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The result of the Swiss competitors is as follows:

Balloon "Basel." (Pilots Dr. van Baerle and Dr. Dietschi) landed near Warsaw, distance about 1100km.

Balloon "Zurich" (Pilots: Lt. Gerbeg and Dr. Tilgenkamp), landed at Deutsch-Rasselwitz, distance about 900km.

Ballon "Victor de Beauclair" (Pilots: Captain Huber and Lt. Lochinger), landed at Calish near Warsaw, distance 887km.

(There may still be some adjustments as to the exact distance).

## THE SWISS WAY WITH CRIMINALS.

### A "Scientific Police" Institute

*By* Joan Woollcombe.

*Diseases of society, like those of the body, provoke their own remedy; and the threat of the modern criminal has forced Europe, no less than America, to organise a scientific defence against crime. The author of this article has been given special opportunities of studying the methods of "scientific police." She describes here what she saw at the Lausanne Institute.*

The modern scientific criminal is being fought, most vigorously, with his own weapons and with better weapons than he can ever employ. The Swiss "answer" to him (and to her) is in their unique *Institut de Police Scientifique* in Lausanne; one of the most astounding colleges ever attached to any university.

It is entirely independent of any police control and actually provides some of the most unbiased "expert evidence" obtainable: the Director of the Institute puts his students through a grim curriculum of crime, trains them actually in the raw material of their craft and gives the world, eventually, graduates of the newest of exact sciences. Professor Mark Bischoff, who is responsible for this work, looks far too gentle for his formidable reputation — a reputation which extends as far from Switzerland as Siam and Serbia, Poland and Bolivia; and it is here, in the decorous buildings of the University of Lausanne, working like beavers with their batteries of strange modern instruments, that his experts and his students carry on their two-sided work: first to train the crime expert of the future and then to continue a relentless research into the methods of crime detection.

A great deal of the training — there is three years' gruelling work — is extremely grim and the Director explains that it needs a most persistent vocation to survive it, and no small scientific ability. There are very few women who have attempted to pass the ordeal and they are not encouraged, as yet, to present themselves, unless they have a clear call in their own genius. A very high standard of previous education is first demanded and a clear cool brain to avoid at any time the mistake of what has recently so well been described as "ghastly conjecture."

Once admitted, students are bound to secrecy: they learn methods and deal in processes that any forger or coiner would be delighted to obtain; they must maintain the position of their science which is exactly "one better" all the time than its enemies.

The curriculum is comprehensive; too long to detail, but it includes Penal Law and Practice; Legal Medicine, dissection and anatomy; Modern Chemistry; Experimental physics and toxology; and the Theory and Practice of Modern Photography. Then at the same time the special and concentrated studies of the Institute itself cover technical research on the scene of the crime, whatever it be; the use of microscope, microphotography; ultra-violet and infrared rays; technical researches into theft, arson, rape, homicide, accidents, damage to property, etc. Then comes the whole complicated business of forgery, false coins, post-office thefts and bank thefts. At the same time the habits of criminals, their identification, classification and the check-up on the recidivist present a separate and exact science; as do the various methods of examination, of reporting, of presenting cases; and this is only some of the material!

The students work first on the material in cold storage — the famous Crime Museum of the Institute — and then on actual raw material as the cases come in for solution. Then, after three years of extremely hard work, they face their six weeks' Finals for the coveted Diploma granted in state by the University.

Deadlier weapon than any other, they have learned to use the microscope; it is said that the guilty prisoner may as well (and often does) throw in his hand when he sees this and the microcamera of the Institute in action.

At the end of their six weeks' Finals, the students tackle one of the most difficult jobs of their careers, so far; for each must solve a specially arranged "crime" complete in every detail (except the actual demise of the victim, for instance) arranged by the Director personally to test their knowledge. He sets the stage and works out the problem "backwards"; then the examinee must prepare his dossier, plans, photographs, analyses — *everything* on his own. It is his first real "case," and for its solution he has all the formidable equipment of the Institute at his prior call.

*A Visit to the Institute.*

Go round the Institute with Professor Bischoff, and, before taking his visitor through the laboratories, the library, the file room of criminals or showing any of the remarkable "investigations in progress," he will touch a switch in the hallway of the Institute which floodlights case after case of the grimmest of all Museums — weapons and their results — *the Crime Museum.*

It is a most valuable training ground for his students, as it shows crime "in cold storage" — from the duller brutalities of crimes of violence to the more intriguing crimes of forgery and embezzlement.

To the layman there is a certain amount of interest in the varieties of weapons, complete with a great deal of "local colour" that need not be described — the revolver that killed the Soviet Delegate at Lausanne in 1923; a walking-stick that conceals a complete rifle in its slender shaft; an array of knives, hammers, axes, stilettos and bludgeons that is most intimidating. There is the greater interest of those delicate instruments that are used in forgery and for all types of coining, and a case full of the most convincing false passports, cheques and bank-notes. Then, lest the visitor should presume on his or her own immunity, Professor Bischoff will show the "Hotel Door" with a grim smile.

This is a section of just such a door as one may see in any hotel, complete with lock and bolt. With a slender pair of pincers the Professor manipulates the lock you thought so safe and drills a tiny hole above the bolt, which enables him to ease this back with one of the most ingenious instruments ever invented for the thief. It is apparently easy to effect an entrance; and rather disconcerting to watch!

The various exhibits are all material for the earlier studies of the students. "You see where the first blow fell?" — and the Director turns the fragile skull of an old lady over in his hands, to show the deep triangular cleft. "She was sitting up then — until the second blow caught her — so ..." and he indicates the circular cut, showing how the axe fits it. It is the case of an elderly woman, murdered by her servant.

He shows next a severed thumb, in spirits: this bears cuts at the inside of the base, indicating plainly the characteristic wounds of the victim who seeks to defend him, or herself, from the knife of an attacker. Another exhibit is merely a framed postcard showing a few spurts of blood; tell-tale signs of the murder that took place immediately below, indicating the force used by the assailant, and the approximate position of attacked and attacker.

Infinitely more interesting are those cases that contain some of the most spectacular work of the Institute: a few charred fragments pieced together and mounted on a piece of glass; beside them a microphotograph that shows these fragments to be a "proof" of a fake bank-note, recovered from the grate in a deserted room after a quick get-away by the forgers, and used as invaluable evidence against them after many hours of patient toil and meticulous chemical and microscopic work.

Forewarned and forearmed by their work in other branches the students learn to apply these tremendous resources of lighting and photography. The visitor may see the machines in use and may form some idea of their possibilities.

First, Professor Bischoff closes the door of a small laboratory and shuts out all light; then, from the complete darkness comes the glow of the hooded ultra-violet rays lamp, under which rays the Director puts a series of special exhibits. The chemically treated cheque yields instantly its falsifications; the tampered seal shows its two kinds of wax. A dozen specimens of post-office gum plainly show their twelve different "luminosities," and an opened and re-sealed letter is thus easily detected. A criminal, desperately washing and re-washing his stained linen, may think that all bloodstains, or any other stains, are removed; and so they may appear to be to the naked eye. Chemically treated, however, and presented to this lamp, they are again at once apparent; and the Director demonstrates that it is practically impossible ever to eradicate all trace of such stains from a textile.

Adulterated medicines are easily shown up: a recent case of adulterated aspirin with a very dangerous "make-weight" is particularly instructive.

From this room one goes into the daylight of the laboratory that is equipped with a mercury vapour lamp — clear, *cold*, all-round illumination — where can be photographed such things as the incriminating stub of candle, held in his bare fingers by the stupid criminal and carelessly thrown away. Normally, under sufficient illumination to shown the tell-tale finger marks, the wax would blur or melt: the mercury-vapour lamp, arranged in a hollow square or T-shape, illuminates without radiating heat and is invaluable in such investigations. The Director shows it at work on a screwed-up scrap of paper, rolled up and thrown away, but resurrected to give excellent evidence of the indentations of a written message; a message that is only decipherable when the all-round light has eliminated the innumerable little shadows and creases.

Then, into another small room and again in in the dark — the ticking of the metronome measures the seconds for an unseen operator who manipulates the micro-camera equipment. Magnified, we see the innocent-looking treasury bill reveal itself as a clever (but not clever enough) forgery, and thus provide photographic evidence against a gang recently caught, but not red-handed. Here the Director explains that not only the proof of guilt, but *the proof of the proof* is rightly necessary to convince a jury. Take the case of a recent shooting, in which the help of the Institute was invoked by the police of a certain Swiss city. An empty cartridge case was picked up near the victim and it was necessary for the prosecution to prove that this had been fired from the small calibre pistol owned by the accused; and that the weapon had been discharged from a second-floor window.

It was relatively easy to demonstrate, by the microphotographs, that an indentation in the rim of the little case indicated that it had fallen or been thrown from a height. Then five similar bullets were discharged from the same weapon, and the cases of these were photographed under the same conditions. Each one showed identical markings, which in each case coincided with those on the first photograph of the vital "exhibit." It is, of course, a fact that the hand-tooled detail of a firearm produces marks on the discharged case that are, to the pistol, as finger prints are in the identification of the human. These incriminating details were unmistakably shown in the specially taken photographs and, as a necessary control experiment, a variety of other photographs of discharged cases from other weapons of exactly similar make were prepared. The jury was thus presented with the proof and the proof-of-the-proof, and the accused, faced with the formidable dossier of photographs, instantly confessed.

Researches into the possibilities of chemistry yield results that are both useful and spectacular; tests for bloodstains show, as we have said, that it is almost impossible to eradicate them; but although their existence is established beyond doubt, it is further necessary (and perfectly possible) to differentiate between human and animal blood — very pretty little experiments, these; and the experts here are continually extending their sphere of usefulness in this and in similar directions.

The Director will tell the visitor that it is possible to dilute one drop of human blood in a solution of 20,000 of water, and still, from a cubic centimetre of this mixture, obtain what scientists coldly call "a useful reaction."

Very often it is chiefly a matter of deduction. Not long ago the wife of a certain Ambassador received some poisoned sweetmeats from an unknown source and certain suspected persons were held on trial. Actually during the trial she continued to receive strange parcels, but only filled with earth and rubbish and leaves! One of the accused (then under question of the Juge d'Instruction) had a garden, and analysis of the soil of his garden showed the contents of the strange parcels to be the same. But this was not sufficient, nor the evidence that the leaves coincided with those of a relatively rare plant growing there; the final touch was the fact that this plant alone suffered from a plant-disease which was also found in evidence on the leaves. The sending of the parcels designed to prove an alibi therefore served to convict the prisoner. And, in the face of these careful researches into simple crimes, it is interesting to remember that a very few years ago cases were chiefly solved by deductions from inspired guesses.

Less spectacular, but none the less vital, are the various systems of classification of data and of photographs, which enable Professor Bischoff not only to keep his Institute's information instantly accessible, but to reorganize and to plan the records of various police centres. And, although he is absolutely independent of Police control, he and the police chiefs work together in the continual and relentless researches into methods of crime detection, the latter providing a supply of raw material that is invaluable to the scientist. Meanwhile, crime experts from all over the world visit the entirely unadvertised work that is going on in the attics of the School of Chemistry; and the would-be forger, coiner, murderer or writer of anonymous letters would do well to remember that Professor Bischoff and his scientific "sleuths" are always just one move ahead in the most difficult game in the world.

*Review of Reviews.*