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SEGMENTS OF HISTORY

THE LITERATURE OF BLOODSTAIN PATTERN INTERPRETATION

SEGMENT 03: LITERATURE FROM 1921 THROUGH 1930

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This is the fourth installment in a series of Segments of History in the Documentation of Bloodstain Pattern Interpretation. The period of time covered in this segment is the that of the third decade of the twentieth century, 1921 - 1930. The previous segment covered literature in this field from 1911 through 1920.

1921 - JULIUS KRATTER¹ emphasized the importance of examining blood at the scene of a crime by experts in forensic medicine. He wrote of the various forms of blood such as pools, blood spatters and wiped or smeared blood. He stated that a pool of blood was easily recognized if it was not old blood. He pointed out that blood can spatter from damaged arteries but that the resulting patterns were frequently not identified due to their arched path. Blood that is spattered onto an inclined surface will be elongated rather than circular. Wiped or smeared blood is easily recognized since it is present mainly in a thinly layered stripe. Kratter also pointed out how animal and human blood could be differentiated by the time that was required to dissolve dried bloodstains.

1922 - HANS GROSS² revised his classic 1904 criminalistics reference in Germany in 1922. Basically, it is the same as his 1904 book. It was translated into English in 1924 and published in London as described below under that date.

1923 - C. AINSWORTH MITCHELL³ wrote that the identification of blood is now decided by chemical methods, even though these tests are usually applied by medical men trained in biochemistry. In early trials, unskilled witnesses were called to prove that stains consisted of blood. Much sketchy evidence was accepted as being conclusive. (Several instances of mistaken inferences are given in earlier editions of Taylor's Forensic Medicine.)

Early attempts to differentiate between the blood of different animals was based upon the fact that the shapes and numbers of the red corpuscles show great variations in the case of different species. Also, pronounced differences in crystal formations can show distinction between man and various animals. These tests may enable a conclusion to be formed with some degree of probability in the case of fresh blood, but are seldom of value in the examination of dried bloodstains.

The biochemical method of injecting blood, serum, or other fluid from the body of a man or an animal into another animal and producing a precipitate with the blood serum of the same species to which the animal was immunized was first used at a trial for murder in France in 1902. In 1910, evidence based on the results of these tests was presented in important criminal cases in this country.

Mitchell cited a case given in which a witness made the following statement in court: (1682) "... a ditch where they said he lay some blood. I cannot say it was his blood...some more whitish blood...I will assure you the blood looked to me more like blood that was laid there than anything else." This evidence (at the time) was accepted as conclusive.

This book discusses "instances of mistaken inferences" such as stains on a knife which could appear to be bloodstains but were found to be lemon juice stains.

1924 - HANS GROSS⁴ discussed the angle of impact and other general characteristics of bloodstain patterns. This is an excellent reference but contains very little beyond his 1906 edition. It is of interest that bloodstains are discussed in 1st, 2nd, 3rd but not in 4th or 5th editions of this classic textbook.

1924 - ERNST ZIEMKE⁵ expanded on his earlier work of 1914 and further emphasized that a perpetrator can be totally free of blood stains even though circumstances indicate that he must be heavily covered with blood when, for example, the type of injury causes the arterial blood vessel "to empty itself in a strong [systolic] spurt." He stated that he had made five observations of this and Loock⁶ had recently reported making one. "It is possible if the perpetrator in the act of inflicting severe neck wounds stands behind his victim and is thus in the main protected from blood spatters by the body of his victim." In four of Ziemke's cases his observations indicated "that every trace of blood spatters on the perpetrator was missed, and in one case so minimal that the small blood stains on the clothing was discovered only with the greatest difficulty."

Dr. Ziemke elaborated on the chemical methods for the detection of blood of the period. He mentioned the catalytic properties of blood, crystalline methods, the significance of blood's albumen and iron content, tincture of guaiacum, benzidine, p-phenylenediamine chlorohydrate, leucomalachite green, eosin hydrate, and rhodamine to mention some of the chemical methods used at the time. He also reviewed spectroscopic and microscopic techniques for the presence of blood. He summarized his paper on this point with, "The number of chemical tests for the detection of blood are numerous leading

one to the conclusion that not one is totally satisfactory."

This excellent chapter included a table of the diameters of red blood cells for a variety of animals in addition to those in human blood. It also offered some rules to determine the volume of blood required to produce bloodstained areas. Overall, this is a most worthwhile contribution to the literature.

1928 - SYDNEY SMITH⁷ wrote an outstanding forensic medicine reference which contains considerable information on bloodstains and bloodstain patterns. Dr. Smith wrote that washed stains may be detected by means of the benzidine, guaiacum, or other color tests, but it is extremely difficult to obtain conclusive evidence of the presence of haemoglobin if the stain has been well washed. Combined with friction, a fresh blood stain may, of course, be easily effaced by any cold alkaline or soapy liquid. In all animals having red blood the corpuscles have a disc-like or flattened form. The chief microscopical distinction between the blood of man and domestic animals consists in a minute difference in the size of the corpuscles. From a forensic standpoint, therefore, the biological test involves the demonstration of blood and the demonstration of the origin of blood.

Dr. Smith briefly mentioned bloodstain patterns and shapes. "The size and direction of the spots vary according to the distance of the person wounded and the direction in which the spurting has taken place against the surface. I am sure he would be willing to accept the error of one of his conclusions in light of the current state of the art. He wrote, "The only clue on the dead body at all likely to help is to notice upon which side of a garment the blood has been shed and coagulated." Obviously, he did not study the effect of impact velocity in producing very small bloodspatter.

1928 - E. P. MINETTE⁸ conducted some interesting experiments in Hong Kong where he was a lecturer at the University. He was asked

by the police if he could determine the age of bloodstains on clothing of two Chinese who were suspects in a robbery and murder case. The defense was that the stains were fish blood and that they were very old. The precipitin test quickly resolved the first issue showing that the blood was of human origin. As Dr. Minette wrote, "The question of age of the stains was not answered so easily." He put samples of the bloodstained cloth in normal saline and incubated it at 37 degrees Centigrade from four to twenty-four hours. Dr. Minette then applied a screening test (guaiacum, benzi-dine, or Kastel Meyer) to the solution. He would then use a twenty percent solution of glycerine if the initial results with saline were negative.

Dr. Minette employed the usual serological procedures for establishing a stain as being from blood but his efforts to determine the age of the stain were interesting and detailed. Most experiments were conducted using a white cotton cloth but he also used Chinese paper and glazed paper. He performed chemical tests for blood on the solutions he obtained from incubation of bloodstains at various intervals of time. He reported his results after 6, 12, 18, and 24 hours, and 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 25, and 32 days. His conclusion was that, "Within certain limits the solubility of blood stains in constant solvents can be used as an indication of the probable age of the stain. Perfectly fresh stains differ considerably in this respect from those even a few hours old." Unfortunately, Dr. Minette did not include his conclusion for the age of bloodstains on the suspect's clothing that initiated his research.

1928 - DR. JOHN GLAISTER⁹ did not address bloodstain patterns in this article. He had already covered this subject quite well in his 1902 publication. He discussed species tests for bloodstains and reported that he was able to obtain positive results using the precipitin test on a one inch square of a woolen undervest in a fourteen and a half year old suicide case. He also mentioned a

case where a positive result was obtained "with mummy material 4000 years old."

1930 - CHARLES W. FRICKE¹⁰ wrote, "Pools of blood, their size, shape, depth, location and condition as to whether wet or dry, congealed or coagulated should be noted and the same applies to drops and spatters." He suggested that this should be done not only around the victim but in the entire vicinity of a homicide. He further stated that, "Modern science has not developed the perfect test for blood, but it has advanced to such a degree that various kinds of blood may be distinguished from one another and, while the expert can go no further than to say that a particular specimen is either that of a human being or that of an anthropoid ape, the ape possibility is so easily eliminated that we have a test which will make practically certain that human blood will be proven to be such." Today, with DNA, I am sure there are many who believe we now have such a test. We must excuse Mr. Fricke for stating what he understood to be the state of the art in 1930, however, as he was a Judge and not a scientist. He certainly deserves credit for bringing the significance of bloodstains to his peers through his writings in this forensic discipline.

Judge Fricke included information on bloodstains that he must have gleaned from others. Possibly, they were scientists who appeared in his court as expert witnesses. Regardless, he did document the following information. He suggested that all items that give the appearance of having blood on them must be preserved and examined. Blood does not always appear to be red. Exposed to the sun, dyed fabrics and chemicals can alter the color of blood.

The blood spots are round when the victim is immobile. When the victim is in motion the blood spot is pear-shaped with the small end in the direction the victim was walking. The opposite is true if the hand is being swung backwards. It is possible to find traces of blood on hands, clothing, weapons and floors even after

a thorough washing.

It would be interesting to learn from whom Judge Fricke obtained his knowledge of bloodstain evidence. Possibly, a review of his cases could shed light on this mystery.

1930 - PROF. DR. SCHWARZACHER¹¹ authored this scholarly article that was first published in Germany¹². It is an excellent review of the methods for estimating the age of bloodstains. Schwarzacher takes an analytical approach to the problem and considers many factors that were apparently ignored by earlier researchers. He wrote, "There are a variety of factors which determine the temporal alterations of bloodstains, e. g., the type of formation of a stain; the absolute amount of blood, the thickness of the stain, and the purely physical nature of the surface of the object stained (whether smooth or porous), are of fundamental importance in addition to the chemical and physicochemical reactions." Dr. Schwarzacher availed himself of colorimetric instrumentation of the period very well and classified the color hues in the Ostwald color cone, "the resulting shades of color are evident on a characteristic space curve, in a constant progression." He described the value of determining the solubility of dried blood and how the effect of radiation might be evaluated using the non-filtered light of a quartz mercury lamp. A working curve was generated that might be used for estimating the age of an unknown bloodstain, however, it must be concluded that, at best, it would be difficult to use this information in a practical situation. In fact, Schwarzacher wrote, "In concluding, we must repeat that determination of the age of bloodstains is only possible under favorable conditions. If such is the case, artificial ageing will disclose within fairly narrow limits the approximate age of the 'unknown' stain."

1930 - RALPH W. WEBSTER¹³ wrote that one will always find blood in case the wound be such that external bleeding has occurred. However, there are many fatal wounds that are not associated with

external bleeding, so that under these conditions no stains would be expected. The base being nearer the source and the bulk of the blood being driven toward the stem end, the length of the stem or narrow end indicating the speed of the impact.

According to Webster, human blood begins to clot in two to three minutes and is completely clotted in seven to nine. The time required for blood to dry has some importance in determining the possible age of the stain. A fresh blood stain usually has a fairly bright scarlet color. If the stain be in the direct sunlight, the change to brown will be much quicker, if on thin fabrics like linen, the color may be a gray shade. The fresher the stain, the greater and more rapid is its solubility. This is not the same phenomenon as observed by Dr. Kirk in the Sheppard case, however, as he was comparing the solubility of blood samples known to be of the same age.¹⁴

1930 - CALVIN GODDARD¹⁵ illustrated a somewhat unusual and normally insignificant fact that was evident from the large pools of blood on the concrete floor of the garage of the S.M.C. Cartage Company, 2122 North Clark Street, Chicago following the February 14, 1929 St. Valentine's Day Massacre of the "Bugs" Moran Gang. The floor of the garage was smooth and flat, but not level. Blood that ran from the heads of three of the five victims ran in parallel streams down over their right shoulders away from the wall they faced when they were executed. In the words of Calvin Goddard: "As to the motive for this mass murder, it was commonly conceded that the gang had rivals, who would find business better if competition were less keen. A dead competitor sells no beer."

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