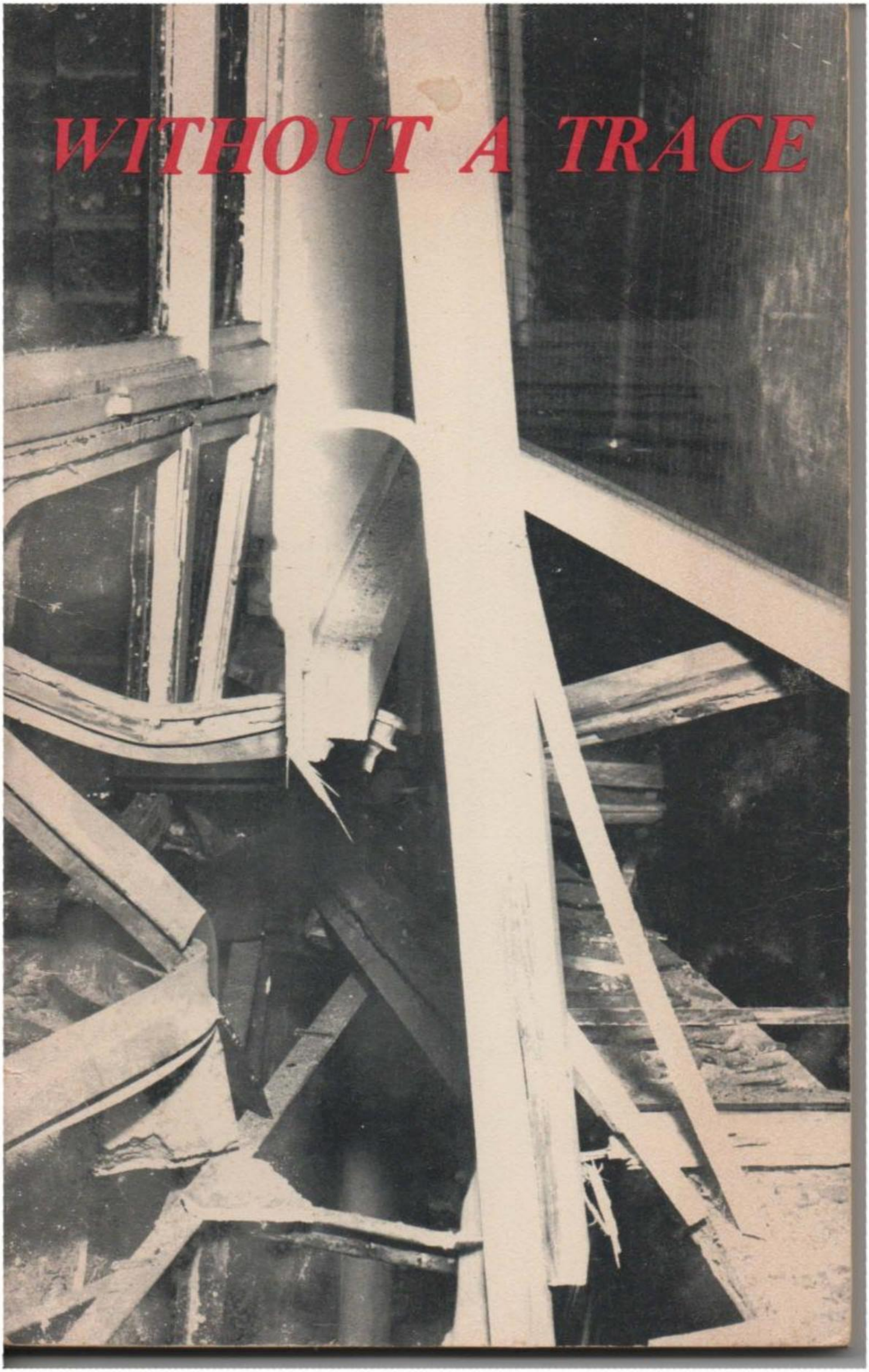
WITHOUT A TRACE

4.95

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BACKGROUND GMBH

WITHOUT A TRACE

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DEDICATION

This brochure is dedicated to all political and "unpolitical" people who, organized or as individuals, have made their contribution in some form to the political struggle and material expropriation of capital, its strategy as well as its exponents and defenders, and in the process have fallen into the hands of the police and justice. Many who were "lucky" enough not to lose their lives through a "purposely closely-aimed warning shot", are now exposed to isolation cells in prisons, and are being destroyed physically and psychologically, robbed of their political identity, and not infrequently "suicided".

If this documentation helps even a single actively-fighting comrade to stay out of the claws of the repressive organs of the bourgeoisie, it has fulfilled its function.

This book was originally made available in the 'left jungles' of Zurich, as well as in a few bookstores in the same city. This edition enjoys a somewhat wider circulation, thanks in no small part to the wonders of American "repressive tolerance".

CONTENTS

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* Dr. Jacob Meier (head of the Research Unit of the Criminal Police in Zurich) for his far-reaching reports on the general problems of evaluating traces, particularly the explanation of weapons traces which he (unintentionally) made available to us in written form.
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* The Criminalistics Publisher of Hamburg, who despite sharp controls has not yet noticed that we have been subscribers to his educational publication for many years.
* Dr. Christfried Leszczwyski (head of the Criminalistics Institute of the B.K.A. in Wiesbaden) for providing us with rich and practical experiences in many areas of the science of tracing, especially in connection with weapons.
* A row of other criminal police officers in and outside the country who have made their knowledge available to us helpfully and unselfishly.

PUBLISHER'S NOTE

The original authors of this book expressed the hope that other people might take the accumulated information presented here, make new contributions to that knowledge, and pass it on to readers in other languages and places.

In the spirit of international solidarity to which they thereby appealed, we have translated, amended, and published this English-language edition of *Without A Trace* (our own title, by the way). Anyone is free to draw his or her own conclusions about the book and our motivations for publishing it, but we cannot accept any *legal* responsibility for actions committed by readers.

We would like to extend our thanks to the numerous friends who contributed their time and skills in the form of typing the original translation, editing, and helping to finance this edition. For reasons of their own personal security, they shall remain nameless, so that the record of their participation may also disappear "without a trace".

FOREWORD

This book appears at a time in which revolutionary comrades are confronted with the problem of doing actions which could leave traces. As a result, it is important to know how such traces can be found, how they can be used as evidence, and most important, how to learn to avoid leaving them.

The political situation both in North America and Europe has developed to a point which makes it difficult for comrades to do above-ground political work and at the same time to participate in varieties of sabotage against the class enemy. Many such actions are consequently carried out by small closed groups, and often bear little relation to a broader movement, though they are broadly supported and understood. The central problem thus lies in finding ways to carry out such actions, and to allow others to understand that such actions can still be carried out without being cut off from everyday life either by imprisonment or underground existence.

The police use of technology, science, and research in the attempt to protect bourgeois society, has made giant strides in recent years. In Europe today, police files are being transferred by computer from country to country. It is only a matter of time before a "European Police" is a formal rather than informal and unacknowledged reality.

In the United States, both formal and informal information exchanges among the various police forces have long been a reality. Private computer storage banks (such as those maintained by the Law Enforcement Intelligence Units or L.E.I.U.) have recently been added to the already overburdened arsenal of information kept on private citizens, whose only crime is frequently non-conformance with bourgeois expectations. In addition, information-exchange between countries in North America has become routine. The technology for a North American police certainly exists, even if the political conditions do not. Not yet.

The European Anti-Terrorism Convention was only the beginning of such developments in Europe. In England, as early as 1973, the issue was raised (in order to test public opinion) whether all British citizens should be fingerprinted "for the protection of the state". In the United States, the assignment of

social security numbers to young schoolchildren and the use of footprints as identification methods with infants born in hospitals, is another large step in the technological control of the state over all of us.

Material evidence has also increased in importance in the crime-solving process. Traces which could not have been found or evaluated several years ago are now readily available to the police through developments in the natural sciences in general and in police technology in particular. That development is far from finished.

It is thus no longer enough for us to make a picture for ourselves about the knowledge and abilities of the enemy on the basis of vague tales or small bits of information gleaned from cop shows and detective movies. Too many comrades have fallen into the hands of the police through such lack of knowledge. And it is often too late by the time one is directly confronted with the new repressive technology. In that situation it is too easy to think one has no chance at all against so much scientific expertise. So it is better to learn a few rules beforehand than to underestimate the police or to be overly impressed by their expert witnesses.

Nor should we say to ourselves, "If they already know so much, then we have to choose between the role of underground militant or aboveground pacifist". The histories of both of these have proven unviable in the last decade, and both of these roles have undergone much needed re-examination in the last few years.

It is our opinion that we must sustain our ability to act across a wide spectrum, despite the fact that this spectrum is being systematically narrowed every day by the bourgeoisie. Concretely, this means that we are exposing the technical capabilities of the police in order to keep open *one* of the necessary avenues which makes it possible to attack the class enemy. That, by far, is the most important aspect of this counter-research.

It is also clear to us that the confrontation with the bourgeoisie is carried out in the political power relationship between classes, and does not happen exclusively on the criminal-technical plane, even though this becomes important

as soon as one is no longer willing to abide by the norms dictated by the rulers.

The bourgeois press and the police will immediately start to scream when this document falls into their hands. Of course, this work is proof that the left equals terror, equals blind violence, equals support of any form of crime. They will say that this work gives pointers to criminals on how to attack a social security recipient, or how to organize a burglary more effectively. Possibly.

Our argument against this is: Who is the criminal? Is it someone who acquires fifty thousand francs at the Swiss Credit Institution, and has to do a few years in prison for it, or someone in the same institution who channels billions of illegal funds into his own pocket, cheats on taxes, or falsifies books, and is only demoted as punishment? Who is the criminal? An employee who shoots his boss in the legs (because he goes bankrupt in order to avoid paying wages) or the prison administrators who drive prisoners to suicide every month?

Of course we don't want to suggest that every form of violence is acceptable. And we find it grotesque when workers steal each other's pay checks, when women are raped, or when a harmless money messenger is shot because it was the easiest way to grab some money; but it is certainly not the police who need to explain our values to us.

Another problem posed in the course of producing this book was that of language. Language expresses the ruling class structure of society and its values. Yet we could not, for the purpose of this book, develop our own new language to replace terms like criminal, legal and illegal, suspect, arsonist, and so on. In the course of our work, which is mainly based on internal police material, these words appear uncritically. All of them are concepts which we were taught early in childhood, as concepts signifying something bad or unjustified.

But actually the person who steals something valuable from a rich capitalist is doing something good, for himself and for others. So we content ourselves for the purpose of this book to drawing your attention to these words, asking you to examine them critically, to re-evaluate their meaning and associations in your mind and frames of reference, and to understand that

while we have to use them here, for clarity and expediency, we do not use them in the spirit in which they are commonly used in the press and elsewhere.

The same holds true of our use of the masculine pronoun. It is extremely awkward to constantly say "his/her", and often adds to confusion in already complex sentences. Yet many of the actions described here were done by women, and many of the comrades both known and unknown, free and behind bars, who have committed acts of revolutionary sabotage, are women. Perhaps our society will become capable of communicating truth, when the structure of the society it reflects becomes more honest and less repressive.

The internal police material which served as the basis for this work is the most contemporary in the field of criminal technology and science, and has equal validity for all Western countries. Nonetheless we see this document only as a temporary result of our investigation. If it were possible to make these contents the basis of knowledge for the whole left anti-capitalist movement in Europe and North America, which would require translations into different languages, there would certainly be comrades and other people somewhere who could expand this work, structure it better, or make certain things more precise. So eventually, there would be the possibility of creating a comprehensive and polished work which might be indispensable as a basis for action by revolutionary comrades. That would be the possible international perspective of this brochure.

TRACES: AN INTRODUCTION

Traces in the criminalistic sense are understood to mean material objects and evidence which are created in the process of a crime which allow one to draw conclusions about the process or circumstances of the action or about the perpetrator. Even a blackmail attempt over the telephone leaves a trace: the voice of the "blackmailer", which can be preserved and evaluated with voice prints (examination of individual sounds and their frequency composition).

There is practically no "environmental change" (the bourgeoisie call them criminal acts) which does not leave some sort of trace behind. These traces, or "silent witnesses of an act" as the criminalists call them, can be made to speak. This is the task of criminalistic technologists and scientists. In fact, it must be a fascinating assignment for the police to be able to prove that a person was present in a specific place and used specific tools or a specific vehicle, on the basis of a few grains of dust that can hardly be seen by the naked eye.

Traces are not always evident; often they are unnoticeable or unobservable by the human eye. Therefore they are sought with the help of all existing technology. The "good" investigator has an intuitive sense for finding traces, in addition to his experience at thoroughness and his powers of observation and ability to make connections. In order to find traces, he attempts to put himself into the role of the perpetrator to try to reconstruct the method of action.

Traces are generally to be found on the way to the scene of an action, in the more narrow area of the action, and on the way back. Traces are also sought on suspected persons, their clothing, their vehicles, weapons and tools. As a rule the perpetrator is on foot at the scene of the action and uses his hands. The search for traces by the police therefore initially concentrates on shoe and foot prints, since these are quickly destroyed by further work at the scene of the action. The second step concerns photographic documentation of the unchanged scene of the action. The search for fingerprints is the third step. Only after that comes the examination for any other traces. That is the usual sequence.

Criminalists differentiate between three kinds of tracing attempts: 1) *The focused search.* If the scene of the "crime"

exhibits a clearly definable event, a simple focused search for traces is undertaken. As a rule, this situation occurs after a burglary. In this case, the criminal police would use plant and soil traces from the vicinity of the scene of the crime for comparison. They test to see if textile fibers or traces of leather from the clothing or gloves of the perpetrator have remained in broken windows, doors, or fences by touching the broken glass or door posts at the ragged edges of the break. In addition, glass from broken windows is compared to see if traces of tools can be found on places that were disturbed. As comparison material, paint traces from tools or chipped off paint from damaged areas are examined along with any available insulation material from safes. This can be important evidentiary material in safe cracking cases when small particles of suspect material are found on the clothing or shoes of a suspect.

The ideal situation, that is the one with the greatest chance of finding the perpetrator, exists if there is an intersection of traces, that is, when traces of the perpetrator are left at the scene of the crime and vice-versa if the perpetrator takes traces of the scene of the crime with him (on clothing, shoes, tools, etc.).

2) *The spectral examination.* If in the beginning of the search for traces the cause or the process of the event being investigated is not known (for example, after an explosion or an assassination) a search for traces has to be made with consideration to every possible procedural variation. This kind of tracing is most far-reaching and can only be done by the police in the most serious cases because of the quantity of work involved. But this kind of far-reaching search for traces is also carried out in house searches for a burglary when, for example, there is a suspicion that the burglar also deals dope, or that he was a conspirator in an organized violent crime, or if it is a question of a series of crimes. Such questions can frequently be answered on the basis of microscopic traces.

3) *The emergency search*: As a rule, in this kind of search it is a question of immediately evaluating traceable material which could be changed by certain outside influences. So, for example, as a fire is being put out, if it is clear that the most important part of the building either collapsed or that all

possible traces could be destroyed in the process of putting out the fire, an emergency search might be done. Criminalists immediately check a shoe print in the snow if it is beginning to snow, or the temperature rises above zero degrees Centigrade. A blood test is immediately done on a pool of blood beginning to dry as long as parts of it are still liquid, since the examination of liquid material yields considerably more information such as subgroup characteristics, which cannot be gotten from dried blood.

If usable results are found while searching for traces, a preliminary report is made for use in raids or as evidence against the first people arrested. This includes: 1] in a case involving weapons where the perpetrator has fled, reports about the weapon and the ammunition used; 2] in a drug case, reports about the first examination of suspicious substances; 3] in a kidnapping, the first reports from the evaluation of microscopic traces of the color, possible brand or age of the vehicle; 4] in explosives cases, reports on the explosive or combustible materials or their packaging; 5] in murder cases, reports about foreign fibers on or near the corpse which could come from the effects of the perpetrator.

The criminalistics specialists are increasing in number and are used to detect traces and evaluate material in more and more house searches. The days when they took Marx out of the bookcase and left the Molotov among empty beer and wine bottles are slowly over. A good house search aims to prove a suspected crime with microtraces which are brought home unknowingly from the scene of a crime. The specialists quickly recognize that among the clean clothes in the closet there is a pair of pants with tiny holes containing sweat drops in the weave, or a layer of dust which has recently been disturbed for no apparent reason, or an upholstered chair with nails 20 millimeters from the original holes. In addition this sort of detective uses various instruments which can also be used in house searches. Here we are thinking of explosives sniffers, metal detectors, portable X-ray machines, intrascopes (magnifying glasses with which one can see into the tiniest openings), or the possibility of preliminary tests (quick tests) when drugs are suspected.

DACTYLOSCOPY

The *ridge lines* on fingers, hand surfaces, toes and the soles of feet are totally unique in every detail and do not change in the course of a lifetime. They show such a great variety that it is practically impossible for two people to have identical prints. Therefore, for police investigators, the examination of the the surface of the skin of the fingers (dactyloscopy) represents the most important means of identifying people.

Dactyloscopy as an aid in identifying corpses is limited to those cases in which there is still skin on the fingers and hands. Even with fire and water victims this is frequently possible., since the skin on the hands is one of the most resistant organs of the human body. On the assumption that prints which can be compared are available or can be made available, dactyloscopy is one of the simplest methods of identifying corpses.

If there is an assumption that the corpse is a specific person and if there are no fingerprints available on that person, under favorable circumstances prints which can be compared can be found at the place of residence or work.

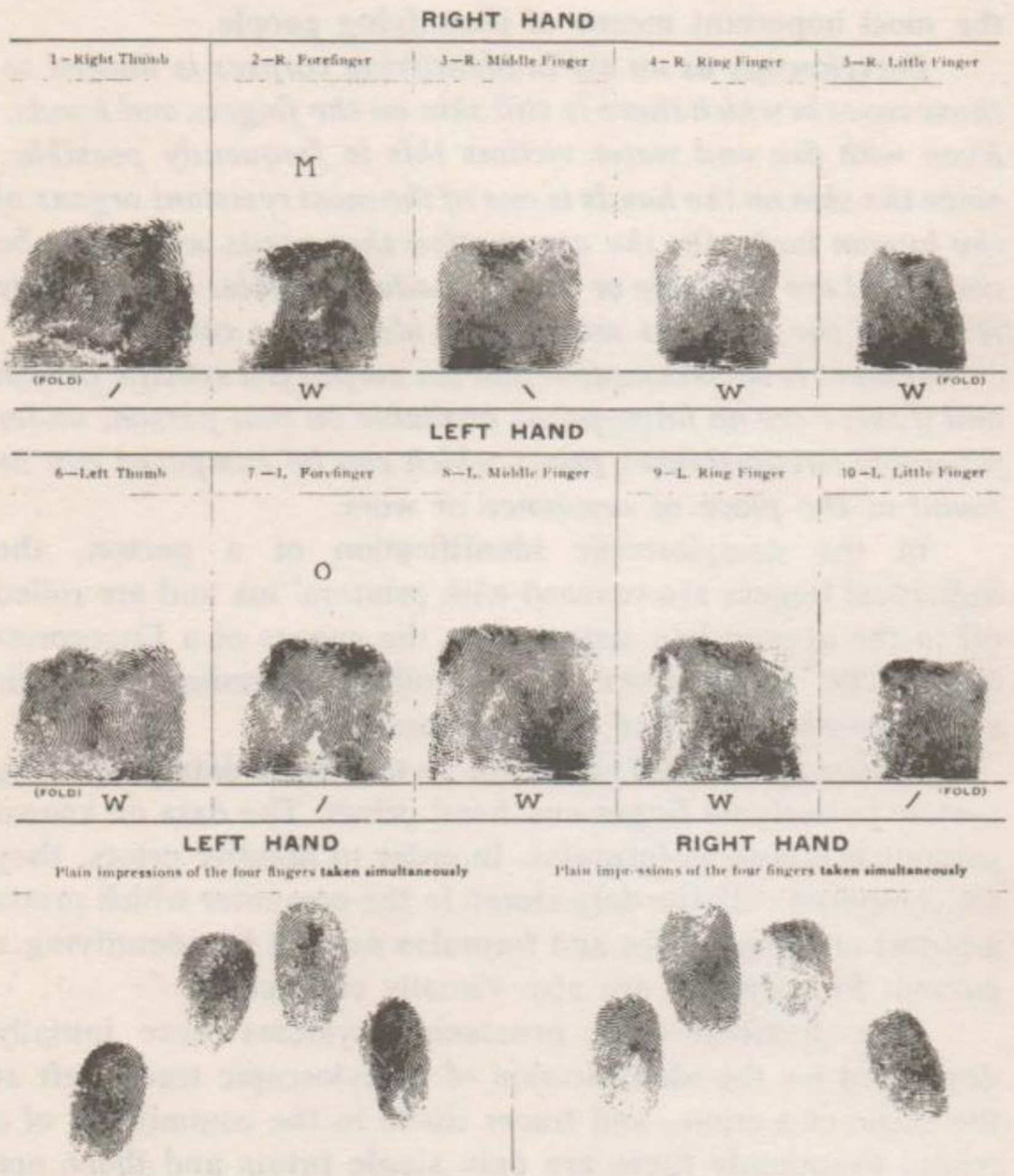
In the dactyloscopic identification of a person, the individual fingers are covered with printers' ink and are rolled off in the appropriate sequence in the spaces of a fingerprint form. The fingerprints are classified according to their characteristic ridge line basic pattern.

Almost all criminal police use an electronic data processing system to evaluate finger and hand prints. The data on known persons is stored as formulas. In order to identify prints, they are compared with the data stored in the computer which prints a report of the specifics and formulas needed for identifying a person. Fingerprints are also visually checked.

The electronic data processing systems were initially developed for the identification of dactyloscopic traces left at the scene of a crime, and traces made in the commission of a crime. Frequently there are only single prints and these are frequently incomplete. Also it is frequently impossible to decide to which fingers they belong. The system was conceived on the following assumptions; partial data can be built into the comparison.

In order to identify specific persons on the basis of fingerprints, ten to twelve coinciding ridge lines must be

proved. These are, for example, forkings, endings, bending lines, formation of islands, and crevices. On the average a finger has 30 to 40 such markings.



Standard fingerprint card usually used in booking a suspect.

Furthermore, the police regularly compare unknown fingerprints with those in the computer. The possibility of solving old cases with newly found data thus exists. This also insures that fingerprints taken a long time after the crime can be used to identify a criminal with a past crime. For those characters who work across borders, prints are sent to all police stations through Interpol. Thus a wanted person may fall into the hands of the police even if he is fingerprinted under a false name.

Two comrades are surprised at night while spraypainting slogans and flee. The one throws the spray can away. It is picked up by the pursuing officer. The comrades escape.

The criminal/technical investigation of the police comes up with the following: the red color of the graffiti is identical with the color of the spray can. On it a fingerprint is found, which leads the police on the track of the comrade whose fingerprints are on file. During a house search the police find a pair of rubber gloves in a garbage can in front of the house. The insides are covered with white talcum powder. The police find two fingerprints which can be identified as those of the comrade on the inside of the right hand glove with which the can was held. They also find fine red paint dust, not visible to the naked eye, on a jacket taken from the closet. This as well as bits of red paint found on the glove proves to be identical with the red paint from the spray can. Two other slogans painted during the same night can also be pinned on the comrade, on the basis of color and handwriting comparisons.

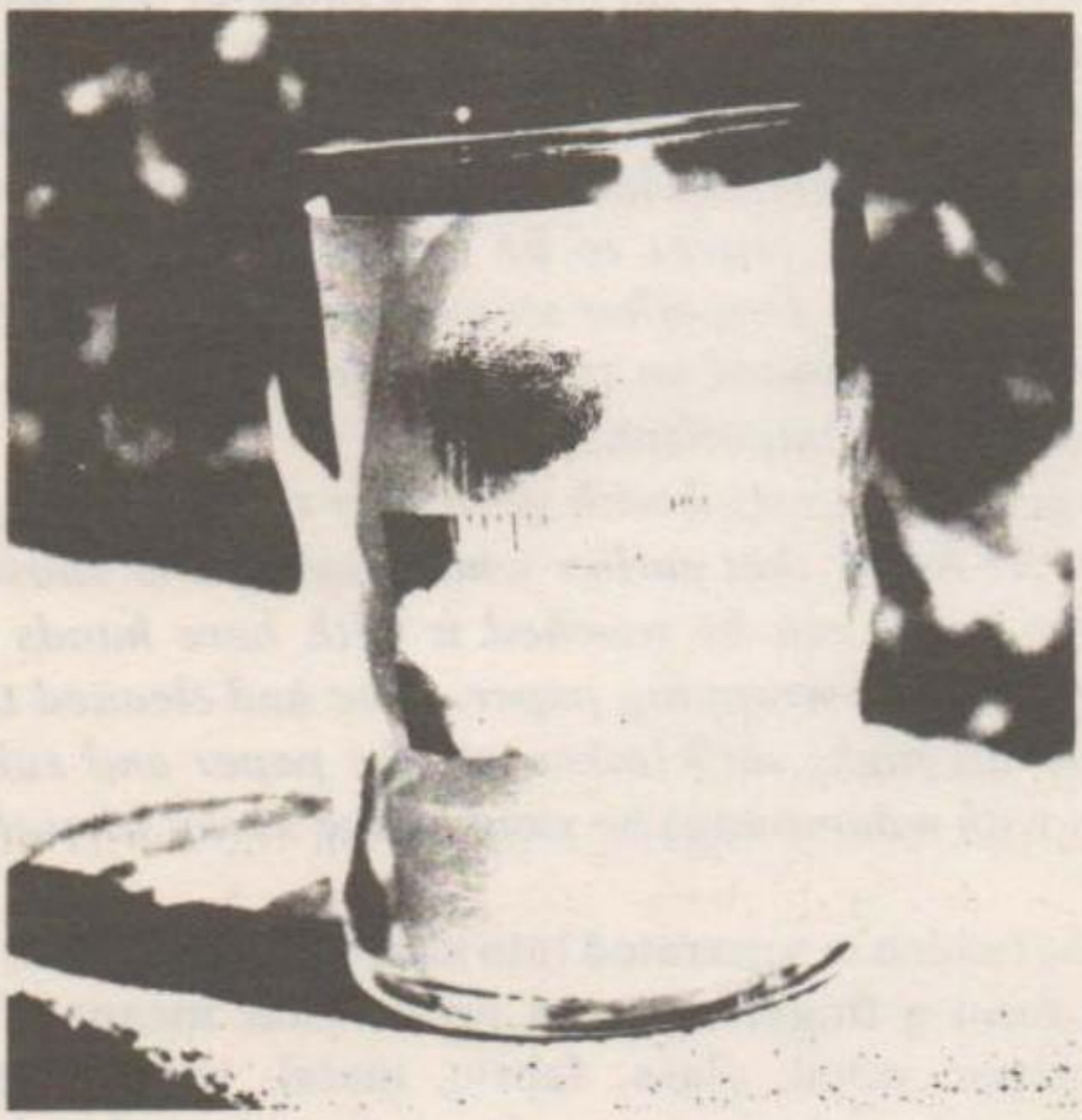
Our comrade worked with gloves on the night in question. However, he forgot that earlier while buying and subsequently storing the spray can he touched it with bare hands and left fingerprints on the wrapping paper. If he had cleaned the spray can before his night shift (taken off the paper and rubbed the can clean with a damp rag) he would have saved himself a lot of hassles.

Sweat (which is separated into salt, fats, and acids) and dirt particles form a finger or hand print. That means if a hand touches paper, wood, glass, fabric, metal, cement, etc., the smallest particles of sweat remain on the place that has been touched. The secretions from the sweat glands form the totality

of the circular pattern in regular lines,i.e. ridge lines. According to the composition of the background and the degree of dirt on the fingers, the fingerprint will either be visible or invisible. With the help of the amino acids contained in sweat, the approximate age of a fingerprint can also be determined.

The most varied processes can be used to find and make fingerprints visible. In the dusting method, for example, the fingerprint is covered with a powder (depending on the color and composition of the background it may be aluminum, iron, magnetic powder or soot).

In this process, the powder clings to the damp sweat containing ridge line patterns and makes them visible. To secure them a transparent self-sticking fingerprint folder is rubbed on to the print, whereupon the print stays on the folder and is taken to the laboratory to be evaluated. This process is primarily used to secure fingerprints on smooth, non-porous surfaces such as enamel paint, furniture, synthetics, metal, and glass.



Latent fingerprint found on a water glass.

To make fingerprints visible on porous, absorbent materials such as paper, leather, fabric, wood, etc., much more complicated chemical processes are required. The reason for this is that the sweaty ridge line picture cannot remain on the surface, but enters into the absorbent material.

Whether identifiable prints can be left on paper depends on whether the person produces enough sweat and on how tightly and for how long the piece of paper was held in the hands. It is absolutely necessary to count on fingerprints being left on a piece of paper once it has been touched (as well as on all other absorbent materials). In most cases such fingerprints are not visible to the naked eye and cannot be removed by wiping the object with a damp cloth.

The most useful process in the search for and securing of fingerprints on paper involves smoking it with cold iodine steam or spraying with ninhydride or silver nitrate. In this process the impressions of the sweat soaked into the paper are discolored in a chemical reaction. The pattern of the ridge lines becomes visible and can be secured photographically. In cases where photography fails, (e.g. on printed textiles) a special x-ray process is helpful.

A manual worker had made his way to a safe through a specially dug tunnel. His work was finished and since he had worked with gloves he felt safe from apprehension. He only took the gloves off for a short time to smoke a cigarette. Unfortunately he threw away the butt and a flat book of matches. He left telltale prints on both. On the cigarette one fingerprint with thirteen identifiable details was found. The butt could also be identified as his on the basis of sputum remains and could be traced to him through blood type specifics.

In Arizona it was possible for the criminal police to develop a method for identifying fingerprints on the horns of cows in connection with cattle thefts. In other cases, bloody fingerprints can be brought to the fore on all sorts of evidence (even on human skin) even after they have faded or are not visible to the naked eye (e.g. on textiles). On certain metals (especially iron and copper) the acids and salts contained in sweat bring about a kind of surface oxidation. That means that the ridge line pattern

is "etched" into the surface of the metal and can only be removed with an emery polishing process. In practice it is most frequently crowbars, chisels, and similar tools which show this particular type of fingerprint.

In order to understand these complicated investigations and the facilities necessary to carry them out, we will explain one of the chemical processes which make it possible to make fingerprints visible on fine, closely woven, cotton and synthetic fabrics (on rough fabric, hardly any usable fingerprints can be left).

A piece of photographic copypaper is prepared. It is soaked in water for ten minutes, then allowed to dry for ten minutes. Then it is left for 30 seconds in a 2% potassium chromate solution followed by 15 seconds in a 1% silver nitrate solution. After drying, the paper is stored in a light proof place. Before it is used the paper is put into distilled water for two minutes, dried with blotter paper and brought to the spot on the fabric on which the fingerprint is found. Both are then put between two wooden plates and exposed to 15 kilos of pressure. The paper is then put into a 5% saltpeter solution for one or two minutes, washed with distilled water and developed, fixed, washed and dried.

Police science specialists think that securing fingerprints from human skin will be routine in a few years. Until now, this has been limited to murdered corpses, where a piece of skin with the fingerprint can be cut out.

Fingerprints are not automatically destroyed by the influence of water. In the best of circumstances (e.g. when they are protected by a layer of soot) they can even withstand great heat. It is therefore advantageous to clean tools used during a break-in or other objects of a similar nature before they are permanently stored in rivers or lakes.

During a break-in somewhere in Germany a television was stolen along with some other things. Since the thieves worked with gloves they left no traces. Three weeks later a fisherman reported seeing a TV in the river. As a result of the investigation, it was found that it was the stolen object. On the bottom side, hand surface prints were discovered which coincided with the prints of the suspect. When the police

presented him with this evidence, he admitted the theft. What is significant about this case is that there were strong currents in the place in the river where the TV was found. Despite this, the prints survived for a long time [presumably because of their low fat content].

The life span of a fingerprint is unlimited in principle (as long as it is not destroyed by foreign influences) because the particles put on the object when it is touched can be traced for a long time. The problem for the police is that the older a fingerprint is, the more difficult (technologically) it is to make it visible.

The soles of feet and toes also have ridge line patterns. Securing and identifying them follows the rules of dactyloscopy. In our latitude, however, traces of bare feet are rare.

GLOVE AND TEXTILE TRACES

The widely held belief that people who wear gloves while working do not leave usable traces, is false. It is correct in the sense that fingerprints are not left this way. But a glove can leave a textile trace behind in slightly dusty or dirty places which can often even be seen with the naked eye. Such structural prints make it possible to draw conclusions about the material from which the glove was made (rubber, leather, vinyl, wool, etc.). If a glove is worn or damaged, it often leaves valuable details which are useful in tracing it. Such details allow a clear identification. In addition, there are almost always material traces in the form of leather particles, threads, etc., at the scene, particularly on the sharp edges of broken glass. Material traces of the specific scene of the crime, can also be recognized on the gloves of the suspected person. Every criminal police office therefore has a file of glove traces. With it, old cases can sometimes be connected to new evidence and credited to a specific suspect. This file is particularly useful since many "specialists" wear the same gloves for each of their projects. In putting on or taking off gloves, bits of the fabric or leather fiber remain on the fingernails from the inside of the gloves. Such microscopic traces on the hands of the suspect can be compared with gloves left at the scene or left behind in flight.

The police pay special attention to rubber or plastic gloves because in the most favorable cases they contain fingerprints on the inside.

Certain kinds of vinyl gloves as well as so-called surgical gloves, can even transfer fingerprints onto other objects. This has been proven experimentally by the police.

In putting gloves on or taking them off, they are often touched by fingers. Thus it is often possible to find chemically well-formed fingerprints especially near the top of the glove. Prints of the textile pattern show up best on soft surfaces like soil, dust, snow, and so on. In accidents in which pedestrians are hit by a car, they are often found on the dust on the bumper, the hood or even on the underside of the car, left by the victim.

In a blackmail case in a small town in France, the blackmailer managed to escape in the darkness despite the police who waited at the scene at which the money was handed over. However, he could be traced in the snow over fields and meadows for many kilometers. The police found one place where the guy presumably laid down in the snow because of exhaustion. In the snow, was a print of his torso with some kind of head covering, and prints of the seat of his pants, legs, arms, and hands. A plaster impression could be made from these traces, making it possible to recognize that the man wore a leather jacket with knitted cuffs and that he had a large master key in his back pocket. Pictures were made of the plaster dummy which made it possible for the police to find the suspect later.

In our practice, the way such textile prints are left can easily be imagined, particularly in circumstances where information about people or places is being gathered. Since such traces are left before the actual event (whenever or whatever it may be) there is a danger that we pay too little attention to them. Concretely, what good is it if you put on old clothes and shoes for an action, if the night before, when you checked out the scene, you walked around in your normal clothes and shoes in the garden of the target?

SHOE TRACES

Noticeable places of wear, damage or repairs on the soles or heel are most important in evaluating shoe traces. Their individual characteristics make them especially important indicators. Even smooth shoe soles, those without pattern, usually show some peculiarities.

The usual details of a shoe trace (form, pattern, an impressed brand name or logo) leave indications about the manufacturer of the soles. These basic details are useful for the police as indicators or exclusions in checking suspects.

There was constant property damage in a graduate institute. At first the suspects were not to be found, even though it clearly had to be one of the students.

After yet another act of sabotage, a shoe print could be found in the loose soil under the window through which the person had climbed. The following day a comparison trace was made of the shoe soles of all the students. This brought no new evidence. However, two days later the attention of the police was drawn to a particular student as the result of an indiscretion.

A housęsearch followed during which an old pair of shoes was found in a container outside his house. As the result of identical soil traces and two matching damage points on the shoe, the left one could be clearly connected with the trace left at the scene of the crime. The student argued that the shoes that were found did not belong to him. Police research, however, proved the facts to the contrary.

Inside the shoes, nine separate textile fibers were identified, all of which came from socks that belonged to the student. In addition, the shoe lace in the right shoe had been replaced. The matching new shoe string was found in its original package in his kitchen cabinet.

The evidentiary value of a shoe sole trace decreases during the natural wear and tear caused by further use of the shoes which left the trace. However, such wear and tear does not give a guarantee that all identifiable details will necessarily vanish. In addition, specific deformations and signs of wear in the leather and on the sole result from the specific foot and manner of walking of each person. They appear in a similar fashion in all shoes worn by the same person. By comparing the traces of

wear as much as possible, it is possible to connect shoes that are no longer in the possession of the original wearer (also, for example, in shoes that are discarded).

Shoe traces appear as sole prints on solid smooth surfaces (floors, papers, textiles, etc.) and as sole impressions on soft surfaces (clay, dust, soil, snow, etc.). On a soft surface, it is often possible to also find other impressions left by the suspect, such as things he carried (tools, weapons, luggage, etc.) or the structure of other clothing (e.g. knee prints from pants).

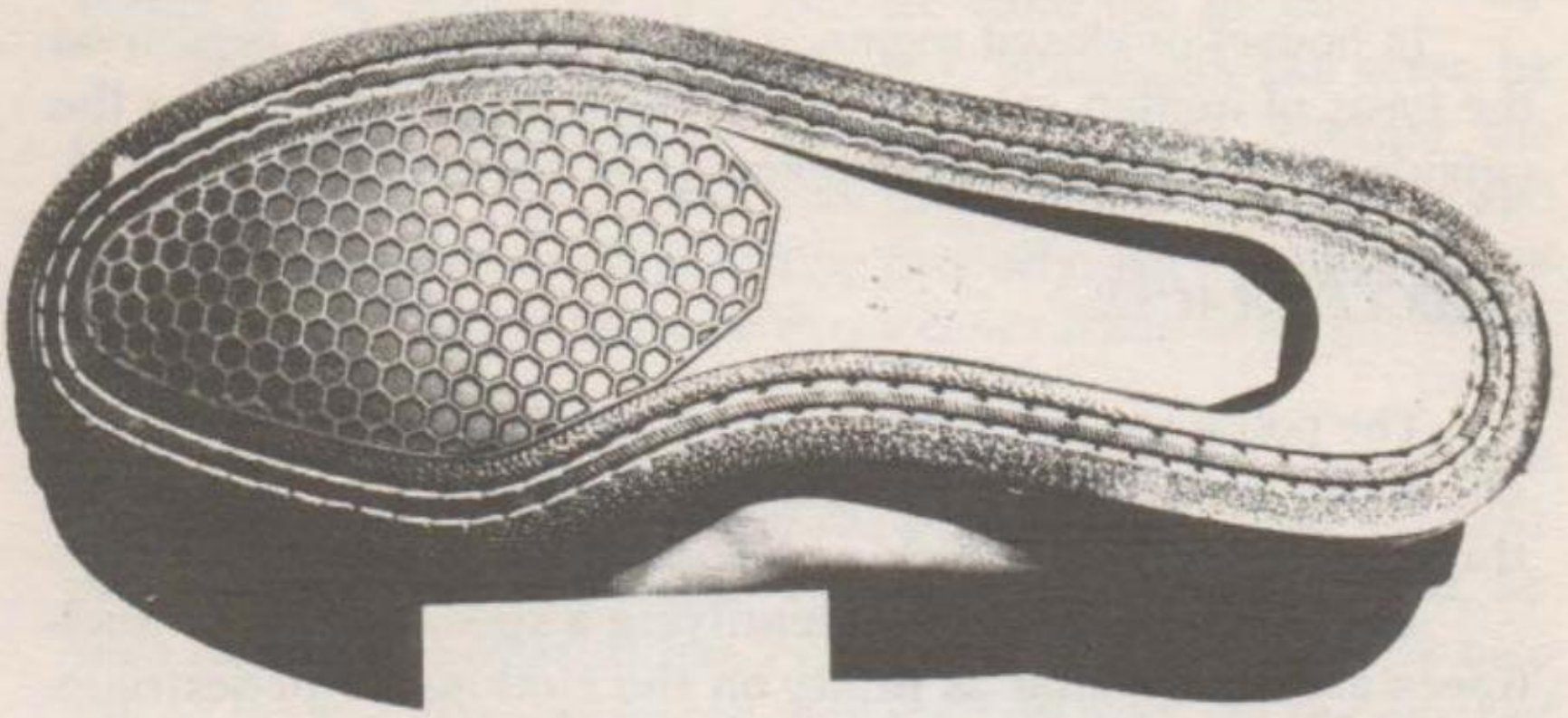
Shoe sole prints can be gotten photographically or in the same manner as fingerprints. Shoe sole imprints are made photographically or with plaster or other impressions.

The topic of search dogs is closely connected with shoe prints. The trace is an invisible smell which is a combination of the change in the surface (floor) made by the person leaving the trace and his own smell. What is given to the dog to make him follow such a trace depends on specific conditions. It is useless, for example, to use a trace dog if ten or twelve hours have passed since the crime. The conditions of the floor must also be taken into consideration: paved, asphalted or cemented streets are not favorable to using a dog, since they hardly take traces of smell, while soft, lush meadows or marsh floors, forests, fields, or woods offer favorable conditions particularly during moist and cool weather. Dry, hard, sandy or stony floors, especially during frost or extremely hot weather, are less favorable. In addition strong rain or snowfall as well as steady wind destroy existing traces of smell.

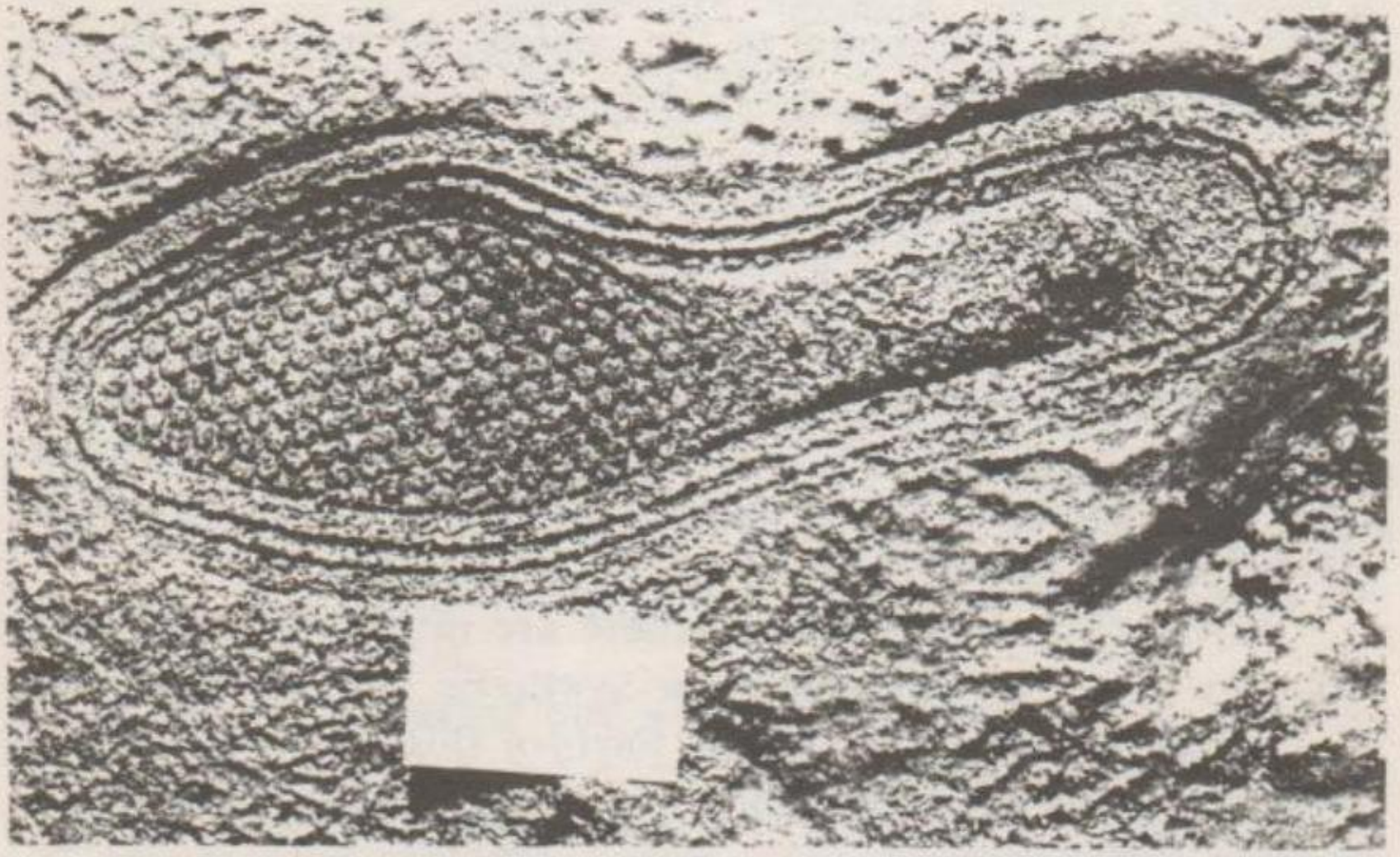
In the favorable circumstances mentioned above, a well trained dog can follow a trace even if it is crossed by other traces made earlier or later. He can also identify all objects touched by a human type smell by behavior recognizable to his master.

To begin with, the dog has to be given a trace of the smell on the ground. It is not certain that he could, for example, smell a hat left at the scene of the crime by a suspect and then follow the trace from it. Also, a dog cannot follow a trail a second time because he would undoubtedly follow the trail left by his master or himself.

On the other hand, a trace dog is able to find objects



Shoe found in the possession of a suspect and a matching trace found at the scene of the crime.



belonging to a person from a selection of objects belonging to different people, after he has been given the smell of a specific person.

In houses or closed rooms, a dog finds a hidden person on the basis of human exhaust smell which makes its way to the outside even in tightly closed places (e.g. a closet, a trunk, etc.).

VEHICLE TRACES

The police use the term vehicle trace to mean all traces left on or by a vehicle, used during a crime, as a means of transportation, or a vehicle involved in an accident.

Tire prints are useful in identifying a specific vehicle. Such traces are often found as prints on the clothing of pedestrians who have been hit, or as an impression (trace relief) in soft surfaces such as street dust, forest soil, bogs and marshes.

By using the profile pattern of the tire, it is possible to determine the make and type of tire. The width of the track can also be determined from tire impressions or brake traces. (The width is the distance from the center of one wheel to the center of the other). This makes it possible to draw conclusions about the make and model of the vehicle. In traffic accidents there are mainly contact traces (transfer traces) in which color and paint traces are most common. Such traces are found as paint rubbed off on the clothing of the victim, on the body of other vehicles, or in the form of paint chips on the roadway. Paint traces are compared with paint samples in the case of vehicles suspected to be get-away cars. If the police do not know a get-away car, and simply have a paint trace of it, sample paint color books produced by the manufacturers of automobile paints are helpful in identifying the brand of the car.

At the site of an accident, there are often glass splinters from the lights or windshield, or synthetic material from the turn signal or brake light covers. Parts of this kind can lead to an escaping car as a result of their shape, color or impressed number, and in many ways are more useful than paint traces. In the same way, conclusions can be drawn about the make of the car on the basis of metal parts (hub caps, trim strips, door handles, etc.). Even the impression of the headlight ring on the

clothing or body of a victim can be used to draw conclusions about the make of the offending car, based on the measurements of the diameter and distance from the ground.

When accidents are investigated, headlights can often be decisive proof, particularly when it is unclear whether the headlights or the high beams were turned on, or if the brake and turn signal lights were functioning properly. An investigation of the appropriate light bulbs in many cases leads to an answer to these questions.

If a turned-on light bulb is destroyed in the course of a collision, air enters the inside of the bulb, and the light filament made of tungsten, oxidizes. The adherent oxidation can be seen during an investigation. Frequently splinters of glass also fall on the hot filament where they melt on to it. On the basis of such findings it is possible to tell conclusively if the bulb was on at the time it was damaged, that is, if the filament of the head light or the high beams was turned on.

In accidents in which the bulb remains externally intact, no air gets in and no oxidation occurs. In a powerful collision a deformation of the filament occurs which can, however, only happen in its hot condition with electricity passing through it. Cold filaments are brittle and do not become deformed. Either they withstand the impact or they break, in which case the breaking point shows a typical picture of a cold break.

The direction in which a car is going can be determined by different signs. The traces of brakes are always stronger in the direction of the car and suddenly break off. If the car drove through water, oil or other liquids, the traces of the liquids on the tires become increasingly weaker in the direction in which the car is driving. If the car is losing water or oil, drops which splatter, are found on the street. These always indicate the direction of the car.

The police gather and evaluate oil traces if the question arises whether oil or grease traces on the clothing of an accident victim came from a specific car.

The absence of contact traces (street dust, paint, textile threads, blood, oil or tire impressions, etc.) on a victim, vehicle or accident site, can play a decisive role in clearing up specific accidents. In this way the police have cleared up cases where

the murder of a person was deceptively passed off as a car accident.

In America it was possible for a kidnapped manager to grab the steering wheel in a struggle with an unknown kidnapper, which temporarily changed the direction of the car. In the process, he hit a road sign at which point he managed to escape. He could make only a few statements about the kidnapper or the vehicle. These, however were enough for the police to receive a useful tip from someone, when they announced the event in the press and radio. The suspect denied the attempted kidnapping.

In the meantime, numerous traces were gathered at the scene: a foot print on the wet ground, a tire print and a clump of soil which seemed to have stuck to the bottom of the vehicle and later fell off. The foot print fit with the left shoe of the unlucky man, the tire trace with one of the tires of the vehicle that had been used, and as far as the clump of mud goes, the part of the car to which it originally stuck could be delivered. Under the back, left mud guard, dirt samples were obtained with soil particles which originated at the scene of the crime, and particles of six plant varieties which grew at the site at which the car started moving in its departure from the scene of the crime. In addition, there were paint traces on the front bumper and on the radiator grate. The width of these corresponded to the width of the road sign. This was corroborated by the damaged spots on the license plate. The screws with which it was fastened had wood traces which came from the road sign. The man was convicted on the basis of this evidence.

Filament of a car headlight. The bulb was broken in an accident. The adhering glass shows that the filament was hot, i.e. that the lamp was alight.

TOOL TRACES

Tool traces appear most commonly in the investigation of crimes. Hardly a burglary, auto theft or act of sabotage happens in which such traces are not left. Tool traces appear mainly as pressure or form traces (from crowbars, chisels, screwdrivers, etc.) as pinch, separation, or cutting marks (from pliers, wirecutters, boltcutters, knives, scissors, etc.) or as slide or scratch marks (on wood, metal, enamel, paint, synthetics, etc.).

In a factory, the cabinets in the canteen were continually broken into and food and cigarettes were ripped off. The thief cut through the locks of the cabinets which were closed with padlocks. Initially the police investigation led to no results.

After further thefts of the same kind, a piece of the cut lock was found. On the place where it had been cut, the pliers which were used, left a three millimeter wide relief.

The suspected tool was found by taking 25 pliers [so-called side cutters] from the personal tool kits of the workers. These were identified with various colors and given to various workers.

Comparative traces were made of the cutting edges of all the side cutters and microscopically compared with the trace left on the lock. The sixteenth tool compared positively with the trace on the lock when enlarged under a microscope.

After the photos were shown to him, the worker admitted the break-in.

In another case, a robbery could be solved in which it was proven that cutting traces on the telephone cable used to tie up the victim, were made by the pocket knife of a suspect.

The first visual examination of a trace can tell what type of tool was used. The police have also learned that all tools, even new ones and those made on an assembly line, have individual identifying marks which are imperfections that can be seen microscopically. Furthermore, changes are made on the tool with further use. Each tool has its own unchangeable "skin" which is transferred in form by small scratches and relief marks to the object being worked on. Consequently, tool traces are designated as relief or scratch traces.

Tool traces are evaluated photographically by making impressions or by electromechanical measurements. Tools of unsolved cases are stored for comparative purposes in.

evidentiary collections from the scene of the crime. In this way, it can be determined if a tool found on a suspect was used in other crimes which are still unsolved.

In addition to the stereomicroscope or the comparison microscope, modern police science uses feeler devices to evaluate the surface of solid bodies electromechanically. An extremely tiny feeler touches the indentations of a surface. Its movement is measured and reproduced graphically on an electronic field. A graph of the results is produced on teletype. This method is particularly valuable in assessing and comparing relief traces on projectiles and cartridge cases. In the documents section, it is used to determine the age of a piece of writing based on the change in the depth of the relief of the writing.

The police pay special attention to so-called contact traces which are transferred from the object to the tool or clothing of the suspect, or vice-versa (e.g. a drawer that is broken open, a safe, a door, etc.). These microtraces in the form of the finest paint or enamel splinters, metallic rubbings, sawdust, lint and so forth are also stored for comparative purposes.

The search for tool traces goes so far that in a burglary, for example, in which the visitor forced his way into a place in an unknown manner, the police take the lock apart (even the most complicated cylinder locks) to the smallest components, to look for scratch traces left by foreign keys.

Habitual thieves, in particular, use the same tools for their work over longer periods of time. Once they are caught, it is often possible for the police, by using comparative traces from the confiscated tools, to come up with proof of thefts over months or even years. Even though new scratches and identifying marks appear as the result of further use of a tool, it is still possible, in many cases to come up with perfect identifications.

A piece of broken screwdriver was confiscated in a cigarette machine that had been broken open. After the first examination brought no positive results, the piece of evidence was put into the evidence collection of the police. A few weeks later, tools taken from the possession of a suspected burglar were compared. In this way, the connection between a broken

screwdriver and the broken off piece was established, even though the profile of the broken edge of the screwdriver had changed with further use.

The proof that two or more cut, torn, or broken parts of an object originally belonged together, is important proof for the police in many cases. The case of the broken screwdriver mentioned above is just one example. In a murder case in Zurich in 1966, the fact that several single postage stamps originally belonged together on three strips of five postage stamps each, played a decisive role in solving the case.

Broken, sawed, or cut objects can be identified by marks that match each other on the edge where the breaking, sawing, or cutting surface is left. With torn objects (fabric, paper, adhesive strips, pages taken from a notebook, etc.) the corresponding characteristics are usually found on the separation edge. On thin, sharp-edged materials such as paper, cartons, and so on, a comparison of the inner structure, invisible to the naked eye, shows definite proof of the original connection.

After an unlucky attempt to take the bag from a money messenger, the cap and a coat button of a suspect remained behind. Later, the police found a coat in the apartment of a suspect which was missing a metal button of the same kind as that left at the scene of the crime. These many details are of interest to investigators since they can thus prove that a torn-off button came from a certain coat. There was total agreement in this case, in the size, form, color and brand name logo. The black thread found in the button was the same kind and had the same number of strands used to sew on the other buttons. The threads in the buttons corresponded with the appropriate thread ends in the coat from which it was torn. In addition, blue threads were found on the button. The corresponding number of threads were found missing on the fabric of the coat itself.

The concept of tools includes such things as laces, ropes, pieces of fabric, or other things used to tie or strangle. In the cases of suicide by hanging, for example, proof that it is a suicide can be established through textile traces from the strangulation tool on the hands of the dead. Even the examination of the knot can give important clues, since each

person has a specific way of tying a knot. Thus it would be suspicious if a fisherman's knot were found on the strangulation tool of a woman who hanged herself. In situations where a victim is tied up, the same style of knot can establish the connection to other similar cases. The manner of knotting can even show if the suspect is left or right handed.

THEFT

As opposed to alarm systems which are installed to be visible in banks, jewelry stores, villas, or other pigsties, there are traps, secretly put up by the police and hidden as temporary structures. Without much ado, they are built everywhere where, with some certainty, repeated thefts, burglaries, or property damage occur. With the help of such traps, the attempt is made to catch a suspect *en flagrante*. A difference is made between traps made with chemical materials and those with mechanical or electronic apparatus.

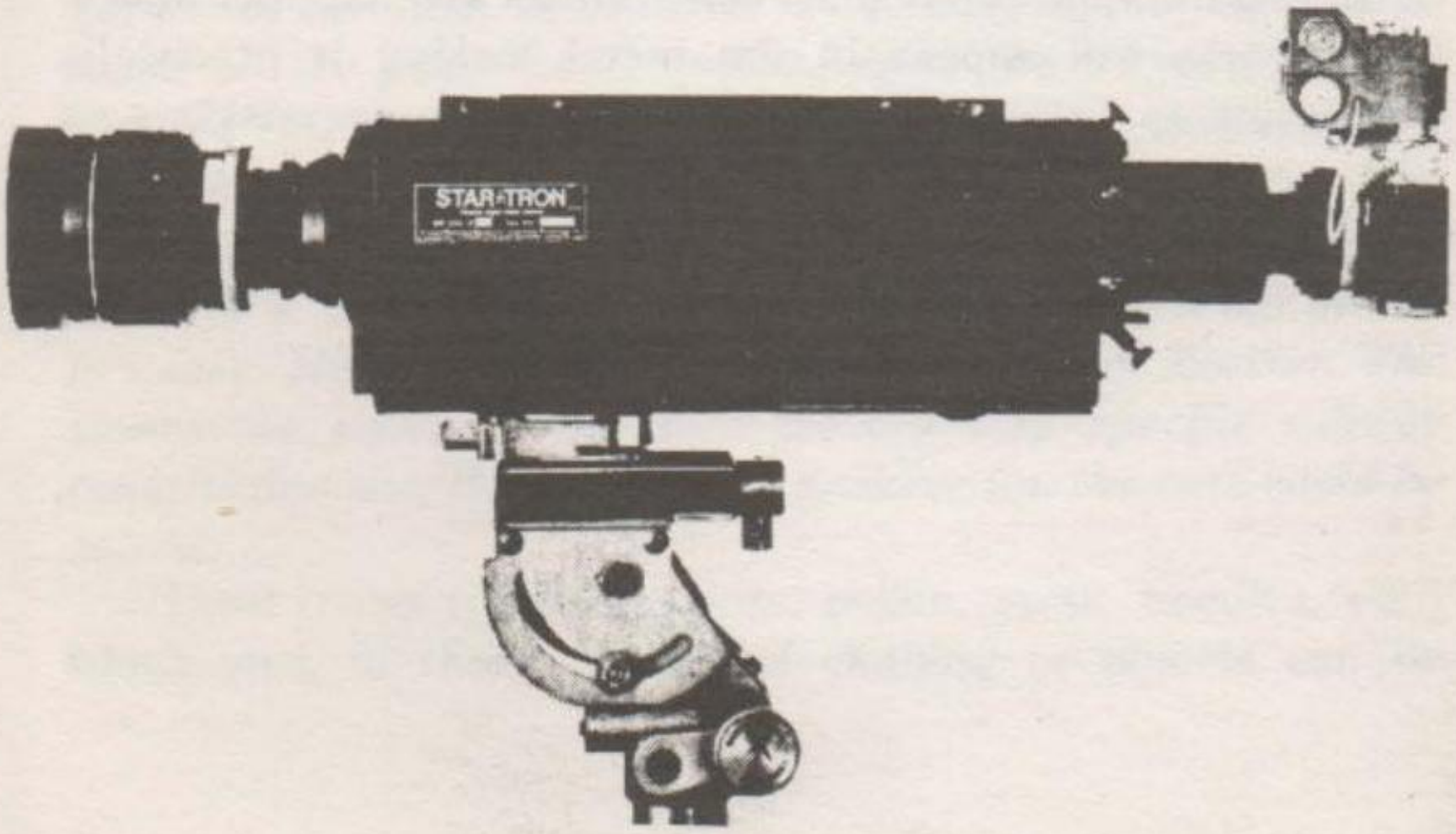
If an expropriator is to be found in a limited or constantly controlled number of people, for example among the personnel of a firm or hotel, the police will, in most cases, use a chemical trap. In this method, places (such as doors, window sills, desks, steering wheels, etc.) which would have to be touched by the thief, or endangered objects (money, jewelry, tools, etc.) are dusted with fine colorless powder. If someone appropriates an object prepared in this way, the trap can later be found on his hands, clothing, or in his pockets. The silver nitrate frequently used for this purpose makes black-brown spots on the hands (by mixing with sweat) after about an hour. These remain visible for days and cannot be removed with the usual cleansers. Fluorescent paints (glowing pigment in powder form) offer another possibility not visible to the naked eye. Such paints are made to glow with ultraviolet light and can also be used in liquids. In this manner, gasoline thefts, among others (e.g. from gas station tanks) are often solved. The pigment is added to the gasoline which later shows up as proof in the tank of the

thief.

Most recently, attempts have been made with radioactive material as the trapping device. The objects to be secured are prepared radioactively whereby a detector alarm goes off at the exit of the scene as soon as the object is carried past it.

The most varied possibilities exist in the use of mechanical apparatuses for traps. In endangered areas, with telephone connections, a microphone is installed into the mouthpiece with a higher than usual sensitivity. The fork of the phone is changed so that the line stays open even though the phone is on the hook. A special telephone with direct connection to the police station is installed by the endangered area so that at the end of the workday a trusted person can establish the phone connection with a normal conversation. Noises made in the endangered area are now transferred in a magnified form to the police station via the open telephone line equipped with a loudspeaker.

Installing a sending device which sets off an alarm in the closest police station is another possibility. If a security guard or the owner of the business live in the same building, there is a possibility of putting in an alarm (usually in door or window contact) which leads to the apartment through a wire. The police can then be contacted by phone, by the person living there. Hidden, built-in cameras (infrared photography) belong to the arsenal of traps for thieves. In this case, the connection is made when someone does a particular action (e.g. opens a door or drawer).



MAKING IMPRESSIONS VISIBLE AGAIN

Many goods and objects such as motorcycles, cars, weapons, etc., are identified by the manufacturers serial number. After such goods are ripped off, it may be necessary to remove such numbers and, if possible, put new ones on. The usual method of affixing identifying signs is with an engraving stamp or an electro-engraver.

There is a widespread belief that identifying marks of this kind can be destroyed or made invisible by filing them down. -Wrong! It is often possible to make such marks visible again with a chemo-physical process using heat, and by etching. If the original signs were affixed by means of an engraving stamp or by electroengraving the metal underneath the area of the visible numbers was changed by the engraving or the welding process in which the metal liquifies for a short time. Such places react differently to appropriate treatment than the unchanged surrounding area. The original signs therefore reappear in the form of a color contrast to the surrounding area.

Another thing was developed in the early 70's by NASA as a by-product of space research. In this process an ultrasound vibrator is used which is placed into water with the piece of metal. The vibrations make millions of microscopic bubbles in the water which cross the metal with a pressure of thousands of kilograms per square centimeter, virtually washing out the engraved areas and the old impressions, partially making the original forms visible.

As a result the safest method of destroying identifying signs is by filing the old impressions off and subsequently changing the appropriate places with chisel and hammer blows. New marks will appear in the metal making it practically impossible to distinguish the old from the new impressions on the metal.

MATERIAL TRACES: SOIL AND PLANT TRACES

The composition of soil (the upper layers of the earth's crust) is extremely varied, depending on the geological, plant and animal parts from which it is built. Soil traces are found most commonly on shoes, clothing and vehicles (mud shields and tire treads). Objects which have lain outdoors also usually have characteristic soil traces. In the sense of police science, synthetic materials such as plaster, cement, concrete, safe insulation material and similar things are included in the category of soil traces.

In evaluating a soil trace, the humus particles as well as living plant and animal microorganisms are separated from the mineral components. Frequently special culture methods are used to grow the small living components. Soil traces are checked by specialists for their chemical composition and their geographic source. In this way it is often possible to limit the search for them to a small area.

An English comrade threw a molotov through the window of an elegant villa belonging to a landlord, who had put hundreds of tenants on the streets with his real estate speculations. On the basis of a neighbor's description [who had seen him during the action] he could unfortunately be quickly apprehended. The comrade claimed to the police not to have been in that area for quite some time; the dirt on his shoes and pants came from a walk through the woods in a completely different area. After an examination of the traces on his shoes and pants, this alibi was invalidated by the police and it was proven without a doubt that the soil traces originated from the garden of the villa. In addition to the soil, textile fibers were found on the place where, according to the witness, he had climbed the garden fence. These could not be distinguished from the fibers of his pants.

In another case, which took place in a large city in Germany in the 60's, an unknown person sank the corpse of a bar owner in a lake. He used small stones to make the sack heavier. The stones the police found came from a very specific subway construction site. Because of this decisive tip, the case could be solved.

Plant traces (grasses, seeds, pollen, moss, needles, etc.) which stick to shoes, pieces of clothing or objects can be

compared with the flora just like soil traces. They can also give pointers as to the conditions at the scene of the crime.

DUST TRACES

On our planet, there is practically no object which is not covered with dust. Thus, even the body and the clothing of each person is constantly covered with a specific layer of dust accumulated since the time of the last cleaning. This layer can be of great significance for criminal evidence.

The composition of the dust allows one to draw conclusions about the place a person has been, gives pointers about earlier whereabouts or about the work the person did. It is possible for typical dust traces to be transferred to a suspect by coming in touch with a specific object or to leave them on a specific object.

It is possible to distinguish between dust particles of animal, plant and inorganic origin. Animal leftovers in the dust can come from small insects, butterfly larvae, microbes, eggs, larvae, mucous, fat, muscle fiber, bones or from decaying parts of all kinds of organisms. Those of plant origin come from decaying leaves, mushrooms, mosses, microscopically small bodies of living plants, pollen, seeds, mushroom spores, etc. carried by the wind, as well as microorganisms, bacteria and microbes. All chemical substances can appear as inorganic dust. This is especially true in connection with specific work or workplaces.

An auto thief specializing in Mercedes was separated from his long source of support by microtraces. He had an accident in a stolen car and landed in a lake. He had to climb out of the car under water, save himself by swimming to shore and immediately flee so that he would not be recognized. A few weeks later, he was apprehended in a similar theft. An examination of his clothing showed typical plankton traces which made it possible to draw clear conclusions about his involuntary bath.

Pollen dust takes on special significance among the various kinds of dust. Different plants have different times during which they bloom, during which time their specific pollen dust

is set free and scattered by the wind. It is possible in analyzing pollen dust to determine the time span during which a specific object or piece of clothing was exposed to the dust and secondly, conclusions can be drawn about the specific geographic region, since certain plants only grow in certain areas. Such discoveries can be very valuable for the police in checking out alibis. That means that if someone claims not to have been in Tessin recently, but the police find pollen dust in his hair, pores or clothing from plants found only in Tessin, it is possible to discredit his claim. Even in cases involving property damage (walls damaged in connection with deep construction or explosions), dust traces can be very revealing. No foreign dust is found in new cracks. In old ones, on the other hand, pollen of the most varied plants which have spread their pollen dust during the existence of the crack in the wall can be found. The survival of these traces is so good, that they can still be recognized a year later.

The possibility of determining age has been a set-back for many property owners who wanted to collect money from their insurence for what were clearly new cracks in the wall.

In a murder case, the investigative branch of the Zurich police had to testify if it was possible to determine when a weapon was last used, on the basis of dust traces. The suspect claimed in an interrogation, that he had last shot the weapon in November or December of 1975 and had than stored it in a case.

An examination of the weapon showed that the weapon was used once in the spring [blossoming time for birch and hazel] and a second time in the months of May or June [blossoming time for evergreens and birches]. This evidence was based on pollen seeds to which the weapon had been exposed. No other pollen dust could be found. It was thus possible to tell when the weapon was packed up [during March-June]. This finding concurred with the legal report. The victim was shot in the middle of March 1976. Later, the police unpacked the weapon during a house search and exposed it to new dust.

Clothes are cleaned of dust by washing and chemical cleaning. Soluble substances of animal and plant cells are destroyed by chemical cleaning in organic solvents. Water soluble substances are not destroyed in this process. Therefore,

it is frequently possible to find usable blood traces in chemically cleaned clothing. During wear the fibers of textiles have a tendency to disintegrate slowly. In parts such as cuffs, seams or pockets, lint balls are formed which are preserved for many years. These withstand washing as well as chemical cleaning.

Dirt under the fingernails can withstand frequent washing of the hands without changing greatly. It is of utmost value for criminal evidence. Fingernail dirt contains particles which allow connections to be made to specific sites or activities (e.g. soil traces, paints, splinters, textile lint, blood traces). These are present alongside particles resulting from a person's usual work.

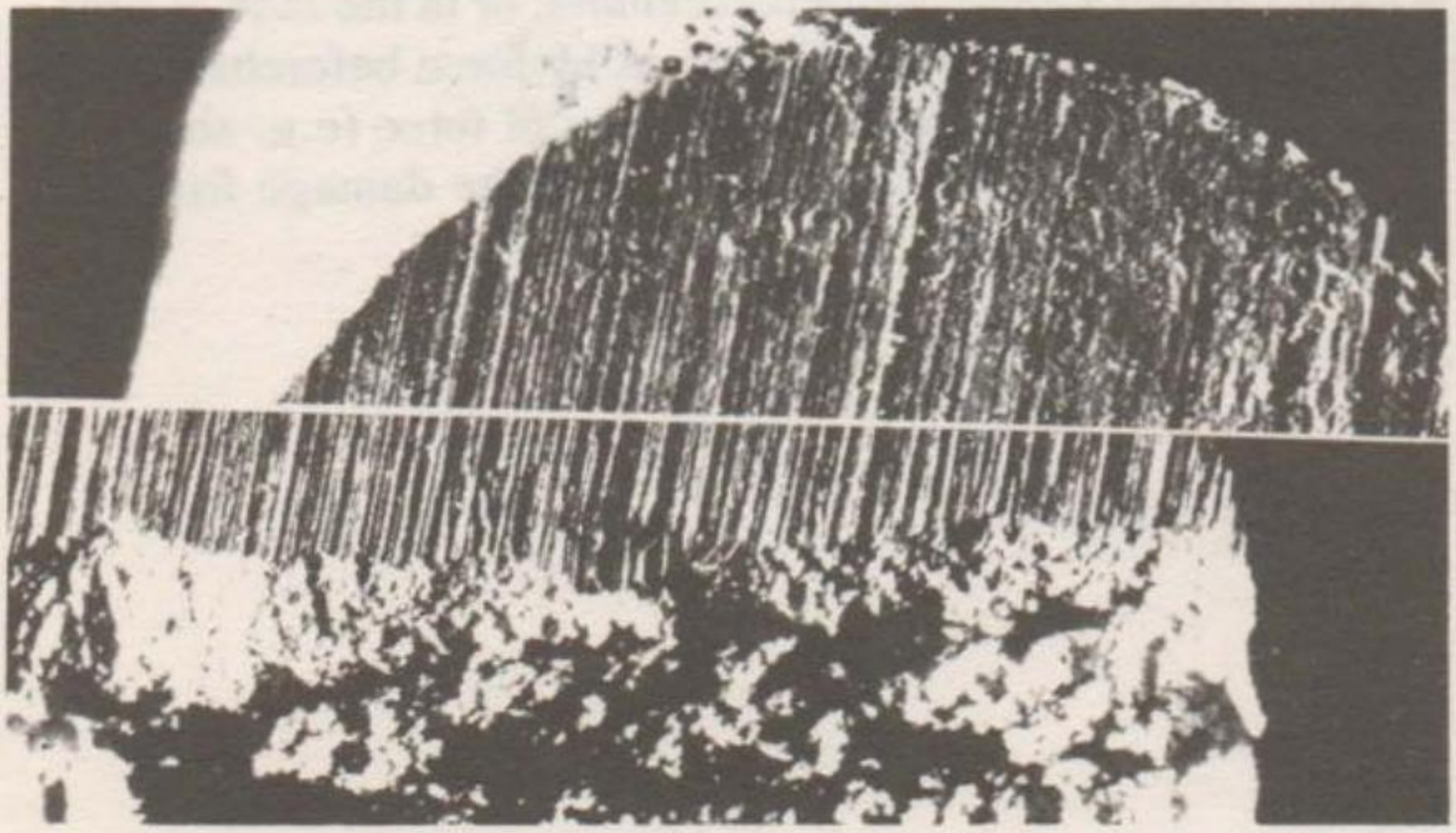
Hairy parts of the body such as the head and beard, eyebrows and ears, are also good collecting spots for dust. Even in the nostrils, skin creases, and pores, dust particles remain and give evidence about a person's whereabouts past and present, and his occupation.

GLASS TRACES

As a revolutionary comrade, one can imagine the most diverse situations in which traces of glass could play a decisive role. The problem is that when glass is destroyed, tiny pieces are spread around, which are hardly visible to the human eye. These cling to everything: to the head, to clothing, inside pockets and seams, and they are trodden into shoe soles and heels. They cling to tools and other objects used to break the window, and appear as trace material in the form of a fine glass powder.

In order to prove that two or more glass splinters have the same source, extensive analysis of the physical and chemical nature of the glass are necessary. Such examinations rely on thickness, conditions of disfigurement, transparency for light of various wavelengths, breaking index, flourescence, chemical composition, and so on. Important differences lead to definite conclusions. Sameness of all details, however, is only proof of a common source with special glass, since most normal glass is

[Top] Micro stress marks on the broken edges of glass. The identical stress cleavage marks on the two edges show that they were originally one. [Bottom] Scratch mark comparison. The semi-circle at the top is the cut end of a padlock. The lower part shows striation marks made by the bolt-cutters. The two sets of traces are almost identical showing that the same instrument must have been used on the padlock and in the comparative test.



mass-produced.

On the Swiss-German border, a man who had hidden watches in his socks was stopped. The watches obviously came from a jewelry store in Basel, at which there had been a break-in the night before. The suspect was found from a number of indicators: on the broken display window there were textile fibers which came from his clothing; on the glass splinters that were found, there was the same break-coefficient as in the glass remaining in the window; sand particles which were also found on his clothing coincided with the material from which the pavement was made. Pieces of pavement had been used to break the window. Despite these indications the man argued his innocence. In order to bring in more evidence the police contacted the manufacturer of the coat which the man wore. It was learned that it had been impregnated with a paraffin emulsion which contained a silicone salt additive. With the help of an X-ray microsound, these substances were also found in two pieces of fiber [length .5mm] at the scene of the crime and compared exactly with those of the coat.

By examining the breaking edge and breakline of glass, it is possible to prove from which side a window was broken or shot at, and with what kind of object the break was made. Bullets and fast flying objects (e.g. stones) make small holes on the breaking point of opposite sides of the glass, whereas slower-moving objects move with more force, causing spiderweb-like or broad surface breaks. It can also be determined on the basis of the break traces whether glass was worked on with a glass cutter beforehand, or in the case of fires, if it was broken as a result of heat or by force beforehand. If a glass plate is hit by several applications of force (e.g. shots), it is possible to determine the sequence of the damage from the break-line.

WOOD TRACES

Wood contains microscopically-small characteristic details which allow a variety of determinations to be made. In a laboratory examination the first check is for foreign objects (textile fibers, blood remains, paint splinters, safebox insulation material, etc.) on the wood sample. Subsequently, the wood is examined to see whether a broken or cut surface exists by which the available piece can be connected to another piece. In addition, the wood is examined for growth marks (annual rings, graininess) and traces of tooling from which, finally, the type of tree can be determined. This determination is possible even in the smallest wood samples thanks to the characteristic features of wood cells. Even tiny pieces of wood, such as saw or drill dust on the clothing of the suspect, are brought in for such examination.

After a commando action by several Italian comrades in which a fascist group leader had been beaten up, the sawed-off end of a piece of wood which had been used in the course of the beating remained at the "site of judgment". The sawed-off other end was later found by the police in a search at the apartment of a comrade. The traces left by the saw, however, were not sufficient to prove the connection between the two pieces. That only became possible later when the sequence of wood pores and other growth signs were matched.

HAIR TRACES

Shed hairs are a trace not usually taken into account by the maker of the trace. For the police they can be an important clue when they are lost during an illegal action and remain at the scene of the crime. This holds true even when they fall off a person's clothing rather than his body.

With human hair it is possible to tell which part of the body (head, beard, eyebrows, nose, shoulder, etc.) a hair came from, on the basis of general and microscopic appearance. In most cases it is also possible to determine whether the hair originated from a Caucasian, Negroid, or Mongoloid race, or from a mixture. It is also possible to tell the difference between a man's or woman's hair. The blood type is a further possibility, even with only a few millimeters of hair.

The determination whether a hair in evidence coincides with the hair of a specific person is nonetheless quite difficult. The head hair of the same person could even show differences. If a greater number (about 10 pieces) are available at the scene of the crime and as hairs to be compared, it is possible to draw conclusions about the pigment content (coloring material) of marrow and rind, the size of the pores, and the features of the structure of the scalp skin, and thus that they originated from the same person. Proof of cosmetic hair care products or artificial hair color can make the spectrographic analysis of the existing dirt in the hair as well as a bend diagram more difficult.

Nonetheless it is not possible on the basis of hair comparisons to come up with an absolute identification, as in the case of other material traces; however, it *is* possible with certainty to exclude the innocent (how nice).

Human hair with medulla [left, right] and without medulla [center].

BLOOD TRACES

Blood traces are not only used in connection with murder and manslaughter cases as they are served up every day by Boulevard journalists. It can happen, just to name a few other examples, that a worker who has the safe of the director rather than the director's chair in mind, accidentally hurts himself in the course of his work and thereby leaves testimonial traces of his blood at the scene of the crime. In some circumstances it may be necessary to flee from the police; sometimes one is hurt in the process, or gets a warning shot in the leg and thereby leaves a blood trace. And finally, if we think of the secret service dogs of barbaric dictatorships (such as Argentina, Chile, Iran, etc.) who make their way around the world, or of the new fascists, like Buback, or whatever all their names are, we notice that for us leftists, blood traces are a thing to be considered.

In events where blood plays a role, the police look everywhere for such traces: on clothing, and under the shoewax of newly-cleaned shoes, on water faucets, in cracks in a floor, on tools and weapons, and so forth. Blood spots on clothing or objects, which have been removed with warm water, can later be found by chemical means. In the same way, removal by chemical means (even chemical dry cleaning) leaves recognizable traces.

The questions whether something is a blood spot or some other dirt spot can be answered by means of simple tests. With a positive result, it is further determined whether the spot is human blood or the blood of a specific type of animal. With further analysis, in the case of human blood examined by a forensic pathologist, the blood type (A, AB, B, or O) and depending on the condition of the blood trace, further subgroups, can be determined. With liquid or damp blood it is absolutely possible to determine many more details than with dried blood traces.

Additionally, blood can show specific combinations and characteristics which are common only to one part of humanity. So, for example, illnesses, drugs, sleeping pills, alcohol, etc., show up in the blood. Under favorable circumstances it can further be determined from which part of the body the blood came, and whether it came from a man or a woman.

The question, however, of whether a blood trace comes

from a specific person can only be answered conclusively in the negative sense: that is, one can determine that the blood in question does *not* come from a certain person, but it cannot be determined with certainty that it *does* come from a specific person. Blood trace comparisons are thus only an indication.

For the criminalist, the question of how old a blood trace is comes up quite often, since the accused often claim that a blood spot (for example on their clothing) has an older source. To determine the age, there are several methods, which can only give an indication of broad time spans, and thus do not have value as absolute proof.

After a burglary in a department store the police officer found a piece of skin 6 mm. long and 8 mm. wide on the edge of the window glass that had been broken, which had served as the entrance for the expropriator. It was photographed and preserved in alcohol. They further found dried blood spattered on the windowpane. On the testimony of a witness, a man with a record was checked 24 hours later. It was possible for the police to fit the piece of skin under the microscope right into the fresh wound. Between the traces [piece of skin and blood traces] found at the scene of the crime, and the blood of the man, the blood group was easily established.

SECRETION TRACES

About 80% of all human beings excrete blood type substances in their bodily fluids. These excretions or secretion traces can give information about a wanted person (if in some way they remain at the scene of the crime).

Sputum traces, for example, are found on cigarette butts, tobacco pipes, anonymous or blackmail letters, the sticky surfaces of envelopes and stamps, and as spit on the ground. Saliva can be examined for its blood type. This is possible with wet as well as dry sputum, and very small quantities are quite sufficient. It also often contains individual identifying marks, such as specific illness-causing bacteria, soot, wood or metal dust, and similar particles deposited in the bronchial tubes or lungs which could also point to the work done by the suspect.

Nasal mucus can be of similar significance and can also give information about the blood type of the person from which it came. Under certain circumstances even this secretion contains mixtures which allow one to draw conclusions about the occupation or location of a wanted person. Nasal mucus is most commonly found on handkerchiefs which have been left at the scene of the crime.

Sweat, too, offers the possibility of blood type as well as other individual details (e.g. medications) that are secreted with it.

Urine traces can give information about the excretor if sickness-causing components can be found in it, such as in the case of diabetics, people with bladder infections, venereal diseases, and so forth. The blood type as well as evidence of poison and alcohol can also be drawn from the urine.

Feces are quite often left at a 'worksite'. Getting it as evidence in such cases is routine work for the police. Human excrement, in addition to sugar, protein, starch, undigested materials, and matter directly connected to the intestinal fauna, contains individual components that give valuable assistance in identifying the excretor. Feces allow one to draw dependable conclusions about the food enjoyed by the suspect, which in turn allows one to draw conclusions about his recent whereabouts. It is possible to determine the blood type as well, but this is undependable because of changes in the feces caused by bacteria.

Vomit can among other things lead to conclusions about whether poisons were used, and to the determination of the time of death. The contents of the stomach can also indicate what the last foods ingested were, and can give information about blood type.

MICROTRACES

Tiny particles hardly visible to the naked eye, or barely noticeable remains such as textile fibers, hair, paint, enamel or glass splinters, dust or dirt traces, plant particles, soil particles, or other foreign particles clinging to clothing, tools, or other objects whose examination is only possible microscopically, physically, or by chemical means, are designated as microtraces. As a rule, the evaluation consists of a comparative analysis in order to prove or disprove that two material examplars have the same composition. Scene-of-the-crime microtraces (even in cases that are solved) are stored by the Swiss police and most other police forces, for ten years.

It was possible for the police to get paint traces from a vehicle used in transporting and later sunk into a stream. They got the traces on the lock of a safe which was found in a van with a Geneva license plate on the basis of testimony by a witness. These paint traces made it possible on the one hand to characterize the car (color, brand, and year) and on the other hand to find out with the help of a vehicle search which car they were looking for from the mass of cars registered in Geneva. This car proved to have paint splinters on the inside from the transported safe.

Through an imaginative reconstruction of the process of a crime, it can be assumed that microtraces will be left at places touched by the suspect during an "environmental change". Microtraces are obtained mainly by the well-known adhesive strip method, whereby all possible places which could have traces are toched with a common commercial adhesive strip (Scotch tape). Small microscopic particles stick to it and in this way can be brought to the laboratory. For example, with a stolen car, all door handles, the steering wheel, driver's seat and so forth, are touched with adhesive to find any textile fibers, hair particles, dust particles, or other small particles left by the expropriator.

Another method consists of vacuuming the area containing traces by means of a vacuum cleaner with special filters. This is particularly useful for securing microtraces on pieces of clothing, carpets, or other places with large surfaces or a great deal of dirt. The traces in this method are gathered without loss of substance on a piece of filter paper, whereby it is also

possible to proceed piece by piece and use a different piece of filter paper for each section.

A woman was found dead one morning in a single-family house with wounds on her neck. Because of the type of injury, the doctors assumed that an accident was most likely, so the police looked for traces that would substantiate this opinion.

First the wool dress of the woman was thoroughly examined. Traces could be found on the front side near the neck line that allowed conclusions to be drawn about wood and soil contact. At the boundary of the property near the street, there was a wooden fence about a meter high. Given the type of injury, it was possible to connect this with the accident, and it could be assumed that the woman had been in the yard with her dog before she died. It seemed possible that she had fallen with her neck on the fence post as a result of foul play, and in this way got her injury. Cautiously, all 50 fence posts were checked with adhesive in order to look for contact traces. And, in actuality, skin particles and wool fibers which coincided in color and structure with the dress of the woman were found on one of the fence posts. On the basis of these microtraces, the accident could be solved.

Using a story about orange-red textile fibers, we will attempt to explain one of the techniques - *the univeral micro-spectrophotometry* - used in the evaluation of microtraces. In getting traces in the apartment of a jewelry dealer who had been attacked, some orange-red textile fibers were found on the edge of the toilet. Several days later, a suspect was taken into custody and a house search was carried out. In this process, one of the officers noticed a sweater which had been worn, which lay wrinkled on the floor of a closet. When the orange-red fibers secured at the scene of the crime as well as fibers from the sweater were examined under a light microscope, the similarity between the colors was immediately apparent, as well as the fact that in both cases the wool came from an animal source. For further proof, both fibers were compared with the help of universal microspectrophotometry.

When light falls on a prism, it is fragmented into the familiar rainbow colors. Our eye cannot recognize that the white light is a combination of all these individual colors. In the same

way, the human eye cannot recognize if two orange-red fibers are dyed with the same dye or with different dye, if they appear to be the same color. It is also possible that the same dye, depending on its concentration, will fool the eye with different color nuances. In order to get definite results, there has to be an objective method of measurement, which is provided by the universal microspectrophotometer.

So that a textile fiber which may be only a few millimeters long can be examined with this machine, it first has to be cleaned of all dirt. This happens in a fine empty object carrier filled with liquid, by means of fine needles and tweezers. The clean fiber is placed into the object carrier made of quartz glass and put into the universal microspectrophotometer. There the light transparency of the fiber is measured for every single color of the rainbow and also for invisible ultraviolet light. These measured values are put on a diagram. If two textile fibers measured in this way give two coinciding curves, one can conclude that they are dyed with the same dye.

In this particular case, the examination done with the aid of the universal microspectrophotometer resulted in strong suspicions. The measurement curves for the transparency of the two fibers showed an almost identical wavelength area in the visible and invisible spectrum.

Even though this similarity was strong evidence against the suspect, it was not a sufficient indication of guilt, because sweaters of this kind were sold by a big department store in sizeable numbers. Thus the possibility existed that the fibers found at the scene of the crime, came from the sweater of the suspect, but they could also have come from another orange-red sweater of the same brand.

As further proof, dark fibers on the sleeve of the sweater of the suspect were found. They were synthetic fibers of the same material as the shirt of the victim. The universal microspectrophotometer also showed identical curves in this examination.

After fatal automobile accidents or in situations where the survivor and guilty driver claim that the dead passenger steered the car and caused the accident, the police try to find which person, in fact, was driving. With an examination of the textile fibers sticking to the driver's seat, and comparative

fibers from the clothing of everyone in the car, this question can often be answered. If all the passengers were at the wheel (e.g. during a vacation), individual fiber traces will be found on those places (doors, window frames, windshield, hood, etc.) where the victims hit the inside of the vehicle or were thrown from it.

BALLISTICS AND FIREARM TRACES

What fingerprints are to the identification of a specific person, identifying marks on the fired bullets and cartridges are to the identification of a specific weapon. Each barrel has a unique "skin" despite machine and mass-production, which leaves a very specific uninterchangeable bullet pattern with each shot. (In technical language these are designated as trigger and field prints.) Under the microscope, these groove traces make a very specific pattern which is identical to each groove trace left by a shot fired through the same barrel and not identical with the pattern of a shot fired through a different barrel. It is possible to correlate the marks on a bullet fired from a specific weapon with the marks on a bullet used in the commission of a crime, by using this method of comparison.

Even smooth, unrifled barrels have this kind of unevenness which, with every shot, and even with shotgun balls (since they are smaller than the inside diameter of the barrel, usually only on one side) leave their individual traces.

Nontheless, it is not possible for the police in every case to draw conclusions about the specific weapon on the basis of the bullets. For example, if a bullet goes through metal or hits a hard, unbending substance such as stone, concrete, etc., the fine groove traces on the surface of the projectile are largely destroyed in the process of penetration or impact (contact). On the other hand, the human body, wood, or thin metal do not offer enough resistance to destroy the groove pattern.

In recent years, there have been two new developments in pistol and rifle ammunition which are relevant to the discussion of ballistic traces. Both relate to new bullet types whose behavior on impact offered the hope that ballistic traces might be obliterated.

One of these is the hollow-point bullet, which to a varying degree, depending on velocity and the density of the target, mushrooms outward on impact. The point of this type of bullet is to transfer the maximum amount of energy to the target, thus increasing the damage done while minimizing the danger of the bullet passing through the target and ricocheting into bystanders. In some cases, the deformation of the bullet has been known to render ballistic traces difficult or impossible.

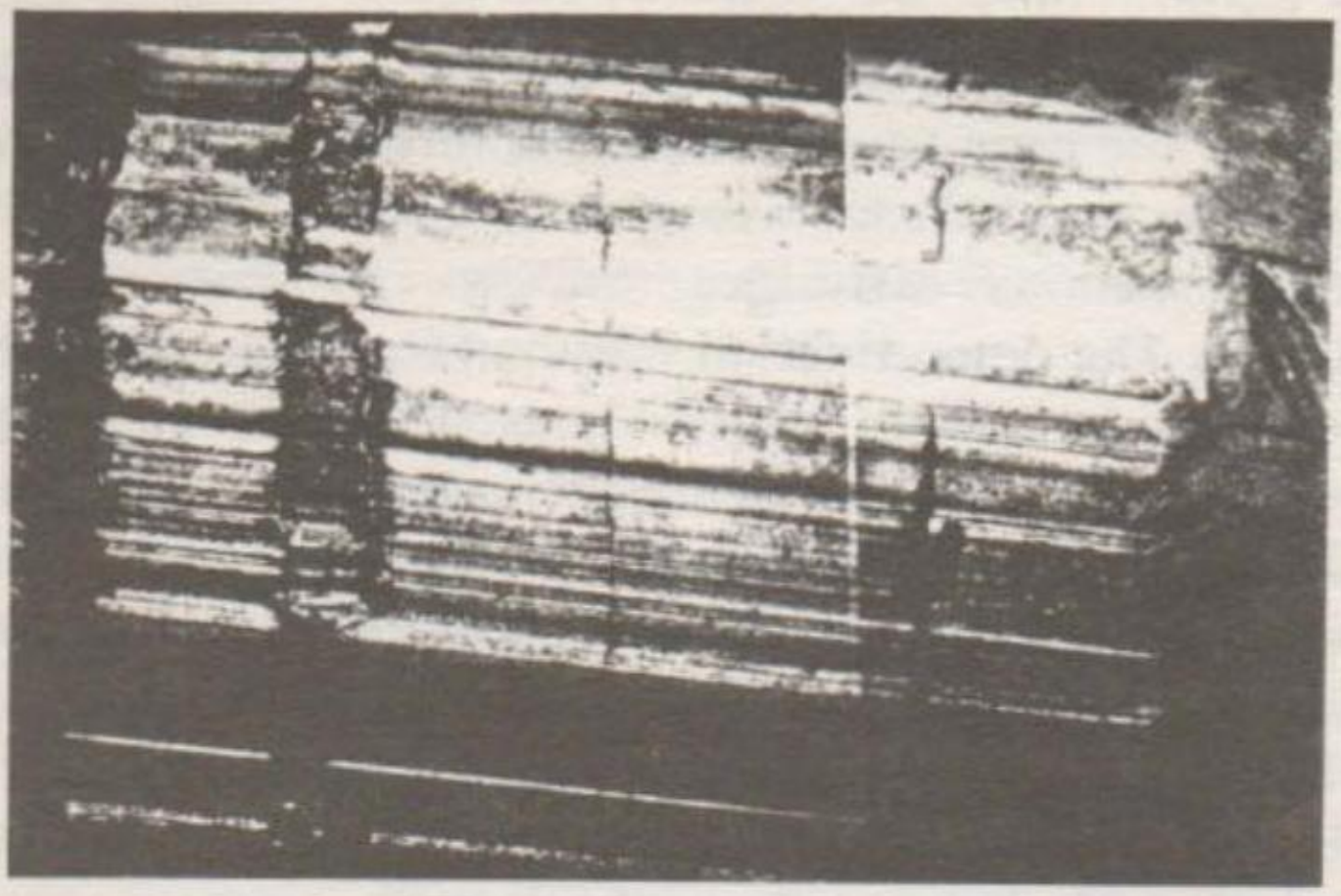
The second type, introduced in the past year in the U.S. is the exploding bullet. Like the hollow-point, it consists of a copper-jacketed lead bullet, opened and hollowed out at the tip. In addition, however, a tiny explosive fuze is inserted into the tip, transforming the traditionally inert projectile into an explosive, miniature artillery shell. The killing power of such a bullet, needless to say, is devastating.

One might reasonably expect that these designs, based on continually escalating degrees of bullet destruction on impact, might lead to the simultaneous destruction of the bullet as evidence. Unfortunately, this is not reliable. The advertising promotions for the first commercial exploding handgun bullets in the U.S. called Velet, in fact stress the fact that ballistic markings remain intact after explosion. In the best of circumstances, this might not prove to be true, but it is clear that no assumption of untraceability can be made even with these new bullet designs.

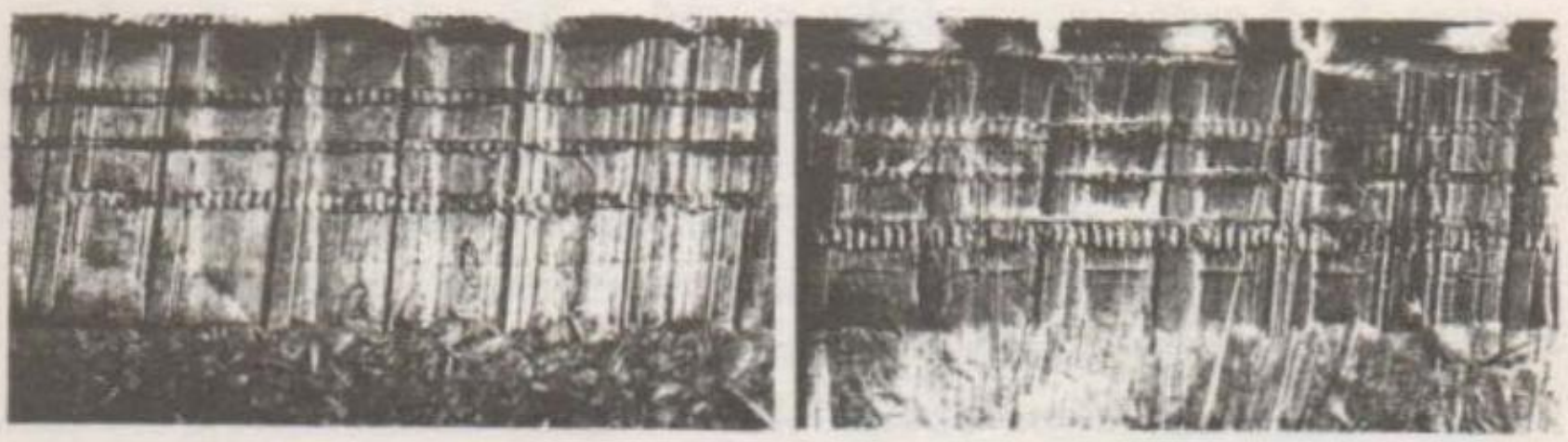
Cartridges also show signs with which it is possible to identify a suspicious weapon. For example, the firing pin of a weapon leaves a very definite impression on the primer of a cartridge whose microscopically fine center deviation, form, impression trace pattern, depth, etc. can only be created by a very specific firing pin. In a revolver the traces of the chamber are visible on the edges of the cartridges which are brought forth only by a very specific cylinder. In self-loading pistols and guns, the traces of the extract fingers are left on the cartridges and are visible on the lip prints of the magazine. That means when putting cartridges into the magazine and removing them, the leading edges of the magazine dig in, in the form of scratches on the edges of the cartridge.

If a bullet and cartridge are available to the weapons

specialist (in most cases one bullet is sufficient), it is possible through microscopic comparative examination to clearly identify the weapon used in a crime (as long as it is available).



Comparative ballistics test using a [top] comparison microscope, [bottom] three dimensional periphery camera. The test bullet is to the left, the crime bullet to the right.



The Weapons Recognition Service and its responsibilities: 1) Systems determination: If the weapon used in the crime is not known, it is possible on the basis of cartridges and bullets found at the scene of the crime, to determine the system and the brand of the weapon used in the commission of the crime. 2) To determine the connection between different crimes in which a weapon was used through comparative examination based on evidence such as cartridges, bullets and cartridge casing defects. 3) The determination whether a weapon taken from a suspect may have been previously used for criminal purposes. This is done through a comparative examination in the central Criminal Munitions Collection, in which criminal munitions (casings, bullets) are stored with munitions which were fired from a suspicious weapon (ballistics tests).

If a stolen or lost weapon is found by the police, a ballistics test is also done, in order to determine if the weapon has been used for criminal purposes in the interim.

Ballistics tests are done even on weapons which are not obtained in connection with crimes in which weapons were used, but in pursuit of other criminal acts (e.g. unlawful possession of weapons or house searches in connection with other crimes), in which weapons come to the attention of the police. Such munitions are also stored in the evidence collection even if no criminal connections show up.

The distance of the shots are an important lead for the police about the process of a weapons crime, particularly if there are no witnesses. A distinction is made between a shot touching the target, a relatively close shot and a distant shot.

In relatively close shots, one can find microtraces of the material shot at, such as textile fibers, body tissue, blood, etc. near the end of the muzzle. These result from the explosive effect of the bullet impact. In close shots, the kind and amount of these materials can lead directly to the determination of the distance of the shot. This is particularly important when there is a question whether or not the shot was intended for the target, as in a suicide. With weapons fired from within 20cm. of the target, it is often possible to find small particles from the target on the inside of the barrel. These are brought in by suction caused by the expulsion of powder gases.

In a shot directly held against a body, one can usually find a tissue explosion, also called a powder hole, which is caused by the entrance of the powder gases into the skin. A further mark is the puncture (entrance) wound. The skin raised by the powder gas explosion bursts in the direction of the weapon, so that its profile is completely or at least partially drawn.

If the weapon is put directly onto clothing, it will show fringed entrance holes with strong powder remains (powder traces are primarily lead, barium, and antimony) which spread between the clothing and skin.

In shot distances of more than a few centimeters, a search for traces to determine the distance can only be made on the surface of impact, in the bullet canal, as well as on the weapon itself. In the expulsion of gases and the remainder of the load, these spread conically outside the muzzle so that the striking parts accumulate in a narrow powder range (powder remains around the muzzle). With greater distances, this circle is broadened.

In 1969, three Arab men and an Arab woman shot at a slowly rolling El Al airplane at the airport Zurich/Kloten. An Israeli security officer who jumped out of the plane then shot an Arab: the others were arrested.

The Zurich police later reconstructed how the Arab had been shot by the security officer. This was possible because the weapon was immediately seized and enough comparative munitions [ballistics] could be obtained. The picture of the traces from the victim could be interpreted as follows: Two of the three bullets in the body of the Arab show an ascending path in the medical findings of the court. Inside the body a further shot shows a slightly descending path. This order allows the conclusion given the proportions of gunman and victim, that the gunman was taller than the victim and that the gunman shot from a standing position toward the upright standing Arab. This indicates that the first shot on the torso coincides with the slightly descending path, which entered from the front of the body; the two shots ascending in the body came from behind into an already slumped over torso.

The observation of witnesses that the victim veered toward the right coincides with this picture. According to this, the first

shot was fired diagonally in the front, in the area above the shoulder blade; the following shots into the corresponding parts of the back, which in the meantime were turned toward the gunman.

In combination with the results of the bullet distance determination, which could be made on the basis of powder traces on the clothing, it became clear that the gunman, after the first shot, took one step toward the victim who had bent forward and turned toward the right. Then he shot from a similar position twice more, one after the other, into the upper part of the body of the Arab. Indications even appeared of the time sequence of the shots.

For every shot distance determination there are weapons specific distance comparisons to be made, which in the case of suicide or self-defense, for example, are always possible, since the weapon and bullets are available. Up to what distance a determination of the distance of the shot can be made, depends on the kind of weapon and ammunition used. In most cases, the upper limit lies between 1 and 2 meters, the critical distance of the length of the arm. The question whether suicide was possible or not thus can be answered in most cases. In short distance shots, in addition to powder traces, there are usually heat effects which are practically unnoticeable to the naked eye, but which can be photographed with infrared light.

In firing a handgun, the hand is dirtied by powder remains. These traces are not visible to the eye. They settle predominantly on the thumb and trigger finger of the hand holding the weapon. As proof of the hand holding the gun, parrafin tests were done in the past. This method consisted of pouring paraffin over the hand in question, whereby the smallest nitrate remains of the exploding cartridge would stick to the paraffin and turn blue.

Today, the hand is rubbed with cotton soaked in distilled water, and the powder traces proven by means of spectography.

A few years ago, the Americans developed a spray with which the hands of the subject are sprayed, in order to quickly determine suspects who shoot out of a large crowd, and then get rid of the weapon. This spray develops the metal remains (which are created in every intensive contact with metal) on the

surfaces of the hand and makes them visible in ultraviolet light.

It is possible in some cases to determine the amount of time which has elapsed since the last shot was fired. Bullet lube, the absence of quick oxidation, (which appears quickly as an atmospheric effect, and is a layer of rust on steel not visible to the eye) and very little dust on the bore, point to a relatively recent shot (up to about two days). On the basis of chemical analysis of the powder remains on the bore, a relative time determination can be made (up to about 5 days), since certain powder particles change in the course of time. The strength of the formation of rapid oxidation as well as the quantity of dust on the inside of the bore (as described on page 36) give information about longer periods of time since the last shot.

Burned or unburned powder remains give information about the ammunition used last. On the basis of traces found at the scene of the crime (powder remains, position of the casings, entrance and exit of the bullet, bullet path, and kind and position of other objects that were hit, etc.) the position of the gunman can be determined in many cases.

A shot landed on the 8th floor of an apartment building in Geneva. It broke a window and went through the curtain. The holes in the glass and in the fabric were the only clues when the detective division got the order to determine the position from which the bullet, which had been found, was fired. First, the pieces of glass which had fallen to the floor were put back into the window and fastened. Then the diameter of the hole made by the bullet and its center could be determined. The police showed that the hole in the curtain which was 11.5 cm from the window glass was 16 mm lower than the hole made by the bullet in the glass. This proved that the path of the bullet was downwards, which was given further credence by the shape of the inner part of the bullet hole in the glass. Since the curtain had been pulled back after it was hit by the bullet, the path of the bullet could not be more exactly determined. With the help of a pole which was led through both openings, [in the glass and in the curtain], the angle of the shot could be determined. The assumption that the shot was fired from one of the other houses could be eliminated since they lay about 200 meters away. On the basis of the available information [angle, height of

the shot above the surface of the ground, speed of the shot, impact on the glass], it was possible for the police officers to conclude that the bullet travelled about 800 meters.

With this information in mind, the area was searched and the weapon was indeed found in a little garden shed [distance of 780 meters], which closed the case.

Naturally, with a weapon that comes into the custody of the police, fingerprints or microtraces (dust, hair, textile fibers, etc.) are always sought, which allow conclusions to be drawn about the method of transportation or storage of a weapon, or contact with specific clothing.

As this section makes apparent, weapons traces are a particularly complicated and perilous business. One Mafia hitman, in characterizing gunmen who failed to completely dismantle, destroy, and dispose of weapons and ammunition after a job, summed it up when he said there was a name for people like that in the assassination business: "convicts". He suggested weapons be wiped off, sawed into tiny bits of metal, and then dropped into the ocean.

The economy-minded comrade, however, may still wish to alter and save a weapon. In this event, alterations must be done immediately and traces discarded, or else totally secure storage must be found until the alterations can be done safely. However, many people have false ideas about the extent of alteration necessary to successfully remove all traces from different kinds of weapons. The following problems can be identified.

The revolver is in some cases the simplest weapon from which to remove traces. If the crime occurs in such a way that the casings can be successfully removed from the scene and disposed of, (i.e. the weapon is reloaded after leaving the scene, or the casings are pocketed while reloading during the crime), then only one part need be replaced. Presuming one is in a situation where acquiring spare parts is possible, the barrel can be removed and a new one installed. This is not a simple operation - it requires using a vice to unscrew the tightly threaded barrel from the frame - but it is adequately described in most gunsmithing texts, and could be done in any workshop.

If, on the other hand, the casings were dropped at the

scene of the crime, then the revolver should be disposed of. This is because the backward force of the cartridge against the breech face on the frame of the gun impresses microtraces on the soft metal of the cartridge which match microscopic scratches on the frame itself. The section on metallic microtraces makes clear the danger of trying to remove such marks from the gun by filing, and a revolver without a frame is not worth keeping. The weapon should in this instance be carefully destroyed and discarded.

The autoloading or automatic pistol, and other automatic and semi-automatic weapons such as assault rifles and submachine guns, share common problems in removing traces, except that the slide on the pistol can be considered analogous to the bolt or breech block on rifles and M.P.'s.

The disadvantage of all these weapons is that their method of functioning involves ejecting cartridge casings around the scene of the crime. As a rule, the situation demands leaving the casings, which contain microtraces from several different parts of the weapon's action. All these parts must be replaced. The advantage is that (with the exception of rifle barrels), all the parts are normally removable and accessible during any cleaning of the weapon.

The parts which must be replaced are: 1) the barrel, which (like the revolver) leaves its traces on the bullet. 2) The slide, bolt, or breech block (depending on the type of weapon), since the breech face makes contact with the bottom of the cartridge casing during firing. 3) The extractor (usually a subcomponent of the slide assembly), which hooks into the rim of the casing to pull it from the chamber after firing. 4) The ejector (also usually a slide assembly sub-component), which marks the casing as it is violently blown from the weapon. 5) The firing pin, which impresses its tiny scratch marks on the primer. 6) The magazine, which scratches the casing against the inside of the feed lips as the cartridge is chambered.

In the fortuitious event that the crime occurs in sufficient isolation (or with the aid of a silencer) such that there is time to collect and remove from the scene all the casings ejected from an autoloading weapon and dispose of them, then only the barrel need be replaced. In an automatic pistol, this is a simple

operation which can easily be accomplished while the weapon is being cleaned after use. Simply remove the old barrel while it is stripped down, and replace it.

It should be remembered that these alterations only remove the ballistic traces which can be used to identify the specific weapon used in a crime. The type,caliber, brand, and model of weapon will still in all probability be known to the police as a result of the microtraces on the recovered bullet(s). Secondly, it should be remembered that many of the other microtraces discussed in this section (blood, textile fibers, hair, etc.) must also be removed before the weapon is totally untraceable.

FIRE TRACES

The widespread opinion that significant traces are as a rule destroyed in the course of a fire is completely wrong. It is often possible for the police to find significant traces even in total fires and to determine whether the cause was carelessness or intentional arson, natural or technical causes, spontaneous combustion or animals as "arsonists".

The exclusionary method is the method most often used to determine the cause of a fire. That means that the police check all the possible causes and attempt to exclude as many as possible on the basis of testimony and of the picture left by the traces. The remaining possibilities are then either eliminated or proven by directed analysis.

First of all, the arson officers will always try to find the specific place the fire actually started. In most cases this is possible based on the testimony of passersby or of the firefighters who first come to the scene of the fire. Once it is localized, the possibilities for how a fire could have started are already limited. For example, if there are no open sources of fire (stoves, fireplaces, etc.) within an area and no electrical installations, these possibilities as a cause of the fire can be eliminated.

Soot traces on pieces of broken glass, metal parts, etc., give important information about what burned first. The soot

differs depending on the flammable material.

On the basis of the soot profile, which gives the sequence of the varieties of soot, it can be determined in the laboratory with microscopic and electromicroscopic tests, if gasoline and then wood, paper or textiles were burned first or vice versa.

Traces of melted glass or metal indicate what temperature was reached in a particular area of the fire which in turn allows conclusions about what materials were burned.

In the following section we want to put special emphasis on the possibilities of proof with the rapidly combustible materials used in most cases of politically-motivated arson. Any highly flammable substance can be designated as a rapidly combustible material. The most favored (or the most suitable) are liquids like gasoline, heating oil, turpentine, floor polishes and so on. When the use of such materials is suspected, the police use a gas sniffing device at the scene of the fire as a preliminary test. With this device air which could possibly contain the gases or fumes, is sucked from the burned materials with a testing straw. If such a preliminary test shows positive results, the attempt is later made in the laboratory to get unburned quantities of the rapidly combustible materials from the burned remains by distillation or extraction. If the liquid was poured over absorbent surfaces or materials such as wood, paper, fabric, etc., unburned remains are usually found. If such a derivation is no longer possible, it is possible to find disintegration or reaction products instead. These are just as good in providing evidence as the derivative materials themselves.

Substances recovered by distillation or extraction (a few milliliters in the best case) are identified and analyzed. First it is determined which materials (gasoline, floor polish) were used. If for example, gasoline was used, thin surface chromatography or spectrophotometry are used, which can show typical coloring for every brand of gasoline. It is also possible to separate mixtures of different brands of gasoline and to determine the quantity of additives (lead, etc.) in the gasoline. The analysis also shows the chemical composition of ashes, which show indications of what materials were used to speed up the fire.

These methods of proof mean that any materials which are

in the possession of a suspect (e.g. in a gasoline can) can be used in a comparative analysis by means of distillation of materials gotten from the fire.

By studying the debris and through material analysis, the kind and quantity of burning material can be determined. This work is often done by the police to clear up insurance claims.

In one case, an undertaker claimed that when a room burned, an old valuable Reubens painting burned up. Through a chemical analysis of the ashes, it could be determined that the painting in question had been done with completely different paints than Reubens used for his paintings.

Another person claimed that her bank notes had burned up (these are replaced, by the way, if proof can be brought). Chemical composition of the ashes, however, presented a different picture than is usual in burned notes. In addition, no metal threads could be found in the debris.

Liquid combustibles often cause fireballs which frequently singe clothing and hair (eyebrows, eyelashes, hair on the back of the hand, etc.) on the arsonist. The microscopic proof of such singeing is still possible several days later, even though the singed hair tips or ends of textile fibers break very easily. What remains are the closing zones in which changes take place (the formation of gas blisters, discoloration). As a result of carelessness or excitement, an arsonist often pours gasoline or similar substances on his clothing or steps into a puddle with his shoes. Many hours later, it is still possible to find such traces with the gas sniffer mentioned earlier.

In exemplary arson cases, the identification of the combustible material used (matches, candles, chemical substances such as phosphorous, black powder, calcium chlorate, etc.) can be of importance for the police in their search. If, for example, matches which have not totally burned up are thrown away - those that are totally burned can hardly ever be found - they can be compared with those found in the possession of a suspect. This is done according to size, color, type of wood, that is, carton type in wax matches, impregnated material (e.g. paraffin), fabrication traces (e.g. pressure traces from the conveyor belt), chemical composition of the matchhead, and so on. In specialty matches there is also the proof of chemicals

characteristic of that type of match. Cases have sometimes occurred in which the police have found a piece of a matchbook on the suspect, which could be compared with the characteristics of the break surface of a match found at the arson site.

When candles are used as ignition material, liquid wax remains often run into cracks in the floor, where they are protected from total destruction by flames. In these cases as well, microscopic chemical analysis of the recovered wax mixture can be compared with candles in the possession of the suspect. Absolutely all ignition materials - whether totally burned or not - can be found in the debris, and the results used for comparative purposes.

We do not want to get into the innumerable possibilities of proof with respect to self-igniting materials and electrical causes of fire. Three examples will suffice:

Through metallographic examination - study of the origin of the melting, oxidation, and tarnish colors - significant conclusions can be drawn as to whether, for example, an iron or immersion coil was damaged from the outside by heat from the fire or conversely, if the heat came from the inside.

Even in cases of subsequent deliberate changes in the plug of an electrical appliance, it can often be determined through a microscopic examination what the original construction of the plug was. In and on the plug, appropriate friction marks of the oxidized materials can be recognized, and layers of soot are scratched up. In this way, very valuable leads can be obtained as to whether a specific appliance was turned on, that is, had electricity running through it. On the other hand, undamaged oxidation or soot films mean that the contact zones in question were not changed.

Through the examination of the inner structure of the metal wires by means of fine X-ray structural analysis, the overloading of an electrical circuit can be proven, as might happen with defective or amateur wiring.

EXPLOSIVES TRACES

In examining explosives crimes, the police distinguish between explosive devices which were found before the explosion, and those which are only available in the form of debris and pieces of materials. One way or the other, the goal of the explosives experts is to get as much information as possible from the available material which can help them solve the crime. Explosive devices that have not yet exploded are usually found by the police on the basis of reports from persons or institutions in public or private life which have been made 'insecure', as it is so politely said. It is funny that 99% of all such reports are false alarms.

If a suspicious package is reported, the police first evacuate the area and determine how great the load might be, what sort of picture of damage the explosion could show, and if further explosives might be around.

The experts always assume that nothing is safe, whether a suspicious package has already been manipulated or is still in its original condition. The possibility always exists that a timing device has not yet run out, or that a detonator run by radio has not yet been set off, or that the package is prepared in such a way that removing it from the place in which it was found could set off an explosion, or that the firing mechanism was damaged but could be put back into position by moving it.

The attempt is made to clear this up by means of a stethoscope (listening to it), to see if a clock is still ticking. Photographic documentation follows, that is, without getting close to the suspicious object, the attempt is made to capture writing or other interesting details with a Polaroid camera. Next, X-rays are taken - still at the place where the suspicious object was found - without touching or moving it. The police use a small X-ray machine for this, which can be pushed on wheels over a suspicious object, while allowing the production of X-rays at a safe distance. Analysis of the X-rays in most cases provides significant information about the contents of the package.

If it really is a matter of a bomb package, the explosives specialists first judge whether the detonating mechanism can be transported, or if a disarming device is necessary right then and there. In this phase, the attempt is often made to drag the suspicious object outside and allow it to explode there

harmlessly. This method, however, forces the police themselves to destroy a great deal of information and traces which could lead to the criminal.

It was possible for the Zurich police in September of 1972 to disarm the first explosive sent there from Amsterdam to Jewish institutions and people. In this process, the detonator was separated from the detonating mechanism without setting it off. Almost all the traces for determining the time and place, as well as a writing analysis in the documentation laboratory and a fingerprint analysis, were possible for the police, since all the traces were still almost perfect.

If transportation seems possible, the bomb package is delivered into a laboratory with a special vehicle and disarmed.

Once an explosive device has exploded, and only a pile of pieces and debris is available, the explosives specialists know from the beginning that success is only possible for them if they do an incredible amount of work. For example, in the attack on ITT-Zurich in 1974, several functionaries were busy for about 10 days simply separating the heaps of debris, looking for useful debris, and separating it with great detail through different sized sieves.

One phenomenon provides important help to the criminal technologist in seemingly hopeless situations. During an explosion, finely-pulverized material is created around the center of the explosion under high pressure in the explosive process. As opposed to the larger pieces, splinters, and debris thrown around, this fine material is not thrown very far, but is very quickly slowed down by the air. How soon it is slowed down depends on the quantity of the explosive material; in loads of approximately one kilogram it is only one to two meters. In this area there is inevitably an undertow after the explosion, which sucks back the finest materials floating in the air toward the center of the explosion. Contrary to common belief, the greatest chance of finding particles originating from the explosive or from materials close to it is at the center. In looking for traces, a new method is used: it consists of freezing the center of the explosion with the help of dry ice. The explosion center can then be brought into the laboratory as a whole in the form of an ice block, where the trace analysis can then begin after the ice has

melted.

Splinter and debris traces are somewhat different. First of all, the classic trace is often the fuse used for igniting the capsule. Modern fuses come with a variety of constructions, so that even small particles allow one to draw conclusions about the kind and brand of fuse being used.

The investigative service of the Zurich police has a large collection of explosives, ignition capsules, and fuses of different kinds and origins for comparative purposes.

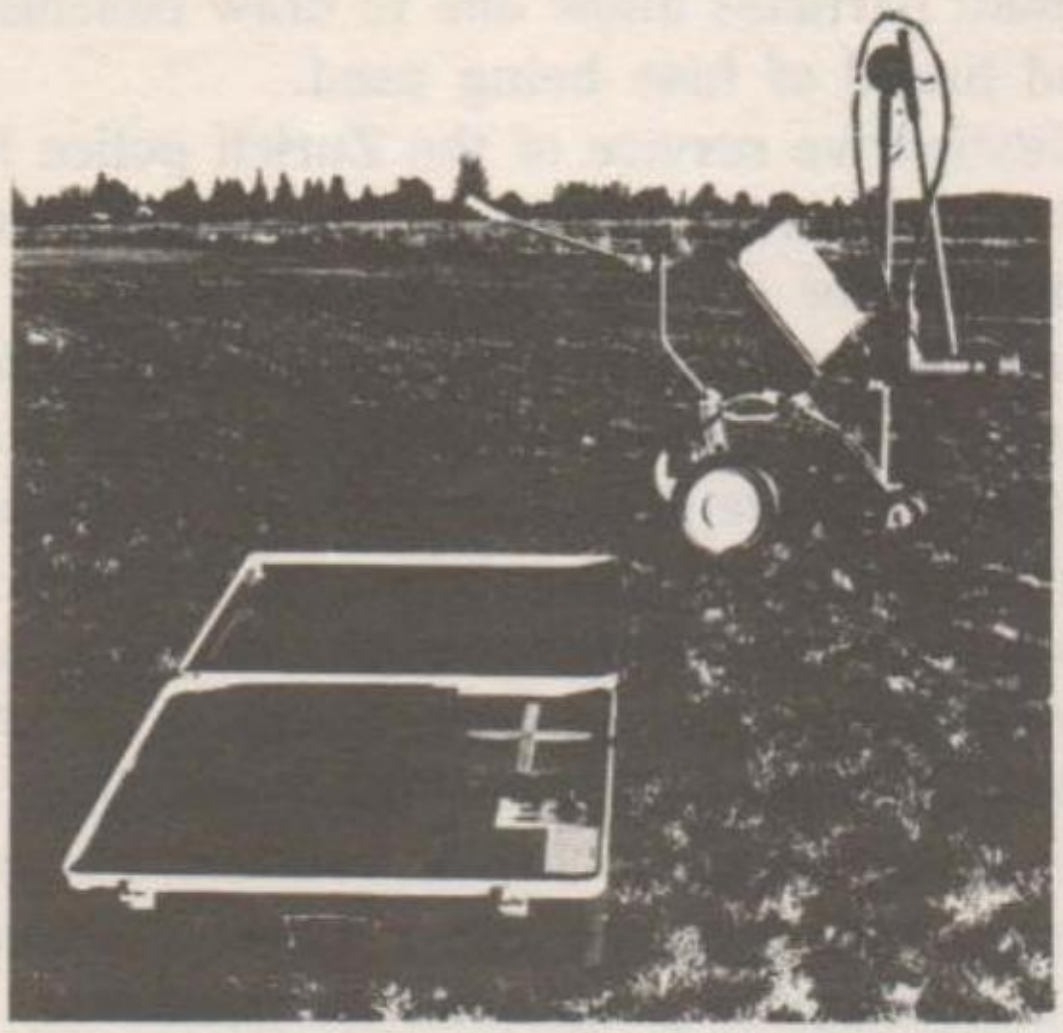
In its fuse collection, the complicated construction of every safety or time fuse is schematically represented. For example, a fuse is constructed in the following manner: on the outside one finds transparent synthetic insulation; the layers continue - from the outside to the inside - a paper cover, a layer of tar, layers of jute, a layer of paper, another layer of jute, a paper cover, another layer of paper, the black powder part and inside cotton fibers. Depending on brand and use, fuses exhibit a different composition in construction. From this multiplicity of fuses and the complexity of their construction, important indications can be found in evaluating traces.

Usually it is possible to find the remains of the detonator, which tells whether an aluminum or copper capsule was used, and on the basis of pressure traces, created by fastening the fuse line to the detonator, conclusions can be drawn about the place of production.

From the standpoint of finding traces, an electrical detonator is more helpful than pyrotechnic detonators and fuses, with the exception of particularly information-rich fuses. There are remains of individual insulated ignition wire as well as parts of different batteries and switches. This modern form of ignition is used more frequently since it allows the use of time delays or radio wave ignition. The more elements are used for the ignition, the greater the chance of finding some specific trace.

In addition to the ignition mechanism, the explosive material itself allows for possibilities of individualization. In general, it can be said that exact identification is possible in a comparative analysis of the explosive material if unexploded particles are available. It varies from case to case whether such

remains are found. This depends on the even distribution of the explosive material around the detonator, as well as the form of the explosives container. There are almost always remains in homemade explosives in which combustion is imperfect.



Portable x-ray equipment used in investigating the sites of explosives crimes.

It is different if conclusions about the composition can only be drawn from the debris (pulverized explosives remains) which is created in an explosion. The analyzable traces lie in the gamma range, that is, contain only a millionth of a gram of undetonated explosives material. Despite available analysis, it is often not possible to say if military explosives were used and if civilian explosives can be excluded or vice versa.

In many countries (such as the United States), there are attempts underway to enact legislation and programs whereby *taggants* - specific identifying chemical additives - would be added to every lot of manufactured high and low explosives, including dynamite, TNT, black powder, smokeless powder, and so on. This would supposedly allow the criminal police to not only identify the particular type of explosive used more readily, but would also give them the means to trace possession through the entire distribution chain, from manufacturer to

distributor to the ultimate purchaser. Advocates of taggants, which are already being added to many commercial and military explosives, have made grandiose claims as to the potential benefits they would provide to investigators. However, in addition to the obvious drawback in this tracing system resulting from the fact that most explosives crimes are committed with stolen explosives, there is also considerable evidence to the effect that taggants do not survive detonation any better than other components of the explosive material.

In two break-ins in which safes were cracked by explosives, particles of the capsule were found at the scene of the crime. These had pressure traces which coincided in every detail with traces from the press of a specific firm. The appropriate fuse line with capsules attached by machine were stolen from the firm the previous night. The finest traces of explosive material were also found. These remains were smeared when the load was prepared. They showed the same results in analysis as the materials which were stolen from the warehouse.

For years the investigation unit of the Zurich police has obtained remains of various samples from Swiss explosives thefts. This sample collection serves to clear up what explosives are used in a given crime. On the basis of such comparative analysis, connections can often be made between different explosions.

In a house search for explosives, specialists are used just as they are with drugs to guarantee results. These specialists use helpful devices such as explosives sniffers or dogs trained to sniff explosives.

An explosive sniffer is externally composed of three connected parts: the sniffing pistol, a measurement and determining device, and a pressure device filled with argon gas. The sniffing pistol ends in a thin metal pipe with which the area to be tested is vacuumed. With the tip of this pipe, small cracks and openings can be systematically checked. A pistol-like grip has a loudspeaker which now and then produces a sharp sound very similar to the sound made by a Geiger counter.

If the sniffer finds something, the sounds speed up until they become a continuous tone. At the same time the existence of explosive material is indicated on the scale of the measuring

device.

The explosive sniffer - seen technically and physically - is nothing more than a detector responding to nitrocompounds, especially to specific particles of nitroglycerin and nitroglycol. These come out of the mass of explosives, permeate even thick packing materials as escaping gases, and thus arrive in the surrounding atmosphere. In sufficient concentrations these compounds can be recognized, even by the human nose, as a typical explosives smell. The sniffing device, however, reacts much more sensitively. For example, it can recognize that a gelatin explosive was in a closed container for two hours, ten weeks after the event. Even after six weeks it can be proven that explosives were wrapped in a newspaper which has been lying open since then. Another advantage is that even after several days it can show explosives traces on human hands that were very carefully washed, insofar as the explosive was touched with bare hands.

As far as criminalistic information is concerned, those particles of a "hell machine" which the bomb builder does not recognize as suspicious and therefore handles much more carelessly than would be expected are much more useful. For example, in the attack on the Zurich City Hall, 1969, a bomb exploded in a suitcase as it was delivered from a travel bureau. Even though the suitcase was totally ripped up, it could be identified, namely, by the spiral stiffening wires, the covering, and the smallest pieces of lining material. Parts of the alarm clock used as a timing device led to the identification of the correct type of alarm clock.

In solving explosives crimes, the police undertake the following steps in most cases:

1. Checking who bought explosives: however, only a few cases are known where a person used explosives he bought.
2. Checking buyers of component parts used in an explosive device: for example, batteries, watches or alarm clocks, electrical wire or fuses. In many cases this is a matter of mass-produced articles which are bought in department stores. Therefore, there are seldom leads to the buyer.
3. Technical connections between a series of crimes: the use of the same explosive material and the same method of detonation

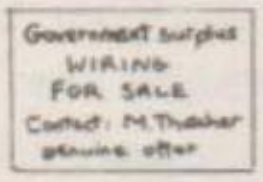
can allow one to draw conclusions about a specific "criminal group".

4. Questioning of informants, witnesses, and suspects: among other things, checking out people and vehicles found at the scene of the crime, and sometimes also subsequent raids.

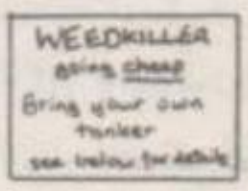
5. Bringing suspicious persons before the criminal police for microtrace comparisons: here one must think about traces which someone might have on his clothing or effects, and which could be connected to the scene of the crime (e.g. soil traces on shoes.)

6. Securing comparison material and other material in house searches: e.g. wires, adhesive, packing paper, wood, nails, clay, solder, insulation tape, wires, and other electrical materials such as tools (wire cutters, scissors, screwdrivers, hacksaws, etc.). Dust and particles from and on tools are also secured, as are receipts which could give leads to things that have been bought.

7. Evaluation of all possible writing found at the scene of the crime or communiques: search for fingerprints, evaluation of handwriting or typewriter writing in the documents laboratory.



Daily Mail



WEEDKILLER DEFUSED IN PARLIAMENT

A POLICE SPOKESMAN SAID 'THIS IS OBVIOUSLY AN ATTEMPT TO OVERTHROW SOCIETY'

POLICE WISH TO contact a Mr G. Fawkes who they believe may be able to help them with their inquiries. In the meantime 6 gardeners have been interned in Brixton Prison until more information can be produced.

Superintendent Cadbury of the Anti Terrorist Squad announced that if any member of the public sees someone with weedkiller there they should be reported at once to the nearest Police Station.

VOICE IDENTIFICATION

Voice identification has become more important for the criminal police in the past few years. At an increasing rate, messages to the police come from anonymous telephone calls (ugh).

Anonymous telephone calls to the police or to newspaper offices are a frequently practiced warning method in politically-motivated attacks, acts of sabotage, or other criminal activities, or they are used to provide the political reasoning behind an action in announcements about an action. Even in blackmail cases, the demands are made by telephone in most cases. It is known that the police, fire departments, and many newspaper offices have their telephones connected to tape recorders, so that all phone calls coming in are recorded on tape. In this way the first requirement for comparing voices is established, not even to mention the fact that the voices of anonymous callers can be played over radio and television to the general population. Thanks to the surprisingly high recognition factor of the human voice and styles of speech, the cops have a disturbingly high rate of success with this simple method.

In the United States, various laws and court decisions theoretically prevent anyone from tape recording telephone calls without the knowledge and consent of both parties. One corollary of these triumphs of liberal "freedom through law" is that any telephone conversation which is being recorded is supposed to be identifiable to both parties as such by a frequent, audible beeping sound. In fact, however, these rulings are meaningless: at best, the failure to observe the rules of wiretapping by police or other interested parties may result in such evidence being inadmissible in court. It will not prevent these traces from being used by the police to identify the caller. In any event, the taping of police telephones (at least the 911 Emergency lines), is now standard practice.

One can differentiate between two different voice identification systems. The "subjective analysis" consists of a voice comparison by a linguist. The comparison is done with the human ear in the same natural way with which we recognize the voices of our friends and acquaintances with certainty even in difficult circumstances (telephone, loud speaker).

In the "objective method" analysis, the comparison is done

with a highly developed apparatus, the sound spectrograph. This method is an electronic system in which the human voice is pictorially represented. It was developed by a physicist named Kersta, and used for the first time ten years ago in the U.S. as evidence in a trial.

Voice prints, technically called spectrograms, are the graphic representations of the sound spectrograph, which electronically draws the energy which is released when a word is spoken. Whenever a person says the same word, regardless of pitch, volume, and the possibility that the person altered his voice, the voice print will be essentially the same.

This results from the fact that the quality of the voice is determined by the voice box (in the throat, the nasal system, and the mouth), as well as the structure and the use of more than a half dozen vocal muscles in the lips, the jaw and the tongue.

In most cases, the voice of the anonymous caller preserved on a tape recorder is the only trace for the police. It is, along with the voices of suspected persons which are also recorded on tape, the starting material for the actual analysis. In such circumstances, all the voices are analyzed, by making spectrograms with the sound spectrograph.

In 1966, a young black who had taken part in a race riot with theft and arson was interviewed by a C.B.S. reporter. The viewers did not see the face of the black man, which was covered for security, during the television showing. His voice, however, was not protected. It was recorded by the police on tape and compared by Kersta with voices from a group of suspects. The comparison led to the arrest and conviction of the black man.

To take a comparative voice print, the police try as much as possible to use the text of a communique or some simple text which uses all the words used by the suspect, and has them repeated by all the suspects. Naturally, for the pigs the necessary nature of the suspect's cooperation is the great disadvantage in this system.

Under particularly favorable circumstances, neutral tape recordings taken by some private person and confiscated by the police can be used for a comparative analysis. Technically

insufficient recordings result though, for example, from a hidden microphone installed during a hearing. It is absolutely necessary for a comparative print to have the same spatial settings (e.g. telephone booth) as those under which the suspicious event took place.

All in all, voice identification is a system that functions only under the most favorable circumstances. Because of this, at least at the moment, it is only used by the police in the heaviest cases, in which the requirements mentioned above are fulfilled.

Translated into practice, this means for example that the radio pirates who have become popular in Switzerland in the past few months hardly need to fear that the cops will attempt to identify their voices in an offensive sense. The possibility is much greater for the pirates that they will be snitched off by their acquaintances or bosses who recognize their voices. In such cases the police would certainly try to prove the accusations with the help of voice comparisons.

Despite the technical completeness of voice identification, there are still possibilities for making voice comparisons more difficult or totally impossible. First of all one should never get into a situation of reading a comparative text for the police - not even in situations where one is actually innocent. By the way, these comparative texts must be read onto a tape several times by the suspect, so that the police can determine if an attempt was made to speak in an altered voice. Furthermore, different ways of speaking cannot be compared with one another, e.g. high German with some other dialect. If one holds one's nose shut while speaking, small changes take place in the vocal cavity of the nasal system which result in a somewhat different expression of sound.

With the help of the sound spectrography developed by Kersta, not only voices can be compared and identified; it is also possible with this analysis to identify bits of background noise, even on copied tapes. In the Patty Hearst kidnapping, for example, exhaustive spectrographic tests were done on copies of tapes received from the S.L.A., in an attempt to determine the actual location of the various hideouts, (e.g. urban or rural), on the basis of background sounds. The value of a tape recording in criminal proceedings can thus be shown, since a

positive check can be made of possible falsification and change marks.

TELEPHONES

Another tremendously significant development in police investigative capabilities related to telecommunications, which is most advanced in the United States, has resulted from the gradual implementation by the Bell Telephone Company of the *unit pricing system*. Under this system, telephone company computers automatically record the time at which every call is made, its duration, the telephone number from which it was made, and the telephone number called.

The unit pricing system has been gradually introduced over a period of years across the country, in an attempt to sustain the high profits of the telephone company. At this point it is at least partially effective in most major cities in the U.S.; unquestionably, it will become universal (probably even for pay phones) in the near future. Unfortunately, perhaps because it does not yet involve voice recordings, too few people have realized the political implications of this system.

In essence, what this does is give the police almost instantaneous access to records of every telephone communication made. By merely making a polite and informal request of the telephone company, they can discover a whole network of communications and relationships among certain communities of whose activities they do not approve. This gives them vast intelligence gathering resources which are as potentially damaging to comrades involved in legal activities as those using more secretive means.

Thus, for example, the police can now determine that during a particular political crisis, Activist A immediately made lengthy calls to Activist B, C and D, as well as shorter ones to Activists E, F, G, and H. Or conceivably, following a bombing in which a telephoned threat was made, the police may be able to determine the pay booth from which the warning was made. On the basis of this instantaneous information, they may be able to rush to the booth, and collect more specific traces of the caller,

such as fingerprints, hair and textile fibers, and so on. They might even run a check on adjacent booths, and find out that immediately after calling in the warning, the caller switched to another booth, in order to verify having made the call to another comrade involved in the action. The possibilities raised by this sort of data-storage and retrieval are almost endless.

One further threat already partially in effect with respect to telephone communications has to do with the mode of transmission. The switch to microwave satellite transmission from cables has made almost all long-distance calls and telex subject to eavesdropping. The American National Security Agency, and the Soviet K.G.B., already routinely monitor millions of calls a year, using computer data processing systems. The computers reputedly have been programmed to recognize certain key words related to espionage, crime, and terrorism, at which point the call is automatically recorded. Use of code words, preplanned obscurity, and the inability of present computers to correctly understand words as pronounced by humans, offsets the effectiveness of the system at this point, but the promise of more sophisticated, successful, and generalized eavesdropping on telephone communications is clear.

Because unit-pricing and microwave transmission are in their infancy, there is still undoubtedly some room to move in this area. Nevertheless, the message in all this for the militant is already unambiguous: when in doubt, stay off the phone.

We don't care
We don't have to

FACE IDENTIFICATION

Just as a human voice can be used as a trace by the police, so the human face is obviously valuable in finding someone. The only requirement is that witnesses can reconstruct the face of a wanted person. To help with this there are several systems.

One common system used by many police departments divides the face into five parts. Each of these parts - hair and forehead, eyes, nose, mouth, and chin - is available in many dozens of forms and variations. Each witness can thus find a part of a face that is similar, and in this way a composite can be made of the picture of the suspect. With the help of pencils, witnesses can add detailed changes.

In another system, the Identikit, more than 800 parts of the human face are printed on transparent sheets. These can be laid one over the other until the face that is desired is created.

WRITING AND DOCUMENT TRACES

Handwriting is an important method of proof in finding those known in police jargon as writing lawbreakers (check forgers, document forgers, blackmailers, etc.). The handwriting of the specific person is a highly personal phenomenon because of the large number of unique details. As opposed to graphology (writing analysis), which is supposed to give hints about the character of the writer, the documents expert attempts to identify the original writer from the detail of the writing. It is therefore always necessary for the comparison to have two handwritings, the writing in question and a sample of the writing of the suspect. In this method, the documents expert attempts to examine the picture of the writing to find similarities in specific writing elements, particularly in oddities in the writing. In order not to warn a suspect beforehand, the cops usually get the necessary comparative sample from employers, landlords, bureaucratic offices, and so forth. If no sufficient material is found by these means, the suspect is brought in for a writing sample.

An educated writing expert knows and interprets the psychological, physiological or pathological influences that appear as changes in the handwriting. This can happen under

the influence of drugs, alcohol, disease, fear, or threat.

Fear, for example, leads to increased or reduced movement in the musculature through the bloodstream. This can lead to disquieted, speedy, or hunted strokes in the handwriting of the cold-blooded, and in the handwriting of the sensitive to broader, more crowded or diminutive movements. These influences lead to irregularities of movement, defective precision in the form, and irregular spatial ordering of the letters. It is also possible to recognize a hesitant, damaged, or unclear writing picture with almost schoolishly correct forms.

Even in disguised handwriting, it is possible to find the original writer. In writing, it is only possible to disguise those elements of one's handwriting to which one pays special attention. Other details will be put onto the paper in the manner to which one is accustomed; as soon as total attention is allowed to drop, one quickly falls back into the handwriting to which one is accustomed.

The examination of falsified signatures is common work for officers in documents laboratories. In almost all cases, a microscopic or chemical examination (dissolving the ink in order to find the lines that were traced) shows that the falsifier first traced the original signature with tracing paper or some other method, and then copied it. Freehand falsifications are very rare and difficult. In the process, there are usually more or less great deviations from the usual picture of the original script.

The identification of print, on the other hand, provides sizeable difficulties for the handwriting expert. In this type of writing, almost all idiosyncracies which exist in normal handwriting, are eliminated. This means that it is impossible for the police to bring proof that a schoolishly exact printed piece was written by a specific person. This advantage should be kept in mind, particularly when spray-painting slogans.

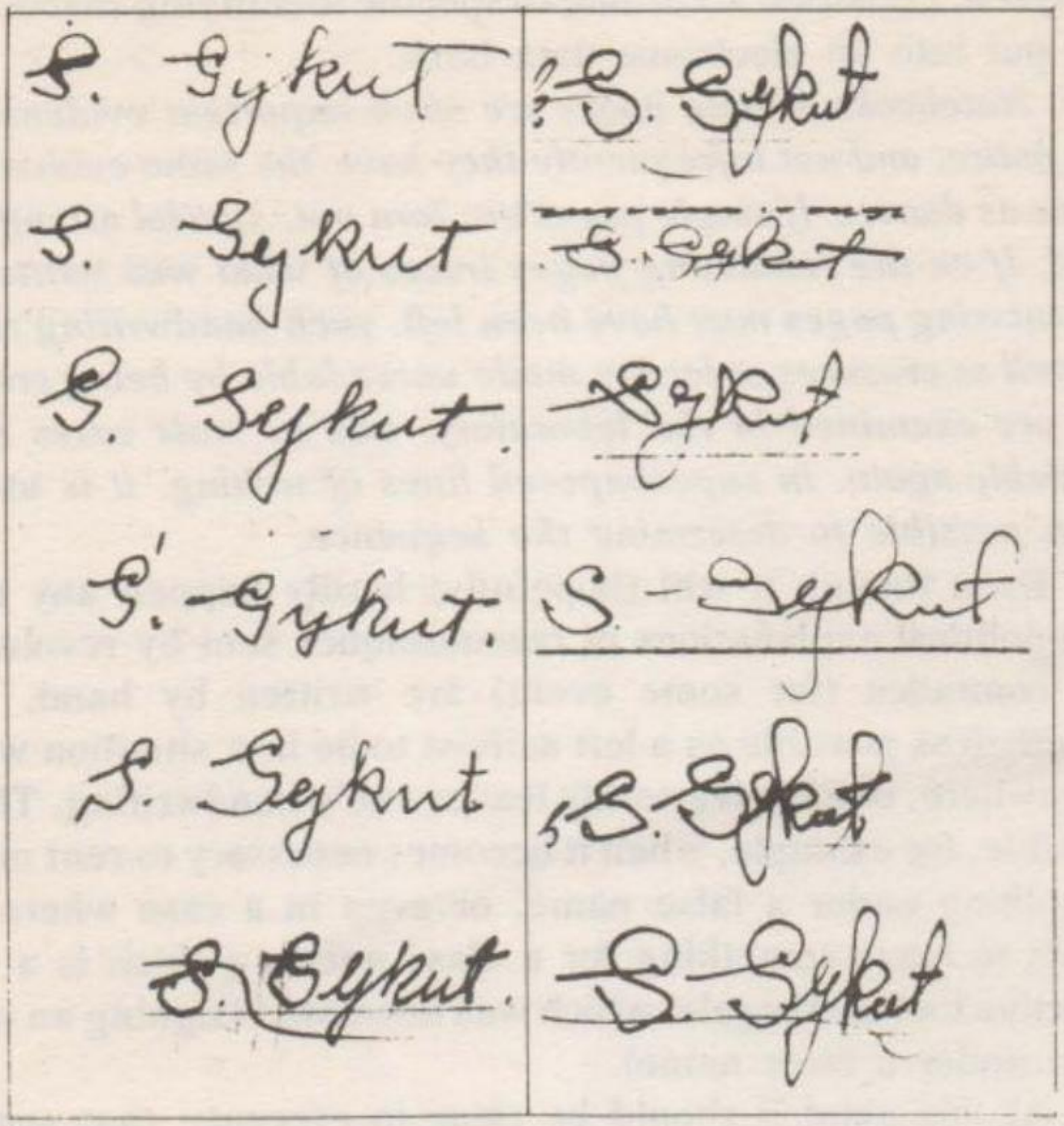
An important aid for every criminal police force is a collection of handwriting samples from known and unknown criminals. Persons falling under the category of "writing law-breakers" are asked for a handwriting sample as a standard requirement. The handwriting of known and unknown persons (drawn or spray-painted slogans fall under this category) are

analyzed, classified according to specific identifying marks, and are put into an electronic data bank.

Notebooks or date books are often important evidence for the police, and not infrequently they have the same evidentiary value as diaries. If single pages are torn out, special attention is paid. If on the remaining pages traces of what was written on the missing pages may have been left, such handwriting traces as well as erasures or letters made unreadable by being crossed out are examined in the laboratory, and in most cases made readable again. In superimposed lines of writing, it is usually even possible to determine the sequence.

Even though it will (hopefully) hardly happen any more that political explanations or communiques sent by revolutionary comrades (for some event) are written by hand, it is nonetheless possible as a left activist to be in a situation where somewhere, one inadvertently leaves one's handwriting. This is possible, for example, when it becomes necessary to rent or buy something under a false name, or even in a case where one wants to leave something for a class enemy (which is a very effective tool of struggle) which was unwanted (signing an order form under a false name).

At this point it should be clear to everyone that even in these situations one must avoid leaving fingerprints, and must only write in print. Further, it is advisable to use a felt-tipped pen as a writing instrument. With a fountain or ball-point pen, it is possible that on the basis of the color deposit characteristics and the impression left in the paper, certain individual handwriting idiosyncracies, such as the position of the writing implement (position of the hand), printed spots inside the individual letters, and so on, can be determined. With felt-tipped pens, these identifying characteristics appear with less frequency.



The suspect signatures [left] are characterized by poor line quality, different letter alignment and a greater degree of resemblance to each other than is seen between the genuine [right] signatures.

Traced forgerv with [top] visible pencil line, [bottom] erased pencil line.

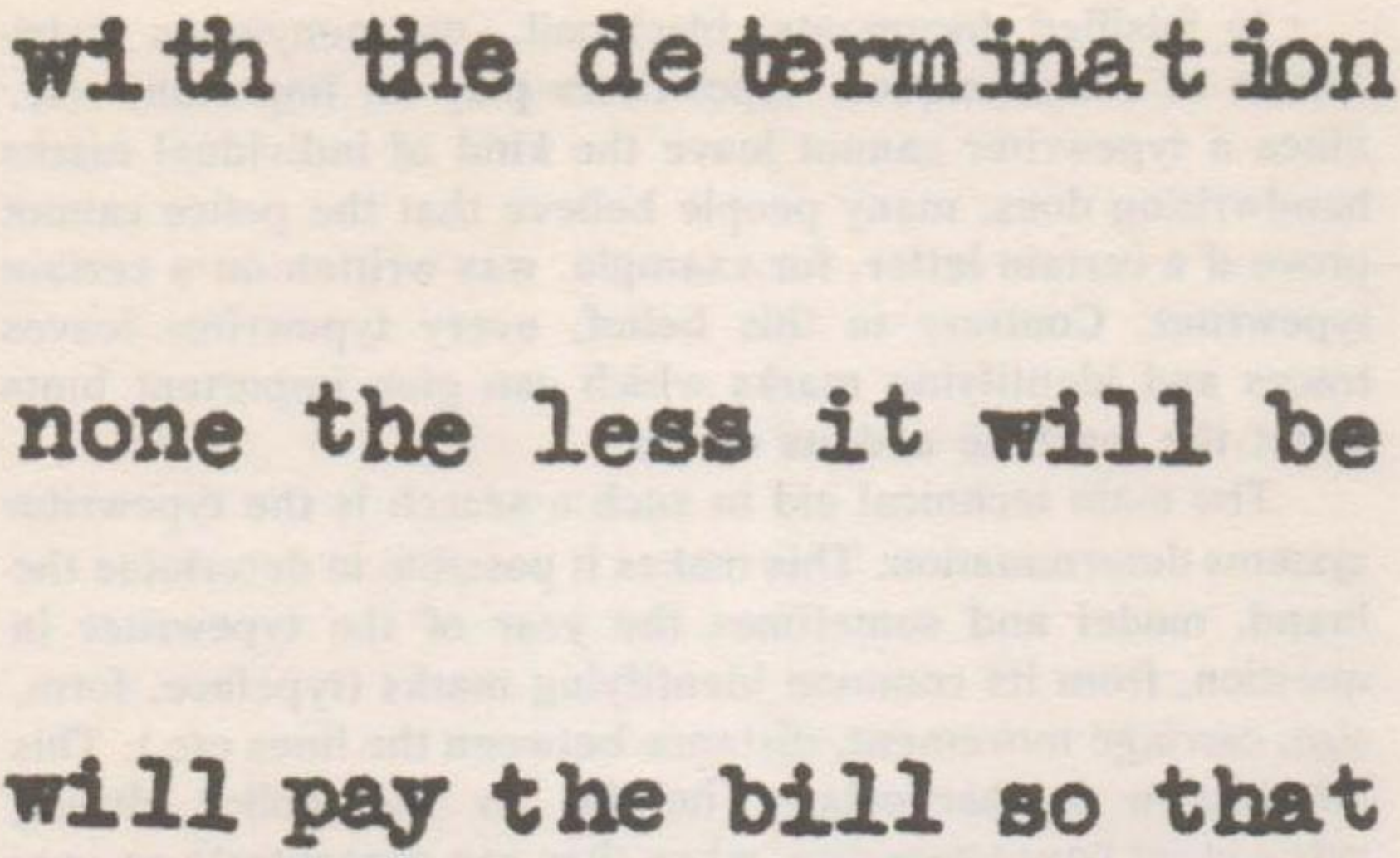
In falsified documents, blackmail, or anonymous distribution of communiques, typewriters play an important role. Since a typewriter cannot leave the kind of individual marks handwriting does, many people believe that the police cannot prove if a certain letter, for example, was written on a certain typewriter. Contrary to this belief, every typewriter leaves traces and identifying marks which can give important hints about the machine and its owner.

The main technical aid in such a search is the typewriter systems determination. This makes it possible to determine the brand, model and sometimes the year of the typewriter in question, from its common identifying marks (typeface, form, size, carriage movement, distance between the lines etc.). This information is particularly helpful to the police during subsequent house searches, when they can concentrate on very specific brands of typewriters.

In addition to the system identifying marks, every typewriter also has individual marks, which are of both a personal and technical nature. Personal marks are those in which the influence of the typist has bearing on the typewritten picture. This for example includes the sequence of the text, spelling, line ends, the heaviness of the touch, typing skill, and means of correcting typos. In order to make conclusions, however, the experts need a great deal of comparative material. Technical identifying marks are those which have to do with damage to the type, signs of wear, mistakes in the position of individual letters, distance between letters, dirt on individual letters, color details, and so forth. On the basis of such marks, it is possible to identify a criminally-used typewriter.

The longer a typewriter is in use, the more individual identifying marks can be found in it. Proof of type identity, however, is also possible on brand new machines, because even with the most modern methods minimal differences (e.g. in the justification) result.

It is also crazy to assume that special identifying marks vanish on carbon copy, photo copies or stencils (used to print from). This may be true for certain traces, but enough indications remain to allow for the identification of a particular typewriter in question (always assuming that it is in the hands



Typescript with [top] horizontal misalignment, [center] vertical misalignment, [bottom] slope misalignment.

of the police).

The identification of typewriters using elements is far more difficult for the criminalist. The difficulty lies in the fact that the type element is very easily exchangeable, easily hidden or destroyed. If the type element is missing, no identification of the machine is possible. The type elements themselves have very high precision and when new, have no special identifying marks. These can be created, however, through use or damage (e.g. by being dropped). Identifying marks of this kind have a very definite value in identification, because in their position and form it is impossible for them to occur on another type element. For security reasons it is therefore advisable to always destroy the type element after 'criminal' use.

In a blackmail case, the blackmailer wanted to proceed with great care. He did the blackmail letter with a carbon copy, photocopied it, and mailed it. Later, when he was one of the suspects and the police began a search, the exact wording of the blackmail letter could be read on the plastic band [carbon

ribbon] of his typewriter and the text could be reconstructed. Reading typed letters is also possible on cloth ribbons as long as these are new and have not been run through more than two or three times.

Other cases are known where the police could reconstruct complete texts on carbon paper.

There are two possibilities for determining the age of a typewritten piece (e.g. contract, receipt, will, etc.). It is possible to determine if a typewriter or a type element was on the market at the time at which a document was supposedly written. For the second possibility, the experts require comparative writing from the same time period as the writing in question, as well as writing samples from an earlier and later period. On the basis of this comparative material, he can make a picture for himself of the gradual development of technical shortcomings and mistakes of the machine, and its degree of dirt. In this way he can put the writing in question into the correct time frame. However, these two options only provide information about large time spans.

One of the most frequent examinations of documents is an analysis of the written means, which is significant when the means of writing (ink, ballpoint, paste-up, felt-tip, ink, lead or colored pencils) are identified or must be differentiated from one another. An examination of this kind is carried out if there is a question of a blackmail letter, for example, being produced with the writing implements of a specific suspect.

First of all, in order to save the document, methods are used which will not destroy it; this means an optical examination is done. First it is determined what kind of writing implement (fountain pen, felt-tipped pen, ballpoint, etc.) was used. The examination, which requires an analysis of the characteristics of the color of the writing implement, is usually carried out under a stereomicroscope, which can also pick up traces of erasures or cut-away writing. Other means which lead to results are the surface light and penetrating light microscope which, as opposed to the stereomicroscope, only provide a two-dimensional view. If the examination with visible light shows no useful results, one proceeds to examinations with ultraviolet or infrared light, which make a further

view of the material characteristics of the writing implement possible.

If with the help of the above-mentioned destruction-free optical methods no differentiation is possible, or if the brand of the writing implement can be determined, chemical-physical micro-methods are used. It is possible with the help of thin-layer chromotography to analyze individual components of the color mixture of the writing implements. In this way the question can be answered whether a questionable sentence in a contract, for example, was written with the same ballpoint pen as the rest of the text.

If two different ballpoint pens are used, it can be determined with the help of an age determination of the writing implement, whether the questionable sentence was put on the contract at a later date. In many cases, this is possible with an examination of the changes that take place over time in the color of the ink. With writing implements which create an impression by pressure on the paper (ballpoint pen, pencil, typewriter, etc.), measurement of the changes in the depth of the impression which come with time can be used to determine the age. These changes are measured in microbes (thousandths of millimeters).

The examination of the paper makes it possible to determine the type and kind of paper in order to establish the means of fabrication and the time of fabrication. The kind of paper used, particularly specialty papers such as are necessary for false identification, may even allow conclusions about the circle of people who would use such paper.

If comparative material is available, it is also possible to determine whether the same kind of paper from the same source was also used for criminal purposes (blackmail letters, anonymous communiques, leaflets, etc.) as that taken from a suspect.

In a house search in a blackmail case, the officers found further indications of paper identical to that of the blackmail letter and the writing implement in question. To determine the identity of the paper, the thickness, atmospheric weight, surface weight, grain, smoothness, structure, wood content, flourescence of the finish and back, and type of fiber were

checked. The results were: thickness of the criminal document, .0909 mm.: comparative paper, .0900 mm.: median value of measurements at ten different places and in the atmospheric weight: criminal document, .825 kg./dm.: comparative paper, .833 kg./dm., a tolerance allowed in such cases. The minor differentiation of flourescence could be put down to a difference in storage. On the basis of this evaluation it could be said that the criminal paper and the comparative sample were the same type of material.

Finally, the examination of the paper allows one to determine whether falsifications in the writing or stamps on the paper were undertaken. Falsifications of writing are possible through erasures. These are done with knives, erasers, and so on. But the surface of the paper is visibly damaged in the process. Chemical erasures are done through the treatment of the falsified place with an acid solution, a bleach or an ink remover.

Further work in the documents laboratory involves making writing on carbon paper visible again. One can imagine the most varied cases where the police are interested in deciphering burned pieces of writing. One possibility is certainly notes from a political meeting, which are often left as burned paper remains in the ashtrays of a meeting room. The prerequisite for successfully deciphering these, however, is that large pieces of the carboned paper are available. In order to transport these fine particles undamaged without having them fall apart, they are sprayed and fixed with a substance similar to hairspray. The carbon writing is then made visible with a variety of techniques, photographed, and deciphered.

THE UNDERGROUND PRESS

THE EVALUATION OF TRACES FOR THIS BOOK

OUR ANSWER TO THE POLICE

Dear Sirs:

Your documents expert will undoubtedly have noticed immediately that this brochure before you is a sample of offset printing. We can assure you that this is correct.

In an analysis of the ink, you will in the best case only be able to learn the brand name. Nothing definitive will come of this, however, since it is a color in common commercial use with which tons of paper are printed every day in Switzerland.

The same situation, unfortunately, exists with the paper. We have made an effort to buy it in small quantities over a long period of time in a variety of stores. Any businessman who would carry on his purchases in such an uneconomical way would immediately lose his job. For us, however, it means that you will not be able to trace us on the basis of the paper.

If, despite all this, you should find the print shop, it will not be possible for you to draw any positive proof from the offset press, because, as we have already mentioned, only common ink and paper were used, and, in the meantime, a quantity of other orders have been printed. In addition, the machine was thoroughly cleaned and newly-adjusted (by the printer himself, of course). Furthermore, we know that the grippers on the impression cylinder can leave impression traces on the lead edge of the paper which are characteristic, but invisible to the naked eye. These traces would be sufficient for an identification of the machine, since every offset press leaves differently formed impression traces. In order to eliminate them, we have cut off 5 mm. on the appropriate side of the paper. By the way, the printer is one of us, so unfortunately he wouldn't help you either.

This brochure, as you have undoubtedly noticed, was cut in large stacks with a paper cutter from the original A3 format to an A5 format (standard paper sizes). Now we know that all paper cutters have tiny damaged spots which leave a very definite pattern on the cut edge of the paper. This pattern would allow you (assuming, of course, that you find the paper cutter) to prove that the brochure was cut with this particular paper

cutter. Unfortunately, we must disappoint you on this point too, since the knife in question has already been very thoroughly resharpened.

So the only things remaining, to give you a lead on traces, are the stitcher and the staples. Besides the possibility of determining the brand of the stitcher from the staples, it would also be possible for you to identify the stitcher used. When the staples come through the paper, the hammer mechanism leaves a very specific impression pattern on the back of the staples which could only be made by a very specific machine. Well, since we could get this machine at a quite reasonable price, we have destroyed it for reasons of security, along with the plates and the element of the typewriter.

The layout unfortunately suffered the same fate, even though we very carefully did the whole production with gloves. To save such things, however, would still be a security risk.

Furthermore, you can, of course, also save yourself the trouble of looking for fingerprints in the brochure itself. You will find none, neither left by the paper buyer, nor the warehouse person, nor the printer, nor the distributor. (We are, after all, a diligent firm.)

House searches are useless. First of all, you will undoubtedly look in the wrong apartments, and in the wrong political milieu (you don't know us yet, ha ha!), and second of all, you wouldn't find anything among us anyway that would let you draw conclusions about this brochure. Of course, you will create a special search group as is always done in such cases, but will hardly be able to prevent exposing your officers to unnecessary disappointments and frustrations.

There are no warehoused copies. The whole edition was distributed among comrades within two days (by the way, an enormous achievement).

So the only possibility practically left to you would be to confiscate a lot of copies from individual people, and so we hope that the comrades are careful about this little book. But this variation on your techniques would create such an uproar that more people would find out about this brochure, which is also not necessarily in your interest.

In This Spirit We Greet You Cordially,

FORENSIC PATHOLOGY

There is little sense in writing a long history of forensic pathology at this point. First of all, such an attempt would be too voluminous, and secondly, we understand too little about its details. Third, it wouldn't be much use to us. That is, (as often) when those fallen in our own ranks come to court, an analysis of the cause of death lies in the hands of specialists paid by the state. The results of their examination can hardly be checked or controlled bv us, because of the complexity of the material. That's the one side.

If on the other hand, a few comrades decide to punish a criminal (who has committed crimes against the workers or humanity in general) with death, they do this openly and on the basis of concrete accusations. This does not take medical knowledge about how best to hide a murder. Such attempts were carried on characteristically (as has recently become public) by the C.I.A. in the past fourteen years.

So that we have some idea despite all this about work in forensic medicine, we will describe in broad strokes a few of the examination possibilities that seemed important to us.

By its nature, forensic medicine deals primarily with corpses, especially the examination of unusual causes of death, and the identification of unknown corpses.

If the cause of death remains unclear on the part of the medics, or if there is the slightest suspicion on the part of the police, the forensic pathologist is brought in. An extensive autopsy is the first step in many cases in answering the question of whether the unsolved cause of death is accidental or criminal. In this examination, there are necessarily criminal indicators in some cases, in the first viewing of the corpse and the scene of death, and in the medical picture, as well as in the possible opening up of the corpse.

Recent forensic pathology has worked more and more in the area of crime, and is therefore designated as a specialty of criminalistics.

The forensic pathologist, for example, in a murder case, helps to limit the circle of suspects, or to give information that would make recognition of the criminal possible. One can think of information about blood type determination, and blood and sputum traces, and so forth. Further indicators about the crime

can come from the determination of the time of death, which can be important for the police in a search, and in checking alibis and testimony. In the majority of cases, the forensic pathologist can determine the time of death on the basis of color, position and extent of death spots, type and degree of stiffness in the corpse, the degree of coldness, or on the basis of body disintegration.

Once blood circulation stops, blood follows the law of gravity and sinks. The raised parts of the body become pale and devoid of blood, the lower lying vessels fill with blood. In these places, the death spots appear. Their position allows one to draw conclusions about the position of the corpse. In a body that has been hanged, for example, they are found in the legs, forearms and hands.

Death spots can still move if the position of the body is changed in the first three to five hours after death. If the position of the corpse, for example, does not correspond to the position of the death spots, the corpse must have been moved during those first hours after death.

In drowned corpses, which often lie in the water for days or weeks, the changes in the skin give indications about the time spent in the water. After two or three hours, the fingers show swelling. After two or three days, swelling appears on the hands and feet, and after two or three weeks, the top layer of skin on the hands can be pulled off like a glove. After about ten hours, the drowned corpse, as long as it isn't held to the bottom, comes to the surface of the water as a result of gas formations.

The actual cause of death can usually not be determined definitively from an external view of the corpse, with the exception of obviously fatal injuries. It can only be assumed. Even serious external injuries could occur after death. For example, in a death at the steering wheel (a heart attack) with an accident that follows, or in a drowning, through subsequent injuries on ship propellers. Judgment about injuries on corpses, and the determination of the time at which they happened, is a further task of the forensic pathologist. In this process, he distinguishes between vital and post-mortem injuries. The former happen while a person is still alive; the latter, after death.

A definite sign of a vital injury is the existence of a bruise. If wounds are sustained through external force, there is bleeding from them, because the heart and circulation have not come to a standstill. A further sign is the inhalation of blood and other materials such as grease, textile, air, and lung embolisms. In complicated cases such as drowning victims, microscopic examination of body tissue is a further aid.

In the examination of wounds and injuries, the forensic pathologist pays special attention to material traces not visible to the eye, such as fibers, paint splinters, powder traces, and so on. They are sought with the aid of a surgical microscope, and left to the crime technologists to evaluate.

In cases where an external examination of the corpse is not sufficient to determine the cause of death, a section or autopsy (finding traces in the body) is ordered. As far as the condition of the corpse allows, the head, chest, and stomach cavity are opened. If opening up the corpse does not provide instant clarity, special examinations are done on individual organs, primarily mjcroscopic tissue examinations. The search for poisonous materials in organs and body fluids (when there's a suspicion of poisoning) is left to the toxicologist.

An autopsy can, for example, clear up the question in a burning or drowning victim, whether the person in question was still alive at the time of the burning or drowning, or was put into the fire or water as a corpse. Proof of burning while alive is found in the carbon oxide in the blood of the heart and aorta, as well as soot traces in the air passages and the lungs. As a rule, the inner organs of a burn victim are better preserved than would be indicated by the external condition of the body. A sure sign of drowning is a stomach filled with water, or the existence of a drowning lung [mixture of water and bronchial mucous and air] as well as the proof of the drowning liquid in the lungs, in the heart, and in the circulatory system.

If subsequently indications appear that a dead person fell victim to a crime, an exhuming may be ordered (digging up the body). Even if the corpse has already begun to rot, important determinations can still be made. The most frequent reason for exhuming is a post-mortem suspicion of poisoning. Depending on the kind of poison, it can be found for a long time after its

ingestion in the rotting organs of the corpse, or in the skeleton. Traces of metallic poisons can even be found in the ashes after a cremation.

The criminalistic desire to find the cause of death, as has already been mentioned, is to distinguish between crimes, accidents, suicides, and natural causes of death. In our time, important judicial consequences result from the official declaration of death, as for example in matters of family law, inheritance and insurance claims, demands for damages, dissolving of contracts, changes in the structure of companies and corporations, and so on.

This is the reason the police and bureaucracies go to great lengths to identify unknown corpses. The conventional means are comparative examinations based on lists of missing persons, as well as clothing, other possessions, special identifying marks on the body, fingerprints, direct identification, press releases, and so forth. In cases where such means do not suffice, such as during catastrophes or large accidents (explosions, aircraft crashes, etc.) where it is a matter of identifying badly distorted corpses and body parts, as well as in cases of burning and drowning victims, or when corpses are found, the only usual methods that are of any help are X-rays, or comparative dental examinations.

One can assume in an X-ray identification that everyone at some point in his life has had an X-ray. All X-ray pictures can be obtained by the criminal police from doctors, health insurances, and hospitals, and used in comparative examination in relation to special marks in the skeleton (fractures, surgical marks, changes wrought by disease, etc.). This method of identification is as dependable as dactyloscopy, or even more dependable, because of the durability of the skeleton, which makes such examinations possible even decades later. X-rays of a skeleton also make an approximate age determination possible, allow conclusions about the sex of the person, and in some cases make it possible to find traces of shots or projectiles which were overlooked in a body with broad surface destruction.

In the case of a burn victim, there was a great probability that the corpse was that of a 45-year old man. The body, which was X-rayed and compared to X-rays of the presumed victim,

could be identified on the basis of the brain cavity as well as an old fracture of the cheekbone.

Forensic odontology, a comparatively new branch of forensic pathology, is a specialty occupied with the identification of living persons or corpses on the basis of their teeth, as well as the evaluation of teeth marks in foods or on human skin.

In catastrophes, especially when the corpses are injured beyond recognition, an examination of the teeth can be a tremendous help. Individual specific dental work (bridges, crowns, fillings, etc.) are among the significant factors for identification. However, coinciding pictures can also be made on the basis of the bone structure of the jaw. The kind and manner of dental work often allows conclusions to be drawn about the country in which it was done, the quality giving leads to the economic position of the patient.

Recognition is also possible if a broken piece of tooth comes from a specific tooth. This can be valuable for police work, if a piece of tooth is found at the scene of a crime.

In 1972, the corpse of a woman was found in Lake Constance. Since indentification was not possible because of the advance disintegration of the body, it had to be limited to the teeth. Extensive gold work indicated that she was very well off. The extreme yellowing despite extensive care indicated a smoker. On the basis of the condition of the teeth, the woman's age was estimated at about 40, while the form of the jaw indicated a narrow face.

In the course of the investigation, the expense book of a 38-year old secretary was found in which payments to a specific dentist were recorded. He still had X-rays of the woman, with which the definite identity of the corpse could be established.

Tooth marks are found relatively often (especially in burglaries) at the scene of the crime, on food (chocolate, cheese, sausage, fruit, etc.). In body injuries or sex crimes, they are often found on human skin. Especially on the arms and hands of a criminal, teeth marks can be found as defensive injuries inflicted by the victim.

Teeth marks on the human skin change after approximately one hour. Because of this, they are immediately secured photographically, and by making a model with liquid synthetic

material. They can also be conserved on foodstuffs.

An apple with a bite in it was the evidentiary proof in a trial of an 18-year old sentenced for arson in England. The apple was found in a burned-out office building in which the accused was supposed to have started the fire, according to the prosecutor. The jury pronounced the youth guilty, after experts with the help of very sophisticated technology, made three-dimensional microscopic measurements and found 46 coinciding marks between the teeth of the suspect and the teethmarks in the apple.

For a complete evaluation of teethmarks, there is also the search for sputum (blood type determination), since in the course of biting into the skin of a victim or into food, there are usually sputum secretions. In this way, suspects can be examined for coinciding blood type as well as direct comparison of the teeth.

The evaluation of powerful influences on a living body is also part of the work of the forensic pathologist, in addition to the examination of corpses. For example, the examination and evaluation of bodily injury (mistreatment, rape, accident victims, etc.), or contrarily, the recognition of false claims on the part of a person with bodily injuries, are routinely performed. A part of this is judgment and reconstruction of a crime.

A further task lies in the examination of blood samples for blood type determination, or the determination of alcohol content (particularly in traffic cases), as well as taking blood and urine samples for examination for drugs or pharmaceuticals.

TECHNICAL METHODS OF ANALYSIS

Physical evidence and with it material traces are increasingly important for the cops and the courts. This development has been made possible mainly through the use of the natural sciences and their progress (the knowledge as well as the methods allowing precise determination of the smallest substances). This speedy progress is also reflected in the staff of criminalistic departments: beside the old-timers, all-around crime technologists, lab technicians and photographers, there are biologists, physicists, chemists, engineers, programmers and researches to complete the staff.

In the following section we will attempt to describe these complicated analytical instruments, mechanisms, and methods in a simplified way; not because we believe it is necessary to understand the exact method by which this repressive technology functions (in any case, that can only be done by an educated specialist), but so that we have some idea about the dimensions within which analytical criminal technology operates today.

CHROMATOGRAPHY

The most common methods for separating out a mixture of materials are *thin layer, gas,* and *liquid chromatography.* These three types are based on the principle of differential separation points of different substances. With these methods, quantities of substances in the area of micrograms (1 microgram = .000001 grams) and even into the realm of the nanogram (1 nanogram = .000000001 grams) can be recognized and measured.

1) *Thin-Layer Chromatography:* A thin layer made of finely-grained material, put on a slide, is capable of taking apart any substance put on a separation layer, with the help of a solvent. These substances are dyed by means of a color reagent. The thickness of the applied substance, its color, and the color intensity, give information about its composition, which can be determined with the aid of a chromatogram.

Like substances behave in like manner in thin-layer chromatographs.

With this method, almost all drugs and narcotics, for example, can be analyzed and compared. The basis for this is a

collection of all sorts of narcotics in every thinkable variant as comparative substances.

2) *Gas Chromatography:* This method is used for separating all gas-forming, liquid, or even solid materials which can be changed into a vaporous form (e.g. alcohol, materials that speed up the burning process, carbonated water, carbon gases, narcotics, etc.).

The substance to be examined is put into an appropriate solution and injected into the gas chromatograph, where it immediately vaporizes, is moved into a separation chamber, and there is divided into its individual components. The individual components are electronically registered and the results are drawn on a gas chromatogram. Substances with the same components always result in like chromatograms.

With the help of gas chromatrography, traces of smells which can be obtained ultra-microchromatographically can also be evaluated. So, for example, the hands of a specific person leave characteristic smell traces on anything they touch. These not only allow an identification of the one who left the traces (insofar as there is a suspect on whom smell comparisons can be done), but also result in additional pointers about materials that have been touched by the hand in question, during recent periods of time (e.g. foods, drinks, tobacco, metal, synthetic objects, gloves, etc.). In this way, it is sometimes possible to draw conclusions about the way of life, the habits, or the occupation of the person who left traces.

On the other hand, an evaluation of the smell traces left on the body can sometimes prove that a suspect has been in a certain place, or can establish the material with which gloves were made which were worn in the commission of a crime. Even in the realm of fighting the narcotics trade, this method opens up new possibilities for the police because it allows them to find smell traces on the hands, the clothing, or containers from which the narcotic has already been removed.

SPECTRAL ANALYSIS

Spectral analysis is a physical method used to determine the chemical composition of various materials such as dust, hair, textile fibers, liquids, enamel chips, powder traces, skin

particles, blood traces and so on.

The material to be examined, which does not have to be greater in mass than a grapeshot ball, is exposed for a certain number of seconds or minutes to a concentrated source of heat, with which the individual molecules of the material under examination are irradiated. Applied heat makes the individual molecules glow. Each irradiated molecule now gives off light, and glows at a frequency specific to that molecule. The *spectral-line picture* occurs when the glowing molecules are photographed. The specialist can evaluate according to individual sections for intensity and width of the line picture, and establish the proof of what molecules compose the material being examined.

A weapons collector had an antique gun stolen from his basement. He immediately suspected an acquaintance, in whose hallway a gun like the one that disappeared was found.

The police tried, among other things, to establish the proof with spectral analysis, that the gun was originally owned by the gun collector. For this purpose, dust traces on the gun were compared with dust from the cellar of the collector, as well as from the hallway of the accused. What became evident in this process was that the spectral lines from the gun and the comparative sample from the basement of the collector had a completely different composition from the comparative sample of the hallway. In this way, proof could be established that the gun must have been in the basement of the collector.

LASER MICRO-SPECTRAL ANALYSIS

Among the characteristics which distinguish lasers from other sources of light, it is important for criminal research that the laser beam can be directed to the smallest surfaces (diameters of .01 to .25 millimeters).

Where the light energy is absorbed by a solid body the temperature rises by about 6000 degrees Centigrade within thousandths of a second. In this way, the tiniest amount of a substance (several millionths of a gram) is vaporized. At the point where the light beam appears, a slightly-glowing lightning effect with continuing illumination is created, which

can be analyzed spectrographically, thus giving information about the composition of the substance. In this way, almost all comparative material examinations can be carried out (the determination of whether two materials have the same composition). The material being examined is left practically undamaged in this process.

ELECTRO-SCREEN MICROSCOPES

In this microscope, as opposed to the more common light microscopes, the depth accuracy is about 500 times greater for each enlargement. As a result, it is possible with this new instrument, which was only developed a few years ago, to evaluate and photographically establish even heavily fissured three dimensional surfaces. The object under examination can be enlarged from 20 to 500 times. In addition to the optical illustration, material traces on the object being examined can be evaluated for their chemical composition. This is a whole new possibility with the electron microscope in connection with energy-dispersive X-ray microanalysis.

This means that such material traces no longer have to be prepared by the carrier of the traces through detailed work under a microscope for the examination methods used before.

MASS SPECTROMETRY

Mass spectrometry is a spectrographic method for material analysis, of significance to criminal technology because of its quick work method and its tiny substance requirements (as little as .00001 grams).

The solid, liquid, or gaseous substances to be identified or compared (particularly anaesthetic and pharmaceutical materials, explosives, chemicals, arson materials, petrochemical products, paint traces, synthetics, etc.) are put into the ion source of the spectrometer and vaporized. The gas formed in this process is bombarded with electrons, whereby the individual molecules are ionized. In a process which can no longer be described for the layman, the whole "piece of shit" is further treated until the results of the analysis can be spit out in the form of tables by a mathematician (mass spectrograms).

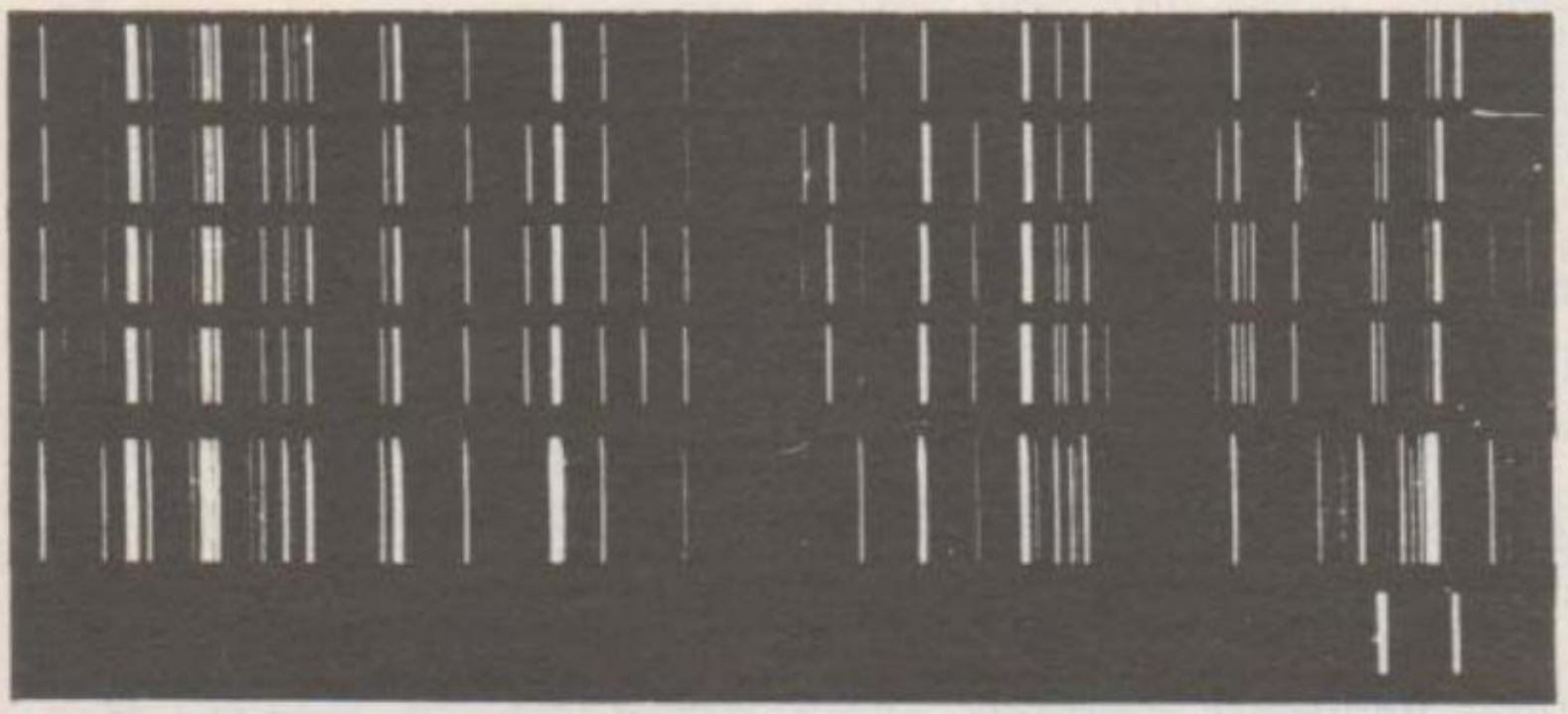
In order to find out what the material in question is, the

mass spectrum is compared in a computer with comparative spectral collections stored in its memory. All like substances behave in the same way in the mass spectrometer.

NEUTRON ACTIVATING ANALYSIS

In this method, the existence of the tiniest quantities of a chemical element can be proven on the basis of the spectrums which are brought out by illuminating the neutron-bombarded atoms. This method of analysis is particularly adept at identifying practically all material samples as well as almost all comparative materials. In this process, the substance being examined is taken apart into its individual chemical components, even if there are only tiny quantities. Then the relationship of their quantitative division is established. The evaluation of the individual illumination spectrums is done by computer.

Analysis by activating the neutrons is the most precise (and the most expensive) method of analysis available to the cops at the moment.



Spectrographic analysis of a piece of lead fastened with copper tacks.

1. Pure graphite
2. Pure copper
3. Tacks from evidence
4. Tacks found on suspect
5. Tacks manufactured during the period in which the evidentiary material was made.
6. New tacks sold at the time of the theft.

CLOSING REMARKS

It is necessary to be clear about the fact that criminal technology and police science are not value free, and stand in the service of those who have created them. Their actual strength, therefore, also lies in the psychological realm; that is, the police can intimidate a suspect by telling him that he is already convicted scientifically, and in this way try to get him to confess, which is still worth much more than all the scientific results put together.

One has to imagine the situation of being isolated in the joint, humiliated by the cops, oppressed, tyrannized, with just one wish in the gut - to get out. If in that situation one is shown an impressive document, scientifically formulated, and seemingly unimpeachable by the layperson, the danger actually exists that one gets the feeling of being stuck in a totally hopeless situation.

If, in addition to that, one is offered a release or a milder sentence in exchange for a complete confession, it rapidly becomes a very short step to signing any kind of confession.

In this situation, it is necessary to see that many criminal technical examinations, especially in most comparative analyses (textile fibers, hair, soil tests, glass splinters, paint traces, etc.), where there are positive results, are merely an indication and a long way from being definite proof. That means for a legal judgement, many different indices are necessary and must be mutually complementary at least right now. (West Germany is an example to the contrary.) Finally, in cases of direct proof, there is the possibility of explaining how one's fingerprints, for example, could have gotten to the scene of the crime, or for what reason one is in possession of a tool that has been proven to have been used in a burglary. In other words, there is never a reason (at least up to the actual trial) to recognize scientific evaluations as conclusive.

Nontheless, it is important as a comrade to understand the criminal technical methods and possibilities, to acquire this knowledge, but not to accept its results. Along with a class standpoint, there are futher reasons for this. Many of these methods of analysis can provide false results, especially when the trace material has been fallaciously acquired or transported (which happens particularly in rural areas with officers who are

not specialists), or when work is done in an unclean manner in the laboratory. Insufficient acquisition of comparative material can also lead to mistakes.

So it is always worthwhile, and this is particularly true for lawyers, to always be informed from the specialty literature about possible sources of errors.

Doctor Max Frei-Sulzer, for example (former head of the investigation unit of the Zurich police, and known as the father of microtrace analysis in professional circles), had to resign from his position in 1972 as it became possible to prove, more and more frequently, that his analysis had been mistaken. How many innocent people this fucking pig sent to the joint in the course of his career, is impossible to tell.

The more new methods of analysis are developed, the more the police themselves know and even admit, that in the past they have worked with useless methods. In a few years, it is possible that the methods used today will also prove to be unreliable or insufficient.

Knowledge is power, goes a well-known saying. We hope that this document will make you keep mum, and give you some of the necessary prerequisites to cross over the boundaries of "the free, democratic state of law", unmolested and successfully.

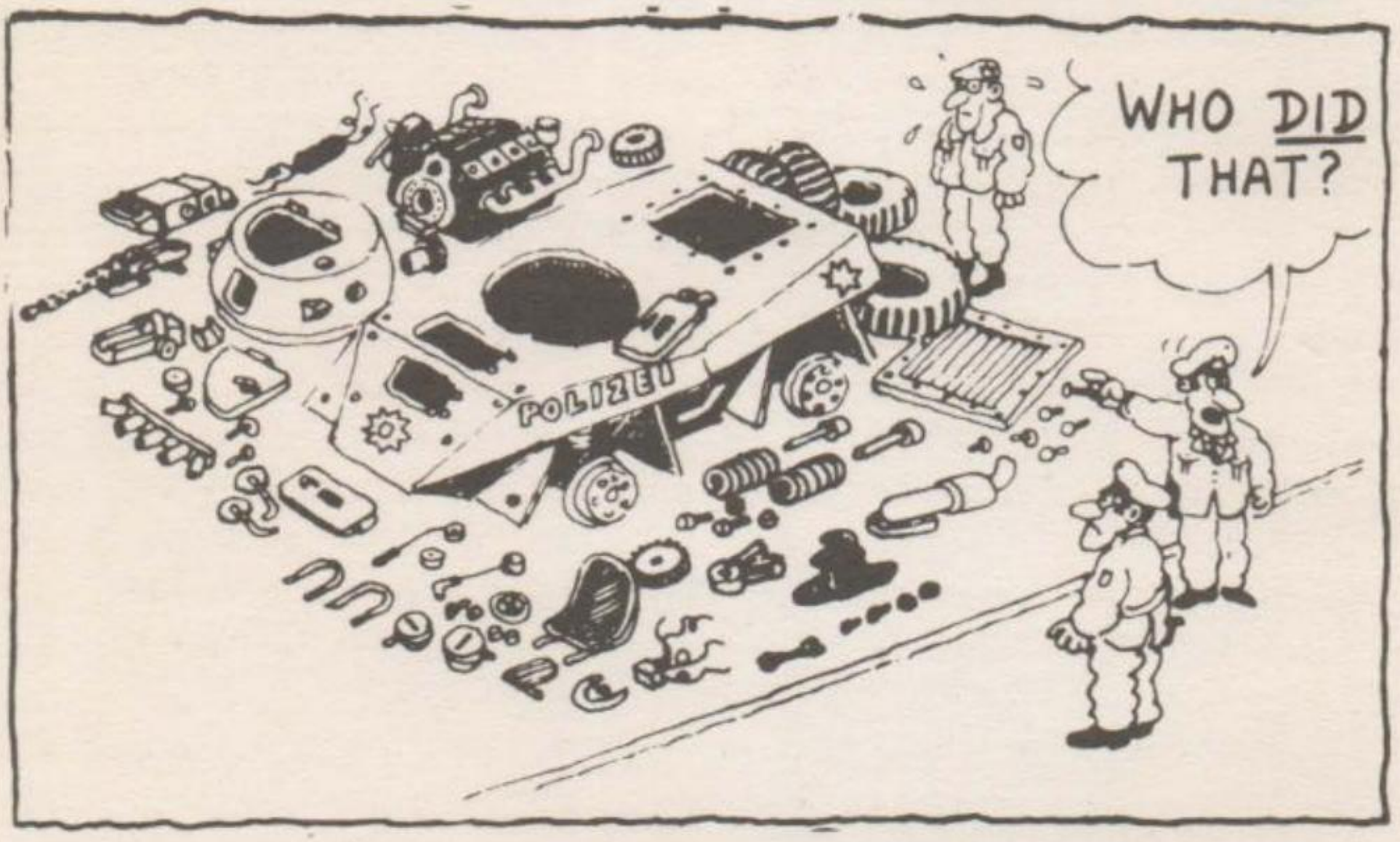
Naturally we also know that there is a difference between theoretical understanding of the materials discussed here, and their practical application without mistakes.

In order to prepare and carry out a punishable action or sabotage successfully, it is necessary to actually think about the dozens of possible mistakes in advance, in order not to make the job of the police too easy.

We have interspersed many authentic examples throughout this text, in an attempt to describe situations against which you can compare your own actions. This way you can see if you haven't made the same mistakes, or would make them, and you can also see what you can do better in the future to make yourself more secure.

ANNOTATED BIBLIOGRAPHY

Community Organizing



is fun!

AN ANNOTATED BIBLIOGRAPHY

This book, while undoubtedly extraordinarily useful to us as a guide on what *not* to do in planning and executing political actions, contains a certain potentially negative influence for the reader. One might justifiably wonder how, in the face of the awesome police technology outlined here, one can possibly do anything without encountering a reasonably great possibility of apprehension. The creation of this fear is certainly part of the spychological intention of the police, but just as certainly, it was not the intention of the authors.

To offset this possible interpretation of *Without A Trace*, we can only do two things. First, we suggest that anyone inclined toward forms of political action which are unlikely to meet with police approval, prepare by becoming thoroughly informed about and conversant with the criminalistic methods detailed in this book. Second, the conscientious comrade should also strive to acquire skills and knowledge in a wide variety of areas related to survival and illegality in the modern world.

We couldn't even begin to present the range of different material which might be useful. However, we *can* help people to find out where to get books, periodicals, sources of information and equipment, and other resources which - while well-known to the authorities and the paramilitary right, for example - are virtually unheard of among the left. having done so, we can only hope that the reader will find the inspiration and the circumstances to make use of this information, and to pass it along to others.

THE REPRESSIVE APPARATUS

Any attempt to consciously strike at the foundations of the contemporary order requires a certain familiarity with police technology and modes of operation. Undoubtedly a great deal of such familiarity can be acquired through simply reading one's daily newpaper regularly (an expedient unfortunately neglected by all too may alienated Americans); but a somewhat deeper investigation is also indicated. The books and periodicals listed here are a starting point for understanding police practices and capabilities, and the social institutions that direct them.

Agee, Philip. *Inside the Company: A C.I.A. Diary.* New York: Bantam Books, 1975; and *Dirty Work: The C.I.A. in Western Europe.* New York: Lyle Stuart, 1978.

These two books written by a notorious ex-C.I.A. agent-turned-radical expose the daily operations of the C.I.A. around the world. *Inside the Company* is an exhaustive personal account of Agee's own career as a case officer in Latin America during the 1960's, during which he and his local associates stabilized and destabilized governments, political parties, and the personal lives of hundreds of individuals, using bribery, extortion, blackmail, break-ins, bugging, terrorism, and other stock tools of the secret police. *Dirty Work* is both a report on C.I.A. operations in Europe during the early 1970's, and a guide to the research methodology which can be used to identify secret agents.

Applegate, Rex. *Riot Control - Materials and Techniques.* Harrisburg: Stackpole Books, 1969.

This textbook for cops is a virtual encyclopedia on crowd control and riot handling. It covers all aspects of training, equipment, preparation, and organization by the police to cope with urban insurrections. It details numerous anti-subversive technologies now widely in use, such as water cannons, staining agents which can be used to identify rioters, ultra-high and low frequency sound generators for scrambling the brains of demonstrators, chemical agents (gas), and other devices. Its main limitation is that it is already somewhat dated after ten years; nevertheless, it is a useful primer in police riot control technology.

North American Congress on Latin America. *NACLA Research Methodology Guide.* Berkeley: N.A.C.L.A., 1970.

This guide is an invaluable source of information, not on the power structure itself, but rather on how to go about finding information concerning the various power factions in American society. Included are sections on the process of doing power

structure research, and the specific problems involved in finding out everything you want to know about specific personalities, political parties, corporations, the media, labor unions, the military-industrial complex, universities, and the police. Again, the age of the book is somewhat of a drawback.

The Repression Information Project. *The Public Eye.* Washington, D.C.: P.O. Box 3278, Washington, D.C. 20010. $8.00/year.

The Public Eye is an extremely valuable periodical containing up-to-date, well-researched articles on police operations and technology, the intelligence community, the far-right wing, and the interconnections between these various groups. The only journal of its kind in North America, it provides a constant source of insightful analysis and facts on the latest trends in repression, 'anti-terrorism', and violence against the left. It also serves as an effective network for the exchange of information on these topics between comrades and groups across the country, as well as providing helpful hints on how to conduct the same sort of research in your own area.

CRIME WITHOUT PUNISHMENT

As *Without A Trace* demonstrates, there are a myriad of different factors which must be taken into consideration in safely planning and carrying out an action. If one is doing complex and dangerous actions, and particularly if one gets into the habit of it, it becomes even harder to figure out how to prevent making fatal mistakes. The books listed below, which include both fiction and non-fiction, give vital insights into the degree of complex and meticulous planning, integration of various skills in orderly sequence, and psychological preparation which are required to successfully commit crimes without being apprehended.

Agirre, Julen. *Operation Ogro.* New York: Ballantine Books, 1976.

This book, unlike the others listed here, is one from which we can drawn inspiration as well as information. *Operation Ogro* is the personal narration of the four militants of the Basque organization E.T.A. who successfully carried out the assassination of Carrero Blanco, President of Spain, and heir apparent to General Franco, in 1973. In their story, the four recount the painstaking process of preparations over a period of a year, which ended in the terminal flight of Blanco and his limousine over the roof of a Madrid cathedral. In addition to the valuable information revealed about the planning of illegal operations, the book gives extremely important insights into the pitfalls and psychological stress of clandestine life.

Frederick Forsyth. *The Day of the Jackal.* New York: Bantam Bantam Books, 1972.

The Day of the Jackal is an internationally famous thriller about an attempt by the right-wing O.A.S. to assassinate Charles DeGaulle in 1963. Here we have a fictional study which reveals the actual methods used by the most skillful criminals to carry on their activities. In this story, an unknown anonymous contract killer is hired for the hit. In preparation, he spends months preparing false identities by different methods (all of which are known to work), acquiring tools and weapons through untraceable channels, and constructing an airtight plan and schedule. At the same time, we are shown the extraordinary police capabilities which are marshalled against the assassin, which in real life have become far more sophisticated in the meantime. A brilliant portrayal of the possibilities and limitations inherent in clandestine criminality.

Emmett Grogan. *The Final Score.* New York: Ballantine Books, 1977.

The Final Score is a fictionalized portrayal of how a gang of four criminals set out to steal some plutonium. There is nothing political about the story; but it is a casebook study of how professional criminals might execute a large number of dangerous crimes without leaving traces behind, and without

getting caught. Many of the problems presented in *Without A Trace* are successfully and plausibly anticipated and resolved by the protagonists.

Thomas Plate. *Crime Pays!* New York: Ballantine Books, 1975.

This mass market paperback is an inside view of how professional criminals - the ones who for the most part don't get caught - operate. It covers a wide variety of criminal activities and the people who practice them. While these criminals are morally indistinguishable from capitalists, what is important about the book is that it shows not only how successful criminals plan and carry out their activities, but also identifies the crucial psychological and lifestyle considerations which allow the criminal to continue to live and operate undetected.

David B. Tinnin. *The Hit Team.* boston: Little, Brown and Company, 1976.

This book reads like another thriller, but it is not. Instead, it is a well-researched chronicle of the operations of Israeli Mossad agents in Europe and the Middle East between 1972 and 1974. These agents, organized into teams for the purpose of assassinating Palestinians believed to have been responsible for the Munich Olympic attack, enjoyed considerable success for several years, until a second-string group of novices bungled an operation in Norway. In the course of the book, the author discusses in detail the training, weapons, planning, preparations, execution, systems of false identification, and elimination of traces used by these agents in their operations. It is unfortunate that we must concede again that there is much to be learned from the organized forces of repression.

WEAPONS AND MILITARY TECHNOLOGY

The romantic myths of past eras of revolutionary struggle die hard, and probably none more so than those which evoke the image of small bands of heroic comrades, assaulting the mighty tyranny of the State with guns and bombs in their hands. Sadly, in our own era, these ventures have generally ended with most of the glorious comrades dead, imprisoned, or isolated and hunted at every turn. Still, there are times when blowing something up or "shooting to live" are the only appropriate responses to an intolerable situation. The books, magazines, and sources of information listed below help form a basis for action during such historical moments.

Barrow, Bonnie and Clyde. *The Poor Man's Armorer.* Eureka: P.M.A., 1978.

The Poor Man's Armorer, originally published under the auspices of Atlan Formularies (see below), is a magazine which, at the end of each year, is bound into a book. It is devoted exclusively to improvised weaponry, particularly firearms construction and conversions. While it is definitely written with the gun nut - violence fetishist in mind (many of the readers in fact contribute their designs to the magazine), it *does* have many ingenious and often simple plans whereby one can fabricate firearms, automatic weapons, hand grenades, mortars, and other devices out of readily-available materials. Volume I concentrates on "kitchen table" technology; Volume II assumes basic machining and gunsmithing tools and abilities. It should be noted that readers sometimes write in, to point out that designs featured in earlier issues either don't work or are positively dangerous; nevertheless, there is a wealth of ideas and information presented both about designs and access to materials and information which is nowhere else to be found. Copies and subscriptions can be obtained from P.M.A., P.O. Box 586, Eureka, CA. 95501.

Ezell, Edward. *Small Arms of the World.* Harrisburg: Stackpole, 1977.

This is the definitive English-language text on all

commonly available police and military small arms around the world. It provides pictures, detailed drawings describing parts and functioning of the weapons, and describes the processes by which the various weapons can be disassembled for cleaning and repairs. It is a veritable enclycopedia of gun lore, with the added advantage that it is routinely updated.

Holmes, Bill. *Home Workshop Guns for Self Defense: Vol. I [The Submachine Gun], and Vol. II [The Pistol]*. Boulder: Paladin Press, 1977, 1978.

These two books describe in detail the means by which one can use scrap metal parts from junked autos, and a few simple hand and power tools, to construct sturdy and reliable firearms. Vol. I contains plans for a simple 9mm. submachine gun (similar to a Sten or M-3 Greasegun); Vol. II describes the production of a semi-automatic pistol in .22 Long Rifle, .32 A.C.P. (7.65), or .380 A.C.P. (9mm. Short). Unfortunately, despite the glowing promises, it appears that it would be very difficult to actually build these weapons unless one has some experience as a machinist and/or gunsmith, and has access to a metal lathe, welding equipment, and heat-treating set-up. In the United States, where weapons of every variety are fairly readily available (at least right now), the value of these books is somewhat dubious; it would be easier to buy or steal a suitable weapon. In other places, however, these books could still be of considerable value if comrades have the resources and skills to carry out the instructions contained in them.

E.I. duPont Nemours & Co. *The duPont Blaster's Handbook*. Wilmington: E.I. duPont Nemours & Co., 1978.

The duPont Blaster's Handbook is generally recognized to be the most thorough textbook on the use of all different types of commercial dynamite and blasting accessories. Since duPont is one of the leading manufacturers of explosives in the world, they should know. It can be purchased directly from the company's Sales Development Section, or special ordered through bookstores. Unfortunately, most of the mail-order

paramilitary publishers and book dealers don't carry it, but if you're ready to move up from homemade pipebombs to real quality demolitions work, this is the essential volume to have.

Nonte, George. *Pistol and Revolver Guide.* South Hackensack: Stoeger Industries, 1970.

This is one of the better popular manuals on handguns to be found in your local library or gun shop. It has chapters on choosing weapons, the relative merits of different types, how to learn to shoot properly, the difference between different types of handguns and how they function, basic maintenance, repairs, modification, ammunition reloading, and so forth. For the novice, a book like this one (there are several other comparable, and more moderns texts available) can be a valuable resource in learning the fundamentals of handguns.

Saxon, Kurt. *The Poor Man's James Bond.* Eureka: Atlan Formularies, 1972.

This book, written by a notorious right-wing individualist, paranoiac, and survivalist, is nevertheless an excellent source on improvised, bargain-basement, do-it-yourself mayhem. There is some material on firearms silencers and a converted 11-shot shotgun, but for the most part the book focuses on improvised explosives, arson, and demolition techniques. Also included in later editions are some good ideas on purchasing chemicals legally, and reprints of 19th century explosives manuals. Atlan Formularies also offers several other titles, including a four volume work on personal survival. Books and catalogues may be obtained by writing Atlan Formularies. P.O. Box 483, Eureka, CA. 95501

United States Army. *Explosives and Demolitions.* (FM 5-25).

This reprint of the standard army manual on the handling, effective use, and storage of high explosives and detonators of both commercial and military manufacture is another good text on basic demolitions. The explanations are simple and

comprehensive, and deal with all the basic materials and problems likely to be encountered. The specialist may need to do further reading, but for basic applications, this book is a good place to start. Available from most of the right wing mail-order outfits.

United States Army. *Improvised Munitions Handbook* (TM 31-210), and *Unconventional Warfare Devices and Techniques* (TM 31-200-1).

These two books, available from most of the large paramilitary publishers as reprints, are among the most popular and useful texts on improvised demolitions and weaponry. Compiled by the Frankfurt Arsenal, they include hundreds of different designs for bombs, arson devices, initiators, timing devices, crude firearms and ammunition, and other useful tools, which have as their common denominator the ability to be readily constructed by amateurs out of common household substances and tools. Most although not all of the devices have been field-tested and are known to be effective, which should not prevent the ambitious experimenter from using all due caution and prior testing before attempting practical applications of the various devices. In any event, these two books are essential references which should not be overlooked.

Shotgun News. P.O. Box 669, Hastings, Nebraska 68901. $7.50/year.

Shotgun News is the biweekly trade newspaper of the firearms industry in North America. As such, it is an invaluable source of information on where to buy weapons, parts, literature, surplus goods, and other useful things. One drawback is that many of the advertisers sell only wholesale, to federally-licensed gun dealers in the United States. Still, it is an important source of goods and information, including new developments in weapons technology (such as the recently developed "exploding bullet"), and miscellaneous bargains (such as a book on the secret listings of federal government radio frequencies).

Book Publishers and Dealers

There are several right-wing publishing houses and mail order book dealers which specialize in technical manuals for police, military, and the paramilitary right. Rather than listing their titles, it is more useful to simply list briefly the major sources for these books. While it is totally legal to write and ask for their catalogues and order their books, a reasonable sense of caution and personal security may suggest the wisdom of using safe mailing addresses and phony names. Who knows who buys their mailing lists?

At any rate, a quick glimpse of their catalogues will invariably reveal a host of titles on a wide variety of topics which may be of interest, including technical manuals on specific weapons (which are extremely useful if you own a common variety of military or police firearm); numerous demolitions texts; silencer construction studies; lockpicking manuals; books on false identification; improvised weaponry pamphlets; and works on electronic surveillance, police technology, guerrilla warfare, and other such topics.

Many or most of these works are written by and for the police, military, and intelligence communities, which has both positive and negative aspects. On the one hand, frequently the practical and theoretical expertise of the authors cannot be questioned, despite the political despicableness of the presentation. On the other hand, because many of the books are written for the ignoramuses who staff these government agencies, they are frequently boring and unenlightening for the intelligent reader.

A further word of warning: many of the books in these catalogues are advertised with considerable hype about their practical value, when in fact they are of little interest to anyone but historians and violence freaks. For example, there are dozens of explosives texts, including some of the military manual reprints, which purport to be of general interest, but which in fact only describe the workings of highly specific (and often obsolete) types of manufactured ordinance. Read the descriptions carefully, and then select only titles which either deal with the topic in broad terms, or else discuss the use of the specific materials at hand.

Here, then, are the most important sources of technical

information in these areas:

Desert Publications
Cornville, Arizona 86325

Ken Hale
Hillcrest Publications
P.O. Box 395
McDonald, Ohio 44437

Paladin Press
P.O. Box 1307
Boulder, Colorado 80306

One other source for information on these subjects is *Soldier of Fortune*, a monthly magazine devoted to mercenaries and would-be professional adventurers. A genuinely disgusting magazine, it nevertheless routinely reviews all the latest literature and hardware of warfare, contains advertisements for weapons, parts, and book dealers, and discusses the latest theory and practice in 'anti-terrorist' strategy and tactics. If you can't find it at a local magazine stand, it's published by the Omega Group Ltd., 17282 28th Street, Boulder, Colorado 80306. If you can't stomach paying for it, read it at the newstand, or take it out on the "community borrowing plan". They deserve it.

CRIMINAL SKILLS AND SURVIVAL

More so even than skill with weapons and explosives, a thorough understanding of the workings of the bureaucracy and the security systems with which it surrounds itself is essential to successful illegal activity. The myth of "street wisdom" is a dead end for the revolutionary; "board room wisdom" - that is, knowledge of the way in which social reality is controlled in a macro as well as micro sense - is the real key to survival in the modern urban jungle. The following books are crucial guides to that knowledge.

General

French, Scott. *The Big Brother Game*. New York; Lyle Stuart, 1976.

The Big Brother Game did to the high-technology world of surveillance and social control what *The Anarchist Cookbook* (a dated and highly unreliable work, by the way) did to the world of street-level politics. The author narrowly escaped death in an assassination attempt for revealing the methods by which the agents of Big Brother operate. Electronic surveillance, bugging, and detective methods are thoroughly described; forced entry, security breaching, false identification, computer record systems, credit, and self defense are also detailed. The author also gives information on sources of equipment and information necessary for activities in these areas. Highly recommended as a general overview of this area.

Identification

Eden Press. *The New Paper Trip*. Fountain Valley: Eden Press, 1979; and Paladin Press: *Black Bag Owner's Manual III: "False Face"*. Boulder: Paladin Press, 1978.

These two books concentrate on techniques of creating false identities which are of primary relevance to United States identification systems. The wide variations in national identification systems limit the applicability of this information to other countries, although without question many of the general techniques described would also be effective elsewhere. In any event, *The New Paper Trip* and *False Face* are both up-to-date reviews of the many ways to create new identities, including name changes (legal), alterations, forgeries, the dead infant technique, and others. Of the two, *The New Paper Trip* is by far the more comprehensive. Both, however, are indispensable survival manuals for anyone contemplating illegal activities.

Illegal Entry

Lockpicking Simplified. Boulder: Paladin Press, and O.S.S./-*C.I.A. Locks, Picks, and Clicks*. McDonald: Ken Hale.

These two short books are summaries of the basics of lockpicking. They discuss the basic types of lock, including past and present designs; the construction, purchase, and use of lockpicking tools; making keys by impressioning; the sorts of locks likely to be found on differing "secured areas", such as buildings, file cabinets, padlocks, and cars; and in general, everything one would need to know to begin learning lockpicking. If this sort of career training appeals, these two works are a good place to start. Either is an adequate basic text, although *Locks, Picks, and Clicks* is perhaps a better bargain for the money.

Lock Out. Phoenix: Desert Publications. 1975.

This pamphlet is a brief explanation of the cruder, "brute strength and ignorance" means of circumventing security systems. If you don't have the skill or patience to pick complicated locks, or your target doesn't require such finesse, the techniques in this pamphlet may be what you need. The anonymous author lists simple tools and means by which locks can be jimmied, pried, or broken open in a hurry, to ease your surreptitious entry into buildings, automobiles, and office equipment.

Russell, John L. 3. *Involuntary Repossession, or, In the Steal of the Night.* Tampa: The Spyder Corporation Publishers. 1976.

Just when the automotive conglomerates and the government thought they had begun to solve the tremendous problem of automobile theft, along came this wonderful little pamphlet devoted exclusively to the fine art of stealing cars. Tired of confining yourself to stealing '63 Chevies and hot-wiring old Volkswagens because of the ignition and steering wheel locks on the newer models? With this book, you can find out the specifics of breaking into and stealing any car, right up to the latest models. Unfortunately, there is no universal and simple technique for cracking every car lock, but with the right combination of locksmithing tools and techniques described

in this text, you can once again drive away from the scene of an action in the finest of style.

Concealment

Hjersman, Peter. *The Stash Book.* Berkeley: And/Or Press, 1978.

In this era of metal detectors, X-ray machines, and police ransacking during house searches, there is no total security against the loss of valuables and contraband which have been hidden. In *The Stash Book*, though, Peter Hjersman accomplishes two things. First, he explains in great detail some ingenious ways to construct hiding places for a wide variety of items, including money, documents, weapons, drugs, and not least of all people, inside homes, automobiles, furniture, and on your person. Secondly, he discusses in depth the psychology of hiding things and searching for them, so that readers can soundly devise their own personal forms of concealment. Although this book is perhaps not required reading, it does contain some interesting and potentially valuable information.

Modern Survival and Prosperity

As we mentioned at the beginning of this section, the key to effective revolutionary action in this era is a thorough understanding of the operational methods of high society: Big Business, Big Government, and Big Crime (isn't it all the same?). These methods cannot be learned from one book, but there *is* one publisher which has virtually cornered the market on books in this area.

This publisher is Eden Press (P.O. Box 8410, Fountain Valley, California 92708). The publisher of *The Paper Trip* and *The New Paper Trip*, now considered the standard works on false identification. Eden has also compiled an impressive list of titles on many other aspects of staying alive and doing fundraising. Among them are such works as *Credit!*, a book on how to use the increasingly pervasive credit economy to your

own advantage; *Privacy*, a thorough treatise on personal anonymity and security; *The Check Book*, which details all basic check frauds, kiting, and techniques for safely stashing money overseas; and a number of other such books. Best of all, most of these texts also include bibliographies, which allow the reader to easily supplement and further research the basic concepts and information presented.

ELECTRONICS AND COMMUNICATION

The electronic technology of today is important to the revolutionary struggle in two ways. First of all, it is central to the rapid mobilization of the State's repressive apparatus; and secondly, it can be vital to the coordination of attacks on that apparatus. While it is important never to believe that one can actually compete with the State on an equal level in this area (it always has more and better equipment at its disposal), an understanding of the weaknesses and strengths of this technology is vital for effective action. The following information and resources are particularly significant in this respect.

Scanners

Within the United States, in most areas it is legal to purchase radios with which to monitor police and governmental radio traffic. For many years, numerous electronics firms have marketed special radios which receive transmissions in the wave bands used by these agencies. Until two years ago, the most advanced designs were of a type known as the *scanner*, which contains crystals for as many as sixteen different frequencies. The radio automatically searches among these frequencies every few seconds, locking on to any channel on which there was a broadcast.

These scanners were extremely useful, but suffered from the fact that a separate crystal had to be purchased for every frequency to which one wanted to listen. Happily, in the last few years, the *programmable scanner* has appeared. This type allows the listener to simply punch into the radio's computer the exact frequencies desired at a particular time, thus doing away

with the need to buy separate crystals for each channel. Even better, the radio can be set to search a certain frequency range. When a broadcasting station is located, the radio will lock on to it, and give a digital readout of the frequency, so that stations not publically known can be located and identified.

In order to combat this free enterprise-sponsored unwanted eavesdropping, many public and private agencies are planning to incorporate "scramblers" on their radios. Fortunately, the technology for using scramblers on a wide level is still too primitive and expensive to have been generally adopted. We still have a few years to listen in.

Among the numerous programmable scanners now available, the *Bearcat* line is probably the cheapest and most popular. Your local electronics store can help you find one.

To supplement your equipment, there are numerous guidebooks to the airways. For local private and public two-way radio systems, many enterprising groups of hobbyists have begun publishing listings of frequencies which are in the public domain. In the Pacific Northwest, for example, Mitchell Publications (P.O. Box 277, Seahurst, Washington 98062) publishes *McKenna's Police and Fire Radio Callbook*, in an annually updated edition. Other areas have similar books: again, check your local electronics store.

The federal frequencies present a more serious problem, since they are not listed publically for reasons of national security. Fortunately, C.R.B. Research (P.O. Box 56, Commack, New York 11725) has brought out *The 'Top Secret' Registry of U.S. Government Radio Frequencies* (25 *to* 470 *MhZ*] to fill the gap in our knowledge. The main weakness of the book is that it lists many or all frequencies used by the various agencies across the country, but without specification as to which frequencies are used in particular areas. Still, with a programmable scanner (possibly aided by a voice-activated tape recorder, also available commercially), it should be possible to quickly identify which frequencies belonging to a particular agency are used in your area.

Citizens Band Radio

Citizen's Band Radios can be a useful means of communicating during an action, if their limitations are understood. Following the C.B. fad of 1977-78, dozens of books were written about what to buy, C.B. slang, and so forth. If you have need of such communications equipment, find one of these books, learn the procedures and language, and practice using it until you can sound appropriately comfortable and inane.

C.B.'s are readily available, cheap, and potentially valuable in North America. However, they suffer from the fact that all 40 channels are routinely monitored by hundreds of patriotic and law-abiding citizens. In many states, one channel - often channel 9 - is kept reserved for citizen-police communications. Thus if you must use a C.B., never forget that you are probably being heard by many people with a direct and instantaneous communications link to the police. Keep it short and innocuous-sounding, use phony (but plausible-sounding) names and call numbers, and observe correct procedures.

Computers

Bequai, August. *Computer Crime.* Lexington: Lexington Books, 1978.

Computer Crime is primarily concerned with the bureaucratic and legal attempts of the system to stem the flow of computer-related crimes which, according to one of the many studies cited in this book, now results in an average take of $400,000 per computer criminal. The book is short on technical detail about how these crimes were committed, but it does give detailed information on recent attempts to define and create new laws, punishments and investigative capabilities for a wide variety of crimes which have only just been invented. It includes extensive bibliographic reference material, and the early chapters provide many insights into the high success rates and wide variety of approaches of the new class of computer outlaws.

Brunner, John. *Shockwave Rider.* New York: Ballantine Books, 1976.

This science fiction novel, while not without its political flaws, postulates a government-trained computer genius in the cybernetic America of the 21st century who turns renegade. A "Phone Phreak" of the future, the hero uses nothing more than a computer console and a telephone to create new identities for himself, wreak havoc with the government, and ultimately destabilize its totalitarian rule by programming the national computer networks to spill forth the sordid details of social reality to the public. While the scenario may be a bit far-fetched, the exploration of the potentials for subversive uses of computers is thoughtful, plausible, and in many respects not far-removed from the accomplishments of contemporary computer and phone phreak wizards (some of whom have already reputedly learned to access government and telephone company computers by telephone).

The Ombudsman Committee on Privacy (Los Angeles Chapter), and the Association for Computing Machinery. *Privacy, Security, and the Information Processing Industry.* New York: Association for Computing Machinery, 1976.

This handy little report, available from the ACM for $12.00 (P.O. Box 12105, Church Street Station, New York, N.Y. 10249), is an outline to the management headaches caused by computer insecurity. It discusses the main categories of threats to computer security, including physical vulnerability, hardware problems, software or programming weaknesses, and user manipulation; sets out the basic procedures for "hardening the target" by means of a comprehensive security program; and then deals with the tremendous legal problems concerning privacy which are implicit in computer centralization of information. The format is rather dull, but useful insights into the strengths and weaknesses of computer defenses can be gleaned from this inside report.

Parker, Donn B. *Crime by Computer.* New York: Charles Scribner's Sons, 1976.

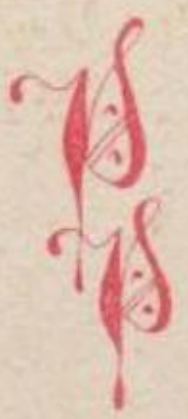
Crime by Computer, written by one of the foremost experts on "computer abuse", is probably the best overview of this subject yet written. Parker identifies the main social and economic problems created for capital and the State by computer crimes, focusing particularly on the potential for sabotage and disruption on the one hand, and theft of untold billions on the other. He provides statistical analyses of the different types and numbers of computer abuses, and sociological profiles on computer criminals. From this overview, he moves to detailed descriptions of the whole range of possible computer-related crimes, complete with real case examples which demonstrate the ingenuity and resourcefulness of the perpetrators, as well as their mistakes. He concludes with some suggestions for improving computer security, and a projection of the future of computer abuse. The bibliographic references further enhance the value of this essential book to the enterprising comrade interested in the "revolutionary" new field of computer science.

$4.95 U.S.

Without A Trace is a technical manual like no other, for it attempts to teach not only the perpetrators, but also defense attorneys, social critics and the general public about the vast array of scientific and technological means by which the police attempt to find and prove "who done it". The book is complete in its coverage of the various areas of forensic science and criminalistics.

Without A Trace is also a political book. It makes no bones about the fact that its *raison d'etre* is to provide information not usually accessible to people outside the police forces of the state. It speaks to everyone interested in knowing how the police operate, and where their technical limits lie. Most importantly, it attempts to provide essential information to those engaged in political actions at which they would rather not be caught.

Cover art by The Angry Brigade



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