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Hearings on the Current State of Film Preservation

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TESTIMONY

The *Webster's New Collegiate Dictionary* definition of "preserve" includes the phrases "To keep intact, specif.: a. To keep from decaying." From my perspective as a scientist who studies the processes of decay in photographic films, one of the main issues confronting American film preservation is a preoccupation with duplication/restoration of a few films at the expense of the survival of the entire rest of the corpus. I do not mean by this to criticize the mandate to identify 25 nationally significant films each year, but rather to call into question the commonly accepted *definition* of "preservation" as the act of copying films from unstable nitrate and acetate base. As an example, in the Librarian's request from institutions for information about their preservation efforts in support of these hearings, the question was put in this form: "What are your major preservation accomplishments to date (specific information such as titles and numbers of feet of film preserved)?" Putting the question in this fashion implicitly equates copying a film and preserving it, as if there were no other way.

Except for human negligence and physical wear-and-tear, the causes of deterioration in film are rooted in the very nature of the materials of which it is made: cellulosic plastics, color dyes, and silver. We need preservation primarily because silver and dyes fade, and because acetate and nitrate plastics decompose. These are chemical deterioration processes, about which we now know the key facts. Most importantly, we can control the major forms of chemical deterioration through improved regulation of the storage environment. If we wish to mount a meaningful effort to preserve films, we must do a better job of addressing these root causes and stop devoting almost all our resources to correcting the symptoms.

New Data on the Storage Environment

The technical facts are plain in these matters; nitrate and acetate plastic films will chemically decompose at room temperature at a rate which (in archival terms) is unacceptably rapid, and which will lead to massive, unbearable costs if we try to keep up with it through a policy of duplication. I have attached to these written remarks two graphs which resulted from research at the Image Permanence Institute. The studies were funded by NEH and the Commission on Preservation and Access, with the assistance of the J. Paul Getty Trust. Figure 1 (derived from a three-year accelerated aging study) shows approximately how many years are required at different temperatures and RH's for the onset of acetate degradation, the so-called "vinegar syndrome". Figure 2 shows how long it would take for significant color dye fading to occur in a contemporary color motion picture negative film (in this graph the humidity dependence is estimated, but the temperature dependence is based on accelerated aging data).

We are forgetting the fundamentals and not using the technical facts to our advantage. For, as grim as the predictions are at room temperature, they offer impressive, even astonishing life expectancies at lower temperatures. The chemical processes of decay, including those in film already quite advanced along the path of deterioration, can be slowed to a tremendous extent.

The archetypal problem in film preservation has been chemical decomposition of cellulose nitrate, and the way the nitrate problem has been managed—through duplication—serves as the paradigm for dealing with today's even more threatening menaces, vinegar syndrome (cellulose acetate degradation) and color fading. We have learned to regard such deterioration as inevitable, which it is not; many hundreds of years of service are possible through lowered temperature storage.

Relative Costs of Storage and Duplication

In the absence of good storage, however, nearly every film in archival collections is a potential victim to one of these forms of chemical deterioration. Even the most casual glance at Figures 1 and 2, when joined together with the fact that a single feature film can cost $40,000 to preserve by duplication, will lead to the inescapable conclusion that for reasons of cost, preservation policy should emphasize prevention of decay rather than remediation of it.

Improved storage is much more cost-effective than living with room-temperature storage and attempting to keep up with advancing decay through duplication. It preserves the film in original form, with 100% of its image quality. If we have improved storage and are comfortable that the chemical processes of decay are safely slowed down to minimal rates, we then have the freedom to concentrate on film restoration, rather than a "body count" of numbers of feet transferred to save it from advancing ruin. Better storage can give us many years in which to go forward with activities which will make our film heritage more accessible.

Policy Emphasizing Better Storage Should Be a Top Priority

A formidable barrier to implementation of better storage is the initial high cost of facilities; this is where a national preservation policy can be immensely useful, creating funding mechanisms that at least make it easier to amortize and reallocate existing resources toward storage upgrades. The Library of Congress, as well as many other institutions, deserves help with upgrading its storage facilities as part of a coordinated national preservation program. Ten or even five years ago the technical data did not exist to support the conclusions I present here today. Now that we know with some assurance how much the life of collections can be extended by improved storage, we ought to act on that knowledge. It is by far the cheapest and the most broadly cost-effective policy decision we can make.

Figure 1

TIME CONTOURS FOR VINEGAR SYNDROME (FAHRENHEIT VERSION)

Predicted Time in Years for Fresh Triacetate Film to Reach 0.5 Acidity at Constant Conditions

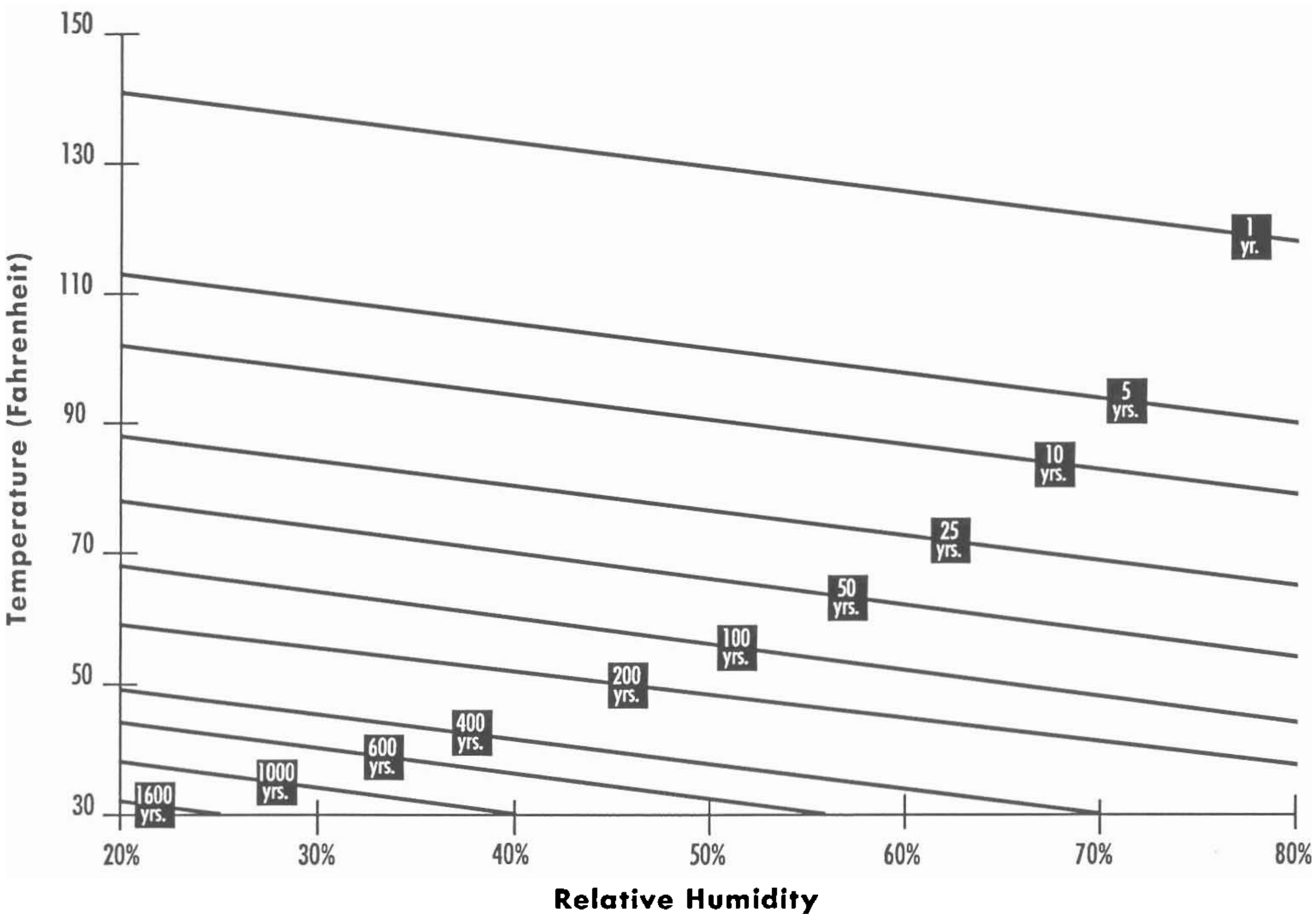
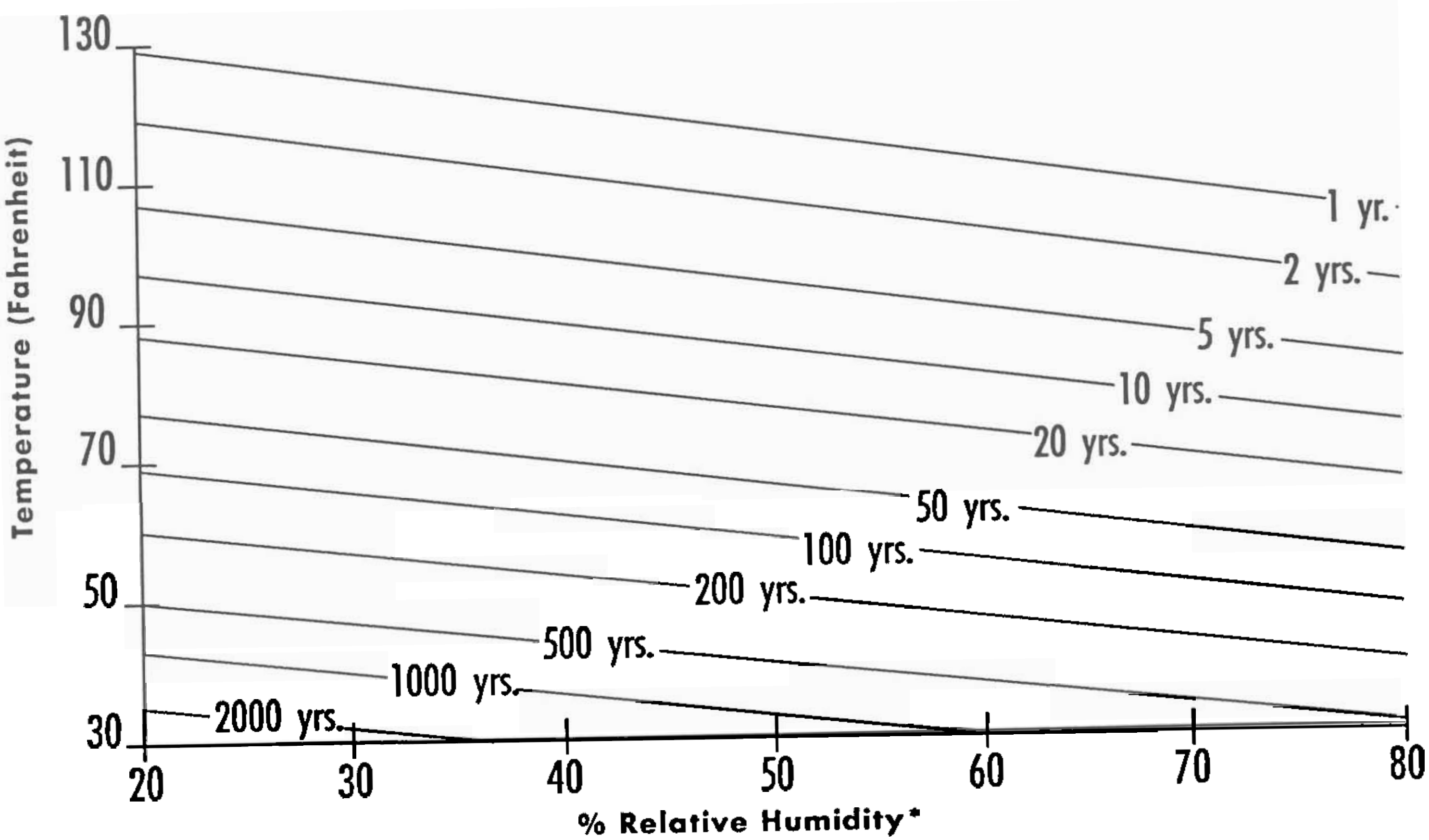


Figure 2

PREDICTED TIME TO REACH 30% CYAN DYE LOSS

In Eastman 5243 Color Negative Film



*Humidity dependence based on estimates in Kodak Publication F-40.