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## Problems of Forensic Handwriting Examination in the Analysis of Signatures and Short Notes

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■ **Abstract.** The widespread introduction of the latest means of printing and copying, new materials of writing, the use of advanced technologies for performing individual details of various documents has led to an increase in the role of forensic handwriting analysis and technical and forensic examination of documents in the disclosure and investigation of criminal offences, which are now one of the most complex types of forensic expertise. During the investigation of criminal offences, identification studies, which establish the presence or absence of identity, are of the greatest evidentiary importance. However, recently, short handwritten notes and signatures have become increasingly the objects of forensic research, which are often performed using technical means and tools. This causes considerable difficulties for knowledgeable people in solving investigation problems and their combination. Such tasks often remain either unresolved, or insufficiently substantiated conclusions are drawn from the findings. The purpose of the study is a detailed scientific analysis of the problem of investigating documents that exist at the present stage and relate both to this branch of forensic technology in general, and some individual aspects of forensic handwriting research and technical and forensic research of documents, and, based on this, the development of ways to improve the implementation of the mentioned investigations. In accordance with the goal and specifics of the subject matter, a number of methods are used, including: dialectical, formal and logical, system and structural, dogmatic and other methods of scientific knowledge. The essence of such categories as “signature” and “short notes” is clarified; attention is focused on the need to establish the method of execution (type of writing device) or the fact of the presence or absence of signs of forgery when conducting expert studies of signatures and short notes. The need to train handwriting experts in order to train complex specialists, in particular in the field of technical and forensic research of documents, computer technologies that can comprehensively examine documents and handwriting objects made in a variety of ways is emphasised. Prospects are defined in: further development of methods that allow for forensic research of signatures and short notes made using technical means and tools; development of parameters for solving identification, diagnostic, classification, and situational problems in terms of the quality and volume of the handwriting object and features of making technical changes to it

■ **Keywords:** graphology; forensic examination of documents; expert examination; low-volume handwriting objects; technical forgery of documents

### ■ Introduction

Forensic handwriting expertise is one of the most common and important forensic studies. Its objects – handwritten texts, short notes, and signatures – are widely represented in public life and are of great

importance in the implementation of legal proceedings and other law enforcement activities. Forensic research of such uninformative handwriting objects as signatures and short notes in the investigation of criminal offences is aimed at establishing the objective side of crimes, the circumstances that are included in the evidence. The method of forgery established with the help of special knowledge of the expert, making changes to the handwriting object in the process of further proof is interpreted by the pre-trial investigation body, the court based on legal knowledge as a method of material forgery of the document, or its individual details.

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Questions of studying properties of low volume handwriting objects, determining the possibilities of solving identification, diagnostic, and other tasks during their forensic research were the subject of attention of some Ukrainian [1-3] and foreign forensic graphologists [4-6]. A significant contribution to the forensic study of documents was made by N. Terziev, who in his works in the middle of the 20<sup>th</sup> century for the first time identified two parts in the forensic study of documents: 1) handwriting expertise; 2) technical expertise of documents [7]. Modern studies devoted to this problem should include the works of V. Biriukova, V. Kovalenko, T. Biriukova and K. Kovalov ("Forensic documentation") [3], E. Simakova-Yefremian ("On the criteria for evaluating methods of forensic examinations in Ukraine") [2], G. Kutskir ("Modern methods of technical forgery of signatures using technical means" [8], M. Hryha ("Forensic examination of signatures made using technique" [1].

At the same time, it has to be stated that methodical foundations of forensic handwriting expertise were developed in the second half of the 20<sup>th</sup> century, when the texts of documents were written by hand. Over time, both the methods of committing offences and the theoretical foundations of this expertise were improved, which tried to keep up with the times. Paying tribute to the theoretical and practical significance of previous studies on this issue, it is worth recognising the insufficient number of papers devoted to clarifying the organisational and technical aspects of forensic research of signatures and short notes made using technical means and tools. There is a need for the further theoretical and scientific study of the chosen problem, considering and developing existing scientific achievements, to practically use the identified potential opportunities. After all, in the 21<sup>st</sup> century, the development of forensic research of documents is associated with the greatest technological progress in the field of printing and office equipment.

In particular, one of the problems of modern research of low-volume handwriting objects is that when conducting them, sufficient attention is not paid to establishing the fact of the presence or absence of signs of technical forgery, due to the fact that the expert does not have the competence to establish such circumstances. It also requires solving the issue of clearly delineating the competence of experts in the study of signatures, mainly in relation to documents with technical forgery in the framework of forensic examination of documents. These circumstances actualise the expediency of scientific and practical analysis of the identified problem.

*The purpose of the study* is a detailed scientific analysis of the problem of forensic handwriting expertise in the analysis of signatures and short entries and, based on this, the development of ways to improve the implementation of expertise. To achieve this goal,

it is necessary to solve the following tasks: to find out the essence and content of signatures and short notes as objects of expert handwriting research; to determine the theoretical and applied and organisational problems of forensic handwriting research of documents; to suggest ways to optimise the conduct of forensic handwriting expertise.

## ■ Materials and Methods

The complex application of methods and techniques which form the methodological basis of this study allowed considering the problems of analysis of signatures and short entries made using technical means in the unity of their social content and legal form. The main research method is *dialectical*, with the help of laws and categories of which the essence of forensic research of signatures and short notes made using technical means and tools is determined. The use of general scientific and special methods allowed considering the features of the object and subject of this study. In particular, the application of the dogmatic method contributed to the clarification of the content of such forensic categories as "signature", "short note"; with the help of the system and structural method, the main tasks of forensic handwriting expertise are determined during the analysis of signatures and short notes, the main problems that arise are highlighted. The formal and logical method contributed to determining the content of scientific categories and concepts that are considered; the use of the sociological method confirmed individual scientific conclusions based on the results of empirical research.

The theoretical basis of the study is made up of scientific and applied results of fundamental research of Ukrainian and foreign graphologists, whose focus was to determine the possibilities of solving identification, diagnostic, and other tasks during handwriting research of low-volume handwriting objects. The empirical basis of the study consists of materials of criminal proceedings and the results of a survey of 132 handwriting experts of the State Research Expert Centre of the Ministry of Internal Affairs, Dnipropetrovsk, Poltava, Ternopil Research Expert-Criminalistics Centre, Kyiv Scientific Research Institute of Forensic Expertise of the Ministry of Justice of Ukraine (2019-2022) on the problems of applying special knowledge in the study of signatures and short notes, namely: features of low-volume objects of forensic handwriting examinations; methods of conducting these handwriting studies; opportunities for using knowledge and methods of a number of sciences in the study of complex objects, etc.

## ■ Results and Discussion

The history of falsification of documents for illegal purposes accompanies the entire history of mankind,

as evidenced by the evolution of methods of documenting information and related methods of forgery. The relationship between these two phenomena became the basis for the development of tools and methods for studying documents and finding facts of falsification. Characteristic of the modern period is that the production of forged documents has become one of the branches of criminal fishing, often carried out in a group, in particular, organised, which is associated with the “specialisation” of criminals, the emergence of skills in forging signatures, reproduced with the help of high-tech tools and performed at a fairly high level [8, p. 354]. Criminals learned to imitate the pressure characteristics of handwriting objects [3, p. 182], which led to the emergence of new difficulties in practice conditioned by the lack of appropriate methods for conducting handwriting analysis under such circumstances.

Finding out the authenticity of the search objects submitted for examination and solving other expert tasks now causes serious difficulties and requires finding solutions. The rapid development of copying and multiplying technology, which has a high retail capacity when applying a signature image or a short entry to the surface of a sheet of the document under study, poses new tasks for expert departments that require a comprehensive approach to solve them, new requirements are imposed for improving the skills of relevant specialists in this field.

Forensic handwriting expertise is a highly developed branch of criminalistics and forensic expertise. The analysis of signatures and short notes is a special case of conducting this type of expertise. The material carrier of information about the fact of writing, its signs and other circumstances that are important in criminal proceedings, in such cases, is a low-volume handwritten product (signature and/or short note) [1, p. 33], reflected in the relevant document.

First of all, it is necessary to consider the essence and content of such objects of forensic handwriting examinations as “signature” and “short notes”.

The signature is one of the most important details of the document and, at the same time, the most common proof of identity. The abundance of different categories of documents and the variety of circumstances that they certify do not allow making even an approximate list of all cases of using a signature as one of the document details. The signature is one of the most difficult objects when conducting expert research. There are the following reasons for this: a signature is an identifiable object on documents; the emergence of new methods of signature forgery; an increase in the number of criminal offences related to document forgery; the obsolescence of signature research methods, etc.

A signature differs from handwriting in the process of its formation, but as a handwriting material,

it also has the main identification properties – individuality and stability. The signature is associated with handwriting by the unity of psychophysiological foundations, technical and graphic writing skills. At the same time, the content of signature features differs from the content of handwriting features, and the signature features themselves are peculiar only to this object of research.

Despite different interpretations, the characteristic features of the signature are the following: the signature is a certifying sign of a certain person [9]; it is performed personally in the form of a graphic image [9; 10]; it can consist of letters of the surname or be a conditional graphic design of the surname, initials, first name [11; 12]; it is applied to the document to certify various facts and events [10; 12].

Short handwriting objects according to the existing classification of objects of handwriting expertise include: small texts (with a letter composition – from 4 to 10 words and digital – from 8 digital characters to half a page of a standard sheet filled with digital text), short entries (respectively 1-3 words and 1-7 digital characters), and signatures. A common property that unites all handwritten objects of this type is that the volume is significantly smaller than that of large and medium-sized texts that represent the handwriting of a particular person more fully. Ultimately, it is well known that a manuscript, other things being equal, is either larger or more informative [13].

According to a survey of handwriting experts, the vast majority of handwriting information in the form of signatures, short entries, can be contained on official documents (84%), less often – on such media, as a box or packaging, which can be either paper (12%) or non-paper (4%).

The study of such objects is based on the general provisions of the methodology of forensic handwriting expertise, which is a step-by-step sequence of expert actions and is determined by typical expert situations. Situations that arise during the study of low-volume manuscripts leave their mark on the entire methodology of expert research and make significant features in each of its stages.

Forensic research of such uninformative handwriting objects as signatures and short notes in the investigation of criminal offences is aimed at establishing the objective side of crimes, the circumstances that are included in the evidence. The method of forgery established with the help of special knowledge of the expert, making changes to the handwriting object in the process of further proof is interpreted by the pre-trial investigation body, the court based on legal knowledge as a method of material forgery of the document, or its individual details. Modern forensic science contains areas that allow it to assist the authorities in the prevention, investigation, and detection of criminal offences. In this case, forensic research of documents,

as a branch of forensic technology, is important. However, it is worth noting that the exact differentiation of experts' competence in the study of signatures remains a debatable issue, mainly in relation to documents with technical forgery in the framework of forensic research of documents [14, p. 23].

For example, when conducting a forensic analysis of signatures, the fact of the presence or absence of signs of technical forgery is practically not established, due to the fact that the expert does not have the competence to establish these circumstances. The method of conducting handwriting expertise provides for the mandatory establishment of the method of execution (type of writing device) or the fact of the presence or absence of signs of forgery. Avoiding this provision leads to expert errors. Experts have problems studying documents created using computer technologies. It can be concluded that the very narrow competence of the handwriting expert does not allow them to fully investigate texts, notes, and signatures. Today, it is necessary to supplement the competence of experts in the field of technical and forensic examination of documents.

In practice, a technical and forensic examination is assigned to these documents, during which it is necessary to establish factual data related to the execution of documents, the specifics of changing documents during their use and storage, etc. At the same time, the work of an expert is impossible due to insufficient knowledge in the field of computer technology. There is a way out of this situation in the need to move from training narrow-profile experts to training complex specialists who are able to examine documents and handwriting objects made in a variety of ways.

A relevant issue is the examination of signatures and brief notations in documents produced by ink-jet method. When performing such an examination, a handwriting expert who has little work experience and does not have the appropriate competence in the framework of technical research of documents may be misled and come to an erroneous conclusion, considering these handwriting objects as original documents made in handwriting and continue their further identification research. Since to identify the structure of a single-colour image during a cursory study (inspection) of these objects, without the help of appropriate technical equipment (when studying these objects in less than 32<sup>x</sup> magnitude), it is almost impossible and they can be similar in general features to those made by a writing device like a capillary pen. This is conditioned by the rapid development of copying and multiplying technology, which has a high retail capacity when applying an image of a signature or a short entry to the surface of a sheet of the document under study.

In general, it can be concluded that the tasks of an expert in conducting these studies are of an

integrative, complex nature, and their solution is associated with the use of knowledge and methods of a number of sciences in the process of conducting forensic expertise in the study of complex objects. The authors of this study share the position of such modern criminologists as E. Simakova-Efremyan, T. Balinyan, L. Derecha regarding the integration of knowledge during complex examinations is a mechanism that helps to overcome the lack of information about the object under study, correctly substantiate the expert opinion, and therefore increase the level of its completeness and reliability. Ultimately, it is precisely according to the principles of objectivity and completeness of research that forensic expert activity should be built [2, p. 153].

### ■ Conclusions

Thus, it can be concluded that the forensic study of signatures and short notes made using technical means and tools refers to complex and integrative tasks of forensic handwriting expertise. The rapid penetration of computer technologies in almost all areas of activity, the constant increase in the variety and improvement of digital printing equipment, the active use of modern technical achievements by criminals for the production of forged documents and their details, require the development of new research methods in the field of handwriting and document science.

While maintaining the conventional procedure characteristic of the study of all objects of handwriting, during the forensic handwriting examination of signatures and short notes for the expert, the organisation of work on obtaining additional information is relevant, namely: determining the degree of suitability of the object, on the quality of which the possibility of handwriting research depends; orientation information on the use of technologies for forging signatures and short notes; information and systematisation of those factors that affect the quality of the manifestation of individual signs of writing; information about those signs that have undergone changes and masking, etc.

The handwriting expert studies of signatures and short notes, considering their relevance, require an integrated approach and additional development of theoretical foundations related to the definition of the object, purpose, and objectives of this type of research, and the development of recommendations for research methods of these low-volume handwriting objects, which are often performed using technical means. In this regard, it is effective: to further define methods that allow for forensic research of signatures and short notes made using technical means and tools; to develop parameters for solving identification, diagnostic, classification, and situational problems in terms of the quality and volume of the handwriting object and features of making technical changes to it.

With this in mind the expert must pay particular attention to: establishing whether or not there are any signs of technical forgery; making a clear distinction between the competence of experts in the examination of signatures and short notes, mainly documents with technical forgery within the framework of forensic document examination. The quality of such research primarily depends on the level of knowledge and competence of the expert.

The considered topical issues in the field of handwriting and technical and forensic research of

documents, conditioned by the needs of the development of society and forensic investigative practice, require a clear regulation and a single methodological approach when conducting forensic research of signatures and short notes, because in practice there are problems that in the absence of appropriate methods today would cause misunderstandings not only among experts, but also among authorised subjects of criminal process – the investigator, prosecutor, judge, who evaluate the expert opinion as a source of evidence, and individuals who commissioned the expert analysis.

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## Проблеми судової почеркознавчої експертизи під час дослідження підписів та коротких записів

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■ **Анотація.** Активне впровадження новітніх засобів поліграфії та копіювання, нових матеріалів письма, використання передових технологій для виконання окремих реквізитів різних документів призвело до підвищення в розкритті та розслідуванні кримінальних правопорушень ролі криміналістичного дослідження почерку й техніко-криміналістичного дослідження документів, які нині є одними з найскладніших видів криміналістичної експертизи. Під час розслідування кримінальних правопорушень найбільше доказове значення мають ідентифікаційні дослідження, у яких встановлюється наявність чи відсутність тотожності. Проте останнім часом дедалі частіше об'єктами криміналістичних досліджень стають короткі рукописні записи та підписи, які нерідко виконуються за допомогою технічних прийомів і засобів. Це викликає неабиякі труднощі в обізнаних осіб під час вирішення завдань дослідження, їх комбінації. Такі завдання нерідко залишаються або невирішеними, або за результатами дослідження робляться недостатньо обґрунтовані висновки. Метою статті є детальний науковий аналіз проблеми дослідження документів, що існують на сучасному етапі та стосуються як загалом цієї галузі криміналістичної техніки, так і деяких окремих аспектів криміналістичного дослідження почерку та техніко-криміналістичного дослідження документів, та, на підставі цього, вироблення шляхів удосконалення здійснення зазначених досліджень. Відповідно до поставленої мети та специфіки предмета наукового дослідження, використано низку методів, серед яких: діалектичний, формально-логічний, системно-структурний, догматичний та інші методи наукового пізнання. З'ясовано сутність таких категорій, як «підпис» та «короткі записи». Акцентовано на необхідності встановлення способу виконання (виду пишучого приладу) або факту наявності чи відсутності ознак підробки під час проведення експертних досліджень підписів і коротких записів; наголошено на необхідності підготовки експертів-почеркознавців вузького профілю до підготовки комплексних фахівців, зокрема в галузі техніко-криміналістичного дослідження документів, комп'ютерних технологій, здатних всебічно досліджувати документи та об'єкти почерку, виготовлені найрізноманітнішими способами. Визначено перспективи дослідження, які полягають у подальшому розробленні методів, що дозволяють здійснити криміналістичне дослідження підписів і коротких записів, виконаних за допомогою технічних прийомів та засобів; визначенні параметрів вирішення ідентифікаційних, діагностичних, класифікаційних і ситуаційних завдань з точки зору якості та обсягу об'єкта почерку й особливостей внесення технічних змін у нього

■ **Ключові слова:** почеркознавство; криміналістичне дослідження документів; експерт; малооб'ємні об'єкти почерку; технічна підробка документів