CRIME LABORATORY PHOTOGRAPHY*

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THE Federal Bureau of Investigation has been honored by a place on the Program of the Annual Meeting of the American Society of Photogrammetry. It is a pleasure to appear here to present the subject "Crime Laboratory Photography."

The uses of photography are many and varied in a laboratory such as that of the Federal Bureau of Investigation. In many of the examinations which are made of evidence, the results obtained could not be achieved without the aid of photography.

First, photography makes it possible to record the condition and appearance of evidence as it is received in a laboratory. When it is necessary to change

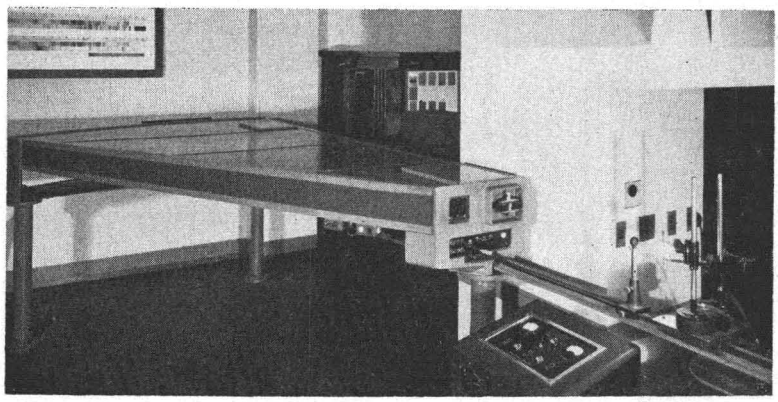

FIG. 1. Large grating spectrograph used in the FBI laboratory.

or alter the evidence during an examination, these photographs become indispensable. Such would be the case when a document is chemically treated for latent fingerprints, causing a change in the color or other physical characteristics of that document.

Through photography, copies of certain types of evidence such as fraudulent checks, anonymous letters, et cetera, are provided for reference files. Such files have proved very helpful in the investigation of many cases. The National Fraudulent Check File in the FBI laboratory is an example of such a reference file. Fraudulent checks received for examination are compared with the photographs previously placed in this file and are often identified with previous cases in which the identity of the check passer may be known. Last year over half of the 15,643 checks received in the FBI laboratory were identified with previous cases. The checks received last year represented a total value of two and a quarter million dollars. Of course, we did not receive all the bad checks passed throughout the country. The results of comparisons which are made in a reference file like the FBI National Fraudulent Check File annually save thousands of investigative hours. Such reference files would not be practicable without some reproduction process such as photography.

The findings of some of the instruments used in a crime laboratory must be recorded photographically on plates or films. For example, the characteristic

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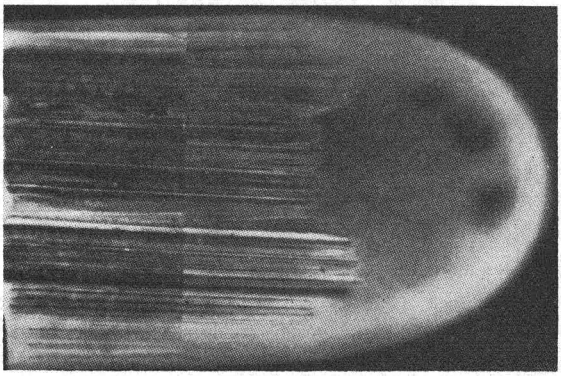


FIG. 2. Photomicrograph showing markings in a bullet comparison.

spectral lines of an inorganic substance are recorded in a spectrograph on a photographic plate (Figure 1). With this instrument it is possible to analyze a small fragment of paint such as that received in a hit and run case. From such an analysis of a paint chip, half the size of a dime, which was recovered beside the body of a man who had been run down by a hit and run driver in Lima, Ohio, it was determined that the subject car was a 1941

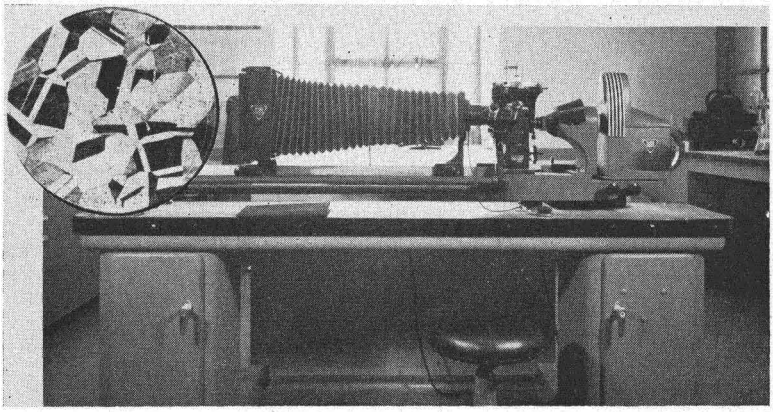


FIG. 3. Metallograph and photomicrograph showing crystalline structure of a metal sample.

Mercury which had been repainted several times, and was now a light gray color. Such a car was located by the Lima police in a repair garage, and the owner, when confronted with the laboratory findings, admitted his guilt.

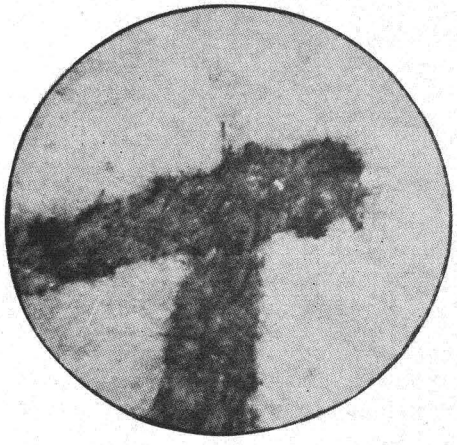


FIG. 4. Photomicrograph of ink line crossing.

The electron microscope may be used to identify crystalline substances from a diffraction ring pattern recorded on a photographic plate.

In the use of other scientific equipment, as the comparison microscope, it is important to record in a photograph what an examiner can see through the use of the instrument. Thus, the markings in a bullet comparison are always recorded in this manner in the FBI laboratory (Figure 2).

The metallograph (Figure 3) is used to study the crystalline structure of a metal in a casting, for the purpose of detecting defects or other peculiarities of the metal. The structure of the metal can be recorded in a photomicrograph.

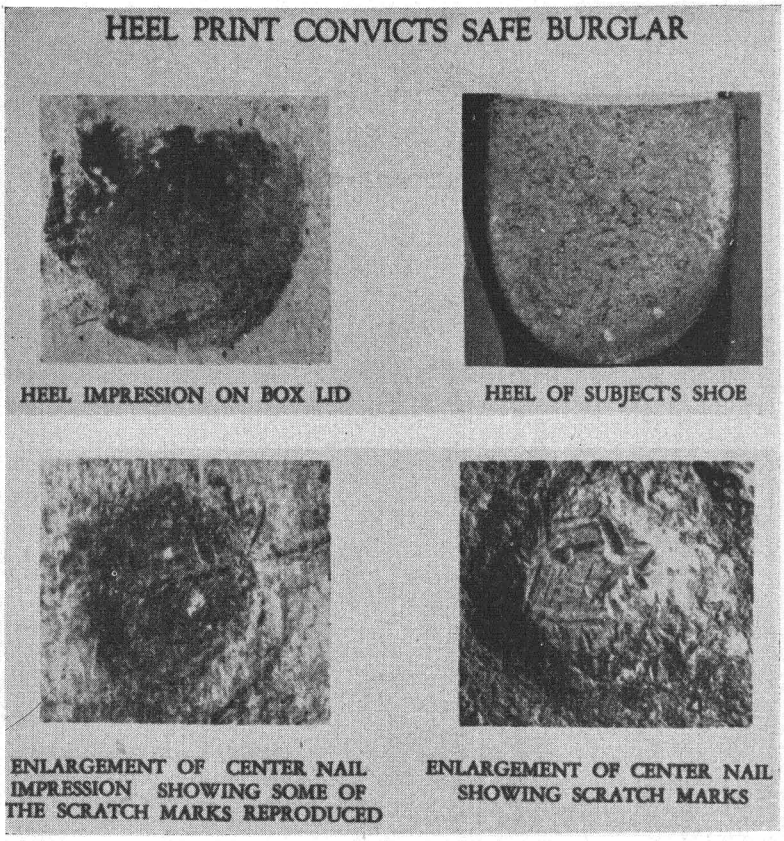


FIG. 5. Heel print convicts safe burglar.

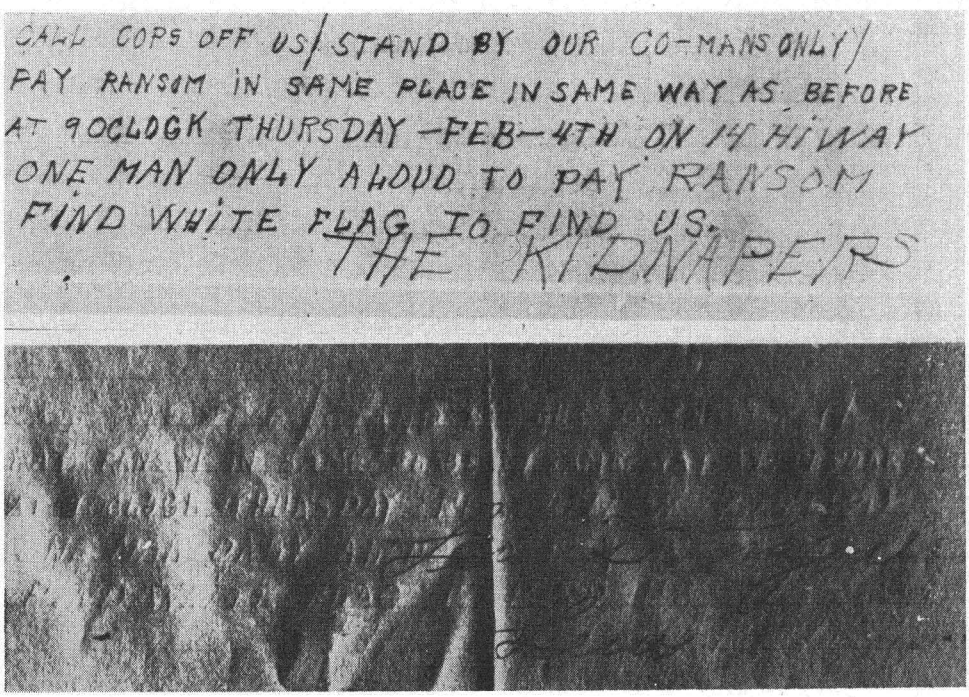


FIG. 6. Indentations developed on top page of tablet, lower photograph, match ransom note, upper photograph.

A photomicrograph of an ink line crossing will provide proof of which of two crossing lines is on top. The horizontal line in Figure 4 is shown to be on top by the spreading of the ink from that line down into the line originally on the paper.

In a case in which a safe was stolen from a warehouse, a box lid with a smeared heel impression was found inside the warehouse. The heels of one suspect's shoes were found to conform in general shape and size with the questioned impression, but the over-all detail of the impression was not sufficient for a positive finding. However, photomicrographs of the scratches on the center nailhead of the suspect's shoes and of the corresponding impressions made in the box lid (Figure 5) provided essential proof that aided in a conviction for safe burglary, resulting in a life sentence, since this subject had four previous convictions in the State of Virginia. In this particular case the heelprint evidence was the only evidence placing the subject at the scene of the burglary.

By properly lighting a heel impression on a piece of glass, some indentations on a document or a fingerprint on a highly reflective surface, it is frequently possible to develop evidence photographically which can materially assist in the solution of a case. A heelprint on a piece of glass is usually invisible in ordinary light, but when photographed by directing a beam of light almost parallel with

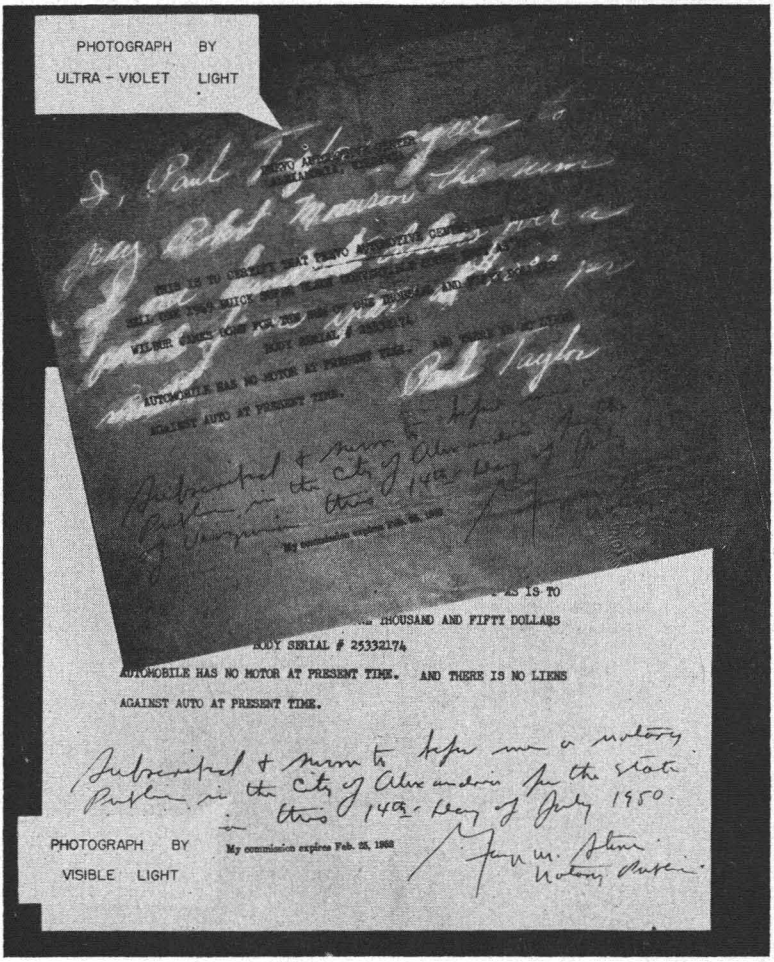


FIG. 7. Fraudulent notarization of bill of sale.

the glass, such impressions become important evidence. The indentations in a tablet located in a suspect's home were found, when developed in a photograph made by lighting the tablet with a light from one side, to match a ransom note in a kidnapping case (Figure 6). A fingerprint on a gun shown in a photograph can be used to identify a suspect as a murderer.

An alteration on a document, the stain on a piece of cloth or a laundry mark on a shirt developed in an ultraviolet photograph may reveal evidence important to the successful conclusion of an investigation. An ultraviolet photograph of an authentic looking bill of sale for a stolen automobile showed that the notarized document was originally simply an IOU (Figure 7). Ultraviolet photographs of two pieces of cloth show matching stain marks which are invisible in ordinary light (Figure 8). An invisible laundry mark is made visible under ultraviolet light.

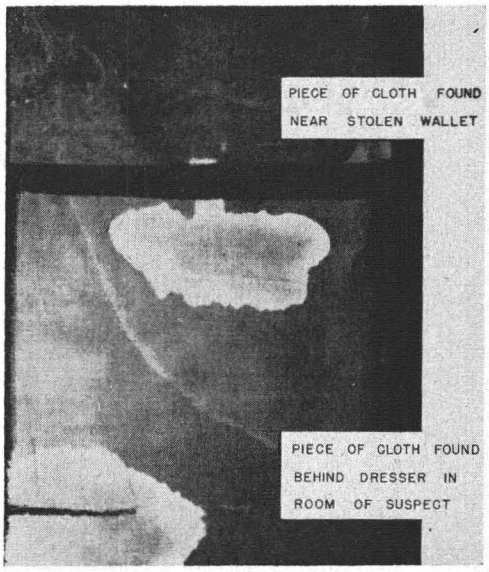


FIG. 8. Ultraviolet photograph showing the matching of the stains.

A marked-out address, a changed serial number, a worn identification mark, either on an item of clothing or on a leather article, or a pencil notation on charred paper developed in an infrared photograph may unveil evidence essential to an investigation. Pencil invoice numbers covered over by an ink stamp are made readable by an infrared photograph. A printed serial number on a negotiable bond may be shown by an infrared photograph to have been altered, even though the ink used to make the change matches visually the color of the ink of the original number (Figure 9). A name on a knife sheath developed in an

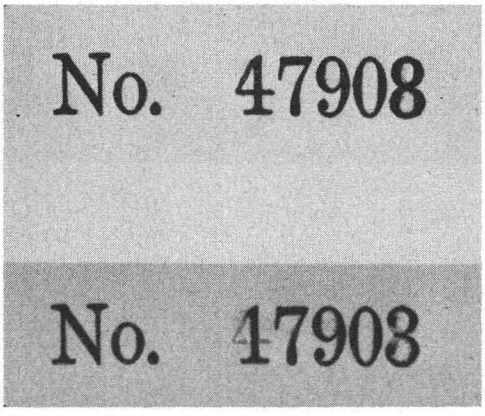


Fig. 9. Infrared photograph (lower photograph) shows serial number to have been altered.

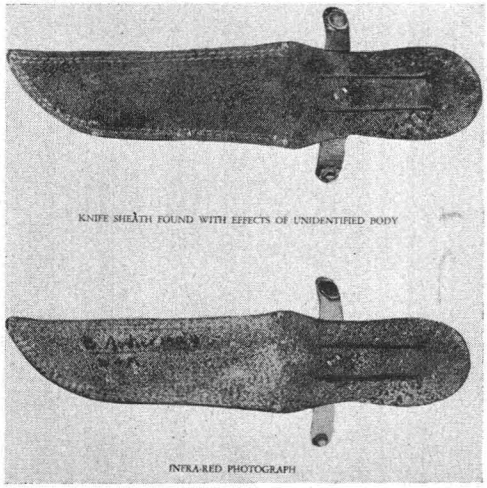


FIG. 10. Body identified through investigation based on name developed in infrared photograph.

infrared photograph led to the identification of an unknown dead woman (Figure 10).

The pencil notations developed by an infrared photograph on charred paper were found to be the names of horses with figures giving betting odds (Figure 11). The charred paper recovered during a raid of a bookmaking establishment near Baltimore, Maryland, was used as evidence of bookmaking. All four subjects were convicted and received maximum jail sentences.

Photographs made with color filters may serve to separate two closely related colors as in the case of a check raised from $200 to $6,200, in which parts of the original ink writing were retraced with a slightly different colored ink used to make the change, in an effort to conceal the change (Figure 12). In another instance, the ink used to fill out a money order was separated from an ink used to raise the money order from $9.00 to $19.00.

Color filters were used recently to prove that three samples of paint are fluorescent as a result of visible radiation. The tests consisted of exposing the paints and a control section of white cardboard with monochromatic blue light and testing the reflected light with color filters (Figure 13). In one test the reflected light was allowed to pass through a Wratten number 25 filter. The blue light from the control was absorbed, as was that from one of the paint samples. However, light from the other two samples of paint was transmitted by this filter. When the test was repeated with a green Wratten number 61 filter, the light from the control section was again absorbed and that from the two samples

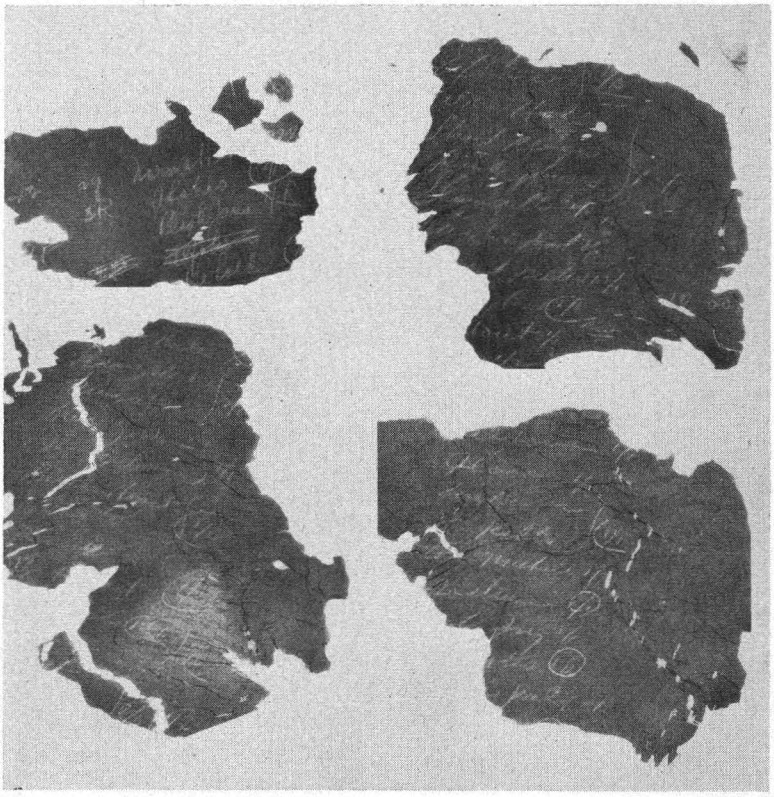


FIG. 11. Infrared photograph of charred paper.

of paint which previously transmitted light was absorbed. However, light from the third sample was now transmitted by this filter. A blue Wratten number 47 filter transmitted the blue light from the control section and varying lesser amounts of light from the paint samples. Thus it was shown that the blue light

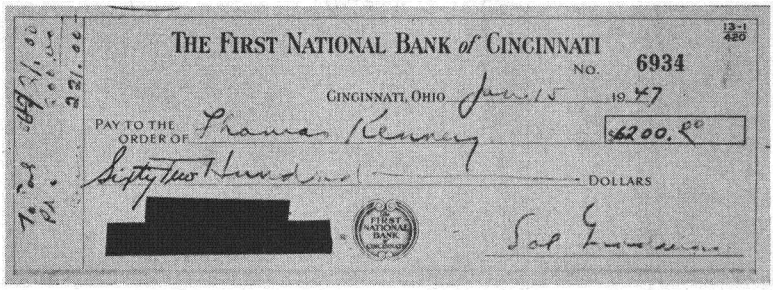


FIG. 12. Photograph of altered check made with filter to show changes.

was changed to light of different wave lengths by the paint samples in question, proving they were fluorescent in daylight.

A color photomicrograph of the edge of a paint chip will show the layer structure of the paint in a highly effective manner.

X-ray photographs often serve to reveal the contents of or structure of solid objects without disturbing the object, as in the case of the burglary of a small bank in Oklahoma. A clue furnished by the cashier was that he remembered some mutilated coins had been in his drawer and had been taken in the burglary. Several days later he thought he recognized a mutilated ten cent piece received from a customer as one of the coins taken from the cash drawer. The suspect was questioned. He explained that the dime was chipped when it had been put on a tree and used as a target for his .22 rifle. He pointed out the tree and the portion he indicated was examined in the laboratory under X-ray, and photographs were made (Figure 14). Several lead slugs and some pieces of a dime were observed. The pieces of the dime were found to match the dime in question, to prove the suspect's innocence.

Photography is indispensable in the presentation of laboratory evidence in court. An enlarged photograph showing a chisel alongside markings found to have been caused by that chisel is an accurate way of presenting such evidence to a Court (Figure 15).

Much use is made of photographic enlargements in the presentation of evi-

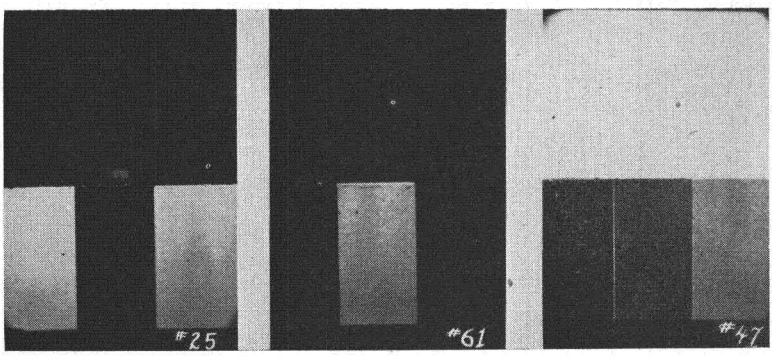
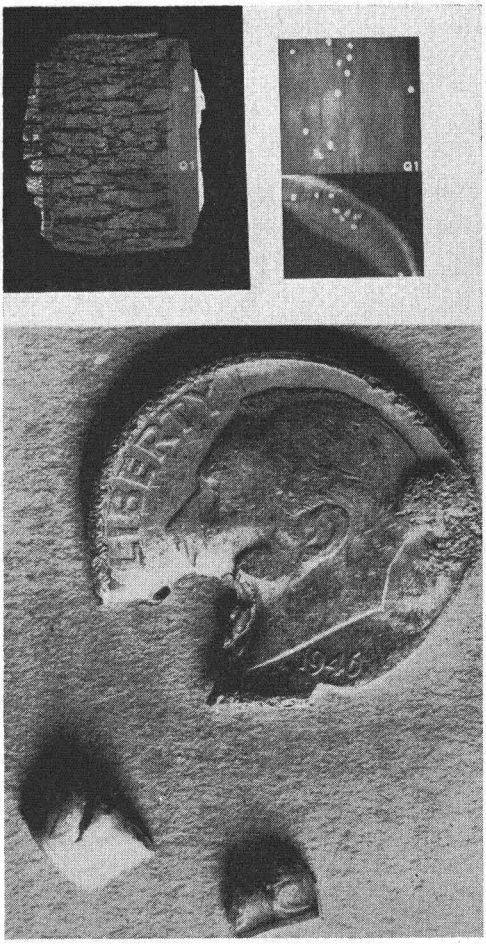


FIG. 13. Tests showing three samples of paint to be fluorescent as a result of visible radiation.



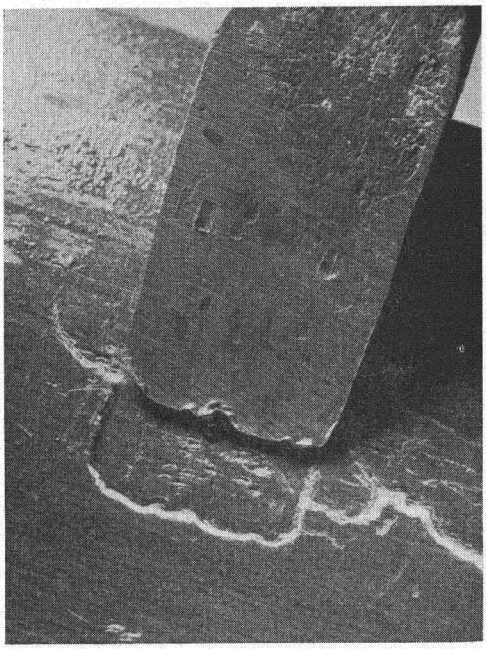


FIG. 15. Comparison of chisel with tool mark in wood.

FIG. 14. Upper left—Portion of a tree purportedly containing bullets. Upper right—X-ray photographs showing bullets and chips of a dime. Lower—Chips of dime removed from tree match remainder of dime found in suspect's possession.

dence found in document examinations such as handwriting testimony and other document evidence.

Photography is essential to a crime laboratory. Much of the evidence developed in the laboratory would go undeveloped if it were not for photography.