

Meditations on an Unruly Discipline: New Media Art

It has become a commonplace to declare that we are living through one of the great epochs of human discovery. “The digital revolution.” The Internet as a “fundamental and extensive force of change.” With the advent of the Internet as a mode of communication and information discovery, we are leading lives, and facing challenges undreamed of in previous generations except as the stuff of science fiction. But what if it’s actually true? What if we are living through a period as significant as the Renaissance or the Enlightenment? What if our current circumstances are comparable to the Depression? Or the Post-war era? How about the counter-culture revolution of the 60s? Each of these eras, great and small, are marked, not only by their social upheavals, but also by their great strides in artistic representation. The Renaissance had Michelangelo and Leonardo; the Enlightenment had David and Ingres. In the modern era, we have Frank Lloyd Wright, Andy Warhol, Georgia O’Keeffe, le Corbusier, Picasso, Matisse, and the list goes on and on. Great artists, whose work helps us make sense of the past. Of course, we also have meaningful contemporary art – but there’s a problem. Whereas we can still look at Michelangelo’s paintings and sculptures, and in many cases, can look at preliminary studies and drawings – we’re running the risk of losing contemporary art as soon as ten years after its creation.

The new media art community has recently come to the realization that the objects and ideas of their most compelling thinkers and artists run the risk of disappearing forever, because these objects are often in digital or other variable formats, which tend to rapidly become, at best, inaccessible; and at worst, irretrievably lost. Unless there is a systematic and persistent exploration of preservation and archival procedures for these significant cultural objects, they will, in all likelihood, not be accessible for future generations of artists, scholars, or the general public. One of the new media community’s most important advances towards this goal of systematic investigation is the development of the “Archiving the Avant-Garde” project, which brings together new media venues, curators, and artists to devise possible solutions to this very difficult problem of the disappearing objects of the avant-garde.

There are three distinct challenges that the new media art community must confront if they want to successfully preserve these art 'objects.' They must first assess the nature and goals of new media art in general. Second, they might consider the current state of art preservation in related fields, like traditional art conservators' methods of dealing with more ephemeral art forms such as conceptual and performance art. Finally, it would be profitable for them to recognize and reflect on the history of access and preservation from an archival or library point of view.

This paper is a meditation on a theme: I am exploring new media art as it relates to other, more established, art forms. I would like to deal specifically with the first of these challenges, although they are all interrelated. To generally assess the nature and goals of new media art, one must have a perspective from which to proceed, in this case, preservation of the materials. Further, one must possess a rudimentary knowledge of preservation and conservation terms, and an understanding of related art forms from which to draw a model. Because of the variability inherent in art in general, and new media art specifically, establishing a general definition will be difficult, but established it must be, for the good of the field. It is difficult to preserve a nebulous "something," especially if that "something" is a complex series of digital objects with variable and intricate relationships between parts and the whole, which also happens to comment and feed off of a culture in which the conservator is currently living. Unless the preserving agency has a convincing vision of what is intrinsically important to maintain, the resulting objects run the risk of being inauthentic and/or presenting an inaccurate indication of the artist's intentions. Furthermore, if an object is cataloged without an underlying schema, intellectual access as well as retrieval may be hindered. Towards this goal of coaxing out a workable definition of new media art for access and preservation purposes, I will explore some relevant archival ideas and related artistic forms, observing the qualities that are intrinsically valuable in those forms, and determining how those valuable characteristics are modeled for preservation, access, retrieval, display, and scholarship.

The preceding paragraph mentioned the concept of the "intrinsic value" of an object. Because I will be trying to define the intrinsically valuable characteristics of various art forms, I

think that it would be worthwhile to first define “intrinsic value” from an archival point of view, and work towards an understanding of how the term will be used for the purpose of this paper.

Archivists use the term “intrinsic value” to define and describe historical artifacts that should be preserved in their original form rather than as copies. The qualities that determine intrinsic value in archival settings may be either physical, meaning the artifact has value because it exemplifies some means of production or outstanding physical properties; or intellectual, which means that the artifact has value because of the information contained within it. There are nine qualities and characteristics of records with intrinsic value, which relate to the physical nature of the records, their prospective uses, and the information they contain (Committee on Intrinsic Value, 1982).

1. **Physical form that may be the subject for study if the records provide meaningful documentation or significant examples of the form:** Documents may be preserved in their original form as evidence of technological development.
2. **Aesthetic or artistic quality:** ...may include photographs, pencil, ink, or watercolor sketches...
3. **Unique or curious physical features:** ...might include quality and texture of paper, color, wax seals, imprints and watermarks, inks, and unusual bindings...
4. **Age that provides a quality of uniqueness:** Age is relative rather than an absolute quality...age can be a factor with comparatively recent records.
5. **Value for use in exhibitions:** Records that convey the immediacy of an event, depict a significant issue, or impart a sense of the person who is the subject or originator of the record.
6. **Questionable authenticity, date, author, or other characteristic that is significant and ascertainable by physical examination:** Although it is impossible to foresee which documents will be questioned in the future, certain types of documents are well known to have the potential for controversy and, if the original records are extant, handwriting and signatures can be examined, paper age can be ascertained, and other physical tests can be performed.
7. **General and substantial public interest because of direct association with famous or historically significant people, places, things, issues, or events:** This criterion is not only the most difficult to apply, but also the most important in terms of the volume of records to which it could be applied. It could be used to justify preserving in original form almost all permanently valuable records because of their historical importance. On the other hand, if limited to records of unusual significance, it would be used to justify disposal of almost all original records. Archival judgment is the crucial factor in determining whether there is general and substantial public interest.
8. **Significance as documentation of the establishment or continuing legal basis of an agency or institution:** These records have in common the characteristic of documenting the shifts in function of an agency or institution at the highest level.

9. **Significance as documentation of the formulation of policy at the highest executive levels when the policy has significance and broad effect throughout or beyond the agency or institution.**

Within the context of the above outline, archivists are primarily concerned with retention of physical documents in a series or collection. In fact, the concept of intrinsic value gained importance in 1979 when the National Archives and Records Service began to consider the replacement of paper records with miniature surrogates like microfilm or microfiche. In order to make routine determinations on huge quantities of documents, the schema outlined above was developed by the Committee on Intrinsic Value to determine which documents should be saved in their original format and which should be saved as surrogates (Committee on Intrinsic Value, 1982). This paper is not concerned with arguing whether or not new media artifacts are intrinsically valuable, or whether they should or should not be retained. By the very act of collection, these objects are imbued with value, and will be retained. This paper is more concerned with defining those *characteristics* of new media art that are intrinsically valuable, which must be present for the object to retain its authenticity throughout its life. However, current preservation practices on new media artifacts often involve procedures, such as migration of the artifact from one form to another and emulation of the underlying operating system or software, that subtly alter the essence of the artifact. Having said that, is it possible to manipulate the archival concept of intrinsic value in such a way as to map any *characteristics* of new media art to the above schema? Instead of deciding on the retention and/or migration of *artifacts* (the artifacts will in fact be both retained and migrated), the concept of intrinsic value might be valuable as a basis for the discussion of which *characteristics* demand attention. Translating the above table into a usable form for the discussion of preservation of new media art, the following five qualities and characteristics are important in the definition and preservation of the artifact's nature, its prospective uses, and the information it might contain:

1. **Format of the artifact** (maps to #1, above): especially if that format has a meaningful relationship to the understanding of the work
2. **Aesthetic or Artistic Qualities** (maps #2 and 3, above): By definition, new media art objects have aesthetic or artistic qualities, which should be preserved at all costs.

Furthermore, as art objects, each artifact has “unique or curious physical features,” often referred to as “style,” which are related to the work of a specific artist or collective, and demand attention and retention.

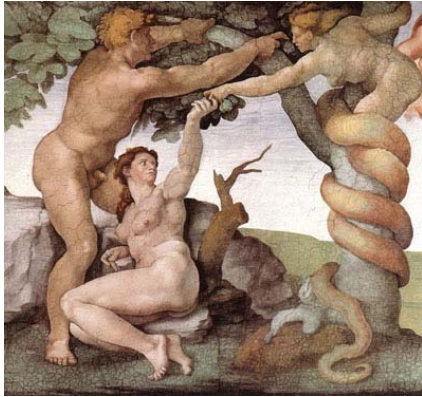
3. **Contextual qualities** (maps to #4, 7, 8, 9, above): This is the most complex characteristic to define and put into practice. How one defines contextual characteristics of a work is often a scholarly pursuit – these are sometimes not qualities physically present in a work.
4. **Exhibitory qualities** (maps to #5, above)
5. **Characteristics related to authenticity** (maps to #6, above)

The remainder of this paper will be devoted to discussing and further defining these characteristics with an eye towards the methodologies already in place for related, but more traditional art forms like painting and sculpture, the performing arts, and literature. I hope to find some avenues for further research, and perhaps clarify some misunderstandings about this very exciting, but unruly art form.

1. Format

Format is often an invisible characteristic of any type of art object – so pervasive and common that it is often taken for granted. All art forms have a basic format, be that canvas, fresco, or etching in the fine arts. Creativity is often defined by the ability of the artist to overcome the limitations of format: for instance, if an artist decides to work in fresco, there are some fundamental limitations on procedure and workflow; furthermore, fresco is particularly good at representing certain kinds of images and not so good at representing others. A fresco will never look like an oil painting, for example, for a myriad of reasons.

Figure 1.



Michelangelo, *The Fall and Expulsion: the Fall*, 1509-10. Fresco. (Sistine Chapel, Vatican City, Rome)



Leonardo da Vinci, *The Virgin and Child with Saint Anne*, 1510; Oil on wood. (Musee du Louvre, Paris)

These two contemporary images, painted in the same country, both depicting religious subjects, convey completely different attitudes and ambiance. This difference is not only because of the different styles, worldviews, and personalities of the artists (although those aspects certainly play a part), but because of the fundamental advantages and disadvantages in the different formats in which they're working. Michelangelo painted primarily in fresco, which is a notoriously difficult format, in which permanent lime proof pigments, dispersed in water, are painted on freshly laid lime plaster. Because of time constraints due to the rapidly drying plaster, the artist must plan all details and contingencies fully and completely before beginning work, and the work is completed in parts, over a period of days and weeks (and in the case of the Sistine Ceiling, years). Finally, shading and "atmospheric" qualities are simply not possible in this format, and are sacrificed for of crisp outlines and finely modeled forms, qualities for which Michelangelo is best known. Leonardo, on the other hand, worked with oil, a format still commonly used today. These paintings can be done quickly, but at the same time, the paint dries slowly, so mistakes can be wiped away and corrected. It's a much more forgiving format, which allows for a more "modern" representation. Finally, one of the great strengths of oil painting is its ability to convey an atmosphere, through subtle and gradual blending of one tone into another, or "sfumato," as Leonardo termed it. Again, these qualities are completely impossible in fresco.

Before forging ahead and discussing the practical applications of the concept of format to new media art, I would like to briefly touch upon the idea that different artists choose to work in various formats for reasons that are important to them. Format, although largely taken for granted, is not necessarily a given. There must, after all, be a reason why an artist would choose to be a sculptor over a painter, or to work with marble as opposed to sandstone.

The Dublin Core Metadata Element Set defines format: "Format may include the media-type or dimensions of the resource. Format may be used to identify the software, hardware, or other equipment needed to display or operate the resource. Examples of dimensions include size and duration. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of Internet Media Types [MIME] defining computer media formats)" (Dublin Core Metadata Element Set, Version 1.1, 2003). So even though the format is a major determinant of what a finished product looks like and what 'mood' that object has the ability to convey; even though artists have been making choices throughout the millennia regarding with which format to work, as a concept, it shares its definition with recording the size of an object. It is certainly not given the same weight in the Dublin Core as "type," for example, or "coverage." It is not the goal of this paper to stand up for the poor, underestimated "format" attribute, but simply to point out that there is a sense in the IT community that format, as a characteristic, is simply an organizational tool, or a means of display, and at worst, an attribute not even important enough to include in the searchable interface.

However the IT community views the format attribute of an object, new media artists definitely have opinions about the format in which they work. In fact, the need to choose a format is so pervasive and fundamental when an artist is working with digital media, that those opinions and subsequent decisions are often essential to fully understanding the work. Artists make decisions about what kind of computer they're going to work on (Mac or PC?), which photo editing software they're going to use (Photoshop, Fireworks, or Illustrator?), and how they're going to edit the accompanying text (vi, Word, notepad, or LateX?). When the new media artifact gets to the presentation stage, the artist must decide on which presentation format to use: Internet, network, or stand alone applications, and how those presentation formats are going to

be coded...the choices go on and on. All of these choices convey meaning for both the artist and the viewers, and are currently understood at a very basic level. For example, someone who chooses to use a Mac is making a cultural decision, one that goes beyond the mere availability of hardware. These choices and the resulting understandings might not be so obvious in fifty or a hundred years from now. For example, we know from literary evidence that Michelangelo insisted on using Carrara marble for his sculpture. He would personally select and quarry specific pieces for his works. It would be very interesting to know if he had similar preferences in his tools (who made them?) his paints (what methods and procedures produced them?) and assistants (he had to have them, although we don't know their names). These are similar choices that new media artists are making today; Michelangelo's "brush maker" is roughly akin to a new media artist's use of Photoshop. They're all tools. Fortunately, because new media artists typically use commercial products to create their objects, this sort of information is available today simply as a public record. For example, Josh Davis uses Flash as his presentation medium. Flash is the format. Macromedia, which has its own history as a company, makes Flash, which uses Lingo as its programming language. Lingo is based on C++. The general terms 'Flash,' 'Macromedia,' 'Lingo' and 'C++' all convey meaning to the modern new media art viewer; and the specific format, 'Flash,' has bearing on the understanding of Josh Davis' art.

Figure 2.



Josh Davis, *bacteria.study.17*. 2002. Flash. (Praystation year 3, version 2.)
<http://ps3.praystation.com/pound/v2/>

At this point in the paper, I hope that I have made a strong argument that the format is a significant characteristic of a work, and that any preservation system that the IT community develops should take format into account, in the best case trying to preserve the original format, and at least trying to fully catalog the import of the underlying choices inherent in the format. Unfortunately, the current thinking and technological ability available to the IT community is not amenable to the significance of format.

A major theme of this paper is the difference between content and intellectual expression of that content. Technology, heralded by the IT community as the saving grace of nearly everything made by man, tends to preserve those characteristics of things that can be automatically indexed, cataloged, listed, and defined. Namely, technology is good at saving the thing's straightforward content. This is a perfectly acceptable methodology, if we're dealing with an artifact for which the content holds paramount importance. Legal records, for example, are important for the information they contain, as opposed to the way in which that information is expressed. In fact, with legal many documents, the expression has been removed from the process through the use of templates, learned legalese, and procedures meant to reduce the expressional qualities of a document. The problem with applying technological solutions to art, however, ought to be obvious. In art, the content of art IS its expression. If you've changed the expressional quality of some piece, that piece is now no longer in its original state – it's different, and might have a totally different impact through technology's mediation. This theme will be repeated throughout the paper; unfortunately, I have only a few recommendations to put in technology's absence.

The primary problem with the longevity of digital documents is the "viewing problem" (Besser, 2000a). Unlike analog or physical information, which tends to exist independent of human involvement, digital information requires intervention in order to survive. Whereas we can look at the Rosetta stone, created two thousand years ago, it is virtually impossible to view simple documents on 8-inch floppy disks created in the last twenty years, even if someone has taken an immediate, proactive role in preserving digital documents. History has shown that digital documents are problematic by default. Without concerted effort on the part of archivists and

preservationists, digital documents become obsolete or inaccessible due to unforeseen advances in information technology.

There are two fundamental issues related to the “viewing problem.” The first is the obsolescence of physical storage formats, and the second is the obsolescence of software systems. Physical storage formats are forever being replaced by newer mechanisms: 8-inch floppy disks became 5.25-inch floppy disks, which morphed into 3-inch diskettes, which became CD-ROMs, which are now turning into DVDs. While it may be possible to extract information from two iterations before (for example, it’s possible for me to view files saved on a 3-inch diskette), we cannot depend on the ability to view documents stored in older formats (it’s impossible for me to view files on 5-inch floppies). The solution to this changing storage format issue is the concept of “refreshing” (Task Force on Archiving of Digital Information, 1996), which involves periodically transferring a file from one physical storage mechanism to another. This is a solution that will probably persist for many years (Besser, 2000b), although it is not elegant, and does not address the problems of authenticity or file format obsolescence.

Word processing programs, probably the most basic systems on today’s computers, have a life span of ten to fifteen years. After that they become inaccessible (Besser, 2001). For example, in the mid-1980s Wordstar was, by far, the most popular word processing program. Now, there are only a few people who can read any of the millions upon millions of documents created in Wordstar. Furthermore, even Microsoft Word cannot read files created any further back than two previous versions, and even then, important formatting information is often lost. This line of reasoning leads to some obvious conclusions: if the simplest programs like Word or Wordstar, are unreadable just three software iterations later, what is the outlook for much more complicated programs like Adobe Photoshop or Macromedia’s Director? In a word: bleak. There have been no published studies specifically dealing with the problem of obsolete file formats in these more complicated software programs, but personal experience, specifically with Macromedia products, suggest difficulties to come. For example, the current version of Flash is FlashMX. It’s a great product, with added features for integration with other formats (MPEG-7, for example) and it has some functionality to address accessibility issues. If a viewer wants to view animations developed

with FlashMX, s/he must download that plug-in from Macromedia. Unfortunately, once that plug-in is installed; it's impossible to view animations from just *four years* earlier, developed with Flash 2.

There are two methods in managing the problem of obsolete file formats (Task Force on Archiving of Digital Information, 1996): *migration* and *emulation* (discussed later in the paper). *Migration* focuses on the files themselves, periodically updating files in new software formats. For example: we could move a file created in Wordstar to WordPerfect to Word 3.0 to Word 5.0 to Word97 to Word XP. This is a process by which we can consolidate numerous historical file formats into limited numbers of contemporary programs, thereby simplifying the process of access in the future. However, there are obvious monetary, organizational and authenticity issues involved with *migration* that make it an imperfect option (Besser, 2000a). These obvious issues don't even address the subtler problem of the artistic choice of one format over another. If a writer chose to write a "digi-novel" in lateX, and it eventually got migrated to Word XP or some variant thereof, then is the work being honestly represented? To take a more strident example: would the Sistine ceiling convey the same meaning if the fresco layer were separated from the wall, transferred to canvas or wood, and hung in a museum? The technology is certainly there, but it would be a fundamentally different experience. Again, it becomes a question of whether the conservation/preservation community is trying to preserve access to the physical content of a work, or if they're trying to preserve access to the deeper meaning of a work. It becomes a very sticky business wherein the conservator is making artistic choices traditionally left to the artist.

These are choices traditionally left to the artist, certainly, when we're dealing with the fine arts like painting and sculpture. But literature is a different story entirely. Whereas the valuable product in the fine arts has traditionally been a unique object – the *Mona Lisa*, or *Guernica*, for example – in literature, the 'valuable' product is taken from the author, edited, and mass-produced. In the production and distribution aspect of the work, new media art is closer to literature than the traditional fine arts. And notwithstanding the current discussion focused specifically on format, to which I will return posthaste, I believe the new media art community could profit from a deeper understanding of the process of rare book cataloging, or descriptive bibliography.

From a liberal arts point of view, if it's thought about at all, descriptive bibliography is generally understood as the study of books as material objects, but it can also be understood as the "science of transmission of literary documents." (Gaskell, 1995) "Transmission" in the sense not only of recording the genealogy and relationships of variant texts, but also capturing the evolution of particular texts in the processes of their production and reproduction. "There is no reason to confine bibliography to literary documents...[and] the aims of bibliography need not only apply to written and printed books, but to any document, disc, tape, or film where reproduction is involved and variant versions may result" (Gaskell, 1995). Most notably, bibliography is a helpful tool in the identification and description of mediated materials; it helps to judge the relationship between variant versions, assess their relative authority; and, where the reproduction is defective, to guess at what the creator meant. "Bibliographers, like other scholars, have to be able to think logically, to judge critically, and to persevere in tediously repetitive tasks; but in addition, they must understand the history of book production. The study of printed books as material objects and the right interpretation of the printed documents of the past will be based primarily on a knowledge of how authors' manuscripts were transcribed in type, printed, distributed, and sold" (Gaskell, 1995). The associations between the cataloging of rare books and new media art are promising. Again, it is not within the scope of this paper to give an in depth study of the relationships between hand-press books and new media art objects (although that would be very interesting), but suffice it so say that at first glance there are some obvious similarities. Both are mass produced or transmitted, variable, and have something of a precious quality about them. They've been produced with care and technological ability. Many of the issues that enhance the understanding of a text also increase the understanding of a new media art object, and finally, the end product, once it is ready for production and distribution, is largely out of the creator's control.

Returning to the topic of "format," the descriptive bibliographers are characteristically meticulous in their recording and understanding of that attribute. Recording the format for a hand-press book is particularly relevant in the rare book cataloging, where the book's basic layout and format might be completely different from one printing to the next (and sometimes within the

same printing). I think it would be useful to quote in full the first paragraph on the section entitled

“FORMAT” from the Gaskell’s *New Introduction to Bibliography*:

“In bibliographic usage, the format of a book of the hand-press period means the arrangement of the *formes* and the subsequent folding of the printed sheets as indicated by the number and conjugacy of the leaves and the orientation of the paper in the gatherings, and is expressed in the terms folio, quarto, octavo, etc. A book made up of sheets printed from pairs of four-page *formes* folded twice to make four-leaf, eight-page, gatherings with horizontal chain lines is called a quarto; and it is still called a quarto, not a folio, if the eight-page sheets were cut in half before folding to make gatherings in pairs of leaves with four pages each. If the size of the paper can be established by measuring the leaves or identifying the watermark it is added to the format statement, thus indicating the size and shape of the book in the terminology of the trade: foolscap, quarto, demy octavo, etc.”

From just a cursory reading of this definition, it is easy to see that understanding *format* in the parlance of bibliographers involves the understanding a great many other things, like paper size and production, printing methods, and trade terminology. When it comes to actually communicating the “format statement,”

“The formula, which includes both the format and the collation or detailed register of signatures, serves the dual purpose of showing how the book was—or ideally should have been—constructed, and of providing a system of reference to its parts.

The imposition, paper size, and folding are determined as far as possible... This format statement for books of the hand-press period generally indicates not only the size and folding of the gatherings as they are found in the book, but also the sheet size and the imposition used in printing it...

Next comes the collational formula, which is a shorthand note of all the gatherings, individual leaves, and cancels as they occur in the ideal copy...”

And an example of the format statement, or *formula*:

Figure 3.

Formula. 4^o: πa-d⁴ A-3V⁴ 3X² a-2m⁴ 2n⁴ (2nI+²2o-²2r⁴ 2s²) 20 – 3n⁴; [\$2 (+\$3 in F-S, a, c-k, y, ²20 – ²2q, 2q, 2s, 2x, 2z – 3c) signed]; 536 leaves, pp. [8] [I] II-XV [XVI] XVII-XXIV 1-304 307-532 [2]; 1-143 [144] 145-294 285 296-318; 283-304 [168].

Paper. (a) Large: mixed: i. Fleur-de-lis/PC; ii. -/-; 9 ½ x 7 5/8 in.; (b) Small: mixed: i. Coat of Arms with Cross of Lorraine and circles/-; ii. Cross of Lorraine and circles/-; iii. -/-; 8 x 5 7/8 in.

Entry 131 from Appendix I of McKenzie, D.F., *The Cambridge University Press 1696-1712*, Cambridge 1966, i. 273-6. (Gaskell, 1995)

If the new media art preservation community had a method for identifying and cataloging the “ideal copy” of a work, and further explicitly stating the differences between the ideal copy and a variant thereof, my reservations with migration would be greatly mitigated. This issue will be expanded later in the paper.

2. Aesthetic or Artistic Concerns

When thinking about a work of art, it is almost a given that the aesthetic or artistic attributes are the most important, and should be preserved at all costs. However, with the current technology and common thinking on the topic of new media art preservation, artistic concerns again run the risk of taking a back seat to technological ones. This is not because artistic qualities are taken for granted, the whole point of art, after all, is artistic expression. The problem again stems from our technological abilities, or lack thereof. The second method of preservation that IT professionals have indicated as a promising technology for preservation is *emulation*. Instead of endlessly transferring files from one format to another like proposed in *migration*; *emulation* focuses on developing systems that mimic the application software used to create the original document. For example, if we wanted to run a piece of software created in 2001 on a computer in 2101, we could write a piece of software called an “emulator” which would make the 2101 computer appear, for all intents and purposes, to be a computer from 2001. Once the emulation software is in place, we could run all of the original software from 2001, including the operating system, the application program and all the document files. Some emulation proponents want to develop systems that mimic every application ever used for every file format, then make those systems operate in the current computing environment, whatever that might be (Besser, 2001), but the researcher most closely allied with emulation, Jeff Rothenberg, makes a pretty strong case for emulating only at the hardware level, and running the original OS, application, and document within that hardware emulator. He argues that hardware is well documented on a technical level, and hence can be re-created with the most ease; and that this approach gives the most “bang for the buck.” By writing just a few hardware emulators, we could run dozens of operating systems, thousands of applications, and millions of documents (Rothenberg, 1999a).

As evidenced by the numerous articles, institutes, and recent breakthroughs, emulation is currently the preferred method of digital preservation and access (BBC News, 2002) (University of Michigan & University of Leeds, 2002) (Granger, 2000) (Rothenberg, 1999b).

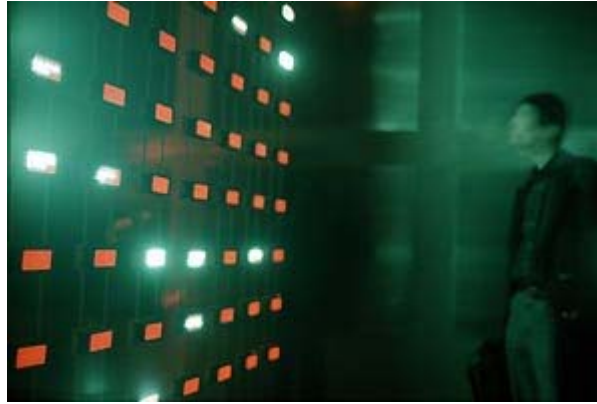
The CAMiLEON project recently had a major success in its quest to preserve the BBC Domesday project, a social life of England in the 1980s. BBC Domesday was created to celebrate the 900th anniversary of the Domesday book of 1086, the original record of William the Conqueror's survey of England. The BBC and countless schoolchildren across England and Wales developed the interface and collected data, and it was one of the largest digital projects developed from that era. Procedures, methodologies, and lessons learned from this project were influential in the development of various others, modern international digitization projects occurring today. Unfortunately, the Domesday book was so expensive that hardly any schools or libraries could afford to buy a copy, and the technology used to store the data, video laserdisc, became obsolete almost immediately after the product was released. Only ten years after the first release of this enormously influential and well-funded project, the data was unreadable and the interface was inaccessible.

There were several pieces to preserving the BBC Domesday. First is the decay of the media—discs got scratched during use and became less reliable. The hardware to read the discs is also rare, and the few remaining laserdisc players were prone to break downs. Finally, the Domesday system also had a particular look and feel that required extra effort in addition to preservation of the actual content. The CAMiLEON folks decided that it was outside the scope of their endeavor to preserve the interface, so they could focus on extracting the content of the system (Mellor, 2003). There are new projects underway to develop new interfaces to the data, with allowances made for re-interpreting the look and feel of a mid 1980s computer interface. Because of this necessary focus on extracting content at the expense of interface, I think that the success of the CAMiLEON project is qualified, rather than complete. But it does raise questions about the appropriateness of using this sort of emulation strategy for art objects, where the interface, or format, or intangible expression of the content is at least as important as the content itself.

Emulation isn't only gaining importance in providing access to documentary content. Rhizome, one of the premiere venues for digital new media art, recently released the white paper "Preserving the Rhizome ArtBase" (Rinehart, 2002), basically recommending the support, development and use of emulation software. One of Rhizome's primary functions is the maintenance of the ArtBase, an archive of new media art. As initially conceived, in 1994, the ArtBase was an archive of exclusively net art projects, but has expanded to include other forms of new media art such as software, games, and web-based documentation of installation and performance works. The ArtBase is maintained and developed by Rhizome members, and includes works of historical significance that are either submitted by the owners of commissioned artworks, or by the artists themselves. Information is collected through an online submission process (Rhizome.org, 2002), which includes an artist questionnaire, and user-defined metadata entry. The white paper deals specifically with Rhizome, but also serves as a general research agenda for long-term new media art preservation.

Rinehart's recommendation for the development of emulation software is in line with his previous thinking on the subject (Rinehart, 2000), although he does admit that there are advantages and disadvantages to emulation when applied to new media art, and that emulation might be but one component of an overall preservation strategy. One of the major drawbacks of current emulation strategy in relation to Internet art, for example, is the focus on stand-alone computers rather than the network per se. Much of new media art integrates the Internet into the work – for example the *Listening Post* (Rubin & Hansen, 2001) is a project that collects data in real time from tens of thousands of newsgroups, chat rooms, bulletin boards, forums, and other online public communication channels, and statistically analyzes those messages into topic clusters based on their content. This data is then translated into a "tonal soundscape" with spoken text responding to the changes in the flow and content of the messages (Hansen & Rubin, 2001).

Figure 4.



Listening Post, 2001–02 (installation view at the Brooklyn Academy of Music). Electronic components, copper wire, aluminum, loudspeakers, computer software, dimensions variable. Collection of the artists.

Emulation will never be able to reproduce the entire Internet environment needed for this type of work, although one might be able to mitigate this problem through collection of very specific information about the functionality of the artwork. For example, some of the *Listening Post's* underlying technologies are the pinging of IP addresses and the use of “carnivore”-like software to monitor online discussions. However, in the future, the two most basic technologies, “ping” and “IP,” might be obsolete protocols (let’s hope this is also true of Carnivore), so the preservation of this sort of work would have to contain an IP-style number generator, and a simulated discussion environment to which the system could listen. Obviously, even if this sort of very intelligent emulation happens, in many cases the emulated artwork will only preserve *some* of the original work’s features or a simulation of the original experience, and will therefore serve primarily as a snapshot or fragment to preserve some critical historical evidence of the original. For example, a major part of the *Listening Post* experience is the knowledge that you are “listening to” and experiencing “the Internet” in a real-time time setting. If the environment were emulated, the immediacy of the experience would be mitigated.

Software emulation presents more profound artistic problems, related to the disruption of formal elements of a work, such as pacing, aspect, ratio, and format. In the context of game software, from which many new media artworks draw inspiration, emulation as a preservation strategy is facing some opposition. At the Getty Museum’s *Time & Bits Conference* (MacLean &

Ben H. Davis , 98), Jaron Lanier, a pioneer game developer, related a story about how a group of “game-hackers” had built an emulator to run one of his earliest works. When he went to see the emulation, he realized that contemporary computer processors made the game run much faster than originally intended, and that the faster pacing changed the piece into something he refused to accept as his own. In art, every difference makes a difference (Goodman, 1976). The problem of accountability and authenticity leads to the very complex issue of defining the nuances in individual art works. What is the work, really? What parts of new media art are important to preserve, and why? Who decides what’s important? The artist? The critic? The viewers? Because something is always going to change, particularly in new media art, how do we track those changes? These are questions that have been plaguing art conservators since the beginning of the profession over a hundred years ago (Glueck, 1980). However, the dilemma really came to a head in the post-war era, with the dual emergence of “modern” art, which tended to have more ephemeral qualities than the art of the old masters (Wyer, 1988), and “modern” science, which was able to take advantage of new chemical techniques to halt or repair the progress of time on works of art. Specifically, there are two issues in traditional art conservation that are particularly germane to the discussion of digital art preservation: the reliability and/or appropriateness of seeking out artistic intent; and the reality of ageing itself – should conservators try to keep the work in pristine condition, or is it more honest to allow for some ageing?

The first problem, that of artistic intent, is particularly notable, because much of the current thinking on digital art preservation has an artist questionnaire as one of the first and central means of defense (Guggenheim Museum, 2001) (Rinehart, 2002) (Besser, 2001) (Rinehart, 2002) (For the Rhizome questionnaire, see Appendix i). However, for the last fifty years, conservators have been debating the appropriateness of seeking out artistic intent (Wimsatt & Beardsley, 1948) (Lyas, 1983). Cognition of intent is a very complex process, sometimes not fully understood even by the artist him/herself (Sloggett, 1998); it is often ancillary to received wisdom about the piece (Dykstra, 1996); and more often than not, conflicts with what a conservator is, or should be, willing to do (van de Wetering, 1989). For example, Vincent van Gogh would have had his brother Theo shave off the peaks and valleys of his paintings, saying

he only painted thickly to guarantee the “solidity of color.” What we see – the rich texture that hints of van Gogh’s “famous” madness, is in fact only a side effect of his painting technique, and was meant to be “erased” by shaving (van Gogh, 1996). However, the impasto of his paintings, whether he intended it to persist or not, has gained historical value as an essential element of his style, and it would be impossible to find a conservator willing to shave a van Gogh. This is not to say that conservators should ignore completely what an artist has to say – they are a valuable resource. However, there ought to be some recognition of the limits of the artist’s ability to define the importance or poetry of his or her work.

But because the “artist questionnaire” is such a major component of the current preservation strategies, it should be addressed here in a little more detail. In March 2001, the Solomon R. Guggenheim Museum in New York City held a conference, “Preserving the Immaterial,” which dealt with variable art forms. This included not only new media and net art, but also performative, reproducible, interactive, and duplicable artworks. Specifically, it was a chance for the curators and conservators of collecting institutions to test out the “variable media questionnaire” that had recently been developed. They brought artists on stage, and asked them questions relating to works that had previously been collected by the institution. There were two particularly notable lessons to bring away from this conference. First, and this should come as a surprise to no one; the artist questionnaire is difficult and complicated. The artists were having a difficult time answering the written questionnaire (Webster), and when being orally questioned (on stage), their answers were not simple – there were almost always qualifications, and “you’d have to ask me if that situation arose,” sorts of answers. Precisely the sorts of answers that the questionnaire is trying to get away from. The second notable idea is that the artists were almost universally appalled at the technology available for preserving and reproducing artwork. At many times throughout the conference, the artists, particularly the older ones, whose art is ageing, would assert that the thing being displayed was merely a “record” of the art, not the art itself (Ippolito, 2001) (Morris, Jacobs, Ludwig). This is a very interesting idea to me, because if the art being presented in an institution is only a “record of” the original work, what kind of record is it? Is it possible to know certain things about the original thing, or has that information been lost

forever? I will return to these issues later in the paper, in the sections on “exhibition qualities,” and “authenticity.”

The matter of ageing gracefully is also relevant to the discussion of digital art preservation, although there are considerable differences between physical works, which deteriorate slowly over time; and digital works, which tend to simply disappear. In his keynote address to the “Preserving the Immaterial” Conference in 2001, science fiction writer Bruce Sterling put it nicely when he said, “entropy requires no maintenance. Entropy has its own poetry: it’s all about delamination, disintegration, deterioration, degeneration, decomposition, and doddering decline” (Sterling, 2001). To make matters even more complicated, chance does play a large part in a lot of new media art. One work will look different depending on the browser used to view it; and some artists will use images that are actually links to other web pages – when the links fail, the image no longer works. The artist regards this as a “feature,” illustrating that some artists program an “ageing” mechanism into their work. Should that mechanism be overridden in the name of aesthetics? Again, this ageing problem has also been a major issue for traditional art conservators. Picasso and Braque “would rather have had a painting disintegrate than see it undergo plastic surgery” (Richardson, 1983). “Death with dignity” would be their rallying cry. However, not all people see the problem in those black and white terms, and there is a question of whether the will of those conservators, who define themselves as restoration “minimalists,” might take precedence over the creative process of the artist. By refusing to repair decaying art works, even if the technology is available, is the conservator then locking the artwork into a single moment in time (Albano, 1988)? If it’s possible to fix something, and that action does not change the inherent nature of the original work, isn’t it the conservator’s responsibility to keep the work “alive,” relevant, and accessible as long as possible? The real question, then, becomes whether an emulated work is still “alive,” relevant, or accessible, in an intellectual sense.

3. Contextual Qualities

Contextual qualities are those that are not physically part of the work, but are the concepts and ideas that surround the object, and imbue it with meaning. In general terms, these qualities can be considered the ‘metadata,’ or cataloging terms of the object. Every major

preservation initiative recognizes the importance of a robust metadata schema for the storage, retrieval, and intellectual access of their objects. 'Archiving the Avant Garde' has concentrated on Dublin Core, EAD, and MARC as schemas on which to test. There are advantages and disadvantages to each, but the structure is not as important as the level of completeness, and the theoretical underpinnings of the system itself. What sort of information are these agencies going to collect, how are they going to collect it, and how is that information going to be retrieved are the more interesting questions.

In 1994 Sarah Shatford Layne developed a very robust image cataloging methodology, wherein she called for the cataloging of four distinct attribute groups for each image: biographical, subject, extensive, and relational (Shatford Layne, 1994). *Biographical* attributes document the "birth" and "travels" of the object; *subject* attributes are related to determining the meaning of an image; *extensive* attributes are associated with the format of an image; and *relational* attributes basically act as pointers between the image being cataloged and other objects that might relate to that image such as preliminary drawings, text, and critical essays about the image. The primary, and most troublesome attribute for most art catalogers is the "subject" attribute—the common assumption is that by providing a statement on the subject of the image, by deciphering what an image is "about," image catalogers will provide a very important access point to users trying to find images or information. In a recently published article in the JASIST, Choi and Rasmussen state in relation to their findings, "This study also found that subject descriptors that represent about-ness of the image content were a key element for users' judgment. It seems that topical terms provide a useful approach to describe image documents...A majority of the users wished that more informative data such as citation status and structural and contextual information related to an image had been found on the textual descriptions...Beyond the bibliographic description (i.e., name, title, date) textualizing what is essentially pictorial plays a major role in providing better indexing service in an image retrieval environment" (Choi & Rasmussen, 2003). This all seems pretty straightforward. Image retrieval would be improved by providing topical terms, citation status, structural and contextual information, and "textualizing what is essentially pictorial." However, none of those concepts are related to the "meaning" of an image, and do not

correspond to the “about-ness” of an image as defined by Shatford (Shatford, 1986), which has Erwin Panofsky’s (Panofsky, 1962) iconological interpretation system as its source.

Panofsky was arguably one of the most influential thinkers of the modern era. He is most commonly associated with his “Studies in Iconology,” a series of lectures published in English in 1955 that describe a theoretical system that allows for interpretations of Renaissance paintings in light of Neo-Platonic philosophy, classical mythology, and general humanistic knowledge. What was particularly distinctive about this methodology was its claim that it held the key to the history of artistic styles as an expression or manifestation of changing worldviews, or *Weltanschauung*. This approach, which had a basis in the philosophical system of Georg Fredrich Hegel (1770-1831), essentially says that the course of human history “resembles a clockwork of wheels within wheels activated by the unfolding spirit of mankind, a spirit that animates art, no less than science, law, or religion, in a precise and determined way” (Gombrich, 1996). Because of this intermingling of fields within the scope of the whole human endeavor, a successful art historian would have to be familiar with most of the other humanistic disciplines to produce the parallels from philosophy, poetry, and all the other aspects of the past. Panofsky was able to find ingenious parallels between art and contemporary (meaning contemporary to the painting) culture.

In Panofsky’s system a painting has three interpretative levels: pre-iconographic, iconographic, and iconological. The pre-iconographic description is a basic listing of the elements of an image, and deals with primary or factual or expressional subject matter: Figure 5 is a painting of a faintly smiling woman with two children, playing in a tranquil landscape. All of the figures are haloed. The older child, wearing a roughly textured toga sort of thing is bowing to the younger child, who, while grabbing a crossed staff, seems to be giving a benediction. They are sitting in an open field, with a blue-sky overhead. There is a lake, trees and a small village in the middle distance. The scene is dramatic in the sense that the figures seem to be acting out a pre-ordained story.

Figure 5.



Raphael. *Madonna of the Meadow*. 1505 or 1506. Oil on panel. Kunsthistorisches Museum, Vienna, Austria

The iconographic interpretation requires familiarity with literary themes or concepts, and deals with images, stories, and allegories: This is an image of the Madonna and Child with Saint John the Baptist. The iconological interpretation deals with the image's "intrinsic meaning" or symbolic value: whole books have been written about the intrinsic meaning or symbolic value of this type of image.

Shatford (Shatford, 1986), Markey (Markey, 1984) (Markey, 1988), and Krause (Krause, 1988) have focused on the first two levels of interpretation, pre-iconographic and iconographic, arguing that iconological interpretation is too subjective and complex, and is more of a scholarly activity than a practical one. But the iconographic level is, as well, very subjective and problematical. In the above image the iconographic interpretation was based on knowledge of Christian themes and actors, for example. Shatford recognizes this complexity and affirms that varying interpretations will arise at the iconographic level, and so the cataloging entity should make a decision about whether the users' needs outweigh the difficulties of cataloging to this degree of complexity. She proposes a binary indexing at the pre-iconographic and iconographic levels, "At the pre-iconographic level, the *Of* aspect is generic description of objects and events; at the iconographical, it is a specific, or proper, appellation of those objects and events. *Of* words

describe people, places, objects, conditions, and actions that have a physical manifestation. The *About* aspect is, at the pre-iconographic level, a description of the mood of the picture; at the iconographic level the *About* aspect is an identification of mythical meanings and abstract concepts that are communicated by images in the picture” (Shatford Layne, 1986).

The discussion of subject headings for images it is, unfortunately, not particularly germane to preservation of new media art, except as it regards future access and retrieval of that art from the databases in which it will surely reside. No mean problem, that. However, it does illustrate the primacy that catalogers and metadata librarians give to providing the subject access of a painting, to the detriment of other, more easily cataloged, and, I dare say more valuable, image attributes, like Shatford Layne’s biographical and extensive attributes. An improved focus on cataloging these additional attributes would provide access to what the users in various studies (Keister, 1994); (Hastings, 1995b); (Hastings, 1995a); (Turner, 97); (Jørgensen, 1996); (Oranger, 96); (Armitage & Enser, 1997); (Chen, 2001) said they wanted most (although they said it in different ways): contextual information.

Contextual information is the focus of some current pioneering art historical writing, by Professor David Summers, of the University of Virginia. Another of the great thinkers of the profession, Summers has devised a new “meta-language” for discussing art, which provides the theoretical vigor necessary to change perceptions of the more “bibliographic” attributes, as they are often termed today (Choi & Rasmussen, 2003). In his soon to be published book, *Real Spaces*, Summers argues that the primary importance of a work of art is its context. If a scholar intellectually separates an object from its contextual situation, that object has had a great disservice done to it, and our understanding of that object is much diminished. Subject analysis has an almost negligible impact as an aid to understanding primarily because it is so subjective as to be useless, but also because the very idea that an image could be “about” something, or speak for some lost culture it is based on outmoded and frequently offensive metaphysical philosophies, convoluted rhetorical tropes, and is often inappropriate or misleading (Summers, 2003). Two of Summers’ most important attributes in the discussion and understanding of art objects roughly correspond to Shatford Layne’s “biographical” and “exemplified” attributes.

In addition to Shatford Layne's biographical attributes, that information related to the birth and travels of the object, Summers would include a discussion of the object's "spaces of use." For Summers the "spaces of use and creation," were fundamentally important to gaining a deeper understanding of the work: where, and for what reason was the artifact created, who had control over its use, how was it used, what sort of meaning did it carry for people who came in contact with it, and what did this object mean to the culture that allowed for its creation. All writers on the subject of image cataloging recognize the importance of indexing the "biographical" attributes of an image. What is different here is that Summers is making the understanding of these features inherently important in the subsequent understanding of the work. They're not merely bibliographic data. They're the most important contextual information and must be recorded.

Shatford Layne's exemplified attributes, as the definition is commonly understood, relate to format. For Summers, the fact that an object was made by a person for a specific reason is the essential significance of that object. Any attributes that demonstrate the "facture" of that object are meaningful. The creators made choices when deciding what the object was going to be, and those choices, as exemplified in the object, are worthy of note. Summers breaks his discussion of facture into five sub-sections: The format, discussed above; the "embodied existence," meaning the work is manageable or unmanageable from a human point of view; the "disposition of materials," whether the object was made for functional or conventional uses (an ax versus a ceremonial ax); "the arbitrary," using the word "arbitrary" not in the sense of random acts but in the sense of "an arbiter," someone who makes decisions; and "the notional," which is related to the arbitrary in that someone is making a decision to expend extra effort in trying to perfect or refine a skill (they have a notion that they want to make the roundest pot possible, for example). This is all contextual information, linked to the object only through our understanding.

It is beyond the scope of this paper to develop a new metadata schema that would be able to catalog and present this work in all of its complexity. But it is worth mentioning that the Dublin Core Metadata Element Set, combined with the CIDOC Conceptual Reference Model (Doerr, 2000), goes a long way towards providing contextual, topical, informational, and semantic

meaning to this work, where traditional cataloging techniques, or simply the Dublin Core alone provide paltry clues as to its substance (please see Appendix b).

4. Exhibitory Qualities

One of the more radical approaches to preservation, only recently suggested by conservators and new media venues is *re-interpretation* of the work. While this is not at all a revolutionary idea in the performing arts, where new interpretations of musical, dance, and dramatic performances are de rigueur, in the fine arts, re-interpretation challenges the fundamental concept of what a work of art actually is. This idea is intimately related to the ability of the collecting institution to exhibit the work. For example, if a museum or gallery is staging a retrospective of a eighties era computer artist, the “cutting edge” technology from the eighties will seem comically old fashioned now, if it’s even possible to run or view the original program. Wouldn’t it be better, the conservators and curators ask, if they could update and re-interpret the work to make it more accessible and comprehensible by contemporary audiences, thereby making it more “true” to the original intent of the artist? The practical applications of this line of thinking on new media art would be the replacement of obsolete hardware with machinery that has the same social or metaphoric function, or updating outmoded methods and with more culturally meaningful (although still relevant) techniques. The museum would, of course, continue to hold the original work in its original state in their collection, but it wouldn’t necessarily be the piece that existed in the public consciousness. In a way, the idea of re-interpretation is simply a way for curators and conservators to be honest about the realities of presenting a work of art over time. Both of the previously discussed preservation methods, emulation and migration, are in themselves subtle re-interpretations of a work – only they do so in the more prosaic name of accessing the physical content of a piece, as opposed to preserving the inherent meaning of a work for future generations.

Given that the re-interpretation of an artwork is such a complicated and problematic endeavor for the fine arts community, perhaps the performing arts community could provide some guidance. It’s hardly groundbreaking or earth shattering when a play is re-interpreted or reworked for the modern audience. It’s simply the way things are done. Take, as a glaring example, Baz

Luhrmann's *Romeo + Juliet* (William Shakespeare's *Romeo + Juliet*, 1996), an MTV-style retelling of Shakespeare's very famous play. One might argue that this sort of re-interpretation is only possible because it's already understood so well. The play is already a part of our culture, and the re-interpretation is only adding to the public's previous experience with the piece. Furthermore, if someone wanted to look at the original, it's freely available for reference – totally unadulterated. It's possible to look back at Shakespeare's original words and see what Baz Luhrmann changed, and what he kept. This is much more difficult with new media artifacts because the original "script," the operating code, the program code, the original image files, would often no longer be visible or available.

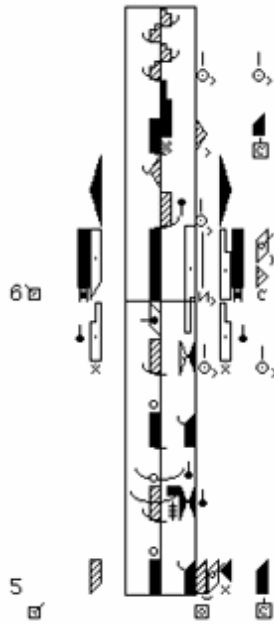
Various curators and artists have noted the similarities between new media art and the performing arts (Ippolito, 1998) (Dietz, 2003). On an observable level, both are ephemeral: a dramatic performance is gone the moment it ends. Videotaping that performance does not capture the inherent qualities of being at that performance. The same is true of much of new media art. Every time a viewer looks at a piece, it's different. Sometimes the work changes continuously. Sometimes it changes only when the viewer makes a change – but the new media artifact is rarely stable or permanent. They are both presented within a space constructed specifically for the "performance:" dramatic works are performed on a stage, be it an actual theater or street performance, the "invisible wall" still exists. New media art is invariably presented on a computer screen of some type. While the computer screen has not been developed specifically for the presentation of new media art, it is a powerful mediator. On a more interpretative level, new media artifacts also have actors, directors and producers. The actors could be the objects on the screen (Macromedia, for example, has purposefully emphasized the theater metaphor: the programming space is called the "stage," the animated objects are the "actors," and the program is called the "script.") or they could be the viewers themselves, who often are responsible for advancing the work to the next level. New media art often requires interaction in order to proceed. Furthermore, both performative art, such as dance, and many new media artifacts have the distinction of being both temporal, meaning the action happens over time, and that time span is important for the meaning or experience of the work; and spatial,

meaning the objects, be the dancers or animated images, move from one point to another, and that movement is definitive as related to that work (Johnson & Snyder, 1999).

Performance company archivists have a host of procedures and methods to preserve their art form. Not only do they save physical archival objects like playbills; set design and costume sketches; and director and stage manager notes to preserve something of the process of production; they also try to preserve the work through the use of video and audio tape, and critical reviews of the performance. But those are all objects that might record the actions surrounding a performance. The performance itself, with all its layers of meaning and experience, is gone once it's over, and is created again the next night for that brief time it's being acted out upon the stage. Whereas the performing arts community understands this basic limitation, that they can only preserve parts of a performance, and references to it, the new media art community seems to want to preserve the performance itself—the actual running of the program and the viewer's interaction with that ephemeral thing, as it happened in its original incarnation. Unfortunately, it's an impossible task, and more importantly, not really appropriate to any artistic medium. Actors and dancers are not expected to do the same exact thing with every performance. The creative process, for a performer, is about re-interpretation and making different material come alive within different situations. Viewers should not be expected to relate to the work in the same way throughout the life of the artifact, and the artifact should not be expected to remain the same throughout its existence. It's stifling for the viewer, the venue, and the work itself. In this light, re-interpretation is the *only* way that a new media artifact can really be preserved.

Shakespeare wrote scripts. We can still read them. Producers and directors can interpret them, cast the production, and build their own Shakespearean worlds. Bach wrote symphonies. They are still readable. Conductors interpret those scores; musicians play the notes written in those scores. Dance, too, has a system to record dances in a written form, called dance notation.

Figure 6.



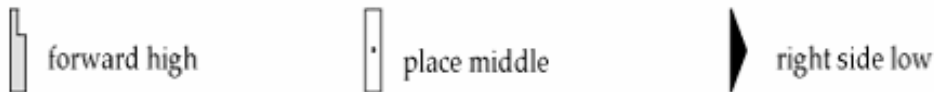
Labanotation for excerpt from variation of the Dance of the Sugar Plum Fairy. *The Nutcracker Site*. Courtesy of the Dance Notation Bureau, Inc.

Labanotation is only the most prevalent form of dance notation, and is primarily concerned with recording the physical dance so future dancers can learn the movements long after the original choreographer, dance master, and / or dancers have died. It is a rich descriptive system for recording the physical movements of the dancer through space and time, as conceived by the choreographer.

Figure 7.

Each Labanotation symbol gives four pieces of information:

1. Direction of the movement is indicated by the shape of the symbol. (See diagram below.)
2. The level of a movement is shown by the shading of the symbol; diagonal strokes for high, a dot for middle, and blackened for low.

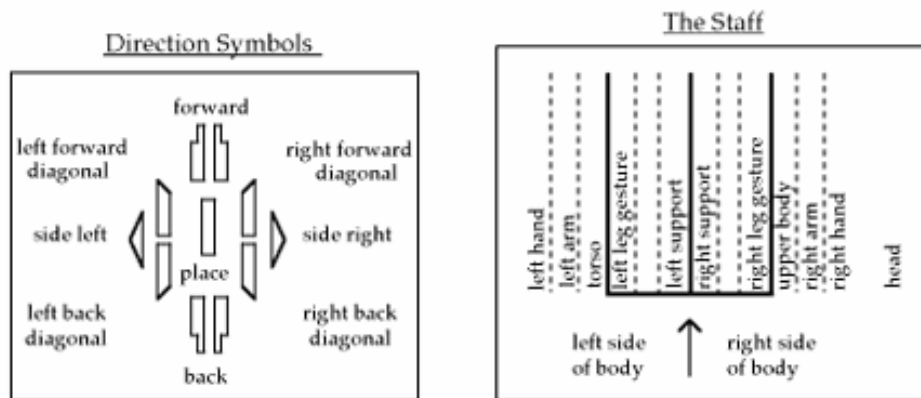


3. The part of the body that is moving is indicated by the column on the staff in which the symbol is placed. A Labanotation staff represents the human body; the center line of the staff divides the left side of the body from the right. Symbols to the left of the center line refer to the left-hand side of the body, symbols to the right of the center line to the right-hand side of the body.

Some body parts must be identified by a symbol, for example:

☉ = the head, ☐ = the face, ☸ = the hands, ☐ = the front of the left shoulder

4. Duration of the movement is shown by the length of the symbol. The staff is read from the bottom up; moving ahead in time. The tick marks on the center line divide the time into counts and the horizontal lines correspond with the bar lines in the music. Movements written on the same horizontal line occur simultaneously; movements written one above another occur sequentially. Measure numbers and dancers' counts appear to the left of the staff.



(Dance Notation Bureau, Inc., 1998)

Reading Labanotation. It is also possible to use colors to record "intentionality" within the piece, or marking sections of the dance meant to be improvised.

Like descriptive bibliography for hand-press books, dance notation appears to be a promising cataloging / preservation tool for new media objects, particularly those that involve interaction, or movement. Whereas descriptive bibliography records the variant formats and

versions of a work, dance notation records interactions, and spatial and temporal movements of objects (in this case, dancers) within the canonical form of a work. Each Labanotation “score” is developed in concert with the choreographer, if alive, or with the other participants, if not. If the work is in production, the dance notation expert often takes rehearsal with the cast, learning the dance along with them. It’s a creative, as well as an intellectual, process, and the entire procedure provides a valuable document for future generations. If a similar notation system could be developed for interactive new media artifacts, it would somewhat mediate the problematic “artist statement” or even more awkward “artist questionnaire.” While a notated “score” probably would not take the place of either of those documents, a reliable notation, which seeks to record time/space actions and interactions of objects within the system, might supersede them as the primary record of documentation.

5. Authenticity

The concerns and issues mentioned in the above discussions of migration, emulation, re-interpretation, and documentation of a new media artifact are related to the idea that we’re trying to provide an authentic and reliable representation of the object we’ve set out to preserve. If the preservation community cannot supply a meaningful and trustworthy record of the intentional or unintentional modifications performed on an object, the process will be disputed. More troubling, the object itself may be challenged or even rejected as inaccurate. Because of this eventual dependence on the authenticity of the system and the objects entrusted within, it is fundamentally important to understand what constitutes an authentic document, and further, how that authentic document is produced. There are two concepts, one from computer science and one from archives and records management, which might be useful in a discussion of authenticity. The first is the definition of an object’s “canonical form,” and the second is the idea of diplomatics.

The InterPARES Project has recently revived the idea of diplomatics, and is using it as a methodological base for their research into the preservation of electronic records. InterPARES is a major international research initiative in which Information Technology scholars, computer scientists, and private industry researchers are collaborating to develop a theoretical and methodological foundation for the long-term preservation of the authenticity of records created in

electronic systems. The first phase of the project, InterPARES 1, focused on the preservation of the authenticity of archival records, and ended in 2001. This phase produced a template for analysis (Authenticity Task Force, 2002a), conceptual requirements for authenticity (Authenticity Task Force, 2002b); and models of the processes of selection and preservation of authentic electronic records (Appraisal Task Force, 2002).

Diplomatics is an archival discipline developed in the Seventeenth Century for the purpose of verifying the authenticity of disputed (or disputable) records, and provides: a **theory** that describes the nature of the record and of its components, a **method** that establishes the procedures to follow in the analysis and assessment of a record, and a **practice**, called *special diplomatics*, that applies theory and method to real situations. Authenticity in this sense is related to the trustworthiness of a record, whether it is what it purports to be and has not been tampered with or otherwise corrupted. A record has integrity if it is “intact and uncorrupted,” meaning its intended message is unaltered. Integrity, or authenticity, may be demonstrated by evidence found on the face of the record, in metadata related to the record, or in one or more of its contexts (MacNeil, 2000).

A document or record is presumed authentic from inferences made from known facts about the manner in which the record has been created and maintained. There are eight benchmarks of authenticity, as defined by InterPARES.

1. The expression of record attributes: These attributes must be explicitly expressed and inextricably linked to every record. There are two sub-categories:
 - a. Identity of the record: the names of the creators, the name of the action or matter, the dates of creation and transmission, the expression of the archival bond, and the indication of attachments.
 - b. Integrity of the record: the name of the handling office, the name of office of primary responsibility, the indications of types of annotations, and indication of technical modifications.
2. Access Privileges: whether or not the creator has defined and effectively implemented access privileges concerning the creation, modification, annotation, relocation, and destruction of records.
3. Protective Procedures – Loss and Corruption: establishment and implementation of procedures to prevent, discover, and correct loss or corruption of records.
4. Protective Procedures – Media and Technology: establishment of procedures to guarantee the continuing identity and integrity of records against media deterioration and across technological change.

5. Documentary Forms: The creator has established the documentary forms of records associated with each procedure either according to the requirements of the juridical system or those of the creator.
6. Authentication of Records: The creator develops rules as to which records must be authenticated, by whom, and the means of authentication.
7. Identification of Authoritative Record: If multiple copies of the same record exist, the creator has established procedures that identify which record is authoritative.
8. Removal and transfer of Relevant Documentation: If there is a transmission of records from active status to semi-active and inactive status, which involves the removal of records from the electronic system, the creator has established and implemented procedures determining what documentation has to be removed and transferred to the preserver along with the records.

These are benchmarks that the preserving institution should follow in order to maintain documents that are authentic and accurate. However, the first phase of InterPARES involved definitions and related benchmarks for measuring an *archival* record's status as authentic. Archival records are often evidential in nature, meaning they serve an official function within the bureaucracy of an organization. Further, evidential documents are important for their content rather than its expression, and the record's physical integrity is less important than its intellectual integrity. This is fundamentally different than new media art, where the expression of content *is* the intellectual capital of the document, and if the physical changes, the intellectual will change as well. InterPARES' second phase, which began in 2002, will be dealing with just these issues, exploring Experiential, Interactive and Dynamic Records. InterPARES 2 will address issues of reliability and accuracy in addition to issues of authenticity; and it will address these issues throughout the records' life-cycle, from creation to permanent preservation, as opposed to InterPARES 1's concern with non-current records destined for permanent preservation. It will be interesting to see how the plans and frameworks develop for this very different set of documents.

Whatever the specific requirements and proposals the InterPARES Group makes in its second incarnation, I feel compelled to mention that while the the initiative has provided a sound methodology for exploring the idea of authenticity, it has not developed a practical model for actually producing the authoritative record. For example, the seventh benchmark for authenticity, the "identification of an authoritative record," not explicitly defined by the InterPARES group, is the crux of what this paper is attempting to address. What is the canonical form of a given electronic document? How do we define that? This isn't just a question for new media art, but all

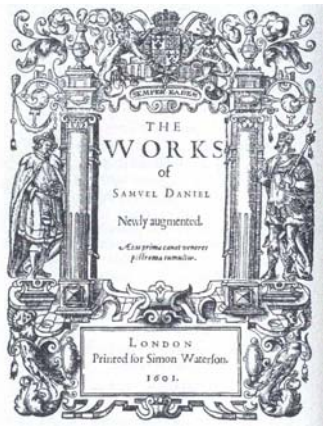
new media artifacts. According to Webster, “canonical” means “reduced to the simplest or clearest schema possible.” In mathematics and computer science, the term “canonical form” has a more specific meaning: “The usual or standard state or manner of something...Two formulas such as $9 + x$ and $x + 9$ are said to be *equivalent* because they mean the same thing, but the second one is in *canonical form* because it is written in the usual way, with the highest power of x first. Usually there are fixed rules you can use to decide whether something is in canonical form” (Raymond, 2000). So the definition is associated with fixed rules, standard benchmarks, and defined schema. As it relates to digital repositories and new media art, the representation of the canonical form would consist of a robust cataloging or metadata schema, which captures the intrinsically important elements of each artifact, and presents them in an easily discernable and verifiable manner.

And so the circle is completed, returning to the second page of this paper – what *are* the intrinsically important elements of a new media artifact and how should they best be recorded? The answers lie, I think, in a further exploration of descriptive bibliography as a methodology of access. Descriptive bibliography, and its sub-category, analytical bibliography attempt to infer from physical evidence in books the procedures and production values of the printing shops that produced them. Descriptive bibliography is the analysis of physical details, and analytical bibliography, as a tool of descriptive bibliography, tries to reconstruct the detailed history of typesetting and presswork for a given book. Although descriptive bibliography is at present associated primarily with librarians and list making, it has traditionally been closely linked to literary and textual criticism, as well as rare book collecting and evaluation. Before a critic can attempt a definitive assessment of any book, “he must be in possession of every fact which has any bearing on the history of that text” (Bowers, 1994). Like diplomatics, descriptive bibliography is concerned with identifying the “authentic,” and unlike diplomatics, it is concerned with artistic forms, for which the physical is equally as important as the intellectual. Furthermore, it provides a very robust, and **practical** model from which to examine the minute details of any given mass-produced object.

The association between early printed books and new media artifacts is a close one, both on a historical and intellectual level. However, there is a fundamental difference between the two, related to the artists' use of technology to represent ideas. Authors wrote manuscripts, gave them to their "editors" (often the printer himself, in the hand-press era), who "edited" the text, and through technology, the printing press, mass-produced it. In the case of "net" or Internet based art, New media artists use technology themselves to mass-produce their art. There is no equivalent middleman in the new media art market. Furthermore, the art object itself isn't mass-produced (there's just one program running on one server somewhere), but its surrogate is being transmitted through the web, and changed through that transmission. So the correlation between hand-press books, or even incunabula and new media art is not one to one. However, the generic purpose of descriptive bibliography is to recognize the ideal copy or state of a mass-produced, variable object. New media art is, in a sense, mass-produced, and is certainly variable, so the relationship is a promising one. The remainder of this section will provide a brief introduction to the major parts of a full descriptive bibliographical "record," the title page transcription, the format and collational formula (discussed on pages 12-13), and the contents note; and will attempt to map those sections to corresponding components of a new media art object.

The first element of a descriptive bibliography is the title page "transcript" of the title page.. The chief bibliographical purpose of this transcript is to provide "all practicable information necessary for a minute comparison of any individual copy with the published transcript in order to confirm its precise identity or to establish variation" (Bowers, 1994). There are of course different levels of comprehensiveness; but the basic idea is to describe the title page's elements, and printing process in the most appropriate level of detail.

Figure 8.



From Bowers, 1994, Figure 2. pg. 136.

[within a sected compartment: McK. & F.
229] THE | WORKS | of | SAMVEL DANIEL |
Newly augmented. | *Aetas prima canat*
veneres | postrema tumultus. | [within a slot]
becomes LONDON | Printed for Simon Waterfon. | 1661.
[Works with W from filed VV, the first with
shortened limb]

From Bowers, 1994, pg. 146.

There are two things to notice about the title page transcription. First, there is a focus on making graphic equivalences between the book and the transcription. For example, each font type used in the original is reproduced approximately, as are the uses of capitals, semi-caps, and lower case. The second important point about title page transcription is that there is an attempt to record the technical process by which the title page was produced. The phrases “[within a sected compartment]” and “[within a slot]” are referring to the printing forme on which the letters and ornamental objects were placed and then printed from. This is not merely a representation of the title’s page’s appearance, but also of its structure and production. There has been some discussion within the bibliographical community about replacing this transcription with a photograph. This suggestion ignores the fact that there is intellectual value added in a transcript. Not only is the bibliographer providing the user with a graphic representation, s/he’s providing them with accumulated knowledge about the history of book production and printing procedures, and how those procedures are realized in the specific object of inquiry. No photograph could do that.

New forms and constructs would have to be developed in order to provide a full account of how different elements from a new media art object would be represented in a descriptive bibliography, and is thus beyond the scope of this paper. However, there are promising

similarities, and it is worthwhile to explore them briefly. Does the new media art object have a title-page equivalent? In a printed book, the title page provides the basic introductory information for interacting with a work. It is part of a text's "macro-articulation," presenting the book's general nature to the reader by its layout, its typographic style and level of ornamentation, and by its own words – an abbreviated identification of its contents: naming the author, the text, and giving its production pedigree, who produced it, when and where (Smith, 2000). Is there some element in a new media artifact that provides a "macro-articulation" of the work? Nothing as specific yet as a title page, but the *interface* itself does, by default, provide a means of interaction with a work. The problem with the association between title page and GUI is that the GUI is something of a social construct; it tends to be both pervasive *and* overlooked, whereas the development of the title page is more conscious and rational. It seems inappropriate to catalog for posterity an element of a new media artwork that may not be relevant to the artist him or herself (and if it is relevant, it should probably be represented as part of the art work itself, not the title page).

Another avenue of approach is the title page as advertisement. In the hand-press period, books were not bound immediately upon printing. After printing, the text was sent to the "bookseller" (again, often the printer himself) as a folded quire. In this capacity, the title page announced the availability of a text for purchase, and promoted the printer's services (Smith, 2000). Is there any promotional equivalent to the new media artwork? Again, I think that the interface is the closest. However, in this sense, it wouldn't simply be the interface in which the work is presented, but perhaps the site that hosts the work. Related to this idea, at least with Internet or net art, would be the representation of the "index.html" page.

After the format and collational formula comes the statement of contents, in which all of the pages are accounted for in the order in which they appear (Harmon, 1998). It's intended to provide a description of the different parts of the book, including preliminaries, text, sections, appendices, indices, and tables. Engraved title-leaves and frontispieces are also noted. The list of contents must be that of the ideal copy represented in the collational formula; variations resulting from different makeup are noted at the conclusion of the list or in the annotations paragraph (Bowers, 1994). The "ideal copy" refers to the book as it left the printer's shop. A copy is deemed

“ideally perfect” when the book’s physical details are complete, and refers to the printer’s representation of the original manuscript.

There are few hard and fast rules for recording the content paragraph, but it should ideally serve both a bibliographical as well as a literary purpose. From the bibliographical point of view, the content statement should provide the reader with a reasonable supplementary check for variance between copies, the primary check being the collational formula. For the literary scholar, the content statement is valuable as an index of the major sections’ subjects, the details of dedications, commendatory verses, prefaces, and letters. The content statement should also record different authors for different sections.

New media art is not a physical entity; but it would be possible, as well as useful, to fully catalog the contents of a new media art object. This would consist of a listing of all the elements in a work, a representation of the placement within its file structure, and their interactions amongst each other. There are a number of methods by which these elements could be fixed and listed, automatically, without the intervention of a person. However, for a representation of the interactions among elements, the example of Labanotation might be followed. Again, it’s not in the scope of this paper to develop a Labanotation for new media art, but a system that could transmit the original intentions of the artist, as a stylized set of symbols and bits, is a very attractive option. It would take the artist out of the equation, getting rid of the “intentional fallacy” problem, it would provide a readable transaction of the interactions and relationships between parts and the whole without complicating the matter by using “words;” and if developed correctly, it could have the intellectual value added that descriptive bibliography provides – giving the viewer something of the technical and production procedures for any given work.

Finally, the content statement could also have a notepad version of the program itself. While not as exciting as watching a new media art object, it is possible to read programming languages (particularly java and Lingo) and understand what should be happening on the screen. It’s very similar to a play’s script, in the sense that it defines the actors, the characters, the actions, and the interactions. In fact, there’s currently an exhibit at the Whitney ArtPort in which the artists’ code is the intellectual focus (Whitney ArtPort, 2002). (Providing access to the code

would also feed into my [tangential, true] theory that in a hundred years, people will be reading java programs like they're poetry.)

Conclusions

In this paper, I've discussed the various means and ideas that new media art conservators are using to preserve this new and ephemeral art form. I've tried to outline the problems with the two most pervasive methodologies, emulation and migration, and present new techniques, which might provide new models for preservation. Namely: exhaustive documentation as a means to authoritative re-interpretation, and critical understanding of the artifact. After reviewing and critiquing the various methodologies and philosophies feeding into the preservation of new media, there are three general themes which deserve further study: First, with any form of art, expression is at least as important as content. Both migration and emulation are basically concerned with retrieving content, at the expense of form, and alter formal expression in a fundamental way – they both change the format itself. Further, the subsequent changes are not dependably recorded, so they might be fixed or accounted for in the future. Hence, it's my contention that any art objects that have been migrated or emulated can no longer be demonstrably authentic. Or ideal. Or canonical. I'd like to do further study on this line of reasoning, because although I believe it to be true, there are currently no specific studies to support my claim.

Second, I'd like to repeat my belief that new media art is less like the traditional fine arts, which are physical, preservable entities, and more like a play, or a dance. No one in the performing arts is trying to preserve a performance. A performance is an inherently ephemeral thing, and that's understood at a basic level. We can videotape performances, but that's not the performance – it's a very limited surrogate. We can save artifacts that relate to the performance, like props and costumes, but those only add to the understanding of the performance. They are not the performance itself. We can get an audience list and demographic information for any given performance, but that's not the performance either. Performances are understood as the amalgamation of many different elements: a script, a set design, a good stage manager, the actors, the director, a producer, the audience on any given night, the theater...some or all of

those elements can be preserved in some way, but as a group, they will always remain distinct entities that will never be together again in the same way, as they were at the original performance. In the performing art world, things change, and that change is considered an essential element to the creative process. Trying to lock an interactive, variable work into some unchanging system is a miscarriage of authority, inadequate to foster understanding of the piece, and inappropriate as to the aims of the artist, the viewers, and the work itself. I would like to further explore the associations between “canonical form,” or “intrinsic value” and the performing arts specifically, and how those ideas can be mapped to new media artifacts. Specifically, the idea of re-interpretation is a powerful one for me, and it would be interesting to develop some practical standards for the successful re-interpretation of a new media art object.

Finally, I would like to further investigate the different ways in which a new media artwork could be comprehensively cataloged. Descriptive bibliography is a powerful tool in determining the ideal form of any variable object, and it would be very interesting to devote more time and energy to developing a robust mapping of new media elements to the elements of books or manuscripts. I think that in many ways, we are in the incunabula period of new media artifacts, and a fuller understanding of the transmission and codification of tropes and methodologies from that period could provide us with a valuable foundation with which to establish some theories, approaches, and attitudes for this new digital era.

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