

Old Forensic Evidence, Contemporary Resources of Forensic Science and the Police X-Files — Crime Is Not an Abstract and Theoretical Entity Out of Touch With Reality

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*The crime was committed by the one who benefited from it.
Seneca the Younger*

Abstract. *The obligation to prosecute the perpetrator of any crime throughout the entire period of its punishability is one of the statutory tasks of the Police. The prominent forensic scientist — Hans Gross claimed that crime is not an abstract and theoretical entity out of touch with reality, but a real social phenomenon that can be investigated and recognised. Nevertheless, archive shelves contain records of undetected crimes from the past years that cast a shadow over police statistics and never give investigators any peace of mind. These undetected crimes from a few, a dozen or even several dozen years ago, are reinvestigated by officers from the Cold Case Units (colloquially referred to as the Police X-Files). Currently, such a unit operates in each regional police headquarters as well as in the National Police Headquarters. The methods and means that the X-Files investigators take advantage of depend on the specificity of an individual case, however, in the model of their conduct, it is forensic science that plays a significant role — alongside covert policing or criminal analysis. Physical evidence plays a huge role in determining the objective truth, and thanks to the research methods and tools currently available to crime scene investigators, the boundaries of learning about the reality are expanding. Despite the passage of time, the purpose of criminal proceedings is achieved, i.e. perpetrators of many crimes committed years ago are identified and brought to justice.*

DOI: 10.5604/01.3001.0012.7493

<http://dx.doi.org/10.5604/01.3001.0012.7493>

Keywords: police X-Files, undetected crimes, forensic evidence, modern research methods, tools of forensic science

Introduction

Crime is not an abstract and theoretical entity out of touch with reality but a real social phenomenon that can be investigated and recognized, as was claimed by the prominent forensic scientist — Hans Gross¹. Still, investigation and detection happen to be a very long process and it may take a lot of years to solve a crime. As result, archive shelves contain records of undetected crimes from the past years that cast a shadow over police statistics. In addition, mistakes by investigative bodies in very serious cases, and sometimes also in those seemingly minor (but socially harmful)

¹ Szostak M, Kryminalistyka w systemie nauk penalnych a problem prawdy sądowej, [in:] Nauka wobec prawdy sądowej. Księga pamiątkowa ku czci profesora Zdzisława Kegla. Wrocław, 2005, p. 504.

ones compromise the reputation of the criminal justice system², and shock the public opinion.

Main part

The obligation to prosecute the perpetrator of any crime throughout the entire period of its punishability is one of the statutory responsibilities of the Police. Police officers attach particular importance to the accomplishment of this task — it is becoming more and more difficult for criminals to escape justice, also in case of so called cold cases. Perpetrators cannot feel safe and secure. This clear message is sent to them by investigators from the Cold Case Units, colloquially referred to as the Police X-Files. It is worth explaining that this name was created by the media to enhance the attractiveness of the message (which they managed to achieve), and it also successfully functions in the popular opinion. These undetected crimes from a few, a dozen or even several dozen years ago, are reinvestigated by officers from these units, who launch or re-open investigations (very often with a measurable effect) that were discontinued due to the failure to identify their perpetrators, or due to the lack of sufficient data substantiating the suspicion that a crime was committed. Many crimes have not been detected, among others, because they were originally treated as disappearances, or were hidden behind alleged suicides or deaths from natural causes, while in fact being murder cases.³ According to the Latin saying *ubi culpa est, ibi poena subesse debet*, which is proved by the results of arduous and conscientious work by investigators from the Cold Case Units. It should be added at once that the modern resources and potential of forensic science provide a valuable support for their actions, which will be discussed further on.

In 1999, the first Cold Case Team started operating in the Regional Police Headquarters in Krakow. After five years, in January 2004, it was transformed into a full-time unit, whose tasks (till this day) include:

- analysis of murder cases discontinued due to the failure to identify the perpetrators of the crime, with a view to determining the possibility of continuing the investigative process;
- analysis of incidents statistically recorded as natural deaths, suicides, disappearances, drownings or unfortunate accidents, with a view to establishing which of those were in fact murder cases;
- covert policing and conducting investigations in cases revealed as a result of the above-mentioned analytical activities.

Investigators from the Krakow team have so far solved 20 archival cases and are consistently working on the next ones. The murder of Katarzyna Z., a 23-year-old student of religious studies, which was committed at the end of 1998, was one of the first cases to be reopened by the team from Krakow. It is worth emphasizing that the investigators used in this case everything that is new and the best

² Gurgul J, Sens czy bezsens wracania do starych spraw? *Problemy Kryminalistyki*, 2012, Vol. 277 (3), p. 5.

³ Zubańska M, Nowoczesne narzędzia techniki kryminalistycznej a niewykryte przestępstwa sprzed lat — czy sprawcy powinni się bać? *Przegląd Policyjny*, 2016, No. 3 (123) July-September, p. 162 and following.

in forensics (including an expert in torture marks), technology and psychological sciences⁴. What is the result of these activities? The man suspected of committing the high-profile and very mysterious crime in the history of Polish crime ended up in the hands of law enforcement agencies 19 years after the crime was revealed — on October 4 of 2017, 52-year-old Robert J. was apprehended in the Kazimierz district of Krakow.

In subsequent years, police X-Files units were created in other garrisons and currently also in every regional police headquarters, in criminal police department (there are 8 of such teams) or CID departments (there are 8 of such teams) while in Warsaw Police Headquarters there has been established Cold Case Unit in the Homicide and Serious Crime Squad. The link which complements the whole — figuratively speaking — is the Cold Case Unit created on 1 August 2017 in the Criminal Investigation Department of the Criminal Bureau at the National Police Headquarters. The tasks of this organizational unit include:

- reviewing investigations which were discontinued due to the failure to identify perpetrators, involving the most serious crimes against life, health and property, as well as cases involving people presumed to have gone missing, from the whole of Poland, in an effort to conduct another analysis of thereof and to initiate procedures which are aimed to identify and apprehend their perpetrators;
- carrying out procedural acts under Article 327 § 3 of the Code of Criminal Procedure, in cooperation with the territorially and subject matter-related relevant units of the public prosecutor's office, and re-opening discontinued investigations ordered by the public prosecutor's service;
- commissioning of criminal analysis for the needs of preparatory proceedings;
- performing covert activities as part of police investigations;
- cooperation with institutions, research centers and experts specialising specialists in various fields of science, whose expertise can contribute to the identification of perpetrators;
- cooperation with police organisational units as part of investigative procedures in cases selected by the Cold Case Unit;
- coordination of the work by X-Files units functioning in the structures of the regional police headquarters and the Metropolitan Police Headquarters.

To sum up, there are 18 Cold Case Units operating in the country, in which 57 officers and 12 civilian employees (experienced retired police officers) work full-time on unsolved cases. The staff of such a unit consists of 2 to 6 employees who specialise in different branches of knowledge.

From the beginning of their existence, the X-Files investigators have dealt with a total of 1113 most serious cases (including murders, rapes, armed robberies) which were originally closed, following a decision to discontinue the investigation in the absence of their perpetrators⁵. The conducted covert and investigative activities have resulted in the identification of perpetrators in 61 cases, which confirms the thesis that there is no perfect crime. The apprehension of a criminal who was able

⁴ Sitek E, Jak w „Milczeniu owiec”. *Policja 997*, 2017, Special edition, Vol. 10–11, pp. 22–25.

⁵ Sitek E, Poczucie sprawiedliwości. Rozmowa z nadinsp. dr. Jarosławem Szymczykiem, Komendantem Głównym Policji. *Policja 997*, 2017, Special edition. Vol. 10–11, p. 7.

for years to avoid criminal liability is also a clear proof for the inevitability of punishment, and a good reason for satisfaction for the investigators themselves. In 2017, X-Files officers managed to arrest suspects in connection with five cold cases while 171 of previously unsolved cases are currently under investigation. The passing time is undoubtedly a factor which urges officers to act fast as they are constantly guided by the thought — to identify the perpetrator before the statute of limitations expires. What is meant here is the provisions regulating the period of criminal liability. The institution of prescription is regulated in Article 17 § 1 point 6 of the Code of Criminal Procedure and stipulates that proceedings are not instituted and that the proceedings initiated are discontinued when the prescribed statute of limitations has lapsed. After a specified period, the case is finally terminated and the perpetrator cannot be held criminally responsible for the act committed. Therefore, the investigative team are supposed to choose the most effective methods and forms of action and to organise their work in such a way which will bring a tangible result in the form of sufficient evidence necessary to resume the proceedings or reopen the investigation before the time limit for prosecuting a given crime expires.

Who is entrusted with the task of reading the files of such cold cases and what features are necessary to become part of an X-Files team? The key issue here is the selection of people on the basis of their individual qualities of the mind and spirit that guarantee getting more information from the analysed files than can actually be found in the files — as claimed by J. Gurgul. A necessary condition is the involvement of people with extensive professional experience, having vast theoretical knowledge, familiar with procedural law, knowledgeable about psychology at the individual and team level and with good analytical skills⁶. An open mind, intellectual nonconformity, unconventionality combined with stubbornness and the ability to use new technologies is undoubtedly useful, too⁷. Professional experience, which is of great significance, can be obtained through doing police work — in different units and in a variety of jobs, with the best preparation being, in this case, the criminal service. A good knowledge of the specificity of investigative work, intelligence gathering and covert policing is essential. The length of service in itself is obviously not a guarantee that detection process will be more effective. Nevertheless, professional experience makes it possible to acquire adequate skills and influences the formation and growth of competences essential in the work of an investigative analyst (and a passionate person at the same time). Individual members of police X-Files must complement each other. The experience, thoughts and conclusions of each of them are unique. Close cooperation with other officers, experts and specialists should also be mentioned. Some of the teams have retired officers on their staff. Their expertise, professional experience and knowledge of the changes that have taken place in recent years on many levels (including the legal, social, cultural and economic one), as well as availability (which is not insignificant) are invaluable. By all means, a member of an X-Files team must be a very skilled reader. In this case, reading is a labour-intensive activity requiring much experience, as this is what the reading of cold case files, meaning unsolved case files, is like. Here, the point is to find between the lines of hundreds of pages of documents such information

⁶ Gurgul J, *op.cit.*, p. 6.

⁷ Kryczka K, Nie tylko doświadczenie. *Policja 997*, 2017, Special edition, Vol. 10–11, p. 94.

which may lead to obtaining additional knowledge, which might result in formulating new investigative hypotheses. Routine leads astray. Determination, on the other hand, is helpful. Stereotypes and schematic approaches must be avoided, and there is no one-size-fits-all model for solving a criminal case⁸. The thing is not to miss any detail (even the smallest and seemingly unimportant one), which the previous investigators did not notice. According to J. Gurgul, the discovery of such a detail may lead in the future to the closing of the chain of circumstantial evidence in one case or another. In other words, the reading of old files must be carried out without any prejudice and with the assumption that there are many truths, which can be read, among others, from photographs, sketches, records and expert opinions⁹. The same view was expressed over 20 years ago by Tadeusz Hanausek. He drew attention to the fact that by reviewing case files, often many years after they were placed in the archives, one can get a new, different perspective on the reviewed material, thus obtaining new information which was hidden in the materials previously examined but was originally unnoticed or overlooked.¹⁰ There is no perfect crime.

According to Jan Wojtasik, it is increasingly common that a new look at a case is obtained only after applying a different research method than the one used during the original investigation¹¹. Investigators agree that such a cold case should be viewed from the perspective of the developments of modern science and technology (and even arts and crafts), which do not escape the attention of criminals. The influence of modern instruments, techniques and research methods available to forensic analysts on solving archival cases is enormous. It is worth mentioning that in the science in question progress is based primarily on practice, with specific cases posing new problems and forcing law enforcers to search for more efficient or completely new methods¹². Continuous adaptation of modern technological solutions (for the needs of criminal proceedings) to forensic science broadens the potential for uncovering the truth. In other words, new research tools and methods make it possible to gradually overcome many of the barriers to identifying people and objects that have not yet been overcome. Moreover, the history of forensics is inextricably linked with the history of law enforcement agencies and it has provided support and assistance to many lawyers for many years. The demand on the part of the criminal process for scientific methods to detect crimes and identify criminals is steadily increasing. That is why Krzysztof Krajewski is right to observe that while criminology can afford to be, at least to some extent, a purely theoretical science, in the field of forensics such an attitude and approach is difficult to accept¹³. The US Supreme Court judge Stephen Breyer, in turn, says that scientists offer their help and that lawyers should accept the offer. The result will be fruitful not only for

⁸ For more information see: Pachura E, Cold Case czyli jaki powinien być śledczy. *Policja* 997, 2017, Special edition, Vol. 10–11, pp. 15–16.

⁹ Gurgul J, *op.cit.*, p. 5.

¹⁰ Hanausek T, Kryminalistyka — zarys systemu. Kraków: Wydawnictwo Zakamycze, 1998, p. 86.

¹¹ Wojtasik J, AFIS, czyli Automatyczny System Identyfikacji Daktyloskopijnej. *Electronic source*: <http://www.zielona-gora.po.gov.pl/index.php?id=36&ida=3405>, accessed: 5.03.2018.

¹² Jaworski R, Opinia z ekspertyzy poligraficznej jako dowód odciążający. Wrocław, 1999, p. 55.

¹³ Kała M, Wilk D, Wójcikiewicz J (Eds), Ekspertyza sądowa. Zagadnienia wybrane. Warsaw, 2017, p. 25.

the truth, but also for justice¹⁴. Still, one cannot be silent on the fact that forensic scientists' satisfaction from transforming scientific discoveries into an instrument of justice does not always arouse enthusiasm among lawyers¹⁵. The discussion of this issue, however, goes beyond the scope of this paper. Regardless of individual attitudes, it is an undisputed fact that the new research tools and methods currently available to forensic science are one of the factors which provide an incentive to review and re-analyse records of unsolved cases from the past.

Is the role of modern forensic tools in resolving cases that have been dropped for failure to find the perpetrators or because of the lack of data sufficiently justifying the suspicion of a crime being committed, indeed so important?

There is no doubt that technological progress makes it possible for evidences, which were secured even several decades ago, provided that it was done *lege artis*. Evidences can be re-examined using new research methods available to forensic technology, such as genetic tests. It can be metaphorically stated that these new methods can bring new knowledge out of the old traces. This is confirmed, among others, by the results of research conducted by the American research organisation RAND Corporation. When asked about the factors that contributed most to the reopening of files discontinued, respondents to the case (cold-cases in the United States) prioritised new methods of DNA testing (90% of cases), followed by other new methods of forensic testing (80% of cases)¹⁶. It is characteristic of the investigative work of the X-Files Unit that they reach for solutions that have not been considered so far, use people's help, modern tools and methods that others have not considered or have not been able to use. The officers agree that they often use the help of experts and specialists. They cooperate with police forensic laboratories functioning in the structures of provincial headquarters, the Central Police Forensic Laboratory, the Institute of Forensic Studies in Krakow, Forensic Medicine Institutes and other scientific centers.

Cooperation with experts includes consultations regarding the handling of evidence, on its assessment and selecting traces for research (eg genetic) and managing research as part of an expert opinion. At various stages of the activities, experts from various disciplines are appointed. Their knowledge and skills can be used to confirm (or exclude) hypotheses set by investigators and to establish new facts.

Officers are in many cases confronted with cases where the actual perpetrator of an incident was granted the status of suspect, but due to the limited science opportunities, inefficiency or lack of research methods to identify the person on the basis of secured traces, (e.g. fingerprint or biological), lack of tools in the form of forensic databases and insufficient information, enough evidences were not able gathered.

The use and impact on the new forensic tools and investigative methods in the resolution of undetected crime can be considered from the point of view of the

¹⁴ Breyer S, The Interdependence of Science and Law. *Science*, Vol. 280, 1998, pp. 537–538.

¹⁵ For more information see: Kwiatkowska-Wójcikiewicz V (Ed.), *Kryminalistyka dla prawników. Prawo dla kryminalistyki*. Toruń, 2010, pp. 9–11.

¹⁶ Davis R.C, Jensen C, Kitchens K.E, Cold-Case Investigations. An Analysis of Current Practices and Factors Associated with Successful Outcomes, 2011. *Electronic source*:

http://www.rand.org/content/dam/rand/pubs/technical_reports/2011/RAND_TR948.pdf, accessed: 7.07.2017.

activities carried out at the scene of the incident, the place where the corpse is hidden (which may be established or suspected), and laboratory identification researches.

It is therefore possible to distinguish between devices designed to visualize and map space, devices used to search for corpses, and new techniques and research methods currently available to experts. Thus, searches with the use of a georadar or sonar help to indicate the place of hiding human corpses or objects originating from crime. On the other hand, the comparison of the genetic profile isolated from the biological traces protected during the visual inspection with the profiles in the DNA database enables, in case of a match, the identification of a person already at the initial stage of the analysis. Finally, the results of some identification tests make it possible to confirm the identity of a person, e.g. a victim of a crime. 3D laser scanning has been used in forensic technology for several years now. This technology, due to its special features and versatility, is successfully used in many areas of life, such as: construction, archaeology, geodesy, aviation industry. One of the first reported attempts to use the scanner by the police is in 2004. Today, many police forces around the world have this innovative tool at their disposal and are using it in investigative practice¹⁷.

Simply, the 3D scanning process is based on transferring the real shape of the 3D model to a digital form in the form of a so-called point cloud, which enables a "virtual view" of the registered location. This is because the point cloud is a kind of spatial documentation that can be returned to at any time to supplement it with additional measurements, analyses or to reconstruct the state on the day of scanning. A point cloud takes the form of raw data, which then needs to be processed using special software. Selected scanner models have software dedicated to forensic purposes, which significantly facilitates the work of technicians who operate the equipment. From this material, precise, realistic, three-dimensional computer graphic models are obtained, which are useful for analysing crime, road accident and fire sites. Digital methods of 3D imaging have created new opportunities for insights in forensic and opinions of experts in forensics medicine.

In 2009, the Laboratory of 3D Expertise of the Faculty of Forensic Medicine at the Medical University of Wrocław was established. It has a wide range of technical possibilities

and technological mapping and then the multi-aspect analysis of human body biology with the surrounding space in a virtual three-dimensional environment. For this purpose, 3D laser scanning technology, photogrammetry, modelling, texturing and 3D animation are used¹⁸.

It was precisely this laboratory that the prosecutor commissioned research as part of an expert study whose task was to create a spatial model of damage inflicted by Katarzyna Z. The experts managed to recreate by computer, on the basis of the remains, the figure of the girl and the type of damage inflicted on her. Visualization of the probable course of the crime significantly broadened the

¹⁷ For more on this subject, see: Wieczorek T, Zubańska M, Wiciak K, Szymczak M, Technical and legal aspects of visual inspection of the scene using 3D scanning, [in:] Kosinski J (Ed.), *Teleinformatic crime*. Szczytno, 2015, pp. 147–157.

¹⁸ Maksymowicz K, Tunikowski W, *Zbrodnia w 3D. Policja 997*, 2017, Special Edition, Vol. 10–11, pp. 26–29.

knowledge of the police officers from the X –Files Unit in Krakow, i.e. showed the type of place where it took place, as well as how and in what order the knife-broken wounds were inflicted. According to the prosecutor’s investigation, the nature of the reports showed that *the cuts had been made in a well thought-out manner, taking time and space*¹⁹. Unmanned aerial vehicle (UAV), commonly known as drones, may be used for operational and process purposes. This is a zero operator requirement device capable of autonomous remote flight (ground or airborne) or self-programming. Its wide range of capabilities allows, among other things, for support of services in search and rescue, identification and chase operations. They perfectly pass the exam in the event of the need to identify the area of interest of investigators, they make it easier to determine the extent and observation of the area of the crime committed. This tool enriches the photographic documentation of the place of the incident, and its mobility allows to reach hard-to-reach areas²⁰. As far as the Cold Case Units are concerned, the use of drones for detection purposes comes down to, among others, to look for a place of hidden corpses. In this case, investigators derive from the experience of archaeologists who use unmanned robots to search for settlements, gardens and cemeteries. It has been observed that changes in the shape of the ground surface at specific times of the year and on the day are perfectly visible in photos taken from heights²¹. Similarly, if you try to bury human corpses. In addition to the anomaly in the soil structure, anomalies on the surface are always noticeable and possible to register. Based on the aerial photographs taken from the cameras placed on the aircraft, these differences can be visualized more easily, found and selected for further research. Such use of drones supports the first stage of searching for corpses, i.e. field prospecting. Its main purpose is to reveal the place of deposition of corpses or human remains by observing environmental determinants²². Unmanned aerial vehicles used in investigations undertaken after years also allow visualization of the place of the event and taking into account topographical changes that took place over several years, and not related to hidden human corpses. The drones can be equipped with additional recording instruments, e.g. an air laser scanner, a thermal imager with an infrared filter. When re-analyzing the course of the event and attempting to reconstruct it, the documentation is made of the so-called Bird’s eye view and it is a useful visual material that allows to look at the matter from a different perspective.

Much more often, investigators from the X- Files Unit reach for georadar (Ground Penetrating Radar — GPR), usually in cases where, as a result of the perpetrators’ actions consisting of covering up (hiding) traces, the body cannot be found. Georadar is one of the group of devices using active geophysical methods of prospecting, whose main assumption of functioning is the registration of geological anomalies, which should be understood as deviations from normal soil properties

¹⁹ Sitek E, Jak w „Milczeniu owiec”, *op.cit.*, p. 25.

²⁰ Stojer-Polańska M, Lisowicz J, Bynie szukać wiatru w polu, [in:] Gontarz A, Kosieliński S (Eds), *Rynek dronów w Polsce 2015. Księga popytu i podaży*. Warsaw: Institute Mikromakro, 2015.

²¹ *Ibid.*

²² Dobrzański K, *Wykorzystanie metod archeologicznych w kryminalistyce*. Unpublished master’s thesis written under the direction of dr. hab. Maciej Trzcziński. Wrocław, 2013, p. 19.

such as electrical resistance, electrical conductivity or magnetic properties²³. The characteristic feature of these methods (as in the case of 3D laser scanning) is non-invasive, i.e. the ability to detect and preliminary recognition of the examined position without digging it. It should be emphasized that it is important to determine the largest possible number of information useful to identify areas that are potentially a place of concealment. Personal sources are important, i.e. testimony of witnesses or explanations of a suspect (in a situation when he cooperates with law enforcement agencies, but is unable to indicate the exact place of burial), some arrangements can also be made on the basis of monitoring records.

The appropriate range of knowledge about the test site facilitates the proper selection of antennas and measurement parameters. The depth and resolution of the measurements is regulated by the frequency range of the transmitting antenna. And so, antennas with low frequencies (from 20 MHz to 300 MHz) are used to study deeply lysologic layers, but they are characterized by low accuracy. In turn, to find structures with very small sizes, but at a small depth, those with the highest operating frequency (about 2000 MHz) work best. The most universal and widely used in forensic archeology are antennas with a frequency of 500 MHz, which allow penetration up to 5 meters and detection of structures of small size. Such properties allow, for example, to detect a funeral cavity of more than 1 meter and a depth of 1.2 to 18 meters²⁴. In addition, it allows horizontal and vertical surfaces to be surveyed, even in small rooms, making it possible to inspect wall structures that may contain concrete corpses, hiding places or bricked up rooms. With this method, and with the appropriate knowledge and experience of the operator, the search time can be significantly reduced and the area of intervention on site reduced. The Commission shall be assisted by the Radio Spectrum Policy Groups of Inquiry. The Cold case officers used a georadar at different stages of detection activities. Sometimes it is possible to precisely determine the place of hiding the body, and the georadar confirms the version adopted by the police. This was the case in one of the cases that concerned the disappearance of a 40-year-old Romanian woman. After analysing the file, the investigators took the view that the woman was dead and that her death was probably caused by the actions of third parties. Officers started questioning people who claimed that the missing person would not leave the family home voluntarily and would not leave the child. It was also found that there had been acts of violence within the family. Further actions drew the attention of the case leaders to the husband, who was initially very involved in the search for his wife, after a time completely ceased to be interested in her disappearance. It was decided to initiate an investigation under Article 189 (1) of the Penal Code. A decision was made to search the property and the house where she and her husband lived. The activity was carried out with the participation of an expert in field tests and a forensic expert. Georadar indicated a characteristic anomaly in the garden at home. As a result, it turned out that the skeleton of the wanted woman was there. It was found that the perpetrator

²³ Ruffel A, McKinley J, Forensic Geoscience: Applications of geology, geophysics and geomorphology in criminal Investigations. *Earth-Science Reviews*, 2005, Vol. 69 (3–4), pp. 234–247.

²⁴ Konczewski P, Archeologia sądowa w praktyce, [in:] Trzciniński M (Ed.), Archeologia sądowa w teorii i praktyce. Warsaw: Wydawnictwo Wolters Kluwer, 2013, p. 139.

threw the body into a previously dug pit, and then poured lime over it, covered it with concrete slabs and covered it with about 15–20 centimetres of soil. To sum up, the effects of the use of georadar can be very useful to the case. It should be remembered, however, that the success of this project is determined by the issue of obtaining detailed information limiting the area of registration. Even if the corpses searched for in a given place are not revealed, this is also a clue for investigators, because it may accelerate the following verification of the hypotheses and search for another solution.

Sonars for searching and detecting underwater targets are further devices used by investigators in cases where there is no basic evidence — the victim's body. Water reservoirs are frequent places where corpses or crime objects are hidden. Criminals are guided by the belief that such action is effective. Indeed, this is a considerable obstacle for law enforcement authorities, especially when the perpetrator burdens the corpses with heavy objects, e.g. concrete blocks or stones²⁵. The probability of the corpse materialising is then negligible, and the lack of sufficient knowledge of the event makes it possible to disclose it only by chance. In this case, the already mentioned sonar — a device for detecting underwater objects — may be helpful. They have been used for a long time, but only today's systems are able to detect sunken bodies and small objects. Generally speaking, the operation of a sonar is based on calculating the time over which the sound emitted from the transducer reaches the seabed and returns to the receiver placed on the hull of the vessel. The time obtained is then used to determine the distance between the transmitter and the reflective point of the signal²⁶. The result is processed and displayed on the screen as a continuous line on the display which shows the bottom line and each object between the surface and the bottom. Models used for human body search include the lateral towed sonar, the lowered scan sonar and the scanning sonar integrated in the submarine, which is the most innovative device. Due to mobility, multitasking and versatility, ROVs (Remote Operated Vehicles) are used more and more frequently in exploration activities. These are remote-controlled unmanned vessels capable of submerging and remaining below the water surface. The robots act as a platform equipped with a sonar and camera (or cameras) to visualize the object after its targeting. They can work in polluted and contaminated water as well as in difficult hydrometeorological conditions, enable current monitoring of the effects of diving underwater, and even replace them in performing some activities. By placing an additional mechanical tool, it can help to extract the body and minimize the contact of the diver with the corpses²⁷.

The use of sonar, as in the case of georadar, requires prior preparation in the form of planning the activities and field reconnaissance of the examined area. It is important to have a reasonable suspicion that the corpses are present in the tank. Choosing the type of sonar and its optimal parameters, you should obtain as much detail as possible about the object you are looking for. It should

²⁵ Wojtasik J, AFIS, czyli Automatyczny System Identyfikacji Daktyloskopijnej. *Electronic source*: <http://www.zielona-gora.po.gov.pl/index.php?id=36&ida=3405>, accessed: 5.03.2018.

²⁶ Grabiec D, Środki hydroakustycznego wykrywania obiektów podwodnych i prezentacji hydrograficznych danych pomiarowych. *Polish Hyberbaric Research*, 2004, Vol. 1 (9), p. 57.

²⁷ Narel M, Podwodne roboty — ROV (Remotely Operated Vehicles): praktyczne zastosowanie w działaniach PSP: możliwości i ograniczenia. *Przegląd Pożarniczy* 2015, Vol. 2, p. 36.

be remembered that the corpses move with the water current, and in unfavourable conditions the decomposition processes are accelerated. Practice has shown that some objects that may be present around the corpses have better properties for reflecting ultrasonic waves, so it is important to try to determine the last known appearance of the missing object or person²⁸. The Undetected Crime Commission cooperates with groups of divers from units equipped with specialised equipment used to explore underwater areas. An example of a case which ended in finding corpses in a water body is the disappearance of a 25-year-old man who was seen for the last time at one of the petrol stations in Gniew. At the very beginning of the operation, the officers decided to search with divers the bottom of the Vistula river in the place of the ferry crossing in Gniew. Due to very poor visibility and high siltiness, the actions were not successful. More than three years after the disappearance, the case was taken over by the investigators of the Gdańsk X-Files, who, having been acquainted with all the materials collected so far, decided, among other things, to re-search the previously researched part of the river with the use of the most modern sonar. This time they found a car covered with a thick layer of mud. Inside, the corpses of the missing man were revealed, as was subsequently established.

New research methods play a key role in investigations after years, when time is not an ally of law enforcement agencies and any evidence is in search of which could affect the success of a case. Those traces are considered particularly important in order to establish the identity of a person and to prove that the trail, once secured at the scene of the incident, originates from a person selected by the police. Biological traces and fingerprints are undoubtedly such traces, but other types of forensic traces are also important (e.g. traces of the use of firearms, mechanoscopic traces). Advances in the field of forensic genetics (DNA analysis is considered a method of forensic identification of high cognitive significance), in fingerprint research and in other disciplines, inspire investigators to re-examine the evidence from the files of closed proceedings, which has already been emphasized. From the point of view of detection activities, breakthrough moments was the implementation of the Automated Fingerprint Identification System (AFIS) in the year 2000 and the DNA Database seven years later. These forensic tools are important for criminal proceedings, both in current and archival cases. Generally, a lot has already been written about both databases and there is no need to go into the details of their functioning.²⁹ However, it should be mentioned that both AFIS and the DNA database are non-trial sources of information, but the effectiveness of identifying the perpetrators of crimes, including those of interest to X-Files, has been significantly increased thanks to them.³⁰

²⁸ Markowski Z, Wykorzystanie sonarów do wykrywania ofiar utonięć. *Electronic source: <http://www.escort.com.pl/hydroakustyka-specjalistyczna/82-sonary-skanujace-o-wysokiej-rozdzielczosci/236-wskazowki-eksploatacyjne>, accessed: 5.03.2018.*

²⁹ See for more details on this subject: Jurga A, Mondzelewski J, Funkcjonowanie bazy danych DNA w Polsce. *Problemy Kryminalistyki*, 2017, No. 297, p. 14; Kot E, Tomaszyci K, Funkcjonowanie automatycznego systemu identyfikacji daktyloskopijnej AFIS, [in:] Filipkowski W, Pływaczewski E.W, Rau Z (Eds), *Przestępczość w XXI wieku — zapobieganie i zwalczanie. Problemy technologiczno-informatyczne*. Warsaw 2015, p. 332 and following.

³⁰ Zubańska M, *op.cit.*, p. 164 and following.

Generally speaking, AFIS³¹ it is used to collect and search fingerprint images of hands and fingers taken from suspected offenders and unidentified fingerprint traces (N.N.) secured on crime sites for the purpose of rapid identification of a person.³² When analysing the evidence in the case file, the X Files officers, often with the assistance of experts from the police forensic laboratory, identify which traces are suitable for comparison with the records recorded in the database. Findings made on the basis of searches in the system are only information, but both positive (referred to as HIT) and negative results of the check in a specific way determine the planning of further activities within the framework of the conducted procedure. Obtaining a positive result of a check often becomes the starting point for determining (and consequently for arresting) a person who may be involved in the crime.³³

It is worth citing an example: in 1984, a woman was murdered in the municipality of Dobre Miasto. Her actions showed that her death was caused by injuries to her abdomen and chest, among others. The perpetrator could not be detected and the investigation was discontinued. Years later, police officers from the Olsztyn X-Files Unit returned to this matter. They had late-secure fingerprint traces. They checked the traces in the AFIS system and the search was successful. As a result, the investigator was able to identify a person associated with the crime. There has been a breakthrough in this matter. The officers directed further activities at the 47-year-old Tadeusz N. All the proceedings in which this man was involved were analysed. It turned out that he had already been punished for robbery, theft and participation in the fight. It was not a problem to determine where he was staying, Tadeusz N. he was serving a one-year prison term in the Investigation Arrest in Olsztyn for road traffic offences. During the interrogation, the man heard a charge and confessed that he had committed that crime. He was found guilty and was sentenced to 15 years' imprisonment. Thus, justice reached the perpetrator more than 25 years after the crime was committed.³⁴

An equally useful forensic tool is the DNA database. The Polish DNA data filing system was registered in the public register of personal data filing systems kept by GIODO on 23 April 2007. Its administrator is, within the meaning of the Act of 29 August 1997 on the Protection of Personal Data, the Chief Commander of the Police³⁵. The DNA database is located in the Department of Biology of the Central Forensic Laboratory of the Police and is maintained pursuant to Article 1 (1) 2 point 10 of the Police Act. The purpose of the system is to combine the profiles in the system with the track profiles secured during the inspection of the event sites, or to combine the track from different event sites. The tool also enables

³¹ Order No 27 of the National Police Chief of 31 July 2017 on the performance of tasks related to the maintenance of dactyloscopic data filing systems by the Police, (Dz. Urz. KGP z dnia 17 sierpnia 2017 r., poz. 52).

³² *Electronic source*: http://clk.policja.pl/clk/clkp/struktura/zaklad-daktyloskopii/65735,Ze_spol-CRD.html, accessed: 6.03.2018.

³³ Zubańska M, *op.cit.*, pp. 165–166.

³⁴ Kryczka K, Zabójstwo w Starym Dworze. *Policja 997*, 2017, Special Edition, Vol. 10–11, pp. 62–65.

³⁵ Jurga A, Mondzelewski J, Funkcjonowanie bazy danych DNA w Polsce. *Problemy Kryminalistyki*, 2017, No. 297, pp. 14–15.

the identification of bodies and unknown persons and supports the authorities carrying out search operations in cases of disappearance.

As has already been emphasised, forensic technology overcomes further barriers by continuing to improve methods for identifying people and objects; evidence that has been around for years can be re-examined. It is legitimate to state that after years the experts extract from the old traces the information potential inherent in them. Forensic inability is gradually being reduced. Genetic research is the best example. The development of DNA analysis methods makes it possible to conclude that genetic hegemony in forensics will not be interrupted quickly. As knowledge of the structure, organisation and functioning of the human genome grows, the methods of identifying biological material continue to improve³⁶. Recent years have brought about, *inter alia*, a significant increase in both the sensitivity of methods and their strength of discrimination by increasing the number of labelled systems³⁷. Currently, the experts have a set of various tools at their disposal, which are selected on a case-by-case basis. In addition to Short Tandem Repeat (STR) markers, SNP (Single Nucleotide Polymorphism) markers, mitochondrial DNA polymorphisms and even markers for predicting appearance traits and biogeographical origin are also being studied. In addition, research on RNA markers and DNA methylation analysis are ongoing³⁸. There can be no question of a stagnation in judicial genetics.

Material sources of evidence, called by Edmond Locard the silent witnesses of events, play a huge role in reaching the objective truth. Evidence from an expert's opinion in investigative and judicial cognition is often of key importance. The outcome of a forensic study, regardless of the progress made in the field of testing methods, is fundamentally influenced by the evidence (its quality, quantity and method of protection) which goes to the identification tests — this is a unique principle. The evidence must meet formal, procedural and technical-criminalistic requirements. There is no freedom with regard to the proper disclosure and protection of forensic evidence and objects on the scene of an incident, nor with regard to the proper storage and handling of that evidence at the various stages of the proceedings and after their conclusion³⁹. This is particularly important where the case has not (yet) been resolved. Educating forensic technicians, procedural decision-makers and experts in this field is essential. The offender always changes reality and the thing is to make the most of the information potential that lies in these changes. This includes the place

³⁶ Rogalska-Niżnik N, Analiza genomu człowieka technologiami nowej generacji — możliwości i ograniczenia aplikacyjne, [in:] Pływaczewski E.W, Filipkowski W, Rau Z (Eds), *Przestępczość w XXI wieku. Zapobieganie i zwalczanie. Problemy technologiczno-informacyjne*. Warsaw: Wolters Kluwer SA, 2015, p. 118 and following.

³⁷ Nawotka R, Możliwości identyfikacji na podstawie śladów kontaktowych uzyskanych na podstawie kryminalistycznych badań DNA, [in:] Kwiatkowska-Wójcikiewicz V, Zubańska M (Eds), *Współczesna kryminalistyka. Wyzwania i zagrożenia*. Szczytno, 2015, p. 151.

³⁸ Branicki W, Kupiec T, Ekspertyza genetyczna, [in:] Kała M, Wilk D, Wójcikiewicz J (Eds), *Ekspertyza sądowa. Zagadnienia wybrane*. Warsaw, 2017, pp. 230–259.

³⁹ Ordinance No. 10 of the Police Chief Commander of 7 May 2015 on the manner of handling research material and the manner of creating and conducting forensic collections in forensic laboratories of the Police, *Dz. Urz. KGP* of 8 May, 2015 r., item 30.

of the incident as well as the traces and objects discovered and protected during the examination. Over 30 years ago Cz. Grzeszyk stated that: "Since the quality of forensic examination, and in particular the quality, quantity and accuracy of the traces secured (...) often determine the further course and often the outcome of criminal proceedings. From position, size and the method of leaving traces, it is possible to draw many conclusions during forensic inspection of the place of the incident, which are useful for building procedural and forensic versions and planning further activities aimed at detecting and disclosing the perpetrator. Due to the free access to publications in the field of criminalistics, criminals improve their methods of operation (...). For these reasons, law enforcement authorities are under an obligation to constantly upgrade their technical and tactical detection methods to a higher level⁴⁰.

Logically speaking, if a perfect crime is excluded, the failure to detect the perpetrator is attributed to the mistakes made by the investigators and possibly also by the experts⁴¹. An incorrectly secured trace (or object) or an incorrectly prepared expert's report will not make it possible to determine the course of events in accordance with reality. Incorrect storage of traces of material evidence in warehouses, resulting in their degradation or loss, as well as taking evidence from the case file without information on the proceedings in which they are used, is one of the errors mentioned by investigators from previous years. Another mistake is the fact that different standards of biological expertise were used at the time, often combined with the destruction of traces during their examination by an expert, which now makes it impossible to apply new testing methods, including DNA tests⁴². For crimes of police interest to X-Files, the time limit is 1988 (crimes committed at that time are now on the verge of expiration). We must be aware that at the beginning of the 1990s, forensic technicians did not have sufficient knowledge of how to deal with biological traces, they did not know the requirements for securing such traces, and we should add that fulfilling them is crucial to the ability to carry out genetic identification tests. The quality and quantity of preserved traces, not only biological ones, could also have been negatively affected by the lack of due diligence of other members of the inspection teams. The issue of handling evidence, both at the stage of activities carried out on the spot, as well as at the subsequent stages of the proceedings, should be looked at from a perspective. In other words, protected traces and objects must be used in such a way that they can be used in the future (in a few or several years' time), if the need arises, because, for example, a given proceeding is discontinued due to the failure to detect the perpetrators, or due to the lack of data sufficiently justifying the suspicion that a crime has been committed. The boundaries of knowledge of reality are constantly widening. New research methods and techniques are emerging. If the current capabilities of forensic identification

⁴⁰ Grzeszyk Cz, *Taktyka wykorzystania wyników ekspertyz kryminalistycznych w postępowaniu karnym ze szczególnym uwzględnieniem ekspertyzy daktyloskopijnej*, [in:] Widacki J (Ed.), Katowice, 1984, p. 71. Problematyka etyczna w kryminalistyce. Materiały V Sympozjum Metodologii Kryminalistyki i Nauk Pokrewnych. Chęciny 14–16 June, 1984.

⁴¹ Gurgul J, *op. cit.*, p. 10.

⁴² Krytycznym okiem, czyli jakie błędy widzą policjanci, prowadząc postępowania sprzed lat. *Policja 997*, 2017, Special Edition, No. 10–11, p. 56.

methods or the resources of forensic databases are not sufficient, the information potential of secure material evidence may be used years later, at least for some traces, because the passage of time is not always an ally.⁴³

Summary

Procedural decision-makers should ensure that the objective of any criminal proceedings is achieved, i.e. that the perpetrator of the offence is identified and held criminally responsible. Each time the process of reaching the truth about an event is different and depends on many factors. In addition, investigators simply need to have an idea for a case. Every crime has its own logic. Undoubtedly, the harmonious combination of the laborious (Benedictine may say) investigative work of the Undetected Crimes Team with the use of the potential of available technologies, research methods, bridge knowledge resources, cooperation with forensic techniques, experts, prosecutors, as well as with representatives of technical and natural sciences makes that subsequent archival cases find a solution. It is also a proof that reading old records is not a waste of time. Some of the discontinued cases have been re-opened or re-investigated mainly on the basis of personal sources of evidence, but modern investigative tools and methods provide significant support to investigators at different stages of the investigation. The results of their application may significantly influence the direction of decisions made on the performance of specific activities. Without the use of forensic knowledge, it would be often difficult to reach the objective truth, especially after a dozen or so years since the crime was committed. This is because the offender must not be allowed to live in the belief that he or she will avoid punishment. The passing time may be reinforced by such a conviction, however, regular media reports and headlines on the front pages of newspapers, such as: The murderer from 16 years ago is responsible for his actions, and the trial for the murder from 23 years ago is going to start. The case was solved by police officers from X-Files, Let them be afraid... etc., it is a real vision of the inevitability of punishment.

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Streszczenie. Obowiązek ścigania sprawcy każdego przestępstwa przez cały okres jego karalności jest jednym z ustawowych zadań Policji. Wybitny kryminalista Hans Gross twierdził, że przestępstwo nie jest bytem abstrakcyjnym i teoretycznym oderwanym od rzeczywistości, ale stanowi realne społeczne zjawisko, które możliwe jest do zbadania i rozpoznania. Jednakże na archiwalnych półkach znajdują się akta niewykrytych przestępstw sprzed lat, które rzucają cień na policyjne statystyki i nigdy nie dają śledczym spokoju. Do tych niewykrytych przestępstw sprzed kilku, kilkunastu lub nawet kilkudziesięciu lat wracają funkcjonariusze z Zespołów ds. Przestępstw Niewykrytych (potocznie nazywanych policyjnym Archiwum X). Obecnie w strukturach każdej komendy wojewódzkiej Policji a także w Komendzie Głównej Policji działa taki zespół. Metody i środki, po które sięgają śledczy policyjnego Archiwum X determinuje specyfika konkretnej sprawy, po którą sięgają, jednakże w modelu ich postępowania znaczącą rolę — obok pracy operacyjnej czy analizy kryminalnej — odgrywa wiedza pomostowa. Rzeczowe źródła dowodowe odgrywają

ogromną rolę w dotarciu do prawdy obiektywnej, a dzięki metodom badawczym i narzędziom jakimi aktualnie dysponuje technika kryminalistyczna poszerzają się granice poznania rzeczywistości. Mimo upływu lat cel postępowania karnego zostaje osiągnięty, tj. sprawcy wielu przestępstw sprzed lat zostają wykryci i pociągnięci do odpowiedzialności karnej.

Резюме. Одной из законных обязанностей полиции является преследование виновного в совершении любого преступления в период, в котором он подвергается судебной ответственности. Известный криминалист Ганс Гросс утверждал, что преступление не является абстрактным и теоретическим, отстраненным от реальности. Преступление является действительным социальным явлением, которое можно исследовать и распознать. Однако, на полках архива находятся материалы нераскрытых уже несколько лет преступлений, которые бросают тень на статистику полиции и смущают следователей. Именно к этим, нераскрытым несколько, а даже несколько десятков лет возвращаются сотрудники Групп по нераскрытым преступлениям (которых на разговорном языке называют полицейским Архивом X). Сегодня в структурах всех введодских управлений полиции, а также в Главном управлении полиции существует такого вида группа. Методы и средства, которые применяют следователи полицейского Архива X тесно связаны со спецификой определенного дела, хотя в модели деятельности наряду с оперативной работой и криминализмом существенную роль играют знания в области криминалистики. Вещественные источники доказательств играют огромную роль в достижении объективной истины, и благодаря методам и инструментам исследований, которыми сегодня располагает криминалистическая техника расширяются пределы познания действительности. Несмотря на прошедшие годы, цель уголовного расследования достигнута, то есть многие преступники, совершившие несколько лет тому назад преступления обнаружены и привлечены к уголовной ответственности.

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