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On the Origins of the Virtual Museum

by Erkki Huhtamo
University of California, Los Angeles

"Through the dials of your Teleset you will share in the ownership of the world's great art treasures." Frederick Kiesler

Introduction: the Notion of the Virtual Museum

In recent years, the notion "virtual museum" has been evoked so often in cybercultural discourse that it has lost all of its novelty value, if indeed, it had any left. The list of Web sites purportedly falling under this category is long, and growing. A recent search with *Google* for "virtual museum" brought up more than 141,000 hits. Such a "category" is understandably extremely vague, accommodating entries that have little to do with each other regarding both their institutional status and their interpretation of the word museum. There are "virtual museums" that might more conveniently be classified as libraries or archives, although the cyberspace definitions of these are not absolutely clear-cut either. If the "wired" virtual museums have a common denominator at all, it is a very general one, referring to almost any kind of collection of material (supposedly of "historical" or at least "cultural" value) put on general display on the Web.

There is no doubt that the vogue for virtual museums received a powerful impetus from the emergence of the World Wide Web and particularly from its transformation into a multimedia environment with the introduction of the Mosaic browser in 1993. Yet the idea did not originate with the WWW. The invention of the hypertext in the 1960s may, in the long term, have been a more decisive influence, pointing out the possibility of creating huge non-linear data-architectures. Ted Nelson's "Xanadu" was an early description of the cultural implications of networked hypertext, which Nelson foresaw leading to the creation of an accumulating universal databank accessible from any node in the network.¹ A pioneering project investigating the implications of this idea for

¹ Although nearly forgotten, the idea of a global database or "world brain" was presented in the early part of the 20th century by H.G. Wells, who spoke about this idea in numerous lectures and articles. Wells saw microfilm as a possible medium for his project: "The time is close at hand when any student, in any part of the world, will be able to sit with his projector in his own study at his or her convenience to examine *any*

the museum institution was "The Museum Inside the Telephone Network", an exhibition organized in 1991 by the Project InterCommunication Center, founded by the Japanese telecom NTT.² The exhibition was only accessible to home users by means of the telephone, fax, and in a limited sense computer networking (the Internet was not yet available in Japan). It was meant as a model for a new kind of an "invisible" museum. Logically, it was followed up four years later by another ICC exhibition titled "The Museum Inside the Network" (1995). The "museum" had now been re-located into the Internet.³

In the early 90s the possibilities of hypertext were applied to the creation of numerous CD-ROM-based virtual museums.⁴ One of the first was Apple Computer's "Virtual Museum", a demonstration disc for Apple's proprietary QuickTimeVR software shown at "Siggraph 92" in Chicago. By clicking the mouse the user was able to explore interactively a 3-D simulation of three interconnected museum spaces, one of which was a very conventional looking art museum gallery. Numerous commercial, some of them highly successful, CD-ROM products, now almost totally forgotten, were conceived as virtual visits to existing art museums such as *Le Louvre* or the *Hermitage*.⁵ These products rarely attempted to simulate in 3-D the physical space of the museum (with the exception of a CD-ROM about *Musée d'Orsay*, Paris). Rather, they deliberately limited their scope, highlighting some treasures from the collection and providing useful background information. For many users such CD-ROMs were supplements rather than substitutes for the physical museum. They were sold as souvenirs in the museum shops as part of their promotional machinery. In France, such CD-ROMs were also widely available through the FNAC chain of book and media stores. As products, they did little to question the legitimacy of the traditional museum institution. Many museum websites today continue this tradition, although they may occasionally contain virtual galleries and other non-material elements with no physical counterpart in the museum building.

book, *any* document, in an exact replica." (Wells' emphasis). It is tempting to replace "computer with Internet connection" to the projector. Wells' texts on the subject have been collected into the volume: H.G. Wells: World Brain, London: Adamantine Press, 1994 (quotation p. 116).

² InterCommunication '91 The Museum Inside The Telephone Network, catalogue, edited by Urban Design Research Inc., Tokyo: NTT, 1991 (In Japanese/English). Most of the numerous works in the exhibition were contemporary projects. The ICC later became a physical institution as well, operating still at the Tokyo Opera City Tower in Western Shinjuku.

³ InterCommunication '95 "on the Web": The Museum Inside The Network, catalogue, edited by Junko Tachibana, Akira Takada and InterCommunication editorial office, Tokyo: NTT Publishing Co, 1995. Beside the Internet artworks, some broadband ISDN projects were presented.

⁴ Already earlier "virtual galleries" had been realized by 3-D computer graphics, for example the videotape work *Luminaire* by John Sanborn and Dean Winkler (1985, running time: 6:54). The work was described as "a visual tribute to video artist Ed Emshwiller that includes a surreal space age landscape, digitally transformed dancers, and a central scene that traces the history of art through a computerized gallery". I would like to thank professor Machiko Kusahara for informing me about this work. One of the earliest digital virtual museums within an actual museum was the Micro Gallery of the National Gallery in London. It was sponsored by American Express.

⁵ Among the most successful was *Louvre. Palais et Peintures*, realized by Montparnasse Multimédia and produced by the *Reseaux des Musées nationaux* in France. It sold many copies also in Japan, where it was translated and distributed by Fuji Television. According to Professor Machiko Kusahara, a leading multimedia specialist, the CD-ROM worked as a true virtual museum for many Japanese, who would never have been able to make a physical visit to the famous art museum (private conversation in Los Angeles, June 30, 2002.)

Whether straightforward museum websites merit the title "virtual museum" is open to debate.

As important as new software (hypercard, QuickTimeVR, VRML) or new media (CD-ROM, The World Wide Web) were for the emergence of the virtual museum, the topic was also grounded in wider cultural issues. In recent years, we have seen a massive amount of academic writing about the museum as an institution. This has received an impetus from a wave of post-modern theorizing about the impact of media on notions like authenticity and the original. With images and sounds reproduced in principle in unlimited numbers, and distributed, copied, mixed and manipulated at will by the media, the idea of temples dedicated to the cult of the authentic (or "auratic") objects seemed outdated to many. As prophesied by Walter Benjamin in 1936, the original was seen to be disappearing, replaced by an infinite number of copies.⁶ The (media) reality itself was turning into an all-encompassing, albeit chaotic, museum available to anybody. Theorists and critics often felt they were standing, to quote the title of Douglas Crimp's well-known book, "on the museum's ruins".⁷ This attitude was influenced by André Malraux's famous idea about the imaginary museum without walls, presented in 1947.⁸ The main factor behind Malraux's questioning of the traditional role of the museum institution was the spreading of photography. The ever-present photographic reproductions of artworks made art accessible to audiences who would never have entered a museum. At the same time in the United States (but unknown to Malraux) Vannevar Bush was theorizing about the Memex, a new non-linear system of storing and retrieving data.⁹ As well known, Memex was later recognized as the earliest model for hypertext. The ideas of Malraux and Bush combined take us to the gates of the virtual museum.

In this article, however, I will claim that the origins of the virtual museum can be taken even further back in time. A key factor in this respect is the emergence of exhibition design as a new medium within the avantgarde art movements of the early 20th century. In their own ways artist-designers like László Moholy-Nagy, El Lissitzky, Herbert Bayer and Frederick Kiesler reacted to the challenges posed by new media technologies, like photography, film, and sound recording.¹⁰ Aware of the need for radical changes in the concept and the roles of art, a radical re-thinking of the relationship between exhibition spaces, exhibits and spectators/visitors was needed. Besides re-defining the public viewing contexts, the notion of "domestic picture galleries" was also raised and explored. Having a closer look at these experimental

⁶ Walter Benjamin: "The Work of Art in the Age of Mechanical Reproduction", translated by Harry Zohn, in *Illuminations*, Glasgow: Fontana/Collins, 1979, pp. 219-253.

⁷ Douglas Crimp: *On the museum's ruins*, Cambridge, Mass.: The MIT Press, 1993.

⁸ André Malraux: *Le Musée Imaginaire*, Paris: Gallimard, 1996 [orig. 1947].

⁹ Vannevar Bush: "As We May Think" (1945), in *Multimedia From Wagner to Virtual Reality*, edited by Randall Packer & Ken Jordan, New York: W.W. Norton, 2001, pp. 135-153.

¹⁰ For a very useful general account of exhibition projects by these and other pioneers, see the first chapter of Mary Anne Staniszewski: *The Power of Display. A History of Exhibition Installations at the Museum of Modern Art*, Cambridge, Mass.: The MIT Press, 1998, pp. 1-57.

designs and their cultural backgrounds will help us understand better the design challenges facing the creators of virtual museums and galleries as well. One should also note that some of the issues explored by the avantgarde artists and designers of the first half of the 20th century have been recently taken up by contemporary experimental media artists, working with installations and networked environments. Their works often raise issues like storage and erasure, memory and forgetting, revealing and hiding, the physical and the virtual. Some such works will be introduced and discussed in the final part of the article.

Exhibition Design as a New Medium

An important aspect of the explosion of art in the 20th century was the introduction of new technological media from photography, film and sound reproduction to video, the computer and the Internet. The use of such media by artists contributed to the emergence of many new aesthetic forms, such as the ready-made, the abstract or "absolute" film, the photomontage, mechanical or conceptual "bachelor machines", kinetic light displays, responsive cybernetic sculptures, video installations, interactive computer environments, and so on. From early on, the visionaries of the avantgarde felt that the new media were changing the ways of perceiving and conceiving the world. This was clearly expressed by F. T. Marinetti, the leader of the Italian Futurists, in one of the *Futurist Manifestos*:

"Futurism is grounded in the complete renewal of human sensibility brought about by the great discoveries of science. Those people who today make use of the telegraph, the telephone, the phonograph, the train, the bicycle, the motorcycle, the automobile, the ocean liner, the dirigible, the aeroplane, the cinema, the great newspaper (synthesis of a day in the world's life) do not realize that these various means of communication, transportation and information have a decisive influence on their psyches."¹¹

Art based on such "discoveries" was obviously not easily compatible with existing cultural institutions and the ideologies on which they were grounded. As a consequence, an essential part of the avantgarde activity was the search for new ways of displaying art. The prevailing academic convention, still evident in the displays of early landmark avantgarde events such as the *Armory Show* in New York in 1913, used the gallery walls for framed paintings (often in several rows practically covering the wall), while free-standing sculptures on pedestals were distributed within the gallery space. The gallery was treated as a background, to be filled with significance by the artworks themselves. The 19th century museum gallery could, however, hardly be treated as neutral, being the product of the overarching dominance of the bourgeois ideology as a cultural legitimating force. In reality, the museums and art galleries of the late 19th and

¹¹ F.T. Marinetti: "Destruction of Syntax / Imagination without strings / Words-in-Freedom" (1913), English translation on-line: <http://www.unknown.nu/futurism/destruction.html> (link checked June 27, 2002).

early 20th centuries were thoroughly permeated by connotations of cultural hierarchies and decorum (expressed in their stylistic eclecticism) that affected anything placed within their confines.¹² High cultural connotations were linked with the idea of the artwork as a cultural prestige object and, increasingly, as a financial investment.

For radical art, practices exposing the ideological camouflage of the exhibition space and re-configuring its elements were a main challenge. This might take the form of a calculated multi-sensory (and, anachronistically, multimedia) chaos of a Dadaist exhibition or it could be turned into a carefully orchestrated dialogue with established exhibition practices, as in the famous last exhibition of the Russian Futurists in Petrograd, 1915. Here the radical abstract compositions gained part of their revolutionary impact by having been arranged on the walls, as if substitutes for traditional paintings. *The Black Square* by Kasimir Malevich was placed in one of the upper corners of the room, a place traditionally reserved in Russian homes for the religious icon.¹³ Marcel Duchamp's ready-mades also brought an element of ambiguity into the exhibition space. By placing banal everyday objects (often "prepared" by enigmatic linguistic puns inscribed on them) on display as artworks, Duchamp deliberately interfered with our relationships to objects, merging the banal tactility of a bicycle wheel or a urinal with the almost "sacred" untouchability of high art.

Groups like the Dadaists often abandoned the museum or the gallery altogether by re-defining art as a unique (and often deliberately scandalous) temporary "event".¹⁴ Instead of denoting static objects for display and sale, art came to mean a process unfolding in a time and space and incorporating an element of surprise (or "indeterminacy", as defined later by John Cage). Such events often included time-based media, like film projections or playback of recorded sound. Yet, there were also artist-designers who made efforts to re-configure the gallery to correspond with the requirements of the new media, and also with the social and political realities of the time. Visionaries like László Moholy-Nagy, Frederick Kiesler, El Lissitzky and Herbert Bayer, saw exhibition design as a new medium, comparable to other new media (including electric light). Looking back in 1961, Herbert Bayer characterized exhibition design in words that may recall the Wagnerian notion of the *Gesamtkunstwerk*, but which at the same time anticipate future developments on the field of art and technology:

"Exhibition design has evolved as a new discipline, as an apex of all media and powers of communication and of collective efforts and effects. The combined means of visual communication constitutes a remarkable complexity: language as visible printing or as sound, pictures as symbols, paintings, and photographs, sculptural media, materials and surfaces, color, light, movement (of the display

¹² For a general treatment, see Roland Schaer: *L'invention des musées*, Paris: Découvertes Gallimard / Réunion des Musées nationaux, 1993.

¹³ See Kirk Varnedoe: *High & low: modern art, popular culture*, New York: Museum of Modern Art: Distributed by H.N. Abrams, 1990.

¹⁴ About art "events", including those by the Dadaists, see "Event" *Arts and Art Events*, edited by Stephen C. Foster, Ann Arbor: UMI Research Press, 1988.

as well as the visitor), films, diagrams, and charts. The total application of all plastic and psychological means (more than anything else) makes exhibition design an intensified and new language."¹⁵

The key idea is integration. Here the exhibits are no longer seen as separate entities put on display in any space. Instead, they are considered integral elements of a total environment that envelops the visitors and encourages them into a dynamic relationship with the space and all its dimensions and elements. The environment comprises different media and channels of communication. Instead of a passive spectator in front of static exhibits, the visitor is meant to turn into an active participant.

Activating the Viewer

To achieve such goals, various strategies were developed. The space could be made more engaging by using reflective, optically flickering wall material that changed its nature depending on the visitor's movement through the space, as El Lissitzky did in his design for the "Abstract Cabinet" (Abstraktes Kabinett) commissioned by the *Landesmuseum* in Hannover in 1927-28. This idea in a sense anticipated Op-Art of the 60s. El Lissitzky also placed some of the exhibits on sliding panels or rotating drums, which had to be physically manipulated by the visitors. El Lissitzky's comment on his achievement clearly anticipates the idea of interactive exhibition design: "If on previous occasions... [the visitor] was lulled by the painting into a certain passivity, now our design should make the man active."¹⁶

Another strategy experimented with by the German architect and designer Frederick Kiesler in the 1920s, refused the convention of hanging exhibits on the walls. Influenced by Constructivism, Kiesler created an adaptable "L and T system" (Leger und Träger), which was first used at the "International Theatre Exhibition" in Vienna in 1924. The exhibition room was filled with a three-dimensional system of grid-like horizontal, vertical and diagonal supports, that were used to display images and other items. The visitors had to literally "immerse" themselves into the exhibition design and navigate amongst the architectural display "racks". The experience of the exhibition was dependent on the routes and points of views chosen by each visitor. The walls of the gallery were left blank. The exhibition hall was on the way to becoming a non-linear data-space.¹⁷ Related ideas were also explored by Moholy-Nagy and El Lissitzky. In his famous "Room one" for the "Film und Photo" exhibition in

¹⁵ Herbert Bauer: "Aspects of Design of Exhibitions and Museums" (1961), cit. Staniszewski, op. cit., p. 3.

¹⁶ Cit. Staniszewski, op.cit., p. 20.

¹⁷ The idea of a kind of "proto-hypertext" was also present in Moholy-Nagy's "Filmváz: A nagyváros dinamikája", a storyboard for an experimental documentary film first published in the Hungarian avantgarde journal *Ma* in the early 20s and in revised form in Moholy-Nagy's Bauhaus-book *Painting Photography Film* (1925). Moholy-Nagy's storyboard tries to give form to a simultaneous, multi-sensory experience. It has been seen as a "graphic film", which could not have been realized by the linear film medium. Non-linear hypermedia and multimedia would probably have been the solutions Moholy-Nagy was looking for.

Berlin in 1929, Moholy-Nagy chose to display only photographic reproductions in different shapes and sizes without any captions to anchor their meanings, while El Lissitzky's contribution also contained special film-viewing machines.

An early example of multimedia exhibition design was Moholy-Nagy's *Raum der Gegenwart* (The Room of Our Time), commissioned by museum director Alexander Dorner for the Hannover *Landesmuseum* (begun in 1930). Moholy-Nagy included an ample selection of visual technologies: photography, film, reproductions of architecture, theater technique and design. In the center of the room he planned to place his *Lichtrequisit, or Licht-Raum Modulator* (Light Prop, Light-Space Modulator), a functioning machine creating variations of light and shadow.¹⁸ Considered one of the precursors of kinetic art, *Light Prop* was a complex structure with machine-driven rotating metal plates and rods. By means of a push-button, the visitors could activate moving abstract light patterns that were projected on the walls and the ceiling. There were also photographic slide and film projections activated by other push buttons, although these never functioned satisfactorily due to technical problems.¹⁹ Most importantly, the room contained no original works of art (with the exception of the *Light Prop*), only reproductions. Perhaps more than any other exhibition design from the early 20th century, Moholy-Nagy's creation truly spoke "the language of new media". In its attention to the impact of the media on the notions of originality and authenticity, it anticipated Walter Benjamin's famous essay "The Work of Art in the Age of Mechanical Reproduction" (1936) by several years.

"Penny Arcade without the Pennies"

Moholy-Nagy's room has been considered a precursor to the famous exhibition designs Kiesler created for Peggy Guggenheim's Art of Our Century gallery in New York in 1942 (they remained in place until 1947). All the four galleries, although dedicated to different tendencies in modern art, emphasized the active role of the spectator. The designs refused to retreat to the background, enveloping both the artworks and the visitors. Kiesler later elaborated on his position in the *Second Manifesto of Correalism* he published in 1961:

"The traditional art object, be it a painting, a sculpture, or a piece of architecture, is no longer seen as an isolated entity but must be considered within the context of this expanding environment. The environment becomes equally as important as the object, if not more so, because the object breathes

¹⁸ See Jack Burnham: *Beyond Modern Sculpture*, New York: George Braziller, 1968, p. 291-292.

¹⁹ Staniszewski (op.cit, pp. 21-22) claims that the Light Prop was actually shown in Hannover. Lucia Moholy (Moholy-Nagy's first wife) claims that it was not shown publicly until an exhibition in Paris in 1930. Lucia Moholy also debates the nature of Licht Prop - is it sculpture or a machine, originally meant as an electric prop for experimental theatre? (Lucia Moholy: *Marginalien zu Moholy-Nagy Marginal Notes*, Krefeld: Scherpe Verlag, 1972, pp. 82-83.)

into the surrounding and also inhales the realities of the environment no matter in what space, close or wide apart, open air or indoor."²⁰

Among the most well known features of The Art of Our Century design were the horizontal rod-like wall mounts of the surrealist gallery. Each mount was holding an unframed (!) painting that could be manually swivelled by the spectator. The lights were continuously switched on and off, and recorded background noise was heard. In the abstract gallery the paintings and sculptures were held by bundles of strings stretched between the floor and the ceiling. Again, the artworks could be raised or lowered by hand. Perhaps the most exceptional solutions were those used in the "kinetic gallery", where works by Duchamp, André Breton and Paul Klee could be viewed by specially constructed viewer-activated "peep-show" devices. Breton's "poem object" was revealed from behind a shutter by means of a lever. The miniature objects from Duchamp's *La Boîte-en-valise* (a set of tiny replicas of Duchamp's most famous artworks in a carrying case; in itself an anticipation of the virtual museum!) could be viewed by peering into a hole and simultaneously turning a large spiral-like wheel.²¹



Such "vision machines" could obviously be dismissed as mere trickery. Some reviewers spoke about "a kind of artistic Coney island" or "a penny-arcade peep show without the pennies."²² Quite clearly Kiesler was inspired by the well-known hand-cranked peep show movie machines (like the *Mutoscope*) and other popular entertainment devices, just like Duchamp's "Roto-reliefs" had a relationship to 19th century optical toys, like the phenakistiscope and the stereoscope.²³ Kiesler shared the Surrealists' fascination with "obsolete" machines and popular culture, but his interest in experimentation with

²⁰ Cit. Staniszewski, op.cit., p. 8.

²¹ Herbert Bayer had already used the idea of the peep hole, although without any interactive mechanism, as part of his design for the Bauhaus 1919-1938 exhibition at the Museum of Modern Art, 1938-39. Another peep hole can be found from the Exposition internationale du surréalisme (Galerie Maeght, Paris 1947). A hole in the wall was used to see Duchamp's *Le Rayon vert* (The Green Ray). The work was installed by Kiesler according to Duchamp's instructions. The peep hole was also a central element of Duchamp's last major work *Étant donnés* (1946-66). See Dieter Daniels: "Points d'interférence entre Frederick Kiesler et Marcel Duchamp", in Frederick Kiesler. *Artiste-architecte*, edited by Chantal Béret, Paris: Éditions du Centre Pompidou, 1996, pp. 125-126.

²² Cit. Lewis Kachur: *Displaying the Marvellous. Marcel Duchamp, Salvador Dali, and Surrealist Exhibition Installations*, Cambridge, Mass: The MIT Press, 2001, p.201.

²³ I will elaborate on this relationship in a forthcoming article. The preliminary paper "The Avantgarde Goes to (Pre-)cinema, or Mr. Duchamp's Playtoy" was read at the Excavating the Future conference, Goethe Institut, Prague, Dec. 3.-5. 2001. Interestingly, the connection between the Mutoscope and the idea of the virtual museum was made by a cartoonist in *Punch*, May 10, 1899. The cartoon showing a gentleman peeping into a Mutoscope and turning its crank, while other people in the background are seen observing wall-mounted paintings. The caption says: "Suggestion for the R.A. [Royal Academy]. A Mutoscope of the Pictures, for the use of visitors in hurry. The Royal Academy in five minutes." Reproduced in: Colin Harding and Simon Popple: *In the Kingdom of Shadows. A Companion to Early Cinema*, London: Cygnus Arts, 1996, p. 21. See cartoon above.

visual technology went back further to his earliest efforts in theatre set design.²⁴ However, dismissing his creations as "a nostalgic return to individual perception at a time when the consumption of images had for a long time been a collective ritual" is clearly beside the point.²⁵ Although dominant at the time, the hegemonic position of the cinema as a ritual of mass media has since been challenged by a great variety of individual, interactive audiovisual experiences, from playing videogames and exploring educational science exhibits to surfing the Internet. Instead of seeing them as nostalgic, one might consider Kiesler's designs as remarkably forward looking, pointing towards the culture of interactivity.

Mary Anne Staniszewski's statement, according to which the international avantgarde's fascination with "viewer-activated gadgetry for installations...was no doubt linked to advances in technology and the growth of the mass media" need to be specified.²⁶ The technology was used *against* collective consumption typical of mass media and *for* individualized and customized experiences. Kiesler's designs contested the taboo of touching the exhibits. This was especially poignant in the context of the academic art world, where the forbidden touch and the principle of "keeping distance" as a precondition of the aesthetic experience had long ago been established as timeless truths. The act of touching had been as if transposed (and almost "transfigured") from the fingertips to the remote "tactility" of the gaze.²⁷ Although it may be true that "human history was cultivated through speech and the motions of fingers", in the ideology of the art world the "motions of fingers" had been strictly limited to the act of creation, and excluded from the acts of reception and consumption.²⁸ Creators like Duchamp and Kiesler were interested in bringing the "lost" dimension of tactility and with it a sense of "life" back to art.²⁹ This

²⁴ Kiesler's first stage design was for Karel Capek's R.U.R. at the Theater am Kurfürstendamm in Berlin (1922). Its references to media included both a kind of large peep show opening (provided with a large simulated camera shutter, one of Kiesler's "trademarks"), revealing a back-projected film, and a simulated television screen - a very early anticipation of television. For more, see RoseLee Goldberg: *Performance. Live Art 1909 to the Present*, London: Thames and Hudson, 1979, p. 75-76. Interestingly, Kiesler used the concept "Guckkastenbühne" (peep show stage). See: Bruno Reichlin: "The City in Space", in Frederick Kiesler. *Artiste-architecte*, op. cit., p.17. Kiesler returned to the theme of the peep hole with shutter in the "Screen-O-Scope" invented for the Guild Hall Cinema that he designed, New York, 1939. The Screen-O-Scope was an original high-tech replacement for the traditional theatre curtain.

²⁵ Christoph Grunenberg: "Espaces spectaculaires: l'art de l'installation selon Frederick Kiesler", in Frederick Kiesler. *Artiste-architecte*, op.cit., p. 109.

²⁶ Staniszewski, op.cit., p.22.

²⁷ About haptic or tactile vision, see Jacques Aumont: *The Image*, translated by Claire Pajackowska, London: BFI Publishing, 1994 (1990), pp. 77-78.

²⁸ David Sudnow: *Pilgrim in the Microworld. Eye, Mind, and the Essence of Video Skill*, New York: Warner Books, 1983, p. 24.

²⁹ In 1943 Duchamp and Kiesler collaborated on a project called "Twin-Touch-Test", which was published in the journal *VVV* (No 2-3, 1943). The idea was to have the readers move their hands pressed on a piece of actual wire fence (incorporated into a page of the journal), eyes closed. The reader was asked to describe one's sense of touch, and compete for five prizes that "will be given for the best solutions". See Yehuda Safran: "L'Angle de l'oeil. La Vision Machine de Frederick Kiesler", in Frederick Kiesler. *Artiste-architecte*, op.cit. p. 137. Duchamp also played with tactility by creating a foam model of a woman's brest for the cover of the exhibition catalogue *Le Surréalisme en 1947* (Galerie Maeght, Paris, 1947) that he designed. The brest was accompanied by the exhortation "Prière de Toucher", Please Touch! A photo was taken in gallery about a

could be achieved, either by changing the nature of the art object itself (for example by "infecting" it with features from common everyday objects, including machines), or by changing the conditions within which art is perceived and consumed.

It should be noted, however, that until recently the established art world has not been very receptive to the kind of designs Kiesler created. They have sometimes been doomed as an anomaly; excessive and disturbing, unnecessarily interfering with the artworks themselves. The dominant ideology of art exhibition design has been the "empty room" of modernism, a neutral space that merely provides the necessary viewing context for the artworks, seen as autonomous in their essence. The modernist gallery is a space for meditation and interiority; in that sense it resembles a church. It could be claimed that the new principles of exhibition design first came to flourish outside the art world, at trade fairs, world fairs, amusement parks and science centers that were able to embrace the idea of interactive exhibits as a novelty without feeling the weight of tradition. Of the last mentioned, The *Palais de la Découverte* in Paris, opened just before WWII, and influenced by the educational ideas of Paul Valéry, is a good example. Many of the early interactive exhibits were targeted to children, which is understandable. The hands-on experience was seen as a necessary step in a child's development; manipulating interactive exhibits was a logical continuation to playing with toys; at the same time it was seen as unworthy of higher "cerebral" culture. Another target group for interactive exhibit design were the disabled; tactility was seen as a way of compensation for sensory deprivation (for blindness, for example).

The Domestic Pinacoteca

The exhibition projects analyzed so far introduced themes and motives that can be claimed to have prepared the way for future virtual museums in a number of ways. These include the idea of the gallery as a navigable non-linear database, the convergence of several different media and the visitor's/user's interactive and haptic relationship with the exhibits. On the other hand, although different from their predecessors, all these exhibitions still took place within the material confines of a public exhibition. They involved physical movement through the space. In spite of the nature of the exhibits, the visiting the gallery was still a collective experience. The exhibition was not only "location-based"; it was also disconnected from the rest of the world. Against this background, it is interesting to note that artist-designers like Moholy-Nagy and Kiesler also envisioned new ways of displaying and consuming images in the home, thus attempting to supply the missing dimension of the virtual art museum - the domestic consumption of art at a distance.

nude female model with Duchamp's foam breast attached over her lower belly, standing next to Kiesler's Totem des religions. (See reproduction in Frederick Kiesler. *Artiste-Architecte*, op. cit., p.124).

As Didier Maleuvre has shown, the idea of turning the bourgeois home into a locus for pictures, even to a kind of private art museum, was an essential feature of the 19th century bourgeois culture.³⁰ Beside paintings, many different types of "cheaper" images also penetrated the home, from chromolithographs to photographs. Innovators like Moholy-Nagy and Kiesler were naturally aware of the increased visuality of the domestic interior. The real challenge was to classify and store this wealth of visual information and to marry it with the possibilities of the new media. Moholy-Nagy's classic Bauhaus-book "Painting Photography Film" (1925) contains a chapter entitled "Domestic Pinacoteca", in which the author presented in condensed form a great number of ideas about turning the home into a "picture gallery".³¹ His ideas ranged from filing systems for traditional images (which would not be displayed all at once, but retrieved for viewing from a kind of "database" only when needed) and collections of colored slides to hologram-like imaginary three-dimensional imaging systems which would not need a "direct plane of projection". Moholy-Nagy also anticipated the television, or what he called the "radio picture service", that he saw as an important future channel of visual information for the home.

A little later Kiesler envisioned a "Telemuseum" (1926), which may well have been influenced by Moholy-Nagy's description of the "Domestic Pinacoteca". Kiesler's design for the home was to have "walls for sensitized panels that would act as receiving surfaces for broadcasted pictures", and "built-in shrines for original masterpieces that will be concealed behind walls and revealed occasionally". When it comes to user interfaces, Kiesler imagined a kind of customized virtual museum. In a remarkable formulation he prophesized: "Through the dials of your Teleset you will share in the ownership of the world's great art treasures". He emphatically opposed the traditional display of paintings in the home: "The use of pictures as a permanent wall decoration will be discarded as practice." Although Kiesler never managed to build a complete version in time for the 1926 "Société Anonyme" exhibition at the Brooklyn Museum, New York, a simplified version (described by some witnesses as a darkened gallery with push button interfaces that illuminated reproductions of classic artworks like Mona Lisa) was shown at the Anderson Galleries in 1927.³²

There were other interesting efforts to re-define the relationship between art and new technology in the home, most of them fallen into oblivion. Among these are the "Luminars" and "Clavilux Juniors", produced in several different forms by the Danish-born Lumia-artist Thomas Wilfred in the United States

³⁰ Didier Maleuvre: *Museum Memories. History, Technology, Art*, Stanford: Stanford University Press, 1999, p. 115. The idea of home as a private museum was based on even longer historical traditions, particularly that of the curiosity cabinet. A wonderful example of the transition between these is Sir John Soane's Museum in London, still open to the public in much the same form as it was at the moment of its owner's death in 1837. See <http://www.soane.org/>

³¹ László Moholy-Nagy: *Painting, Photography, Film*, translated by Janet Seligman, Cambridge, Mass.: The MIT Press, 1987, pp. 25-26 [orig. 1925].

³² Kiesler described the project in his book *Contemporary Art Applied to the Store and its Display* (New York: Brentano's, 1930), see: Staniszewski, op.cit., p.313.

from the late 1920s on.³³ Originally Wilfred created and performed moving light displays in public performances with instruments of his own design. In 1928 he began to adapt his ideas for home use, producing instruments that could present abstract moving color-light compositions, either on a screen or projecting them to the ceiling. Several of the models Wilfred produced had a remote control with a series of knobs, which allowed the viewer to change the light display interactively while sitting in his/her armchair gazing at the screen. Although Clavilux Junior provided no "radio picture service", it used "software", or changeable painted glass discs rotating inside the machine.³⁴ Although Wilfred's devices were never mass-produced, they were an early effort to introduce interactive art experiences to the home, replacing the static pictures on the walls with more dynamic and absorbing displays.

It would be interesting to investigate the media-archaeological background of Moholy-Nagy's, Kiesler's or Wilfred's domestic galleries and vision machines. In the interest of space, only a few preliminary remarks can be made here. It seems clear, however, that none of these ideas appeared out of nowhere. Since the mid 19th century, a succession of new media technologies had entered the home. These included devices like the stereoscope, the phonograph, home movie equipment, and eventually the telephone and the radio (a novelty in the 1920s). The appearance of each of these technologies triggered great numbers of proposals for their possible uses, some of them realistic, some outright fantastic. There were many anticipations of the virtual museum. The phonograph was almost immediately seen as a way of storing the voices of remarkable personalities and creating an auditive museum of mankind. An interesting product were the dedicated filing cabinets for stereoscopic photographs marketed by large companies like Underwood & Underwood and Keystone.³⁵ These handsomely crafted cabinets were pieces of "database-furniture" for the domestic saloon. The companies also produced elaborate "travel systems", consisting of hundreds of numbered stereoviews, viewers, guidebooks and maps meant for "armchair travelling" within the home.³⁶ Consuming and storing stereoviews of famous art treasures was an essential part of such a domestic image bank. Almost as a premature echo of Moholy-Nagy's and Kiesler's suggestions, these images were not kept permanently on display. They were retrieved from the logically arranged databank only when needed.

³³ See Donna M. Stein: Thomas Wilfred: Lumia. A Retrospective Exhibition, Washington, D.C.: The Corcoran Gallery of Art, 1971, pp. 15-18.

³⁴ I would like to thank the collector Dr. Eugene Epstein of Los Angeles for an opportunity to examine the Clavilux Junior -machines in his collection.

³⁵ See Points of View: The Stereograph in America - A Cultural History, edited by Edward W. Earle, Rochester: The Visual Studies Workshop Press, 1979.

³⁶ In his novel Looking Backward 2000-1887 (1887) Edward Bellamy imagined the Boston of the year 2000. Among the wonders he imagined was a domestic "music room", which was connected by telephone lines to kind of pre-broadcasting music studios elsewhere in the city. The listener, who had to pay a fee for the service, could choose between four simultaneous channels. Although this is not a virtual museum, Bellamy's vision anticipates the idea of a permanent subscription-based, always available cultural service for domestic users. Edward Bellamy: Looking Backward 2000-1887, edited with an Introduction by Cecelia Tichi, Harmondsworth, Middlesex: Penguin Books, 1982, pp. 98-99.

Looking backward, many other historical precedents could be mentioned, including the habit of collecting and storing picture postcards of artworks and museum.³⁷ Looking forward, we could point out later media art projects that have raised and developed further the idea of the virtual museum. To mention just one example, the eminent Australian artist Jeffrey Shaw created an interactive work titled "The Virtual Museum" in 1990. Preceding the emergence of the World Wide Web, Shaw conceived his work as a gallery installation. The visitor sits on a motorized rotating platform, facing a large screen. By leaning in his/her chair sideways or forward/backward, the visitor controls both the rotation of the platform and his/her movements in the virtual world on the screen. The virtual world on the screen is an exact replica of the physical gallery space, with a difference: the visitor is able to penetrate through the virtual walls, discovering other galleries showing moving virtual sculptures and reliefs, works that could not exist in any normal museum. Shaw's installation evokes both the earlier history of "armchair travelling" and the coming world of virtual museums. For Shaw, the virtual museum is a location that transcends the physical space, opening up new possibilities both for art and its display.³⁸ For him, merely replicating existing physical spaces does not make any sense. Last but not least, Shaw's work also shows that there is a line of development connecting interactive media art installations with the innovative exhibition design by Moholy-Nagy, Kiesler and others. So far, this has hardly been pointed out.³⁹

Conclusion: Challenges for Virtual Museum Design

The aim of this article has been to shed new light on the design of virtual museums by looking at some of their anticipations in the fields of exhibition design and interactive media art. The article does not claim that these are the only factors that explain the nature and the emergence of the virtual museum as an institution. Even in the field of experimental art there are other phenomena that still deserve to be investigated. An interesting starting point for this continued analysis is Craig J. Saper's recent study titled "Networked Art".⁴⁰ Saper explores the background of current electronic networking art practices by analyzing such overlooked phenomena as mail art networks and visual poetry as a communication system.

³⁷ Media artist George Legrady dealt with postcard culture, connecting it with contemporary networking practices, in his highly interesting CD-ROM-based artwork *Slippery Traces. The Postcard Trail*, published as part of the CD-ROM book combination *ArtIntact3*, Cantz Verlag and ZKM Karlsruhe, 1996.

³⁸ The idea of the virtual museum both as an organizing principle and a metaphor has also been used by artists producing multimedia CD-ROMs. These include George Legrady's *An Anecdoted Archive from The Cold War (1994-95)*, based on the ground plan of the Museum of the Workers' Movement (Munkásmozgalmi Museum) in Budapest. Another example is *Alice. An Interactive Museum* by Kuniyoshi Kaneko, Kazuhiko Kato and Haruhiko Shono (Japan: Toshiba EMI and Synergy, Inc., 1992).

³⁹ For a general history of installation art, see Julie H. Reiss: *From Margin to Center. The Spaces of Installation Art*, Cambridge, Mass.: The MIT Press, 2001.

⁴⁰ Craig J. Saper: *Networked Art*, Minneapolis: University of Minnesota Press, 2001.

Based on the discussions in this article, the "historical" challenges for the creators of virtual museum can perhaps be best summed up as a series of questions:

- Public or private: should a virtual museum be addressed to the home user or the museum goer or both? How does this affect the design?
- What is the role of tactility? Can tele-tactility replace the physicality of touch?
- Push buttons and peep holes: are these still valid interfaces? What else is needed?
- How does one maintain user involvement without turning it into a goal in itself?
- What role does creating "a total atmosphere" play? Are there any alternatives?
- How does one make a distinction between a museum exhibit and an entertainment application?
- Is there a need for distancing the user, at least sometimes? When and under what conditions? For what purpose?
- Is there a limit to the "multisensory overload" in exhibition design? How many information channels can be added without causing confusion and miscommunication?
- How should physical museum relate to virtual ones? Can a virtual museum be merely a replica of the physical one, or should it be something radically different? What?
- Can all location-based exhibits be replaced by virtual ones? Is this a viable goal?
- How important is user interaction? Wouldn't it be good to try to do without it, at least sometimes? What would be the consequences of non-interactive virtual museum design?

As an institution, the digital and "wired" virtual museum is still in the earliest stages of its development. As a consequence, the key questions to ask will certainly change, and new ones will be added to the list. Much will depend on the development rate and the spreading of higher speed Internet connectivity to everyday consumers. However, solving problems of routing and data-transfer is not everything. Our modes and routines of communicating and interfacing with multimedia databases are cultural, historical and ideological issues as well. Considering precedents from the non-digital eras - covering most of the history of mankind so far - should not be neglected.