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G. H. Hahn,[1] *Sgt.*

Paper Fiber Impressions on Carbon Tape Ribbons

The standard method of identifying a typewriter as having typed a certain document has been to examine the typed impressions on the document for irregularities or identifying characteristics peculiar to that certain typewriter, as distinguished from all other typewriters of the same class. Among the identifying individualities considered are alignment, characters striking off their feet (striking harder on one side of the character than on the other), slant, and damage to the type face. Positive identification requires a sufficient amount of questioned and exemplar type to eliminate the element of chance and establish a definite pattern. In practice, this has not always been easily accomplished. Frequently a very limited amount of typing is available, and additional difficulty arises when the typewriter in question is fairly new and individual identifying characteristics are few.

All of the methods discussed have one common element: The typewriter has left its impressions on the document, and the document examiner attempts to identify or eliminate a certain typewriter as having been the instrument that left the impressions on the document.

During a recent criminal investigation, a method was found whereby the document in question left its identification on the questioned typewriter ribbon. A positive identification was made using only one character from the questioned document.

The question was whether or not a certain series of checks deposited into the account of a company had actually been typed on the typewriter owned by the company. The typewriter in question[2] was equipped with a carbon tape ribbon. This ribbon is used only once and then discarded. This type of ribbon moves through the typewriter in the normal manner but upon reaching the end of the ribbon, the ribbon is removed and a new one inserted. The ribbon does not reverse itself to go through the typewriter again. By examining the ribbon, the exact sequence of letters typed on the typewriter may be determined.

In this particular investigation the carbon ribbon was removed from the typewriter and transcribed. It was found that the exact sequence of characters typed on the questioned checks also appeared on the carbon tape. After transcribing the carbon tape, however, it was discovered that apparently three checks, typed on the same date, had been made out to the same person for the same amount. No typing errors were evident on any of the three checks or the ribbon. There were, therefore, three apparently identical checks in

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[1] Document examiner, Scientific Investigation Division, Questioned Document Section, Los Angeles Police Department, Los Angeles, Calif. 90012.

[2] Model "C" Standard Electric, IBM Corp., Office Products Division, Parsons Pond Drive, Franklin Lakes, N.J. 07417.

existence. The question arose as to which one of the three checks was the one in question, if indeed any of them were. One of the questioned checks had the same date, payee, and amount as that appearing on the ribbon, which was strong circumstantial evidence, but a positive identification was needed.

The carbon tape was examined under the microscope at ×3 with transmitted light. The light source, a neon desk lamp, reflected light from the microscope mirror through the tape. The tape was on a clear glass stand and a glass slide, held down by the tension arms on the microscope, was placed on top of the tape. This slide kept the tape flat and took out some of the indentation caused by the typewriter key striking the tape. When observing the carbon base ribbon with the naked eye, it appeared to be opaque except where the typewriter key had struck the ribbon and transferred the carbon on the paper. This left an outline of the character on a clear celluloid base. Under the microscope, using transmitted light, however, it was found that this outline of the character was not completely clear, but contained a mesh-like design. Upon closer examination, the mesh-like design appeared to resemble paper fibers. One of the characters (Fig. 1) on the questioned

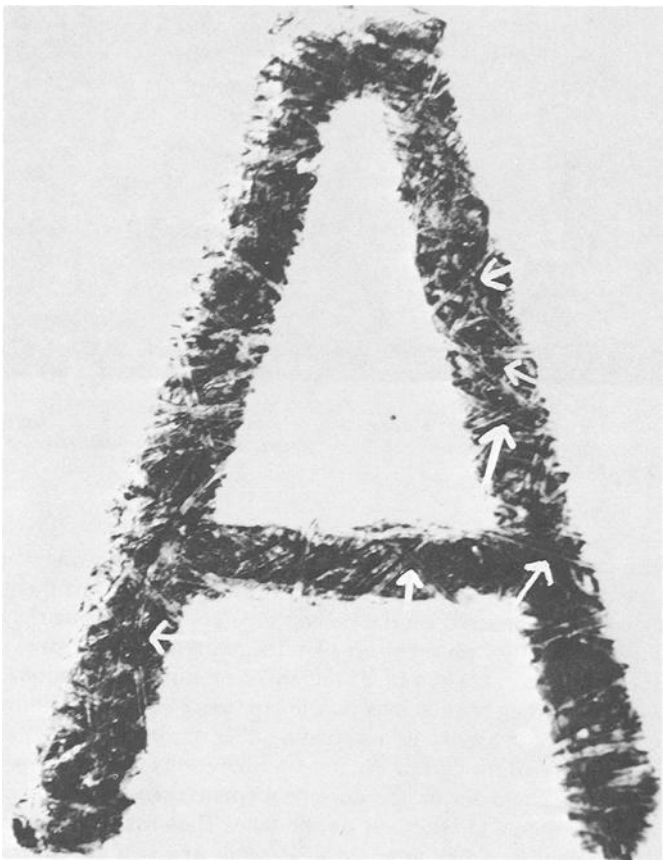

FIG. 1—*Photo of character from questioned check, original magnification ×38. Note paper fibers crossing the carbon transfer. Fibers appear to end at edge of character in photograph, but this is due to critical focusing into the depression left by the typewriter key striking the paper.*

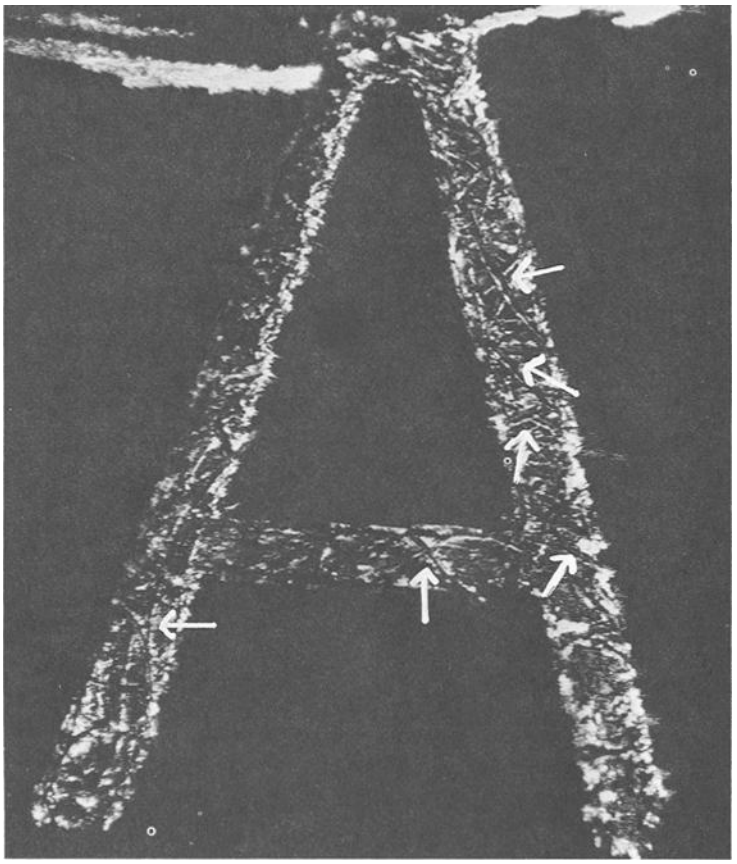

FIG. 2—*Photo of character from carbon tape ribbon, original magnification ×38. Note the paper fiber impressions left on the ribbon as compared to the paper fiber in Fig. 1. The white streak at the top of the photo is a scratch on the ribbon.*

check was placed under the microscope and a design was drawn showing where the paper fibers crossed the carbon impressions on the check. The character was then examined on all three places where it appeared on the carbon tape and the fiber marks on the check were found to match exactly with the mesh-like design on one of the same character impressions on the tape (Fig. 2). The rest of the characters on the questioned check were examined, the corresponding impressions on the tape were compared, and all of the impressions were found to contain the corresponding fiber marks.

Also, it was observed that the carbon did not transfer evenly from the tape to the paper. Uneven outlines of the character on the document where carbon was missing were then compared to the corresponding character on the tape. The missing carbon was found to be still on the ribbon and could be fitted into the blank space on the paper. This did not occur on all of the characters, however.

Every character on the checks was positively identified as having been typed with that ribbon, by means of the paper fiber mark impressions left on the carbon ribbon. Fiber mark impressions were even found on small characters such as the dot of an "i." Some

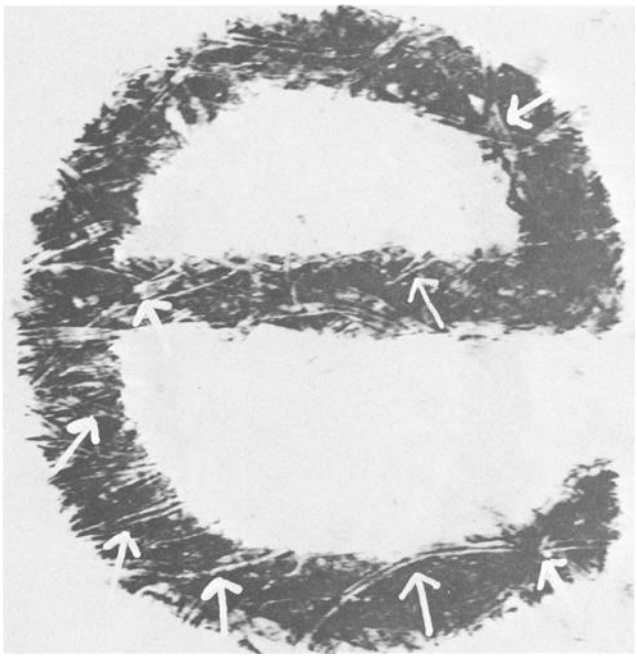

FIG. 3—*Photo of character from questioned check, original magnification* ×38.

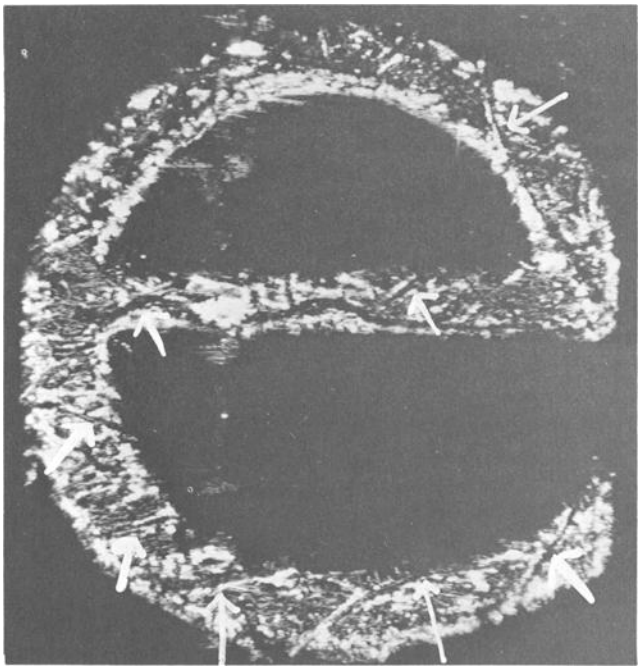

FIG. 4—*Photo of character from carbon tape ribbon, original magnification* ×38.

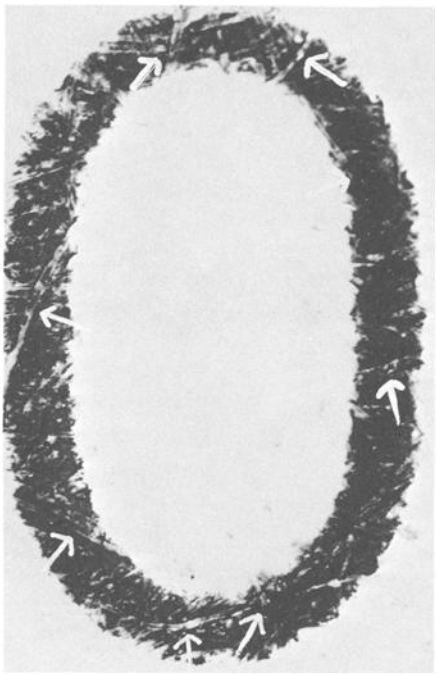

FIG. 5—*Photo of character from questioned check, original magnification* ×38.

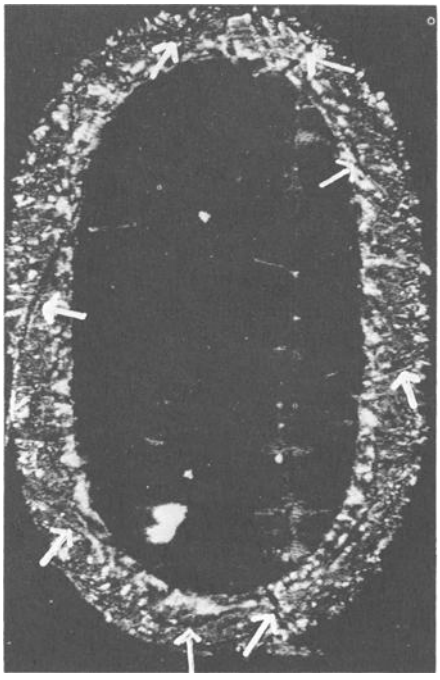

FIG. 6—*Photo of character from carbon tape ribbon, original magnification* ×38.

characters contained more points of identification than others, depending on the random configuration of the fibers under the carbon transfer at point of impact of the type with the paper.

Several characters from each check with numerous fiber marks, as well as the corresponding impressions on the ribbon, were photographed. While some detail was lost in the photographic process, sufficient fiber marks were visible in the prints to demonstrate the points of identification (Figs. 3–6).

Summary

The standard method of identifying a typewriter as having typed a document has been to examine the document for impressions left by the typewriter. A new method of identifying a specific typewriter, whereby the document has left its impression on the typewriter, was discussed. A positive identifiction was made by examining as little as one character on the document, and matching the paper fiber with the impressions left by the fiber on the carbon tape ribbon.

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Scientific Investigation Division
Questioned Document Section
Los Angeles Police Department
150 North Los Angeles St.
Los Angeles, Calif. 90012