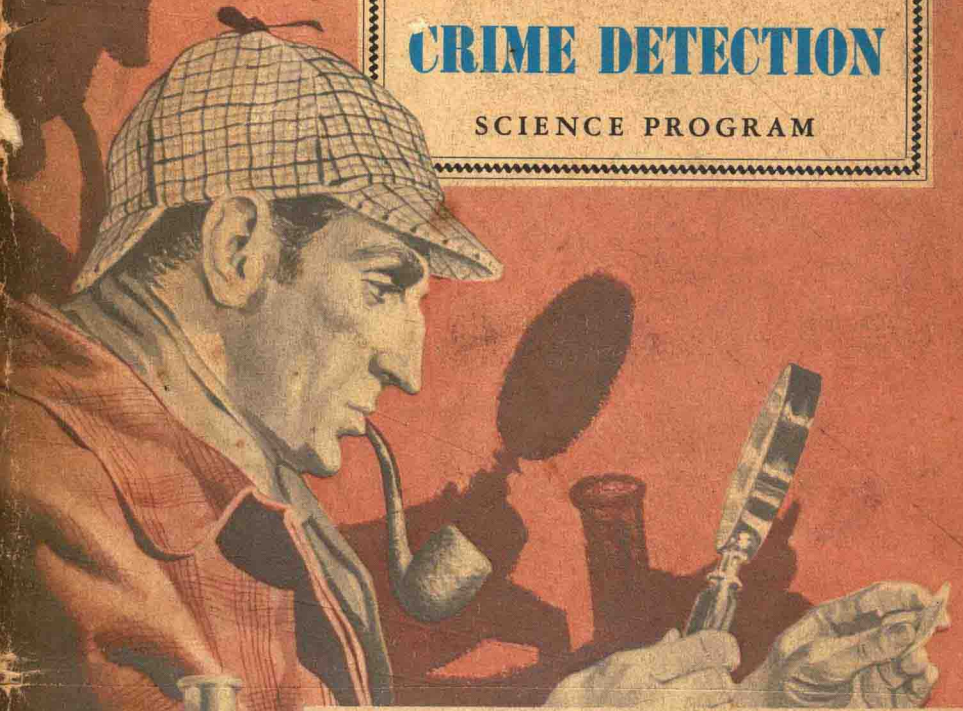


Science Service

CRIME DETECTION

SCIENCE PROGRAM



SCIENCE
AND
CRIME DETECTION

by

DENIS BRIAN

NELSON DOUBLEDAY, INC.

•

GARDEN CITY, N. Y.

*Prepared with the cooperation of
Science Service*

We gratefully acknowledge our appreciation for the cooperation extended by J. Edgar Hoover and the Federal Bureau of Investigation in the preparation of those portions of this booklet which concern the FBI.

©Copyright 1960, 1963

BY NELSON DOUBLEDAY, INC.

PRINTED IN THE UNITED STATES OF AMERICA

SCIENCE
AND
CRIME DETECTION

by

DENIS BRIAN

NELSON DOUBLEDAY, INC.

•

GARDEN CITY, N. Y.

*Prepared with the cooperation of
Science Service*

We gratefully acknowledge our appreciation for the cooperation extended by J. Edgar Hoover and the Federal Bureau of Investigation in the preparation of those portions of this booklet which concern the FBI.

©Copyright 1960, 1963

BY NELSON DOUBLEDAY, INC.

PRINTED IN THE UNITED STATES OF AMERICA



SCIENCE AND CRIME DETECTION

FOR THOUSANDS OF YEARS, some criminals have gotten away with their crimes while innocent people were punished. Why? Because there were no sure ways of telling men apart or linking the criminal to the crime. If witnesses thought a man was the one seen killing or stealing, then just because he looked something like the real criminal, that man was accused, arrested, and even tortured. Often a prisoner under torture would confess to a crime he had not committed.



1.

ROYAL CANADIAN MOUNTED POLICE

Troopers of the Royal Canadian Mounted Police ride out from their headquarters. Their uniform may be glamorous, but their job is as arduous as that of any other police officer anywhere in the world.

Over three thousand years ago a Pharaoh's tomb in Egypt was robbed of its treasures. One of those accused confessed when "examined" under the lash. To make sure he was telling the truth, the judge had him led to the tombs and ordered him to show which one he had robbed. He indicated one of the tombs of the king's children from which nothing had been stolen. Was he guilty? No one will ever know.

Men suspected of crimes have had their feet and hands crushed between stone rollers until they said they were guilty. These and other tortures, such as the rack and thumbscrew or the "water cure" (in which liquids were forcibly poured into the mouth), could make most men confess to anything.

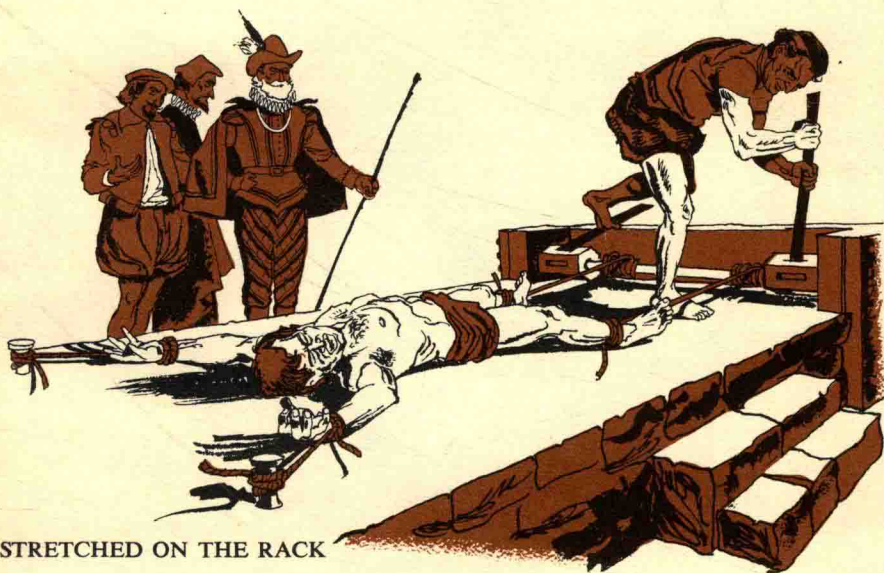
Women accused of witchcraft were thrown into deep water. If they sank, they were judged innocent. If they floated, they were considered guilty and burned to death. Those who sank usually were left to drown, so that innocent and guilty alike perished in these cruel tests. In a village where some cattle had died, a stranger would be hauled before the court by a pack of superstitious villagers and made to undergo trial by ordeal. He would have to plunge his arm into boiling lead or water. If his arm healed quickly, he was considered innocent.

Even today torture is used to extract confessions. The horrors of the Inquisition have been surpassed by the methods of the Gestapo and investigators in other police states.

Asia was one of the first places where men tried to obtain the truth about crime without using torture. Suspects were each given dry rice to eat. Those who could not swallow all their rice, or who failed to spit it out when requested, were pronounced guilty. This had some sense in it since emotions affect the working of the salivary glands. A frightened person, one perhaps trying to hide a guilty secret, has difficulty swallowing and spitting.

A test of this kind was not truly scientific, yet was more likely to yield the truth than the thumbscrew. Its weakness? For one thing, no allowance was made for inability to swallow because of a sore throat.

"Magic" was another method used. Suspects were told that they would be exposed to a "magic" donkey. One by one they would be sent into a darkened room to pull the animal's tail. "If you are guilty," the magistrate would tell them, "the donkey will bray when you pull its tail." Secretly the magistrate would have covered the donkey's tail with soot. After the test the hands were examined. Those without soot were considered to have been afraid to pull the tail and so were judged guilty. The drawback of this system was that as soon as the method was known, both innocent and guilty men would pull the tail.



STRETCHED ON THE RACK



The Sword of Solomon

ONE JUDGE of the old days, about three thousand years ago, is still known for his wise decisions. He was Solomon, king of Israel. When two women claimed a child to be theirs but brought no evidence or witnesses, Solomon called for a sword. Then he ordered the child to be divided in two, so that each mother would get an equal half. Immediately one of them cried out, "O my lord, give her the living child, and by no means slay it." Solomon judged the woman who cried out to be the real mother of the child and he awarded it to her. He assumed that rather than let her child be killed she would give it away to another.

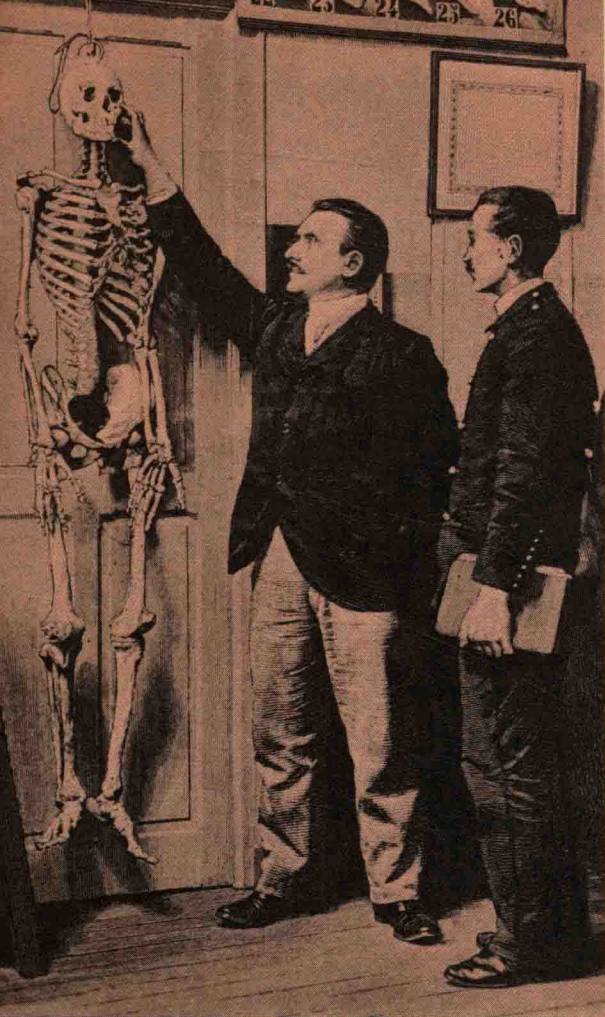
Today, footprints are taken of babies soon after they are born, and this is a certain way of making sure that a baby born in hospital is given to the right mother when a question of identity is raised. Blood tests are frequently made to establish the identity of the father of a child. Though these do not indicate for certain that he is the father, they may indicate if he is not.

An improvement in trials took place when crimes were considered to be an act against the government instead of against another person. It was then that a prosecutor came into existence, a man whose job was to find evidence of the criminal, charge him, and expound it at the trial. His opposite number was the defense advocate whose job was to find evidence defending the innocence of the accused. Both of them use detectives to help them in this task. Scientific evidence in the early days was rejected by courts because of errors and false claims, and experts were consulted only when it was absolutely necessary. Even today the evidence of a psychiatrist, for example, is regarded by many a jury with suspicion, especially when psychiatrists cannot agree among themselves.

Science really started to develop when scientists learned to take an objective attitude toward experiments, accepting only those as proved which could be repeated by other scientists of equal knowledge and skill. Most of the progress in applying science to the investigation of crime is surprisingly recent, developing as science itself developed during the past one hundred and fifty years.

Bone Measurements

A GREAT STRIDE in the identification of criminals was the discovery that measurements of the bones could distinguish individuals. A bright young clerk in the Paris police department, Alphonse Bertillon, saw how



In this old print, an instructor of the French Police points out the Bertillon system of identifying criminals by comparing body measurements. Notice the different types of ear in the painting.

this could be used in the fight against criminals. No longer would they be able to hide behind false names and false whiskers. He began to record their bone measurements, which he filed with full face and profile photographs. The scheme worked wonderfully and spread everywhere. For the first time previously convicted criminals faced identification with their previous records.

The Bertillon system was welcomed throughout the United States. In the past "wanted men" had been sketchily described as follows:

\$150 REWARD

BROKE JAIL!

WILLIAM RAVENSCRAFT, American, light hair, about 5 feet 10 inches high, genteel dress, thin in flesh, has a crease in his under lip, about 28 years of age.

\$50 will be paid for this man delivered to the Chicago Jail.

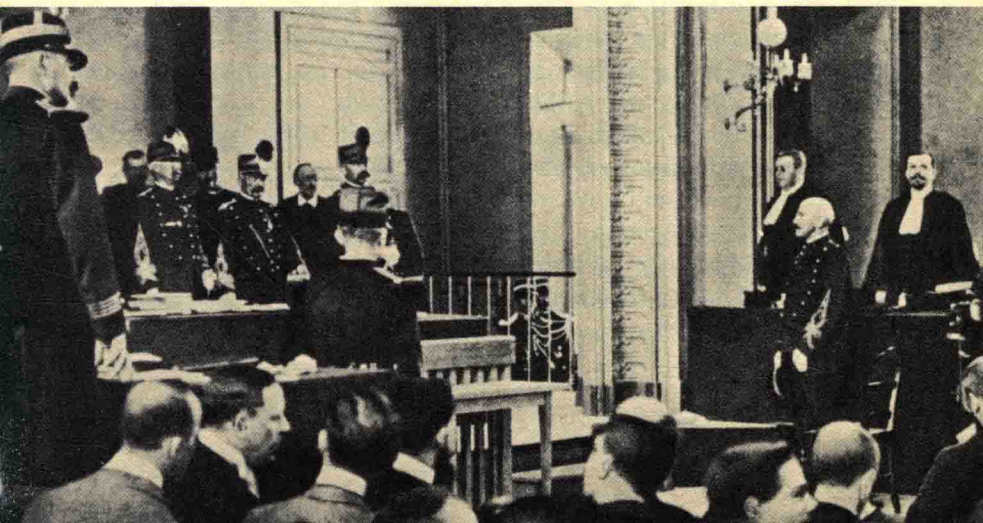
\$25 for any private information of the above described.

I. Cook, Sheriff, Cook County, Chicago.

August 4th, 1847.

Under Bertillon's system, photographs of criminals together with detailed bone measurements made their identification much more likely. The lesson of this early use of science is incomplete without an account of the scandalous Dreyfus case and the false identification of handwriting into which Bertillon was suborned by political pressure and for which he utilized his reputation as an expert in criminology.

Taken more than 60 years ago, this photograph shows Capt. Dreyfus standing bareheaded before the Council of War during his trial.



Alfred Dreyfus, a French army captain, son of a Jewish manufacturer, was convicted of being a German spy, and in 1895 sent to Devil's Island for life. The main piece of evidence was a letter which revealed French military secrets. It had been found in the wastebasket of the German military attaché at the Paris Embassy. In order to pose as a handwriting expert, Bertillon invented a "new system" of handwriting identification and reached an "opinion" that the writing of the letter was that of Dreyfus.

Eventually, when genuine handwriting experts examined the letter, it was proven that Dreyfus was innocent and the writing was that of Major Esterhazy, a Hungarian in the French army. For Bertillon to have called himself an expert on something about which he knew very little was a scandalous blot on the otherwise fine record of his achievements.

The bone-measurement (anthropometry) system worked with great success until one day in 1903, when a strange thing happened. A prisoner, Will West, arrived at the Leavenworth Penitentiary in Kansas. Another Will West was already there, serving a life sentence for murder. Not only were their names the same but so were their bone measurements, and their faces were so alike that nobody could tell the two men apart. As a sure method of identification the Bertillon system had failed. The theory that no two men are exactly alike was not wrong, but it proved to be not their bone measurements alone which showed the difference. It was their fingerprints.

Fingerprints

IT WAS the English scientist Sir Francis Galton who, after experimental research, concluded that fingerprints are a certain means of identification. Single prints had been used as signatures for identification purposes for many years in China and other Asian countries where few of the population were able to write. Another Englishman, Sir Edward Henry, Inspector General of Police in Bengal, developed a method of classifying fingerprints. It described the combination of all ten fingerprint patterns in terms of a numerical formula. Such a formula, of course, can be transmitted by wire or radio all over the world in a few seconds.

Scotland Yard adopted the Henry System in 1902, and United States record bureaus followed suit in 1903 and 1904.

Science had well and truly entered the fight against crime. Now the criminals tried to outwit science. They had their fingerprints removed by surgery. But they could have spared themselves the trouble. Science was usually one step ahead of them, identifying injured fingertips even more easily than whole ones.

Sir John Nott-Bower was, until he retired in 1958, England's number-one policeman. His title was Commissioner of the Metropolitan Police. He is seen here in his office at Scotland Yard.



2.

SIR JOHN NOTT-BOWER

Scientists found ways of tracing criminals by blood, by hair, even by invisible specks of dust. How could a criminal hope to remove evidence of his crime when it was invisible to him?

Dust collected from the clothes of a suspect by a vacuum cleaner may show that he was present at a crime scene. Dirt from the wax in a man's ears has identified him as a murderer. Edmund Locard, famous French Police Laboratory scientist, said he could tell the particular work of 92 out of 100 manual laborers by examining the dust in their ears.

In their laboratories today scientists quickly test blood to see if it is human or animal, examine hairs, glass, paper, wood, and mineral objects to discover where they came from. A crime is an illegal act at a place. Materials foreign to that place, which may have been left there by a criminal, link the man to the place. Also, materials naturally found at the place but consciously or unconsciously taken away by the criminal will link him to the place.

Forgers, blackmailers, and writers of poison-pen letters must face the fact that today scientists can trace the crime to them by the very paper, pen, or typewriter they used. Hit-and-run automobile drivers, no matter how fast they drive away from the scene of their crime, will have left some trace, per-

haps a tiny speck of paint from the automobile, which will link them to the crime.

A "law" that applies to both natural and man-made things traps the criminal these days. The law asserts that no two things—the leaves on a tree, the fingerprints of a man, the words typed by two different typewriters, or the bullets fired by two different guns—are exactly alike. They may seem so to the naked eye, but a scientist can detect the differences.

Many of the laboratory instruments and tests available to science are now being used in crime detection. Some were developed for quite different purposes and have been modified for this special use. The spectroscope, used for chemical analysis and to see what stars are made of, shows the presence of gas and poisons in the blood. The spectrophotometer identifies dyes in minute amounts. The fluoroscope, with which doctors observe signs of internal illnesses, can be used to photograph wrapped parcels to see if they contain bombs. Specially adapted microscopes "compare" bullets and then photographic copies are made by adapted cameras. The blood pressure instrument of the physician is combined with electric measurement of sweat secretion to form the polygraph or lie detector, which measures emotional response to questions.

In the Petrography Unit of the FBI, soil is being removed from a suspect's shoes for mineral analysis.





An examiner in the Document Section of the FBI Laboratory makes ink tests under a microscope.



The "body" of a man lies sprawled on the ground. Around him lie scattered pieces of wood, his hat, and a bucket. What should this indicate to an investigating officer? Here, a group of recruits in the Royal Canadian Mounted Police learn to detect evidence.

FACTS AND EVIDENCE

SINCE the earliest days of crime detection, investigators have collected two kinds of evidence: 1) materials and scenes affected by the crime, and 2) statements by witnesses under oath.

Scientists have concentrated most on the first kind of evidence. Only in psychological tests, and with the lie detector and "truth serum," has science tried to ensure that witnesses are telling the truth. The "truth serum" could