

Criminal Investigation Methods according to Hans Gross: Past and Present

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The primary concerns of this paper are to determine the role of the methods proposed by H. Gross during the formation and development of criminalistics and to prove their relevance today. To fulfil this goal, methods of scientific cognition have been applied: observation, comparison, abstraction, analysis, synthesis, modeling, etc. The contribution made by H. Gross to establishing criminalistics as a science has been demonstrated. Emphasis is placed on two methods he proposed for investigating crimes: setting a moment of firm conviction about case circumstances (the investigator's impartial attitude to the information received at the beginning of an investigation) and graphic tables (visualization of relevant forensic information). From these methods, the following conclusions have been drawn: crime investigation involves the use of specific actions and techniques; the investigator must approach the information received during the investigation impartially; at the beginning of alleged crime investigation, one should not rush to conclusions; they should be developed as the truth is clarified; the investigator may involve other experts (well-versed assistants); the basis of crime investigation methods is the step-by-step execution of the algorithm of actions. After implementing each subsequent stage (step), the investigator should summarize received results (preferably in written, tabular [visual] form). It has been argued that the methods proposed by H. Gross are still relevant today due to the prospects of developing a modern

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applied scientific area (forensic technologies ensuring visualization in a criminal proceeding) and certain issues of unbiased analysis of relevant forensic information by investigators at the initial stage of investigating crimes.

Keywords: *cognition methods in criminalistics; investigation method; criminal offenses investigation; criminalistics history; forensic methodology; criminal proceeding visualization; investigator's unbiased attitude towards information; criminal analysis.*

Research Problem Formulation

The process of developing civil society foundations, which began as early as the mid-17th century, was extremely uneven. England, the United States and France (as the most advanced countries at the time) led the process, and only a century later Austria, Germany, Italy and other European states joined them.

The late 18th and mid-19th centuries saw significant changes in Western civilization: urbanization, industrialization, the spread of new socio-political ideas and the beginning of political democratization. The ideal of the new society became the recognition of the human being as the highest social value, the satisfaction of the interests of various social groups and individuals, and the guarantee of economic, political and ideological freedom for citizens and their associations.

In the second half of the 19th century and the beginning of the 20th century, Western European countries underwent economic, social and legal changes that necessitated the use of scientific methods in pre-trial investigations and trial.

During this period, which modern historians refer to as the Modern Age, a new era in Western civilization began: a shift in the socio-legal character of

society towards civic-mindedness. This was facilitated by radical changes influenced by socio-economic, political and ideological processes, which effectively shaped a new consciousness among people and created a system of values for the new Western society.

Nevertheless, rapid development of capitalist relations and industrialization led to an increase in urban population, which resulted in a rise in urban crime, becoming more organized and technologically complex. This phenomenon was particularly evident in Germany, France, England, the United States, and other leading countries. The criminals of the time made active use of the advances in science and technology (such as rapid rail transport, telephone communication, telegraphy, state-of-the-art polygraphic tools, etc.), resulting in a complete transformation of criminal activity.

The incapability of the then authorities to prevent social conflicts brought about the need for a special instrument that would ensure optimal conditions for the normal functioning of the emerging civil society. This instrument became the state of a new type with updated mechanisms and functions. In the era of civil society development, the law enforcement role of the state also transformed and acquired

new meaning, and the police officers underwent structural, organizational and functional changes: their actions were centralized, and their rights were extended.

Police reform and the enhancement of its efficiency in new conditions required new knowledge and innovative methods to combat crime and ensure justice during trial. In the past, law enforcement officers relied solely on their experience and common sense to solve crimes; but in the Modern era, this is no longer enough, as professional and organized crime has armed itself with the most advanced technologies of the time (the number of crimes increased, offenders significantly complicated the process of their commission and advanced methods of concealment).

That is why leading countries have established a social order aimed at developing new, efficient means and methods of combating crime (which would meet the requirements of the time and be based on the latest achievements of science and technology) and standardizing investigation methods and means of collecting evidence.

Scientific discoveries in natural and engineering sciences have provided new opportunities for detecting and preserving crime evidence, revealing the truth, and proving suspects' guilt. The success of applying these advancements in crime-solving has demonstrated that physical evidence, rather than testimonies, should hold a leading position among investigation methods, resulting in a more active involvement of individuals with specific expertise (well-versed persons) in the investigation and justice administration.

With the aim of identifying criminals and developing an evidential base, photography, anthropometric criminal records, and fingerprints were introduced at that time: the application of scientific methods significantly improved the quality of both pre-trial investigations and trial ¹.

All the aforementioned prerequisites have contributed to the consolidation of forensic knowledge; and the needs of investigative practice have necessitated the urgent application and systematization of this knowledge within a distinct scientific field. One of the first to understand this was *Hans Gustav Adolf Gross*, an Austrian lawyer and forensic scientist, one of the founders of criminalistics as a science. We consider the investigative methods developed by H. Gross as an important stage in the development of modern forensic science.

Analysis of Essential Researches and Publications

In the post-imperial territories of the Russian Empire before the civil war, the scientific achievements of H. Gross were mentioned only in individual publications by experts in criminal law and procedure (who were later called criminalists). For instance, in 1908, L. Vladimirov emphasized the natural science direction within the course of criminal law, separately highlighting the application of "*methods and perceptions of natural sciences*" to the study of crime, and mentioned H. Gross among the known representatives of this direction ². M. Rosen understood criminalistics as "*the technical doctrine of evidence in a criminal procedure*" and "*the art of obtaining the highest number of accurate conclusions from*

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- 1 Комаха В. О. Історія криміналістики як одна з актуальних проблем сучасності. *Актуальні проблеми криміналістики* : мат.-ли міжнар. наук.-практ. конф. (Харків, 25–26.09.2003). Харків, 2003. С. 60–61.
 - 2 Владимиров Л. Е. Курс уголовного права. Москва, 1908. Ч. 1 : Основы нынешнего уголовного права. С. 171–172.

evidence in a criminal procedure”, referring to H. Gross as an “*authoritative representative of criminalistics*”³.

In the 1930s, Bolshevik authors emphasized the *systematic organization of forensic knowledge and the mixed legal-scientific method* developed by H. Gross among his significant scientific achievements. We consider such a designation of Gross’s method as a certain substitution of concepts: it is more appropriate to call it the *use and adaptation* to the needs of criminal justice of methods from the natural sciences, which were then undergoing rapid development. At that time, Soviet criminalists provided an objective assessment of H. Gross’s scientific contributions, recognizing his pioneering approach to studying the material aspect (substantive element) of crime and its investigation as the first significant contribution to criminalistics, which soon emerged as an independent science, and his proposed method *a mixed, simultaneously legal and natural-scientific one*.

During the analyzed period, scientists and practitioners paid particular attention to the fact that H. Gross oriented the investigator towards collection, examination, and evaluation of physical evidence: which, according to the scientist, was more objective compared to subjective evidence (such as testimonies of eyewitness and other participants in a crime). H. Gross was called the father of criminalistics, and his opinion on setting priorities during criminal investigations was shared: to focus primarily on objective evidence obtained

through examination of material objects, which always have greater value and probative force than subjective evidence, the reliability of which cannot always be verified (i.e., testimonies).

One of the first Soviet textbooks on criminalistics (1938) discussed the appropriateness of using data from various sciences (mostly natural sciences) specifically adapted for investigative purposes in investigative practice, which had been proposed many years earlier by H. Gross in *a Practical Handbook for Magistrates as a System of Criminalistics*⁴ (hereinafter referred to as *A Practical Handbook...*) and generalized the experience of investigative work. The criminologist defined the field of knowledge introduced by him as a science dealing with the *realities of criminal law*, based on a mixed legal and natural-historical method. This science focuses on the factual aspects of crimes and the information necessary for conducting individual investigative actions. In later editions of his book, H. Gross referred to this science as criminalistics.

The *method of reconstructing the crime scene through its consequences*, developed by Hans Gross, provides that the investigator must determine exactly what criminal event occurred (by identifying, investigating, and analyzing the circumstances that preceded, accompanied, and followed the commission of a crime) with the help of separate, distinct acts and their consequences aimed at both the preparation of a crime and the commission of the crime itself, as well as at concealing its traces. Thus, the investigator must reconstruct the entire

3 Розин Н. Н. Уголовное судопроизводство : пособ. к лекц. С.-Петербург, 1914. С. 338, 384.

4 Gross H. Handbuch für Untersuchungsrichter als System der Kriminalistik. Teil I. München, 1908. 546 s. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false. Teil II. München ; Berlin und Leipzig, 1914. 1216 s. URL: https://books.google.com.ua/books?id=VIozAQAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

pattern of the committed crime, uncover its motives, identify perpetrators, establish consequences, etc.

In the textbook on criminalistics of the first postwar year (1945), Soviet experts recognized *A Practical Handbook...* by H. Gross as the *first comprehensive systematized course on criminalistics*, the use of which significantly facilitated the detection of crimes and the search for criminals, while at the same time noting that *each success in criminalistics increased the importance of tangible evidence and simultaneously decreased the importance of witness testimony*. Guided by communist narratives, they even declared that the *search for true scientific methods of evidence detection and investigation was replaced by the desire to find a formula suitable for all cases, a kind of universal key to unlocking the secrets of any criminal case* in *A Practical Handbook* by Hans Gross.

Later (in 1950), Soviet rhetoric regarding Hans Gross and his developed methods became even more militant: as a *bourgeois scientist*, he was considered to be *fully committed to the ideologies of his class* and therefore incapable of creating a *true science* that would accurately and comprehensively reflect reality; *his research method is pseudo-scientific and metaphysical*; he treats described phenomena in isolation and examines them from *mechanistic positions*; his social and political conclusions resulted in *erroneous and deceitful statements, distortion of facts*; while assessing witness testimony, he *advocated bourgeois views*, thus tending towards *mechanization of the criminal procedure, which involved excluding the witness – a living person – from the court and replacing his/her with evidence*. They vehemently condemned Gross's position, which he laid out in the preface to the third edition of *A Practical Handbook...*, even arguing that the *opposition of evidence collected from*

“people” to evidence collected from “things” is a program of bourgeois forensics that paves the way for evidence falsification, especially in political processes.

Later, in the USSR (1962), a similar detrimental position was declared: *Hans Gross initiated the fetishization of “silent” witnesses under the guise of a supposedly “scientific objectification” of the investigative process, which essentially conceals arbitrariness and terror towards everything progressive and democratic*. As far as we know, Hans Gross did not intend to create a “true science” of criminalistics: he merely systematized the existing forensic knowledge of the time (mostly natural scientific) and demonstrated the possibility of its use for the needs of crime investigation, illustrating the expediency of initiating a new scientific direction, rather modestly defining its place among the existing legal sciences at that time). Biographers of Hans Gross do not mention his familiarity with the dialectical method of Karl Marx or the Marxist positions on antagonistic and non-antagonistic classes. However, we remember that the *idea of intensifying class struggle during the construction of socialism and capitalism* was cultivated in Soviet science until the death of Joseph Stalin himself. It was this idea that led to massive repression in the USSR, in which the “silent witnesses” of Hans Gross played no role, in contrast to the “confessions” and “testimonies” that were mostly obtained after prolonged torture of detainees in the course of pre-trial investigations during the mass repressions of the 1930s–1950s.

In the 1960s, J. Torwald, a German popularizer of criminalistics, noted that H. Gross, recognizing the inadequacy of crime identification methods used by rural police officers, as well as the erroneous practice of obtaining confessions of guilt from suspects, independently mastered the basics of various natural and engineering

sciences. He attempted to create a moral and, above all, a scientific-technical basis for criminalistics. At the same time, he strongly advocated for the introduction of anthropometry in Austria as a progressive method of identifying criminals and a means of keeping criminal records ⁵.

At the end of the 1980s, distinguished Ukrainian criminalistics and practitioners V. Honcharenko and V. Berger hailed Hans Gross's scientific work, which was grounded in extensive analysis of scientific literature and his own twenty years of experience, as a catalyst for addressing issues related to the implementation of forensic methods in many countries around the world ⁶.

At the turn of the 1990s and 2000s, analyzing H. Gross's contribution to the development of the modern forensics foundations, scholars recognized his primacy not only in systematizing forensic knowledge and adapting the methods of natural sciences to the needs of criminal procedure, but also in developing tactics for conducting investigative actions, studying the psychological traits of individual participants in a criminal proceeding, systematizing requirements for an investigator, and utilizing interdisciplinary methods during crime investigations (observation, analysis, etc.).

M. Saltevsykyi pointed out that "according to H. Gross, criminalistics should study the methods of committing a crime and the methods of its disclosure" ⁷.

The rhetoric of the Soviet era successors changed at the turn of the century: for some, substantially (*the name of this field of human knowledge [criminalistics] was proposed by Hans Gross, an Austrian scientist, who defined it as the study of physical evidence, offenses, or*

phenomena that are components of a criminal case, as well as the characterization of the psychological traits, habits, and activities of individuals participating in a criminal proceeding), for others, radically (*Hans Gross's merit lies in substantiating the independent nature of criminalistics as a branch of scientific knowledge, constructing the system of this science [he himself proposed the term "criminalistics"], systematizing and significantly expanding scientific means and methods of detecting and investigating crimes, including methods of working with traces and other physical evidence*). However, analyzing the translation into Russian (1908) of *A Practical Handbook* by H. Gross, opportunistic criminalists (chameleons) did not emphasize investigation methods proposed by the author; they merely noted his distinction in criminalistics between two main teachings: 1) about detecting crimes (theoretical part) and 2) about conducting investigations (practical part). However, they ultimately acknowledged its historical significance and relevance for the present. A year later (2001), the same analysts observed that the development of forensic methodology as *a branch of science and the systemization of its recommendations in investigative practice were accompanied by an investigation into the possibility of the existence of a general method for investigating crimes regardless of their types*, and recognized that Western forensic science had attempted to provide *a positive answer* to this question: *Hans Gross asserted the existence of a mixed legal and natural-scientific method for disclosing crimes*.

L. Gschwend meticulously described the methods used by Hans Gross in the *Justice Reaches for the Magnifying Glass*

5 Thorwald J. *Das Jahrhundert der Detektive. Weg und Abenteuer der Kriminalistik*. Zürich, 1965. P. 56.

6 Гончаренко В. И., Бергер В. Е. *Криміналістика і криміналісти*. Київ, 1989. С. 24—25.

7 Салтевський М. В. *Криміналістика : підручник*. У 2 ч. Харків, 1999. Ч. 1. С. 4.

book⁸. In his opinion, the Austrian scientist employed the casuistic-pragmatic method, the basis of which was the qualitative evaluation of a large number of individual cases: quantitative research, observation, and information gathering enabled him to systematize practical experience, which yielded positive results⁹. As a judge and prosecutor, H. Gross accumulated various practical skills by investigating and evaluating numerous criminal cases. Gross's field of study was crime scene: each separate case in his own experience served as an *epistemological monad*; he, as a "hunter-gatherer", relied on his own experience and the experience of his colleagues, rather than on scientific theories¹⁰.

Hans Gross presented his acquired experience both domestically (in Austria) and abroad, considering its results reliable due to his use of inductive research and organization. He viewed the formation of theories as "completely alien" in the "modern sociological understanding"¹¹. Gross's work is characterized by qualitative, reflective connection of his own observations and experience with the state of science at that time (for example, he used the method of mass individual observation, which was popular at the time), and the direct expression of his own position makes his conclusions convincing¹².

The authors of the textbook edited by V. Tishchenko (2017) noted that in the

preface to the 4th edition of *A Practical Handbook...* by Hans Gross, he planned to describe a new system of criminalistics consisting of two parts (*Theoretical Doctrine on the Detection of Crimes* and *Practical Handbook for Investigation*). This indicated the need to distinguish two objects of study in criminalistics: 1) criminal activity and 2) crime investigation activity. It is regrettable that he did not implement his idea, although "the main outlines of the new science – criminalistics – were defined during this period, serving as the initial basis for its further development"¹³.

In one of the new Ukrainian textbooks on criminalistics (2018), A. Volobuiev observes: "After working for a long time as an examining magistrate, Hans Gross realized that crime investigation is, above all, a deep analytical work requiring the use of knowledge from various sciences... By thoroughly studying all available literature and relying on the scientific developments of his predecessors, Hans Gross concluded that virtually any achievement in the natural sciences can be applied to solve tasks in crime investigation. He succeeded in formulating a number of significant theoretical principles and practical recommendations, collectively termed the 'criminalistics system'¹⁴.

Yu. Chornous believes that "among the foreign papers that significantly impacted the further development of forensic tactics, it is necessary to mention the works by H. Gross. In

8 Gschwend L. Justitias Griff zur Lupe. Zur Verwissenschaftlichung der Kriminalistik im 19. Jahrhundert. Verfasst anlässlich der Eröffnung des Kriminalmuseums der Karl-Franzens-Universität in Graz am 28. Februar 2003. Graz, 2004. Pp. 70–71. URL: <https://www.alexandria.unisg.ch/server/api/core/bitstreams/3f29cd0e-c1f7-484d-98de-c50917d1427f/content> (date accessed: 28.01.2024).

9 Ibid.

10 Ibid.

11 Ibid.

12 Ibid.

13 Алєнін Ю. П., Аркуша Л. І., Подобний О. О. та ін. Криміналістика : підручник / за ред. В. В. Тіщенко. Одеса, 2017. С. 29.

14 Волобуєв А. Ф., Даньшин М. В., Іщенко А. В. та ін. Криміналістика : підручник. У 2 т. / за заг. ред. А. Ф. Волобуєва, Р. Л. Степанюка, В. О. Маляррової. Харків, 2018. Т. 1. С. 7.

these works, the author not only summarized the experience of investigative practice but also proposed using the methods developed and adapted by him and some predecessors for crime investigation activities”¹⁵. It is worth pointing out that until the mid-1920s, forensic tactics included not only the study of issues related to the organization of investigative activities but also the first theoretical developments of crime investigation methods.

Recognizing the considerable scientific achievements and organizational efforts of Hans Gross aimed at the development of criminalistics and forensic science institutions, M. Shepitko unfortunately does not mention the investigative methods developed by him in the *Great Legal Encyclopedia*¹⁶. Similarly, the article about H. Gross in *Encyclopedia of Criminalistics in Personalities*¹⁷ and one of the most recent forensic encyclopedias *Criminal Law, Criminalistics and Forensic Sciences* do not address this issue¹⁸.

Therefore, the so-called “mixed legal and natural-scientific method” (“mixed legal and natural-historical method”) is nothing but “the use of data from natural and engineering sciences in criminal proceedings”, while “forensic methods”, “scientific methods of evidence detection and examination”, and “methods of investigating the material (physical) side of a crime” are “techniques for working with physical evidence”, since at the beginning of the formation of criminalistics as a science and the

development of its individual branches, scholars and practitioners did not clearly distinguish between the terms “method”, “technique”, and “way”.

Few attempted to identify and analyze individual investigative methods proposed by H. Gross. Most simply stated that the researcher had instructed criminalists to “study the methods of committing crimes, their disclosure” and to “develop methods of detecting and investigating crimes”, without “delving into these methods themselves”. As for the casuistic-pragmatic method mentioned by L. Gschwend, it is a research method (activity) used by H. Gross, not a method of crime investigation. In modern understanding, it is recognized as a method of criminalistics.

Article Purpose

Scientific analysis of the investigation methods developed by H. Gross in the second half of the 19th century aims to define their role in the formation of the criminalistics doctrine on methods of investigating criminal offenses and their significance for the development of modern criminalistics.

Research Methods

To fulfil the stated purpose, scientific methods of cognition have been applied: observation, comparison, abstraction, analysis, synthesis, modeling, etc.

URL: <https://dspace.univd.edu.ua/server/api/core/bitstreams/1c71481e-5339-4203-a94d-5fcac8dfec32/content> (date accessed: 28.01.2024).

- 15 Пясковський В. В., Чорноус Ю. М., Самодін А. В. та ін. Криміналістика : підручник / за заг. ред. В. В. Пясковського. 2-ге вид., перероб. і допов. Київ, 2020. С. 373.
- 16 Шепітько М. В. Гросс Ганс Густав Адольф / Велика українська юридична енциклопедія. У 20 т. Харків, 2016. Т. 20 : Криміналістика, судова експертиза, юридична психологія // редкол.: В. Ю. Шепітько (голова) та ін. 2018. С. 144–148.
- 17 Енциклопедія криміналістики в лицах / под ред. В. Ю. Шепітько. Харьков, 2014. С. 112–114.
- 18 Шепітько В., Шепітько М. Кримінальне право, криміналістика та судові науки : енциклопедія. Харків, 2021. С. 203–207.

Main Content Presentation

Already at the beginning of the 20th century, theorists in the field of crime detection and investigation unanimously recognized Hans Gross, an Austrian examining magistrate, deputy prosecutor, and later a renowned scholar and professor at universities in Graz, Prague, and Chernivtsi, as the undisputed founder of a special scientific knowledge: criminalistics. He believed that the task of criminalistics was to adapt the methods of natural and exact sciences to the objectives of crime detection and investigation, identify criminals, and work with forensic evidence (traces).

In the preface to the third edition of *A Practical Handbook...*, Hans Gross wrote: *"If we consider criminalistics as a component of criminal law, then criminalistics must introduce its natural-scientific methods into criminal law... However, if criminalistics does not belong to criminal law as an integral component, then it must provide its own methods for development. Both the conclusions drawn by criminalistics and their value cannot be denied by criminal jurisprudence"*¹⁹.

In Hans Gross's numerous publications, he convincingly demonstrated that various advancements in natural and engineering sciences can be effectively utilized in crime investigation. From the researcher's perspective, criminalistics has a dual purpose: practical and theoretical. The practical aims to uncover the truth in every criminal case, while the theoretical seeks to study the criminal and

gain insights into the nature of a crime. H. Gross believed that criminalistics should study physical evidence, actions, and phenomena associated with crime commission, the character, habits, and behavior of participants in a criminal proceeding, as well as develop methods for detecting and investigating various traces, forged documents, etc.²⁰.

Having defined criminal anthropology as the science of spiritual and physical manifestations that indicate a connection with criminal behavior in humans²¹, Hans Gross strongly directed investigators to apply the method of observation: he recommended that criminals and the consequences of their crimes be closely observed, and that information about them be collected, compared, and explained. *Archiv für Kriminal-Anthropologie und Kriminalistik*, a periodical initiated by Hans Gross in 1898, aimed to familiarize lawyers with knowledge from various scientific fields and to teach them how to use this knowledge and methods for solving individual crimes through practical educational examples.

After teaching himself the basics of physics and chemistry, botany and zoology, photography and microscopy, psychology and anthropology, Hans Gross was one of the first to attempt to adapt the methods (cognitive procedures) of these sciences to the practice of criminal investigation. And not just to *adjust*, but *specifically to adapt*, that is, to *actually create new cognitive procedures*.

The above conditions contributed to the creation by Hans Gross of a set

19 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbg_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

20 Гончаренко В. И., Бєргєр В. Е. Указ. соч. С. 24.

21 Gross H. Aufgabe und Ziele. *Archiv für Kriminal-Anthropologie und Kriminalistik*. 1899. Vol. 01. P. 2. URL: <https://archive.org/details/ArchivFrKriminalAnthropologieUndKriminalistik.V01.1899/page/n3/mode/2up> (date accessed: 28.01.2024).

of crime investigation methods that became a significant contribution to the development of the theoretical foundations of forensic methodology in general and the forensic teaching of crime investigation methods in particular.

The fourth edition of *A Practical Handbook...* by Hans Gross outlines two methods of crime investigation developed by him, which can conditionally be called *the method of determining the moment of firm conviction about circumstances of a case* and *the method of graphic tables*.

Explaining the essence of the method for determining the moment of firm conviction about the circumstances of a case, Hans Gross noted that for an examining magistrate, *“the most important thing is, above all, to find the right moment when he is ready to develop a firm conviction about a case. The success of the entire case almost always depends on this extremely important circumstance. If the investigator forms such a conviction prematurely, he will adhere to this bias more or less tenaciously, eventually losing precious time when the traces of a crime disappear forever. However, if the examining magistrate misses the moment of forming the correct view of the case, they conduct pre-trial investigation without a plan, haphazardly, through indecisive attempts and aimless searches. When exactly this important moment occurs is impossible to predict: neither generally nor in each specific case. However, the examining magistrate will definitely feel this moment if they start the investigation with correct and unwavering principles and understand that such conviction cannot arise fully formed; he/she must arrive at this conviction gradually, step by step, relying*

*on the foundations they prepare through careful and thorough individual convictions regarding the facts and episodes of a case”*²².

During the direct implementation of the *method for determining the moment of firm conviction about the circumstances of a case*, Hans Gross suggests adhering to the following basic rules:

- 1) one should refrain from forming a specific opinion about the event at the outset of the investigation (police reports and statements from private individuals should be used only to help the investigator establish known facts, such as *“it is reported that a certain crime was committed there”*);
- 2) it is necessary to receive consistent further notifications (about the guilty party in crime commission, about the damage caused as a result of a crime, about its motives, etc., which should only mean *“according to the rumors it is true”*);
- 3) the investigator forms opinions about the case (whose testimonies are credible, how the suspect gained access to the crime scene, what tools were used, when exactly the actions were committed) as the case progresses;
- 4) opinions about separate aspects of a crime can be combined according to common features (arrive at a conclusion simultaneously: *“the way the event is presented is not true: it has been skillfully altered”* or *“a positive belief is formed that such a crime has been committed”*)²³.

Hans Gross concludes his advice as follows: *“To avoid...complications, there is only one means: to be skeptical about*

22 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAAAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

23 Ibid.

biased ideas. If one firmly adheres to this fundamental rule...and does not scatter in all directions, then from this arises a new rule: to have people at hand who are willing to help, to know their abilities and qualities well, and to be able to use their assistance effectively"²⁴. Therefore, for the successful implementation of the proposed method, H. Gross recommends that the investigator choose assistants who are willing to help in crime investigation, and skillfully manage them, utilizing their abilities and qualities efficiently to achieve the investigation's goal.

The method of investigation proposed by H. Gross is a combination of theoretical principles (an intellectual concept) and specific practical guidelines regulating the investigator's activities aimed at the systematic collection, examination, and utilization of relevant forensic information (clarification of crime circumstances through the sequential execution of assigned tasks) during the investigation of a crime. Consequently, H. Gross considered investigative actions as a certain form of implementing special (private-scientific) methods, which the investigator applies in practical activities with the aim of understanding the crime and uncovering the truth in a case, and which, by their nature, serve as a means of understanding the surrounding reality.

Given the modern understanding of the activity approach theory, H. Gross suggests that the investigator should undertake specific social acts (actions) intended for achieving a particular socially significant outcome (understanding the event; clarifying what happened).

Furthermore, H. Gross elaborately describes the elements of such a social act (the investigator's activity): 1) goal (the act is aimed at achieving it); 2) means, tools (not just specific objects or tools, but interaction with other people: investigation participants); 3) procedure (the investigator directs certain volitional efforts to overcome obstacles in order to achieve the planned result); 4) conditions (under which these efforts should be made, without relying on a single biased idea, etc.); 5) results (the changes that the action contributes to, i.e., the changes that actually occur).

In our opinion, Hans Gross understood well that the era of sole investigators solving crimes had passed, and the future belonged to group methods. Therefore, he recommended that investigators carefully select assistants with specific abilities and qualities and skillfully manage them. It is these ideas of Hans Gross that are realized today in the group method of crime investigation.

Describing the method with clear algorithmic attributions, H. Gross warned investigators against mistakes: inappropriate, incorrect, one-sided, or illusory awareness of reality. These mistakes should not be identified with a deliberate, conscious distortion of the true state of affairs. With his extensive practical experience in investigating crimes, H. Gross understood better than anyone else that an investigator who makes a mistake often sincerely believes that he/she is close to the truth.

In H. Gross's view, truth is the representation in a person's consciousness of objects, phenomena, and regularities of objective reality as they truly exist,

²⁴ Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

independent of and beyond the subject who perceives it (the investigator). In this case, the characterization of truth belongs to the thoughts of the investigator, rather than to the things themselves or the means of their verbal expression.

Hans Gross advised the investigator not to develop a specific opinion about the event at the beginning of the investigation, as an opinion without sufficient justification, unsupported by necessary arguments and factual verification, is subjective and unreliable knowledge. Instead, judgments should be formed as relevant forensic information is obtained.

In our opinion, H. Gross regarded the process of scientific research as akin to investigating a crime. And it is not just an analogy but an essential connection. Both of these processes are varieties of a single cognitive process; both should be carried out with observance of its laws. Hence, it is impossible to completely equate criminal investigation with the process of scientific cognition, since they have significant differences, primarily due to the fact that a person investigating a crime (the investigator) does not pursue scientific goals but rather seeks to clarify the circumstances of an offense (including the guilt of the accused), thus performing practical tasks associated with justice administration.

We believe that the method proposed by H. Gross has laid the foundation for the use of scientific hypotheses (investigative leads) in criminal investigations, thus becoming the source for the development of another method: *forensic leading*.

H. Gross's recommendations remain quite relevant today. It is known that at the initial stage of investigating a criminal offense, an investigator often lacks sufficient grounds to determine which of the proposed leads to reject and which is the most promising and should be further

confirmed. This approach is likely to indicate the investigator's bias in evaluating the initial data and demonstrates subjectivity in the investigation of a crime. Even at the final stage of an investigation, it is tactically, procedurally, and psychologically wrong to dismiss a newly emerging lead as unlikely and to prejudicially reject it because such a belief has already been formed in advance.

In our opinion, H. Gross understood well that the high quality of verifying the proposed leads (hypotheses) and the logical consequences derived from them depend on the promptness and efficiency of the investigative actions conducted by the investigator, as well as the interaction of the investigator with the police and assistants. The most plausible lead, if verified incorrectly, can bring the criminal investigation to a standstill, much like how the verification of leads may yield no results if they are proposed too late, fail to explore all potential explanations, do not align with the circumstances of a case, or do not lead to all logical conclusions.

In addition to the above-mentioned *method for establishing a firm conviction regarding the circumstances of a case*, *A Practical Handbook...* by H. Gross also details a method of investigating crimes known as *the graphical table method*. The algorithm for implementing this method is as follows:

- 1) it is recommended that the investigator make a list of everything that needs to be done in a case (such lists are especially useful such lists are especially useful in the form of ordinary lists or reference sheets when a person is suspected of committing several crimes or when there are several suspects). The purpose of compiling such lists is twofold: to facilitate the work of those who will continue the investigation af-

ter the examining magistrate, and to provide the successor with an opportunity to familiarize himself/herself with the circumstances of the case, verify its completeness, and complete any unfinished tasks²⁵;

- 2) the planned stages should be executed gradually, one step at a time.
- 3) for the most important moments of an investigation, it is vital to provide separate sections solving the questions: “Who?”, “What?”, “Where?”, “By what means?”, “In what way?”, and “When?”;
- 4) it is necessary to summarize the “*names of accomplices*”, “*evidence in favor of and against the suspects*”, and to thoroughly outline the “*signs of a crime and the most important circumstances*” in each case. These notes should be organized in such a way that it can be seen at a glance whether the investigation has been sufficiently comprehensive and what needs to be added;
- 5) in certain investigative proceedings, it is advisable to create special tables that graphically display investigation results, allowing important aspects to be grasped at a glance. It is worthwhile to extract and visually represent only the crucial and essential details from a case, setting aside all non-essential and incidental information (such tables are useful when it comes to tracking the movements of a person or object; when a suspect commits crimes in different locations or has encounters with various individuals; when an item changes hands; when multiple injuries are inflicted on several victims in a large altercation; or when the ag-

gregate of evidence collected against the accused contains numerous elements, each of which is insignificant on its own but gains significance only through their sequence)²⁶.

Thus, H. Gross understood that a crime as an object of cognition by an investigator has a rather low degree of visualization (because the investigator is actually unable to directly perceive the events of the past, i.e., to observe the process of committing a criminal offense in real time, except when there is a video recording of such an offense).

It is worth noting that since the 1860s, devices such as the zoetrope and the praxinoscope have become widespread. These are simple optical devices capable of displaying a sequence of still images at a speed that creates the impression of movement for the entire image (due to the persistence of visual perception). Soon after, the invention of celluloid film made it possible to capture objects in motion in real-time (chronophotography), but a special device was needed to achieve this effect. In the 1880s, motion picture cameras gained popularity, storing images on a single roll of film, while film projectors transferred these images onto a screen. However, it is notable that H. Gross does not mention such visual aids. Furthermore, they were not widely utilized in criminal proceedings and investigative practices until much later.

It should be stressed that the process of introducing photography into the practice of criminal investigation stretched over many decades. Detection, documentation, and examination of evidence through photography owe their

25 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

26 Ibid.

existence to the discovery by J. N. Niépce and L. J. M. Daguerre of the method for obtaining images on light-sensitive silver plates, as well as to the invention by W. G. F. Talbot of the negative-positive process of obtaining photographs (1839). Already in the 1840s, the first photo studios began operating in leading Western European countries. By the 1880s, photography became a commonplace tool, actively used in scientific fields, including astronomy and medicine (X-rays).

In the 1840s, one of the first to use photography for criminal investigation purposes were the French police and the Brussels prison authorities²⁷. In the early 1870s, in Great Britain, O. G. Rejlander made the first attempts at forensic photography and published concise guidelines on photographing criminals. The 1870s also saw the first serious attempts to use photography in the investigation of offenses and for registering individuals suspected of criminal activity (rogues' gallery, etc.). Subsequently, photographing criminals became commonplace in Belgium, Switzerland, and other European countries. It was during this time that specialized techniques, methods, and equipment for photographing criminals were rapidly developed. Significant progress in this field was achieved by the French criminologist A. Bertillon, who constructed several cameras for identification photography, crime scene photography, and photographing corpses.

He also developed rules for signaletics and metric photography (1885–1888)²⁸.

When first publishing *A Practical Handbook...* at the end of the 19th century, H. Gross envisioned the prospects of introducing photography as a means of visualization into the process of crime detection and investigation: *"The greatest utility of photography is demonstrated in its application to criminal procedure: only recently has it been introduced into this field for the first time, and its application is already so diverse. While we can only anticipate its successful future, in some cases photography proves to be expedient, but we cannot even imagine all the spheres of photography application, as the cases known to us are only a tiny fraction of all the assistance that photography can provide to the cause of justice"*²⁹.

To illustrate the criminal case, H. Gross recommends using photography for footprints at the crime scene; bloodstains; papillary patterns; physical evidence; documents and manuscripts; individuals; objects in X-rays; microobjects.

A Practical Handbook... by H. Gross reflects on the prospects of using photography in criminalistics: *"Among lawyers, there are many amateur photographers who understand how photography can serve the cause of justice, so there is hope that all more or less valuable discoveries in this field will not remain fruitless. In any case, we must work systematically and utilize everything that can be somewhat useful for*

27 Thorwald J. Die Stunde der Detektive. Werden und Welten der Kriminalistik. Zürich und München, 1966. 286 p.

28 Комаха В. В. До питання стосовно хронології створення окремих криміналістичних установ. *Актуальні проблеми держави і права*. 2008. Вип. 44. С. 245–246. URL: <http://www.apdp.in.ua/v44/47.pdf> (date accessed: 28.01.2024) ; Юсупов В. В. Криміналістика в Україні у XX — на початку XXI ст. (історико-теоретичне дослідження) : дис. ... д-ра юрид. наук. Київ, 2018. С. 83.

29 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAAAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

*crime investigation in this direction. For the convenience of review, we must comment on all photography achievements from two sides: what can we, as criminalists, achieve today through photography? when could we use it later?"*³⁰.

Later, photography became an essential element of *visualization technology* in criminalistics. It began to be combined with specialized visualization devices or graphic aids (chalkboards, marker boards, flip charts, etc.). In the digital age, such tools constitute a certain intellectual system of criminal analysis.

However, according to H. Gross, a list, table, and photograph are not the only means of providing visualization in a criminal case. He notes that small bloodstains (splatters) are better preserved in the form of a drawing: *"For example, splatters... can be drawn while preserving their true dimensions; in other cases, it is advisable to limit to a seizure, but in any case, after the completion of the inspection protocol"*. Further, he states: *"Photography will never completely replace drawing and is only its most desirable complement"*³¹.

In the 20th century, criminalistics had an arsenal of scientific and technical tools that allowed not only to describe the course and results of investigative actions but also to visually present them to all participants in a criminal proceeding. And the leading place among such means belonged precisely to graphic tools and methods: plans and flowcharts.

A considerable amount of detail in the photographs made it difficult for the investigator to identify the main points and to track the routes of participants in an investigation, relative positioning

of distant objects, their placement on the terrain, etc., in large areas. Most frequently, other means of recording/visualizing (such as photography) did not replace plans and flowcharts but rather substantially supplemented them (especially in adverse weather conditions [fog, rain, snowfall, etc.], as well as in situations involving cluttered areas or premises, or equipment malfunctions).

There arose a need to develop forensic recommendations both for preparing plans and flowcharts during interrogations (since sometimes it is quite difficult to describe with words the placement of people, vehicles, or other objects at the time of the event, their movements, etc.: in this case, the interrogated person drew up a flowchart (plan) independently or with the assistance of the investigator, specifying information relevant to the case, which was then noted in the interrogation protocol), and for explaining specific graphic terms (in particular, "plan", "flowchart", "technical drawing", "diagram", "draft", "figure", "illustration", "sketch", "drawing", "croquis", etc.).

In the second half of the 20th century, while working on complex multi-episode and group cases, understanding the relationships between separate crimes, analyzing digital indicators and reporting, and illustrating document flow in financial accounting, investigators were recommended to create graphic flowcharts. Therefore, flowcharts illustrating criminal connections of suspects (defendants), relationships between different organizations and institutions, departments (plants) within a single enterprise (institution), the

30 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbg_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

31 Ibid.

structure of the department where crimes had been committed, rapid turnover or accounting document flow, places and methods of committing crimes, and evidence belonging to specific episodes or persons, etc., became widespread.

Most often, in cases with several episodes, “chessboard” flowcharts were created, indicating the concise content of episodes and other details (i.e., specific evidence incriminating the defendant, specifying whether he/she admits guilt and for which episodes of criminal activity, the amount of damage caused by his/her actions, etc.).

Graphic flowcharts with conventional symbols helped the investigator to quickly locate the necessary places on the plan, saving time on adding new relevant forensic information to it. Such improvement of symbolic images in flowcharts fulfilled one of the main requirements of organizing an investigator’s work: the rational use of working time.

The recommended “chessboard” flowchart proved useful for organizing a crime and compiling the indictment, making it the most common document complementing the investigation plan for complex multi-episode group cases.

Even flowcharts with the same content and purpose could take different forms. Sometimes different geometric shapes were used, connected by lines (often of different colors) according to identified and anticipated relationships (identified relationships were indicated by solid lines, anticipated ones by dotted lines).

To attain the highest level of organization and clarity in work, the leader of the investigative group should be familiar with the current information about a crime under investigation (or series of crimes) and take measures to ensure that all members of the investigative group (brigade)

are informed. If such a group (brigade) is small but dispersed in different locations, it is recommended to plan special days for meetings and to obtain part of the information not from protocols and other documents, but from “chessboard” flowcharts, flowcharts, defendant accounts and graphs, which reflect information of interest to all members of the investigative group (brigade).

In the 20th century, criminalists (consciously or unconsciously following the recommendations of H. Gross) continued to refine the existing and develop new means of visualizing criminal cases.

Turning back to the analysis of the forensic guidelines presented in *A Practical Handbook...* by H. Gross, it is noteworthy that his proposed approach to investigating crimes stems from reconstructing the event of a crime through its consequences (evidence-traces), that is, based on the objective-trace environment at the crime scene. According to H. Gross’s intent, the outcome of such reconstruction should be a *mental model of the crime event* formed in the investigator’s mind through constant analysis of relevant forensic information acquired during the investigation process. Additionally, the investigator also constructs a *physical model*: a criminal case (criminal proceeding). These two crime models are intended to create a comprehensive and objective picture of the committed unlawful act, as well as to facilitate its understanding during trial.

From our perspective, H. Gross, an experienced practitioner, understood that the above-mentioned process of modeling forensic information occurs exclusively in the investigator who investigates the crime from its discovery, through the moment of disclosure (clarification of all essential circumstances of the unlawful event), and up to the compilation of the final

report, which systematically organizes evidence. However, if the investigator has not completed an investigation and has transferred the materials of a criminal case (proceeding) to another, then the described process of model formation will not immediately be evident for the new investigator, as he/she has not personally examined the crime scene, interrogated the victim and witnesses, or conducted other investigative actions. That is why, according to H. Gross, graphic representations and lists (from which everything unimportant is crossed out) should assist a new investigator in transitioning from ignorance to knowledge in a criminal case by familiarizing themselves with both non-visual (non-obvious) traces of evidence and visual (obvious) ones. At the same time, the described process of perceiving criminal case (proceeding) materials by the new investigator allowed him to look at the case from a different angle and apply his/her own analytical skills.

The *technology of ensuring visualization in a criminal case*, proposed by H. Gross and intended by the author of *A Practical Handbook...* to become the basis for crime investigation, requires implementing

two main operations: 1) creating a visual image of the object (trace, object, process, phenomenon, etc.); 2) visualizing the object by reproducing (presenting) its fixed image. H. Gross believed that such reproduction should, if necessary, be combined with the general scientific method of measurement: *"If possible, photographs, technical drawings, and the results of precise measurements of not only the entire scene but also individual objects, as indicated by forensic experts, should be included in the case..."*³².

Over the past four decades, the described method of graphical visualization has gained popularity in investigative practice and scientific research by criminalists due to the development of computer forensics³³, spread of computer technology, and application software. Some publications illustrate current possibilities of using this method in investigative practice, particularly for the analysis of stages (phases) of criminal activity³⁴; structure of criminal activity; predictive model of a series of crimes³⁵; the process of investigating crime in general and preparation for a tactical operation in particular; phone calls during the investigation of organized criminal activity³⁶; scenes, dependencies

32 Gross H. Op. cit. Teil I. URL: https://books.google.com.ua/books?id=BB3ZAAAAMAAJ&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (date accessed: 28.01.2024).

33 Хахановський В. Г. Проблеми теорії і практики криміналістичної інформатики : монографія. Київ, 2010. С. 138–210.

34 Таран О. В. Криміналістичне забезпечення розслідування злочинної діяльності у сфері порушення авторського і суміжних прав : дис. ... канд. юрид. наук. Київ, 2005. С. 45–47.

35 Старушкевич А. В. Криміналістичний мережевий аналіз організованої злочинної діяльності та можливості його використання у сфері протидії нелегальній міграції та торгівлі людьми. *Митна справа*. 2004. № 3 (33). С. 19–32.

36 Idem. Метод криміналістичного аналізу телефонних викликів та можливості його використання у розслідуванні організованої злочинної діяльності. *Бюлетень Міністерства юстиції України*. 2003. № 11. С. 49–67 ; Idem. Метод криміналістичного аналізу телефонних викликів і особливості його використання при розслідуванні злочинної діяльності у сфері наркобізнесу. *Вісник Київського національного університету імені Тараса Шевченка. Серія «Юридичні науки»*. 2004. Вип. 60–62. С. 39–47. URL: http://visnyk.law.knu.ua/images/pdf/60-62_2004.pdf (date accessed: 28.01.2024).

(relationships) between various phenomena and processes, quantitative data of criminal economic activity³⁷; quantitative data of criminal economic activity³⁸; tracking the movements and detection of suspects during crime commission; chronology of criminal activity within an organized criminal group³⁹; interactions (relationships), flows of money and goods, events, individual actions, telecommunications data, hidden profits⁴⁰; materials of a criminal case (proceeding), etc.

In the preceding twenty years, such an applied area of forensic research as *Criminal Intelligence GIS Solutions for Intelligence Analysis* has become widespread

in leading countries of Western Europe⁴¹. Under the concept of this research area, each crime starts from a specific location. GIS software products assist investigators in visualizing events, people, and critical infrastructure, allowing them to address immediate tactical challenges by determining the whereabouts of potential suspects for subsequent analysis. These modern software products enable investigators to actively engage, obtain needed information, support their planning in criminal proceedings, and allocate resources (time, people, means, etc.). Modern GIS systems provide an integrated platform for various types of relevant forensic information, facilitating

- 37 Комарков В. С., Митрохина З. И. Графические изображения в следственном осмотре места происшествия. *Криминалистика и судебная экспертиза*. 1976. Вып. 13. С. 17–23.
- 38 Мочкош Я. В. Наочно-інформаційні таблиці в слідчій практиці. *Радянське право*. 1976. № 1. С. 32–34; Idem. Засоби дослідження кількісних даних злочинної економічної діяльності. *Право України*. 2001. № 5. С. 114–117.
- 39 Аленин Ю. П., Лазарев А. А., Сухова Г. И., Тищенко В. В. Взаимодействие при раскрытии и расследовании очагов корыстно-насильственных и половых преступлений : метод. рек. Одесса ; Симферополь, 1995. С. 79–81.
- 40 Бейкманис Ю. У. Возможности анализа оперативно-розыскной информации, используя информационные технологии (специальные компьютерные программы). *Спеціальна техніка у правоохоронній діяльності* : мат-ли II Міжнар. наук.-практ. конф. (Київ, 22–23.11.2005). Київ, 2006. С. 198–216 ; Никифорчук Д. Й., Бусол О. Ю. Проведення аналізу оперативно-розшукової інформації: аналітична розвідка : монографія. Київ, 2010. С. 33–47 ; Цільмак О. М., Користін О. Є., Заець О. М. та ін. Сучасні методи досудового розслідування кримінальних правопорушень : підручник / за заг. ред. О. М. Цільмак. Одеса, 2017. 352 с. URL: <https://dspace.oduvs.edu.ua/server/api/core/bitstreams/b8885019-499a-4287-aa91-7feb15b6721e/content> (date accessed: 28.01.2024) ; Федчак І. А. Основи кримінального аналізу : навч. посіб. Львів, 2021. 288 с. URL: <https://dspace.lvduvs.edu.ua/bitstream/1234567890/3723/3/%D1%84%D0%B5%D0%B4%D1%87%D0%B0%D0%BA%20%D0%BE%D1%81%D0%BD%D0%BE%D0%B2%D0%B8%20%D0%BA%D1%80%D0%B8%D0%BC%20%D0%B0%D0%BD-%D0%B0%D0%BB%D1%96%D0%B7%D1%83.pdf> (date accessed: 28.01.2024).
- 41 Chen H., Miranda R., Zeng D. D., Demchak Ch., Schroeder J., Madhusudan Th. (Eds.) *Intelligence and Security Informatics: First NSF/NIJ Symposium, ISI 2003 Tucson, AZ, USA, June 2–3, 2003. Proceedings*. Berlin, 2003. 392 p. ; Chen H. *Intelligence and Security Informatics for International Security. Information Sharing and Data Mining*. New York, 2006. 182 p. DOI: [10.1007/0-387-30332-4](https://doi.org/10.1007/0-387-30332-4) (date accessed: 28.01.2024) ; Ratcliffe J. H. *Intelligence-Led Policing*. Portland, Oregon, 2008. 265 p. ; Scott Jr. E. D. *Police Information Sharing All-Crimes Approach to Homeland Security*. El Paso, 2009. 212 p. ; Ronczkowski M. R. *Terrorism and Organized Hate Crime. Intelligence Gathering, Analysis, and Investigations*. Boca Raton London New York, 2012. 381 p. ; Milne R. *Forensic Intelligence*. Boca Raton FL, 2013. 262 p. ; Boba Santos R. *Crime Analysis With Crime Mapping*. Thousand Oaks, California, 2017. 663 p.

spatial analysis and visualization. The indicated information systems are useful for collecting, analyzing, visualizing, disseminating, and evaluating forensically significant information, as well as for creating predictive models of criminal activity to support the tactical and strategic decisions of investigators.

During the last decade, research findings aimed at creating semantic models have been published. These models “link” an event to time, place, specific objects, and subjects of activity, thus associating them with specific unlawful actions. The technology for constructing such a *semantic model* involves defining numerous concepts necessary for describing a crime, which are then grouped semantically closely together. In our view, the future lies in the use of network models, which are best able to comprehensively describe the content of criminal proceedings using intelligent information systems. That’s why, effectively formalizing the structure of criminal activity will enhance the information support provided in criminal investigations, bringing it to a new, modern standard.

The method of graphic tables presented by H. Gross essentially anticipated an entire area for future research: *forensic technologies for enhancing visualization in criminal proceedings*. These technologies encompass a system of organizational and managerial measures, scientific and technical tools, operations, techniques, methods, processes, devices, and materials, as well as scientific descriptions of how to utilize scientific methods and technical means for capturing, demonstrating, and visualizing information during proving of the stages of pre-trial investigations and trial.

Today, virtually every investigator has access to means of visualizing a crime event model (specialized computer programs capable of modeling and visualizing the crime scene, as well as the crime event itself in the form of a 3D model: this can be conditionally referred to as a *virtual investigative experiment*). Creating such a computer-animated 3D model of a crime event is possible, for example, using programs such as *3DEyeWitness* and *TheCrimeZone*.

Using computer programs, an investigator also has the ability to create and visualize complex analytical schemes (intelligent maps), graphs and diagrams (i.e., *Microsoft Visio*, *EDraw Mind Map*, *Visual Understanding Environment*, *Xmind*), and flowcharts with visual representation of various relationships (for example, flowcharts depicting relationships between members of criminal groups, flowcharts showing connections between pieces of evidence in a criminal proceeding, etc.).

Sometimes, the information-analytical support for investigating serial (multi-episode) criminal offenses requires analyzing significant volumes of data and identifying hidden connections within them. Much of this analytical work involves identifying relationships between different objects (such as people, events, evidence, etc.), with the key concepts being “object” and “relationship”. This information is often impossible to aggregate, making traditional methods of presenting it through screen forms and tables largely inefficient.

In addition, information may sometimes originate from interrelated or entirely independent sources, which can be inconvenient and unreliable for identifying information objects and effectively selecting them from such data

sources, given the significant volume of duplicate information. This issue can be addressed using visual analysis tools and graphic data such as specific diagrams depicting relationships, event sequences, and transactions. The use of such visualization tools should not impede the ability to work with a separate object to identify its connections with other objects⁴². In the USA and leading European countries, investigators commonly use *IBM i2 Analyst's Notebook* software to overcome this problem and analyze the mentioned data. This software suite serves as a visual analytical environment recommended as a standard in the field of criminal analysis. The efficiency of using *IBM i2 Analyst's Notebook* was tested by Polish researchers⁴³: it enables quick and efficient analysis of interconnected object systems and the dynamics of sequential events, displaying research findings in easy-to-understand flowcharts and diagrams

Conclusions

Therefore, there arose a need to counter professional, organized, and transnational forms of crime, promoting changes in the organizational structure of police services and also leading to the improvement of means and methods for such counteraction in leading Western European countries in the second half of the 19th century. H. Gross, an examining magistrate with years of experience, successfully systematized the existing forensic knowledge at that time, establishing

a new direction in applied scientific knowledge: criminalistics. One of his fundamental and detailed works revealed the essence of two crime investigation methods: the method of determining the moment of firm conviction about case circumstances and the method of graphic tables. Analysis of these methods has shown their orientation towards the investigator's impartial approach to the information received at the outset of a potential criminal investigation, as well as the appropriateness of visualizing relevant forensic information separately from criminal case materials to facilitate its perception and systematization.

From these methods, the following conclusions have been drawn: crime investigation involves the use of specific actions and techniques; the investigator must approach the information received during the investigation impartially; at the beginning of alleged crime investigation, one should not rush to conclusions, they should be developed as the truth is clarified; the investigator may involve other experts (well-versed assistants); the basis of crime investigation methods is the step-by-step execution of the algorithm of actions. After implementing each subsequent stage (step), the investigator has to summarize received results (preferably in written, tabular [visual] form).

H. Gross's analysis of investigation methods has demonstrated that his developments remain relevant today due to the prospects of developing a modern applied scientific area (forensic technologies for enhancing visualization

42 Воронов І. Використання технологій візуального аналізу даних та виявлення прихованих зв'язків у протидії терористичній діяльності. *Протидія терористичній діяльності: міжнародний досвід і його актуальність для України* : мат-ли міжнар. наук.-практ. конф. (Київ, 30.09.2016). Київ, 2016. С. 60.

43 Chlebowicz P., Filipkowski W. *Analiza kryminalna. Aspekty kryminalistyczne i prawnodowodowe*. Warszawa, 2011. P. 108.

in criminal proceedings) and specific challenges related to unbiased analysis by forensic investigators of relevant information at the initial stage of criminal offense investigations.

Методи розслідування злочинів за Гансом Гроссом: минуле та сучасність

Анатолій Старушкевич

Метою дослідження є визначити роль запропонованих Г. Гроссом методів розслідування злочинів у становленні й розвитку криміналістики та довести їхню актуальність сьогодні. Для досягнення поставленої мети застосовано методи наукового пізнання: спостереження, порівняння, абстрагування, аналіз, синтез, моделювання тощо. Доведено внесок Г. Гросса в започаткування криміналістики як науки. Увагу акцентовано на двох запропонованих ним методах розслідування злочинів — визначення моменту твердого переконання про обставини справи (неупереджене ставлення слідчого до отриманих на початку розслідування відомостей) і графічних таблиць (візуалізування криміналістично значущої інформації). Підґрунтя цих методів склали такі висновки: розслідування злочинів передбачає застосування особливих дій і прийомів; слідчий має неупереджено ставитися до відомостей, які отримує у процесі розслідування; на початку розслідування ймовірного злочину не можна поспішати із висновками, їх слід формувати в міру з'ясування істини; слідчий може залучати інших фахівців (обізнаних помічників); основою методів розслідування злочинів є покрокове виконання алгоритму дій, після реалізації чергового етапу (кроку) слідчий повинен узагальнити здобуті результати (найкраще — у письмовому, табличному

(наочному) вигляді). Аргументовано, що запропоновані Г. Гроссом методи розслідування актуальні до сьогодні у зв'язку з перспективами розроблення сучасного прикладного наукового напрямку (криміналістичні технології забезпечення наочності у кримінальному судочинстві) та окремими проблемами неупередженого аналізування слідчим криміналістично значущої інформації на початковому етапі розслідування кримінальних правопорушень.

Ключові слова: метод пізнання у криміналістиці; метод розслідування; розслідування кримінальних правопорушень; історія криміналістики; криміналістична методика; забезпечення наочності у кримінальному судочинстві; неупереджене ставлення слідчого до інформації; кримінальний аналіз.

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The author declare that they have no conflict of interest.

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