

Photographic Media: Care and Handling

South Carolina Department
of Archives and History

**Archives and Records
Management Division**

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Introduction

Many South Carolina state and local offices house a “stash” of photographs and negatives. These images might not be heavily used, but the office does not usually want to discard them. Photographs can be very valuable records. Photographs can also overwhelm the custodian by their sheer numbers. Worse, they are rarely adequately identified. This leaflet provides guidelines on the identification and efficient handling of photographic media, focusing on the most common types of 20th century photographic media.

Many offices house 20th century photographs (positives or prints on paper), negatives, film, slides or transparencies. Earlier photographic processes are commonly represented by “case photographs” (usually daguerreotypes or ambrotypes and some tintypes), tintypes (on metal plates), cyanotypes (bright blue prints on paper), and albumin prints (usually yellow and brown thin prints mounted on heavy card stock). To identify photographic processes from the 19th and early 20th century, consult James M. Reilly’s *Care and Identification of 19th Century Photographic Prints* (1986). If you come across these in your files, talk with a conservator about the special requirements for their care and handling.





Silver Gelatin Prints

Black and white positive images, called silver gelatin prints, are remarkably permanent if they are on good quality paper. The images are made from light-sensitive chemical salts containing silver particles suspended in a layer of gelatin. They retain their true black and white appearance over time. If they are poorly processed in the dark room, handled with dirty hands, or stored in humid and hot conditions, silver gelatin prints sometimes take on a silvery sheen in the darkest areas of the print. Referred to as “mirroring,” this is the result of the silver molecules rising toward the top of the gelatin layer. It is irreversible, but it will stabilize if the photos are stored properly. As a rule of thumb, the older a silver gelatin print is the more stable it is, for processing was done more carefully in the early labs and paper quality was generally high.

Almost all photographs tend to curl. This is because a photograph is an object with three layers: the gelatin emulsion, a binder, and the paper (or substrate). Each layer absorbs water from ambient humidity and then gives that moisture off at different rates. The resulting expansion and contraction of these layers changes the layers’ shape and causes the photograph to curl. Curling can be prevented if photos are stored carefully. It can usually be corrected if the photo is gradually humidified and then gently flattened, but do not attempt to do this without instructions from a conservation specialist.

Prints on Resin-coated Paper (RC Prints)

As newspapers, magazines, and government agencies required more and more photographs as quickly as possible, the industry sought ways to speed up the process of making prints, creating a fast-drying print process using resin-coated (RC) paper. Originally clear and sharp glossy prints, the RC prints began to fade, losing detailed information. The fixing process was “quick and dirty”; chemicals were not changed as often as they should have been and prints were not handled carefully. Usually RC prints started turning reddish-brown, and fingerprints showed up as dark smudges. Stored in humid conditions, the emulsion layer got sticky, and these photographs tended to stick to one another. These problems did not really matter to the people who created and first used the images, since they used them quickly and stored them away — often in bad conditions. RC prints are not permanent; they will eventually fade. The negatives of these prints are probably more likely to survive if they are properly stored.

RC prints are common to any office that produced frequent publications (daily papers or weekly bulletins). They can also be found among engineering and insurance records, where projects were heavily documented with photographs.

Color Prints

Color prints are similar to black and white photos because they are objects with at least three layers, but the printed color image is made with a different chemistry. Instead of silver salts, the color images are created with colored pigments or dyes in a gelatin layer. All colors are



Color Prints *CONTINUED*

created from three basic colors and black. If you remember your early years in school, you were taught the three primary colors were red, blue and yellow; all other paint colors could be made from those three primary colors. In photography, the principle is the same, though the primary colors are slightly different hues on the color wheel. They are called Magenta (a deep pink/red), Cyan (a bright turquoise or blue), and Yellow. These are usually mixed with some black to make the colors in the images. Over the years these colors proved to be more or less unstable, depending upon the chemistry of the dyes and the quality of the paper substrate. Magenta tended to fade out first when the pictures were on display, while cyan would fade if they were stored in the dark. Combine the fugitive dyes with poor quality paper (much of it resin-coated), and the results have been devastating to an entire generation's pictures.

Kodak introduced its "Kodacolor" negative in 1941, and the widespread use of color photography grew rapidly. Both professionals and amateurs moved to the "magic of color" with enthusiasm. Although the manufacturers were aware of the problems with dyes and papers, they continued to sell the unstable color film and prints well into the 1960s. By the early 1970s the industry had quietly begun to develop more stable color prints. Not until the late 1970s, when customers began to file lawsuits against professional photographers, did the industry publicly acknowledge the problems.

What does this mean for you? If you have color prints dating from the 1940s through the mid-1980s, you are going to lose most of those images. If you have the negatives of these images, you might be able to save some of the images by having them printed now — an expensive process. If you hope to save the images by scanning them and enhancing the digital version, consult the section on digital photography. If you have truly unique and historically valuable color images, you should have them copied in black and white to save the information.

Polaroid Prints

The Polaroid Land Camera was introduced in 1947, and the instant color film for Polaroid cameras was put on the market in 1963. Polaroid pictures are used heavily by claims adjustors in the insurance industry to document damage. Government offices have made use of them frequently for identification pictures, insurance purposes (particularly after disasters), and as documentation for various types of projects: construction projects, cemeteries, archaeological surveys, geological surveys, and so forth.

Polaroid images are not permanent. Black and white prints fade. Color print dyes shift and fade within ten years, faster if they are exposed to light. All of the prints curl severely. The process creates no negatives from which to print new images, making the Polaroid image a unique information source on a very unstable medium. Put bluntly,





Polaroid Prints CONTINUED

Polaroid prints are a “dead loss” in the long term. Before you expend resources trying to capture the images, consult a records analyst or records manager to determine whether the record series containing Polaroid pictures must be retained permanently. In most cases, the record series will not be scheduled for permanent retention. If, however, you should happen to have permanently valuable images on Polaroid prints, you must have them copied as soon as possible.

Film

All films have the same basic structure. They are multi-layered objects: a substrate (usually a flexible plastic), a binder layer, and an emulsion, which contains the image. They may be black and white or color. Early black and white film is chemically unstable, as are color dyes unless they are stored at very low temperature and humidity levels.

Slides

Slides are usually images without negatives, and they are widely used because they are so cheap to produce. Offices that use slides usually have thousands of images. The slides are almost always working records projected for presentations or exhibits, but they may also be of enduring value. Unfortunately, the different types of slide film have special problems over time.

Fujichrome lasts longer if it is projected or exposed to light; but it does not hold up well in dark storage. Kodachrome fades quickly when it is projected, but it lasts well in storage. What does this mean for the office that creates and uses slides? Images of enduring value must be maintained in duplicate, and the creators must think strategically when selecting film for shooting and duplication.

If you have enough money, create duplicate sets (one master set and one projection set). The master set should be stored and used only to create new duplicates as the old ones wear out. Use Fujichrome slides for projection and exhibits. Use the Kodachrome set as the stored master. Be sure to have your master set made on slide duplicating film. Although it is an added expense, the quality of color and image in duplicates will decline dramatically if the duplicates are made from ordinary projection slides.

A cheaper strategy is to take multiple shots (at least three) of the same object or scene, using Kodachrome film. Mark the best image of the multiples as the master and store it in dark, cool, dry conditions in good archival enclosures. Use each of the other two sets for projection. When the second projection copy of an image begins to fade, it will be cost-effective to pull the master from storage and have that image reproduced on Fujichrome film for further exhibit. For digital alternatives, refer to the digital section of this leaflet.



Negatives All negatives have the same basic structure: a gelatin layer, a binder, and a substrate or support. As a result, all negatives tend to curl, so they must be stored flat. The larger the format, the clearer the print will be. The gelatin layer is fragile but stable if it is properly processed in clean chemicals. Negatives are described by the type of the support, which is also the primary source of preservation problems for most of them.

Glass Plates

The earliest black and white negatives were often put on glass plates. These were an ideal medium for professional photographers because the glass plates could be cleaned and reused many times. They were a large format negative, which captured precise detail. The images were of such clarity that professional photographers continued to use glass plate negatives for many years after the Kodak “brownie” camera was introduced with its flexible film-based negatives. Hence, it is possible for you to discover glass plate negatives in your office dating from the 1920s and 1930s. Glass plate negatives are truly archival materials. They will retain their image if they are properly handled. Their only disadvantages are weight and breakage. A collection of glass plate negatives usually comes out of a professional photographer’s studio, and they are almost always stored badly. (Wooden fruit crates were a popular choice.) Should you encounter a collection of glass plate negatives, consult a conservator about storage and handling. Minimal care involves storage in specially designed archival boxes that hold them upright and separated from one another. Large numbers of glass plates should be stored on sturdy shelving set on floors that can support heavy loads.

Cellulose Nitrate

The next major development in negatives was the creation of cellulose nitrate film, usually just called nitrate film. It was flexible, light, and could be easily cut to any size for any camera. Cellulose nitrate is an organic compound, first developed in 1889, which remained in use in various formats until the early 1950s. The formats or size of the film varied widely, but the most common sizes found in a government office settings are the 4 x 5 inch individual images, roll film, and motion picture film. Nitrate film is unstable, breaking down first to a sticky mass and finally drying to a powder. Nitrate film can also damage the rest of your film collection because, as it deteriorates, it gives off chemicals that contaminate and destroy the other films with which it is stored. The most serious problem is nitrate film’s extreme flammability. A nitrate film-based fire is a greater hazard because burning nitrate film gives off toxic gases, and once alight, it is very difficult to extinguish the flames.

How do you know if you have nitrate film in your collection? If you notice the smell of “rotten egg” in your storage area, you may well have deteriorating nitrate film. There are chemical tests and





Negatives CONTINUED

flammability tests, but both are somewhat hazardous. An examination of the film through polarizing filters (commonly found in children's chemistry kits) will determine whether a film is polyester or organic based, but this will not distinguish between nitrate film and its successor, acetate or "safety film." For some years, a few manufacturers notched the edges of safety film, or they printed the word "safety" on the edges of their negative film. If there is a notched edge, it probably is not a nitrate negative. If the word "safety" appears on the edge, it is not nitrate-based film. But remember that not all manufacturers printed that designation on their acetate film or notched the negatives. The safest way to determine whether you need to test your film stock is to know the dates of your photographic records.

Dates nitrate film stopped being manufactured, listed by format:

X-ray films – 1933

Roll films in size 135 – 1938

Portrait and Commercial sheet films – 1939

Aerial films – 1942

Film Packs – 1949

Roll films in size 616, 620, etc. – 1950 (used primarily by amateurs)

Professional 35mm Motion Picture films – 1951

Note that these are just the dates when manufacturers stopped producing the nitrate film in these formats. A professional photographic operation typically bought film in bulk and would use it gradually over a period of years. If you have photographs, medical records containing X-rays, or motion picture film (training films, for example), which date from this era, you may well have a serious preservation problem and a potential hazardous materials problem.

Nitrate-based films should be segregated, kept dry and cool, and replaced as soon as possible. Contact hazardous materials specialists for advice on their destruction. Contact the South Carolina Department of Archives and History if you want to have suspect film tested safely.

Acetate film

In the 1930s, after some disastrous fires in film warehouses, the industry began to replace nitrate-based film with new organic-based films. These were the cellulose acetates, often called "safety film."

While acetate films are not as flammable as nitrate film, they are still organic materials and are subject to deterioration over time. In the 1970s large collections of historically valuable negatives began to show signs of deterioration. As cellulose acetate breaks down, acetic acid forms, and the film emits a vinegar smell. In the later stages of deterioration, the plastic substrate begins to cockle and shrink. The gelatin emulsion forms large bubbles and then pulls apart, and the image quickly becomes impossible to reproduce.

How do you know if you have acetate film in your collections? Acetate film can be either black and white or color, and it had superseded



Negatives CONTINUED nitrate in all film formats by 1955. The first 35mm camera was introduced in 1948, and acetate was used exclusively in 35mm negatives. In fact, all 35mm negatives prior to 1980 are suspect, because they are likely to be acetate rather than the more permanent polyester film.

Polyester film

A preservation breakthrough was achieved when polyester-based film was introduced in 1960. This plastic is man-made, inorganic, and chemically inert. As far as anyone knows, properly stored and carefully processed polyester-based film is a permanent medium.

The images on all of these films are created in the gelatin emulsion layer. With proper handling, black and white images are regarded as permanent. The chemistry is simple and comparatively stable. Color emulsions, on the other hand, are far less stable because the color process is dependent on dyes, many of which were vegetable-based. Permanent retention of color film requires freezing temperatures and humidity levels below 35%.

Motion picture film

Moving pictures are the same materials as still negatives. Black and white film is more stable than most color film. Color motion picture films are the positives from negatives or internegatives, but most offices deal only with the final positive print of the film. Fujicolor film has proven to be the longest lasting. If you have a color movie film, the cost of reproducing it as a new film will be high because the lab will have to produce the internegative first.

With the introduction of videotape, video camera, and video player, motion picture films quickly disappeared from everyday use. Now these films are unplayable because the projectors are not available. If your office has motion picture film, you face some complex decisions. Refer to the section on care and handling for suggestions.

What to Do With the Photographs and Film

Identification of the Image The most time-consuming aspects of storing photographic media are identifying and indexing the materials. Purchase a light box to check the images on negatives and slides. Never write on the emulsion layer of film or on any part of the negative. Instead, write identifying information on the sleeves — before you put the photograph or negative inside the sleeve. The best system of identification is to establish a numbering system and put the numbers with the images. On a separate document, create a finding aid, and there list the identification number and the description. If you **MUST** write on the print, use a #2 pencil on the back in the upper corner, writing only on the white border area. If you have glossy, slick paper, there are special pens available from archival suppliers. Do not use ballpoint pen or felt tip pen. Press down as lightly as possible. Never write in the middle of





Identification of the Image *CONTINUED*

the back. The pressure of your writing will break down the emulsion layer on the other side. Never glue or tape a written description to the back of the photo. The adhesive will stain the paper, and the stain will migrate through to the image on the front. Adding insult to injury, the paper with the identifying information almost always separates from the print over time.

Still Photographs

If you are going to exhibit photographs, keep them out of direct sunlight, for the sun's visible and ultraviolet light will fade all photographic images. The light level recommended for exhibits containing photographs is less than 55 lux or about 5 foot candles. This is very dim, much darker than most offices and many shallow caves. You can increase the light levels in display areas if the photographs are expendable duplicates or if they are exhibited no more than a few weeks. Most black and white prints will last for a few years on permanent display if they are not in direct sunlight. Color prints will exhibit color shift and fade within a year. Since all light damage is cumulative and irreversible, any valuable image put on display should either be a duplicate or have a high quality negative. The cheapest and easiest duplicate is a good color photocopy.

Most photographs are not on the walls, though. Good storage enclosures and careful handling will allow you to maintain your black and white images indefinitely. These precautions will not stop the color shift on older color prints, however. Color prints will remain stable only if they are stored in freezing temperatures and 20-30% relative humidity. In other words, black and white prints can be permanent documents, but color prints are going to be lost without very expensive special storage that is unavailable to most government offices.

Choice of Enclosures for Storage

Select storage enclosures that are certified to pass the Photo Activity Test (PAT) described in American National Standards Institute (ANSI) standard IT9.2. Carefully read the catalog information for any enclosure you are considering. If the product description does not specifically state that the item passes the PAT, do not buy it.

Heavy Use

If the prints are handled frequently, plastic enclosures are the best option, since they prevent users from touching the photographs. You may safely use inert plastic sleeves: i.e., polyester (either DuPont Mylar D or ICI Melinex #516), polypropylene, or polyethylene. The polyester or Mylar sleeves are the most rigid of these and the most expensive, but they are also the clearest. Polyvinylchloride (PVC) sheets are sold widely for photograph storage, but they must be avoided at all costs. PVC is not chemically stable and will cause the photographs to deteriorate over time.

Plastic enclosures are available in many formats. Envelopes have heat sealed seams on three sides and are available in polyethylene and



Heavy Use *CONTINUED*

polyester from conservation supply houses. Folders are used within paper folders to prevent handling of the photographs. L-Velopes are sealed on two adjacent sides and work well for smaller formats, which can be tucked down into the corner of the enclosure. Sleeves are open at opposite ends, though some are made with a self-locking folded third edge. The self-locking edge style makes it easier to slide the photo into the sleeve, but it tends to catch on other photos when stored.

Ring-binder storage pages are available in a wide variety of styles to accommodate virtually every format of photographic print. Some are even designed with sleeves for paper labels on which you may write identifying information. Others have areas of “frosted” plastic on which you can safely write information. Try to avoid mixing different size formats within an album. If you must do so, add pages of stiff support paper or boards between every few sheets of plastic sleeves. This should reduce the pressure on the images. Albums of truly archival quality are very expensive, but they are worth it for permanent collections.

The most expensive storage enclosure for individual prints is the polyester sheet and mat board folder. A polyester sheet is attached along the long edge to a museum quality mat board of the same size. This format provides excellent support for photographs, and it should be stored flat in boxes designed specifically for archival photograph storage. It is recommended only for very valuable or extremely fragile prints.

Low Use

Paper envelopes can be used to store photographs that are not handled frequently. Use envelopes that have a thumb notch cut at one end, to make it easier to grasp the photograph. You may select either seamed or seamless types. Seamed envelopes are less expensive and quicker to fill, but they do have a strip of adhesive along the seam to hold the envelope intact. This seam might form a ridge in the photographs stored in them. Seamless envelopes have no adhesive or ridge because they are four folded flaps.

Paper envelopes have three advantages over plastic: they block light; you can write identifying information on the envelope (BEFORE you put the photograph inside it); and they are less expensive than plastic. They have two disadvantages, however. (1) The photos cannot be viewed unless they are pulled out of the envelopes, and this will cause some wear and tear on the image. (2) Users must wear cotton gloves when handling the photos. Cotton gloves do not fit well, and users want to discard them because they are awkward. If the gloves are not readily available, it is very easy for a user to “skip it just this once.”



Least Expensive If you have many hundreds or even thousands of photographs, you may not be able to afford paper sleeves for them, much less plastic sleeves. The least expensive option for print storage is to keep them in paper folders. Simply fold a sheet of paper and place one photograph inside it. You may store five or six prepared photos inside an archival quality file folder. The files may then be stored horizontally in archival flat document cases or vertically in file drawers if you have adequate support for the files. If you have staff members who will keep their files in good order, you can use a standing file system, bolstered by stiff support boards spaced every twenty or thirty files. The files should be snug enough to prevent curling at the bottom of the drawer. Remember that all files and support boards should be of archival quality. Some archivists recommend hanging file systems because they will not curl in a drawer as readily. No hanging file folders of archival quality are available, however. Store images of like size together as much as possible, and do not overfill the folders, the drawer, or the box.

Polaroid Prints These are not permanent images, and they have no negatives. The image quality is often very poor. Consider the value of the images before you make the effort to retain these records permanently. If they are unique and historically valuable, you will have to have copies made. Scanning them into a digital format may be a viable option, but refer to the digital photography section for further considerations.

Negatives Since most negatives are not regularly pulled for review, it is relatively easy and inexpensive to store them. If you have a large print collection for which you also have the negatives, you have more preservation storage options.

Avoid the glassine paper commonly used by professional labs. Be sure to select only sleeves that are designated to meet the Photo Activity Test (PAT). Store like size negatives together. Light Impressions, a photographic supply company, offers an excellent storage system for negatives, consisting of sleeves, envelopes and boxes, called the Negagard Kit (www.lightimpressionsdirect.com). Relatively inexpensive, it provides excellent storage for large numbers of negatives. You can then choose to store your prints of these negatives in less expensive file folders or notebooks.

If you possess only a collection of negatives without prints, the least expensive strategy for printing them can also help you create an inexpensive index system. Have a photographic lab create contact prints. These are prints made by placing the strips of negatives directly on an 8 x 10 sheet of printing paper and exposing them. The prints made are exactly the same size as the negatives. If you are using 35mm negatives, you get dozens of images for the price of one 8 x 10 print. These contact prints are then used as thumbnail prints attached to informational cards in a file. Users review the cards and, using an eye

Negatives CONTINUED loop to check the image, they can select the images they want to have printed. It is a remarkably cheap and easy reference system. You need only expend enough to house the negatives in proper archival enclosures — making sure that you have marked the enclosures with the correct identification code.

Always wear clean cotton, lint-free gloves when handling negatives. Fingerprints contain oils that harm the emulsion layer, and fingerprint marks can be removed safely only by a qualified conservator.

Slides There are different strategies one can use to store slide collections. You must decide first whether the images are permanently valuable. Then you must be ruthless in selecting the best quality images.

One approach is to create the original set of slides in Kodachrome. Select the best and most valuable images, and have only those duplicated in Fujichrome for exhibit. You must create duplicating masters on slide duplicating film, however. Otherwise, the images will be dramatically poorer in quality. Place the original Kodachrome images in storage and use them as masters when the exhibit slides wear out.

A less expensive approach has already been mentioned: multiple shots. Take several images of the same object or view. The master copy will be the best, most representative view. When the duplicate views have worn out, create a new projection slide in Fujichrome. You can be certain by then that the image is both good quality and useful enough to be worth the expense of a master copy.

If you have hundreds of images, a more cost-effective option might be the creation of intermediate duplicates on slide duplicating film. This will be relatively cheap (about 10 cents each), when you duplicate many slides. One state parks project chose to make a complete duplicate set for a large folklore study heavily documented with slides from several parks across the state. They needed the slides for exhibits specific to each of the parks, and they split up the exhibit copies geographically. The master set was kept at the South Carolina Department of Archives and History where the public could obtain access to the entire body of work and where the parks system could obtain duplicates as their originals wore out.

Motion Picture Film Motion picture films must be stored flat in good quality containers, not on edge. If you do not have enough room to store film canisters on the flat, you will have to rotate the containers annually. Over time, gravity causes the film (or video tape) to “droop” on the core, stretching it. Ideally, film should be stored not on reels but on cores, but this is rarely done. Replace rusted film canisters. Older plastic canisters may not be chemically inert and should also be replaced.





Motion Picture Film **CONTINUED**

Always handle film while wearing clean, lint-free gloves. If you play these films on a projector, be sure it is properly maintained. If you cannot obtain a projector, there are services available that will convert the film images to videotape or DVD. Not all of these firms can handle all film formats. Most are set up to duplicate amateur films that are 16mm wide. Professional motion picture film prints are usually 35mm wide. Fees for the conversion services usually run from \$20 to \$75, depending on the length of the original film. This fee does not guarantee careful handling of the original, however. If you have a historically valuable print that is unique, you should use a reliable firm familiar with archival practices. Check with the staff of the University of South Carolina's News Film Archive for vendors of these services (www.sc.edu/newsfilm/). One service vendor recommended by many conservators is VidiPax, 450 West 31st St., 4th floor, New York, NY 10001, phone 212-563-1999 ext. 101.

Digital Photography

Digital cameras are now priced for the mass market. Professional photographers are moving to entirely digital operations. The prints created by photographers look the same, but the photographer does not work from negatives created with the detail of light exposure directly on emulsion. Digital originals are stored on CDs, on Zip drives, or in computers.

There are serious problems with this technology. It is changing rapidly, constantly driven by the mass market. Cameras that save images on floppy discs or on computer chips built into the camera start at about \$250. The high-end cameras start around \$5,000-6,000 and use memory sticks — this year.

The low-end cameras produce images of very low resolution, and you will be disappointed with the images if you plan to publish them or if you need detailed information in the images. To get sharp, detailed images, you must use high-resolution originals, which require more expensive cameras and more memory in your computer to manipulate the images.

Digital technology is software and hardware dependent. All digital cameras use software to download the camera's images and produce a picture on the screen which can be saved to the computer's hard drive, CD, diskette, or to a printer. The software is proprietary, and you may find that your images are lost when you upgrade your digital camera — and you will. Delivering the large files of high-resolution images requires high-speed servers and broadband Internet access.

Printing digital images in color presents another major problem. The printed image can be changed radically by the available printer. Many office printers print only in black and white, so obviously, color images cannot be duplicated clearly. Color printers in most offices cannot duplicate true images containing natural color. Less expensive color printers also have limited memory for color selection. The printer's



Digital Photography
CONTINUED

software reads a color from an electronic image and selects the closest hue available in its color palette. The printed results can produce startling changes. If you must have accurate color, you will have to spend several thousand dollars for a high quality color printer, and add the cost of glossy paper to make the print look more like a photograph.

**Duplicating Prints
in a Digital Format**

Those problems listed with digital photographs also apply to any digital copies you make from photographic prints. Substitute the problems of scanners for cameras.

The proliferation of scanners for mass-market consumption misleads many people into thinking that scanning images is the perfect, low-cost solution for preserving their photographs and slides. The problem is that most of these low-end scanners cannot provide adequate resolution for detailed images. Low cost mass-market scanners copy images at a low resolution because greater resolution and true color recognition require greater memory. Most scanners scan images at a resolution adequate for projection on a small screen — 72 dots per inch (dpi). This will produce a reasonable small picture on a computer screen at 100%, but this standard is designed for speedy downloads as email attachments. Try enlarging one of these photos for more detail, and the image becomes distorted squares of color — “pixilated.”

To make adequate digital copies of historically valuable images, you must scan them at 250-800 dpi, depending upon the content and your user needs. The scanner will need a software package that allows you to adjust the size of the image, the number of pixels, and the color to get an accurate, usable reproduction. To save these images, manipulate them, and create usable thumbnails, an expensive software package like Adobe Photoshop is required. The scanner will cost about \$1,800, and the Photoshop package will run in the neighborhood of \$800. You will also need a PC with large amounts of memory to run the programs and save the images. Finally, if you have hundreds of pictures that are heavily referenced, you will have to store them on a special server or on many, many CD-ROMs.

Add to this the database you will require to keep track of these images. This is the great drawback (and strength) of digitized images.

Hundreds or thousands of digital images cannot be stored in a box or a drawer like paper or film prints. A would-be user cannot simply leaf through digital files. Digital photographic files need a carefully designed, searchable database as a finding aid. The database must be searchable by subject, and it usually stores “thumbnails” or small images linked to a large image that provides the detail the user wants.

If you have no more than fifty images to copy, you can probably put them on a CD-ROM with enough detail to satisfy most users. Digital copies may be cheaper than having photographic copies made in this





Duplicating Prints in a Digital Format **CONTINUED**

case. Many professional photographic studios can do this for you. But the photographers cannot create a database to control hundreds or thousands of images. Therefore, if you have more than a hundred images, it is still cheaper to store your original photographs and negatives and handle them carefully. If you want to use computer technology wisely, invest your time and money in creating an automated finding aid or database that will help you search your images by subject. Then, when digital imaging technology does become cheap enough to scan high quality images quickly and inexpensively, you will be ready to set up an image file that is fully searchable.

Resources and Recommended Reading

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- Public information leaflets from the Archives***
- no. 1 *Legal requirements for microfilming public records* (1992)
 - no. 2 *On choosing records for microfilming* (1998 revised)
 - no. 3 *Service bureau or in-house microfilming* (1992)
 - no. 4 *Targeting and certification of microfilm* (1996 revised)
 - no. 5 *Choosing a microfilm camera* (1992)
 - no. 6 *Quality testing of microfilm* (1998 revised)
 - no. 7 *Microfilm and microforms* (1992)
 - no. 8 *Choosing a micrographics service bureau* (1998)
 - no. 9 *Choosing microfilm readers and reader/printers* (1992)
 - no. 10 *Computer assisted retrieval systems* (1992)
 - no. 11 *Microfilm storage* (1992)
 - no. 12 *Preservation microfilming* (1992)
 - no. 13 *Public records stored as digital images: policy statement and recommended practices* (2003 revised)
 - no. 14 *Storing records in the State Records Center* (1993)
 - no. 15 *The deposit of security microfilm* (1993)
 - no. 16 *Disaster preparedness and recovery in state and local government records offices* (1999 revised)
 - no. 17 *How to conduct a records inventory* (1993)
 - no. 18 *How to establish records retention schedules* (1993)
 - no. 19 *Photographic Media: Care and Handling* (2003)
 - no. 20 *Editing and splicing roll microfilm of long-term or archival value* (1994)
 - no. 21 *Managing e-mail* (1998)
 - no. 22 *Standards for microfilm service bureau certification* (1998)
 - no. 23 *Sample e-mail policies* (1998)
 - no. 24 *Storage and handling guidelines for maintenance of electronic records of long-term or enduring value* (1999)
 - no. 25 *Preserving evidence: recommended practices for creating and maintaining legally-admissible records on automated systems* (1999)
 - no. 26 *Managing public records on web sites* (2002)
 - no. 27 *Guidelines for the conversion of digital images to microfilm format* (2003)
 - no. 28 *Time Capsules Old and New* (2003)

* These leaflets are available electronically through our WEB page at www.sc.state.us/scdah/techlflt.htm#leaflets

