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Issue 93 | July 2019

DETERIORATION: ENVIRONMENTAL VERSUS INHERENT VICE

By Karen DePauw, coordinator, IHS Local History Services

When talking about museum collections, we often discuss collection best practices (for more in depth discussion on best practices check out this previous CA article [Back to Basics](#)). But what exactly happens when we do not follow them? What happens when the collections environment is less than stellar? And, are there types of deterioration that happen despite our best efforts?

There are two main types of deterioration that affect historic items: environmental and inherent vice. Environmental deterioration is caused by external factors that are often preventable, while inherent vice refers to deterioration that comes from within, usually due to the raw materials or the manufacturing process used to create the item.



Light fading on fabric.

Many environmental factors can negatively impact items in the collection. Light can irreversibly fade textile dyes or photographic prints. Heat speeds up chemical reactions therefore shortening an items lifespan by speeding up its disintegration. And humidity fluctuations force materials to expand and contract creating tears, splits and cracks. By being mindful and creating the best environment possible for our collections when they are in storage or on display, we can reduce the risk of environmental deterioration.



LINE RESOURCES

[Collections Care Webinar Archives](#)
(Connecting to Collections)

[Session 4: Caring for Paper Collections](#)
(Northeast Document Conservation Center)

[2.4 Protection from Light Damage](#)
(Northeast Document Conservation Center)

FROM OUR LENDING RESOURCE CENTER

[The Care and Display of Historic Clothing](#)
(Karen M. DePauw)

[Collection Care: An Illustrated Handbook for the Care and Handling of Cultural Objects](#)
(Brent A. Powell)

[New Tools for Preservation: Assessing Long-Term Environmental Effectson Library and Archives Collections](#)
(James M. Reilly, et al.)

UPCOMING TRAINING AND PROGRAMS

[HVAC Installation, Renovation, and Collections Environments: An Introduction](#)
July 9 -
Connecting to Collections Care webinar.



Dissintegrating plastics.

Inherent vice, on the other hand, is deterioration that is much more difficult, if not impossible, to control. We may be able to slow it down through proper storage, such as keeping items made of synthetic, chemical-based materials in cooler storage to slow down the chemical reactions. However, the breakdown of chemicals begins the moment the item is made and can be slowed, but not eliminated. Plastic is a great example of this type of chemical deterioration. When an item made of unstable plastic, as most plastic items are, begins to break down it often becomes either sticky or brittle. This is caused by the deterioration of the chemical bonds creating the end material. While it is possible to slow this process down, it is not possible to stop it completely.

THE FARM CLINIC

of

...The United States...

Box 481 Phone 2301

HOME OFFICE

WEST LAFAYETTE, INDIANA

FARM CLINIC

Determines
Types of Soil
Methods of Water Control
Erosion Losses
Fertility Losses or Gains
Maximum Cropping: per
Field
Present Soil Fertility
Livestock and Feed Require-
ments
Recommendations

Mr. Allen Clowes
Indianapolis, Indiana

Dear Mr. Clowes:

Attached hereto is the clinical report and a five year plan of operation for the farm.

In obtaining this report, a soils specialist has gone over every square rod of the farm at least twice. He first mapped the soils with the results as shown on page 1. He then went back and took soil samples. The tests of which are shown herewith and checked the amount of loss of soil from erosion. From the above data, the crops suitable to the soils of the farm were determined and a plan was worked out by one trained and experienced in crop and farm management, in cooperation with yourself.

FARM

HOSPITALIZATION

Establishes
Proper Land Use
Proper Fertilizers
Pasture Improvement
Reforestation
Gully Control
Seeded Waterways
Livestock Program
Farm Accounting
Complete plans in detail
for profitable and
pleasurable farm operation

When this plan had been decided upon, the amount of the plant food needed for the proposed crops was determined. The amounts of the various kinds of plant food found necessary for the crops were compared with the amount previously found to be available in the soil. Such deficiencies, as found, were made up by writing the fertilizer formulas field by field. This information has been written on the crop maps for each of the five years. These maps are accompanied by an order sheet showing the annual amount of lime, fertilizer, grass and grain seeds needed.

The information given in the five land use maps is also written in narrative form and finally put in tabular form for study and ready reference.

Along with the narrative forms are numerous suggestions regarding seeding and harvesting.

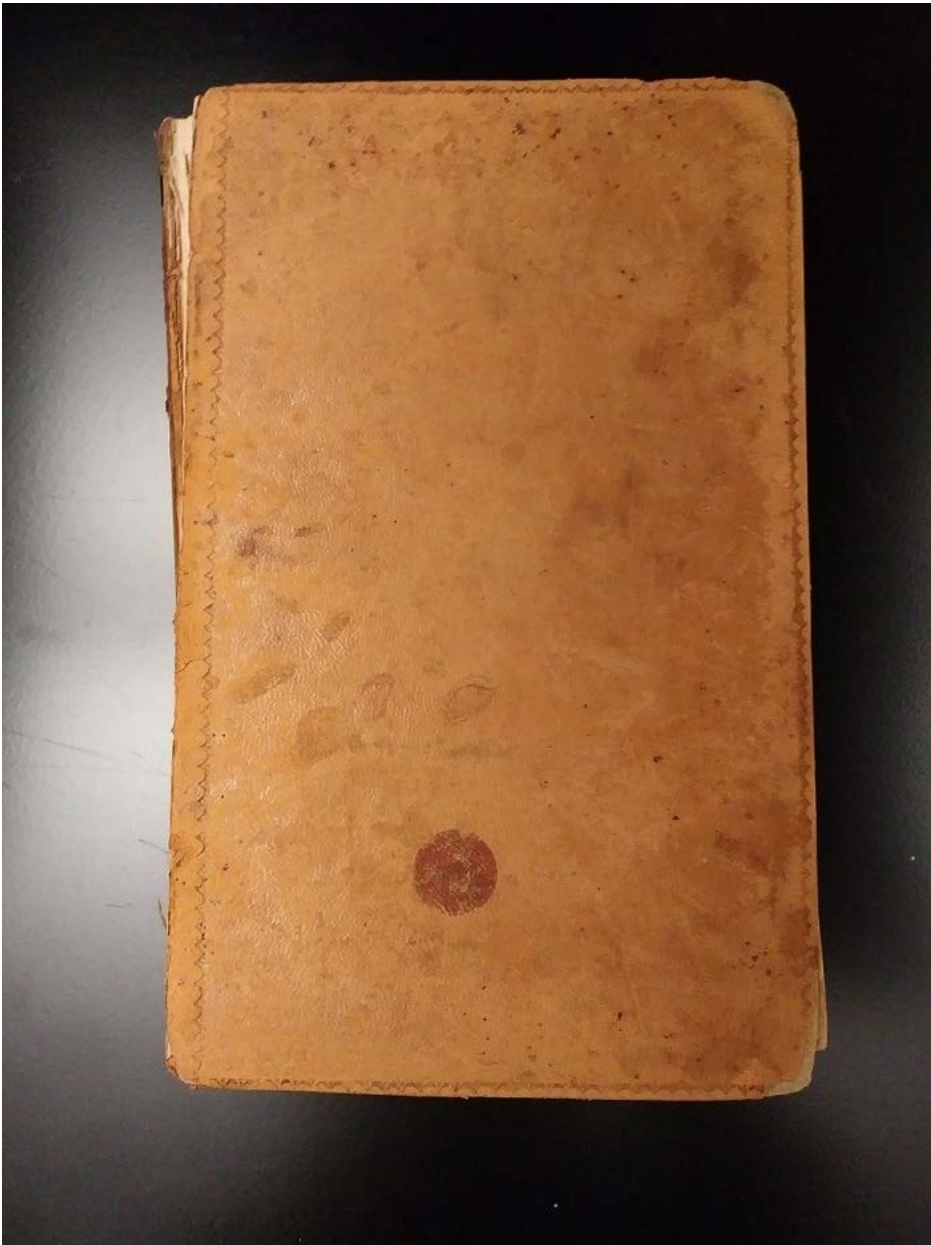
Under General Items, the kinds of seed best adapted to each kind of soil are given. This section also shows the fertilizer formula for each kind of crop.

"If You Lose the Surface You Lose All"

[Soil Conservation, Clowes Farm, Clinical Report and Operating Plan, n.d.](#) (Indiana Historical Society).

This chemical breakdown does not just happen in man-made items. The chemicals present in nature can cause an item to self destruct. For instance, cellulose in plant-based fibers contain a chemical that becomes acidic as it ages. This acid can stain other items. Some prime examples of this natural acidification are brown spots appearing on paper or on textiles that are housed in wooden furniture or cardboard boxes. Luckily this type of acid can be removed from cellulose, but it can be a costly and time-consuming process only undertaken by trained conservators. Leather fibers breaking down and turning into a red powder, known as red rot, is also a very common type of inherent vice seen in historic collections. It is particularly evident in books and manuscripts with leather covers. Unfortunately the only thing to do is try to keep the powder from staining other items.

Another form of inherent vice is when one material eats away at another material. Two recognizable examples of this are iron mordants for dyes and iron gall ink. In both cases the iron that was used to treat the wool before dyeing or to create the ink, eats away at the supporting material, whether that is wool yarns or papers. This can create places where holes appear in the exact shape of the portion that was disintegrated.



Leather bound book.

Every type of deterioration falls under the category of either environmental (handling, light, temperature, humidity, et cetera) or inherent vice (usually chemical in essence). It can be helpful to understand which type of deterioration you are dealing with for different objects as it can help you prioritize whether it is something you can affect by changing its environment or not. Knowing when an item is disintegrating because of inherent vice can help you prioritize its digitization if it is necessary to capture the item before it becomes too far destroyed. It can also help to prioritize its perfect storage environment in order to greatly slow down the deterioration process.

This is a free publication. Anyone may subscribe.

[Local History Services](#)
Indiana Historical Society, 450 West Ohio Street, Indianapolis, IN 46202
(317) 232-1882 | [\[email protected\]](#)

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