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Drops of Death

A New Look at Bloodstains Is Changing Forensics

By Frank Thadeusz

Bloodstain analysis is gaining new ground thanks to research of forensic scientists in Germany. Their insights shed light on how investigators can analyze blood spatters left behind at crime scenes and could force closed murder cases to be reopened.

The rolling pin is traditionally seen as a woman's tool. She can use it to roll out dough -- or to smash her husband's skull.

The latter tends to be rather bloody, so it's no surprise that the seemingly harmless kitchen utensil is part of the equipment at Germany's only institute specializing in bloodstain pattern analysis, where it's stored between blood-splattered pieces of paper.

The lab uses very little high-tech and modern equipment. Inside the old barn in Usingen, a town in the western German state of Hesse, the creative chaos of a workshop prevails. Much of the equipment seems to have come directly from a hardware store.

Dr. Silke Brodbeck, the director of the institute, turns out not to be a morbid forensic scientist but a tidy and introspective woman. Brodbeck regularly assembles medical experts and criminologists in the barn for demonstrations in the art of interpreting bloodstains and blood splatters at crime scenes. Blood drop patterns can provide important clues on how a murder unfolded. Brodbeck reconstructs the course of events at crime scenes for police and public prosecutors throughout Europe.

Brodbeck will soon travel to the Scottish city of Edinburgh to attend a conference of the International Association of Bloodstain Pattern Analysts. Experts in the field are looking forward to the event with great anticipation. "We are on the verge of a completely new classification system," says Brodbeck.

'The Fugitive'

Recently, ideas that were once seen as certainties in the field have been put to the test. Brodbeck believes that the conclusions forensic blood experts were reaching only two decades ago are worlds apart from current insights in the field. She even ventures to predict that, in light of the most recent revelations, a number of criminal cases will have to be reopened.

Early on, criminal science pioneers realized that bloodstains on walls, ceilings, floors and furniture offered important information that could help convict murderers. Eduard Piotrowski, a doctor in Krakow, Poland, wrote the first standard work on the subject, "On the Origins, Shape and Spread of Bloodstains Following Gashes to the Head," published at the University of Vienna in 1895.

Piotrowski gained the insights he wrote about by smashing the skulls of rabbits in front of a white screen. But the experiments, which would be incompatible with modern-day animal welfare guidelines, did not produce any recognized science. The young branch of research soon fell out of favor in Europe.

It was only a spectacular crime in the United States that helped the discipline stage a comeback. In 1954, Marilyn Sheppard, the wife of an up-and-coming surgeon, was beaten to death in her bed. Her husband, with his reputation as a philanderer, soon became a suspect in the murder.

Sam Sheppard's case was not helped by the discovery of a piece of blood-soaked material, on which investigators claimed to have found the imprint of surgical tongs. Experts like Brodbeck now know that they were bloodstains that developed as a result of creases in the material.

"A technically incorrect expert report can make the difference between conviction and acquittal," says Brodbeck. Sheppard was sentenced to life in prison, but he was acquitted after 12 years. He was a broken man when he died in 1970. The courts continued to deal with his case, which served as the basis for the character of Dr. Kimble in the legendary television series "The Fugitive," until 2002. What happened on

the night of the murder remains unexplained to this day.

Errors in Reasoning

The trial of Dieter Riechmann, a German national who has been incarcerated at the Florida State Prison in Raiford for 25 years, was also marred by uncertainties in a forensic report. Riechmann and his girlfriend of 13 years, Kersten Kischnick, were driving through Miami in a rental car on the evening of Oct. 25, 1987 while on vacation. According to Riechmann's account, a black man shot Kischnick in the head as she was sitting in the passenger seat, after she had asked him for directions. The woman died, and Riechmann claims to have witnessed the crime from the driver's seat.

But a government forensics expert questioned his account. Investigators had discovered stains on the inside of the driver's door, which they identified as the murdered Kischnick's blood. The forensic scientist argued that if Riechmann had been sitting in the driver's seat, as he claimed, the spattered blood could never have reached his door.

That assumption has now been exposed as nonsense. The trajectory of splattered blood is curved and not straight, as was assumed at the time. It is because of this insight that bloodstains can now be evaluated in their downward movement.

"That's why, of course, the blood could have been splattered past Mr. Riechmann and onto the door," says Brodbeck.

Errors in reasoning from the 1970's probably also lead to a number of other false early conclusions. At the time, ballistics specialists were trying to figure out the amount of energy with which blood is hurled through the air after the use of a firearm. The scientists applied the bullet energy of a projectile directly to the flight characteristics of blood and arrived at the following principle: Small blood splatters were only created by high levels of energy, while less energy produced large splatters.

"But this is nonsense, based on what we know today," says Brodbeck. "For instance, small splatters can develop with all forms of energy influence."

Forensic scientists have only known how blood splatters actually form and expand since scientists conducted an experiment in which they shot into a blood-soaked sponge with a pistol, and filmed the process with a high-speed camera.

Meaningful Drops

Many factors complicate the work of investigators. Sometimes insects distort bloodstains. Flies, for example, can suck up the blood from individual stains and regurgitate it elsewhere. To rule out such inaccuracies, forensics specialists have to analyze each drop individually.

Criminals who try to obliterate all traces of their actions at the crime scene make the job especially difficult. They often try to clean up the bloodbath resulting from the murder with cleaning utensils, but they often make the same mistake: In their haste, they overlook meaningful bloodstains in peripheral locations.

"No one wants to remain at the crime scene for long. There is a strong tendency to get away as quickly as possible," explains institute director Brodbeck. She says that she has never inspected a crime scene without at least one area where those meaningful drops of blood, bearing witness to the death of the victim, can be found.

Paintbrushes aren't very helpful to the perpetrators, either. For forensics specialists, bloodstains hidden under a coat of paint are often relatively easy to find. The case of an American who worked in a crematorium, where he incinerated the body of his wife, whom he had murdered, offered important insights for this discipline.

Owing to a technical problem, the furnace didn't reach it maximum combustion temperature. Although the body was completely incinerated, the police found patterns of dark adhesions in one part of the furnace. As it turned out, a few bloodstains from the victim were preserved in the flames, so that investigators were even able to obtain usable DNA samples.

Bloodstains can survive temperatures of up to 800 degrees Celsius (1,472 degrees Fahrenheit). For a long time, forensic scientists found it almost impossible to secure such artifacts. When they attempted to

remove the layer of soot, the bloodstain was often destroyed in the process.

A few years ago, researchers at Scotland Yard discovered a new material that produces far more effective crime scene analysis. They painted a film of latex milk onto the burned surfaces. When it hardened and was pealed off, the soot layer came off with it.

The miracle substance was nothing new. Liquid latex is normally used to make latex costume masks.

Translated from the German by Christopher Sultan

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