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# CRIMINOLOGICAL IDENTIFICATION OF PERPETRATORS IN SILESIA VOIVODESHIP IN THE PERIOD 2017-2021 ON THE EXAMPLE OF SELECTED DIRECT FORENSIC EVIDENCE

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## Abstract

Criminology and related methods of identification of perpetrators which are vital for the operations of investigative agencies, have become increasingly interesting for the general public. Criminology seems to be the fastest developing and the most intriguing discipline included in the criminal law. Extended scope of criminology which embraces a number of different disciplines spreads from psychology to information

technologies. Bearing in mind the above, it is necessary to obtain and update relevant information especially those related to the techniques of individual identification of persons. Acquiring information on identity of an alleged perpetrator is a difficult task. Fortunately, there is a number of solutions which make the task possible against all odds. One of such solutions is direct evidence. The literature on the subject defines direct evidence as a unique type of trace which leads to direct identification of a specific person and reveals their identity. Direct evidence includes dermatoscopic, biological and phonoscopic traces and documents. Organised character and possibilities offered by such traces make them an important evidence material which is often critical in deciding the guilt or innocence of a person. Therefore, direct forensic evidence is more than useful for investigators and other law enforcement officers.

### Key words

forensic identification, dactyloscopy, phonoscopy, forensic biology,  
examination of documents

## Introduction

Interpretation of the origins of criminology is largely dependent on how this term is understood<sup>1</sup> as it usually has two separate meanings which may be confusing<sup>2</sup>. Scientific publications stipulate that in the beginning the term criminology was used in relation to activities of the law enforcement aimed at identification and apprehension of the perpetrator. In this sense the term criminology goes back to the times when crime was born as a social phenomenon. With time, however, it became obvious that something more specific than this basic notion of criminology was needed. Hence, the more modern definition of criminology perceived as a fully scientific discipline.

Contemporary criminology originated in the late 19th century<sup>3</sup> and replaced its earlier predecessor that had existed since the dawn of crime<sup>4</sup>. *In the modern and more precise version criminology is a science, a consolidated system of constantly developed knowledge which uses specialised cognition methods thanks to which the relations between statements are subject to continuous verification*<sup>5</sup>. The end of 19<sup>th</sup> century was not only the moment of recognition of criminology

as a scientific field, it was then that the prominent book by H. Gross was first published. The book included the first outline and tasks of criminology which contributed to the modern understanding of the discipline<sup>6</sup>.

One of the most frequent terms occurring in literature devoted to criminology is forensic evidence<sup>7</sup>. Despite the fact that the term has been in use for years, there is no precise definition of this term and each attempt at regulating its meaning arises controversies. J. Sehn was deeply concerned with misconceptions related to the term and he said that the definition of the very term proves to be difficult and leads to heated discussions<sup>8</sup>.

In the proper science of criminology the term forensic evidence was first mentioned by H. Gross, who stipulated that *evidence is an imprint in susceptible material which is connected to a criminal deed*<sup>9</sup>. Another outlook on the term was provided by T. Hanausek. In his opinion evidence is a certain tangible result of changes whose structure constitutes an occurrence or is related to it<sup>10</sup>. Assuming such a definition one may conclude that forensic evidence makes the outcome of an activity with which it is closely tied starting from the cause all the way to the

<sup>1</sup> T. Hanausek, *Kryminalistyka. Zarys wykładu*, Warszawa 2009, p. 13.

<sup>2</sup> Ibidem, p. 13.

<sup>3</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach dowodzenia przestępstw*, Warszawa 2020, p. 21.

<sup>4</sup> J. Kasprzak, B. Młodziejowski, W. Kasprzak, *Kryminalistyka. Zarys systemu*, Warszawa 2015, p. 15.

<sup>5</sup> T. Hanausek, *Kryminalistyka. Zarys wykładu*, Warszawa 2005, p. 15.

<sup>6</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 21.

<sup>7</sup> W. Miś, *Ślady kryminalistyczne*, Piła 2007, p. 6.

<sup>8</sup> J. Kasprzak, B. Młodziejowski, W. Kasprzak, *Kryminalistyka...*, p. 54.

<sup>9</sup> W. Kędzierski, *Technika kryminalistyczna*, vol. 1, Szczytno 2007, p. 15.

<sup>10</sup> K. Sławik, *Kryminalistyka. Przegląd zagadnień*, Warszawa 2002, p. 53.

effect.<sup>11</sup> In his considerations Hanausek emphasizes yet another characteristic of evidence i.e. its tangibility which facilitates the process of handling it<sup>12</sup>. Even more general and more straightforward description of evidence was developed by J. Sehn<sup>13</sup>. He argues that forensic evidence is an integral and inseparable element of all occurring events<sup>14</sup>. Sehn's definition embraces evidence as *visible changes taking place in objective reality which result from an occurrence which is the subject of proceedings and which make it possible to reconstruct this occurrence*<sup>15</sup>. Alas, such description of the notion of evidence is not specific as it does not include circumstances which occurred right before the event.

Taking the above into account, it is only fair to talk about forensic evidence as a certain state of things which fulfills certain conditions. The first condition is that the evidence must be defined and revealed in the area where the investigative operations are taking place<sup>16</sup>. Next, it must correlate with the occurrence under scrutiny being either its aftermath or impacting its further development<sup>17</sup>. Evidence should also play its role in solving the case. The last important aspect is the recognisability of evidence, it can be revealed and secured<sup>18</sup>.

In scientific publications on criminology, one encounters not only various definitions of evidence but also different approaches to its classification. Moreover, systemization of evidence relies on a specific way of classification assumed by a particular author.

## Methodological and methodical assumptions

The aim of the paper is to present the process of identification of perpetrators on the example of selected forensic trace in the Silesian Voivodeship in the period 2017–2021. In order to present the issue in question it is necessary to provide the classification of forensic traces. The first division of traces is made in accordance with organisation of the matter.

The material evidence constitutes a change or the state of the matter which impacts the reality<sup>19</sup>. Due to its physical form the evidence may be divided into gases, liquids and solids<sup>20</sup>. As the evidence impacts the physical surroundings it can get reflected as cavity and surface evidence<sup>21</sup>. The first type of evidence occurs when the hardness of the ground is divergent<sup>22</sup>. When it comes to prints, there is a stratified type which becomes visible when transferred on

<sup>11</sup> Ibidem.

<sup>12</sup> T. Hanausek, *Kryminalistyka...*, p. 88.

<sup>13</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 34.

<sup>14</sup> J. Widacki, *Kryminalistyka*, vol.4, Warsaw 2018, p. 196.

<sup>15</sup> J. Kasprzak, B. Młodziejowski, W. Kasprzak, *Kryminalistyka...*, p. 56.

<sup>16</sup> D. Wilk, *Kryminalistyka przewodnik*, Toruń 2013, p. 39.

<sup>17</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 37.

<sup>18</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 35.

<sup>19</sup> J. Kasprzak, B. Młodziejowski, W. Brzęk et al., *Kryminalistyka*, Warszawa 2006, p. 53.

<sup>20</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 39.

<sup>21</sup> M. Kulicki, *Kryminalistyka. Wybrane zagadnienia teorii i praktyki śledczo-sądowej*, Toruń 1994, p. 247.

<sup>22</sup> K. Sławik, *Kryminalistyka...*, p. 54.

another element, or detached which occurs when the agent is taken away from the element<sup>23</sup>.

Transient evidence occurs in quite an unusual way, that is why it cannot be spotted with an unaided eye. Earlier, it belonged to the group of material evidence but due to its low tangibility it was assigned to another category<sup>24</sup>. The most frequent transient evidence are odours and thermal traces<sup>25</sup>.

Digital trails are all the data left in the IT space. On their basis investigators may prove there exists a connection between a person and a criminal deed<sup>26</sup>. Digital trails exist due to automation of everyday work where each activity performed on the Internet is saved in the cyberspace. Memory traces are certain residues of fragments of occurrences which took place in human life<sup>27</sup>. On their basis it is possible to reconstruct the sequence of events and identify persons involved. They are particularly useful during line-up activities.

Each revealed piece of evidence offers different potential for identification of the perpetrator therefore the science of criminology disposes of specific categorisation of traces with respect to identification. There are traces which allow direct identification, indirect identification,

group identification and individual identification. Direct identification points to the connection of a specific person to the particular piece of evidence. Such evidence may include traces of earlobes, teeth and tissues. Indirect identification will not result in pointing to a particular person but will determine a specific object or thing which was the source of the evidence. Here, the most common pieces of evidence come from tire treads or firearms. The group identification focuses on a group of persons with certain features such as gender or height<sup>28</sup>. The last type of identification helps to determine the characteristic features of a person or thing.<sup>29</sup>

One of the most important branches of criminology and the basis of direct identification is dactyloscopy. The word itself comes from Greek and is a merger of two lexical items *daktylos* – finger and *skopein* – look<sup>30</sup>. The term was used for the first time in 1893 and its scientific foundations were developed in the two final decades of the 19th century<sup>31</sup>. Advances in dactyloscopy were made thanks to studies of W. Herschel, H. Faulds and F. Galton<sup>32</sup>. Now dactyloscopy is considered to be one of the oldest branches of forensic techniques focused on the determination of identity based

<sup>23</sup> W. Miś, *Ślady kryminalistyczne...*, p. 7.

<sup>24</sup> J. Kasprzak, B. Młodziejowski, W. Kasprzak, *Kryminalistyka. Zarys systemu*, p. 56.

<sup>25</sup> J. Widacki, *Kryminalistyka...*, p. 197.

<sup>26</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 41.

<sup>27</sup> T. Hanausek, *Kryminalistyka...*, p. 76.

<sup>28</sup> M. Kulicki, *Kryminalistyka. Zagadnienia wybrane*, Toruń 1988, p. 15.

<sup>29</sup> K. Sławik, *Kryminalistyka w związkach z procesem karnym, kryminologią i wiktymologią*, Szczecin 2003, p. 120.

<sup>30</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stepka, *Kryminalistyka. Wybrane zagadnienia teorii i praktyki śledczej*, Toruń 2009, p. 376.

<sup>31</sup> J. Moszczyński, *Daktyloskopia*, Warszawa 1997, p. 12.

<sup>32</sup> J. Kasprzak, B. Młodziejowski, W. Brzęk et. al., *Kryminalistyka...*, p. 65.

on the skin structure of fingertips and soles of the feet<sup>33</sup>.

Fingerprints have specific features which is the pillar of dactyloscopic identification<sup>34</sup>. The first feature is their uniqueness which was proved in numerous studies and through many years of observations<sup>35</sup>. It is assumed that there are no two people in the whole world with the same pattern of lines which is an effect of connection of random fragments from which the skin is made<sup>36</sup>. Research shows that the possibility of two identical fingerprint patterns will only occur if the global population reaches 64 billion<sup>37</sup>. Taking the above into account, the fingerprint pattern remains one of the most critical features that enables identification of the perpetrator.

Processes that occur in the germinal layer of the cuticle provide continuous supplementation of exfoliated cells and assure durability of epidermal ridges<sup>38</sup>. When the cuticle is damaged through skinning or injury, it does not impact whatsoever the lines of the fingerprint pattern, and the cuticle is regenerated in no time at all<sup>39</sup>.

The structure of fingerprints which is formed in the prenatal phase remains unchanged over the whole cycle of human life.<sup>40</sup> In the puberty period when the body mass is increased, the size of fingerprints becomes larger but their general appearance and composition remain the same<sup>41</sup>. The only time when the fingerprints are dissipated comes after death when the body is decomposed<sup>42</sup>.

The processes occurring in human body trigger the formation of characteristic patterns on the external layer of fingertips. It was observed that the patterns differed considerably from one human being to another and the specificity and diversity of the patterns became interesting for many people. In 1823 first studies on the topic were published and a proposed set of patterns was presented<sup>43</sup>.

Loop patterns are the most frequent and account for as much as 64% of all patterns<sup>44</sup>. They are the only type with one delta and they have at least one decently built loop with a round head<sup>45</sup>. The foundation of the core construction are fingerprints which take the form of loops<sup>46</sup>.

<sup>33</sup> G. Kędzierska, *Współczesna daktyloskopia*, „Problemy Współczesnej Kryminalistyki” 2000, vol. 3, p. 164.

<sup>34</sup> B. Sygít, *Dorobek nauki w badaniach nad ustrojem człowieka wykorzystywany w praktyce śledczej i sądowno-lekarskiej*, „Problemy Współczesnej Kryminalistyki” 2003, vol. 7, p. 68.

<sup>35</sup> J. Moszczyński, *Daktyloskopia*..., p. 21.

<sup>36</sup> Cz. Grzeszyk, *Daktyloskopia*, Warszawa 1992, p. 35.

<sup>37</sup> W. Kędzierski, *Technika kryminalistyczna*, vol.2, Szczytno 1994, p. 176.

<sup>38</sup> J. Kasprzak, B. Młodziejowski, W. Brzęk i in., *Kryminalistyka*, p. 67.

<sup>39</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach*..., pp. 325–326.

<sup>40</sup> K. Sławik, *Kryminalistyka*..., p. 100.

<sup>41</sup> J. Widacki, *Kryminalistyka*..., pp. 234–235.

<sup>42</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stępka, *Kryminalistyka. Wybrane zagadnienia teorii i praktyki*..., p. 377.

<sup>43</sup> K. Sławik, *Kryminalistyka*..., p. 101.

<sup>44</sup> J. Moszczyński, *Daktyloskopia*..., p. 34.

<sup>45</sup> B. Hołyst, *Kryminalistyka*, Warszawa 2018, p. 389.

<sup>46</sup> D. Wilk, *Kryminalistyka*..., p. 199

Arch patterns account for 6% of all fingerprints so they are not very common<sup>47</sup>. They have no delta nor core and their structure is quite straightforward<sup>48</sup>. Their characteristic feature in fingerprints are arches which rise in the central part of the pattern<sup>49</sup>.

Whorls are quite characteristic and make up to 30% of the remaining patterns<sup>50</sup>. They may have different layout as their structure consists mainly of circles, ellipses and spirals<sup>51</sup> and there usually are minimum two deltas.

Epidermal ridges, apart from the patterns presented above, also feature elements called minutiae<sup>52</sup>. Formation of minutiae happens through different configurations of continuous lines which connect with one another creating various bifurcations. Minutiae are of different sizes and their beginnings and ends occur randomly<sup>53</sup>.

Apart from the layout of fingerprints and the features of the patterns, criminology also takes into account other elements that enable identification of a person. One of them are pores which are of uneven shape thanks to which they may constitute auxiliary material in an attempt to identify the perpetrator<sup>54</sup>. Yet another example are the edges of

fingerprints which due to their unusual structure are frequently used by the law enforcement<sup>55</sup>. Identification possibilities are also offered by the friction ridges structure of the skin without any visible patterns<sup>56</sup> which can be found on selected parts of human face and palms.

Direct identification of the perpetrator is also possible thanks to forensic biology which focuses on widely understood biological material coming from humans, animals and plants. In forensic science such material is called biological evidence and the most frequent examples are blood stains, hairs or sperm<sup>57</sup>. Examination of biological material concentrates mainly on determination of the source of the evidence which will lead to the identification of a specific individual<sup>58</sup>.

The origins of forensic biology are linked to a number of events which are important to the whole science of criminology. The first was the discovery of ABO blood groups made by K. Landsteiner in the beginning of the 20<sup>th</sup> century<sup>59</sup>. This unusual discovery laid foundations for further serologic studies and gave rise to conducting group identification studies. The next milestone in shaping the science

<sup>47</sup> J. Widacki, *Kryminalistyka...*, p. 237.

<sup>48</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 179.

<sup>49</sup> *Ibidem*.

<sup>50</sup> Cz. Grzeszyk, K. Sławik, *Przestępczość a kryminalistyka*, Warszawa 1985, p. 94.

<sup>51</sup> J. Moszczyński, *Daktyloskopia...*, pp. 39–40.

<sup>52</sup> K. Sławik, *Kryminalistyka...*, p. 102.

<sup>53</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 185.

<sup>54</sup> M. Kulicki, *Kryminalistyka. Wybrane zagadnienia teorii i praktyki...*, p. 264.

<sup>55</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 175.

<sup>56</sup> K. Sławik, *Kryminalistyka w związkach z procesem karnym...*, p. 129.

<sup>57</sup> Cz. Grzeszyk, K. Sławik, *Przestępczość a kryminalistyka...*, p. 150.

<sup>58</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stępka, *Kryminalistyka. Wybrane zagadnienia teorii i praktyki...*, p. 414.

<sup>59</sup> J.A. Berent, J. Czarny, M. Woźniak et. al., *Statystyczna ocena wyników badań DNA w identyfikacji śladów biologicznych*, „Problemy Współczesnej Kryminalistyki” 2000, vol. 3, p. 29.

of forensic biology was in 1953 when J. Watson and F. Crick published their theory that DNA molecule is shaped like a double helix.<sup>60</sup> This discovery triggered further studies as the result of which A. Jeffreys discovered that a given feature may have two or more variants. He developed a method called DNA fingerprinting<sup>61</sup>. A few years later came the last phase which was the crowning of all previous studies. It was the PCR technique<sup>62</sup>. It is worth adding that numerous research and analyses proved unlimited possibilities of application of genetic tests which already constitute a considerable competition for classic dactyloscopic identification.

The science of criminology divides biological evidence into bodily fluids, excretions and tissue related evidence<sup>63</sup>. It goes without saying that blood is the most frequent material found on the crime scene. Blood is a liquid tissue which consists of plasma and blood cells floating in it<sup>64</sup>. Plasma contains proteins and organic and non-organic compounds which are responsible for proper realization of life processes<sup>65</sup>. Currently, plasma is considered to be the most valuable material for biological identification. The next tissue related trace is

skin whose main function is to protect the human body<sup>66</sup>. Skin is composed of three layers which perform a number of different functions. According to criminologists, the most useful for identification of the perpetrator are fingerprints. The fingerprints are left during interaction with an object which receives the sebaceous and sweat secretions which contain the cells mentioned above. Hairs, on the other hand, are built of smooth and filamentous fibers and grow from a root and a hair bulb which are placed beneath the skin, the visible fragment of hair growing outwards is called hair shaft<sup>67</sup>. Due to the fact that the largest amount of hair can be found on the head and there is a natural and automatic process of hair loss, hair specimen are a frequent biological material encountered on the crime scene. The literature on the topic also mentions nail and claw traces. The nails are equipped with keratin plates which are supposed to protect the fingertips<sup>68</sup>. The structure of claws is similar but unlike nails, claws are sharply edged. In criminology the highest evidential value is offered by nails which were broken off or cut off<sup>69</sup>. The last category of evidence are teeth which consist of two key elements i.e. the crown of the

<sup>60</sup> I. Surożyńska-Godzina, *Kryminalistyczne fenotypowanie DNA – możliwości, ograniczenia oraz stan prawny*, „Problemy Współczesnej Kryminalistyki” 2017, vol. 21, p. 208.

<sup>61</sup> T. Hanausek, *Kryminalistyka. Poradnik detektywa*, Katowice 1993, p. 136.

<sup>62</sup> J. Moszczyński, *Identyfikacja genetyczna – złoty standard czy złoty wyjątek?*, „Problemy Współczesnej Kryminalistyki” 2014, vol. 18, p. 59.

<sup>63</sup> D. Wilk, *Kryminalistyka...*, p. 217.

<sup>64</sup> W. Kędziński, *Technika kryminalistyczna...*, p. 219.

<sup>65</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 392.

<sup>66</sup> B. Sygit, *Dorobek nauki w badaniach nad...*, p. 67.

<sup>67</sup> W. Kędziński, *Technika kryminalistyczna...*, p. 224.

<sup>68</sup> M. Goc, J. Moszczyński, *Ślady kryminalistyczne. Ujawnianie, zabezpieczanie, wykorzystanie*, Warszawa 2007, p. 133.

<sup>69</sup> *Ibidem*, p. 134.



tooth and the root<sup>70</sup>. The investigative practice puts a heavy emphasis on the evidence material such as jaw or just an individual tooth because it is sufficient to determine the identity of a person.<sup>71</sup>

Another type of biological evidence are discharges or bodily fluids made in the human body. They are crucial for proper functioning of the organism and perform a number of important functions. The most common fluids are saliva, sweat, tears, semen, mucus and sebum<sup>72</sup>. Saliva is produced by three pairs of salivary glands located in the oral cavity<sup>73</sup>. Mostly made of water, saliva has a form of transparent fluid<sup>74</sup>. Because saliva often contains exfoliated epithelial cells, it is perfect for DNA analysis<sup>75</sup>. The next fluid, semen consists of water, plasma, mucus, spermatozoon and other essential nutrients<sup>76</sup>. Semen is rich in DNA material and can be used for genetic identification. Similarly, vaginal fluids which contain enzymes and exfoliated cells from vagina and uterus give solid grounds for identification proceedings<sup>77</sup>.

Excretions is the last group of biological evidence with the lowest identification value but they are sometimes used by investigators. Excretions is a waste

matter which is eliminated by the organism because it is no longer needed<sup>78</sup> such as urine, stool and vomit thanks to which it is possible to determine the gastric contents<sup>79</sup>.

Identification analysis may also be conducted on the basis of plant tissues which may be secured as a whole or in part. In most cases such analysis is undertaken in order to determine whether the place of origin of the plant which was found on the clothing or the body of the victim coincides with the place where the body was found<sup>80</sup>. Sometimes investigators decide to examine the eggs of insects in order to determine the time of death of a person<sup>81</sup>.

Individual identification of a person can also be conducted on the basis of all kinds of documents which often-times constitute indisputable evidence material. As relevant literature indicates, the term 'document' can have multiple meanings depending on the context. Legal language will use the term differently than the language of science or vernacular<sup>82</sup>. If one takes into consideration the dictionary definition, the term 'document' may be understood as a material item which offers proof that a

<sup>70</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 392.

<sup>71</sup> B. Sygit, *Dorobek nauki w badaniach nad...*, p. 97.

<sup>72</sup> K. Sławik, *Kryminalistyka...*, p. 132.

<sup>73</sup> B. Sygit, *Dorobek nauki w badaniach nad...*, pp. 115–116.

<sup>74</sup> B. Hołyst, *Kryminalistyka...* p. 495.

<sup>75</sup> Ibidem.

<sup>76</sup> B. Sygit, *Dorobek nauki w badaniach nad...*, p. 117.

<sup>77</sup> M. Goc, J. Moszczyński, *Ślady kryminalistyczne. Ujawnianie, zabezpieczanie...*, p. 143.

<sup>78</sup> B. Hołyst, *Kryminalistyka...*, p. 494.

<sup>79</sup> V. Kwiatkowska-Wójcikiewicz, *Kryminalistyka dla prawa – prawo dla kryminalistyki*, Toruń 2010, p. 64.

<sup>80</sup> M. Goc, J. Moszczyński, *Ślady kryminalistyczne. Ujawnianie, zabezpieczanie...*, pp. 144–145.

<sup>81</sup> A. Domasat, *Entomologia sądowa – próba weryfikacji dotychczasowych założeń*, [in:] *Problemy Współczesnej Kryminalistyki*, (ed.) E. Gruza, T. Tomaszewski, M. Goc, Warszawa 2019, vol. 23, p. 83.

<sup>82</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 443.

given hypothesis is correct<sup>83</sup>. From the point of view of criminology, however, a document is 'any record imprinted or written down on any surface'<sup>84</sup>.

As stipulated in scientific publications, documents may have a written form or any other form of annotation<sup>85</sup>. When it comes to recording techniques, there are written documents, phonic and computer documents as well as photographs<sup>86</sup>. Written documents may be further divided into handwritten, typed, printed and combined<sup>87</sup>.

In the investigative practice documents are treated as forensic evidence which may come individually but also as a carrier of other imprints<sup>88</sup>. Thanks to specific character of documents and their identification possibilities, they play an important role in the science of criminology. Documents may be objects of a crime or a tool in committing a crime on one hand, and important evidence in a case on the other<sup>89</sup>. In many situations documents allow for identification of the individual who was the author of the document.

Criminology differentiates between two kinds of crime related to documents i.e. modification and forgery<sup>90</sup>.

Modification is closely related to introducing changes and corrections to the original document, forgery occurs when a document is noncompliant with the legal regulations in force<sup>91</sup>. Another important crime here is intellectual forgery which is endorsement of false information<sup>92</sup>.

Forensic examination of documents has a multifaceted scope. The most important kinds of studies are handwriting analysis and the analysis of other records. Handwriting analysis helps to detect a person based on their writing characteristics, other analyses focus on group and individual identification of typewriters, printing equipment and punches<sup>93</sup>. In many cases such analyses are able to determine the age of the document and its genuineness<sup>94</sup>. The analysis of type writing for identification purposes is also multidimensional<sup>95</sup> however, due to the advances in technology the number of this particular type of expertise is falling down. Still, the findings of type writing are sometimes used for identification of persons<sup>96</sup> because a large amount of forensic analyses is written on typewriters. Relevant literature suggests that the main purposes

<sup>83</sup> W. Kędzierski, *Technika kryminalistyczna...*, p. 255.

<sup>84</sup> M. Goc, *Dokumenty we współczesnym prawie*, „Problemy Współczesnej Kryminalistyki” 2009, vol. 13, p. 255.

<sup>85</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stęпка, *Kryminalistyka...*, p. 599.

<sup>86</sup> *Ibidem*, p. 600.

<sup>87</sup> A. Bierć, *Zarys Prawa Prywatnego*, vol. 3, Warszawa 2018, p. 663.

<sup>88</sup> D. Wilk, *Kryminalistyka...*, p. 261.

<sup>89</sup> J. Dzida, *Klasyfikowanie pisma ręcznego według jego typu*, Poznań 2021, p. 11.

<sup>90</sup> M. Goc, J. Moszczyński, *Ślady kryminalistyczne. Ujawnianie, zabezpieczanie...*, p. 251.

<sup>91</sup> J. Kasprzak, B. Młodziejowski, W. Kasprzak, *Kryminalistyka. Zarys systemu...*, p. 143.

<sup>92</sup> A. Nastula, *Falszerstwo dokumentów ze szczególnym uwzględnieniem przestępczości internetowej jako wyzwanie dla organów państwa*, „Polonia Journal” 2018, no 8, pp. 78–79.

<sup>93</sup> M. Goc, J. Moszczyński, *Ślady kryminalistyczne. Ujawnianie, zabezpieczanie...*, p. 252.

<sup>94</sup> *Ibidem*.

<sup>95</sup> T. Hanausek, *Kryminalistyka. Poradnik detektywa...*, p. 129.

<sup>96</sup> L. Koźmiński, *Dokument jako ślad kryminalistyczny – wybrane aspekty*, Piła 2010, p. 47.

of such studies is group and individual identification of the typewriter<sup>97</sup>.

Identification of the author of a given typed record is a considerable challenge. According to investigators, one feature which helps to narrow down a group of suspects are widely understood characteristics of writing<sup>98</sup>. In order to single out the actual author of a text it is necessary to study the position of writing against the remaining content, the number of errors and the frequency of certain words<sup>99</sup>.

Criminology related literature also talks about the analysis of printed documents from a computer which gradually replaces the analysis of documents written on a typewriter. Printing devices are increasingly used for forgery purposes. The analysis here concentrates mainly on examination of printing equipment and determination of compatibility of printouts<sup>100</sup>.

Another frequently conducted study in forensics is the analysis of chronology of records commonly referred to as determination of the sequence of crossing lines. Its main aim is to determine the time concordance between the actual record and its manual filling as well as the true order of application of subsequent layers on the document<sup>101</sup>. Thanks to high tech software it is possible to observe objects in 3D technology and

to reconstruct the order of subsequent layers<sup>102</sup>.

Bearing in mind the security of the state and its institutions, the legislator has foreseen relevant legal regulations related to falsification of materials. There are acts and resolutions which among others include provisions on protection of public documents. Therefore, should doubt arise over the authenticity of a document, the technical expertise is conducted. Mostly the expertise involves the analysis of physical and chemical features of the background of the document and covering agents used to make the record<sup>103</sup>. Depending on the nature and form of a given document an appropriate security measure is applied. As stipulated in the Public Documents Act, there are three categories of these materials and each category has a specific kind of protection<sup>104</sup>. The most frequent paper security techniques are watermarks, guilloche background and protecting fibres<sup>105</sup>.

## Identification of perpetrators in silesian voivodship in the period 2017-2021

Methods and techniques used by criminal offenders are subject to constant change. The rise of innovative methods of perpetrating criminal acts, as well

<sup>97</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stęпка, *Kryminalistyka...*, pp. 607–608.

<sup>98</sup> K. Sławik, *Kryminalistyka...*, pp. 117–118.

<sup>99</sup> T. Hanausek, *Kryminalistyka. Zarys wykładu...*, p. 174.

<sup>100</sup> M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stęпка, *Kryminalistyka...*, p. 609.

<sup>101</sup> M. Goc, M. Miron, *Badanie wieku względnego dokumentów. Metody badań kolejności zapisów wykonanych różnymi technikami na podłożu papierowym – zagadnienia ogólne*, „Problemy Kryminalistyki” 2014, no 284, p. 2.

<sup>102</sup> E. Gruza, M. Goc, J. Moszczyński, *Kryminalistyka czyli o współczesnych metodach...*, p. 467.

<sup>103</sup> W. Kędziński, *Technika kryminalistyczna...*, pp. 259–260.

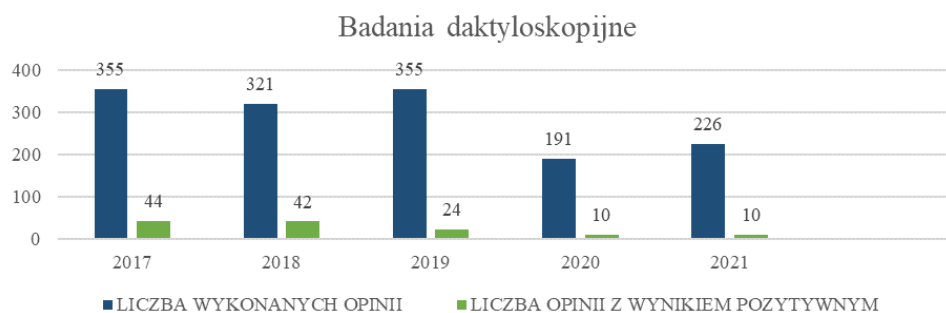
<sup>104</sup> M. Małowiecka, *Dokumenty publiczne*, Warszawa 2019, pp. 7–8.

<sup>105</sup> W. Miś, *Kryminalistyka...*, p. 39.

as increase of social awareness about the increased identifiability of crimes, has contributed to a significant deterioration in the accuracy of some forensic analyses. The differences in the quantity of analyses carried out in a given year and the data on positive expert reviews are presented in the charts

below. An analysis of five groups has been compiled based on the data obtained from the Forensic Laboratory of the Katowice Provincial Police Station. Among the first to be covered are dactyloscopic tests (*fingerprint tests*), which once formed the backbone of personal identification.

**Chart 1. Dactyloscopic tests.**



[blue – the number of tests, green – the number of opinions with positive results]

Source: Data acquired from the Regional Police Headquarters in Katowice.

For many years, dactyloscopic examinations constituted the core of forensic examinations and criminal analyses that were performed. Their efficiency remained unchanged for a long time. However, the efficiency of these examinations has declined significantly with the rise in criminals' awareness. Considering the chart above, one can conclude that in the first two years the number of positive expert tests relative to the number of prints secured remained at a similar level, at about 13%. The scope of the total number of reviews performed in 2019 is very similar to previous years, although in this case the percentage of positive expert results is at 6.8%. Following years exhibit a downward trend, where in 2020 the number

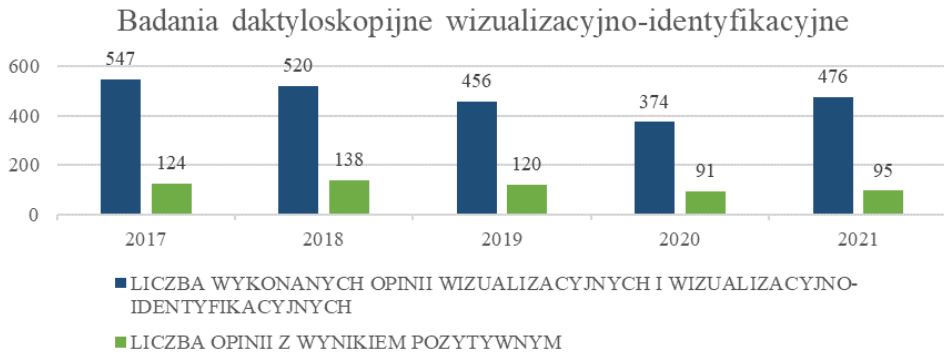
of positive reports in relation to the total number of expert evaluations falls within the range of 5.2%, while in 2021 it accounts for only 4.4%. Considering the aforementioned data, one can conclude that the amount of dactyloscopic prints that are secured remains scarce, while the percentage of positive expert reports decreases annually, reducing the detectability and identification capabilities of criminal offenders.

Criminology distinguishes yet another study that inseparably involves the skin slate prints, namely, visualization-identification dactyloscopic analysis. To perform this kind of analysis, it is essential to acquire objects from the scene of the incident on which there may be potential traces. An

examination of the total tests conducted as well as those with positive results in 2017-2021 is provided further below.

As indicated by the subject of the work, only the Silesian Voivodeship has been taken into consideration.

**Chart 2. Visualization-identification dactyloscopic tests.**



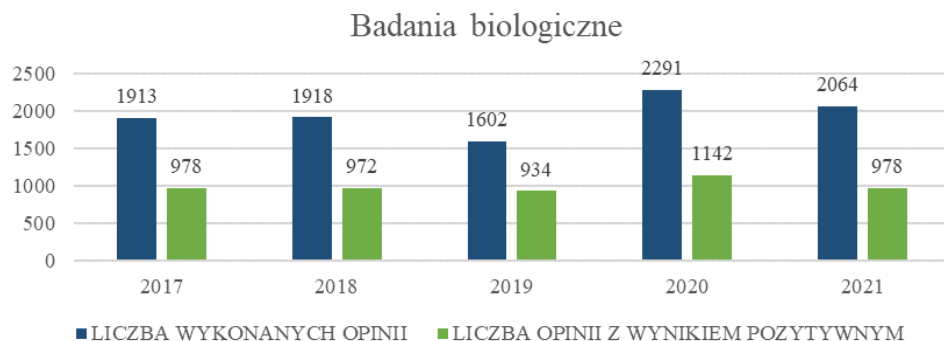
[blue – the number of visualization-identification tests, green – the number of opinions with positive results]

Source: Data acquired from the Regional Police Headquarters in Katowice.

Drawing from the preceding evidence, one can notice a decline in the quantity of reviews performed, a trend that took place during the first four years. Not until 2021 a slight upturn can be observed, however it is not that high relative to the preceding years. Despite the considerable quantity of evaluations performed in 2017, its efficiency stands at a meager 22.7%. The improvement in effectiveness can be observed as late as 2018, where, despite the decline in the number of performed reviews, it amounted to 26.5%. Similar findings may be observed during 2019, as the number of positive reviews relative to their total maintained at 26.3% as well as in 2020, being 24.3%. In terms of efficiency, the year 2021 was the least

productive, with the percentage of positive reviews being only a mere 20%. The main reason behind these poor results is the declining amount of objects seized and sent to the lab for fingerprint trace visualization, so that not only the volume of reviews conducted decreases, but so does their quality.

Biological tests, which have become particularly notable over time, will be covered next. The underlying factor behind the significant shift in the results obtained, was that the methods and techniques for securing oneself from leaving such traces at the scene were not fully known. Nowadays, their efficiency is continuing to improve, thereby enabling the direct identification of individuals.

**Chart 3. Biological tests.**

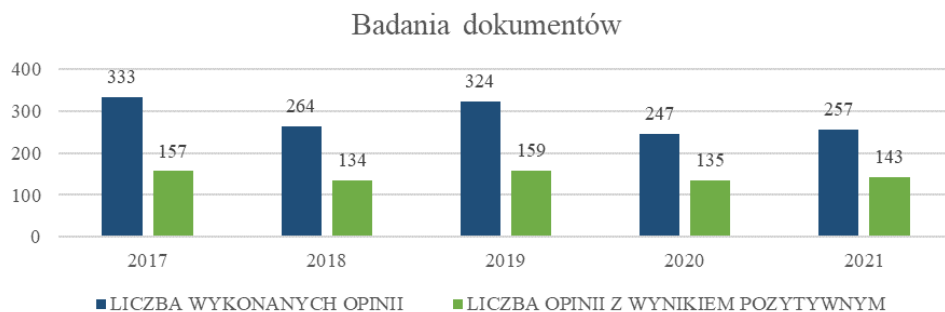
[blue – the number of tests, green – the number of opinions with positive results]

Source: Data acquired from the Regional Police Headquarters in Katowice.

The data contained in the chart above indicates that the amount of evidence secured during the first two years is very similar to each other, with the percentage of positive assessments reaching 51% in both cases. A slight drop in the number of assessments performed occurs in 2019, however, their compliance in this instance stands at 58.3%, yielding considerably better results compared to past years. While there was a significant amount of reviews performed in 2020, their overall quality fell short at 49.8%. By far the weakest in terms of performance was 2021, with the number of positive reviews

compared to the total, which was a mere 47.4%. Given these facts, it can thus be assumed the biological testing is in constant flux, thereby making up a substantial part of the reviews performed.

Also relevant and valuable for forensic science is the examination of documents, an essential element of investigative work. Their analysis is most often prompted following the suspicion that a certain material or record has been tampered with. The following chart demonstrates the total number of reviews and their effectiveness for the identification of a person.

**Chart 4. Examinations of documents.**

[blue – the number of performed examinations, green – the number of opinions with positive results]

Source: Data acquired from the Regional Police Headquarters in Katowice.

Information presented in the chart clearly indicates that 2017 was the qualitatively weakest year, in which, despite the considerable amount of reviews carried out, their effectiveness amounted to a mere 47.1%. A similar finding can be found in 2019, when the proportion of positive reviews ranged up to 49.1%. As can be noted from the aforementioned material, the rapid decline in the evidence secured, which occurred in 2018, had no negative impact upon the effectiveness of reviews. Their findings during this period were contained at a fairly high level amounting to 50.8%. In contrast, the best outcomes have been achieved during the last two years, with the percentage of positive reviews rising to 55.1% despite the small amount of reviews performed.

## Conclusions

Year on year the number of conducted forensic examinations in dactyloscopy is falling down which is caused by the smaller number of fingertip imprints

found on the crime scenes. In the period under examination also the number of visualisation-identification tests is on the decrease as well as the number of objects with identifiable fingerprints which would point to the perpetrator. On the other hand, the number of biological tests is on the increase what is connected with the number of traces secured on the crime scene, technological advances, individualisation of biological tests and the preferences of the judiciary. Biological traces point directly to the person who committed the crime and for the court biological evidence is of much greater value than all other kinds of forensic evidence. The number of biological examinations is also impacted by the continuously growing base of DNA profiles of perpetrators and profiles isolated from secured forensic traces which are then registered in the database. When it comes to documents, the number of conducted examinations in this area remains rather stable which is also true for the number of positive opinions issued in this respect.

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