Journal of Criminal Law and Criminology

Volume 29
Issue 4 *November-December*

Article 7

Winter 1938

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AMERICAN JOURNAL OF POLICE SCIENCE

Editor: FRED E. INBAU
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LATENT FINGERPRINTS AT HIGH TEMPERATURES

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In the course of some experimental work on latent fingerprints, it was noted that papillary impressions on certain surfaces were able to withstand relatively high temperatures (100°-200° C.). This suggested the possibility of detecting such impressions on objects suffering from the milder forms of fire damage. Let it be understood, of course, that in those instances where the object carrying the latent impression is destroyed by fire no technique could be expected to restore the impression to an identifiable state. While in some instances high temperatures have the effect of causing a latent impression to "wet" certain surfaces and thus obscure the pattern, it was found that on many typical surfaces no such wetting occurred. Further, with many surfaces it was noted that the secretion was evaporated to dryness before the pattern was obliterated.

With these observations in mind, a normal latent impression was placed on a microscope slide and passed through the carbonizing flame of an improperly adjusted Bunsen burner. A layer of microscopic soot was thus laid down over the area containing the latent impression. At this stage, microscopic examinations revealed that the pattern characteristics were intact. The glass was allowed to cool and the soot finally brushed from the glass. In so doing, the latent impression was "developed" by the adhesion of carbon particles to the deposited secretion.

Latent impressions were then placed on a variety of surfaces, including enameled metal and wood, painted and unpainted wood, nickel plate, cadmium plate, and porcelain. It was found in all instances that when carbon particles covered the latent impression

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prior to the evaporation of the secretion, the impression was developable and identifiable after withstanding temperatures up to those which caused permanent blistering or other damage to the surface. The extreme temperatures thus depend upon the particular materials upon which the print has been deposited. It was found that the print was generally undevelopable when the secretion was evaporated to dryness prior to the accumulation of soot on the surface.

Latent impressions were deposited upon an ordinary tin can and sooted in the Bunsen flame. The can was then placed in a Fischer burner and brought up to a dull red heat. The temperature, though not measured, was probably around 500° C. A stream of water was then run over the area in which the latent impressions had been deposited. The latent prints were to be observed as soon as the water had washed off the surrounding soot. After the surface was dry, the usual dusting brush removed the remaining soot and the latents were found to be in excellent condition. In Figure 1, *A* is a photograph of one of the latent impressions after experiencing the aforementioned "fire and water" damage. The permanence of many of these latent impressions developed on metal is remarkable. The print illustrated by *A* had been rubbed vigorously with a piece of cloth with no loss of detail or contrast.

B is a latent impression treated similarly to that of *A*, with the exception that it was not subjected to as high a temperature. After washing in a stream of water it was allowed to dry and was then dusted to bring out the greatest detail. The particles of carbon have apparently not been "burned" into the surface because such a print is easily destroyed by rubbing with a cloth.

C and *D* are for latent impressions "discovered" under the sooty unpainted surfaces of a piece of white pine and a piece of Philippine mahogany, respectively. These impressions were not treated with water, but simply dusted in the conventional manner.

The natural implication of these facts is that in some instances unsuspected latent impressions may be discovered on sooty and mildly charred surfaces. If the surface is moist or wet it should be permitted to dry before brushing. One is warranted in using a stiff brush or rubbing with a cloth when the soot clings tightly to the surface. Under the latter conditions, a fingerprint, if present, will usually be "burned-in" to the surface.

Since the conventional powdering methods would be of no avail in developing a latent impression under a sooty coating, it

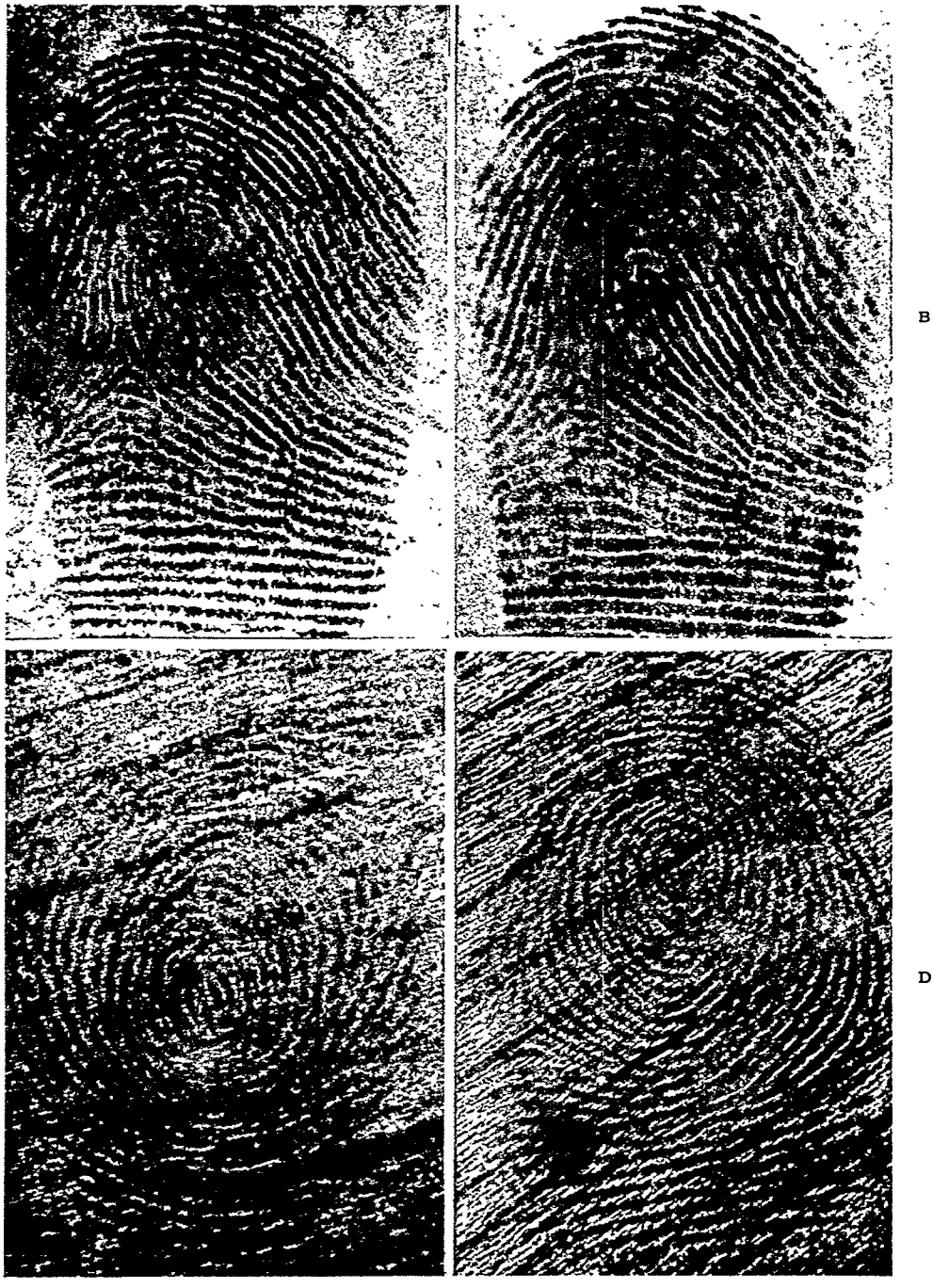

FIGURE 1

appears that the simple procedure herein described is worth trying under such circumstances.

In the absence of a Bunsen flame one can easily demonstrate the technique by placing a latent print on a surface, flaming with an ordinary match to produce a coating of soot over the latent and finally dusting with the type of brush usually employed for fingerprint work.

In those latent impressions in which the amount of sebacious oil is high, the rate of evaporation is quite low. Hence, such latents may be developed in this manner after long periods of time. Several latents of this type which were known to be three months old were satisfactorily developed after flaming, washing and dusting.

It is realized that the conditions encountered in an arson investigation are not as ideal as those under which these tests have been made. In those cases investigated by the writer, he has not as yet had the good fortune to find a latent fingerprint as herein discussed. Nevertheless, the results of these tests indicate that the investigator should not completely ignore the possibility of latent prints in arson cases.