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Article: Survey of Acetate Negative Collections

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## SURVEY OF ACETATE NEGATIVE COLLECTIONS

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### Goals and Objectives

The existence of large numbers of early acetate negatives in many important photographic collections is considered to be one of the most serious and frustrating problems facing the caretakers of those collections. There is currently no reliable source of information or assistance to help begin to effectively deal with the problem.

This project will provide a firm basis for the appraisal of safety negative collections by surveying negatives in appropriate institutions, recording the data, and correlating observable deterioration, notch codes, and approximate date of manufacture. This information will be a valuable tool in determining the most critical periods and film types for these deteriorating negatives.

Existing sources will be searched and consulted. This will include published sources as well as interviews with individuals involved in the research, development, manufacture and distribution of photographic negatives during this period.

The completed survey and report will be an extremely useful tool for dealing with collections of safety negatives. It will present for the first time, a multi-manufacturer list of notch codes and dates. It will provide documentation for the specific location of diacetate film types and represented institutions can be contacted for updated information as these negatives are monitored.

### Background

In the 1920s film manufacturers slowly began the process of replacing the obviously problematic nitrate based negative stock with a wide variety of film bases all categorized as "safety" negatives. Although these developments represented a significant advance to the photographic film industry, they did not mark the end of film stability problems. Examples of deteriorated film have been found in many collections of negatives dating from 1930-1955. It is known that all cellulose ester base will exhibit chemical instability if stored at high humidity or high temperature. However, there is some evidence to suggest that some batches of safety film may be less stable than others. A survey of a statistically

significant number of film collections, stored under a variety of conditions, may establish whether this is the case and possibly identify such materials.

The most serious of these problems are caused by cellulose diacetate base film. Cellulose diacetate, one of several acetate variants used as a photographic film base, was used periodically as a base stock for almost 30 years. Other acetate esters, including cellulose acetate butyrate, cellulose acetate propionate, and even cellulose triacetate will also degrade given the correct conditions.

Degraded acetate film emits a strong odor of acetic acid and shows distortion and shrinkage. This high shrinkage causes the emulsion layer to separate from the base. The deterioration of these negatives may be rapid and final especially at higher temperature and humidity. Since this film is not flammable, it is not subject to the same low temperature/humidity storage requirements as for nitrate negatives. The properties of nitrate negatives are well documented and they are easily identified and isolated.

curators of these collections often cite cases where deterioration of these negatives has advanced rapidly, in months or even weeks, probably due to environmental changes. A collection of negatives could appear to be in good shape one day and almost useless the next time they are checked. In advanced stages of deterioration these negatives are unprintable and they are not useful without heroic restorative efforts such as problematic emulsion lifting and/or transfer. Important negatives on degrading acetate base require duplication if there is any detectable odor of acetic acid.

Degrading acetate negatives are interfiled in collections with other "safety" negatives on more stable film bases including triacetate and later, polyester. Curators and conservators are unable at this point to isolate them from collections until the deterioration becomes obvious. There is no reliable data or comparative study regarding the notch codes, date of manufacture and film types for all the film manufacturers. Film notch codes are cuts on the edge of sheet films that can be used to identify the film type, as well as to locate the emulsion side of the film. This form of identification is of course quite useful when loading or processing film in the dark.

### Existing State of Research

Accurate information on these negatives is simply unavailable even from the manufacturers. The patent office at Eastman Kodak is not able to provide consistent notch code and production information and other major film manufacturers have no records at all. Given the massive proportion of the the problem faced by curators and conservators, the basic and accurate information which will be provided by this survey will be essential for effective and prompt solutions and reasonable approaches to this problem.

### WORK ALREADY COMPLETED

The project already completed at the University of Louisville Photographic Archives surveyed a collection of approximately 100,000 safety base negatives for the period 1932-1954. 1500 samples were included in the survey. Data was recorded on worksheets including: negative number, date of exposure, manufacturer (machine number), observable deterioration, notch code, and film name if known. Notch codes were actually traced on the worksheet and later correlated with a chart to identify them by a number/letter sequence. For Kodak materials, this coding corresponds to the Eastman Kodak notch code records maintained by their patent office.

The data was input into a computer from the worksheets and then sorted by various combinations of data elements such as date of exposure and observable deterioration, or notch code and observable deterioration.

Although the sorted data from this survey is interesting and useful, it does not include manufacturers other than Kodak. There is also the possibility that this sampling could be skewed by the buying and consuming habits of the particular studio involved ie. large film stock inventory, business activity, etc. Another limiting factor for the data is the small number of film types encountered. A commercial studio uses certain film types only and not those preferred by portrait specialists, art photographers, or photojournalists.

PHASE II--PROPOSED SURVEY

Given these limitations coupled with the potential importance of this data, a larger and more representative sampling is called for. This sampling would include a variety of collections (museum, art photos, newspaper photos, and various commercial studio functions) which would yield a representative variety of film types, manufacturers, and formats for the period involved.

Selection criterion for collections to be surveyed include:

1. The existence of deteriorating negatives within a series of safety negatives dating from 1925-1955.
2. The chronological tie with each negative permitting the accurate dating of the sample. Since the computer will sort the data by date, the negatives do not have to be physically filed or surveyed in chronological order
3. Ideally the collection should contain a variety of manufacturers and film types

The following institutions and collections have been selected for the survey because of their importance and their applicability to the project. They have been contacted and have agreed to cooperate with the project and give it their full support.

|                 |   |
|-----------------|---|
| wasnington:     | Juley Collection (Smithsonian Institution)<br>Gottscho Collection (Library of Congress)<br>Historic American Building Survey(LC)<br>Frances B. Johnston Collection (LC)<br>Various collections, National Archives |
| Syracuse, NY:   | Syracuse University Archives:<br>Clara Sipprell Collection<br>Margaret Bourke-White Collection  |
| New York        | American Museum of Natural History<br>Museum of the City of New York<br>Columbia University, Paley Library  |
| Philadelphia:   | Temple University:<br>Philadelphia Enquirer Photo File  |
| Indianapolis:   | Indiana Historical Society Library:<br>The Martin Collection (Studio)   |
| Tallahassee, FL | Florida State Archives<br>Various Collections   |

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|----------------|---|
| New Orleans:   | Historic New Orleans Collection:<br>Clarence John Laughlin Collection |
| Tempe, Arizona | Arizona State University:<br>The Arizona Collection                   |
| Los Angeles    | UCLA Research Lib.Special Collections<br>The LA Times Collection      |
| Riverside, CA  | California Museum of Photography<br>Keystone-Mast Collection          |
| San Diego, CA  | San Diego Historical Society  |

### Methodology and Technique

The first stage of the project will be to assemble the material needed for the analysis of the collected data. This will include a thorough literature search in photographic science and engineering journals as well as discussions and interviews with individuals who were involved in negative base technology or who are especially knowledgeable on the subject. They would include Peter Adelstein of the Applied Technology Organization of Kodak, Carl Maalm, a former research chemist with Kodak, the editor of The Photo Lab Index and Peter Krause, a past-president of Ansco and later Ilford, and others.

The actual survey procedure will be the same as for Phase I. Categories of data will be added to the worksheet for film size, and base thickness. The collecting institution will provide a workplace and will assist in providing access to dating materials for the negatives (invoices, caption lists, chronologies of negative numbers, etc.) Appropriate techniques will be used to select a suitable sample from each collection surveyed on a site visit.

This survey is based on observable and measurable characteristics of the negatives without destructive testing. Occasionally, with the prior agreement and consent of the caretakers or curators, expendable negatives may be requested for further testing.

After the data is input using the computer facilities at the University of Louisville, the results will be sorted and analyzed. Experts on the history of film base manufacture will again be consulted to help summarize the data and assist in making recommendations. Photographic conservators and technicians including Tom Orth, Chris Young, Jim Reilly, and Doug Munson will also be consulted.

The final report will be designed to assist caretakers and conservators in their efforts to prioritize preservation considerations such as lower temperature and humidity storage, monitoring methods and duplication efforts.

Since various acetate formulations exhibit similar dimensional distortion, part of the report will include a discussion of the negatives and their distinguishing characteristics.

#### Dissemination of Results

The results of the survey will be available in a report which should be made widely available to conservators, curators and caretakers of these collections. It will include a section of recommendations and possible approaches to the problem including monitoring, restoration, copying and duplication considerations. Also, the report will include an extended bibliography. Preliminary results will be discussed in August 1986 at the Annual Meeting of the Society of American Archivists. Also, a paper on the project and its results will be submitted for presentation to the American Institute of Conservation Photographic Materials Group at its winter meeting in 1987. Copies of the complete report will be made available to the participating institutions. Other copies will be made available on request for the cost of copying.