the Louvre’s collection and educational program beyond the actual gallery. Like Otlet’s catalog, the possibilities of association are endless, with this system the user may choose to follow a historical path or traverse the collection topically, for instance, through portraiture. But the limited scale of this program is discouraging. Out of the museum’s staggeringly large collection, a mere nine objects receive in-depth examination through the Web feature. By demonstrating the painstaking scholarship and effort necessary to bring objects to life online, “A Closer Look” actually exposes the impracticality of applying the program collection-wide in already short staffed and financially strained institutions. Perhaps the type of thorough analysis presented through the program is irreproducible at a higher level (keeping in mind lessons of scale from the Mundaneum), but the substance of this type of investigation seems too fruitful to sweep aside completely. There must be a compromise

between the organizational power of the database and the exploratory function of the interactive feature.

c. Virtual Environments at The Museo Virtual de Artes El Pais (MUVA)

Describing the first attempts by museums to incorporate the Internet into museum programming, Johnathan Cooper writes, “Some people in the field spoke excitedly about how the Web could be used to create on-line virtual museums.”³³ However, Lianne McTavish’s anecdote of being introduced to the Rijksmuseum online points out how a preoccupation with 3D rendering technology, for example, can be counter productive counterproductive? CHECK! at times. Looking over the shoulder of a colleague at the new digital galleries downloading before her eyes, McTavish rejoins, “There is at least one drawback...Now there is no reason to go to the real Rijksmuseum.”³⁴ Though it was simply a joke, her remark reveals a nervous reflection on the relationship between 3D virtual environments and the actual museum. A large group of institutions including the Rijksmuseum use QuickTime (a popular virtual reality software program) to simulate the gallery experience with near seamless digital reproductions over the Internet. Though fixed to a single point, these environments communicate a sense of space lost to photography and the normally flat presentation of art online. Yet if one were to complicate the term “online museum,” it would require the questioning of what is *real*? Is it expected that virtual applications will replace the museum experience? Or are we rather creating two museums out of one? An early theory held if museums could digitalize their collections and

³³ Cooper, Johnathan. “Beyond the On-line Museum: Participatory Virtual exhibitions.” Museums and the Web. 2006.

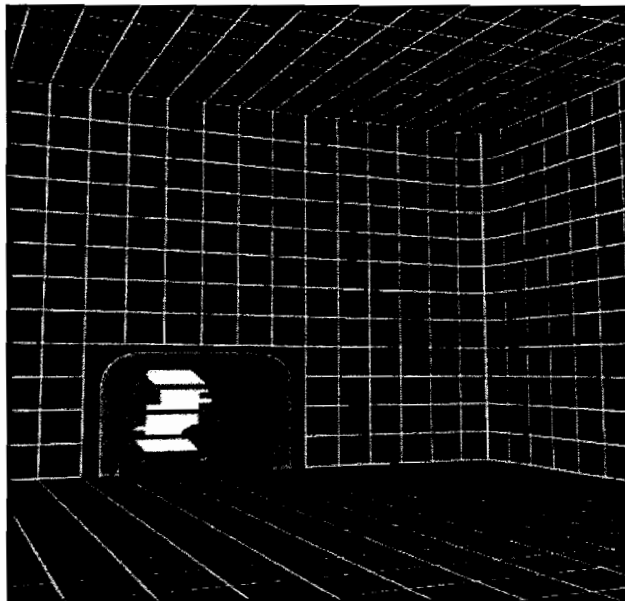
³⁴ McTavish, 227

share the same information online otherwise represented in the gallery, the visitor would no longer need to travel to the physical space. Similar to how the future of education was theorized in the 1950's, it was suggested the museum experience could be accessed remotely from the comfort of the user's home. Travel to New York to see the Metropolitan Museum of Art? No need—it is online! And with the click of a button the entirety of every museum would be at hand. However the imaginative use of virtual space is scarcely a new genre and in fact its many pitfalls have been explored through science fiction.

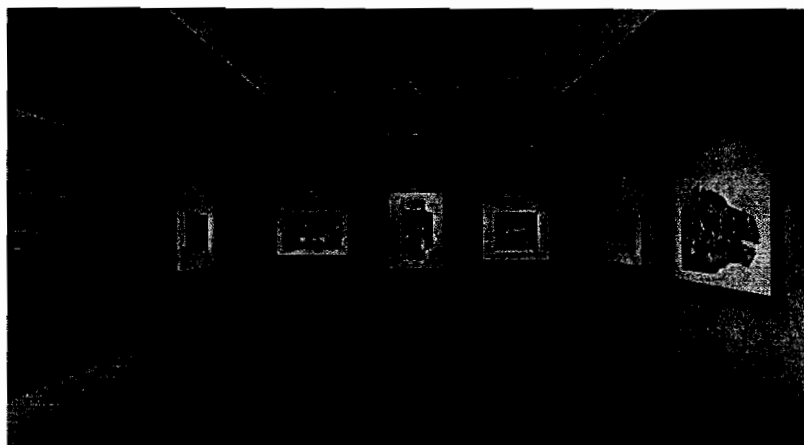
Ray Bradbury was perhaps the first author to envision a simulated environment through electronic technology. Contemporaneous with Vannevar Bush, his short story "The Veldt," involves a children's nursery that can recreate material objects and spaces based on the thoughts of those that occupy the room. It worked so well it tricked the occupants into believing that what they saw, heard and even smelled was real, including the parents' deaths. Taking a similar cue, the holodeck first seen in the pilot episode of "Star Trek: The Next Generation" was used by the crew to simulate settings and events that appear so real they were often difficult to distinguish from reality. The question of what constitutes reality, whether it is physical or mental experience, or a combination of both, was often the center of a dramatic plot. It seems logical the early application of 3D technology online continued the fascination with the representation of objects and space to make reality and its reproduction indistinguishable.

The promise of hyperlink in the museum has consistently been a state of convergence where textual, visual and aural means of communication are blurred and expand the institution's reach past the physical space it has traditionally occupied. This idea epitomizes an optimistic sense that is the undercurrent to the application of technology in the museum. At the outset it was believed that the Internet and hyperlink not only critiqued the status quo, but also provided

real solutions to the issues facing museum work with palpable “antidisciplinary potential.”²⁹ “For a while,” writes Cooper while describing online exhibitions, “the goal seemed to be to make the on-line experience resemble closely as possible the physical experience.”³³ Uruguay’s first virtual museum, the Museo Virtual de Artes El Pais (MUVA) launched in May 2007, is a prime example since it exists exclusively online.



An artist rendering of the holodeck popularized by StarTrek: The Next Generation



An example of a gallery to artist Luis Alberto Solari on MUVA

Unlike the 3D environments created by museums that document actual spaces, MUVA is completely virtual. Instead of appropriating images from an actual museum, the digital architects of this website simulated a concrete slab floor and white walls to create an environment for display.

Far from the enveloping experience of the holodeck, online visitors to MUVA encounter a very convincing museum environment at screen distance. Upon clicking through the entrance of the digitally rendered building, the visitor is presented with a familiar looking, whitewashed reception hall and radiating galleries. Clicking one or another artwork zooms the browser to a tight angle and presents the usual biographical information found in the gallery plus further authoritative resources and explanatory texts. Another click and the viewfinder moves to the left or right or on to another gallery entirely. Writing for *Museum International*, Alica Haber depicts this digital museum “as a medium that is well suited to image intensive exhibits of artwork.”³⁵ This is true, the MUVA site offers a quick perusal of the mainstream and folk forms that comprise Uruguayan art, but immediately there is a sense that something is lacking. At issue is a false sense of interactivity. The virtual environment that Jonathan Cooper determines “Beyond the on-line museum” is in actuality not far from it. Though one can click through the galleries, view images of the art and gain from the curatorial program, it offers what would otherwise be available (and perhaps more functional) in a physical museum. In other words, MUVA and similar online exhibitions tend not to take advantage of the unique connective powers of the Internet, focusing instead on tasks that would perhaps be better served by a visit to and interaction with the actual objects.

³⁵ Haber, Alicia. “MUVA: a virtual Museum in Uruguay.” *Museum International*. Vol.52. No.1, 2000. 29.

It is apparent the central problem to the digital reproduction of art objects is that, in the end, the reproduction still imitates the real thing. It lacks the uniqueness that cultural theorist Walter Benjamin identified as the product of reproduction in the mechanical age. This “aura” of the original experience, Benjamin argues, is what makes the reproduction dependent on the original for its value. In this way the photograph created the aura of the artwork, and similarly, 3D virtual environments created the aura of the real museum. Rather than replacing the gallery and the art it houses, digital recreations confirm the materiality of experience and the importance of object study to the museum’s mission. Of course in the case of MUVA the socio-political condition of Uruguay as a developing nation without a tradition of supporting the arts is one justification for its value. Obviously, without the online exhibition, there would be even less access to Uruguayan art. However, the choice by the creators to fashion a gallery online that largely recreates physical experience appears to maintain the detachment that Walter Benjamin found hurtful to real interaction with art. Reproductions of paintings and three-dimensional objects online continue the trend of detachment and do not take advantage of the inherent strengths of the Internet. Theory aside, the difficulty of spreading the digital experience over the entire museum community would require immense spending. And what about the reinstallation of galleries or temporary exhibitions? How often does the museum need to be re-photographed or re-loaded to stay current? In practice a vision of navigable art galleries online sinks in the quick current of electronic communication.

d. An Old Boys’ Club: The Art Museum Image Consortium (AMICO)

On quite another level, Maxwell Anderson discovered a valuable lesson from the initial excitement that the Internet carried into the museum. Director of the Whitney Museum of American Art from 1998-2003, Anderson oversaw an effort to bring the Whitney to the fore of technological innovation in the field. Aiming to better serve the public through diverse media, and looking for increased visitorship as an advantage over the concentration of museums in New York, Anderson spearheaded an effort to create a powerful online presence for the museum. Following the launch of a successful interactive website for the institution, he then pushed forward with the plan to form a consortium of other prominent institutions on the Internet. Anderson envisioned a network of museums that shared their information with each other and potential users; a sort of mass directory of information related to museums and the objects they cared for. The Art Museum Image Consortium (amico.org), as it is called, brings together a voluntary collection of images from member museums and links them by topic. Similar to the Mundaneum, AMICO exploits the advantages of network communication. Just short of a century after Otlet first conceived of linking knowledge topically, Anderson and his team at the Whitney employed the Internet to forge a platform for searching member sites and return relevant information that would increase access to the work collected and exhibited by museums. And not just the work on display, but in a crucial step toward innovation, Anderson sought to include objects in storage and largely unavailable to the public. The idea was to link similar objects in a metadata center encompassing all collections that could field user queries. It was to be an online library of related and searchable objects including images and information that fostered the contextualization of objects with one another in near limitless ways. However AMICO does not exist today in the form Anderson envisioned because he anticipated success through the sheer application of digital technology in the museum.

Anderson assumed that member institutions would voluntarily open their databases to the public through the AMICO portal. Yet the static form of the AMICO project today (it stopped accepting members in 2003 at the end of Anderson's tenure) reminds the visitor of the misplaced optimism characteristic of initial attempts by museums to network on the Web. Surfing AMICO ends in the realization that Anderson's vision of an online museum consortium morphed into a digital reincarnation of a conventional 'old boys club.' When it was clear that cooperation was stalling online, AMICO's member institutions retreated to a comfortable position as distinct museums bound by a shared web address; a sort of digital Rolodex for the world's top 150 museums. What Anderson did not predict was the tenacity of institutions to cling to their individual identities. Though museums make available their collections online, they do so on their own websites. Hence the problem AMICO encountered was not the difficulty in digitizing collections. Museums have largely done this already for curatorial purposes, to better manage collection care, and administer the complex arrangements necessary to organize traveling exhibitions. Digital collection databases of some sort exist in every major institution today, the information is there. However Anderson's plan for cross-institutional exploration brushed against institutional sovereignty. Relinquishing what is centrally proprietary to museums—access to the art—would constitute institutional suicide.

AMICO confronted the unwillingness of the museum community to yield any authority to a centralized organization. Museum staff feared that turning control over to a central database would diminish their own curatorial interpretations. Instead of linking objects across institutional boundaries on a global scale, AMICO today simply redirects the online user toward the host institution's home webpage, thereby negating its usefulness as an image database. Why not go directly to the museum's website instead where there is likely to be more information?

Though Anderson's project is admirable for its attempt to enlist institutions in a cooperative effort and link objects conceptually regardless of their location or institutional narrative, it also reveals a conflict within the museum community. Despite the value of a massive database including all the information relative to museums, AMICO is exemplary of how the Internet has been used to maintain the scarcity of information. Lessons of scale from the Louvre, virtual reality at the Museo Virtual de Artes El Pais, and Anderson's polarized museum community illustrate how the sheer application of technology does not impose a new conceptual model for the museum. These examples actually retain the devices of subject matter, anonymous narrative and singular interpretation and represent them digitally. Ironically, where museums have overcome Otlet's impasse in storing and retrieving information through electronic media, they have also adapted new methods to obscure it.

4. Dealing with Contradictions

a. Balancing Authenticity with Connectivity

Although Otlet set the model for how hyperlink technology could generate non-linear connections between centers of knowledge, the launch of the Internet reemphasized the shared weaknesses between the Mundaneum and museums. It is no coincidence many of the words in the English language used to describe the position of the museum in society—author, authentic, authority, etc.—are derived from the Greek *authentikós*—to be original, primary, at first hand. Museums are for good reason considered authoritative sources because they are the location for first hand observation of objects. But efforts by museums to exhibit online exemplify how curatorial authority, aesthetic presentation, and institutional identity are conflicted by the open structure of the Internet. Arguably, the Mundaneum was blinded by hubris in thinking it could be the access point for all knowledge. Otlet believed it possible to locate all information in one referenceable location, but he underestimated the immensity of the task in a paper-based world. His example illustrates the difficulty of centralizing authority in one body. Though the network of references was non-linear, the method of consultation was not. His library and archive was in essence a funnel through which all information flowed. “A Closer Look” at the Louvre seems to continue this linear trend. Of course the Louvre project is a contextual tool developed by the staff to augment the curatorial program. But by restricting content to a fixed curatorial program, the museum limits the size of the potential database because of the immense effort necessary on the part of the curators. Instead of promoting new methods of exploration, the reduced scale of “A Closer Look” often forces the user onto predisposed paths.

In comparison, the virtual technologies employed by MUVA reemphasize visual presentation lost to text heavy databases like “A Closer Look” but are hampered by the degree of

separation created by digital media. McTavish asks, “Do virtual museums undermine or reinforce traditional conceptions of the authenticity of art works and museum visits?”³⁶ Her conclusion is a muddled one. If the purpose of object study is direct observation of real artifacts, then clearly 3D virtual environments (or, for that matter, 2D websites) as representations of actual spaces are not wholly authentic experiences. For the same reason copies and slides used frequently in the discipline of art history are deemed less legitimate than experience with the real thing. Bernard Berenson, the well-known nineteenth-century critic and art consultant, spent much of his life traveling Europe to witness the great works of Western history in person. Not only was Berenson a poetic writer and savvy entrepreneur, he also recognized the value of first-person reportage. It was primarily his experiences that solidified his authority in the minds of wealthy patrons as a connoisseur. In contrast, if someone claimed to have navigated every online virtual gallery would they be afforded the same authority? It may be safe to assume most likely not. It is understandable then how authentic experience is linked to direct observation in Western society, and the degree of separation created by digital reproduction—like photography to Benjamin—lessens its experiential authenticity.

Lastly, Anderson’s attempt to link museums and their collections online did not account for the individual spirit of museums or the authority that comes from a singular identity. In effect he did not anticipate the strength of isolationism inherent to the structure of the museum community. Writing for *Museum International* in exasperation, Anderson states, “What is consistent is that each museum thinks of itself as a freestanding identity...This isolationist approach endures despite the fact that what is unique about the World Wide Web is the potential

³⁶ McTavish, 227

of connecting museums to one another and then to the end user.”³⁷ The situation illustrates how many museums define the online experience as an extension of the institution itself rather than a medium of explorative cooperation. For this reason museum websites outwardly promote individualized institutional identity. They are more often than not statements of purpose.

To Haber’s credit she recognizes that MUVA, or any online museum for that matter, cannot solve the underlying problem between context and the display of art. “The intention is neither to substitute for reality nor to usurp contacts with real artwork,” she writes.³⁸ Rather the Internet has been seen by directors, educators and curatorial staff increasingly as a tool to entice visitors to seek out physical encounters with works of art. This, museums reassert, is authentic experience. “If, at home, people have been able to achieve a state of absorption with books and music,” former director of the J. Paul Getty museum, John Walsh confirms, “perhaps they can begin to do the same with works of art on the web...It may actually be that interactivity on the web will not only inform the audience but also condition at least some of them to expect a more thoughtful encounter with the originals.”³⁹ It follows the application of the Internet should not seek to replace the function of the museum in society. Clearly the Internet’s strength is not in the visual representation of art. Museums, for all their inherent contradictions, have been vetted as valuable and sensible places to experience artwork. Instead, a more realistic approach should apply the Internet in such a way as to heighten accessibility to the information the museum has been entrusted with. This, not the sole replication of artwork or museum spaces, has the power to reassert the importance of art collections. The conflict over site between the museum and Internet is less a question of authenticity. Both provide legitimate ways of viewing the world

³⁷ Anderson, Maxwell. “Online Museum Co-ordination.” Museum International. Vol.51, No.4. 1999. 25.

³⁸ Haber, 26

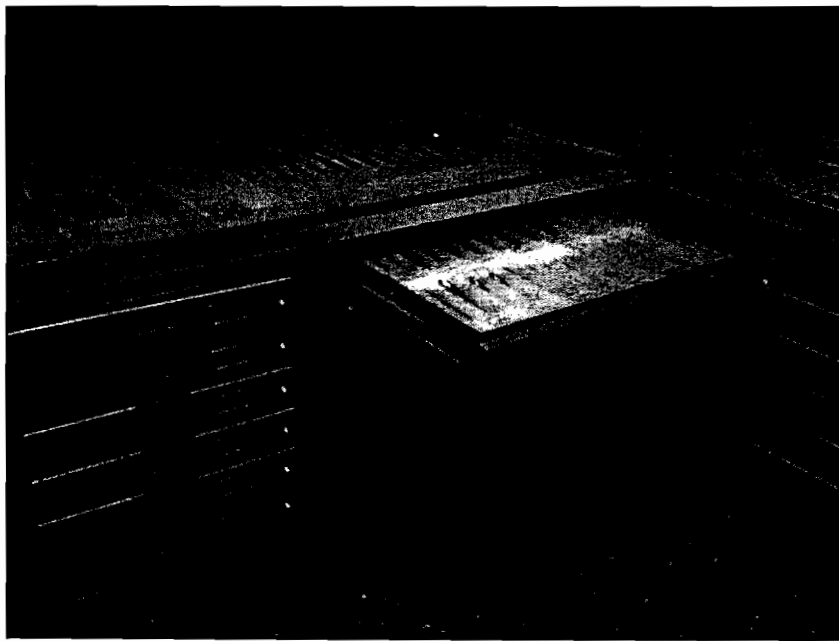
³⁹ Walsh, 96

that have their own benefits and drawbacks. The question is, what balance can be struck that will foster the type of critical engagement we find valuable today? How does one identify the strengths of both and work toward solutions that incorporate the connectivity of hyperlink and the aesthetic component of the gallery space equally?

b. Reaching a Compromise at the Brooklyn Museum

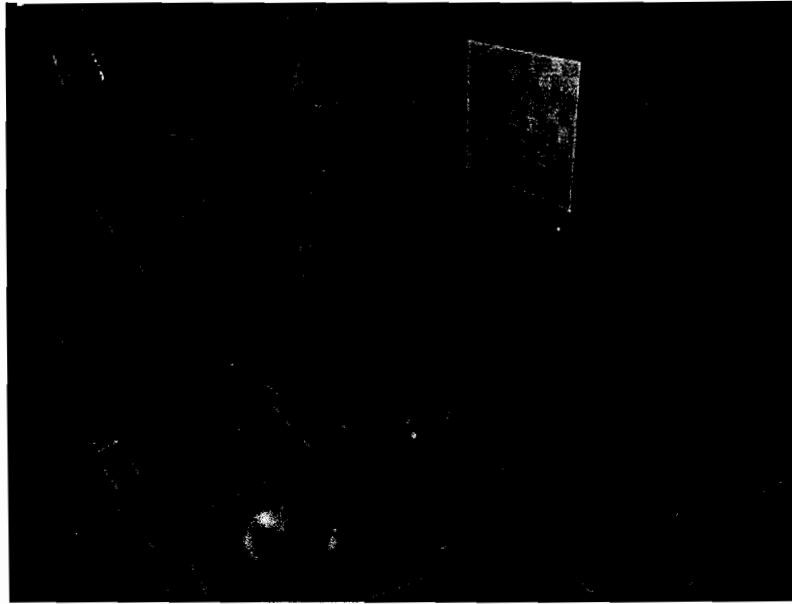
The Brooklyn Museum's Visible Storage space may adequately balance the value of network information with the authenticity of museum experience. It successfully links objects with the appropriate content through the pragmatic use of a museum database. Concentrating on a single gallery, the museum has placed computers with access to its digital catalog directly next to the objects on view prompting visitors to explore a diverse collection of objects both physically and contextually. Within a 5,000 square-foot visible storage area, the curatorial staff has selected more than 2,000 objects to display in a compact setting (compared to the 350 works on view in the adjacent "American Identities" exhibit). The space itself is visually reminiscent of both wunderkammer and archive. In revealing one function of the museum as a storehouse, visible storage intermingles the aesthetics of compact, comparative display with referenceable structure. Paintings stacked one over another on sliding metal racks or the dense congregation of furniture and statuary on industrial shelving are a rare sight for most museum patrons. Recognizing that the Brooklyn Museum, like most, does not have the gallery space to exhibit its collection through traditional methods of display, it makes transparent a typically hidden aspect of the museum in a stimulating way. "The open-storage principle is refreshingly progressive," declares Roberta Smith for the New York Times, "[It refuses] to judge one object better than

another and old-fashioned in its evocation of the very origins of the museum form: the cabinets of wonders kept by European nobility and the accumulations of 19th-century amateur collectors on both sides of the Atlantic.”⁴⁰ Having captured the audience’s attention, select ‘focus’ objects are placed in prime locations with additional booklets of information and demonstrative videos. But the most effective element is the incorporation of computer stations wired to the museum’s database in the actual gallery. This scheme bares an uncanny resemblance to the Mundaneum. Each object, like each citation, has a corresponding number used to link the object to the contextual material in the database. The objects are in turn deposited in a flat file with similar material. Like the Mundaneum card catalogue populated by citations, the files are in turn filled with artwork and easily referenceable through the database.



A drawer filed with objects located with the aid of the museum database.

⁴⁰ Smith, Roberta. “Works, the Whole Works and Nothing but the Works.” The New York Times. January 14, 2005.





A kiosk beside a display case with access to the museum's object database in the Brooklyn Museum's Open Storage gallery.


Access to the Open Storage database is not secreted away in a separate study room to keep the gallery clean and the crowds moving. It is located in the mix of object and storage cases to encourage casual use and accessibility. In comparison to the reference books located on shelves throughout the Mundaneum, the Brooklyn Museum has situated a number of computers in the gallery space to help visitors contextualize the objects on view. Though these computers do not have access to the Internet beyond the museum's site, they share access to a database that incorporates hyperlink text and imagery to draw the user from page to page topically through academically defined groupings. Users cannot augment the content of the site, but rather have the option to post comments for others to see or pose direct questions to the curators. Searchable by map, theme and a keyword feature, the database engages both visitors who have a specific query in mind as well as those who are simply interested in learning something new. The map search allows the user to select an area of the gallery and learn about the objects displayed there. The Theme search is a more organized tool for visitors who are interested in categories


suggested by curatorial staff. Finally, the keyword feature enables exploration of the collection based on specific information such as artist, date or accession number. Perhaps this is an appropriate compromise between the necessities to deconstruct traditional narratives all the while keeping sight of academic authority.

Recent Comments



"I like how this is tagged "man" when the title is Centauress. Without her facing forward—how else would we know, after all?"
by  erin_trying





"Hi Michael, Yes, this work was cast posthumously."
by  shelley


Relief, Lute Player "Our Egyptian Art department has a b/w negative of this work. We're scanning it — should be up on the Web in a couple of days. "
by Deborah Wythe


Join the posse or log in to work with our collection. Your tags, comments, and favorites will display with your attribution.


Recently Favorited




Butter Dish with Lid, "Jumbo" pattern was favorited
by  kdka





Porringer was favorited
by  kdka





Wine Vessel (Zun) in the Form of a Goose was favorited
by  kdka


Recently Tagged Objects




Tile was tagged "terra-cotta"
by  kdka



Tile was tagged "tile"
by  kdka



Tile was tagged "1910"
by  kdka

A snapshot of users interacting with curators on the Brooklyn Museum database.

Importantly, the use of hyperlink through the museum database permits the user to explore the collection non-linearly. It is possible to follow the curators' script and suddenly diverge down another path of interest. The goal of this technology in the museum is not to refute curatorial scholarship, but rather foster the discovery of new connections outside the conventional historical narrative. The resultant conversation between institution, visitor and objects is more constructive than hierarchical exchange, yet remains under the umbrella of academic authority. The marriage of database and object study in one experience embodies a way of thinking about history that values context with an aesthetic balance. The museum

experience—actual physical interaction with objects—grounds exploration in reality while linked centers of knowledge conceptualize the nebulous ways in which events, people and their ideas mingle throughout history. This is one example of how Adorno’s “processual” history may be achieved while respecting the autonomy of the institution and the limitations of its staff. With the visible storage gallery the Brooklyn Museum has given up a portion of its authority. In place of leading the visitor through a narrative, it supplies the option to explore the collection in an infinite number of ways. One may explore the familiar thematic and historical progressions of museum display. Or maybe find all the portraits on view, or those executed by a single artist or a larger group. Perhaps even the sequence of purchases as the interests and funds of the museum ebbed and flowed with history. Instead of one story, a million are suddenly at hand. This is the type of transformation the practical application of hyperlink can fulfill in the museum.

5. Conclusion

As is often the question with inventors whose legacy is revived by others: is modern hyperlink Paul Otlet's dream come true, or is he spinning in his grave? How faithful has the pursuit of Otlet's objective been? Has it highlighted how museums have been slow to meet the demand for greater access and contextualization? Or, within institutions, has network communication via media like the Internet led to a proliferation of information and linked spheres of knowledge? Of course the answer is not black or white. Though network communication has done much to proliferate knowledge, Otlet would probably find the Internet's disorganization disturbing. Moreover, it is perhaps ironic that museums are looking to a concept developed by a once forgotten nineteenth-century scholar to rethink the way they present their collections online. No doubt this is illustrative of the appeal of non-linear systems to organize information. Paul Otlet proved through the Mundaneum that vast stores of data and the relationships between such spheres of knowledge might be explored diversely through hyperlink technology. And though the grand project collapsed under its own success, the Mundaneum is relevant today because it conceptualized a method that museums may appropriate to diversify the ways their collections are explored.

Whereas museums developed from the same enlightened ideas concerning the organization of information as in the case of the Mundaneum, they did not meet the same fate. It was actually the exhibition of cultural objects that made it flexible. Museums are not required to provide access to their entire holdings because a fraction of a collection can often fulfill the goals of display. Still, the visual qualities of art complicated its systemization in the museum. While categorization was for Otlet a simple operation of extracting content from data, the result of systemization in the museum was the secularization of art. The historical example of the Louvre

exhibits the ways in which artifacts were reinvested with art historical meaning, and how the museum politicized display. An unwelcome side effect of this linear organization was, many have argued, the marginalization or complete obscuring of non-conformant histories. Complications to the “march through history” model established as a method of display and its authoritative foundations in the Enlightenment resulted in the critique of convention and forced museums to look for more contextual ways of presenting culture. The Internet is one tool museums have taken up to combat claims of marginalization since the emphasis of non-linear history through hyperlink, it has been shown, offers a new way of looking at the relationships between the user, object and ideas.

Of course the museum is also composed of an additional and centrally important aesthetic dimension. Not only does the museum digest and convey information to the public, it also displays the content of its collection to illustrate art historical concepts. And while there is merit in the pursuit to relate spheres of knowledge with objects, the challenges described in the preceding chapters may be symptomatic of the indefinable character of art. Indeed, if one was to draw a conclusion from the insertion of the Internet into the affairs of museology, it may be an affirmation of art’s impermanence, and equally, our shifting perception of it. Though hyperlink is one solution to the issue of access and a more participatory conceptual model, it is not a replacement for object study. Clearly the strength of the digital format is not in the visual representation of art. Examples show it is best used as a tool for relating ideas and objects conceptually. The application of network communication, therefore, should not interfere with the aesthetic dimension of a work of art but rather seek to contextualize it. “A Closer Look” at the Louvre explores in detail the features and relationships between a select group of objects within its collection. Yet the limited scope of this feature illustrates the immense effort on the

part of curators and museum staff to implement such programming. On the other hand, MUVA uses digital technology to create an entire virtual museum environment, but is inadequate in comparison to physical interaction with art objects. In the end it is simply reproduction of an activity better suited to the museum space. Lastly, AMICO uncovered the individuality of museum identity and its role in maintaining authenticity of experience. The issue with each approach exemplifies how curatorial authority, aesthetic presentation, and institutional identity are conflicted by the Internet's non-linear structure.

A solution to these issues exists in a compromise between non-linear exploration through museum collection databases and the authority of object study. Indeed this is easier said than done, however the Brooklyn Museum Visible Storage gallery has made great strides to marry the two pursuits in a single program. Using Otlet's theories of categorization and opening its storerooms to the public, the museum transcends the shortcomings of historical display. In contrast to the traditional, linear hierarchical perspective, a more honest stance for the museum may therefore lie in the exploration of the web-like interactions between people, art, and ideas. The ability to store and transmit vast sums of data, to index, link ideas and retrieve them independently or in unique narratives as Otlet conceived it are the means by which online databases can deconstruct traditional hierarchical systemization. It is with these lessons in mind that museums should move forward and seek out thoughtful ways of incorporating network communication into the presentation of their collections.

Works Cited

- Adorno, Theodor W. Aesthetic Theory. University of Minnesota Press: Minneapolis. 1997.
- Anderson, Gail. Reinventing the Museum: Historical and Contemporary Perspectives on the Paradigm Shift. Rowman Altamira. 2004.
- Anderson, Maxwell. "Online Museum Co-ordination." Museum International. Vol.51, No.4. 1999.
- Brigstocke, Hugh and Harold Osborne. "connoisseur, connoisseurship." The Oxford Companion to Western Art. Ed. Hugh Brigstocke. Oxford Art Online. 19 Nov. 2008
<<http://www.oxfordartonline.com/subscriber/article/opr/t118/e605>>.
- Bush, Vannervah. "As We May Think." Atlantic Magazine. July, 1945.
- Cameron, Fiona. "Digital Futures I: Museum Collections, Digital Technologies, and the Cultural Construction of Knowledge." Curator. Vol. 46, No 3. July 2003.
- Cooper, Johnathan. "Beyond the On-line Museum: Participatory Virtual exhibitions." Museums and the Web. 2006.
- Dubé, Philippe. The beauty of the Living. Vol. 56 No.1-2. Blackwell Publishing: Malden, 2004.
- Duncan, Carol. "Art Museums and the Ritual of Citizenship." Exhibiting Cultures. Smithsonian Institution, 1991.
- Fraser, Andrea. "Isn't this a Wonderful Place? (A Tour of a Tour of the Guggenheim Bilbao)." Ed. Karp, Ivan. Museum Frictions: Public Cultures / Global Transformations. Duke University Pres: Durham, 2006.
- Haber, Alicia. "MUVA: a virtual Museum in Uruguay." Museum International. Vol.52. No.1, 2000.
- Kirshenblatt-Gimblett, Barbara. "Exhibitionary Complexes." Ed. Karp, Ivan. Museum Frictions: Public Cultures / Global Transformations. Duke University Pres: Durham, 2006.
- Lowry, Glenn D. "A Deontological Approach to Art Museums and the Public Trust." Ed. Cuno, James. Whose Muse? Art Museums and the Public Trust.. Princeton University Press, Princeton: 2006.
- Marstine, Janet. Ed. New Museum Theory and Practice. Blackwell Publishing; 2006.
- McClellan, Andrew. "Inventing the Louvre: Art, Politics, and the Origins of the Modern Museum in Eighteenth-Century Paris." University of California Press, Berkley: 1994.

McLuhan, Marshall; Fiore, Quentin. The Medium is the Message; an inventory of effects. Singapore: Hardwired, 1967.

McTavish, Lianne. "Visiting the Virtual Museum: Art and Experience Online." New Museum Theory and Practice. Ed. Marstine, Janet. Blackwell Publishing; 2006.

Otlet, Paul. International Organization and Dissemination of Knowledge: Selected Essays of Paul Otlet. Ed. Rayward, W. Boyd. FID Publication 684: Elsevier, 1990.

Rayward, W. Boyd. "Visions of Xanadu: Paul Otlet (1868-1944) and Hypertext." JASIS 45. 1994.

Smith, Roberta. "Works, the Whole Works and Nothing but the Works." The New York Times. January 14, 2005.

van Veelen, Ijsbrand. "Alle Kennis Van de Werld: Het Papieren Internet." A documentary film created for the Dutch science series, Noordlicht. Aired on Dutch TV November 1, 1998.

Walsh, John. "Pictures, Tears, Lights, and Seats." Whose Muse? Art Museums and the Public Trust. Ed. Cuno, James. Princeton University Press, Princeton: 2006.

Wark, McKenzie. "Cyberculture Studies." Critical Cyber-Culture Studies. NYU Press, New York, 2006.

Wood, James N. "The Authorities of the American Art Museum." Whose Muse? Art Museums and the Public Trust. Ed. Cuno, James. Princeton University Press, Princeton: 2006.

Wright, Alex. "The Web Time Forgot." The New York Times. June 17, 2008.