Storage Environments
Packing & Labeling Materials

Howard Wellman

Maryland Archaeological
Conservation Laboratory

Packaging Systems

- A complete packing system includes
  - container (bag or box)
  - padding (foam or tissue) or other physical supports
  - labels (interior and exterior)
- Additionally
  - buffering materials (pH or moisture)
  - scavengers (pollutant or oxygen absorbents)

Packing as Environment

- The storage environment includes the materials used to label, pack, encapsulate, or protect the artifacts.
- Proper material choice can have a positive effect on environmental factors, especially:
  - relative humidity
  - pollutants

Humidity

- Different materials have different moisture buffering capacity
- No microenvironment is permanent. The porosity of the container and the size and construction of the seal will affect the quality of a micro-environment.

Pollutants

- Artifacts can be degraded by
  - external pollutants, such as:
    - oxygen & other corrosion accelerants
    - volatile solvents
    - organic acids
  - inherent vice, such as:
    - moisture activated salt corrosion cycles (metals)
    - self-generating organic acids (organic materials)

Choosing Materials

- Start with the manufacturer's data - reputable dealers have data available
- Read the fine print in the supply catalogs
- Consult with colleagues on the track-record of materials in use elsewhere.

Packing Materials

- Good materials will:
  - Provide physical protection
  - Not contribute additional pollutants
  - Neutralize existing inherent vice
  - Scavenge external pollutants
- Bad materials will:
  - Not support the physical weight & shape
  - Add more pollutants to the system
  - Accelerate existing degradation

What does “Archival” mean?

- Archival is a generic term that suggests long-term stability, but there is no industry standard definition.
- Archival materials are
  - inherently stable (will not auto-degrade)
  - of known composition (recipes and formulations are known and consistent)
  - will not contribute to the decay of the artifacts
  - will remain stable 100+ years

Examples of Archival Materials

- Acryloid B72 - acrylic resin of known composition (ethylmethacrylate - methylmethacrylate co-polymer), and tested aging qualities
- “Virgin” polyethylene - PE is a stable polymer, “virgin” means there are no unstable additives (plasticizers or pigments), or recycled materials that might introduce instabilities
- “Acid-Free” paper - 100% cellulose paper with no natural lignins or acidic components
- Carbon-based inks - carbon does not fade or migrate.
- Epoxy or powder paints - do not release solvent vapors

Examples of Non-Archival Materials

- Shellac (used for labeling and mending) - a natural resin that discolors and becomes insoluble with age.
- Newsprint - wood-pulp based papers contain organic acids that will degrade the paper, and migrate to the wrapped artifact.
- Recycled polyethylene - plasticizers can off-gas organic acids, or migrate and stain artifacts
- Wooden crates and shelving - most woods release organic acids that can degrade metals
- Oil-based paints - used to paint shelving or walls, they off-gas volatile solvents that can degrade objects

Labeling Materials

- Labels are critical for maintaining artifact context
- They must be applied using stable materials that age well and will not damage the artifact
- They must be reversible
- The current museum standard is a background of Acryloid B-72 (an acrylic polymer) and India ink. For dark objects white pigment may be added to the Acryloid B-72
- NEVER use adhesive tapes - the adhesives are never stable, and leave residues
- Tags are an acceptable substitute, if they are of archival quality

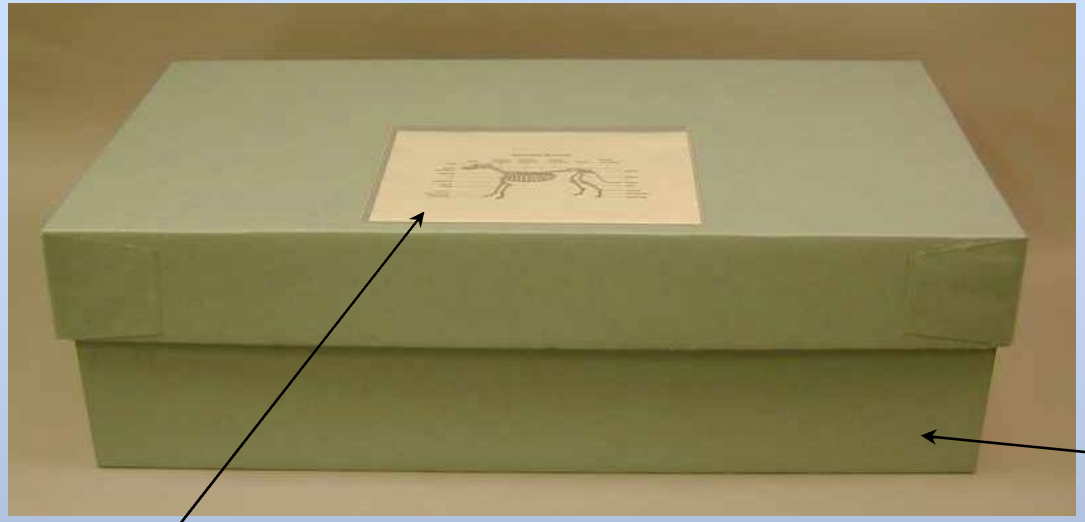
Testing Archival Materials

- There are simple tests to verify claims
  - pH pen for “acid-free” paper
  - The Beilstein test to test for chlorides in plastics.
- More complicated procedures to test unknowns include:
  - The “Oddy” Test for the release of volatile materials that corrode metals
  - Accelerated aging by exposure to intense UV light and temperature to mimic long-term use
  - Instrumental analysis

Verifying Archival Materials

- Constant vigilance is needed to insure that the materials one uses are archival.
- Just because the term “archival” is used or one has purchased materials from a supplier before do not assume the materials are archival. Manufacturers can change their formulas and contaminants may enter the materials.
- If possible test each new batch of materials purchased.

An Example of Good Packing



Acid-free Box

Labeling showing what the box contains to limit unnecessary access

Ethafoam “stops” to ensure that the bones do not move during transport