ALABAMA
DEPARTMENT OF ARCHIVES & HISTORY
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CONSERVATION LEAFLET

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CLEANING AND PRESERVING BOOKS

All organic materials are subject to deterioration. The rate of this deterioration in books is affected by the composition of the paper and binding materials, the processes used in their manufacture, and the adhesives used. The widespread problems with the deterioration of books began in the late 1880s when wood pulp, which is less expensive and more plentiful than cotton or linen rags, became the primary raw material for papermaking. As papermaking grew more sophisticated, the products became more acidic. Properties inherent in wood pulp and the chemicals added during manufacturing create an acidic condition that causes paper to turn yellow, become brittle, and eventually crumble. It has been estimated that books published today have a life span of less than fifty years.

Other factors that affect the longevity of paper and book bindings are temperature, relative humidity, light exposure, pollution, housekeeping practices (keeping books free of dust), and physical wear and tear. Over time, exposure to sunlight and fluorescent light causes a photochemical change in paper and bindings; this can result in fading or darkening, and it also initiates oxidation, which leads to further deterioration.

Acids migrate to materials with which they come in contact. Books stored on wooden shelving units absorb additional acids from the wood. This increases the rate of deterioration. Proper storage conditions are essential for the preservation of book paper and bindings.

We cannot change the quality of paper in our book collections, but we can address the environmental problems in book storage and display areas. Control of the environment is the most important factor in the preservation of paper. The purpose of this leaflet is to suggest methods for slowing the deterioration of book collections.

TEMPERATURE

The temperature of book storage and display areas should be maintained as consistently as possible on a year-round basis. Fluctuations in temperature cause changes in relative humidity. The relationship is inverse. As the temperature decreases, moisture in the air causes paper to expand. Conversely, as the temperature increases, less moisture in the air causes paper to contract. This expansion and contraction cause the chemical bonds in paper to weaken and break down. Rapid or severe shifts in temperature can be more harmful than a consistent but moderately high temperature. Try to maintain temperature at around seventy degrees Fahrenheit (plus or minus five degrees). An even cooler temperature is better, since every ten degrees of temperature doubles the rate of the chemical deterioration of paper.

RELATIVE HUMIDITY

Relative humidity in book storage areas should be maintained at fifty percent with a variation of no more than ten percent. As the moisture in the air increases, paper and bindings absorb it. Moisture moving through the fibers weakens the paper. A high relative humidity, combined with a high temperature, accelerates the chemical reaction within the paper fibers and causes further deterioration. A combination of high temperature and low humidity causes material to become dry and brittle.

From spring into fall, the most effective method for maintaining a constant environment is through air conditioning. If air conditioning is not possible, some practical and relatively inexpensive measures, such as fans, dehumidifiers, and/or humidifiers, can be used to improve the situation. Use portable dehumidifiers to maintain the relative humidity in the acceptable range. Dehumidifiers are only effective at temperatures above sixty-five degrees Fahrenheit; they will ice up below that temperature. Electrical refrigeration-type dehumidifiers are preferable. If possible, connect a hose to the dehumidifier and run it to a drain. If this is not possible, empty the dehumidifier daily as often as necessary. Keep humidifiers clean by vacuuming the louvers and filters and replacing filters as needed. If no other measures are available for improving humidity, an effort should be made to keep air circulating by using electric fans.

Mold and mildew may grow if temperature and humidity are not controlled. Mold and mildew stain, soften, and eventually cause paper to crumble. Mold begins to grow at a temperature of seventy degrees Fahrenheit, at a relative humidity of seventy percent. Improper air circulation also contributes to the growth of mold. Molds and mildews also grow better in dark, dusty areas.

CLEANING BOOKS

In addition to mold, insects are attracted to dusty books, particularly if they are stored in areas with poor air circulation such as bookcases or shelves. Over thirty types of insects are attracted to the cellulose in paper products and the adhesives in book bindings. Keeping books clean helps prevent damage from mold and insects.

If the tops of books are significantly dusty, a vacuum cleaner with a round dusting brush can be used to clean them while they are still on the shelves. Fragile books should not be vacuumed since pieces of the pages may be pulled loose.

Hand dust books periodically to keep them clean. Grasp the book firmly and tip it forward so the spine is facing up and the top edge is down. Hold the book tightly closed to prevent dust particles from being pushed down into the paper. Use a soft bristled brush to remove dust. If books are still dusty, use a treated dust cloth (such as One-Wipe, available at grocery and discount stores) to wipe the top edges of the book in the same manner as described above. Continue to clean all edges of the paper and the cover this way. These cloths may be washed and reused up to 20 times before losing their effectiveness.

Alabama Department of Archives and History
P.O. Box 300100
Montgomery, AL 36130-0100
http://www.archives.alabama.gov