

TECHNICAL NOTE

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Photographically Subtracting Interfering Images from ESDA Print

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ABSTRACT: Documents containing indentations from other written papers may also contain original written material on the reverse side of the page. When such a document is processed on an Electrostatic Detection Apparatus (ESDA), both the subject indentations and the writing on the reverse of the paper are often recorded. It is usually very difficult to decipher the indented writing because of the overlapping images from the reverse of the paper. It is possible, however, to subtract these interfering images by making a positive transparency of the original writing on the reverse of the paper and sandwiching it with a negative of the ESDA. This method provides a clear and accurate record of the subject indentations alone.

KEYWORDS: questioned documents, electrostatic detection apparatus (ESDA), indentations

The Electrostatic Detection Apparatus (ESDA) has become a fixture in the majority of governmental document laboratories and many private laboratories throughout the United States. This state-of-the-art instrument for the electrostatic development of indented writings is used to permanently record indented writings on paper surfaces in a nondestructive manner. The indented writings appear black on a gray background on the ESDA print. At the same time, the tonal image of any original writing appearing on the paper being tested is reversed. The original writings on the paper surface appear as negative or clear images on a gray background. This difference in the imaging record of any original writing and the indented writing makes it a relatively simple matter to differentiate between the two and to decipher the suspected indentations, even when the two overlap [1].

However, the ESDA will also record the impressions from the reverse side of the document. The writings from the reverse side of the page appear as positive (though wrong reading) images similar to the subject indentations which are right reading. When these two sets of images overlap, it may become extremely difficult and occasionally impossible to decipher the subject indentations.

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In several cases, the ESDA recorded indentations from the face of the document and overlapping writings from the reverse side of the page. As a result, it was necessary to develop a method of deleting the writings on the reverse of the page from the ESDA print. The goal was to achieve an accurate, legible record of the subject indentations free of the overlapping images from the reverse of the document.

Procedure

An experiment was conducted to determine if the writing from the reverse side of a page could be photographically removed or subtracted from a high-contrast print of the ESDA transparency. To accomplish this, we processed in the usual manner on the ESDA a page from an office appointment calendar known to contain indentations on one side. A photograph of the original ESDA print appears in Fig. 1. In this illustration, the overlapping of the right and wrong reading images from the face and reverse of the paper are recorded as black lines on a light gray background. 1:1 photographic negatives of the ESDA print and the writing appearing on the reverse side of the original document were produced using 4×5 Kodak No. 4145 (Contrast Process Ortho [CPO]) high-contrast, black-and-white film. A positive transparency of the writing on the reverse was created by contact printing the negative film of the reverse of the page onto a second sheet of 4×5 CPO film. In each instance, the film was processed in Kodak HC 110, dilution B, according to the manufacturer's instructions.

The ESDA negative and the flopped positive transparency (emulsion-to emulsion or back-to-back) were placed together on a transmitted light box. The dark lines of the transparency were aligned with the corresponding clear areas of the negative. The two were taped together using masking tape after the best possible register was established. Following this, the negative and positive transparency sandwich was placed in an enlarger, and a black-and-white print was prepared. However, some difficulty was encountered in obtaining perfect registry of the positive and negative images. This was due, in part, to the use of a two-step process in creating the positive transparency. This resulted in an unacceptable print since the interfering image was not adequately masked.

To overcome the lack of perfect registry, the writing on the reverse side of the original

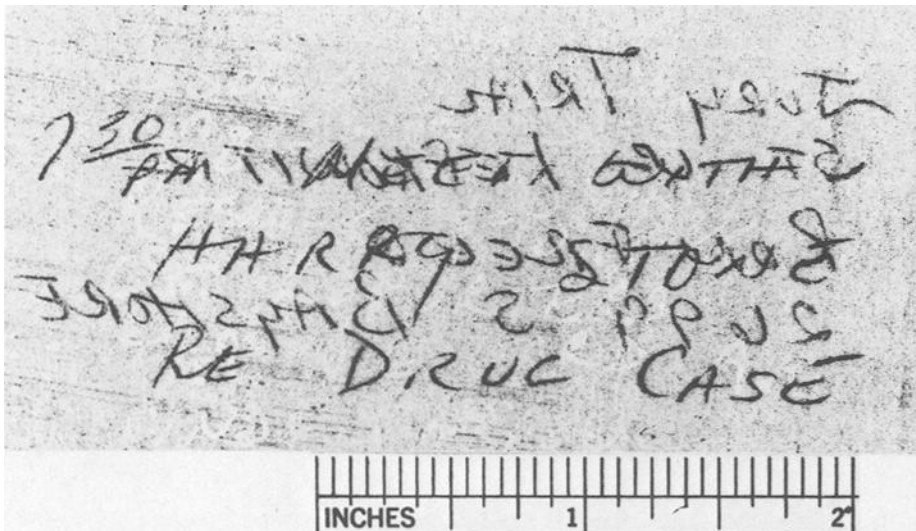


FIG. 1—Original ESDA. 1 in. = 2.5 cm.

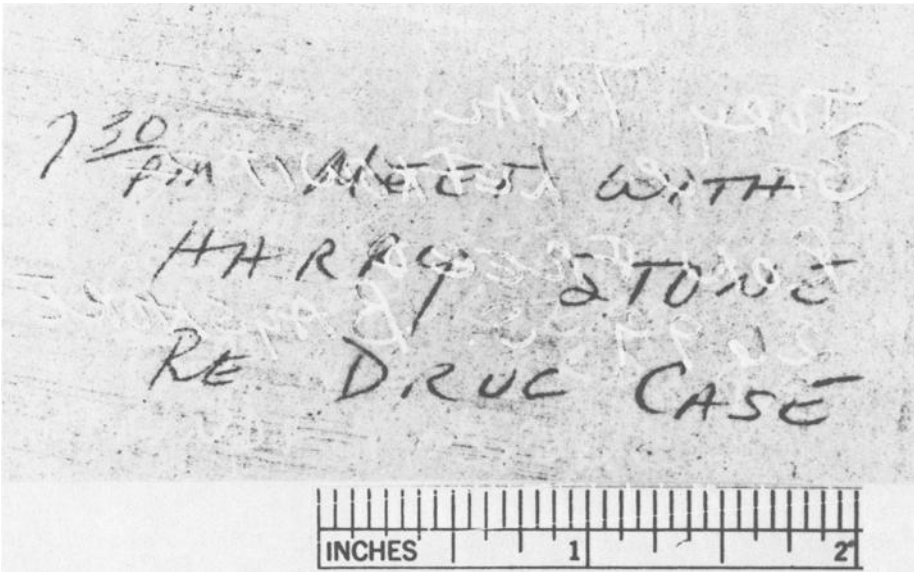


FIG. 2—Final print, produced using soft-focused positive transparency and sharp-focused negative. 1 in. = 2.5 cm.

page was rephotographed slightly out of focus to produce a softer image on the negative. A new positive transparency was prepared as described above. This positive transparency was again sandwiched with the original negative, and registry of the positive and negative images was obtained. Figure 2 shows the final print produced using the soft-focused positive transparency and the sharp-focused negative. The formerly interfering image from the reverse of the page now appears as a clear image on the gray background. The subject indentations retain their typical black on gray tonal qualities and are now clearly legible.

Future consideration might be given to the use of direct positive film which would eliminate one step in the processing. This may result in a better registry of the positive and negative film images. A pin registration system may also be useful in preparing the film sandwich for printing.

Conclusion

Standard black-and-white photographic and darkroom techniques may be successfully employed to mask out or subtract the interfering images created on the ESDA print from the writing appearing on the reverse of the paper being processed. The photograph of the ESDA and the writing from the reverse of the document results in a tonal reversal of the interfering writings with only minimal disruption of the record of the subject indentations.

Reference

- [1] Lewis, G. W., "Examining Indented Writings Using The Electrostatic Detection Apparatus (ESDA)," presented at the 33rd Annual Conference of the American Society of Questioned Document Examiners, Houston, TX, Aug. 1981.

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