OBJECTIVE DIALECTICAL RELATIONSHIP BEHIND FORENSIC IDENTITY

CZEBE, András*

The subject of resear

Forensic sciences support criminal law by providing general principled solutions for scientific questions that arise during the criminal procedure. In practice, the forensic expert is the person who presents this knowledge on a scientific level before the authorities. His/her task is often aimed at forensic identification, that is to individualize the link between two or more objects. However, following formal logic, the fact that forensic experts preliminarily analyze, compare and evaluate objects arisen, collected and managed under various conditions, make source conclusions contradictory. Throughout my doctoral thesis I will therefore address the theoretical question of how the theory of forensic identification can resolve the formal logical contradiction behind forensic identity? The answer to this question is of methodological importance in the field of forensics. Namely, because the relationship behind forensic identity highlights those axioms, that forensic disciplines are supposed to describe through the exploration of causal mechanisms.

The method of research

The task of forensic scientists is considerably complicated by the fact that the axioms in question are theoretical cornerstones that cannot be proved or refuted by complete induction.

The methods of research had to be adapted to the interdisciplinary nature of the topic. Accordingly, historical, comparative and exploratory research has been applied. During the processing of the Hungarian historical roots of the topic (concept of indicium) I strived for completeness and conducted original sourcing and analysis. I only used secondary sources exceptionally. I processed the Hungarian legal literature related to the field of research as fully as possible, and the analysis of logical and philosophical works concerning the narrower topic of my dissertation was also unavoidable. In the analysis of the foreign literature, I mainly used the original sources available in English. My narrower filed of research allowed for the direct use of few specific cases. The etymology of the concept of indirect evidence is closely

*Associate professor at Széchenyi István University, Deák Ferenc Faculty of Law and Political Sciences

related to the fixed demonstration system of thefeudal criminal procedure, which offered more possibilities to use indirect evidence as proof.
The independent disciplinary character of criminalistics is closely related to the theory of forensic identification.

The theory of forensic identification has stood the test of scientific and technological developments because it also provided methodological guidance for better understanding the concept of forensic identity. The mechanical separation of the concepts of trace and substance had a biasing effect on the development of the theory of forensic identification in Hungary. Forensic scientists are able to solve the formal logical contradiction of source conclusions with the philosophical theorems of objective dialectics. The residual problem of forensic identity should not be seen as unsolvable irrational residual problem.

Throughout the cognitive neuropsychological research in forensic identification, we must not forget the comprehensive study of the role of technologies, which are designed to perform cognitive operations in the procedural activities of forensic experts. Source conclusions expressed in numerical form can also bias the regulatory assessment of forensic evidence. Expert uncertainty should be converted into fuzzy sets that are also suitable in the field of forensics to represent natural linguistic concepts with uncertain boundaries.

In the framework of the present dissertation, I do not undertake a complete elaboration of the theory of evidence or criminalistic identification, but of filling the main theoretical gaps of forensic identification: the objective dialectical relationship behind forensic identity. For this I call for the help of the old-new notion of the concept of indicium, which gains new importance in the theory of forensic identification. I conduct the study of forensic identification through this field of dactyloscopy, because I believe that the debate surrounding the scientific basis of forensic disciplines can be best illustrated through this field.

The main results of dissertation and their applicability

Through the results of my dissertation, forensic experts will be able to understand and explain the uncertainty arising from the objective dialectical relationship behind forensic identity. The independent criminalistic discipline is built on the pillars of indirect evidences. Criminalistics began at the point where socially inherited and accumulated experiences, tools, and procedures were no longer sufficient to solve the practical problems of criminal justice. The accumulated forensic knowledge has necessarily changed into forensic science. One of the most important tasks of forensic science is to identify the "phenomena" of crime that can help in investigating, prosecuting and judging the phenomena of "crime".

The etymology of indirect evidence is closely related to the theory of indicium, which was developed in the feudal inquisitorial procedure. The theory of indicium reached its highest level of development between the 16th and 18th century, when all sources of criminal law in Europe came under the influence of the fixed demonstration system. The fixed demonstration system divided evidence into complete and incomplete evidence. Complete

evidence mechanically proved the guilt of the accused. Incomplete evidence, in contrast, was seen as indicia that were insufficient to resolve the question of guilt, nevertheless aroused suspicion against a particular person and provided a basis for the use of torture against non-nobles.

The inquisitorial procedure introduced by Carolina, was divided in two by the middle of the 17th century due to Praxis Criminalis. Under general inquisition the judge examined whether, in general terms, an offence was committed and by whom it was committed. On the contrary, special inquisition took place against known suspects. This differentiation closely relates to corpus delicti, a legal instrument used for material evidences that could prove the objective existence of a material crime with the highest probability. The aspirations of the absolutist monarchy deepened the theoretical gap between general and specialinquisition, as a result of which the legal instrument of corpus delicti became part of the indicium rules of late feudalism. In this way, the Criminal Procedure Code of Joseph I considered the determination of the corpus delicti as a core prerequisite for special inquisition, in which, depending on the nobility of the suspect, general indicia played a significant role. This privileged position has been extended to citizenship by Theresiana more widely than ever before, which has made it possible to remedy the quantitative failures of complete evidence through indicia. Hence, the empirical evidence of indicia could serv as a proper basis for making categorical judicial decisions. The rational theorems of classical criminal law have greatly contributed to the development of guarantee measures of criminal procedure, consisting of a formal and a material side. The formal side was determined by the structure of the inquisitorial procedural stages, whereas the material side was determined by the normative system of indicia. The abolition of legalized torture has transformed the inquisitorial procedure and has also led to the rapid development of legal demands on indicium-proofing. Although the awareness among judges maintained the scope of torture for a considerable time beyond its original period of validity, the doctrine in which confession was the queen of evidence has faded away. This is because contemporary detection methods could not meet the needs of the fixed demonstration system.

The development of indicium-proofing is necessarily related to the marginalization of the fixed demonstration system and the reduction of the extent of corpus delicti. As a result of the abolition of torture, the procedural structure of late feudalism offered more opportunities to use indicia as complete evidence. Thus, in the period of the josephinist penal law reforms, indicium was already the most common evidence in Hungarian court practice: any phenomenon from which a probable conclusion can be dawn related to the criminal offence. The josephinist reform movement against the inquisitorial procedure were also present in contemporary Hungarian legislative attempts. The draft Hungarian Criminal Code of 1795 was a clear attempt to introduce the legal institution of corpus delicti. This remarkable product of Hungarian feudal law, on the other hand, mechanically confused the concept of indicium with corpus delicti. Although the draft Hungarian Criminal Code of 1795 did not become law, but in many respects, it served as a model in the formulation of subsequent reform proposals. In this way, it has also made a significant contribution to today's terminological confusion, in which the concept of indicium is mechanically

confused with the concept of trace evidence. Indeed, my etymological reflection clearly confirmed that the concept of indicium is much more than trace evidence. After all, every trace evidence is an indicium, but not every indicium qualifies as trace evidence.

There is a necessary connection between the theory of evidence and the prevailing theories of criminal law. Nothing proves this more than the impact of the school of anthropology on the theory of indicium. Representatives of objective indicia have built the new scientific stage of evidence: expert evidence. They rightly declared an illusion the way in which the adherents of classical criminal law discussed the freedom of will: they describeree will as a psychological phenomenon independent of the material environment. However, they themselves made the same mistake while proclaiming the materialist and deterministic nature of their own theory. The theorems of the school of anthropology provided a way of confusing the objective nature of indicia with its evaluating methods. After all, the real task of the theory of indicium is to limit the set of uncertainties that remain with certainty as far as possible for the trier of fact. In this way, the effectiveness of expert evidence depends to a large extent on the degree of development of the theory of indicium, as well as on the extent to which the expert and the trier of fact have mastered the theory of indicium. Although expert evidence is an invaluable aid in the nomothetic understanding of the "phenomenon" of crime, the trier of fact still has to reach a final verdict in the world of idiographic legal cognition in addition to the certainty of uncertainties.

The recognition of the partial reflection of evidence has led to the doctrine of the judge's inherent authority, in which the free deliberation of evidence plays an important role. While the sources of the fixed demonstration systemregulated the issues of proof and the assessment of evidence together with legal norms, the need to distinguish legal norms and evidentiary requirements arose within the theory of the free deliberation of evidence. The detection of the partial reflections of legally relevant facts and the appropriate justification of proof have thus become the subject of an emerging field of science.

The existence of criminalistics is justified by the need of practice, the primary aim of which is to promote the day-to-day work of the judiciary. Thanks to its foundations, this discipline has often come close to embarking on the path of mere empiricism, as its theoretical questions have been significantly relegated to the background in addition to the effective service of law enforcement practice. There was therefore initially no consensus among criminalists on the boundaries of criminalistics. Drawing the terminological and disciplinary boundaries of forensic knowledge was a necessary prerequisite for its systematization. It had to be clarified which issues of criminal sciences belong to it and to what extent. In the initial development of the concept of criminalistics, it was so divided by language area and author that even its elimination was raised. However, the lack of unambiguous terminology still has an impact today, which is mainly due to the differences between the European continental and Anglo-Saxon legal systems.

The literature debate surrounding the concept of forensics is rooted primarily in the development of criminology and criminalistics. In the 19th century a number of new criminal disciplines appeared alongside normative criminal sciences, the first practitioners of which developed newer concepts to specify newer issues. The transformation of these

spontaneously created concepts into scientific concepts was thus accompanied by a degree of terminological confusion. The concept of criminalistics was used by LISZT as a collective term for the disciplines dealing with crime, which was replaced by a narrower interpretation by GORSS. The latter view served as the basis for criminalists who considered criminology as a collective name for the auxiliary sciences dealing with the phenomena of crime, of which the science of criminalistics was only a subset. The first literary occurrence of criminalistics is therefore attributed by many authors to LISZT and GROSS. The truth is that GÓRSZKI used it earlier, in his 1848 work titled "Black Book: A collection of the most interesting crimes of old and new times".

In addition to the definition of disciplinary boundaries, the systematization of forensic knowledge was also conducted heterogeneously. Early systematization attempts ignored the theoretical foundations and definitions of its own division. The recognition of the objective dialectical relationship between criminalistic tactic and technique has changed the dualistic division of criminalistics. After all, investigating authorities use procedures developed by the discipline of criminalistics within the framework defined by normative acts for the purpose of effective crime detection. The successful application of such procedures is made possible by two essential components: knowledge of the relevant technical means and their appropriate use. Criminalistic procedures are therefore the most effective with the combined knowledge of the method itself, the technical aids and the rules of their applications.

After recognizing these objective dialectical connections, it was no longer justified to maintain the term "special criminalistic tactic", as the concept of "criminalistic methodology" more specifically reflects the essence of this stock of knowledge. The triple structure of criminalistics has thus become the most common in the continental European language areas, which was supplemented from an educational point of view by a fourth, introductory part in Hungarian literature. The latter should be called criminalistic methodology, which, in contrast to method, denotes the scientific research methodology of criminalistics.

Similarly, as the European criminalistic technique, the concept of forensic science began to be used in Anglo- Saxon language areas to denote the scientific methods of crime detection. This use of the term is still dominant today and its only supplemented by civil justice. The unification of terminology, on the other hand, is greatly hampered by the fact that the concept of criminalistics began to be used in a narrower sense by Anglo-Saxon authors as a branch of forensic sciences. Anglo-Saxon criminalists have paid little attention to these systematical issues which could be remedied by the concepts of expert evidence. The Anglo-Saxon concept of forensic sciences and criminalistics is thus reasonably compatible with the concept of expert evidence, which is also common in continental European linguistic areas. The main cause of these terminological and systematic issues can be traced to the differences between the two legal systems. Whether it is criminalistics or forensic sciences, one thing is for certain: the first and foremost stage of their disciplinary cultivation is the development of the theory of forensic identification. The independent disciplinary nature of criminalistics is closely related to the development of the theory of forensic

identification. The common goal of identification has proved to be decisive in the systematization of forensic knowledge. The theory of forensic identification thus has methodological importance, as it forms a unified system in forensics with its general concepts. The theory of forensicidentification describes test methods only insofar as they are necessary to close theoretical gaps. I myself found a theoretical gap in this very specific feature: the theory of forensic identification provides methodological guidance for understanding the objective dialectical relationship that lies behind forensic identity.

Soviet criminalistics has left its mark on the theory of forensic identification in Hungary. This by no means reduces the significance of its scientific axioms, as they have retained their validity to date. Academician POPATOV, as a pioneer of Soviet criminalistics, was among the first to divide the objects of forensic identification into source and reference objects. This categorization has stood the test of scientific and technical progress because it has shown that forensic identity could be achieved through the individualization of the link between the reference objects.

The theory of forensic identification was initially relied on the tracologcial concept of trace, in which the model of fingerprint identification was decisive. Accordingly, the process of forensic identification was built on the analyzation, comparison and evaluation of characteristics to identify their unique relationships. Since the mutually matching features of the reference objects became the building blocks of the theory of forensic identification, criminalists found themselves confronted with the philosophical question of the quality of these features.

Understanding the unique relationship of the reference objects necessarily presupposes research into the nature of the source object. That is, the quantitative changes of its characteristics take place within a certain quality range. Consequently, the link between the characteristics of the reference objects is unique as long as the quantitative difference of the latter does not show a change to an extent that would lead to a qualitative transformation of the source object.

Following formal logic, the fact that forensic experts preliminarily analyze, compare and evaluate objects arisen, collected and managed under various conditions, make source conclusions contradictory. The logical roots of the theory of forensic identification are therefore to be found in philosophical dialectics. Since forensic contradictions are objective, we should not attempt to eradicate them from source conclusions (in a formal logical way), but rather solve them. The only way to solve forensic contradictions is to ensure both the moments of identity and non-identity. The theory of forensic identification therefore lies on the philosophical thesis of the identity of identity and non-identity. The forensic interpretation of Hegel's theorem states that the generality (genus proximum) of the unique source object is the logical basis which succinctly and necessarily defines what quantity of identical features of the reference objects eliminates difference and vice versa: what quantity of different features of the reference objects eliminates identity. The unique characteristics of the source object are constantly changing as a result of various circumstances, but remain relatively constant within certain quality range.

The qualitative assessment of the identical and non- identical features has become the objective dialectical basis for identification. However, the specific axioms involved were limited to macro size objects with relatively constant morphological features. By the end of the 20thcentury the concept of tracological trace proved to be too narrow to indicate the objects of forensic identification. There were also qualitative changes in forensic cognition, as a result of scientific and technical development. Forensic analyzation of micro- and submicro-scaled substances became possible, to which forensic scientists introduced the concept of substantial evidence. The mechanical separation of the concepts of morphological and substantial trace has a biasing effect on the theory of forensic identification ever since. The emphasis here is not on the fact that substantial traces represent the source object beside themselves because, even if we know the material properties of the source object, there are no reference materials that could be used to draw a conclusion about the individuality of the link between characteristics based on their quantitative and qualitative assessment. This is the objective dialectic relationship, the importance of which LOCARD has drawn to the attention of the forensic community during the discussion of the principle of mutual exchange. Forensic experts needed new methods to monitor the outputs of high sensitivity analysis methods. With the development of forensic sciences during the 20th century, macro-scaled empirical relations were supplemented with micro- and submicro-scaled probability relations. Forensic experts were able to determine more precisely than ever the uncertainties arising from the induction problem surrounding ontological axioms. The case law of the Supreme Court of the United States clearly proves this: although the Daubert trilogy drew the attention of the forensic community to the individualization fallacy of "junk sciences", traditional empirical forensic approaches have not been eliminated from the justice system. The main goal of crime detection guides forensic identification, in which the objective dialectical robustness of expert conclusion helps legal practitioners. It is important to see, that forensic objectives are not constitutive, but rather regulatory. If forensic objectives were constitutive, experts would already implicitly assume that the reference object is the source object. Error lies precisely in this assumption. Although theory-development is an essential part of crime detection, we cannot diverge from the phenomenon itself. In the "phenomena" of crime there is always a degree of uncertainty because of the identity of identity and non- identity. The latter, however, should not be seen as an unsolvable residual problem. On the contrary, we must acknowledge positional irrationality in the process of individualization, namely that the residual is not unknowable but is not yet known at the given stage of development. This includes forensic sciences, which rely on the traditional empirical or Bayesian approach as well. Although the use of more advanced tools reduces uncertainty but does not completely eliminate it. Forensic sciences have always operated with a degree of uncertainty. With the expansion of the scientific horizon, they are now able to say even more what the scope of uncertainty is. In the field of forensics, mathematical logic did not make logic out of mathematics, but made mathematics out of logic.

The probabilistic relationship alone cannot eliminate or reduce the uncertainty of its essence. This is only possible if other independent background information is also taken

into account. Some of this background information is provided by constantly updated expert databases. However, the forensic expert will only be able to make the most effective use of his/her state-of-the-art scientific method if the law practitioner shares case- relevant background information with him/her. The latter, on the other hand, necessarily requires scientific transparency of forensic methods. Otherwise, the possibility of bias arises. All this is well illustrated by the recent development of dactyloscopy, which has been surrounded by livery debate in the scientific literature.

The controversy surrounding the scientific validity of forensic disciplines has mostly put the pseudoscientific stamp on dactyloscopy, which deals with the identification of friction ridge skin. Fingerprint experts should be able to understand and explain the philosophy of fingerprint identification, the methodology used in analyses, the permanence and uniqueness of friction ridges by, at the same time, relying on empirical and scientific research data. The permanence of volar skin lies in its own structure. The rising cells of the epidermis, through the constant cell proliferation of the basal layer, form an outer layer on the surface of the skin that consistently represents the unique arrangements of the basement membrane. The permanence of friction ridges is thus ensured by the three structural elements of the skin: the attachment of epidermal cells to each other, the basal epidermal cells to the basement membrane, and the dermis to the basement membrane. The features of the basement membrane zone are consistently represented on the surface of the skin through the continuous supply of skin cells. The uniqueness of volar skin is shaped by the accidental forces impacting the basal structure, which in themselves are influenced by an infinite number of factors. Although the fetal volar pads play a huge role in shaping the surface tensions that directly influence finger pattern development and ridge count, minutiae formation occurs on a different level. The basis of second level uniqueness are created by localized stresses, resulting from growth of the tissue layers of the digit and contact with existing ridge fields. Ridge morphology (third level uniqueness) paints a three- dimensional portrait of the collective individuality of the epidermis, reflecting the heterogeneous cellularcommunity along the basement membrane. Exact duplication of these physical stresses and cellular distributions can be completely ruled out in two different areas of developing fetal tissue. Since each individual friction ridge is unique, each friction ridge arrangement must also be unique, which can only come from a single source. Although the set of information that is reproduced during the process of trace formation can prevent individualization, friction ridge arrangement is till unique. Our dermatoglyphic conceptions may easily be wrong about this to date. However, no one can deny the fact, that "something" exists, which is called the permanence and uniqueness of the volar skin for now. That, with the help of the principles of objective dialectics we have the ability to identify finger marks.

As the term individualization can easily be misinterpreted in practice, there has been a move away from categorical towards probabilistic conclusions in fingerprint identification, given the extent to which the forensic evidence supports one of the following two competing hypotheses: there is sufficient evidence to determine that the two fingerprints come from different sources; there is sufficient evidence to determine that the two fingerprints come from the same source.

Despite the fact that the counting of minutiae historically dates back to statistical research carried out at the beginning of the twentieth century, it continues to serve as a basis for standardizing fingerprint identification in many countries. However, there is currently no scientific basis for determining a minimum amount of matching points between two impressions to make a single source conclusion. There are many situations in practice where fingerprint experts are confident about an identification in the case of only 7 corresponding minutiae. Conversely, several cases have been documented in which the reference objects came from different sources despite the mutual existence of 12 minutiae points. Instead of counting points, it is more realistic and accurate to consider also the quality of the characteristics. After all, source conclusions rest on the trained and qualified determination of the fingerprint expert. For a long time, the science of dactyloscopy did not address the degree of certainty of identification conclusions. However, with the development of the theory and practice of probability theory, it is becoming a fundamental requirement to communicate the degree of certainty of fingerprint identification. Nevertheless, experts often do not distinguish between the identification of extremely complex borderline fingerprints with few minutiae points and high-quality crime scene fingerprints with many minutiae points. Although the fingerprint expert may be confident in both conclusions, for the sake of transparency, it is appropriate to indicate the degree of certainty in both conclusions.

Despite the proliferation of statistical models and probability theory, there is still no standardized probability model to quantify the weight of fingerprint evidence. Several probabilistic models are currently under development, of which the U.S. Department of Defense's FRStat software appears to be the most promising, which quantifies how similar the minutiae configurations are between fingerprints. It is expected that in the near future, more probabilistic models will be tested in practice and that the communication of fingerprint identification conclusions will be standardized.

In 2004, dactyloscopy witnessed one of the most highly publicized misidentifications: the MAYFIELD-case, in which cognitive bias was also named as a possible source of error. Practitioners of cognitive neuropsychology have in recent decades drawn the attention of the scientific community to a number of contextual influences that can lead to bias in forensic conclusions depending on the flexibility of the human perceptual system. However, in the course of such investigations, we must not forget the comprehensive examination of the role of cognitive technologies, which are designed to perform cognitive operations in the tasks of forensic experts. Since these cognitive structures can mislead the process of forensic identifications, we need to assess the quality and quantity of cognitive infocommunication between these cognitive actors. Forensic genetics is particularly involved in this process, which has undergone tremendous development in recent decades through FDP and MPS technology.

Exploring the nature of forensic technology and human cognition thus draws attention to a new field of research: forensic cognitive infocommunicaion. The interdisciplinary research field of forensic cognitive infocommunications (Forensic CogInfoCom) has emerged from the convergence between forensic science and cognitive infocommunications.

One of the main findings of Forensic CogInfoCom is that forensic experts and the infocommunication network surrounding them are becoming increasingly intertwined at different levels through the greater integration between these fields. As a result, new forms of cognitive competence are appearing in forensic subdisciplines, which are neither purely human or purely artificial. This necessitates serious thinking about new approaches and methodologies for the synchronization of new human-technology competences based on forensic principles. Forensic CogInfoCom investigates the link between forensic science and cognitive infocommunications. The primary goal of Forensic CogInfoCom is to provide a systematic view of how cognitive processes can co-evolve with forensic infocommunication networks so that the competences of the human expert may not only be enhanced through these networks, but may also cooperate with the competences of any artificially cognitive forensic network. This linkage and enhancement of cognitive competences is largely addressed towards developing new forensic applications in which human and/or artificial cognitive systems are enabled to work together more effectively and efficiently.

The use of forensic sciences in criminal proceedings necessarily requires the law assessment of identification conclusions. The difficulty of the latter arises from the fact that an opinion drawn up in the possession of specific expertise must be assessed by a law practitioner with general knowledge and legal training. In this way, the expert must be aware that his/her conclusion becomes the phenomenon of "crime", only after law assessment. In practice, however, it is often a problem to evaluate an expert opinion that objectively expresses probability, for which a significant amount of training is reauired. Thus, a general criticism of the Bayesian approach today is that it often relies on subjective numerical prior probabilities. Although these estimates are based on informed guesses, it is quite difficult to convert them into exact numerical form in the absence of experimental data. My doubt about the application of the Bayesian approach on its own stems not from the inaccuracy of the results, but from the fact that it may give a speculatively distorted impression of accuracy.

After all, in addition to the certainty of uncertainties, it is for the trier of fact to determine the probative value of expert evidence by comparing it with other data and evidence available in the case in question. This is how subjective elements take place in jurisprudence. Although positive law seeks to eliminate this subjectivity, criminal justice is also looking for certainty somewhere in the midst of uncertainty: the best possible solution available at a given degree; because the only one correct decision does not exist, only the one which is the most authoritative in the given conditions of the given age, both factually and legally. Based on the results of my research, which is the basis of my dissertation, I formulate the following suggestions for the practical usability of the above theses. Proposals towards the legislator: Based on the reasons explained in Chapter II.1. of the dissertation, it seems necessary to define the concept of indicium more precisely that at present.

Proposals towards law practitioners: Given that a deeper understanding of the axioms of forensic identification facilitates a proper evaluation of forensic evidence, interdisciplinary discourses (conferences, training) can facilitate a more accurate understanding of the results of identification, evaluation and proper interpretation of these underlying expert opinions.

Proposals towards forensic practitioners: The theoretical foundations of forensic identification can be compelling, and they can also contribute closely to examining, and, if necessary, rethinking the bases of individual forensic disciplines, taking into account the specific aspects of each forensic identification discipline.

The theoretical foundations of forensic identification can contribute to the use of the revealed results in recommendations, methodological letters, standards, good practice proposals prepared in each forensic identification discipline. The results of the dissertation may indicate that in addition to the dynamic technical development of different forensic fields, the elucidation of the theoretical foundations of the identification processes have received less emphasis so far, but this is unlikely to be avoided in the future. An intensified scientific discourse on the topic may help the representatives of co-sciences, philosophy, logic and natural sciences to explore further areas of forensic identification, and these findings can also be relied upon by everyday forensic practice.

The findings of the dissertation concerning dactyloscopic identification, as well as the research results that form the basis of them, can be directly used in fingerprint expert practice. In Chapter III.4.5. of the dissertation I draw attention to the dangers of cognitive bias, while in C hapter III.5. I propose possible future solutions to it.