

# Moving Image Preservation: Analog or Digital?

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## Outline

1. Why moving images are important
2. Special qualities of moving image materials
3. General Issues for Electronic Media: Problems with Analog Preservation
4. General Digital Preservation Issues
5. Issues Specific to Moving Images
6. Moving Image Preservation Education

## 1. Why moving images are important

- Moving Images are critical to understanding our cultural heritage
- Both fiction & documentaries shape any time period's views of the past (Moses & 10 Commandments; Cleopatra; Caesar's Rome; 1940s urban US; Hitler, Holocaust, WWII; Vietnam War, ...)
- We are shaped by the cultural icons of our childhood (Leave it to Beaver, Lassie, James Bond, police shows, Mickey Mouse, Road Runner, ...)
- We are also shaped by the advertisements, industrial, and educational films of our childhood (Maytag repairman, How to be a good homemaker, ...)
- To understand our time period, people in the future will need to have access to the cultural artifacts of our time (imagine trying to understand 1950s and 1960s gender dynamics without pop cultural views of the family)

[Example movie: *Duck and Cover*

Sponsor: U.S. Federal Civil Defense Administration, 1951]

## 2. Special qualities of moving image materials

What's challenging about Moving Image Collections?

- You can't browse a collection
- Many different purposes (documenting events, telling stories)
- "Published" works have variant forms

- Many physical formats (film gages, video sizes and encoding, digital encoding and compressions)
- No format even approaches the stability of rag paper

Moving Images are highly unstable, and an enormous # have already disappeared

- 50% of all titles produced before 1950 have vanished (approximate number as of late 1970s)
- This reflects full-length features; survival rates are much lower for other types (studio newsreels, shorts, docs, independent, ...), and these "orphans" are particularly in peril
- Fewer than 20% of features from 1920s survive in complete form; survival rates of 1910s is <10% (& none of these are negatives)

Film Preservation 1993: A Study of the Current State of American Film Preservation, Vol 1: Report, June 1993, Report of the Librarian of Congress (<http://www.loc.gov/film/study.html>)

Some reasons why Moving Images are disappearing

- Most pre-sound films weren't saved at all
- Nitrates hazard
- Eastmancolor fading
- Video--changing formats, magnetic particles not adhering to backing, little recognition of importance of saving
- Who should be responsible for saving works without lucrative financial value?

### **3. General Issues for Electronic Media: Problems with Analog Preservation**

- Wide number of formats, many obsolete
- Constant reformatting, and implications

Old Video Formats



Old Digital Formats



Possible endless need for reformatting implies

- Possible loss with each generation
- Requires managed environment

#### 4. General Digital Preservation Issues

- Paradigm shift to managing over time: Preservation Repositories
- Hedging bets with Digital Preservation

Digital Preservation

- The Problem
- Preservation Repositories
- Preservation Metadata
- Other Digital Preservation Activities
- Paradigm shifts

### Serious Longevity Problems

- What we know from prior widespread digital file formats
- Previous formats required little ongoing intervention (remote storage facilities, Iron Mtn); digital formats require intense ongoing management
- The Short Life of Digital Info

### The Short Life of Digital Info: Digital Longevity Problems

- Disappearing Information
- The Viewing Problem
- The Scrambling Problem
- The Inter-relation Problem
- The Custodial Problem
- The Translation Problem

### The Viewing Problem

- Digital Info requires a whole infrastructure to view it
- Each piece of that infrastructure is changing at an incredibly rapid rate
- How can we ever hope to deal with all the permutations and combinations

### The Scrambling Problem

Dangers from:

- Compression to ease storage & delivery
- Container Architecture to enhance digital commerce

### The Inter-relation Problem

- Info is increasingly inter-related to other info
- How do we make our own Info persist when it points to and integrates with Info owned by others?
- What is the boundary of a set of information (or even of a digital object)?

### The Custodial Problem

- In the past, much of survival was due to redundancy
- How do we decide what to save?
- Who should save it?  
Mellon-funded E-Journal Archives
- How should they save it?

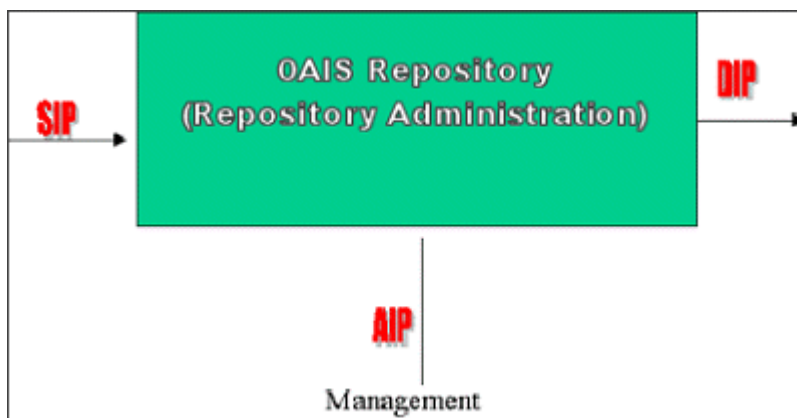
#### The Custodial Problem: How to save information?

- Methods for later access
  - - Refreshing
    - Migration
    - Emulation
- Issues of authenticity and evidence

#### The Translation Problem

- Content translated into new delivery devices changes meaning
  - - A photo vs. a painting
    - If Info is produced originally in digital form in one encoded format, will it be the same when translated into another format?
    - Behaviors

#### Preservation Repositories: Open Archival Info System Model



- High-level reference model describing submission, organization and management, and continuing access
- Conceptual framework for different organizations to share discussions with a common language
- Producers, consumers, management, actual repository
- SIP, DIP, AIP

- AIP consists of data objects plus representation info (Content, Preservation Description, Packaging, Descriptive)
- Originally developed for Space Science community

#### Preservation Repositories -- AIP Metadata

- Preservation Description Info
  - - reference info
    - context info
    - provenance info
    - fixity info
- Packaging Info
- Descriptive Info
- Content Info

#### Metadata Encoding & Transmission Standards (METS)

- Designed to make viewing works less dependent on proprietary software and particular computing environments
- Upsurge in use for digital reformatting of other types of archival material
- METS extensions for streaming media

#### OCLC/RLG Digital Repository Attributes

- Administrative responsibility
- Organizational viability
- Financial sustainability
- Technological suitability
- System security
- Procedural accountability

#### OCLC/RLG Selected Recommendations

- Policies, Certification processes, Risk management, Persistent ID, Migration/Emulation experiments
- Stakeholders meet to decide how to describe what is in a dig repository
- Examine special properties of particular classes of digital objects
- Technical standards for exchange and interoperability btwn repositories
- Develop projects and case studies
- Copyright issues

#### Paradigm Shift

- From managing artifacts to managing disembodied information over time
- Preservation Repository with strong devotion to management over time including
  - - Periodic refreshing
    - Either emulation or migration (or some other strategy that may emerge)

#### Hedging bets with Digital Preservation

- Probably can't emulate every format
- Save the bits (in addition to anything else you may do)

#### 5. Issues Specific to Moving Images

- Collections are often complex and mixed
- Often reformatting, even in an all-film environment
- Digital file format and compression are still not settled
- Many quality questions

#### What's challenging about Moving Image Collections? (2)

- Often important to collect various "unpublished" parts in different formats (A/B rolls, mag-stripe film, separated soundtracks, unedited footage, rushes, screen-tests, ...)
- Film Archivists seldom organize films or videos in standard archival arrangements (no fonds, boxes, folders, or Finding Aids)
- Ancillary materials (pressbooks, stills, scripts, storyboards, set designs, reviews ...) are often necessary to understand a work

#### Hampton Collection (1)



Hampton Collection (2)



Hampton Collection (3)





Hampton Collection (negatives)



Hampton Collection (interviews)



Hampton Collection (exhibits)



Hampton Collection (atmosphere cntrl)



File Format Issues

Various Formats Intermixed (Hampton)



Old Film Formats



We're always reformatting, and dealing with wide variety of formats

- Nitrate
- Super8
- Cinemascope
- 3-D
- Cartridge
- ...

Ideal digital moving image file format  
(Jerome McDonough)

- Non-proprietary file format
- supports 10-bit/pixel
- no compression or lossless compression using non-proprietary CODEC
- supports multiple frame rates/frame sizes
- supports time code data in file
- supports audio (multichannel) and video in single file

Limitations of present file formats

- MPEG seems to be only non-proprietary format
- AVI and Quicktime with extensions incorporate most features, but are proprietary

Many quality questions

- Quality of playback?
- Theater experience?

What about newer formats & developments?

- Moving images on DVDs becoming interactive
- Video installation works
- Net-based works incorporating moving images
- New media and multi-media works

Standards for encoding artists intentions  
(group efforts w/i Cult Heritage community)

- Artists Interviews Project, Netherlands Institute for Cultural Heritage 1998-1999, Modern Art: Who Cares (<http://www.icn.nl/english/6.4.2.html>)
- TechArcheology: A Symposium on Installation Preservation (SFMOMA)
- More recent SFMOMA/Tate collaborations
- IMAP
- Guggenheim's Variable Media

Incorporate parts of Functional Requirements for Bibliographic Records (FRBR)

- work
- expression
- manifestation
- item
- (and push into "change history" section of Technical Image Metadata)

Structural Metadata Standards for Encoding Multimedia

- SMIL
- MPEG 4

Which should be reformatted to digital today?

- Video--probably; at least soon
- Film-Not very soon
- A guessing game; we need more R&D, as well as education

Other Digital Preservation Activities

- LC Natl Dig Info Infrastructure & Preservation
- InterPARES
- Emulation Projects
- E-Journal Archiving
- ERPANET

- Persistent Naming

## 6. Moving Image Preservation Education

### History of Moving Image Preservation

- Learning through apprenticeships
- Each institution does things their own way
- "Professionalism" is a relatively recent idea
- 1990s studies recommending offering MAs to help standardize good practices and professionalize the field

### National Report: Moving Image Preservation Education is critical

- Important to "Create a systematic graduate program for educating new film preservation professionals and continuing education opportunities for those already in the field"
- "ad hoc instruction is no longer adequate"
- "The National Film Preservation Board will work toward the creation of a master's degree program in film preservation at an American university and invite curriculum discussions with pertinent professional organizations."

Redefining Film Preservation: A National Plan (Recommendations of the Librarian of Congress in consultation with the National Film Preservation Board) Library of Congress Washington, D.C. August 1994

### Interdisciplinary; students need to

- learn the context in which each of these cultural artifacts were made
- know the history of changing formats
- need to be scientists and technologists who understand:
  - - the process of color changes
    - how certain stocks become too brittle to provide a flat focus for copying
    - how magnetic particles are laid on videotape and what causes the various types of deterioration
    - how different computer files link and interact, (and how certain compression algorithms cause various types of loss) so that they can anticipate preservation problems of compressed and hyper-linked digital works
- strong organizational and classification skills so that they can manage these collections and help others find things they want in them.
- administrative skills to manage these large preservation repositories (whether they be film, video, digital, or others).

- understand that preservation does not exist in a vacuum, and that they may have to become activists to prevent outside political forces from inadvertently trampling on our ability to preserve

### Three Educational Programs recently established

- David Selznick School (1 year, no academic degree)
- UCLA (2 years, Masters)
- NYU (2 years, Masters)

### NYU's MIAP: A curriculum for studying Moving Image Archiving & Preservation

- Film History/Historiography and Film Style
- Conservation, Preservation, Storage, and Management
- Legal Issues and Copyright
- Laboratory Techniques
- Moving Image Cataloging
- Curatorial Work and Museum Studies
- Programming
- New Media and other Digital Technologies
- Access to Archival Holdings

### Our Graduates

- We are training a new generation of custodians of our cultural heritage
- This training has to involve more than the kind of apprenticeship that has traditionally characterized this field
- To be an effective Moving Image Archivist in the future will require a combination of the professional and the theoretical, and the ability to apply important traditions and concepts to communications technology of the future that we've never even dreamed of today
- We want our graduates to act as "change agents" in the organizations they go into
- We want to instill in them a commitment to preserve the future as well as the past
- many of us will need to work together to make sure that the moving image artifacts of the 20th century and beyond are available to our grandchildren's grandchildren's grandchildren.

### Moving Image Preservation: Analog or Digital

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<http://www.tisch.nyu.edu/preservation>

<http://www.amianet.org/>

<http://sunsite.berkeley.edu/Longevity/>

[http://www.digitalpreservation.gov/ndiipp/repor/repor\\_back\\_tv.html](http://www.digitalpreservation.gov/ndiipp/repor/repor_back_tv.html)  
[http://www.digitalpreservation.gov/ndiipp/repor/repor\\_back\\_archi.html](http://www.digitalpreservation.gov/ndiipp/repor/repor_back_archi.html)  
[http://www.oclc.org/digitalpreservation/presmeta\\_wp.pdf](http://www.oclc.org/digitalpreservation/presmeta_wp.pdf)  
<http://is.gseis.ucla.edu/us-interpares/>

METS official site:

<http://www.loc.gov/standards/mets>

UC Digital Preservation & Archiving Committee Final Report

<http://www.slp.ucop.edu/sopag/>

[http://www.firstmonday.dk/issues/issue7\\_6/besser/](http://www.firstmonday.dk/issues/issue7_6/besser/)