.....27 BC.....1744.....1800s.....1900.....1920s.....19030s.....1940s.....1950s.....1960s.....1970s.....1980.....1990.....2000...

Tracing the Evolution of Preservation Environments in Archives, Museums and Libraries

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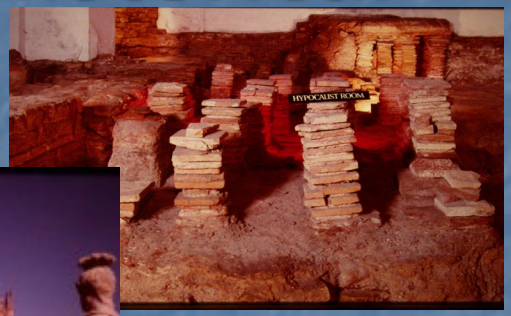
Preservation: Historical Perspective

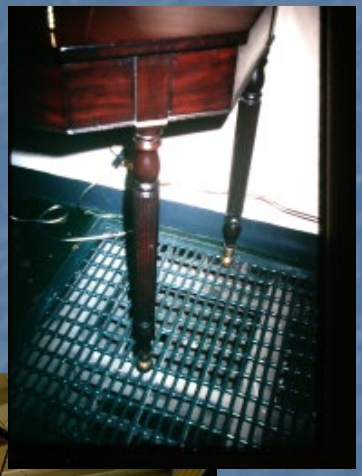
- Care of material culture has a long history
- Term "conservation" was in use by 1930
- Preservation field evolved to address collections holistically and to prevent damage
- Preservation is inherently efficient

Michael Faraday

Mechanical Systems: Historical Perspective

- Early technology focused on providing or controlling heat
- Building design used for natural ventilation
- Mid 1800s power driven fans allowed forced air ventilation and distribution, common by 1900





Mechanical Systems

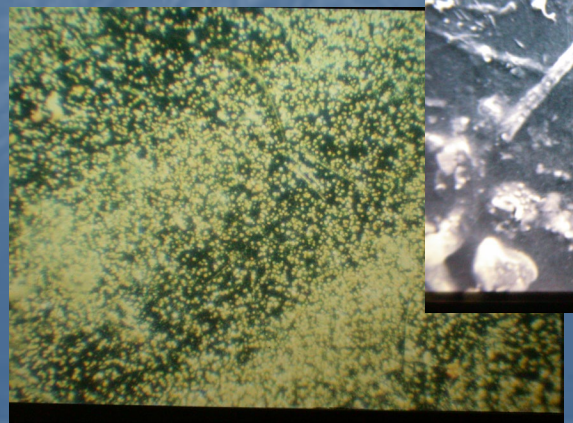
- Mid 1900s forced air systems combined heat and air-conditioning
- By 1941 air conditioning installed in some large cultural facilities, including National Archives Building
- By end of 20th century 81% of all new homes and majority of public buildings have air conditioning
- Coolant systems and desiccant driers allow low temperature and RH for special needs

Standards: Historical Perspective

- Early guidance from Europe almost uniformly recommended 50% as cited by Gary Thompson, *Museum Environment*, 1978
- Recognition of climatic zones in North America allowed wider range in some situations
- Set points for paper and film collections generally lower
- 1986 *Museum Environment*, 2nd Edition established two-tier Class 1 and 2

Environmental recommendations

- Material Differences
- Seasonal drift
- New, renovated and historic spaces
- Microclimates
- Buffering



Brown, J.P. and Rose, William B. "Humidity and Moisture in Historic Buildings: the Origins of Building and Object Conservation" APT Bulletin, 27/3 (1996), 12-24

Common Approaches to Qualifying Complex Issues

- Based on **specific materials** or similar materials: NARA 1571 Archival Storage Standards.
- Grouped into classes according to **relative sensitivity** of materials: R. Buck, "A Specification for Museum Air-conditioning," Museum News Supplement 5. December 1964.
- Ranked by **level of control** required: ASHRAE Chapter 21. Museums, Libraries and Archives Design
- According to **Life Expectancy** of collections: ANSI/PIMA Standards for photographic materials.

Based on specific materials or similar groups of materials

- Similar chemical composition
- Similar mechanical properties
- Similar deterioration profiles

Grouped into classes relative to sensitivity of materials

- temperature
- relative humidity
- pollution
- light

Categorized by level of control required

- Identify level of control required by:
- Space conditions, or
- Mechanical systems

Assigned a Life Expectancy

- "The specific temperature chosen depends on how much the organization is willing to invest to achieve a given life expectancy for its records." (NISO)

National Information Standards Organization

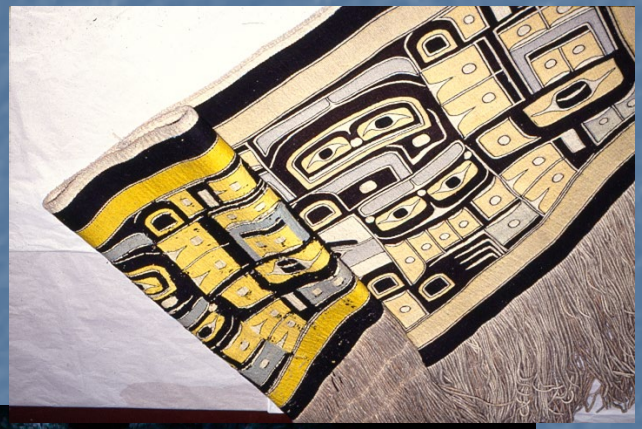
Environmental Guidelines for the Storage of Paper Records

William K. Wilson. A Technical Report Sponsored by NISO Technical Report 1. NISO-TR01-1995. ISSN: 1081-8006. 1995

Table 1. Suggested values for temperature and relative humidity.

Spaces	Temperature (°F) (Table 1.)	Relative Humidity (%) (Table 1.)
Combined stack and user areas	70 (maximum) [a.]	30-50 [b.]
Stack areas where people are excluded except for access and retrieval	65 (maximum) [a.]	30-50 [b.]
Optimum preservation stacks	35-65 [c.]	30-50 [b.]
Maximum daily fluctuation	+ / - 2	+ / - 3
Maximum monthly drift	3	3

…Not so Simple…

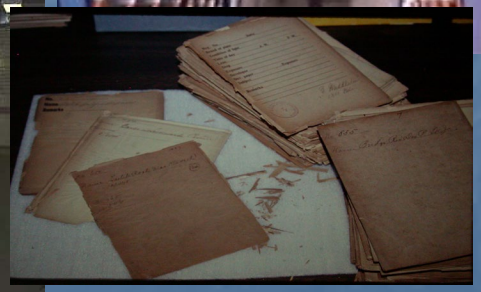


Trends: Artifacts and General Collections

- Allow more seasonal drift 30 – 50%
- Limit high temperature
- Provide specialized storage and display microclimates
- Buffer with enclosures

Trends: Paper Based Collections

- Lower temperature towards 50°F
- Lower relative humidity towards 30%
- Gaseous filtration
- Dense storage
- Housings
- Treatment

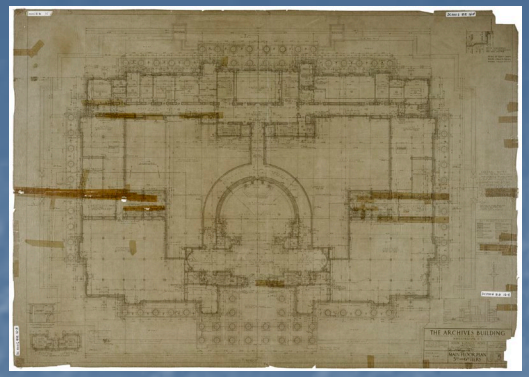


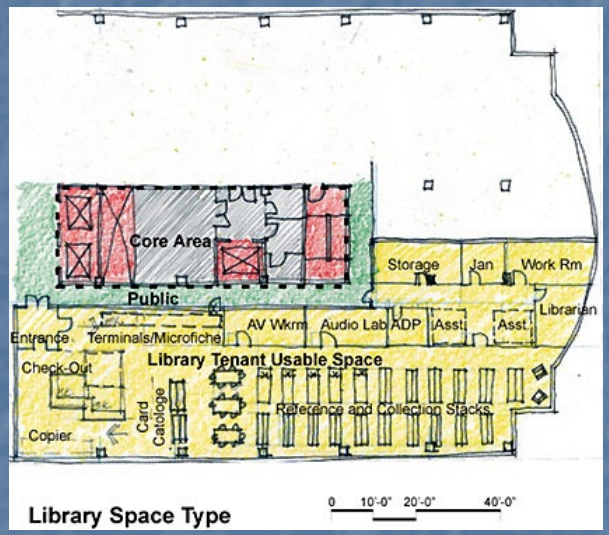
Trends for Audio Visual Materials

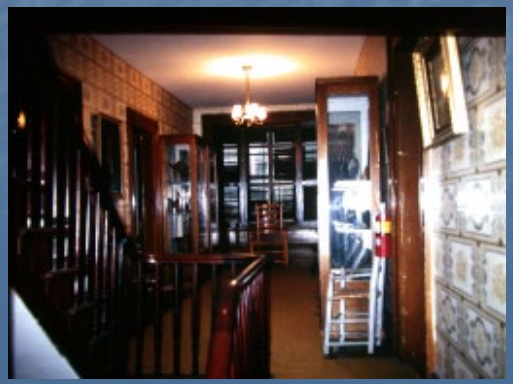
- Cool storage: 65 °F maximum
- Cold storage: 25 °F
- Lower relative humidity towards 20%
- Reformat most significant unstable media at greatest risk

Beyond the Tables: Issues Often Covered in Text and Notes

- Local conditions
- Seasonal drift
- Building design
- Experienced team
- Conservator involvement
- Constant control
- Sealed envelope
- Dedicated air handlers
- Humidification and dehumidification
- Zones
- Sensors
- Simple operation
- Ease of maintenance







Building Design

- Renovation or New construction
- Historic Structure: 1990 New Orleans Chapter for the Joint Preservation of Historic Structures and Artifacts, APT/AIC
- Mission
- Size of facility
- budget
- Location of holdings

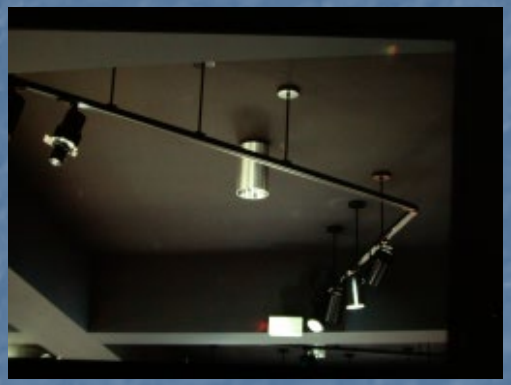
Dedicated or Occupied Space

- Occupant comfort
- Heat loads
- Separation of functions
- Ability to go lower

Vapor, Thermal Barriers and Pressurization

- Humidification
- Energy use
- Tight building
- Positive pressure
- Stability of environment

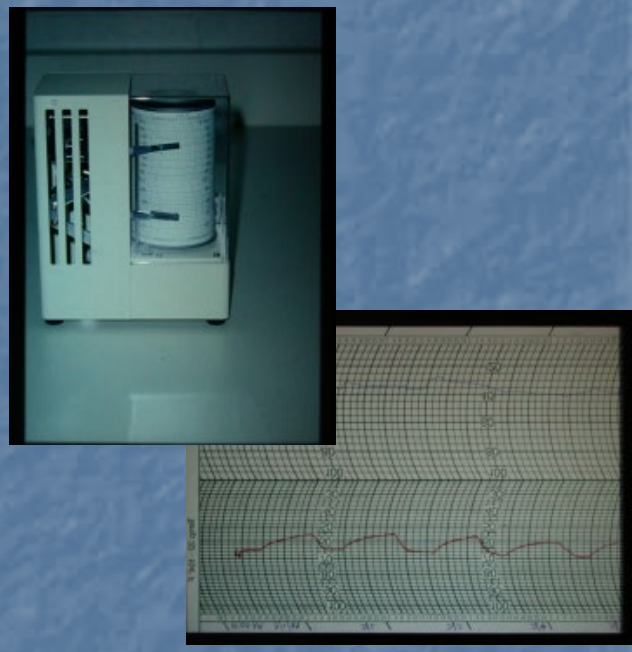
System Design Issues



- Specific requirements
- Heat load analysis
- Type of equipment
- Location of equipment
- Delivery systems
- Zones

Control Systems and Environmental Monitoring

- Building Automation Systems
- Sequencing of equipment operation critical
- Trend data
- Independent space monitoring
- Accuracy of data affected by sensors and location
- Smart Buildings BACnet and LonWorks



Energy Awareness

- 1977. Resource Booklet on Protection of Collections During Energy Emergencies. AAM Energy Workshop Planning Committee.
- 1989. Druzik, Ayres, Haiad, and Lau, "Energy Implications of Humidity and Temperature Control in Museum Environments," American Chemical Society.
- 1999. Conrad, "The Realistic Preservation Environment," NARA.
- 2006. Beyond the Numbers: Specifying and Achieving an Efficient Preservation Environment. NARA

Commissioning

- Google Search Results **1** - **10** of about **9,820,000** for **building commissioning**.

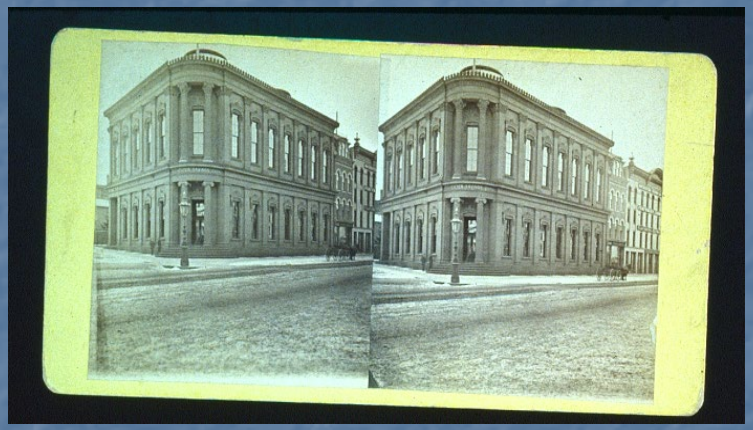
- "The Building Commissioning Association (BCA) promotes building commissioning practices that maintain high professional standards in accordance with the Owner's Project Requirements. To help achieve this, the BCA identifies two important categories of commissioning practices:
- The *Essential Attributes of Building Commissioning* consists of characteristics that the BCA considers fundamental to building commissioning. Written agreement to conduct all commissioning projects in accordance with these *Essential Attributes* is required for BCA membership.
- The *Valuable Elements of the Building Commissioning Process* includes recommendations to optimize the effectiveness of the commissioning process. The *Valuable Elements* are not membership requirements but are strongly recommended as valuable practices."

LEED® Green Building Rating

- Developed by the USGBC membership, the Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a national consensus-based, market-driven building rating system designed to accelerate the development and implementation of green building practices.
- Now LEEDS certification available for existing buildings
- http://www.usgbc.org/

Life Cycle of

- Building: 100 years
- Systems: 20 years
- Holdings: ? – infinity [1.]



1. Dependent of Preservation Environments

Standards Have a Life of their Own

- NARA Architectural Design Standards for Presidential Libraries

  http://www.wbdg.org/design/presidential_library.php