

THE EFFECTS OF ELECTROSTATIC COPYING ON MODERN PHOTOGRAPHS

by Gary D. Saretzky

Concern has been expressed within the archives/library community over the possibly deleterious effects of electrostatic copying (erroneously termed "xeroxing") on photographs. These copies are often made to provide inexpensive references for researchers and to reduce wear upon original prints. One archives manual cautions, "Photographs may be damaged by the extremes of light and heat if reproduced on electrostatic copy machines."¹

Testing

To explore the validity of this assertion, tests were conducted in which photographic print samples were exposed 300 times in either of two copying machines. Density readings, using an ESECO Speedmaster Universal Densitometer Model TRC-60D, were made of unexposed controls, exposed samples, aged controls, and aged exposed samples. As a test oven capable of maintaining high humidity was not available to this investigator, aging was conducted by suspending samples over distilled water in an airtight container. The container was autoclaved for ten minutes at 240⁰F to prevent mold growth and then

¹Karen R. Lewis, *A Manual for the Visual Collections in the Harvard University Archives* (Cambridge, Massachusetts: Harvard University Library, 1981), 7.

placed in an incubator at 98.6⁰F for thirty-two days in the first series of tests and sixty days in the second.

In the first tests, using a Kodak Ektaprint 150 Copier-Duplicator, three different black and white papers (Kodak Polyfiber, Kodak Polycontrast RC, and Ilfobrom No. 4) and one color paper (Ektacolor 78RC) were tested. The black and white test was replicated and the results averaged. No significant effect attributable to electrostatic copying was found.

In the second test series, three different black and white papers (Kodak Polyfiber, Kodak Polycontrast RC, and Agfa Brovira No. 1) and Ektacolor 78RC were used, with 300 exposures provided by an IBM Copier II. In a deliberate attempt to produce density changes in the samples, the black and white papers were deliberately fixed for only about half the appropriate time and "dip-washed." Underfixing was expected to leave light sensitive silver salts in the emulsions. The samples, as previously mentioned, were aged for two months.

As anticipated, a measurable effect of exposure to electrostatic copying was found on some of the poorly processed samples; however, this effect was exceedingly small, and, in fact, not visible. A visible difference is approximately .1 on the density scale used. For the two Kodak samples, there was an average increase of .045 density, with the greater increases in the middle gray zones. No significant change occurred in the Agfa sample as a result of copying. The properly processed color sample was virtually unaffected by copying and aging for two months; there was a very slight (.04) increase in yellow density in both control and exposed sample as a result of aging.

It was hypothesized that if electrostatic copying had an effect, this effect might be exaggerated by aging. To the contrary, for those poorly processed samples which were slightly affected by copying, there was less difference between these samples and controls after aging. Apparently, the adverse effects of the aging treatment, which included yellowing and staining, tended to mask the very miniscule effect of prior copying.

Another significant, if somewhat peripheral finding was that the aging technique used is effective in damaging poorly processed samples, while causing little change to well-processed materials, including Ektacolor, for the time period used. In the second test, the poorly processed black and white resin-coated sample suffered such severe image losses that it could not be measured meaningfully with the densitometer.

It was hoped to be able to report results of a test on a nineteenth century photograph. Conservator Peter Mustardo of New York City recently tested an albumen print sample, using a Xerox 1075 copier and a dry oven for aging. Unfortunately, the results were inconclusive.²

Spectroradiometric data obtained from Kodak and Xerox for a variety of their machines, suggests that the radiation output includes a relatively small amount of ultra-violet wavelength light, although there is variation from model to model. For these copiers, it would take many copies to produce the equivalent of one second of sunlight.

²Personal communication, May 1985.

Conclusion

It is probable that the greatest danger to contemporary photographic materials during electrostatic copying is from handling. Prints removed from files for copying should not be contaminated by ungloved hands or dirt on the machine platen. Obviously, one should limit copying of valuable photographic materials known to be light sensitive, such as unfixed proofs, tinted albumens, untoned calotypes, and cyanotypes. If one has a need to produce numerous electrostatic copies, consideration should be given to using the first copy to make the others or produce a copy print to be used for electrostatic copying. Prudent purchasers of copiers should request spectroradiometric data from the manufacturer. With sensible precautions, occasional copying should not be considered a threat to properly processed modern photographic materials.

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