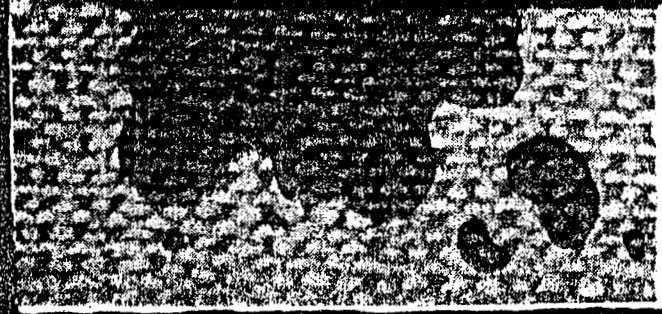


Józef Radzicki

BIBLIOTEKA
Kryminalistyczna

Ślady

KRWI
W PRAKTYCE ŚLEDCZEJ



7
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WYDAWNICTWO ZAKŁADU KRYMINALISTYKI
KOMENDY GŁÓWNEJ MO • WARSZAWA

BIBLIOTEKA KRYMINALISTYCZNA

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Do użytku wewnętrznego

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WYDAWNICTWO ZAKŁADU KRYMINALISTYKI
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Warszawa

BLOODSTAIN PRINTS
IN
PRACTICE OF TECHNOLOGY

DR. JOZEF RADZICKI

Warsaw, 1960

A copy of this book was given to IABPA Historian, Herbert Leon MacDonell, by Michael F. Carrick who found it while visiting Moscow. It seemed appropriate to have portions of this book translated and made available to members of IABPA to have an early reference that describes arterial gushing, a subject that, unfortunately, is often ignored.

This text was translated by Ewa Dornish, a graduate student majoring in languages at Cornell University. Ewa is a native of Poland. She selected the material that she translated as being the most appropriate according to the guidelines presented to her. This book also contains a few diagrams on where to look for bloodstains on clothing and how to package bloodstain evidence but that has not been included here. A few minor grammatical changes were made by Mr. MacDonell to allow better understanding.

CHAPTER 4

ESTABLISHING THE CONDITIONS IN WHICH THE BLOOD STAINS ORIGINATED

The type of surface on which the blood stains appear must be taken into consideration. Blood falling onto hard smooth surfaces makes similar looking stains, whereas on surfaces that are porous, absorbent, etc. we find stains differing among themselves in shape.

With respect to the mechanisms by which they are formed, blood stains can be divided into three groups:

I) Blood stains resulting directly from extravasation:

- 1) drops of blood
- 2) gushes of blood
- 3) streaks of blood
- 4) trickles and pools of blood

II) Blood stains resulting from the application of various instruments:

- 1) spatter of blood
- 2) blood stains coming from bloody objects:
 - a) cast-off drops
 - b) due to direct contact

III) Blood stains which are the result of wiping off or removing blood stains.

I. Blood flowing slowly out of a wound falls due to gravity in drops and forms on the target surface a pattern which depends on:

- 1) the dropping distance
- 2) the type of target surface
- 3) the impact angle
- 4) whether the person dripping blood moved or not

A drop falling at a right angle onto a smooth horizontal surface forms a roundish stain whose appearance depends on the dropping distance. A drop of blood falling the distance of up to 20 cm forms a roundish stain with almost completely smooth edges (Figure 9). A drop falling a distance of 25 to 75 cm has scalloped edges (Figure 10). When the dropping distance is more than 100 cm,

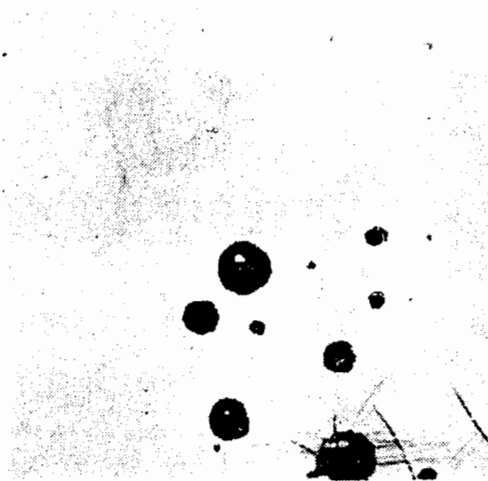


Figure 9. Distance drop 20 cm,
drops falling at a right angle.

the stain shows characteristic spines (see Figure 11). The length and shape of those spines depend on the dropping distance.

When a drop of blood falls a longer distance, e.g. 2 m, we find spatter of individual small drops that can be counted, beside



Figure 10. Stain formed by a drop
of blood falling a distance of 75
cm. showing scalloped edges.

the main stain. The fall of a drop higher than 2 m usually results in spatter of uncountable additional blood spots, in addition to the main stain (see Figure 12). This is the shape and appearance

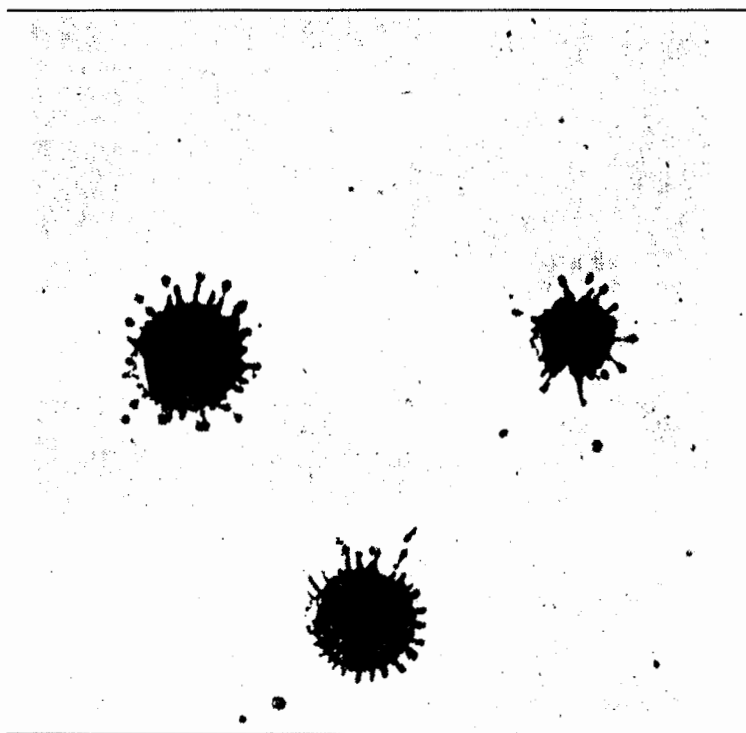


Figure 11. Drops of blood falling at a right angle from a distance of 100 centimeters.

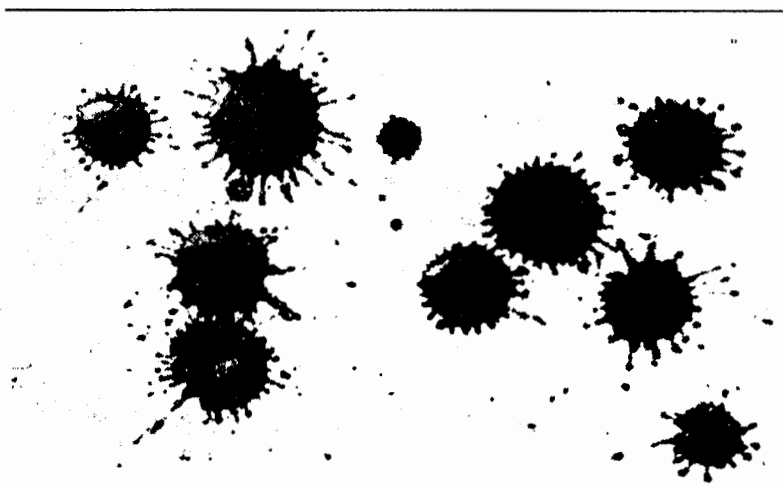


Figure 12. Drops of blood falling from a distance of 3 meters, at a right angle.

of stains of blood dripping from a person standing still or moving very slowly. Stains left by a man running look differently. They impact the target surface at an oblique angle. The faster the runner, the more acute the angle. Thanks to kinetic energy, a drop of blood hitting a smooth surface at a certain impact angle, elongates and becomes an oval stain with an elongated appendix aiming in the direction of the movement of the body. Or, it becomes a flask-shaped (exclamation mark - shaped) stain, aiming with its narrower part in the direction of movement of the person dripping blood (Figure 13). Sometimes, around the narrower part of the stain, we find radially arranged spines and some spatter. However, spines or spatter never appear on that side of the stain which marks the direction from which the drop fell.

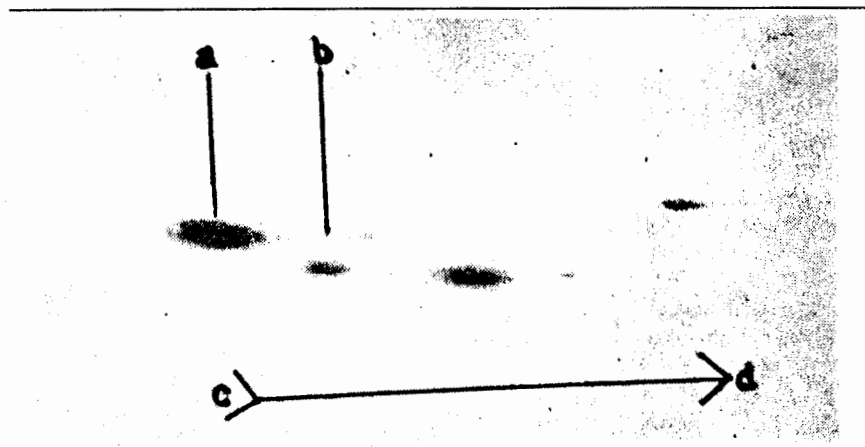


Figure 13. Flask-shaped blood stains formed while the body was in motion.
a) the wider part of the stain
b) the narrow elongation of the stain
c/d) the direction in which the body moved

The mechanism of creation of elongations is as follows: a drop falling onto a smooth surface, touches it first with its lowest part. This part forms the wider part of the stain. The upper part of the drop, falling on the blood from the lower part of the drop, moves forward with a sliding motion, causing elongation of the stain into the shape of an exclamation mark (a flask), which aims with its narrower end in the direction of the movement of the body. The narrower part of the exclamation mark often contains a thicker layer of blood. The two parts, drying at different rates, may break up still further.

It must be remembered though, that not all blood drops act the same: some of them form several elongations (spines), others divide into the main stain and spatter drops, instead of forming flasks or exclamation marks.

Patterns left by a person who was moving their blood covered hands while running have a special importance. Patterns of two types can be formed in such situations, with elongations pointing in opposite directions, i.e. in the direction in which the person was running and in the opposite direction. Those stains are formed in the following way: the person running motions forward with their hands, blood drops break off and are cast forward; as a result, the stains formed have flask-like elongations pointing in the direction of the run; when the hands motion backwards, the falling drops form slightly oval or elongated shapes, pointing backwards with their narrower ends (in the opposite direction from the run). Stains of this origin may also appear as stains with several spines or spatter, then, the small drops point in the direction of the movement of the hand.

Stains resulting from a gush of blood out of an artery look somewhat different. Figures 14 and 15 show stains resulting from a gush of blood hitting a smooth vertical surface at a right angle,



Figure 14. Blood falling at a right angle onto a vertical surface.

- a) the place where the blood fell onto the surface
- b) the trickle of the blood going down



Figure 15. Blood falling at a right angle onto a vertical surface.

from a short distance. Characteristic spatter is evident (which resulted from collision with the surface), as well as streaks of blood flowing down the surface. Stains from blood spouting onto a vertical surface are more or less elongated depending on the impact angle. They have characteristic shapes of spines, exclamation marks, commas or flasks, pointing with their narrower end in the direction in which the blood was gushing. Figures 16 and 17 show stains with their narrow parts (necks) pointing upwards and slightly to the right. This indicates that blood was spouting upwards from the left. The wider parts of the spots are pointing in the direction from which the stream of blood came. At the narrow end of the stain one can see a slight downward bend and a swelling due to accumulation of blood drawn down by gravity. Some stains are also accompanied by spatter of small, comma-shaped spots going up and to the side, as well as streaks of blood leading from the main stain down. Those streaks are of varying length, depending on the amount of blood falling.



Figure 16. Shape of stains that fell onto a vertical surface at an oblique angle.

- a) flask-like elongated blood stains
- b) spatter
- c/d) arrow pointing in the direction of the movement of the blood

Blood falling down onto a smooth vertical surface, creates streaks and/or flask-shaped stains pointing down with their narrow parts, which sometimes are very long and always swollen at the end, as can be seen in Figure 18.

The look and shape of a blood stain can indicate the original position of the victim. Description of blood stains found where a murder by stabbing was committed. On the wall, 0.5 m above the top of the bed, there were stains of blood shaped like flasks, pointing upwards and somewhat to the right with their narrow parts, which were bent downward at the end. This indicated that the victim received the first stabs while lying in bed and that blood was gushing upwards, forming the stains described above. Blood was gushing up somewhat obliquely, that is why the flasks were pointing to the right.

Not all stains resulting from a gush of blood from an artery have characteristic (flask-like) shape. When blood coming out of an artery hits a surface, there will also be, within a narrow area, streaks and larger, shapeless stains. They will not be present if the person bleeding was moving or the outpour of blood was too short.

When blood flows out of wounds, streaks of blood can appear on the body of the victim or the killer or on other smooth vertical surfaces on which blood fell. Their length depends on the tempera-

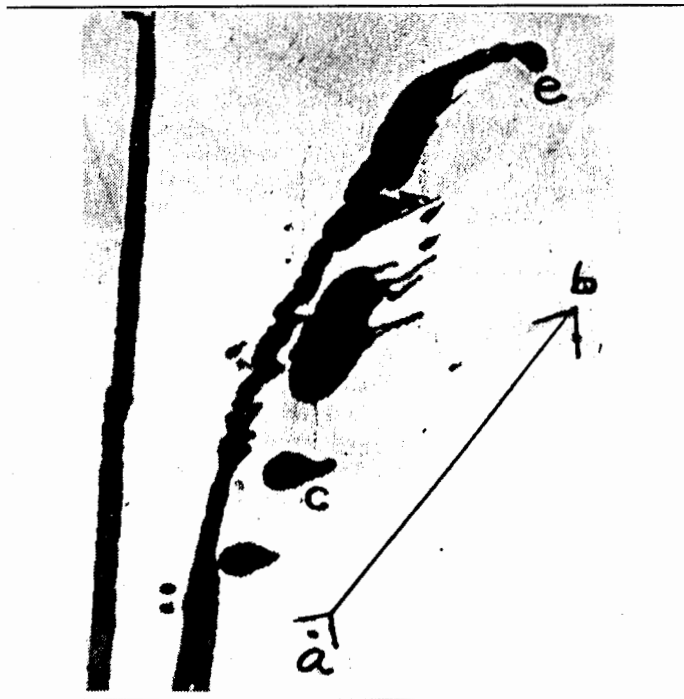


Figure 17. Stains of blood falling onto a vertical surface, at an oblique angle, from beneath, upwards.

- a/b) arrow pointing in the direction of the movement of the blood.
- c) flash-like elongations of the blood stains, with their "necks" pointing upwards (slightly to the right)
- d) trickles of blood going down
- e) characteristic bending of the blood stain and downwards swelling of the tip

ture of the environment and of the surface (on which they are deposited), and on the amount of blood flowing. The blood flows down due to gravity and forms streaks which are swollen in their lower parts because the blood accumulates there.

Blood coming out of arteries, falling at a right angle onto a smooth horizontal surface, forms shapeless stains and spatter. However, on horizontal surfaces, we can sometimes find, besides the stains just described, also small, elongated, flask-shaped stains. They appear when the source of blood is very close to the horizontal surface and blood falls on the surface at an acute angle (e.g. when victim is lying on the floor). When more blood flows onto a horizontal surface, then, depending on the amount of the blood and

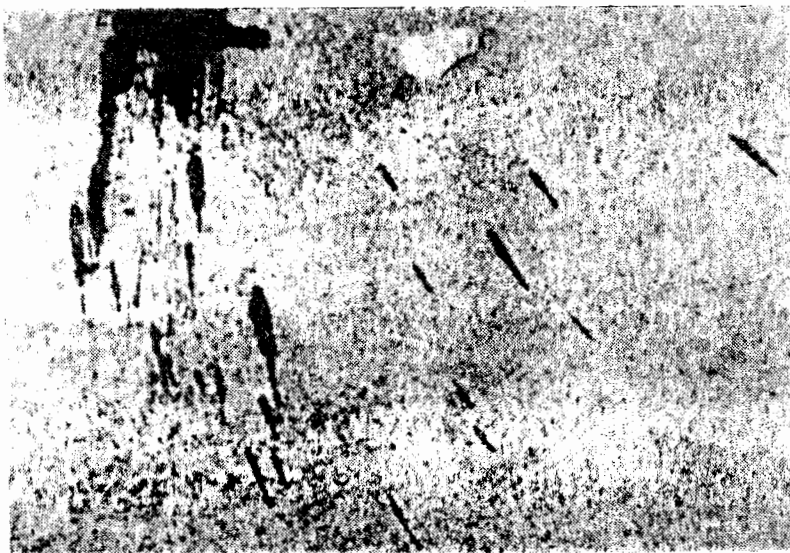


Figure 18. Blood falling onto a wall, downwards (at a slightly oblique angle).

smoothness of the surface, smaller or larger pools and trickles of blood form. On uneven surfaces there may be more of such pools, and they will be connected by thin bridges (of blood), due to the fact that blood gathers in depressions and after filling them up pours out into the neighboring hollows. The original pool of blood, i.e. the one into which the blood fell directly from the wound, will often be surrounded by spatter. The secondary pool, the one into which blood poured from the original pool, is never surrounded by spatter.

II. Blood stains resulting from the application of various instruments.

There are two types of such blood stains; 1) those that result from repeated hitting of a blood covered area (e.g. an open wound) with a blunt instrument - spatter of blood; 2) those coming from a bloody instrument, either cast-off blood or stains due to direct contact with that instrument. The shape of blood stains formed by spattering depends on the impact angle. The blood falls onto a smooth surface at an acute angle, flask-shaped (exclamation mark-shaped) stains will appear. They resemble those stains which form when blood comes out of arteries (described above). There is, however, a difference between those two types of blood stains. Spattering blood spreads over a larger area, in the form of individual stains and/or agglomerations of stains. At the same time, blood gushing out of arteries usually covers narrow areas and, in addition to flask-shaped stains and spines, forms also larger, shapeless stains.

As has been mentioned before, the shape of a blood stain formed due to spattering depends most of all on the angle of impact onto a smooth surface. The more acute the angle, the longer and narrower the stains. If blood hits a surface at a right angle no elongation of the stain appears. Instead, a roundish stain appears with spines around the edge, often accompanied by large "satellite" spatter.

Spatter resulting from blows to exposed parts of the body is smaller than that coming from hair-covered areas. It is because hair retains a lot of blood (accumulates it) and repeated blows on hairy parts of the body can cause spattering even on surfaces distant from the victim.

Description of a murder case. A woman is murdered, her body dismembered. It has been established that the murder was committed in a warehouse. One of the wooden pillars in the warehouse is covered with numerous bloodstains. Within a very narrow area on the pillar there is an agglomeration of hundreds of specks, small and medium-sized drops of blood, result of spattering. They become more scarce on the higher parts of the pillar, however, small individual stains reach all the way to the ceiling. On the base of this pillar (covered with a sheet of lacquered metal), there were streaks of dripped blood and also spatter. On the floor, dried out traces of trickles and pools of blood were discovered. These traces made it possible to establish that the victim had been hit on the head while standing near the base of the pillar and she fell there. While lying she received further blows on the head and drops of spattering blood formed stains on near-by walls. When the killer was raising the weapon overhead, before delivering a blow, cast-off drops of blood reached the ceiling. Since the floor was slightly slanted, blood flowing out of the wounds formed pools and trickles.

If blows with a blunt instrument are delivered in such a way that the whole surface of the instrument comes in contact with the surface of the body, blood spatters in all directions. If the blunt instrument falls onto a wound and the surface of the instrument and the surface of the body form an acute angle, blood will spatter more directionally.

Blood may drip from bloody objects, forming stains whose shape depends on whether objects dripping blood were in motion or motionless. Thus, they resemble in shape stains described before (i.e. stains formed by blood flowing directly out of wounds).

III. Blood stains which are the result of wiping off or removing stains. Scraping off blood-streaks of blood may remain. Wiping off or rubbing off the bloodstains get smudged.

[No specific text was translated regarding this point]

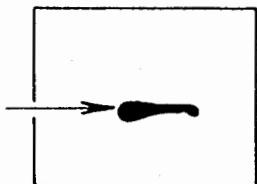
[The following translation refers to the E. Knobloch murder case that occurred in 1937]

A man is suspected of murdering his wife (he claims she committed suicide by drowning herself). Three months after the woman's death, the police investigate in the couple's apartment. On the wall against which the man's bed (the right side bed) was standing, in the corner next to the wife's bed (the left side bed), four very small stains were found shaped like exclamation marks. Their shape and appearance indicated that they were stains of blood which fell onto the wall from the left bed. On the left bed, on the upper part of the outer side edge of the bed, dry stains were found of roundish shape with the diameter of about 1 mm. They undoubtedly (according to the author) came from blood falling at a right angle. Experts concluded that stains like these are usually due to repeated blows on the hair-covered part of the head. This conclusion was later confirmed by the husband who confessed to killing his wife by hitting her on the head with a hammer several times.

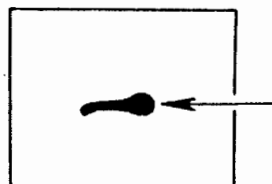
[This partial translation of chapter four contains the most significant information pertaining to bloodstain pattern interpretation. Radzicki made reference to many of the classic publications that were available to him. These included the works of Gross (1954), Piotrowski (1895), and Walcher (1939). Interestingly, Balthazard (1939) was not mentioned. Possibly the French literature was not as readily available in Poland as the German?]



a) blood falling at a right angle

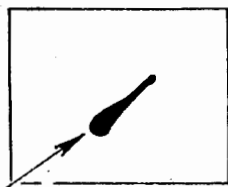


- from left to right



- from right to left

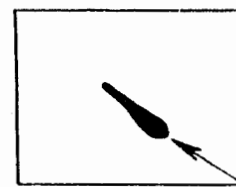
b) blood falling from the side



- from left to right

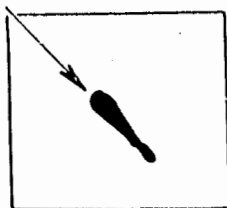


- straight

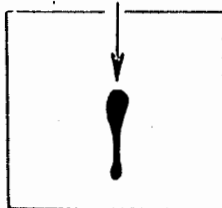


- from right to left

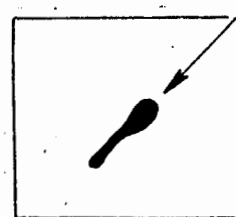
c) blood falling upwards



- left to right



- straight



- right to left

d) blood falling downwards

Figure 19. Various bloodstain shapes resulting from single drops of blood.