

DETECTING BLOODSTAIN EVIDENCE AT CRIME SCENES

THE USE AND PHOTOGRAPHY OF LUMINOL

by

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BACKGROUND

For decades crime scene technicians have used chemical tests at crime scenes to identify suspected traces of blood or to locate blood evidence in crime scenes which have been sanitized by the perpetrators. One of the most commonly used presumptive tests for blood has been Luminol which was introduced to the forensic community in 1937 by Walter Specht of Germany.

Unlike a number of other presumptive chemical tests for blood (phenolphthalein, tetramethylbenzidine, leucomalachite green), Luminol is unique in that its reaction with blood results in the production of light as a blue-white luminescence. When used, Luminol reacts to the peroxidase in the hemoglobin of blood to produce the luminescent glow for several seconds after the initial spraying.

ADVANTAGES OF LUMINOL

1. Applied as a spray, Luminol can cover large surfaces quickly and easily.
2. Luminol is non-corrosive and non-staining to sprayed articles.
3. Luminol is relatively non-destructive to blood. According

to the literature reviewed, Luminol should not hinder serological examinations up through ABO typing; however, Luminol will effect certain electrophoretic systems for enzyme typing.

4. Luminol is unbeatable for detecting bloodstains otherwise unnoticeable to the naked eye.
5. Luminol will reveal patterns of bloodstains in wipe marks, drag marks, shoe and foot impressions, etc.
6. Luminol is highly sensitive and is an established test with a strong track record in many areas. Luminol has general scientific (serologists) and legal (courts) acceptance.
7. Observed reactions may be photographed and recorded for study and courtroom presentation.

DISADVANTAGES OF LUMINOL

1. NOT ALL THAT GLOWS WITH LUMINOL IS BLOOD. Luminol will also react strongly with various metals, vegetable peroxidases, and chemicals, including bleaches used in cleaning; however, none of the presumptive blood tests demonstrate conclusively that blood and especially human blood is present.
2. Luminol must be applied and photographed in darkness.
3. Interpretation of Luminol results should be accomplished by an experienced crime scene technician familiar with Luminol use and application procedures.
4. If possible, Luminol results should be verified by a

subsequent color test using Phenolphthalein or a similar test.

5. Photographing Luminol reactions is very difficult and requires patience.

PHOTOGRAPHING LUMINOL

Traditionally, once a Luminol reaction for blood is identified, the next perplexing problem arises for the crime scene technician...how to photograph the results. Normally, a time exposure is employed which results in a very dark print depicting only the luminescent pattern. (Fig 1) Consequently, the investigator or crime scene technician must attempt a clumsy explanation in court to correlate the Luminol patterns to the actual crime scene through comparison. Fortunately, this method is no longer necessary. At a recent workshop sponsored by the Rocky Mountain Association of the International Association of Identifications (RMAIAI), Officer Fred Gimeno of the Denver Police Department demonstrated a simplistic technique for photographing Luminol which employs modification of an existing technique known as "painting with light". The new technique demonstrated by Officer Gimeno eliminates the need for two comparison photographs and provides sufficient detail of the crime scene and Luminol patterns in a single photographic print. (Fig 2)

PROCEDURE

First, a small, low intensity strobe should be selected for use and the face of the strobe masked to reduce the amount of flash delivered. Officer Gimeno utilized a Vivitar Strobe Model 51. The selection of the proper strobe and subsequent masking of the face is the basic key to success in this process.

Secondly, with the camera positioned on a tripod and a cable release attached, the shutter should be set on the "B" or Bulb setting. Focus on the subject or area and measure the flash to subject distance by using the scale on the lens barrel. Using the chart at Figure 3, the appropriate F stop may be determined for the exposure. All lights should then be turned off and, to the maximum extent possible, all ambient light sources should be blocked for application of the Luminol.

Lastly, the camera shutter should be opened and the Luminol applied. After the luminescence has dissipated somewhat, aim the strobe in the direction of the subject area and discharge the strobe using the flash test button (if the strobe is not equipped with a flash test button, a push button PC adaptor/hot shoe cord may be used). Close the camera shutter and prepare to expose additional photographs in the same manner, but employing the bracketing technique (exposing one F stop above and below the norm).

FILM PROCESSING

Upon completion of the photography, the film (Kodak Tri-X Pan is recommended) should be processed for 16 minutes in T- MAX Stock Solution diluted 4:1 at 75 degrees Fahrenheit. Agitate initially for 1 minute and for 30 seconds every five minutes thereafter. Fix and dry. For the best results, a low contrast filter should be used for printing. Due to the push processing, the film should already display a great deal of contrast. Experimentation with films, processing procedures, and printing techniques may yield improved results.

CONCLUSION

The improvement of crime scene processing techniques is an endless task in our desire to stay one step ahead of the criminal element. The use of Luminol for the detection of blood is a valuable field tool because of the sensitivity and relative ease in application. Now, with the addition of the enhanced photographic technique developed by Officer Gimeno, Luminol becomes an even more effective tool in the collection and preservation of evidence.

REFERENCES

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INFORMATION ABOUT THE AUTHOR

Richard L. Hetzel, a Special Agent with the US Army Criminal Investigation Command at Ft Carson, CO, is a graduate of Webster University, St Louis, MO, and has a specialized background in violent crime investigations and training. SA Hetzel prepared the article, "The Use and Photography of Luminol", while attending the 155th Session of the FBI National Academy.

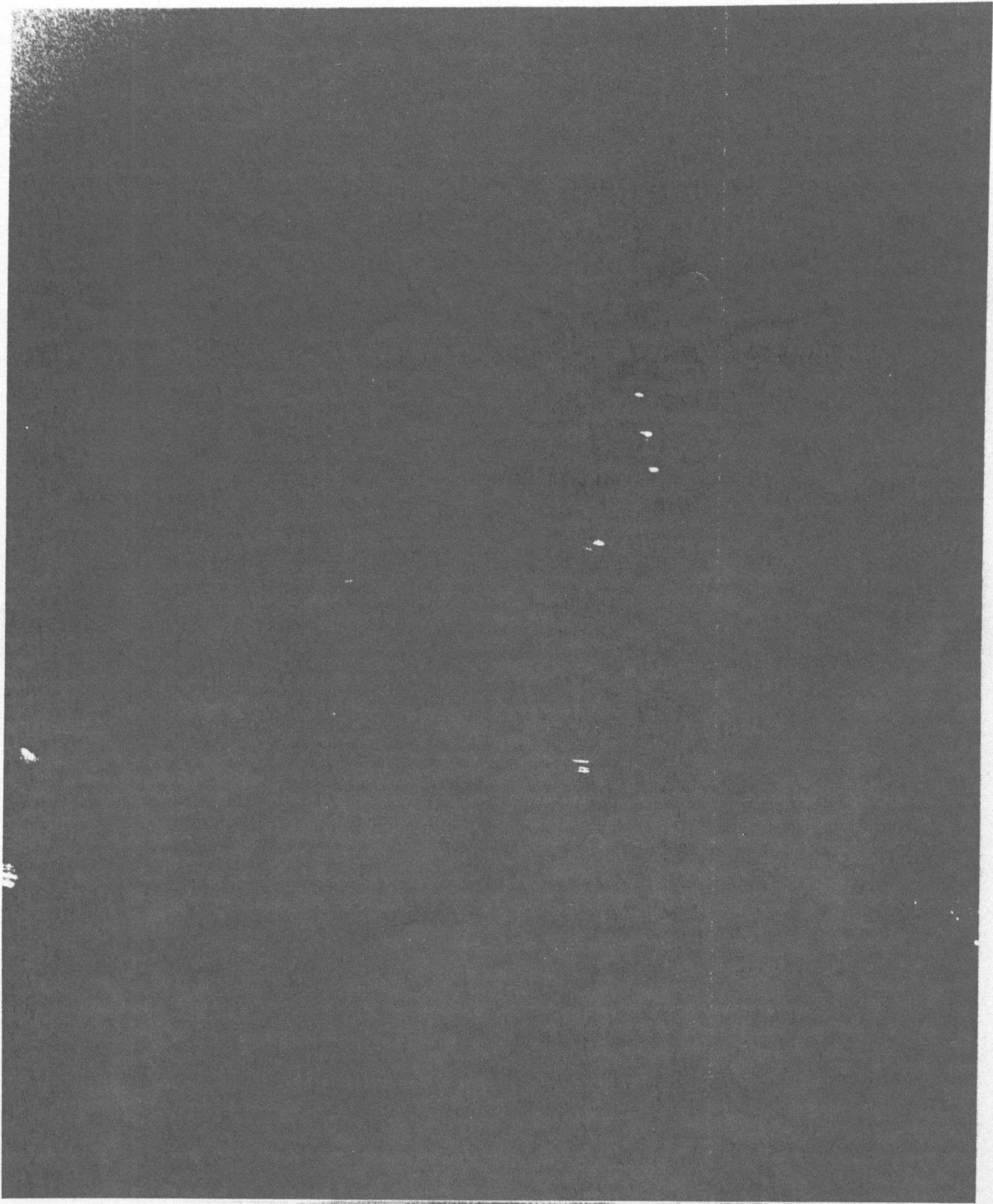


Photo by Fred Gimeno

Figure 1 .

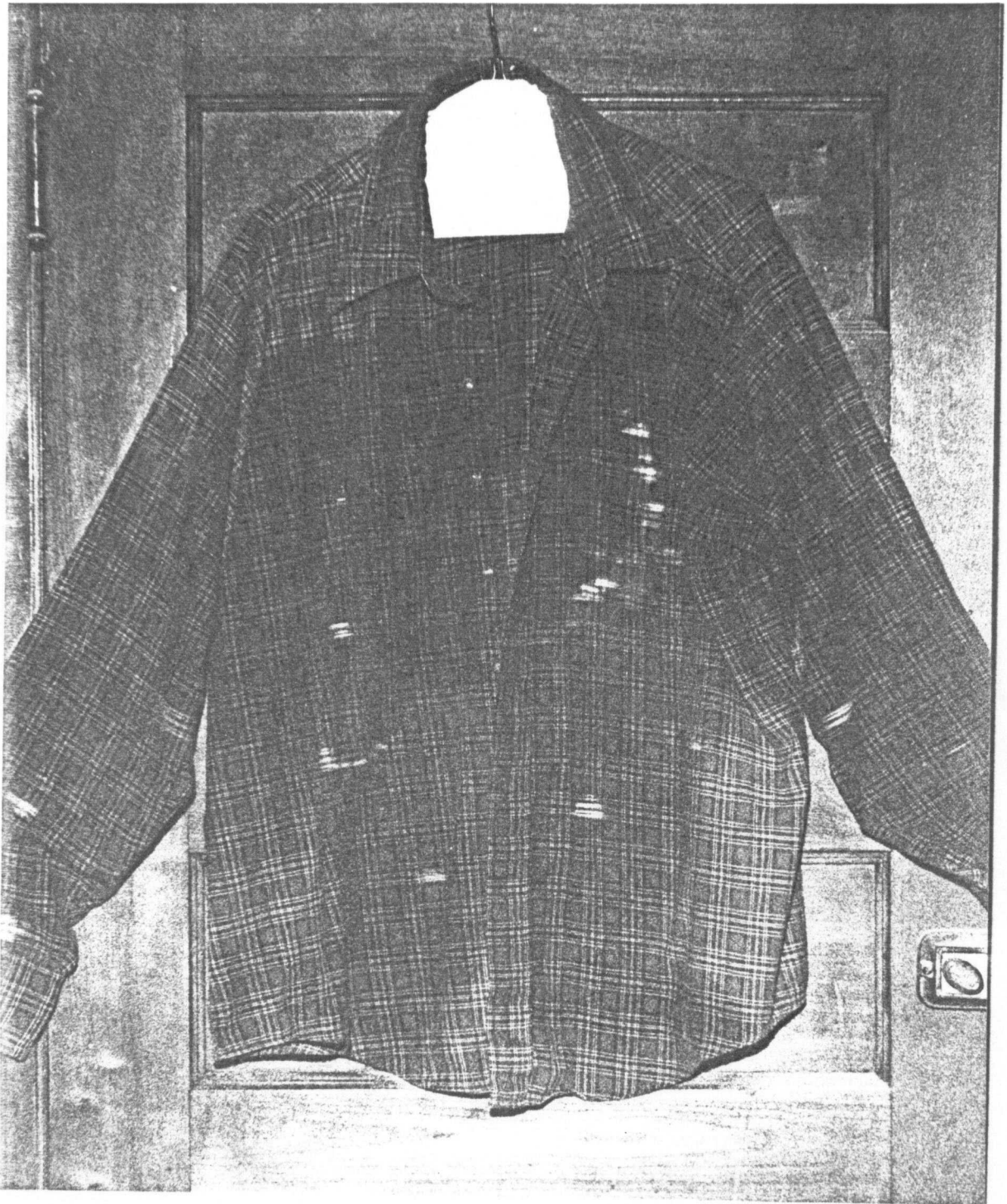


Photo by Fred Gimeno

Figure 2

Use black electricians tape to mask off the face of your Vivitar strobe. Mask $\frac{1}{2}$ diagonally then mask $\frac{1}{2}$ of the face vertically. This will cut down the delivered light, appropriate to photograph a luminous subject and surroundings.

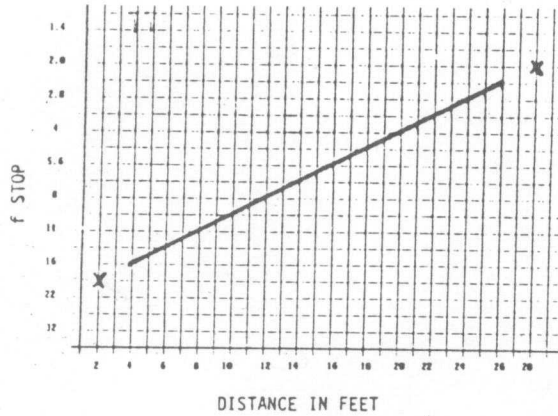
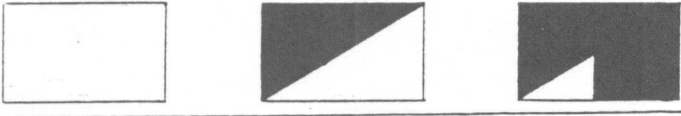


Figure 3

PARTS LIST *(OPTIONAL)

- Camera with a 'B' setting
- Tripod
- Cable release (locking*)
- Luminous paint*
- Hot shoe to PC adapter
- Insulated speaker wire*
- ...ally off push button switch
- Measuring tape*
- Black electricians tape
- Vivitar strobe model #51
- Kodak tri-x pan film
- T-max developer