



InterPARES 2 Project

International Research on Permanent Authentic Records in Electronic Systems

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Agnew, G. (2003). "Developing a Metadata Strategy." *Cataloging & Classification Quarterly* 36(3/4): 31-46.

Covers the steps to building a metadata repository, including modeling the information needs of one's community, selecting and adapting a metadata standard, documenting metadata, populating a database and sharing metadata with other initiatives. In addition, advances and options for metadata for multimedia, particularly video, are presented.

Allen, J. S. (1990). "Some new possibilities in audio restoration." *ARSC Journal* 21(1): 39-44.

Allen identifies and describes some techniques which he says become possible with digital audio. Particularly, he says, time alignment with digital technologies make several new techniques possible, which will be useful in sound restoration. Included among these possibilities are the ability to synchronize multiple copies of recordings for noise reduction, the maintenance of editing histories of recordings, and correction of errors caused by disk warp or mechanical speed variations. As the goal of restoration work is to recover original sound, the application of such techniques could have implications for the authenticity of materials to which they are applied.

Arms, C. R. (2000). "Keeping Memory Alive: Practices for Preserving Digital Content at the National Digital Library Program of the Library of Congress." *RLG DigiNews* 4(3).

This article is an overview of the major issues and initiatives in digital preservation at the Library of Congress. It briefly mentions the issues and actions taken concerning the preservation of digital moving images, but defers a more detailed discussion to the National Audio-Video Conservation Center's prototype development activities.

AV Preservation Trust (1999). *An Assessment of Options for Creating Enhanced Access to Canada's Audio-visual Heritage. Feasibility study.*, Paul Audley and Associates Ltd.

Investigates the feasibility of single window access to information about Canada's audio-visual heritage. The project follows on the recommendations of *Fading Away*, the 1995 report of the Task Force on the Preservation and Enhanced Use of Canada's Audio-Visual Heritage, and the subsequent 1997 report *Search + Replay*.

Ballowe, J. (2002). *Report on related digital preservation/archiving projects, Preservation, Archiving and Dissemination Project: Electronic Literature Organization.*

Jeff Ballowe of the PAD Project researched differences between PAD and other projects whose scope was the preservation of electronic data. The content of the report was to be used in a grant proposal to demonstrate PAD's uniqueness and ways in which PAD might work with these other projects. His main conclusion was that PAD was unique in that its sole focus is e-lit. He presented several ideas on how PAD could adopt metadata standards (DTD's, XSL style sheets, glossaries of metadata tags) in order to archive and preserve e-lit.

Bearman, D. and J. Trant (1998). *Authenticity of Digital Resources. D-Lib Magazine.*

This article addresses the issue of authenticity of electronic records. The authors emphasize its importance and discuss specifically some proposed technological solutions aimed at maintaining electronic records' authenticity.

Bearman, D. (1999). Realities and Chimeras in the Preservation of Electronic Records. *D-Lib Magazine*. 5.

This article argues against the use and implementation of “emulation” for the purpose of preserving electronic records.

Benjamin, W. (1955). The Work of Art in the Age of Mechanical Reproduction. *Illuminations*. H. Arendt. New York, Harcourt Brace & World.

Benjamin discusses the invention of photography and film within a socio-political framework. The key component to Benjamin’s analysis of art (camera based) is the principle of reproduction. He asserts that the introduction of mechanical reproduction alters the nature of art and our perception of reality.

Besser, H. Longevity of Electronic Art.

Besser investigates the hardware and software issues relevant to the long-term preservation and accessibility of electronic artworks. He identifies that “electronic works pose a serious challenge of guaranteeing authenticity over time”, whereby “authenticity was primarily based upon a chain of custody from one trusted owner to another”. More specifically, the lack of fixity, boundaries and dynamic nature of electronic artworks has resulted in a shift from the physical artifact in terms of defining authenticity. Besser proposes pragmatic solutions for the physical and intellectual preservation problems posed by electronic artworks, including capturing an artist’s original intent and defining formal elements that comprise such artworks.

Besser, H. (2001). “Digital Preservation of Moving Image Material?” *The Moving Image* 1(2).

From the author’s abstract: “This article first describes some of the technological-induced changes in moving image production and distribution. It then discusses how those changes are altering viewer habits and expectations, and how those in turn affect how we will need to deliver and store moving image materials. Then the article explains the various approaches to preserving digital materials [i.e. emulation, migration, refreshing, etc.]. Finally, the author points to two paradigm shifts that will be likely for moving image preservation: from preserving completed works as a whole to asset management, and from preserving an artifact to preserving disembodied content.” Of the oft-cited “Besser problems” (“the translation problem,” “the custodial problem,” “the scrambling problem,” and “the inter-relational problem”), the author discusses in particular the first two in relation to the preservation of digital moving images. Both relate to the maintenance of authenticity.

Besser, H. (2003). *Introduction to Imaging*. Los Angeles, Getty Research Institute.

The revised edition of *Introduction to Imaging* offers the basic principles and technical terms associated with the creation and management of a digital image collection. Besser frames the procedures in a manner that offers varying levels of control depending on the predicted use or purpose of the digitized images. An introduction to concepts such as master files, metadata, security and long-term management are located throughout the separate chapters. An overall concern for the creation of digital images that can remain relevant and accessible in the future makes this a unique and invaluable text. Besser concludes that current digital preservation strategies are flawed and therefore an ongoing maintenance strategy must be upheld along with policy reassessment and technological upgrades.

Besser, H. (2003). *Moving Image Preservation: Analog or Digital?* 18th Annual Preservation Conference, NARA.

The author outlines the major issues, problems, and initiative concerned with the digital preservation of moving images, i.e. format obsolescence, metadata, etc. All of these topics have a bearing on the authenticity of digital moving images.

Bormans, J. and K. Grant (2002). *MPEG-21 Use Case Scenario Document*, International Organization for Standardisation.

This document describes a number of scenarios in which MPEG-21 may be used. It notes in the specific use cases which areas within the MPEG-21 design and structure would be affected by the particular use. The use cases described accentuate the importance of the various parts of MPEG-21 (a.k.a. ISO/IEC 21000-N), nearly all of which relate to establishing and maintaining a record's identity and integrity (thus authenticity).

Borwick, J., Ed. (1980). *Sound recordings practice*. London, Oxford University Press.

This is a sound engineering text book and is, for the most, very specific. The book is focused on a commercial music recording market. There is information on the practical process of recording prior to the time when any sound record is fixed. In one introductory article, "The programme chain," Borwick provides flow charts illustrating the stages of the "manufacture of a typical long-playing record" which is useful in understanding the phases of a procedure that produces a sound recording. Borwick also gives a general description of these stages and introduces some key terms: "original master" is the term for the original recorded product, but then, when the recording is "sweetened," the "production master" is also a kind of original record.

Boston, G. (1997). *Ethics and New Technology. Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 77-79.

Boston suggests that new digital technologies offer "many powerful tools to alter the information when copying a document. Without a generally accepted set of guidelines--an ethical base--to work from, everybody making copies will apply their own rules." He suggests that there should be standards for digital copying. Referring to sound recordings, he writes that "the hiss, clicks and bumps...can also be copied. This additional information is part of the history of the document. With the creation of digital copies of documents we are often in the fortunate position of not being required to physically restore the original before copying."

Drawing on definitions issued by the International Association of Sound Archivists (IASA), Boston explains that a copy can be a replica, a historical copy or a recreation of the original document. A historical copy, or a copy that sounds exactly like the original including imperfections, reproduced faithfully as primary information, is the only "achievable copying standard and does not require any subjective decisions. The copy made is either an accurate copy of the original, warts and all, or it is not."

Boston, G. (1997). *New Technology - Friend or Foe? Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 342-347.

Boston warns against thinking that technology will solve all problems. He writes: "A digital recording represents the information as a series of binary coded numbers. This is

a much more rugged system because only two pieces of information - the binary digits 0 and 1 - are ever recorded....As we are dealing with numbers, it is possible to construct a copying system that checks the number on the original carrier against the number recorded on the copy. If the numbers match, the copy is an exact facsimile, a clone, of the original. This means that there has been no degradation in quality or fidelity because of the copying process.”

Breeding, M. (2003). “Building a Digital Library of Television News.” *Computers in Libraries* 23(6).

This article is a brief overview of the processes involved in establishing a digital archive of television news videotapes at the Vanderbilt Television News Archives in the USA. The author examines some technical aspects of converting and preserving the videotape into a digital format; explains the different phases of the project, such as the creation of metadata and the establishment of the digitisation process; and provides an overview of the costs and challenges facing the project.

Brylawski, S. (2002). *Preservation of Digitally Recorded Sound*. Washington, DC, Council on Library and Information Resources.

Discussion of the challenges faced by librarians and archivists who must determine which and how much of the mass amounts of digitally recorded sound materials to preserve. Identifies various types of digital sound formats and the varying standards to which they are created. Specific challenges discussed include: copyright issues pertaining to various digital formats; technologies and platforms from which digital audio acquisitions are selected; digitization and preservation including the necessity of preserving print elements associated with digital objects, metadata standards, and other standards related to digital preservation. Concludes with a call for collaboration between commercial archives, such as those of record companies, and institutional archives, to ensure the preservation of important audio recordings which are at risk of being lost, and to reduce redundancy.

Butler, A. E. (2003). “Encoded Archival Description Tag Library, Version 2002 (review).” *The Moving Image* 3(2): 119-122.

This article discusses the adequacy of Encoded Archival Description (EAD) 2002 as a descriptive tool for moving image materials and thus has a bearing on the discussion of authenticity. The author notes that “EAD 2002 remains a descriptive standard geared toward paper-based and mixed-format archival collections” and calls for further development of the standard to accommodate moving image material.

Butt, J. (2003). *Authenticity*. *Grove Music Online*. L. Macy.

Defines performance and music-textual authenticity, and discusses means of determining it.

Canazza, S. and A. Vidolin (2001). “Preserving Electroacoustic Music.” *Journal of New Music Research* 30(4): 289-293.

The authors present an introduction to the issues surrounding the preservation/archiving of electroacoustic music. They observe that current storage and access (i.e. reading) systems possess too short a lifespan to adequately ensure future accessibility to audio data; and identify the need to consider new strategies to address the unique storage

needs of a generation of electronic instruments. Ultimately, they place these elements in the context of an active conservation of cultural heritage that must be undertaken by “an institutional structure equipped with funds and specialized personnel.”

Specifically, the authors define electroacoustic music as “musical works that use electronics”, and divide the field into four categories: (1) Recorded Music, often referred to as ‘tape’ music, a work that is directly composed onto a digital/analog medium ready for performance; (2) Live Electronics, works in which acoustic sounds, often a traditional instrument or voice, are processed during the performance in real-time; (3) Synthesis Sounds, algorithmically generated sound elements of a work; and (4) Computer aided composition, a work that may include electronic sounds or purely traditional instruments that nonetheless was composed with the assistance of computer software.

Each category presents difficulties for conservation (and restoration), however, the authors maintain a common philosophy for each: “electroacoustic music preservation is intended to keep alive musical thought of men [sic] by preserving masterpieces and instruments, allowing performances and functionality both for musicology research and philological interpretation.” Given this mandate, they identify areas of concern for each category: (1) recorded music exists almost exclusively without a score; and from a musicological perspective it is very important to preserve the sound components and partial materials used to create the work, as well as the software/hardware used and any graphical schema/instructions of the methods employed; (2) conservation of live electronic works require keeping detailed documentation of the sound processes involved (i.e. ‘patches’), and the authors further suggest this documentation must be in a form independent of the software used to create it; (3) similar to live electronics, synthesis sounds and their corresponding algorithms must be stored as a patch; and (4) the software/techniques used for the creation of a computer aided composition would be useful not for musical performances, but certainly for musicological research. This section concludes with an important dual definition of preservation - to preserve, “to keep unaltered the cultural heritage [sic] in its original form”; and to restore, “to make available the cultural heritage [sic]”.

The final segments of the paper conclude with an investigation of three fields of storage that must be considered in conjunction with the four categories of electroacoustic music: (1) the instruments, an ideology of preservation including both a means of categorizing electronic instruments (with useful explanations of various technical elements, e.g. transducer, sound synthesis) as well as a distinction between the instrument itself, and its functionality; (2) the software, and the need to utilize a means of preserving not only the specific software applications used, but also the entire software/hardware/operating system environment employed; and (3) the performance praxis, or the elements of (new) performance technique(s) required by the work, for which the authors suggest the creation of a multimedia record in order to “make possible handing down all the [performance] techniques that cannot be noticed [sic] with the traditional documentation and, above all, those points in the score that differ from a traditional reading”.

Candy, L. and E. Edmonds (2002). *Explorations in Art and Technology*. London, Springer.

As its title suggests, this book documents the creative practices in art and technology. While it does not deal directly with preservation, this text provides insight into the creative processes of digital interactive artworks and focuses on the relationships between artists, technicians and curators in realizing the “ambition” of such artworks.

Chadabe, J. (2001). “Preserving Performances of Electronic Music.” *Journal of New Music Research* 30(4): 303-305.

Joel Chadabe investigates the inadequacy of traditional music notation and its application to electronic music. He somewhat circuitously suggests that “traditional instrumental music can be preserved through notation... because traditional compositions are defined by elements which can be notated”, but also that it is “because traditional instruments are played in standard ways.” Further, “music can be preserved through its notation when the elements of the music that are notated define the music.” Since, as Chadabe defines, “the substance of the music of the western classical tradition is pitches and rhythms”, it follows that traditional music notation is most successful in conveying these core elements. Conversely, as electronic music “differs from traditional instrumental music in that an electronic composition is defined by its sounds or by the nature of its performance process”, and that electronic instruments change rapidly due to technological advances, “[traditional] notation can not serve as a way of preserving performances of electronic sounds.” It fails because it does not meet two conditions offered by the author: “first, that the mechanism of performance remains the same for all specific examples of the intended instrument, and second, that a predictable sound will result from a specific action.”

The author identifies three categories wherein a preservation solution may be found: “(1) notation as a description of the sound itself rather than tablature instructions; (2) the recasting of a performance with current technology; and (3) an update to the basic material of the composition.” Additionally, he suggests that “it should be self-evident that... the success of any specific solution will depend upon the performer’s clear understanding of a composer’s intentions.” Specific successful examples are then given under each heading, the first two involving the updating and performance of works by Luigi Nono and John Cage, respectively. Both emulate “the original functions of early analog hardware... in up-to-date software”, and each performance is lent validity by virtue of the fact that the each performer “knew and had worked with the composers; and [their] goals were narrowly defined as the recasting of a performance in current technology while preserving the spirit and character of the original work.” The third category is perhaps of most interest, suggesting it “may also be artistically desirable, and within the range of the composer’s original intentions, to update and indeed to change a composition to take advantage of new technologies.” Although neither a solution nor methodology is offered to the overall problem of notating electroacoustic music, it is clear that the author feels that a composer can ensure the preservation and future performance of their electronic works only by making clear their intentions with respect to the nature of the sounds required, and the specific interactions that are to occur between them.

Chess, S. (2003). *Cyborg Children in Digital-Land: the Works of Simen Johan*.

Shira Chess analyzes the digital photography of Simen Johan as an example of current

artistic practices that are blurring the boundaries of reality and fiction as well as technology and nature. Chess asserts that Johan's work raises questions about the authenticity of photography.

Copeland, P. (1998). *What Should a Sound Archive Really Do? Care of Photographic Moving Image and Sound Collections*, Worcestershire, Institute of Paper Conservation.

Briefly discusses transferring sound across media and objective techniques for the reproduction of sound. Copeland writes that the quality of sound for analogue media is defined by the "power-bandwidth product." The power-bandwidth product is an assessment of the "number of octaves of required sound from the original, and the number of decibels between the power of the loudest undistorted sound and the power of the background noise." Recordings should be transferred to a destination medium which has a greater power-bandwidth product so the new medium does not "drown some of the power-bandwidth product of the original." The two aims of Copeland's research into objective techniques for the reproduction of sound are: 1) To quantify the behaviour of early sound-recording machinery, so it might be reverse-engineered in effect and the fidelity of the original sound improved; and, 2) To quantify the deliberate (but usually undocumented) distortions imposed by recording engineers, again to improve the fidelity of the recorded sound."

Davey, N. (1999). *Art, religion, and the hermeneutics of authenticity. Performance and Authenticity in the Arts*. S. Kemal and I. Gaskell. Cambridge, Cambridge University Press: 66-93.

Following Heidegger's *Being and Time*, defines aesthetic authenticity in relation to ethical authenticity.

Davies, S. (1988). "Transcription, Authenticity, Performance." *British Journal of Aesthetics* 18: 216-227.

Compares notions of authenticity in musical performance and transcription.

Davies, S. (1991). "The Ontology of Musical Works and the Authenticity of their Performance." *Nous* 25(1): 21-41.

What is meant by authentic performance depends on how the nature of the work is understood. The author's basic premise is that there is a connection between the theory of a musical work's ontology and a specification of those characteristics exhibited in inauthentic performance of that work. Davies' aim is to characterize the debate about the ontology and draw out the connection. He begins by restating the commonly held views against the whole authentic performance movement, namely, that the recreation of the experience of the work shared by the composer and the contemporary audience is unattainable because it is impossible to recreate the historical context of the composer's time. The attainment of this type of authenticity is impractical and undesirable. Like the vast majority of authors addressing this topic, Davies echoes Taruskin's often-stated view that the whole movement is a modern one. The initial conclusion drawn is that in the end there is no single, ideal performance of any work, that any kind of performance it must be creative in order to be convincing, the use of authentic instruments notwithstanding.

The author continues by saying that for a performer to be convincing he must be

dedicated to preserving the composer's intentions, which are expressed and which identify the composer's individuality. At the same time the performer's creativity should not be compromised in a pursuit of the authenticity of performance: creativity and authenticity should be complementary. (The author also notes that, pursuant to this line of thinking, if "authentic" is to mean "accurate" then many different-sounding performances could be equally "authentic".)

Davis, B. (2000). Digital Storytelling, Razorfish Science Department.

This brief article for the general reader traces the arc of the moving image preservation paradigm. Authenticity is implicitly discussed throughout.

Day, M. (1997). Extending metadata for digital preservation. *Ariadne*, Electronic Libraries Programme. 2004.

'Michael Day suggests how the concept of metadata could be extended to provide information in the specific field of digital preservation. This article appears in the Web, and not the print, version of *Ariadne*.' This work focuses generally on 'preservation of information for future use' and not specifically on the preservation of e-lit. Included in this article is an interesting and perhaps useful bibliography related to the preservation of digital data and metadata.

Day, M. (2000). Preservation of electronic information: a bibliography. University of Bath, United Kingdom, UKOLN: The UK Office for Library and Information Networking.

'The aim of the bibliography is to indicate some relevant resources, with annotations and where possible some links to documents [related to the preservation of information in digital form, nc]'. Once again, this very interesting and useful bibliography is broadly related to digital information preservation, and not to the creation and preservation of e-lit.

Depocas, A., J. Ippolito, et al., Eds. (2003). *Permanence Through Change: The Variable Media Approach*. New York, Montreal, The Solomon R. Guggenheim Museum; The Daniel Langlois Foundation.

A collection of essays concerned with the preservation of variable media art, which includes digital moving images.

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DigiCult (2002). Integrity and Authenticity of Digital Cultural Heritage Objects.

This compilation of articles addresses issues of preservation of the integrity and authenticity of digital objects. Amongst the articles are a discussion of what constitutes authenticity, a paper outlining the level at which authenticity should be addressed, a listing of standards and projects, and an argument for cooperation. The journal is illustrated with case studies from traditional archives as well as sound and visual archives.

Edmondson, R. and et al. (1997). Worldview and Paradigm of A V Archiving. *Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 18-22.

The authors contend that copying “is not a value-neutral act; a series of technical judgments and physical acts (such as manual repair) determine the parameters of the resulting copy. It is possible, in effect, to distort, lose, or manipulate history through the judgments made and the quality of the work performed. Documenting the processes, and the choices made, from generation to generation is essential to preserving the integrity of the work: the AV equivalent, perhaps, of the archival concepts of respect du fonds and original order. The same logic applies to the restoration and reconstruction of AV media: only if the choices are documented can the “new” version be judged fairly, in context.”

Edmonson, R. and et al. (1997). Ethics. *Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 73-76.

A guideline for the ethical use of archival sound recordings: “Reconstructions, compilations, excerpting, abbreviation, format transfer or other ways of manipulating collection material for the purpose of presenting it to a contemporary audience shall (a) not threaten the preservation, unchanged, of the source material and (b) shall be documented in terms of the purpose, parameters and actual work done, so that an audience need be in no doubt as to the true nature of the new work so produced.” The authors also include a mandate for AV archivists:

“AV archivists are guardians of the AV heritage. They respect the integrity of the works in their care and do not mutilate or censor them, nor in any other way attempt to falsify history. They resist the efforts of others to do so. They endeavor to complete what is incomplete, restore what has been lost, remove the accretions of time, wear and misinformation. They hold in tension their personal tastes and critical judgments against the need to responsibly protect and develop their collection in accordance with policy.”

On the topic of copying the authors write that an AV archivist “does not edit or distort the nature of the work being copied, nor expose an original or preservation copy to undue risk. Within the technical possibilities available, new preservation copies shall be an accurate replica of the source material. The process involved, and the technical and aesthetic choices which it entailed, will be faithfully and fully documented so the trail

back to the original will always be clear. The terminology, concepts and data recording methods used shall be precise and allow the unambiguous transmission of information for the future.”

Electronic Literature Directory, Electronic Literature Organization. 2004.

The ELD is a descriptive database of electronic works (2203 as of May 07, 2004) created and maintained by the ELO that provides information on their authors and publishers. Various genres of literature are listed, including poetry, fiction, drama, and nonfiction, which use electronic techniques or enhancements.

Flanders, J. (2003). Tilting at windmills: The use of standards in the future of electronic literature, e(X)literature Conference.

Flanders presents a discussion on the potential of TEI (‘The TEI Consortium is an international membership consortium dedicated to maintaining, developing, and promoting the TEI Guidelines for Electronic Text Encoding and Interchange.’ Its web address is /<http://www-tei-c.org/>) and PAD collaborating to produce community, rather than software vendor standards for the preservation of e-lit.

Fleischhauer, C. (2003). “Looking at Preservation from the Digital Library Perspective.” *The Moving Image* 3(2): 96-100.

Fleischhauer, C. (2003). *Audio and Video Preservation Reformatting: A Library of Congress Perspective*. 18th Annual Preservation Conference, NARA.

The author recounts the issues and problems identified and the methods used to deal with such in describing the past and current practices undertaken at the Library of Congress. The discussion has some bearing on maintaining the authenticity when digitizing moving image material but most of the document concerns maintaining authenticity in the digitization of audio material.

Ford, P. (2003). The Perils of Digital Preservation, *Information World Review*.

This article is a non-technical discussion of the social, cultural, and financial issues surrounding digital preservation. Authenticity is implicitly discussed in the author’s account of the ongoing preservation of the BBC’s Domesday book (1986), in which migration, emulation, and “migration on demand” are tools used and developed. It does not specifically address preservation of digital moving images.

Fox, B. (2003). “Not fade away.” *New Scientist* 177(2384): 40-43.

This article describes some techniques being used to distinguish meaningful sound from noise and to recover and restore the true elements of recordings from wax cylinders and acetate disks. A technique used for wax cylinders simultaneously captures two separate recordings--one from each side of the groove. A digital processor is used to compare the two recordings and extract meaningful sound from random noise and to switch from one recording to the other. Similarly, a technique used on acetate discs where two identical copies exist involves synchronizing their playback using a specialized double turn-table or re-recording the disks digitally and using sound peaks to synchronize their play. As with the wax cylinders, comparison helps to distinguish noise and from sound. The article briefly discusses the use of technologies developed for saving old recordings in establishing the authenticity of sound recordings.

Freiling, R. (2001). “Storage & Space: Notes on Collecting, Archiving, and Presenting Digital Moving Image Works.” *The Moving Image* 1(2).

Friedlander, A. (2002). Summary of Findings. *Building a National Strategy for Preservation: Issues in Digital Media Archiving*, National Digital Information Infrastructure and Preservation Program, LOC.

This article is the summary of findings from a project undertaken by the Library of Congress in which interviews were conducted with various stakeholders concerning collection-management issues in the digital realm, among which the preservation of digital film and television are mentioned. The article is a general discussion of the findings and concerns authenticity in its explicit discussion of various standards (i.e. MPEG), formats (digital and physical), establishing status of transmission (i.e. original v. copy), and the importance of maintaining records’ integrity.

Funkhouser, C. (1996). *Hypertext and poetry*. SUNY, Buffalo, Electronic Poetry Center. 2004.

Funkhouser examines some of the issues surrounding hypertext based literature, though does not formulate any suggestions or solutions to preserving e-lit. ‘[M]y concentration has swayed in the direction of finding archival uses for publishing and otherwise presenting and preserving poetry in a hypertextual manner in virtual pools.’ ‘It is in solving the present, second wave of questions, applying further implementation of thought and web-programming to the materials we are gathering, that the actual evidence for learning will become valuable for students and others. Beyond the initial challenges, there are questions such as how to organize and index the materials we gather as a unit. There is no other such project, or precedent for this project as yet.’

Gibson, G. (1994). Preservation of Moving Images and Sound Recordings in the Music Library. *Music Library Associations Technical Reports*. M. Roosa and J. Gottlieb. Chicago, Association for Library Collections & Technical Services: 59-75.

This article deals with issues relating to the preservation of the physical carriers of sound recordings. However, the author concludes by suggesting that the continuous re-recording of recordings on deteriorated carriers onto new media is economically unfeasible and so calls for the development of an archival medium for long term preservation needs.

Glazier, L. P. (2004). *Mayapan: The Poetics of the Web. Documents for a Poetics of Electronic Writing through and beyond the World-Wide Web*, Electronic Poetry Center.

The book *Mayapan*, was created to outline the ways in which to hypertextual poetry. From the summary on the website where this book is mentioned, it does not appear to deal directly with the problem of e-lit preservation.

Godlovitch, S. (1999). Performance authenticity: possible, practical, virtuous. *Performance and Authenticity in the Arts*. S. Kemal and I. Gaskell. Cambridge, Cambridge University Press: 154-174.

Shows that ascription of performance authenticity depends on theories about past practice.

Godsill, S. J. and P. J. W. Rayner (1998). *Digital audio restoration: a statistical model based approach*. New York, Springer.

The authors discuss, in technical language, methods of restoring analog audio signals by converting them to digital signals and processing them. In the introduction, the authors define degradation as “any undesirable modification to the audio signal which occurs as a result of (or subsequent to) the recording process.” For example, the authors suggest that audience noise at a musical performance is not considered degradation of the audio signal because it is seen as part of the performance. This raises questions about what noise is seen as an acceptable part of the record. The authors write that “an ideal restoration would then reconstruct the original sound source exactly as received by the transducing equipment...[but] this ideal can never be achieved perfectly in practice, and methods can only be devised which come close according to some suitable error criterion.” The authors suggest that this criterion would “ideally be based on the perceptual characteristics of the human listener.”

Goodman, N. (1968). *The Languages of Art*. Indianapolis and New York, Bobbs-Merrill.

Distinguishes between two basic kinds of artwork, based on the relationship between an artwork and a copy or duplication of it: in autographic art forms, even the most exact copy of an artwork is not considered authentic, whereas in allographic forms such as music, there are many possible alternative versions or “copies” of a composition, all of which may be considered “authentic” performances despite the differences between them. Distinguishes between “work-preservation,” as paramount, and “score preservation,” as incidental. (178) Discusses the question of authenticity with respect to the musical score. There can be no such thing as a forgery of a known work, although there may be false attributions.

Goodman’s work is a theoretical and scientific exploration of perception and knowing in relation to all artistic disciplines. He states his objective as “an approach to a general theory of symbols.” (Goodman xi) The six chapters inquire into the varieties and functions of non-verbal symbols. Goodman pursues two paths of investigation, the first is concerned with representation and our formation of knowing or understanding of the relationship between reality, symbol, and a copy, the second path addresses the role of authenticity in the various artistic disciplines. The role of notation figures heavily in the latter investigation. Goodman devises a terminology of classifying a work of art as autographic or allographic and as one-stage or two-stage depending upon the importance of the original and the factor of multiplicity.

Much of what Goodman discusses is relevant to current concerns with digital data and methods for identifying source files and proving authorship. Additionally his discourse on knowing and perception in relation to authenticity is the forerunner for contemporary epistemological theory centered upon digital imaging and cultural expectations of truth in a post-photographic era.

Grier, J. (1996). *The Critical Editing of Music: History, Method, and Practice*. Cambridge, Cambridge University Press.

Provides a theoretical framework for the appraisal and editing of texts. The text is merely one state among many that a work may have. Discusses the problem of choosing the most authoritative of several texts. Discusses facsimile editions,

possibilities of electronic text presentation.

Harrison, H. P., Ed. (1997). *Audiovisual Archives: A Practical Reader*. Paris, UNESCO.

In her introduction to this book (p.1-9), Harrison looks at the work of audiovisual archives: “it is not just a question of preservation of materials, it has to be a question of continual transfer, copying and restoration of the originals. ... By their very nature, therefore, archive materials in audiovisual formats are rarely masters or originals. But what do you do with the material you have carefully restored and copied. The increasing tide of opinion of audiovisual archivists is that wherever possible you should copy material for use but keep the original in the very best possible conditions in order that as technology advances and restoration techniques improve you still have the original to return to when such a circumstance arises.” This compilation contains several articles discussing sound recordings which touch on issues of copying, manipulation, and digitization, for example. Entries on articles that might interest InterPARES are included in this bibliography.

Hendley, T. (1998). *Comparison of Methods & Costs of Digital Preservation: British Library Research and Innovation Report 106*. University of Hertfordshire, British Library Research and Innovation Centre.

This paper is a comprehensive treatment of the issues of digital preservation as they presented themselves in 1998. The paper defines generally the different types of digital records and information that must be preserved. Among these types, the author discusses digital video, the context of its creation and preservation, implicitly dealing with authenticity within his treatment of emulation, migration, technological obsolescence, etc. [The programme of studies is guided by the Digital Archiving Working Group, which reports to the Management Committee of the National Preservation Office.]

Holdsworth, D. and P. Wheatley (2001). “Emulation, Preservation, and Abstraction.” *RLG DigiNews* 5(4).

This article is a discussion and explication of the experimental emulation activities undertaken by researchers at the Universities of Michigan and Leeds (a.k.a. the CAMiLEON project) in preserving the BBC Domesday book. Authenticity is an implicit issue in the discussion.

Humanities Advanced Technology and Information Institute and National Initiative for a Networked Cultural Heritage (2002). *The NINCH Guide to Good Practice in the Digital Representation and Management of Cultural Heritage Materials*.

This best practice guide is a comprehensive treatment of the issues involved in the digital preservation of non-digital cultural heritage materials, i.e. “digitization” for preservation. Chapter VII (Audio/Video Capture and Management) provides a broad and detailed discussion of the major issues of digital representation of analogue media, discussing authenticity implicitly in its coverage of sampling rates, metadata, etc. Includes exhaustive array of links.

Hunter, J. and S. Choudhury (2003). *Implementing Preservation Strategies for Complex Multimedia Objects*. The Seventh European Conference on Research and Advanced Technology for Digital Libraries, Trondheim, Norway.

This paper discusses the problems and issues related to the implementation preservation strategies for multimedia objects. It begins with a brief discussion which covers the currently salient methods of digital preservation (i.e. emulation, migration, encapsulation) and continues with summaries of case studies undertaken by the authors.

Hunter, J. and S. Choudhury (2004). *A Semi-Automated Digital Preservation System based on Semantic Web Services*. Joint Conference on Digital Libraries, Tucson, Arizona.

This paper, discussing “digital objects” but not moving image material specifically, describes “a flexible, dynamic, semi-automated [preservation] approach which leverages existing work on preservation metadata and preservation software tools (e.g., emulation and migration) by integrating them and making them available through a Web services architecture.”

Ide, M., D. MacCarn, et al. (2002). *Understanding the Preservation Challenge of Digital Television. Building a National Strategy for Preservation: Issues in Digital Media Archiving, National Digital Information Infrastructure and Preservation Program, LOC*.

Outlines storage problem, includes a review of prevailing criteria for appraisal for selection, standard formats for digital television, asset and rights management, distribution, users, etc. The article also discusses implications for long term storage within which authenticity is at issue. Migration, emulation (noting drawbacks to authenticity for both), and “bundling” are discussed, as are Besser’s longevity problems and Messier’s points for adequate digital video preservation plan.

Institutes for Information Science (2002). *The State of Digital Preservation: An International Perspective*, Washington, D.C.

The authors address key issues in information science relating to digital preservation, which includes such topics as digital libraries, economics of information, and resources for scholarship. Included are the following essays:

- Introduction: The Changing Preservation Landscape, Deanna Marcum
- Overview of Technological Approaches to Digital Preservation and Challenges in Coming Years, Kenneth Thibodeau
- The Digital Preservation Research Agenda, Margaret Hedstrom
- Understanding Digital Preservation: A Report from OCLC, Meg Bellinger
- Update on the National Digital Infrastructure Initiative, Laura Campbell
Experience of the National Library of the Netherlands, Titia van der Werf
- Digital Preservation-A Many-Layered Thing: Experience at the National Library of Australia, Colin Webb
- Good Archives Make Good Scholars: Reflections on Recent Steps Toward the Archiving of Digital Information, Donald Waters

Kemal, S. and I. Gaskell (1999). Performance and authenticity. *Performance and Authenticity in the Arts*. S. Kemal and I. Gaskell. Cambridge, Cambridge University Press: 1-11.

Seeks a broad conception of musical authenticity in relation to cultural aesthetics.

Kim, J. H., S. O. Hwang, et al. MPEG-21 IPMP.

This paper addresses issues that have been identified within the scope of MPEG-21 Part 4: IPMP (Intellectual Property Management and Protection). IPMP relates to the identity and integrity of a record. Discussion is essentially technical.

Kivy, P. (1995). *Authenticities: Philosophical Reflections on Musical Performance*. Ithaca and London, Cornell University Press.

Philosophical critique of the concept of historically authentic performance. Distinguishes intentional authenticity, sound authenticity, authenticity of practice, and personal authenticity. Final chapter deals with the relation of text, work, composer and performer.

Klaue, W. (1997). *Audiovisual Records as Archival Material. Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 23-27.

Klaue contends that archives must be handed on in the form in which they were produced. Records, according to Klaue, should be passed on as records, not cassettes. He asks: "is not the archivist duty-bound to the original?"

Laurenson, P. (1999). *The Conservation and Documentation of Video Art. Modern Art: Who Cares?* Y. Hummelen and D. Sille. Amsterdam, Foundation for the Conservation of Modern Art and the Netherlands Institute for Cultural Heritage: 263-271.

Laurenson describes the Tate Gallery's approach to the conservation of video art works. The article focuses on the relationship between the "equipment and the meaning of the artwork" in video artworks, primarily in the transfer from analogue to digital signals in preservation, where "there is...a risk of changes occurring in the visual appearance of the video material". The concepts of authenticity and reliability, while not directly defined by Laurenson, are central to preservation and are found in the display of video artwork (which has four defined areas: sound, pictures, environment and equipment). These concepts should be respected by conservationists in the documentation and physical transfers of the artworks from analogue to digital signals. Also provided are appendixes outlining the Gallery's management of video material.

Lazar, W. (1995). "A proposed university specialization in sound preservation." *ARSC Journal* 26(1): 46-52.

This article presents an argument for and an approach to designing a university course for sound archivists working in sound preservation. "The significance and complexity of work performed in sound preservation are discussed, and a design of a university course syllabus for sound preservation specialization is offered; the focus is on the audio engineering dimension of sound preservation studies." The proposed specialization is based in the notion that sound archivists have a duty to preserve authentic sound artifacts. Because their work involves the reproduction of original documents, Lazar suggests that sound archivists must be naturally meticulous. In discussing ethics, she says that "the most common case of an unethical decision or

action occurs when the original qualities of the sound recording are changed, as a result of playing the sound recordings at wrong speeds, or over-filtering in search for the ‘better’ quality of sound.”

Lee, B. (2000). “Issues surrounding the preservation of digital music documents.”
Archivaria (50): 193-204.

This brief study identifies and describes the types of digital documents currently generated in the process of making music: digital recording which represent actual sound; notation files which represent notated music; and formats which serve to control computer operations that generate notation or sound. It then articulates the challenges the passage of time poses for these documents, specifically, their readability, intelligibility, adequacy of representation, and authenticity. Though focused on music documents specifically, the study provides a concise description of audio sampling which is applicable to all digital sound recording. A brief discussion of authenticity refers to the InterPARES project and the study concludes with a call for more research into the preservation of digital music documents.

Levinson, G. (1990). Autographic and Allographic Art Revisited. *Music, Art, and Metaphysics: Essays in Philosophical Aesthetics*. Ithaca, Cornell University Press: 89-106.
Refines Goodman’s distinction between two different types of artwork.

Lindquist, M. G. (1997). Long Term Strategies for Electronic Documents - Report from a Swedish Study. *Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO: 351-357.

Describes a study launched in 1994 which aimed to identify methods for the long term preservation and access of e-documents. The study found that a “method for the preservation of e-documents encompasses a set of choices or selections” regarding materials, technologies, forms for representing and storing information, access mechanisms and systems. The author notes that physical deterioration of the information carriers and technical obsolescence of the recording methods, equipment, and computer software and hardware are problems to consider when assessing the long term adequacy of different media and the form of information for representation and storage. The article includes a number of the study’s recommendations which should contribute to an overall strategy for the long term preservation of electronic documents, including sound documents. The article concludes with the following statement on authenticity and restoration: “E- documents can be copied without loss of quality. Together with the ease of manipulation this compounds the problem of establishing authenticity. The distribution of “originals” cannot be controlled by technical means. The quality of an e-document can be enhanced by algorithmic methods. [Sic]shapes and forms can be made more distinct, shadows can be washed away. Restoration of e-documents must be considered as part of preservation.”

Lyman, P. (2002). Archiving the World Wide Web. *Building a National Strategy for Preservation: Issues in Digital Media Archiving*, National Digital Information Infrastructure and Preservation Program.

This article does not specifically discuss digital moving images. This article is a comprehensive treatment of the major issues and problems in preserving the electronic documents found on the world-wide-web. It explicitly discusses the maintenance and

preservation of the authenticity of electronic documents within the discussion of metadata (in the section “The Authenticity and Provenance of the Object Collected”). The article also contains an analysis of migration and emulation as preservation techniques.

Marchionini, G. and G. Geisler (2002). Open Video Digital Library. *D-Lib Magazine*. 8.

An overview of the Open Video Digital Library (OVDL) at the University of North Carolina. The article reviews the theoretical and practical goals of the digital library, provides some detail of its makeup, architecture and user interface and notes the digital library’s future directions.

Masanés, J. (2003). “L’information technique nécessaire à la préservation à long terme des documents numériques.” *Les nouvelles internationales des préservation* (29): 11-19.

This article does not specifically discuss digital moving images. The article cites the OAIS (Open Archive Information System) model and ISO standard (14721:2002) as model tools for endowing “digital documents” with proper metadata. The author draws a distinction between “representation information” (RI) and “preservation description information” (PDI), both of which necessarily have a bearing on authenticity. Various metadata initiatives are described as are the common preservation difficulties of working in the digital realm.

McCarvel, R. T. (1995). You Won’t Believe Your Eyes: Digital Photography as Legal Evidence.

McCarvel gives an overview of digital photography and the ability of digital images to be accepted in court as real evidence, not demonstrative. McCarvel is concerned with the integrity of visual evidence. Digital photography is described as: images captured with a digital camera, images captured by a scanner or computer, sonograms, infrared images and X-rays.

McKee, E. A. (1986). “AAA Audio Preservation Planning Project: a preliminary progress report.” *ARSC Journal* 18(1-3): 20-32.

McKee describes the preliminary findings of the project that “was to gather as much information as possible about all aspects of the conservation, preservation, and restoration of sound recordings...then organize access to the mass of collected data through development of definitions of key elements, a bibliography, a glossary of terms, listings of pertinent standards and a variety of research reports. These materials would be incorporated into a final report which would summarize the nature and size of the audio preservation problem, identify gaps and needs, and make prioritized recommendations for further research and cooperative activity to ensure the continued availability” of sound recordings.

The article discusses how the group defined a “sound recording.” It was recommended that certain “types of documentation” be preserved with each sound recording so that people could understand the recording without having to play it because too much playing of older recordings would be damaging. They named seven categories of documentation: Chief Source, Artifact, Content, Audio Technical, Storage and Handling, Administrative and Transfer. Among other preliminary conclusions, the group suggested that the development of an archival medium for sound carriers be a

priority. As of the date of publication, the Committee recommended that magnetic recording tape be used although it did not meet all the criteria for an archival medium that they had developed. They specifically noted that digital formats were not appropriate for the generation of archival preservation transfer copies at that date because: there were no nationally accepted Standards for the various digital recorders and formats; the audio industry had yet to resolve its conflicting systems; and, neither equipment nor formats had yet been tested or proven reliable in an archival setting.

McWilliams, J. (1979). *The Preservation and Restoration of Sound Recordings*. Nashville, The American Association for State and Local History.

This book is aimed at archivists dealing with sound recordings. In the first chapter, "History of Sound Recording," McWilliams gives a good summary of problems that arose with the onset of electrical recording, including a breakdown of the different kinds of equalization practiced to adjust the sound during and after a recording. He defines equalization as "an emphasizing and de-emphasizing of particular parts of the frequency spectrum during recording and playback to provide linear reproduction." He also offers a good explanation of the digital sound recording process, writing that when the analog form is electronically processed or sampled and converted into digital information, the "sampling rate [must be] kept sufficiently high to ensure that the process - high-speed but not continuous - does not lose audible sonic information." He suggests that sound archivists have a double responsibility: they must preserve the physical carrier through proper storage and its "sonic content" through necessary migrations or transfers that will allow the recordings to be played. The book is primarily concerned with the preservation of the physical carriers, but when discussing the restoration of sound recordings, McWilliams explains how methods of electronic signal processing, dynamic range expansion and computer processing can be abused, as restorers improve the original material instead of simply filtering or eliminating noise.

Mellor, P., P. Wheatley, et al. *Migration on Request, A Practical Technique for Preservation*.

This paper, by CAMiLEON Project Researchers, "describes advanced techniques of data migration which can be used to support more accurate and cost-effective preservation of digital entities." [From authors' abstract.] Authenticity is an implicit issue within a discussion of migration.

Mitchell, W. J. (1994). *The Reconfigured Eye: The Visual Truth in the Post-Photographic Era*. Cambridge, MIT Press.

Mitchell explores the capacity of photography as evidence, of depicting Aristotle's definition of truth - to say of what is that it is. Mitchell investigates the subversion of photography's claim to truth by the emergence of digital imaging.

Mitchell explains a spectrum of creative production with algorithmic and nonalgorithmic end points. He places photography closest to algorithmic conditions because they are automatically constructed with little information about the intent of the artist. Mitchell concludes by pointing out that algorithmic images provide trustworthy evidence. One can defend trustworthiness by proving that standard procedures were followed, and if need be, the original can be produced for inspection. Mitchell questions where digital images fall within the spectrum and how they can be proven.

Mitchell examines verifying the provenance of a photograph as a method of establishing its authenticity. Mitchell questions the tradition of attributing status to photographic originals and copies by posing that if the negative is the original than who is the author of the printed image if it differs from the author of the negative?

Mitchell introduces the problems posed by the digital image, an entity that has no unique negative. He proposes that the rendering procedure may stand for the original in the digital environment. Mitchell concludes that the only difference between an original digital file and a copy is in the tag recording time and date of creation.

Mitchell further investigates the claim that the lineage, or authorial intention of an image file is untraceable. He likens the digital image to an intellectual structure having its own dynamics and values. The digital structures do not just refer to each other file, they are actually made from each other.

The confusion surrounding ownership and copyright of digital images is in part determined by their fundamental differences from photography. The digital image does not have a negative and the distribution of copies cannot be controlled. By disconnecting images from solid substance, Mitchell purports that visual truth can no longer be guaranteed.

Moore, R., C. Baru, et al. (2000). Collection-Based Persistent Digital Archives - Part 1. *D-Lib Magazine*. 6.

This paper defines an approach for maintaining digital data through the development of an environment that supports migration of collections onto new software systems. Authenticity is an implicit issue.

Moore, A. F. (2002). "Authenticity as Authentication." *Popular Music* 21(2): 209-223.

Distinguishes several aspects of authentication in the performance of rock music. All are ascribed by observers, based on features of the performance.

Morgan, E. L. (2001). Alex Catalogue of Electronic Texts, Infomotions, Inc.

Alex 'is collection [sic] of digital documents. The scope of documents in the collection include items from American literature, English literature, and Western philosophy'.

Morrison, A., M. Popham, et al. (2004). Creating and Documenting Electronic Texts: A Guide to Good Practice, Arts and Humanities Data Service.

"The AHDS is a UK national service aiding the discovery, creation and preservation of digital resources in and for research, teaching and learning in the arts and humanities." Currently, their areas of interest include archaeology, history, visual arts, literature, languages and linguistics and the performing arts. The AHDS created this guide in order to provide the steps and standards used "in creating and documenting an electronic text or similar digital resource". It is not a guide specific to the creation or preservation of electronic literature, but to electronic text in general. The authors express some of the sentiments of the InterPARES Projects: "This Guide assumes that the creators of electronic texts have a number of common concerns. For example, that they wish their efforts to remain viable and usable in the long-term, and not to be unduly constrained by the limitations of current hardware and software. Similarly, that

they wish others to be able to reuse their work, for the purposes of secondary analysis, extension, or adaptation.”

Morton, D. (2000). *Off the Record: The Technology and Culture of Sound Recording in America*. New Brunswick, Rutgers University Press.

Discusses the emergence of “sound recording culture” in the United States, looking at the creation of sound recording over time in different contexts. Addresses the change of meaning of the term ‘high fidelity’ from the ability of a sound recording to faithfully duplicate a performance to the ability of a sound recording, perhaps after manipulation, to give the listener an impression of ‘realism.’ Looks at sound recording technologies in the workplace where there were issues regarding the usability of equipment, the quality of the sound and the need for media to be reusable, as opposed to being preservable. Morton suggests that office sound recording technology, such as dictation machines “complimented or transformed other forms of communication, such as the business letter and the typewriter,” which implies that sound recordings were never considered to be records. Likewise, Morton describes the emergence of oral history recordings, secret recordings (recorded conversations) and answering machine messages, but does not discuss their preservation. Morton discusses sound recordings in terms of information storage, not as records. He uses the term “authenticity” to express the concept that recordings can “approach the experience of hearing a live experience,” but points out that this idea is faulty. He also mentions that tape recorded evidence has been admissible in US courts when voices could be authenticated. He concludes by suggesting that the rise of digitization might mean the end of sound recorders and tangible sound media.

Nack, F. (1999). *Everything you wanted to know about MPEG-7 but were afraid to ask*. 10th DELOS Workshop on Audio-Visual Libraries, Santorini, Greece.

Olsen, J. (1994). *Electronic Journal Literature: Implications for Scholars*. Westport, Mecklermedia.

This book examines the use of printed journal literature by forty-six scholars at two universities in the United States, the impact of this material in electronic form, especially in terms of access and offers suggestions for future improvements to access.

Pasquariello, N. (1994). “Archival sound restoration.” *Studio Sound and Broadcast Engineering* 36(9): 47-48.

“Nicholas Pasquariello asks what did the audience miss if they caught a movie the second time around?” This short article describes some of the processes and techniques used to restore sound quality to motion picture soundtracks (including dialogue, music, and effects). Several examples are drawn from restoration projects which aimed to obtain clear original sound from movies whose original soundtracks were deteriorating optical recordings or which had to be pieced together from several versions of the soundtrack. The practices involved in restoring sound quality can potentially affect the authenticity of the recording. Engineers may have to distinguish original sound from extraneous noise and remove extraneous noises, correct problems caused by original recording techniques, compensate for generational loss caused by re-recording;, work with several incomplete versions of a soundtrack, loop tracks to fill in gaps and/or cut frames from the picture where no original sound existed or could be recreated.

Paton, C. A. (1998). "Preservation re-recording of audio recordings in archives: problems, priorities, technologies, and recommendations." *American Archivist* 61(1):188-219.

This article is recent, reputable, and information-rich. From the abstract: "This article offers a context for examining archival audio holdings, determining preservation needs and priorities, and planning audio re-recording (reformatting) projects." Determination of the size, speed, format, and deterioration of grooved phonodisk and magnetic tape recordings are discussed in detail. "[The article] addresses such issues as identification of the most vulnerable recording types, the meaning of 'preservation re-recording,' and the skills, equipment, and personnel that are necessary for working with older recordings." The issues discussed could be of interest to researchers interested in the authenticity and integrity of re-recorded audio materials.

Paul, C. (2003). *Digital Art*. New York, Thames and Hudson.

Surveys the development and addresses issues of collection, presentation and preservation of digital art in various forms and combined mediums, including installations, video and film. To investigate these issues, Paul includes examples of artists and artworks that utilize digital technologies.

Polo, J., J. Prado, et al. (2004). *Interoperability between ODRL and MPEG-21 REL*. First International ODRL Workshop.

This paper describes the current conflict between the two main Rights Expression Languages (RELs): MPEG-21 REL and ODRL (Open Digital Right Language). It goes on to expose the apparent interoperability between the two languages. RELs relate to the concept of authenticity in that the data transmitted within these languages are coming to be considered highly desirable in the metadata schemas for digital moving images (because they identify copyright, i.e. creator, author, permissions on content, etc.), which therefore makes them important in terms of establishing and maintaining the identity and integrity of the records they describe. It is in the best interest of authenticity that these languages be interoperable.

Pullen, D., B. Otterbeck, et al. (1999). *Electronic Media: rethinking the conservator's role. Modern Art: Who Cares?* Y. Hummelen and D. Sille. Amsterdam, Foundation for the Conservation of Modern Art and the Netherlands Institute for Cultural Heritage: 300-307.

Addresses issues represented by electronic media from the conservators' point of view. The words authentic and original are used interchangeably in the context of how conservationists must preserve this quality in artworks. The quality of an artwork as authentic or original as applied to a conventional artwork is found in its technical parameters, which are static and definable. In this vein, the authors investigate how the traditional notions of authenticity and originality apply to electronic works where "the use of digital media implies that the reproduction is no longer fixed to a specific material quality". While they offer no concrete definitions of either term in relation to electronic media, they put forth the ideas of Dr. Wulf Hersogenrath (director of the Kunsthalle Bremen) and philosopher Hans-Ulrich Reck, that: "the 'original' is only the artist's initial idea, the structure of the reproduction of images" and "...in art, the authentic is a place of signification in a multi-faceted field of associations...created by purposes, concept, artistic intentions, but also by institutions, expectancies, formed attitudes". Further, this article discusses the rapid technological developments of media, the intermediary position of conservators between artists and technicians.

Randel, D. M. (1986). Authentic. *The New Harvard Dictionary of Music*. Cambridge, MA, Belknap Press.

Defines three senses of musical authenticity: textual, cultural, and performance.

Real, W. A. (2001). "Toward Guidelines for Practice in the Preservation and Documentation of Technology-based Installation Art." *Journal of the American Institute for Conservation* 40(3): 211-231.

Real examines the preservation challenges inherent to technologically-based installation art, summarizes the current practices in the field, and offers solutions in the form of guidelines and standards in documentation and preservation practices. Real addresses the issues of "originality", "integrity" and "authenticity" in technology-based artwork and recommends a high level of communication between artists, technicians and museum to facilitate these goals.

Rightscom Ltd. (2003). *The MPEG-21 Rights Expression Language - A White Paper*. London.

This paper describes in legal and business terms the rationale for the development of and uses for MPEG REL. Includes a semi-technical discussion.

Rinehart, R. (2000). *The Straw that Broke the Museum's Back? Collecting and Preserving Digital Media Art Works for the Next Century*. *Switch*.

Rinehart outlines the key issues and suggests strategies for the long-term preservation of digital media-based arts, and discusses the impact of these new methods on the art community. Rinehart questions the tradition notions of authenticity and reliability in the digital realm as defined in information science. He interprets points made by John Ippolito in that "when preserving and representing media-based works of art, we should give up the notion of a single, authentic object and view these works as sets of instructions rather than precious originals". This upsets and shifts tradition notions of artworks "from physical object to information object". In this context, the lack of an original and a multitude of copies can in fact be used "for comparison and verification".

Ritchin, F. (1990). *Photojournalism in the Age of Computers. The Critical Image: Essays on Contemporary Photography*. C. Squiers. Seattle, Bay Press.

Ritchin presents an overview of the implications arising from the application of computer technology to photography, concentrating on the realm of photographic journalism. In contrast to earlier methods of manually altering photographs, current computer driven manipulation is quick and seamless. Ritchin addresses the ethical and factual problems that arise out of computer alteration and suggests redefining photojournalism as editorial photography.

Ritchin also raises question with the ownership and copyright of images taken by one person, yet digitally manipulated by another. He questions the path of ownership and the ability to locate the original image or source of digital photographs. Furthermore Ritchin points to the lack of an actual negative or "original" in digital cameras as the cause of additional problems of image authentication.

Ritchin proposes a method of redefining photography to ensure the public's trust in photography. Specific terminology should be employed to differentiate physically

manipulated photographs from other types of images. The photographer must be respected as the author of the image and tampering by others would violate this point of view. Ritchin concludes that without these measures, confidence in photography as evidence will not survive.

Rothenberg, J. (1995). Ensuring the Longevity of Digital Documents, Council on Library and Information Resources.

This oft-cited article presents in a semi-technical manner the major issues and problems relating to preserving electronic/digital records.

Rothenberg, J. (1998). Avoiding Technological Quicksand: Finding a Viable Technical Foundation for Digital Preservation, Council on Library and Information Resources.

This is a comprehensive text treating the general issue of digital preservation. Rothenberg is a major proponent of emulation as a solution.

Schuller, D. (1991). "Ethics of preservation, restoration and reissue of historical sound recordings." *Journal of the Audio Engineering Society* 31(12): 1014-16.

This paper is about "the ethical side of preservation, restoration, and re-recording" as opposed to the technical possibilities of re-recording. Schuller attempts "to analyze what the original carrier represents, technically and artistically, and to start from that analysis in defining what the various aims of re-recording may be." The article includes a block diagram breaking down levels of recording process and moving forward and breaking down levels of re-recording. Schuller discusses the kinds of alterations of the sound recording that are made at all these levels. The two aims of re-recording are identified as: 1) the historically faithful reproduction (either the recording as it was heard in its time, or the recording as it was produced at the time, or the recording as produced but with additional compensation for recording imperfections caused by the recording technique of the time) and 2) reinterpretation at the creative level for re-issuing and marketing. Schuller concludes that sound archives are concerned with the first aim of re-recording and that documentation of all procedures is imperative

Schuller, D. (1994). "Strategies for the safeguarding of audio and video materials in the long term." *IASA Journal* (4): 58-65.

Schuller contends that "[p]reservation of the information rather than the carriers is the only feasible solution to preserve in the long term what is considered of archival importance." He suggests that preserving the carriers of audio and video recordings by attempting to extend their life expectancy is an outdated approach which is not archivally sound. Schuller advocates the use of centralized digital mass storage systems for audio and video signals. Unlike analog recordings, digital information can be "cloned" without generational loss, making it easier to migrate information as hardware becomes obsolete. He contends that such systems can control and verify the integrity of the information being stored and can detect and correct errors that may occur during migration, as well as being able to store metadata associated with audio and video recordings. Though not explicitly discussed, Schuller's strategy hints at the implications of preservation discourses and practices for the authenticity of sound recordings.

Schuller, D. (1997). Data Density versus Data Security: Formats Suitable for Archival Purposes. *Audiovisual Archives: A Practical Reader*. H. P. Harrison. Paris, UNESCO:288-291.

Schuller discusses the concept of data density when storing sound information. He argues that storing records in too compressed a format leads to a loss of quality. He writes that despite initial costs in storage space, “[e]conomists are challenged to calculate the costs of long term preservation including the costs of subsequent transfer of whole archives to new formats. Such a calculation may prove that radical miniaturization may in the end not be the most economic way to store audiovisual material over long periods.” Schuller concludes that archivists should “prefer formats which optimize data security rather than data density.”

Schuller, D., L. Stickells, et al. (1997). Guide to Technical Equipment Audio Archives. *Audiovisual Archives*. H. P. Harrison. Paris, UNESCO: 313-323.

The article begins with the idea that the role of the archivist is to faithfully preserve the content of original sound recordings and that re-recording serves a very specific function; it is a means to preserve the original sonic content of a recording. The authors identify four different kinds of re-recording, three of which are “legitimate for archival preservation.” These three are: 1) re-recording a replica where the intention must be to provide the researcher with a secondary source which is the equal (or at least equivalent) to the original source in as many respects as possible; 2) re-recording an audio history where the sound of an original recordings is perpetuated as it was originally reproduced and heard by the people of the era (i.e. reproduce the sound captured on the historical carrier with real fidelity); and 3) re-recording as a recreation of the original sound source, eliminating distortions made in the original recording in order to attempt an “objective” reconstruction of the artist or performer of the sound. The authors argue that it “is essential to fully document the process of re-recording any historic carrier. The make, model and serial number of all machines and audio processing equipment used in the record/replay chain, details of the equipment settings used, the equalizations used, the size of stylus etc. must be noted to allow future researchers to, if necessary, restore the sound to as near its original form as possible.”

Schwartz, J. M. (1995). “We make our tools and our tools make us: Lessons from Photographs from the Practice, Politics and Poetics of Diplomats.” *Archivaria* 40(Fall):40-74.

Schwartz discusses the nature of photographic archives through the application of diplomatic concepts. The subject of Schwartz’s analysis is traditional ‘chemical-based’ photography, not digital/ electronic imaging.

Seid, S. (2000). “TechArcheology: A Symposium on Installation Art Preservation.” *MAIN* (Winter).

This document is geared towards a conservation audience. It discusses in a general, non-technical way the various problems and issues facing conservators of moving image material (including digital). Included in the discussion are comments concerning technology obsolescence, migration, and the maintenance of authenticity.

Smart, L. J. (2002). “OAIS, METS, MPEG-21 and Archival Values.” *The Moving Image* 2(1).

Smith, B. (2003). “Preserving tomorrow’s memory: preserving digital content for future generations.” *International preservation news: a newsletter of the IFLA Programme on Preservation and Conservation* (29): 4-10.

The author argues that given the current volume of production of digital information its preservation represents a huge social and cultural problem. Among other recommendations, the author argues that general awareness of the problems should be increased, the problem should be understood, and following these, public support should be enlisted in finding solutions.

Spitzer, J. (1986). *Authenticity. The New Harvard Dictionary of Music.* D. M. Randel. Cambridge, MA, Belknap Press.

Describes techniques to establish authenticity of a musical text.

Storm, W. (1988). *The Implementation of Proposed Standards for Copying Audio Recordings. Archiving the Audio-Visual Heritage.* Berlin, FIAF.

Storm writes for professional sound archivists who, he says, have subscribed to the philosophical standard of historical accuracy. “The philosophic standard does not enumerate specific technical procedures, but it definitely does exclude re-recording techniques that can be shown to be subjective and which falsify the original sound recording.” The article describes factors to consider before any technique is applied to an audio recording and in determining what the original recording sounded like, such as, original recording equipment, media formats, and acoustics. It also describes some of the questions that must be addressed in the re-recording process and some cooperative efforts that are aiming to answer those questions. The article concludes that “advocating the philosophy of ‘saving and not rewriting history’ demands that the re-recording engineer seek an understanding of the many variables that affect the perception and actuation of original sound recordings... Implementation of this philosophy is beginning to emerge in sound archives in great part due to improved communications among sound archivists. Questioning each other provides a good system of checks and balances that minimizes subjective rewriting of history.”

Stringari, C. (199). *Installations and Problems of Preservation. Modern Art: Who Cares?* Y. Hummelen and D. Sille. Amsterdam, Foundation for the Conservation of Modern Art and the Netherlands Institute for Cultural Heritage: 272-281.

Stringari discusses the issues surrounding the preservation of installation art. She defines installation art as encompassing architecture, various media, performances, and technologies and proposes a schema for documentation, emphasizing it as an essential step in the preservation of “original intent”. While Stringari does not define “original intent” she does state that in installation art, “some artists are better than others at preconception” which can result “in a work being unresolved or less that ‘perfect’ for an exhibition”. In order to “preserve the integrity of the work” (integrity not being defined but inferred as residing in the material and conceptual nature of the art works), conservators must ask themselves if “can such works be mutable, or will each new conception be a new acquisition?”.

Swartzburg, S. (1993). *Preservation of Sound Recordings. Encyclopedia of Recorded Sound in the United States.* G. A. Marco. Garland.

This article is an overview of issues in the preservation of sound recordings that are

broken down by medium. The author states that the “goal of preserving sound recordings is to maintain the aural quality as closely as possible to the quality when the recording was made.” At the time of publication, the author addressed digital recording as follows: “There are no standards for this medium...The compact disc is considered a transitional medium. It is ideal for the transmission of information, but it is not the medium for storage of information.” Swartzburg also writes that re-recording “older sound recordings in a suitable format, without enhancements, for playback, is a preferred method for preservation and access in archival collections. Of concern is the fact that there are, at present, no standards for the re-recording of sound recordings into a newer medium for playback. When dealing with the preservation of aural materials, the goal is to retain the quality of the sound as closely as possible to the original, blips and all, not to enhance the quality of the sound.”

Taruskin, R., D. Leech-Wilkinson, et al. (1984). “The limits of authenticity: A discussion.” *Early music* XII(1): 3-25.

Classic dialogue problematizing notions of performance authenticity.

Task Force on the Preservation and Enhanced Use of Canada’s Audio-visual Heritage (1995). *Fading Away: Strategic Options To Ensure the Protection of and Access to Our Audio-Visual Memory*, National Library and Archives of Canada.

Predates the serious consideration of digital media being the primary creative media or preservation media. Chapter 3 treats “preservation of the audio-visual heritage” and discusses digital media in the future tense.

Teruggi, D. (2004). “Can We Save Our Audio-Visual Heritage?” *Ariadne* (39).

This article outlines the major accomplishments and initiatives involved in preserving and providing access to audio-visual materials in Europe. It outlines the objectives of the PrestoSpace project which is based upon the work of a previous project, Presto.

Thomas, J. (2004). “Digital Video, the Final Frontier.” *Library Journal*.

This article “explains the benefits and challenges of creating a cutting-edge motion media collection.” Authenticity is implicitly discussed in the author’s discussion of the adequacy of MARC and MPEG-7 as descriptive tools for moving image materials.

Thompson, J. L. (2002). “Truth and Photography.” *Yale Review* 90(Jan): 25-53.

Thompson discusses the concept of truth throughout the development of photography during the late nineteenth and early twentieth century.

Tristram, C. (2002). “Data Extinction.” *Technology Review* 105(8): 36.

This article does not specifically discuss digital moving images. This article presents to the general reader the major social and cultural issues associated with digital preservation. Methods of preservation such as emulation, migration, and encapsulation are explained and discussed. Includes commentary from Rothenberg, Bearman, Lorie, Smith.

Turner, J. M. (2001). “Data Storage Technology Assessment 2000.” *The Moving Image* 1(2).

Vihonen, L. (1997). "Digitization and its consequences for radio sound archives: Finnish Broadcasting Company (YLE)." *IASA Journal* (9): 29-31.

Brief outline of radio sound archiving practices and issues at the Finnish Broadcasting Company (YLE). As YLE's began to digitize its broadcasts, it continued to archive broadcasts by recording, simultaneous to broadcast, on traditional sound carriers like analogue tapes, DATs or CD-R. Vihonen suggests that, in the future, audio files will be "transferred as automatically as possible from the [broadcast] systems to the archive system" and that "producers of the chief editors will be the persons who decide in practice which radio programmes ...are worth [sic] of permanent storing." Different broadcast systems produce different file formats and for this reason, Vihonen suggests that an "archive system has to be as open as possible." However, he also mentions that the European Broadcasting Union (EBU) has started work on a standard which will help to transfer audio files from the broadcast systems to the archive systems. Vihonen notes that the EBU standard will "probably recommend some audio file formats but the main point is that the users have to add some extra information [that] tells the systems, for example, the type of audio file (is it linear or bit- reduced and so on) and also some broadcasting and copyright information." Vihonen also suggests that the EBU standard should include a field for "the status information" that will have information concerning the storage time of the audio files and further adds that many manufacturers have promised to follow the standard when it is approved.

Viola, B. (1999). Permanent Impermanence. *Morality/Immortality? The Legacy of 20th Century Art*. M. A. Corzo. Los Angeles, The Getty Conservation Institute: 54-95.

Viola, a video and installation artist, addresses the preservation challenges posed by time-based art, namely video installations, by discussing not only his work, but the work of other artists as well. He articulates that "the notion of a unique object must be revised" when considering digital preservation and presentation, noting that "the process of duplicating tapes in the digital format to be 'cloning' not 'copying'". Viola believes that what people see when they encounter his video art installations is not a unique or original object, but rather "an exhibition copy". Yet documentation (in the form of architectural plans, computer codes, a book of instructions and a certificate) make up the archival elements of the work, and hence "ensure that the work is installed according to [his] original intentions". Further, he identifies the need for collaboration between artists, curators and technicians in the documentation process, which is essential for preservation.

Wackerman, E. (2001). "Review of Archival Moving Image Materials: A Cataloging Manual." *The Moving Image* 1(2): 186-189.

L'auteur fait une évaluation critique de l'ouvrage qui en est à sa deuxième édition. Une analyse comparative est effectuée avec la première édition ainsi qu'avec les Anglo-American Cataloging Rules (AACR2). On y fait ressortir les nouveaux ajouts, les points forts ainsi que les limites de l'ouvrage pour le traitement des images en mouvement.

Wactlar, H. D. and M. G. Christel (2002). Digital Video Archives: Managing Through Metadata. *Building a National Strategy for Preservation: Issues in Digital Media Archiving, National Digital Information Infrastructure and Preservation Program, LOC*.

This article addresses the question: "How can metadata be produced and associated

with video archives to unlock their contents for end users?" It reviews the key problems and concepts that relate to the question of creating and maintaining metadata for digital video and includes a discussion on the major works toward standardization of metadata (i.e., MPEG and Dublin Core). Authenticity is implicitly at issue in this article.

Warburton, N. (1997). "Authentic Photographs." *The British Journal of Aesthetics* 37(2):129-138.

The article examines candidates for authenticity in photographic art to provide a framework for deciding what is as an authentic photograph. Warburton attaches the question of authenticity to the process of creation. Warburton asserts that the electronic environment will force a shift in authenticity due to increasing copy capabilities. Warburton draws on the work of Nelson Goodman in an effort to explain photography as a two stage art form likened to the musical score and its performance.

Welch, W. L. (1972). "Preservation and restoration of authenticity in sound recordings." *Library Trends* 21(1): 83-100.

Based on research conducted at the Syracuse University Audio Archives and Thomas Alva Edison Foundation Re-Recording Laboratory. "The laboratory is interested not only in the preservation and restoration of authenticity in historical material, but also in problems concerning the extent to which current sound recordings truthfully represent the world of sound, and the extent to which modern artifacts will survive the vicissitudes of time and use." Welch writes that "the authentication of sound depends on its reproduction free of disturbing or diluting effects produced by ambient conditions in the recording or reproducing environment." He considers the mechanisms used to record and reproduce as part of the primary source of recordings. To evaluate a 'truthful representation of the world of sound', recordings should be heard "with the two ears as nature designed them to be used - with a slightly different sound pattern received by each ear" and Welch discusses how this stereophony is necessary to evaluate the fidelity of recordings in terms of tone, sound-level and timbre. Welch goes on to discuss the evolution of wax cylinders to discs and magnetic tape, and their longevity in use and in storage. He calls on "institutions of higher learning" to assume a role in determining acceptable standards for sound recordings and reproducing practice.

Welch, W. L. (1981). "Preservation and restoration of authenticity in sound recordings-to standards." *Library Trends* 30(2): 297-305.

Describes early tone tests by Thomas A. Edison, Inc. in which recordings were compared to live performances in an attempt to prove the authenticity of recording. Also, describes Edison's attempts to build standards to address problems such as the uniform surface speed for the recording and reproducing of cylinders. For the majority of the article, Welch discusses components of the physical carriers or recording/reproducing process that impacted on the quality of sound recordings such as, for example, the smoothness of the playing surface of the carriers.

Welch, W. L. (1994). *From Tinfoil to Stereo: The Acoustic Years of the Recording Industry, 1877-1929*, University of Florida.

This book discusses recording practices and the development of the sound recording industry. The authors point out the problems of recording due to the different sound producing aims of using different equipment. For example, when using a telephone, not

all sound frequencies should be captured because the extraneous sounds will distract from the person's voice, whereas the perfect reproduction of music should have the same relative intensity and phase relationship reaching the ears of listeners as they would have experienced at the actual performance. The authors write that more research should be conducted on the purposes of musical reproduction to determine what qualities a reproduction should possess compared to the original. The chapter titled "A National Archive of Recorded Sound" illustrates the need for preservation by giving examples of lost recordings; however, the authors only state that the physical carriers need to be preserved, writing that recordings should be transferred to a newer carrier if necessary, without going into the qualities that need to be preserved

Wickstrom, D. (1999). "Speaker's corner: recorded sound preservation in the digital age." *ARSC Journal* (30): 30-32.

In this short commentary, Wickstrom observes an inconsistency in sound preservation practices. He suggests that this inconsistency is caused by the contradiction between recommended standards (the Associated Audio Archives Committee's ten year old Audio Preservation: A Planning Study, which officially recommends analog as a preservation medium), and popular digital technology. He encourages his audience to actively seek agreement and standards on this issue.

Wright, R. (2002). "Preserving Europe's Memory: PRESTO shows how to preserve Multimedia in the most cost-effective fashion." *Cultivate Interactive* (7).

This article outlines the PRESTO project which looks at multimedia preservation issues for both analogue and digital media. The project is developing cost-effective and collaborative technologies and workflows for preserving multimedia. The paper treats the preservation of some digital formats and the authenticity issues implied.

Zwaneveld, E. H. (2003). *Audio Visual Standards and Beyond*. 18th Annual Preservation Conference, NARA.

The author discusses within the context of standards the major issues facing those who wish to preserve audio-visual material. The issue of authenticity is implicitly discussed throughout as the author argues against the preservation of media (analogue and digital) in digital form (note section: "Perpetual Migration-It Is An Option From Hell!") and for its preservation in extant formats (i.e. film) proven to last.

NOTE: This document is adapted from a presentation given by the author. It is in full text form with some illustrative slides.