



Article: PHOTOGRAPHIC DUPLICATION AND THE CONCEPT OF REVERSIBILITY: A CALL FOR STANDARDS

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PHOTOGRAPHIC DUPLICATION AND THE CONCEPT OF REVERSIBILITY:
A CALL FOR STANDARDS

Throughout the history of photography there has always been an occasional need to produce duplicate copies of existing original negatives. In the nineteenth century, when prints were made by contact printing full-size glass plate negatives onto one of the slow speed printing out papers, such as salted paper, albumen paper, or one of the P.O.P.'s, duplicate copies were frequently needed whenever a larger volume of printing was required than could be produced from one original negative, and, because printing was nearly always done by contact, duplicates were usually required whenever a change of print format was desired.

But the concept of duplicating for preservation was not unknown either, for it was commonly recommended to duplicate glass plates to protect them from accidental damage or loss.

Today, very little printing is done on any of the vintage media printing-out papers, so the first two occasions for duplication retain little of their urgency. However, the necessity for duplication for image preservation looms even greater today, for the spontaneous deterioration of original negatives has added itself to the list of motivations.

The mechanisms and effects of the deterioration of collodion wet-plates, gelatine dry-plates, and nitrate and acetate films have been widely discussed at these meetings and elsewhere. My concern here is not to justify the need for duplication programs, nor to discuss how an institution might go about defining such a program from a curatorial point of view. These topics have been well addressed already.

Duplication as a preservation tool for negative collections has been in ever increasing use for nearly two decades. And it is time we address establishing specifications for this work, so that it can truly be considered image conservation and have the same code of ethics applied to it as we apply to the conservation of photographic prints and negatives as objects.

The relative merits of producing new negatives via a print and copy negative system, via a direct duplicate or a reversal process film system, via the two-step interpositive/duplicate negative system, or even via a digital interface have been widely discussed, and it is fairly unanimous that, from a preservation point of view, the traditional film interpositive/duplicate negative system is by far the preferable preservation medium.

I stress the word preservation here, because we sometimes confuse the concept of preservation with concepts of access. While there is no more subtle and pleasing access to a photographic image than through a photographic print, and while there can be no easier access to large, or even overwhelming, quantities of photographic imagery than through an electronic data base, it must be remembered that both prints and digital files are access media, not preservation media.

In this age of rampant deterioration, duplicating programs for negatives collections whose longevity is in serious doubt must be conceived as true preservation programs - that is, firstly, they must be highly accurate; secondly, they must continue to be readable under any circumstances; thirdly, they must be indefinitely stable; and, fourthly, they must be reversible.

A traditional, silver based film interpositive goes furthest toward achieving all these goals. A film positive can exhibit a simple and nearly linear response and can regularly achieve information densities as high or higher than the original being looked at.

Being an analog in human readable form, it will be impossible to lose access to it because of system failures, hardware obsolescence, or software failures and obsolescence. We are currently so awed by the power and new sophistication of digital technology that we forget that it is a market driven technology, and market driven technologies have rarely, if ever, been known to evolve in manners which guarantee access to their earlier forms. To the contrary, they thrive on obsolescence. On this topic I call your attention to Jeff Rothenberg's article in the January, 1995, issue of *Scientific American*. Rothenberg, a senior computer scientist in the social policy department of the RAND Corporation, is very pessimistic about his future grandchildren's abilities to read any digital documents he might leave for them. With Rothenberg, we, too, must be very cautious about proposing digital media as a first order preservation tool.

On the question of archival stability, there are, of course, few, if any, doubts relating to the long term stability of properly processed, properly stored polyester base silver films.

The fourth requirement of a preservation medium, that of reversibility, has been given little thought in its relation to duplication, even though the idea is ever present in the minds of print conservators. In a duplication program, the concept of reversibility refers to our ability to reconstruct the exact characteristics of an original negative, even if that negative no longer physically exists.

As photographic historians and as printers of historic negatives, we at the Chicago Albumen Works are perhaps particularly sensitive to this issue, but it is not an issue restricted to the confines of our particular laboratory. It is an issue which, if not attended to, will cause the continuing degradation of the very images we are intending to preserve. And it is not an issue which requires vast energies to address. Consequently, there is no reason to plague the future with our inattention.

What are the appropriate materials and methods to use when the goal is to elevate mere duplicating to true image conservation?

The making of film interpositives centers around two systems and two related films. The first, and still most common system, is based on making exact size, contact exposures using a film such as Agfa P330p, which has characteristics similar to the recently discontinued Kodak Separation Negative Film, Type I. The primary design of these films was for the purpose of making tri-color separation negatives from color transparencies as part of the dye transfer printing process, and the films possesses nearly every characteristic one would want in a black and white interpositive film.

The high density range of color transparencies required separation films to have a very long and linear tonal scale. For separation work it had to be panchromatic, which, of course, turns out to be essential for stain reduction in duplicating historical negatives. For dimensional stability, these films are coated onto 7-mil polyester film base, with a gelatine anti-curl backing.

Because making color separations usually required enlargement, such separation films were camera speed films. And here in lie their limitations as duplicating films. Even

though it has excellent grain structure, resolution, and sharpness characteristics, it was not designed as an intermediary film from which great enlargements should be made.

Quite the contrary is true for the film used in the second system, the optical roll film duplicating system. This film, called Panchromatic Duplicating Film, originates in the motion picture division of Eastman Kodak, and, like its sheet film cousin, was designed to produce tri-color separations from color originals. But unlike its cousin, it had to be designed capable of extreme enlargement without interfering with the image exposed onto it. So the speed versus image quality trade-off was allowed to go in the opposite direction - excruciatingly slow film speed in return for stunning grain, sharpness, and resolution characteristics. It is a film intended for contact exposure, from which great enlargement can be made.

It is available in various roll film widths from 35mm through 5 inches. It is coated onto a medium weight polyester base, but, being a motion picture roll film, has no gelatine anti-curl layer.

Panchromatic Separation Film has nearly everything one might want in terms of tonal scale and image structure. So what are its drawbacks? One problem is exposure. Since it is a slow contact speed film, not a camera film, the illumination levels required to expose interpositives severely tax a camera system, especially when any color filtering for stain reduction is required and/or when significant camera bellows factors are encountered. Incandescent illumination would be quite dangerous to use because of heat buildup, but even the most powerful strobe units sometimes cannot deliver enough output to make proper exposures from original negatives which exhibit any more than normal base-plus fog levels.

Unfortunately, we frequently run into negatives whose thinnest shadows have more density than do a normal negative's highlights. And even with strobe exposure we have occasionally seen a blurring phenomena in the corners of some interpositives which can only be explained in terms of thermal expansion of the original film negative during the short strobe exposure. This has happened with light-weight nitrate base negatives where the mass of the film base is low and cannot dissipate as easily the energy absorbed by the dark image layer during exposure.

So, while they are the best we have, neither of these systems and neither of these films is fool proof. Using the correct materials and methods will never guarantee success; they will allow only the possibility of success. Thus specifications for image conservation projects must define not only the materials to be used, but, as well, how they are to be used.

In optical systems, as one moves to reproduction ratios below 50%, one encounters Jim Reilly's "Real Estate" phenomena - you are just not buying enough film for your needs. And if you go the other way and try enlargement ratios beyond 100%, your equipment and technicians are perched atop a pinnacle of perfection so steep that they are bound to slip off sooner or later, or even regularly. In our experience, a 1:1 duplicating system is easiest to control, whether it is a contact system or a 1:1 optical system.

Any system for producing film interpositives for preservation can be likened to trying to maintain a perch atop a steep sided pinnacle, where the first step in any direction leads to compromised technical quality. There is little performance plateau.

While film interpositives can produce the best matrix for archival image preservation, unless very rigid specifications

are adhered to in their production, their quality will suffer. It is for this reason that I propose we work to the establishment of explicit specifications for the production of film interpositives, and, correspondingly, for duplicate negatives. I know that most, or even all, of us in this room who do duplicating regularly maintain the highest standards, but I also believe there is little flexibility in these standards, so we would be risking little of any proprietary nature if we codified and published them.

And the field as a whole would gain a lot. I am reminded of the curator who brought us a completed project done by another vendor and asked, "Are these right? I can't see the image on the film positives, they're too dark, and I wanted to use them as reference prints." Well, no, they were not right, but the curator had no information to help him make a quality control judgement (the positives were, indeed, grossly overexposed), and he only questioned the product because he wanted to use the positives for what was, ironically, an inappropriate purpose.

Specifications will allow curators and archivists to know what to ask for from any vendor and they will offer both vendors and clients the ability to do quality control on an objective, informed basis.

There are some specifications already in circulation. The ones we see most frequently come, either directly or indirectly, from the Prints and Photographs Division of the Library of Congress. Prints and Photographs Division has done excellent work in both defining how a duplicating project should be performed, and how it will be analyzed for quality control.

But there is room for improvement, and I believe the topic should be addressed and furthered by the Photo Materials

Group. Curators, vendors, and in-house providers of duplication services have the combined knowledge and expertise to establish and adopt standards and specifications for duplicating which are precise, attainable and verifiable. Especially on the arcane topic of tone reproduction, more work needs to be done. The Prints and Photographs specifications, for example, assume a certain degree of linearity in an interpositive film, but they do not specify any allowable limits. The test for contrast compares the average contrast over the entire density range of an image. It would be quite easy, when working with a very consistent collection of negatives, to pass such an average contrast test and yet be working with a highly non-linear film.

We either must be bold enough to specify exact film stocks, or we must tighten the specification to address contrast at every point on a characteristic curve. In truth, I would recommend both approaches. For example, we have found that the Agfa separation films (which we intend to begin using after our stocks of Kodak Separation Negative sheet film are exhausted) are marginally better than even the Kodak films, but I doubt the differences could be quantified adequately. There is a lot of duplicating experience represented in this room. I do not think we need more comparative testing; what I think we need is tighter and clearer specifications to be formulated and adopted jointly by curators, vendors, and providers.

Such specifications would address the requirements for physical quality, accuracy in tone reproduction and image structure, processing quality and the documentation which should be provided with each project to insure reversibility.

The documentation should include full disclosure of the film stocks used, complete characteristic curves for each stock under the specific exposure and processing used, a listing of

the exposure corrections and filtrations applied to each image, methylene blue test certifications, and dimensional scales in all optical generations. This is all information we generate in the course of a project. If it can remain with a completed project, we can attain the goal of reversibility. Unfortunately, precious few of our clients ask for even a portion of it.

Specifications should not be seen as an adversarial issue between curators and providers, nor as a proprietary issue amongst providers, for their enunciation and mutual adoption will preserve access to our photographic past and at the same time provide open access for the future.

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