



Importance, Tasks and Principles of Criminal Traseology

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Abstract:

This scientific study entitled: importance, tasks and principles of criminal Traseology, aims to explain the importance of Traseology as a branch of criminology, and its value to the study of traces at the crime scene, but also their probative value in detecting crime, their origin and their value in the reconstruction of the crime scene.

Another goal is how to examine some of the most common types of trace evidence that we face more often in cases of crimes investigations and to discuss the concepts of collection (receiving), storage, identification and use of these in the investigation. The final aim of this study is the narrative of the history of development and origin and significance and meaning of the word Traseology, and explanation of the scientific value of the Locard's theory of exchange; Locard believed that whenever two objects come into contact with each other, materials of the first would be transferred to the second, and materials from the second would be transferred to the first.

Key words: Traseology, science, classification, research, detection, embedding, traces and mechanism of formation.

1. Definition of traseology

Traseology involves study of traces (From French. Trace - print and From Greek. Logos - science), however professional

literature is not unique about whether it involves study of all sorts of traces, or even if it is part of forensics, or if it is completely part of criminology.

There are opinions in literature that consider "traseology as a science" which elaborates methods, ways and means of determining the group affiliation and object identity based on its traces, respectively *studying the external characteristics of structure of object in question*.¹

Traseology is branch of forensics which studies traces left by objects with specific external structure. The fundamental tasks are to identify the object that made prints. Another task of traseology is to identify the unit based on parts meaning defining the objects, whose parts would belong to the unit before. Therefore, traseology studies prints, which reflect the external structure of objects and pursues the identification of these objects and explains the circumstances related to the mechanism of formation of these traces.²

Therefore, in this context the traseology can be interpreted as science of prints, as a collection of various disciplines that are linked to it concerned with prints as scientific research objects. If criminal offence is subject to actual research then criminal- traseology is concerned with this on broader sense.³

2. Duties and principles of traseology

Traseology is branch of forensics, which studies traces that are left by objects with a specific external (stable) structure. The fundamental task is to identify the object that left traces. But in some cases, when there is no information or when the object that left traces is not found, the study of traces leads to the determination of group affiliation of the objects that made them

¹ Vladimir Vodinelliqi, Kriminalistika, Shkup, 1985fq.718

² Vesel Latifi; Kriminalistika, Prishtinë, 2011, fq.501

³ Berisav Pavicic, Dusko Modly, Petar Veic, Kriminalistika, Zagreb, 2006, fq. 580

(the form of shoe, type of tyre print, the type of tool used for breaking etc.) . Another task of traseology is to identify the unit based on parts e.g. defining the object, whose parts would belong to the unit before. Thus, glass debris discovered at the scene of traffic regulation violation with the other glass debris in the vehicle's headlights suspected to have caused the accident makes a unit.

Finally, traseology task is to explain the circumstances of how the traces are formed. Thus, by detecting traces in the door latch, it is understood how the door was opened , by detecting tyre tracks left by the car we understand the direction, footprints determine the specifics of human walking. In this way traseology is concerned with study of traces, which reflect the external structure of objects and pursues two objectives: to identify these objects and to clarify the circumstances relating to the mechanism of formation of these traces.⁴

Traseology is based on these key principles.

- Every physical object has an external individual structure. The Objects of the same kind have general common external structure, which makes them similar to each other. However each one of them has individual signs on external structure. There is no such object completely polished. Each object has uneven surfaces, which reflects it in the trace at the moment of contact with another suitable object. In many cases, this surface is so tiny (micro surface) that it requires special tools to search, observe and examine them.⁵
- Individualization of object is conducted based on a set of signs related and dependent on each other. In order to distinguish this set of individual signs in the external structure of object, the nature of object is to be studied

⁴ Skender Begeja, Kriminalistika, 2004, Tirana, 113

⁵ Skender Begeja, Kriminalistika, 2004, Tirana, 114

- e.g., the processes of formation of external structure at the time of creation of the object, processing, preparation, using, correcting conditions etc.
- Therefore, when preparing, an external specific shape given to the tool, used by the offender as a breaking tool, with general and individual signs. Later on, in storing, using, constructing condition, the external structure of tool takes some new signs and loses some previous ones.⁶
 - Mainly the external structure of the object with general and individual signs, is not fully reproduced in the trace; this reflection is dependent on the material and mechanism of formation of the trace; that group of signs, sufficient for individualization of the traseological object is called the minimum of identifying signs; the assessment of this minimum of signs necessary for identification is made in traseologic expertise based on quantity and quality criteria
 - Traseologic identification is possible when signs of object that left traces and the reflected signs in traces are relatively stable; thus, identifying traseologic objects are only solid and semi-solid objects (metal, wood, rubber, leather, fabric objects etc.) which have the ability to retain external specific shape, whereas, liquid objects having not stable external structure cannot be objects of traseological identification;
 - Reproduction of external structure of object in trace is either contrast image or lining image.⁷

3. Understanding the trace and its sources

Terms ***Evidence, Traces*** are broad terms for micro materials that can often be even microscopic material. Such evidence can often be overlooked in the crime scene investigation unless

⁶ Skender Begeja, punimi i cituar 114

⁷ Vesel Latifi; Kriminalistika, Prishtinë, 2011, fq.501

special care is exercised during search. The diversity of trace evidence is endless.

When an individual comes into contact with a person or place, certain minor changes occur that probably seem irrelevant. Small parts such as fibres, hair and microscopic residues mixed, can remain by the person or can be taken from him by contact with the environment or other individual. Explicitly saying, it is impossible not to sustain changes in one way or another when coming into contact with the environment no matter how small it may be or in an unnoticed way by leaving or taking something from the environment. This transfer concept is so-called Locard Exchange Method and also serves as a basis for the study of evidence tracing.

The importance of evidence exchanging is that these evidences present the connection of suspects to victims or specific locations.

Exchanged evidence is physical evidence through contact, but even though they are microscopic they can become a very important part for cases investigation.⁸

There is no unique opinion about the meaning of the trace in criminology. As for beginning, **trace** is broader definition as a caused material change related to cause criminal offence. Such meaning of trace in fact is a signal, signal transmitter, such as various optical-acoustic, mechanical (evidence) (including traces) and other signals.

The trace bears on itself informative composition (modal, local, temporal, objective, subjective, motivating, instrumental etc). In this context it's about "**trace text**" (Spurentext-German) of presentation of the offence.

As a subject of research, the definition of broader understanding of the trace is subject to various scientific

⁸ Barry A. J. Fisher; *Techniques CRIME SCENE INVESTIGATION (s e v e n t h e d i t i o n)*, CRC Press, 2004, fq.171

disciplines concerned with clarifying the offence (e.g. Traseology, circulatory-technical, ballistic).⁹

So in this context the trace includes the changes sustained in the location where criminal offence occurred, such as blood, saliva, sperm, cigarette butt, pieces of ripped off paper left by the perpetrator, wood pieces, sawdust residue by breaking tools etc.

The science of criminology is only concerned with the study of methods of establishment and obtaining these traces. However, examination is not handled by criminal expert, but by specialists in other sciences. e.g. blood, sperm, saliva traces are handled by forensic expert (biologist).

In the strict sense, word " trace " includes such changes in the crime scene which reflect external structure of the object that it left it. The trace in this sense is either contrast image or lining image of this object. Based on the reflection the identification of concrete object is obtained. Traces that reflect the external structure of objects left by them are traces of hands, feet, breaking tools and transportation vehicles etc.

These types of traces are called traseologic traces and are studied by traseology. The science of criminology does not deal with the study of methods of detection, embedding and obtaining these traceologic traces only, but it also deals with their examination. In detecting, investigating and prosecuting the offenses the traces, whether broadly or narrowly, have the same provable value. Traces of blood, for example, detected at the scene, have not less provable value than fingerprints when they are related to the incident that occurred.¹⁰

The strict meaning of trace as initial determination specialization may have different meanings and conclusions. Among special meanings of trace important for criminology is the meaning of identified trace.

⁹ Berisav Pavisic, Dusko Modly, Petar Veic, Kriminalistika, Zagreb, 2006, fq. 580

¹⁰ Skender Begeja, Kriminalistika, 2004, Tirana, 113

Identified trace is an expression of the external structure of the object (or its offence), on the other object (or her offence), created regarding causing of the offense, which is suitable for identification. This group of traces is exclusive object of criminology research, of criminal- traseology identification.

As a science of traces, traseology deals with systematic research of traces that include activities such as:

- Detection,
- Security and
- Explanation (interpretation) of traces.

Depending on the particular type of trace, as these activities are developed in various ways, different subjects take part in them.

Below is given a general observation on common basic grounds of criminal traseology according to its basic components.¹¹

1) criminal relevance (affiliation), which is about trace caused by the criminal offence or is related to the criminal offence, and that may be helpful to clarify the facts of criminal offence; In the previous text we have underlined that criminal traces, in essence, contain informative elements associated with the so-called "nine questions of criminology": 1) what happened? 2) when it happened? 3) where it happened? 4) how was it committed? 5) what was used? 6) with whom was it committed? 7) Why was it committed? 8) who is the perpetrator? and 9) What or who was attacked?

By analyzing these nine criminology questions it leads to conclusion that the trace as transmitter of material information (signals) contains these informative elements.

2) criminal trace is a material change on the external world, visible or invisible, macro or micro (small or big), which in essence is caused by a combination of physical processes of

¹¹ Berisav Pavicic, Dusko Modly, Petar Veic, Kriminalistika, Zagreb, 2006, fq. 580

reflection and / or separation, that are the result of the human, animal or object action and

3) The suitability for identification which is dependent on the quality of "notes" and cause of deformation when "recording" it. Embedded traces as source of information (signal) practically do not become old.¹²

4. Informative Elements and forms of traces

In the previous text we have underlined that criminal traces, in essence, contain informative elements associated with the so-called "nine questions of criminology": 1) what happened? 2) when it happened? 3) where it happened? 4) how was it committed? 5) what was used? 6) with whom was it committed? 7) Why was it committed? 8) who is the perpetrator? and 9) What or who was attacked?

By analyzing these nine criminology questions it leads to conclusion that the trace as transmitter of material information (signals) contains these informative elements.

- location (where),
- time (when),
- modal (how) and eventually modus operandi (MOS),
- subject identification (who, with whom, which),
- object identification (what),
- instrument identification (with what),
- motivation (why)
- relation
- differential and
- causal ¹³

¹² Berisav Pavicic, Dusko Modly, Petar Veic, Kriminalistika, Zagreb, 2006, fq. 581

¹³ Dushko Modly, Osiguranje mjesto kaznenog dogadjaja, Zagreb, 2001 fq. 15

5. Contact Traces

-This is a classical type of trace, which is caused by physical contact between persons or objects or between person and object. Contact traces can be divided according to different criteria, but no scheme can be satisfactory, because it doesn't take into account all different viewpoints. There are seven schemes more often prescribed for the classification of contact traces. Each one of them is useful as it provides different views, though some are more appropriate.¹⁴

a) *Classification by criminal offence:* One regular way is the division of traces according to the type of criminal offense. Thus, we will have traces of murder, robbery, violence, rape, etc. Although this scheme applies only in certain cases, bear in mind that each type of trace may appear linked with nearly each type of criminal offence. In other words, different types of traces are not limited to only certain types of offences. For example, blood stains are frequent in assaults or murders, but they can also be important in robbery scene. Traces of semen often are considered more important in rape cases than in other offences against sexual freedom and sexual unnatural actions, but in some cases related to these offences other traces can be even more important. There is a certain connection between a type of criminal offence and a sort of trace, and this connection can serve as an indicator on the occasion of searching the contact traces in the crime scene.

b) *Classification by type of material:* Another way of division is the one through the type of material which forms the trace. Therefore, we have metal, glass, plastic traces, etc. However, there are limitations here as well. For example the finger print on glass is examined the same as trace found in plastic surface or another non-transparent surface. Likewise, the trace found on a metal surface is examined and compared the same as a trace found in another material e.g. in wood.

¹⁴ Xhemajl Ademaj, Ekspertizat Kriminalistike, Prishtinë, 2010

c) *Classification by origin:* The trace can be physical, chemical and biological; another scheme of the division would be the one with origin of animals, vegetables or minerals. Under the first scheme, "physical trace" would be firearm, item, item trace, cartridges, whereas a narcotic sample would be a "chemical trace". "Biological Trace" would be e.g. hair, marijuana and traces of blood. This classification has a great value as indicators when selecting the most appropriate methods for collection and preservation of provable material. In Table 1 are listed examples of some material traces classified under this scheme.

d) *Classification by aggregate state:* Depending on their aggregate state, traces can be classified in gas, liquid and solid traces. Most of the material traces in crime scene are in solid state, e.g. clothing, tool, weapon, glass, paper, etc. Important traces in liquid state are e.g. Traces of fresh blood, flammable liquids in case of suspected arson. Gas samples are rarely collected, although presence of gas traces is frequent. Various tools for collecting gas substances at the crime scene or at the location of fire.

e) *Classification by questions to be answered:* Under this scheme, material traces are classified depending on whether they are used for reconstructing the incident, to link the suspect to the victim or with the crime scene as well as to exclude or to release the suspect. Likewise, the traces can be classified depending on whether they will serve as a lead in criminal processing as a provable material in court.

f) *Classification by way of creation:* As basis of this classification can also serve the connection of trace with the criminal incident being processed. In this case it is important to consider modes in which mixed persons involved have interacted, as well as the surrounding area and the sorts of traces that have been established upon these interactions. Examination and interpretation of traces lead to getting the idea about how the incidents occurred. Such examination of

traces can produce enormous benefit in criminal processing and when reconstructing the incident.¹⁵

Classification of traces by origin

Biologic	Chemical	Physical (traces)	Other
Blood	Fabric	Finger prints	Cloth Labels
Sperm	Chemicals	Firearm traces	Polygraph
Snot	Glass	Handwriting	Voice recording
Other bodily fluids	Soil	Pressed Material	Picture
Hair	Gunpowder	Numbers and signs on metal	
Plant	Metal	Footprints	
Bones	Minerals	Vehicle tyre tracks	
Tissues	Drugs	Equipment traces	
Urine	Paper	Typing Machine	
	Colour ¹⁶		

6. Traces role in crime scene reconstruction

Traces have broader use potential in determining the links that led to the restructuring, but only if the evidence is valid and interpreted properly. If evidence is not valid and accepted, it is considered as lost as if it had not existed. Furthermore, if evidence is not interpreted correctly, it will invalidate any attempt to reconstruct the case.

One could easily argue that the evidence not interpreted correctly is worse than as if there had been no evidence.

Several types of physical evidence represent the evidence tracking amount which will be discussed later here. As Turvey and Chisum underlined in the Preface, this is not a text book in technical mechanics of scene proceeding or procedures applied to forensic laboratories.

Nevertheless, it is essential that any person, who is involved in any way in the reconstruction of the scene, appreciates the contribution that evidence tracking can provide

¹⁵ Xhemajl Ademaj, Ekspertizat Kriminalistike, Prishtinë, 2010

¹⁶ Henry C. Lee, materialni tragovi, Zagreb, 1998, fq.7

in reconstruction process and links that can be defined by them. Most frequent types of traces include:¹⁷

- Fingerprints
- Blood and Sperm
- Hair
- Fibres
- Glass
- Stains
- Dust
- Footwear and tyre tracks
- Residue from firing weapon
- Tools/Equipment Signs
- Scattered Shells
- Explosion Residues
- Vehicle Headlights “on or off”

Anyone trying to reconstruct the case shall represent a part of knowledge of these types of trace categories for awareness or conscience.

It should be realized that although any type of ordering of tracking evidence is irrational this kind of custom exists.¹⁸

Conclusion

Knowledge over traseology and latest science and technology development are very important, they are of an utmost aid in detecting and documenting the crime and perpetrators.

We can conclude that adequate space and special position shall be given to traseology within Criminology or forensic science regarding handling traces left in crime scene. The importance is due to the fact that:

¹⁷ W. Jerry Chisum, BS, Brent E. Turvey, MS: CRIME RECONSTRUCTION; 2007, Elsevier ,Academic press, fq.197

¹⁸ Punimi i cituar fq.198

- All traces left by perpetrator at scene or nearby, are usually extremely valuable material to reach the truth.

Why? What can we conclude?

- It can be strong evidence for prosecuting, detecting and proving the perpetrator's guilt.
- Studying of traces as mute witness produces data about perpetrator.
- Traces found in crime scene may indicate: direction of movement, motions in the scene, and following them may lead to direction of perpetrator after committing the crime.
- By following them it can lead to new traces and evidence, such as: fingerprints, biological residue, stolen items or crime items, footprints with better special features, etc.
- Starting with traces it is possible to question potential witnesses located nearby crime scene.
- Defining the number of persons involved in the crime, this is helpful for further investigations
- Determining some data about the person, based on some formulas or physical handicaps that he may have, by narrowing persons' number.
- Assists in determining the cases when dealing with simulated crime.
- Possibility to identify object (shoe) if it has special features or barefoot print.

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