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The Language and Logic of Inquiry: some basic problems[**]

"Any truth is better than indefinite doubt."[1]

I. The scope of the paper

Legal thinking is typically manifested in legal texts. An important part of legal work is the analysis of legal texts. The analysis of legal texts is basically done with linguistic and logical tools, with which we can explore the ideas appearing in the texts and their connections. All this carries a lot of uncertainty. Uncertainty is not only linguistic in nature (e.g., what a word or phrase means in a given context) but also is logical. A fundamental problem is how to use the available logical categories to properly describe and evaluate the thinking that appears in legal texts, especially conclusions. For example, anyone who tried to outline a logical map of the reasoning of a judicial decision may have run into many problems. The difficulties begin even with the content of the most basic concepts in question in practical application: e.g. what is a fact, what makes a conclusion deductive, how we can measure or express degrees of probability in an inductive conclusion.

In this paper, I try to illustrate some of the difficulties. For this, I chose a text that is voluminous, tied to one author, well-known, has been analyzed by many, has been the subject of contradictory evaluations, and is aimed at the rational solution of problems, i.e. focused on some kind of inquiry. A usual legal text does not correspond to all this. However, the famous Sherlock Holmes stories may provide proper text and basis for analysis. The attempts to describe the detective's thinking can be an intermediary for studying some linguistic and logical issues, which could be relevant to the logical analysis of legal texts.

[1] *The Adventure of the Yellow Face* in: DOYLE, ARTHUR CONAN: *Sherlock Holmes: The Complete Stories*. Wordsworth Editions. London 1996. p. 328. (in the following, the source of the Holmes stories is this volume).

Countless books and articles have been written about Sherlock Holmes' method and thinking. Yet it cannot be said that the thinking of perhaps the most famous detective in world literature has been properly described. I do not attempt to do this either, but I use this literary text to illustrate some of the fundamental logical problems that may also emerge in the evaluation of legal texts.

Is there any definable logical model by which the thinking of Sherlock Holmes (or a detective in general) can be uniformly characterized and understood? Conan Doyle, the father of Sherlock Holmes, has written about the thinking of his master detective in many places, in many ways and sometimes controversially. Perhaps it is worth highlighting where Holmes refers to three important factors in detective work: observation, knowledge (importance of prior knowledge), and "deduction".[2] Sometimes he also adds the power of imagination.[3]

All of this is quite banal, but it shows that the focus of the method is on deduction. The detective's prior knowledge (experience) is one of the foundations of inference that can provide one of the premises (major premise). Another basis for the conclusion is observation, which provides the other premise (minor premise). Thus, the pattern of deductive inference, of which the detective was said to be a master, emerges from the general method. In addition to all this, intuition ("imagination" in Holmes' vocabulary) comes if the logic does not lead to a result.

These three or four factors alone are too abstract to infer the famous and unique method of the detective that stories always refer to. Based on the text of the stories, five specific elements of Sherlock Holmes' method can be identified:[4] (i) observing the little things;[5] (ii) the role of deductive inferences;[6] (iii) research for unique (unusual) signs during observations;[7] (iv) the exclusion procedure;[8] (v) the detective thinks of himself as the perpetrator.[9] The key to Holmes' success lies not only in logic, but logic is given a central role.[10]

According to Conan Doyle, the detective's logical ability lies primarily in executing successful *deductions*. Might deduction be the basic model of Sherlock Holmes' thinking? So, first, some issues of deduction are worth addressing.

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[2]   *The Sign of Four*, The Complete Stories, p. 65.
[3]   *The Adventure of Silver Blaze*, The Complete Stories, p. 300.
[4]   Since Sherlock Holmes did not write the great handbook of investigation, as promised in one of the short stories, it is possible to reconstruct his thinking from the description of his adventures, *The Adventure of the Abbey Grange,* The Complete Stories, p. 713.
[5]   E.g. *The Boscombe Valley Mystery,* The Complete Stories, p. 171.
[6]   E.g. *The Adventure of Engineer's Thumb*, The Complete Stories, p. 230. *The Adventure of the Stock-broker's Clerk*, The Complete Stories, p. 332.
[7]   E.g. *The Adventure of the Lion's Mane,* The Complete Stories, p. 1090. *The Adventure of the Blue Carbuncle*, The Complete Stories, p. 203.
[8]   E.g. *The Adventure of the Blanched Soldier*, The Complete Stories, p. 1078. *A Study in Scarlet,* The Complete Stories, p. 61. In applying this method, Holmes, taking into account every conceivable explanation, gradually excludes those that prove impossible.
[9]   E.g. *The Musgrave Ritual*, The Complete Stories, p. 363.
[10] See also BLUTMAN LÁSZLÓ: *Módszertani zsákutca: miért nem írható le jól egy mesterdetektív gondolkodása*? [Methodological Cul-de-sac: why can't the thinking of a master detective be well described?] Jogelméleti Szemle 2019/3. pp. 123–124.

II. The deductive model

Much of the literature analyzing Sherlock Holmes' stories ("*holmesology*") considers *deductive thinking* to be the main method of the master detective.[11] However, this is not the case. The detective's success does not stem from deductive thinking.[12]

1. The characteristics of deduction

There is no universally accepted definition of deduction as a particular group of inferences. However, we can identify some of its conceptual elements. (i) First, in the case of deductive inferences, if the premises are true, the conclusion is necessarily true. For Aristotle, the necessity of the consequence (conclusion) is a key conceptual element of deductive argument.[13] (ii) Second, in the case of deduction, the *validity* of conclusion is independent of the truth of the premises. A perfect (valid) deduction can also be based on false premises, but then the conclusion will also be false. The basis of the valid deduction is the linguistic-logical structure of the premises. (iii) Third, many authors believe deduction moves from the more general statement to the concrete, it has a constant direction.[14] But this view does not leave room for such arguments that run from general to concrete, but are based on probability. Therefore others argue that the direction of an argument is irrelevant. The deductive argument that necessarily leads to a conclusion does not always go from the general to the concrete.[15] According to this latter approach, all arguments that have necessary conclusion are deductions, while all probabilistic arguments are inductions.

In light of these considerations, it is easy to conclude that deduction is hardly the central element of a master detective's thinking. In a crime, the basic problem to be solved or explained does not require thinking from the general to the concrete. Merely, an answer has to be given as to who committed the crime, or other mysterious circumstances, events have to be explained. More generally speaking, an effect (a situation) is given and the causes need to be explored. Sherlock Holmes also saw this, noting that "*the quick analysis of cause and effect which gives the charm to an investigation.*"[16] Elsewhere, it suggests that cause-to-effect reasoning is "the only notable

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[11] E.g. BERG, STANTON: *Sherlock Holmes: Father of Scientific Crime and Detection*. The Journal of Criminal Law, Criminology and Police Science Vol. 61, No. 3, 1970, pp. 446–452. SEEWALD, JACQUELINE: *Sleuthing: Yesterday, Today, and Tomorrow*. Sherlock Holmes Mystery Magazine Vol. 5. No. 4. July/August 2014. pp. 19–22. RIGGS, JOE: *The Real Sherlock Holmes*. MX Publishing. London, 2012. p. 43. WALTERS, CHARLOTTE: *56 Sherlock Holmes Stories in 56 Days*. MX Publishing. London, 2012. p. 22. and p. 51.

[12] E.g. CARSON, DAVID: *The Abduction of Sherlock Holmes*. International Journal of Police Science and Management Vol. 11, No. 2, 2009, pp. 193–202. KRAFT, RORY E.: *Watson's a Liar!* In: Sherlock Holmes and Philosophy: The Footprints of a Gigantic Mind. (Ed. STEIFF, JOSEF) Carus Publishing Company. Chicago, 2011. pp. 183–184.

[13] *Prior Analytics* I.1. 24b paras. 18–19.

[14] E.g. POTTER, W. JAMES: *Theory of Media Literacy: A Cognitive Approach*. SAGE Publications. 2004. 133. p.; FRANKLIN, MARIANNE I.: *Understanding Research*. Routledge, 2013. p. 233. GREIMAS, ALGIRDAS – COURTÉS, JOSEPH: *Sémiotique*. Hachette Livre. Paris, 1993. p. 85. and p. 187.

[15] KAHANE, HOWARD: *Logic and Philosophy*. Wadsworth. Belmont, 1986. pp. 287–288.

[16] *A Case of Identity*, The Complete Stories, pp. 147.

feature" of the investigation.[17] In the Holmes stories causal reasoning is horizontal, that is – considering its endpoints – it goes from the concrete (effect) to the concrete (causes).

2. Deduction and inquiry

In *A Case of Identity*, Holmes deduced that the visiting lady was a typist because just above her wrists, where her hands are usually pressed against the table, he clearly saw a double line on the plush.[18] The structure of the detective's inference can be described as follows: there is a concrete observed fact (P_{OF}) + there is a more general empirical statement (P_{GES}) + a concrete conclusion as the explanation of the observed fact (C_C). In the specific case the inference looks like this:

> P_{OF} – the visiting lady wearing plush has a double line on the plush just above the wrist, on both arms;
> P_{GES} – every typist wearing plush has a double line on the plush just above the wrist, on both arms;
> C_C – the visiting lady is (probably) a typist.

The conclusion is based on probability. The degree of probability is highly dependent on the proportion of typists and non-typists among all the ladies who wear plush cuff and a double line shows on their plush cuffs just above their wrists. The detective classified an observed concrete situation (fact) under a more general proposition. But it is not a deductive argument, even if we reverse the order of the premises.

> P_{GES} – every typist wearing plush has a double line on the plush just above the wrist, on both arms;
> P_{OF} – the visiting lady wearing plush has a double line on the plush just above the wrist, on both arms;
> C_C – the visiting lady is (probably) a typist.

If all three conceptual elements of deduction are taken at the same time, this conclusion is not a deduction (the conclusion is not necessary), but neither is induction (because it moves from the general to the concrete). So deduction and induction cannot indicate the direction of reasoning, because in this case the distinction would not have good enough explanatory power. The first two conceptual elements remain, according to which deductive inference (regardless of the direction of reasoning) always gives a necessary result, while inductive inference (regardless of the direction of reasoning) is always probabilistic.[19] In our example we only see an inductive reasoning based on probabilities.

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[17] *The Adventure of the Copper Beeches*, The Complete Stories, p. 272.
[18] *A Case of Identity*, The Complete Stories, p. 153.
[19] Cf. KAHANE 1986, p. 288.

It should be emphasized that in such cases it is not a simple causal argument. Detecting a crime requires *reverse thinking* because it is necessary to infer backwards from the effects (present circumstances) to what happened. A detective has to be able to tell the story leading to the current situation (explanation for a crime). In doing so, of course, deductive conclusions can also play a role. The basic task is, however, to reveal the concrete causes (antecedents) of the concrete situation arisen and logically connect them. Sherlock Holmes made this clear: "In solving a problem of this sort the grand thing is to be able to reason backwards."[20] And this is not the basic scheme of deductive thinking.

The inference from effect to cause, which requires the explanation of an observed fact or situation, does not fit well with deductive thinking anyway. In the example taken earlier, everything started from Holmes' observation and a probabilistic inference was built upon that regarding the visitor's profession. Although this can be transformed formally into a deductive inference, but then the situation must also be modified where the conclusion makes sense. A deductive inference – at least in a formal sense – would look like this.

P_{GES} – every typist wearing plush has a double line on the plush, just above the wrist, on both arms;
P_{RD} – the visiting lady is typist wearing plush;
C_C – the visiting lady has a double line on the plush, just above the wrist, on both arms.

The starting point is then not an observed fact to be explained (P_{OF}), but a reported (preliminary) data (P_{RD}). This reasoning requires a situation which is different from the one in the story. Suppose Mrs. Hudson announces to the detective that a lady named Miss Sutherland, who is typist and wears plush, is waiting downstairs at the entrance and wants to consult with him. Holmes is aware of the general empirical observation (P_{GES}; prior knowledge) and also comes to know from Mrs. Hudson what the lady's profession is and that she wears plush (P_{RD}; antecedent as well). Based on these, he can quickly come to the (necessary) conclusion that when the visitor shows up, a double line will appear on her plush, just above the wrist, on both of her arms. This is a deductive reasoning regarding its form, which is going from cause (practicing a profession and wearing plush) to effect. This new situation does not demand any explanation of observed facts. When Miss Sutherland enters the room, Holmes will be able to ascertain if the conclusion is right.

However, in vain will this deduction be valid. It is not certain that Miss Sutherland's plush will show double line when she appears in Holmes' room. The result of the valid deduction can easily be false. In the example, the basic reason for this may be that the general (empirical) statement is not true (in all circumstances). [Of course, the minor premise (P_{RD}) can also be false, for example, Mrs. Hudson misunderstood the young lady's profession or the visitor did not tell the truth in this respect.] The general statement can be false for many reasons. (i) Miss Sutherland might not wear plush when typing. (ii) She might wear another plush when working. (iii) She might have a new plush that she has only used once or twice before the visit and the work has not yet left

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[20] *A Study in Scarlet*, The Complete Stories, p. 61.

lines on the material. (iv) There may be typists who have such a hand position that only one line (or possibly none) is visible on their sleeves.

This example also brings another lesson. In some cases, a probabilistic inference can be transformed into a deductive inference, but it will be worthless. This is because the conclusion must be based on a general statement that, as such, will not be true in all circumstances. Changing the linguistic-logical structure of a probabilistic relation does not eliminate the uncertainty of the content.

The above general statement (P_{GES}) "every typist wearing plush has a double line on the plush, just above the wrist, on both arms," is an ordinary generalization of experience, which could be true in some cases. However, it is not universal truth. Thus, the result of the inference based on it – even in a valid deductive form – will only be more or less likely to be true in specific, individual cases. This is worth noting because in the Holmes stories we may find inferences that are deductive in their logical form. However, if the writer uses them in probability relations (i.e. they are based on general empirical statements) they give uncertain results just like probabilistic inferences would do in the same relations.

There are, of course, many complex, comprehensive arguments in Holmes stories that primarily serve to explain the main mystery or mysteries of a story. The simpler, more transparent retrospective causal arguments, on the other hand, are well exemplified by the recurring elements of the stories when the detective, to entertain Dr. Watson and often independently of the crime to be solved, draws unexpected and not at all obvious conclusions based on tiny signs. For example, from the six tiny scratches on Watson's shoes to how sloppy Watson's maid was (*A Scandal in Bohemia*), from the client's fingertips to her occupation (*The Adventure of the Solitary Cyclist*), from the little mud stain on Watson's shoes to that he recently sent a telegram at the Wigmore Street post office (*The Sign of Four*) or from a tattoo to that the person in question had been to China (*The Red-Headed League*). What all of these have in common is that there is an observed fact, a situation (effect), and it must be inferred from the effect the causes that created it (and the circumstances under which it arose.) It also appears that the retrospective causal reasoning that characterizes detective thinking is fundamentally based on probability and not deductive in nature.

Deductive inference requires a general premise on which deduction can be built with certainty (e.g. mathematical truths, scientific laws, or other empirical generalizations on the verge of certainty). However, crimes usually not or rarely can be solved by such general premises. The detective relies mainly on his own experience and knowledge, which has limited validity, no matter how rich it may be. He has to guess, assess the probability of the assumed causal relationships, select the circumstances to consider. However, he only rarely gets assurance. He cannot resort to the chain of deductive inferences that would automatically (necessarily) lead to a solution and at the same time to the truth.

There is another angle that should not be forgotten. Sherlock Holmes is interested in finding out the truth. He wants to know what happened. However, as I have pointed out, flawless deduction does not guarantee truth. The result of a valid deduction can also be false. In this sense, the success of a detective's work does not lie in deduction itself, but in reaching a true conclusion by applying it. It would be in vain for the detective to be a "master" of deduction if he did not get to the truth. This is only possible if the premises

are true. The key issue, then, is not the use of deduction. What really matters is choosing the right premises. Deduction itself (typically the classification of the description of a particular situation under a general statement and drawing a conclusion) is then already a banality. Despite all that, the opinion according to which Holmes was the master of deduction is still standing in the literature.

3. Various generalizations as premises

The key, then, is to choose the right premises. The data of the specific case, which the detective obtains through observation, testimonies, conclusions, or from other sources, provide one group of premises. Another group of premises is general statements, which help to arrive at more specific data through inferences. It depends on the content of these general statements whether a deductive argument is possible or not. If they contain a general truth (being certain or almost certain), then deduction is possible. If they have only a certain degree of probability, they can serve as a basis for at most inductive argument. For this reason, in what follows, I will deal only with the latter, that is, the general statements that occur in the Holmes stories and serve as the material for the inferences.

In Holmes stories, the direction of inference is typically horizontal regarding its two endpoints: it moves from concrete data to concrete data. More general statements linking them can often go hidden or unnoticed. A crucial question for the thoroughness of the conclusion is the quality and sources of these general statements that make a connection between concrete propositions. In general, it is difficult to typify such more general statements as a basis for conclusions. However, their four groups are noticeably different: (i) mathematical or logical truths, or other truths based on them (they can lead to certainty with valid inference); (ii) scientific regularities or generalizations of scientific experience (valid inference may lead to conclusions that are on the verge of certainty or highly probable); (iii) ordinary generalizations accepted in a narrower or wider human community based on collective experience (making the conclusions probable to varying degrees); (iv) generalizations based on personal experience and thus of limited validity (possibly probable conclusions).

In the arguments that emerge in the Holmes stories, the first two groups have almost no direct role. Mathematical and logical truths do not have a direct, at most ancillary role due to their subject matter. As far as scientific laws are concerned, they do not play a noticeable role in the arguments leading to the resolution of cases.[21] The conclusions will typically be based on generalizations filtered out from the detective's personal experience, or generalizations accepted in the smaller or larger communities of contemporary English society (ordinary customs, wisdom, prejudice, social rules, etc.). As Holmes noted, his art is just "systematized common sense."[22]

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[21] This is not to say that Holmes would not have been proficient in certain sciences and would not have kept tremendous knowledge in his mind. In the background, this helped him to analyse a manuscript in an expert way or to recognize from which part of England a piece of mud came from. However, general and truly scientific propositions, principles did not appear in his inferences.

[22] *The Adventure of the Blanched Soldier*, The Complete Stories, p. 1082.

In the story of *The Hound of the Baskervilles*, an anonymous letter was compiled from the letters of the Times. Since this newspaper "is seldom found in any hands but those of the highly educated" Holmes concluded the letter was compiled by a highly educated man.[23] The binder for the argument is the general proposition in quotation marks. It was obviously a collective experience that the Times was read by the more educated social groups, but that is not the point here. According to the statement, the newspaper does not get into the hands of anyone else, which can already be described as a personal generalization by the detective himself. The truth of this statement is difficult to estimate. One should be familiar with the way of life of the time, and assess the situations in which a non-highly educated man could access the newspaper so that he could cut it into pieces with scissors for assembling an anonymous letter without raising suspicion.

The quality of arguments depends to a large extent on such more general propositions as premises (P_{GES}), which reflect prior knowledge, beliefs, opinions, and experiences. Among these are many simple statements that reflect everyday rules, wisdoms — for example, whoever has to deal with a very cunning man must be circumspect.[24] The success of reasoning depends on what prior knowledge the detective can mobilize and use as a general premise. Holmes knew this well. He accumulated a large amount of knowledge partly in his mind and partly in his famous card system. He constantly filed and used his filing system: for example, to look at the life story of Irene Adler,[25] Professor Moriarty and Sebastian Moran,[26] to keep count of the interesting crimes on the continent,[27] to recall his own past cases.[28] His motto is, "To remember it – to docket it."[29] This card system was partly the source or the basis of generalizations the detective used in his investigations.

If we examine the Holmes stories from this point of view, we can see that the detective sometimes uses dubious generalizations, the source of which is not even revealed most of the time. To illustrate this, I list some examples of such generalizations that have been part of an argument in some cases: oscillation upon the pavement always means an *affaire de coeur*;[30] a well-to-do, drifting and friendless woman, though mostly harmless, but she is inevitable inciter of crime in others;[31] "a dog reflects the family life";[32] nosebleeds are the most common in ruddy-faced, robust and full-blooded men;[33] a woman of Spanish blood does not condone such an injury lightly that her husband tells her he loves someone else;[34] by studying the child, we can gain light as to the character of the parent;[35] if a man writes on a wall, he will instinctively write about the level of his own eyes;[36] when a woman

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[23] *The Hound of the Baskervilles*, The Complete Stories, p. 467.
[24] *The Adventure of the Copper Beeches*, The Complete Stories, p. 284.
[25] *A Scandal in Bohemia*, The Complete Stories, pp. 121–122.
[26] *The Adventure of the Empty House*, The Complete Stories, p. 565.
[27] *A Case of Identity*, The Complete Stories, p. 153.
[28] *The Adventure of the Sussex Vampire*, The Complete Stories, p. 1016.
[29] *The Adventure of the Six Napoleons*, The Complete Stories, p. 661.
[30] *A Case of Identity*, The Complete Stories, p. 148.
[31] *The Disappearance of Lady Frances Carfax*, The Complete Stories, p. 816.
[32] *The Adventure of the Creeping Man,* The Complete Stories, p. 1000.
[33] *A Study in Scarlet*, The Complete Stories, p. 62.
[34] *The Hound of the Baskervilles*, The Complete Stories, p. 551.
[35] *The Adventure of the Copper Beeches*, The Complete Stories, p. 284.
[36] *A Study in Scarlet*, The Complete Stories, pp. 23–24.

thinks her house is on fire, she will instinctively rush to the thing she values most. [37] the individual represents in his development the whole procession of his ancestors;[38] the criminal propensity is inherited; [39] in hotels, the ink bottle is usually low on ink and the pens are neglected; [40] women are naturally secretive; [41] "men of character always differentiate long letters, however illegibly they may write";[42] who perspires a lot is not in the best of training;[43] in an incredible and grotesque case no woman ever sends a reply-paid telegram; she would appear in person to consult the detective.[44]

Perhaps the list provides a kind of cross-section of what generalizations Holmes typically bases his conclusions on. Anyone can judge the probability of these statements. Obviously, there are some that are not too likely. However, in an argument these propositions, as premises (P_{GES}), largely define the probability of the conclusion.

It is clear, however, that such general propositions are not universal truths or statements on the verge of certainty, so no deductive conclusions can be drawn from them. This is one of the reasons for which deduction is not typical of Sherlock Holmes' thinking.[45] The idea is not new that detective stories are not characterized by deductive reasoning, but by a retrospective causal argument inferring from cause to cause, moving from observed concrete facts to other, also concrete facts (causes). The peculiarities of retrospective causal reasoning were already pointed out by *Charles Sanders Pierce*, the renowned American philosopher, in the second half of the 19th century. He did not even see sufficient forms of reasoning based on traditional induction or deduction to logically describe this. Thus, in addition to these two, he introduced a new, third form of inference, which he called abduction (sometimes – arguably – *retroduction*), reflecting backward reasoning.[46] This gives the following model for describing Holmes' thinking.

III. The abductive model

More recently, the thinking of a detective has been modelled by many based on abduction as a form of reasoning.[47] The American philosopher Charles Sanders Pierce first used

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[37] *A Scandal in Bohemia*, The Complete Stories, p. 128.

[38] *The Adventure of the Empty House*, The Complete Stories, p. 566.

[39] *The Adventure of the Final Problem*, The Complete Stories, p. 436.

[40] *The Hound of the Baskervilles*, The Complete Stories, p. 468.

[41] *A Scandal in Bohemia*, The Complete Stories, p. 126.

[42] *The Sign of Four*, The Complete Stories, p. 69.

[43] *The Adventure of the Blue Carbuncle*, The Complete Stories, p. 204.

[44] *A Reminiscence of Mr. Sherlock Holmes*, The Complete Stories, p. 745.

[45] For such a conclusion, see also BLUTMAN LÁSZLÓ: *Bűntény és logika: három tévhit Sherlock Holmes gondolkodásáról* [Crime and Logic: Three Misconceptions about Sherlock Holmes' Thinking]. Jogelméleti Szemle 2019/1. pp. 3–21.

[46] *The Essential Pierce: Selected Philosophical Writings*. Vol. 2. (1893–1913) Indiana University Press. Bloomington, 1998. p. 205.; see also *Encyclopedic Dictionary of Semiotics*. Tome 1. de Gruyter. Berlin – New York, 1994. p. 1.

[47] See especially a 1983 volume edited by Eco and Sebeok; in this high impact publication a series of studies interpreted Holmes' thinking in the context of the abduction model, ECO, UMBERTO – SEBEOK, THOMAS A. (eds.): *The Sign of Three*. Indiana University Press. Bloomington, 1983. For a similar approach from the recent literature, see e.g. FOX, MARGALIT: *Conan Doyle for the defense*. Random House. New York, 2018. p. 79. from the

abduction in its current sense as the third elementary form of inference (in addition to deduction and induction).[48] However, as an elementary schema, abduction is a strange, weakly relevant, inductive inference that is difficult to begin with. Thus, in Peirce's writings, abduction later appeared as one of the methodological elements of scientific thinking, which basically wanted to represent the creation of scientific hypotheses. He also broke with the elementary, three-member schema, and abduction became more and more a model of causal, explanatory reasoning, in which thinking about the effect (an observed phenomenon) traces back to the causes.

Pierce applied this to scientific thinking. The detective's way of thinking only came incidentally into his field of vision.[49] Peirce's abduction as a general scientific methodological element was not at first a great success. The concept, on the other hand, has become popular in some areas since the 1980s.[50] This was mainly due to semioticians (Peirce is the founder of modern semiotics). On this wave, abduction was also included in the toolbox for the analysis of detective stories (in addition to semiotics, theory of science, philosophical methodology, etc.).[51]

That would be fine, but it's quite confusing what abduction really is. This confusion can inherently be attributed to Pierce, who wrote about abduction several times in several ways. According to Chiasson, for example, the philosopher used the term in at least three different ways.[52] Various interpretations were then built on these approaches in the second half of the 20th century. The uncertainty of the theoretical background made it difficult to identify abductive conclusions in a specific text. Some common denominator may be that abduction, by its nature, is a probabilistic inference to explain

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Hungarian literature e.g. K. HORVÁTH ZSOLT: *A barbárokra várva* [Waiting for the barbarians]. Korunk 2011/3. pp. 103–104. or ANGYAL MIKLÓS: *Gondolatok a kriminalista bíborszínű dolgozószobájából* [Thoughts from the criminologist's purple study]. Ügyészek Lapja 2015/5. p. 93.

[48] Abduction was also sometimes referred to as retroduction, or simply hypothesis, which sparked controversy over whether it was the same thought process. Peirce observed that of the three elements of Aristotle's syllogism (rule, case, and result), only two are included as logical consequences in the conclusions – the result is in the scheme of deductive and the rule in the scheme of inductive inference. In the case of abduction, however, the case will be the logical consequence (conclusion), the end point of the inference, cf. BALÁZS GÉZA: *Az abdukció a modern nyelvtudományban, valamint igazolása Mikszáth Kálmán Új Zrínyiászában* [Abduction in modern linguistics and its proof in Kálmán Mikszáth's New Zrínyiász.] In: BALÁZS GÉZA – H. VARGA GYULA (eds.): Az abdukció [Abduction]. Líceum Kiadó. Eger, 2008. p. 44.

[49] Sherlock Holmes does not appear in his writings, only the name of Poe's detective (Dupin), cf. Peirce 1998, 550. p.

[50] A conference has been dedicated to abduction in Hungary as well [conference volume: BALÁZS – H. VARGA (eds.) 2008]; a methodological book was also published about it, SÁNTHA KÁLMÁN: *Abdukció a kvalitatív kutatásban* [Abduction in qualitative research]. Eötvös Könyvkiadó. Budapest, 2011.

[51] As I see, the 1983 volume of studies on abduction cited above established the new trend. The study of the Sebeok couple included in the volume was also published in Hungarian in the form of a small book and came to be one of the most important work in Hungarian holmesology.

[52] CHIASSON, PHYLLIS: *Abduction as an aspect of retroduction*. The Commens Encyclopaedia, http://www. commens.org/encyclopedia/article/chiasson-phyllis-abduction-aspect-retroduction (2020.12.28.); there is author who distinguishes five interpretations, see PAAVOLA, SAMI: *Deweyan Approaches to Abduction?* In ZACKARIASSON, ULF (ed.): Action, Belief and Inquiry – Pragmatist Perspectives on Science, Society and Religion. Nordic Pragmatist Network. Helsinki, 2015. p. 235. For amendments of Pierce's position, see e.g. BURCH, ROBERT: *Charles Sanders Pierce*. Stanford Encyclopedia of Philosophy; source: https://plato.stanford. edu/ entries/peirce/ (2020.12.28.)

a phenomenon.[53] Put this way, it seems somewhat banal. Any person does causal reasoning many times a day. Yet, if we apply this to detective stories to explain suspicions, observed facts, unusual phenomena, the detective's thinking can be characterized by it. The detective often has to infer the causes from the effects, in reconstructing the past from a certain point of view.[54] However, abduction is hardly apt to adequately describe how Sherlock Holmes thought. I see the following reasons for this.

Peirce had fundamental problems in distinguishing between abduction and induction because both are probabilistic inferences. One of the main differences he saw was that induction serves to justify or refute an existing idea, a hypothesis, so its starting point is the already existing hypothesis. In the case of abduction, there is no hypothesis (explanation) for a group of facts and data yet, the hypothesis is set up by abduction.[55]

Thus, in a detective story, the pre-abduction phase would be when the detective has no idea what the explanation might be.[56] However, it can be seen that Holmes sometimes develops an idea or ideas very quickly to explain various unusual facts. Once such an idea is born, we can no longer talk about abduction, only about the testing and justification of the idea by the means of deductive and/or inductive inferences. Most of Holmes's stories are spent justifying ideas, hypothesis (this becomes clear at the end of the stories) rather than formulating a hypothesis. The role of abduction in a story is thus limited to very short, often imperceptible stages in time.

Holmes' famous method of exclusion, where applicable, almost eliminates the abduction phase.[57] He keeps in mind all possible solutions and gradually filters them during data collection, testing them with new data and inductive inferences ("my usual method in logical analysis is to narrow down the range of possible solutions").[58] In stories where the exclusionary method is well applied, abduction is almost imperceptible. In *The Adventure of the Beryl Coronet* Holmes assumed that everyone who was in contact with the lost jewelry around the time of its disappearance was suspicious. The suspects were checked one by one, so the client's niece got caught on the sieve. He then built the story around the client's niece by gathering more data and making inductive inferences that explained what had happened.[59] In stories with this pattern, the methodological starting point actually replaces abduction.

In several Holmes stories, the detective starts from a false hypothesis, and then in checking this, with the new data, the hypothesis is overturned, while the correct solution unfolds (e.g. *Silver Blaze*). The erroneous hypothesis can undoubtedly be preceded by abduction. It is questionable, however, whether any abductive inference plays a role in the process in which refuting a false hypothesis leads to the correct solution. According to Peirce, any hypothesis is already tested with inductive inferences. Obviously this is

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[53] In some places Peirce understood it in such a simple form, see PEIRCE 1998, p. 441. Today's philosophical conceptions of abduction are already sharply different from Peirce's approach, l. DOUVEN, IGOR: *Abduction.* Stanford Encyclopedia of Philosophy; source: https://plato.stanford.edu/entries/abduction/ (2020.12.28.)

[54] Vö. BÁNKI ÉVA: *A bűn nyelvét megtanulni* [To learn the language of sin]. Napkút Kiadó. Budapest, 2014. p. 16.

[55] PEIRCE 1998, p. 106 and p. 205.

[56] The state of blank mind, when the detective refrains from forming any idea due to the lack of data, cf. *The Cardboard Box*, The Complete Stories, p. 313.

[57] Pl. *The Disappearance of Lady Frances Carfax*, The Complete Stories, p. 824.

[58] *The Adventure of the Blanched Soldier*, The Complete Stories, p. 1078.

[59] *The Adventure of the Beryl Coronet*, The Complete Stories, p. 270.

also the case with the false hypotheses, therefore abduction does not seem to play a significant role in the development of the correct theory.

Nevertheless, in the Holmes stories, the abduction situation envisioned by Peirce is often well observed, for example, in setting up some grounding hypotheses. However, general problems of abduction also arise here. Let's take an example. In *The Norwood Builder*, Holmes had to explain a writing (a sketch of a last will and testament) in which the first few lines, the middle of the second page, and one or two lines at the end read well, while between the readable parts the writing is very ugly, barely readable, in some places simply illegible.[60] What could be the explanation for such a varying quality of the writing? If at first glance we have no idea about the explanation, it is a pre-abduction state of mind. We mobilize in our memories the patterns (types of situations) in which such writing can occur. Either we get to some explanation, or we don't. If this unusual fact can be fitted to a situation, an idea (possible explanation) arises. But in the moment an idea emerges, the abduction is already over, because in the next step, the test of the idea (a hypothesis) begins, which is already an induction according to Peirce.

The detective's imagination puts behind the writing image the situation where it may have arisen. However, this will be an intuitive psychological phenomenon and not an inference. Here, abduction does not describe thinking, but conceptually indicates a point in a thought process supported by imaginary, intuitive, and situational patterns stored in mind and based on prior experience. [61] The explanation will be a description of a situation, a short story (that is, a hypothesis).[62] In retrospect, one can argue for the probability of an explanation, but finding an explanation can logically hardly be described. Therefore, Pierce could note that "… abduction is, after all, nothing but guessing."[63]

This is not always the case. If the explanation (hypothesis) does not appear as a story, but in the form of a general statement (rule, regularity) or some general statements connected to each other, which is primarily characteristic of science, then abduction can already mean a real conclusion. This is because thinking can consciously explain an observed phenomenon with a freshly conceived general statement, regularity (although this can also be intuitive). A distinction must be stated between recognition of explanatory patterns (which is typically based on analogy) on the one hand, and explanation of an observed fact or an available data by including them in the scope of a freshly conceived, general statement. Recognition of patterns is intuitive in nature, while the latter, subordination, can be intuitive, but can also be a real inference. Peirce therefore tried to attribute a *dual nature* (both logical and psychological) to abduction, which, however, is difficult to defend.

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[60] *The Norwood Builder*, The Complete Stories, pp. 573–574.

[61] The basis of finding an intuitive explanation is the mass of situation patterns stored in the detective's prior knowledge. It is no coincidence that Holmes knew countless specific crimes (and thus many patterns of crime); he also filed in his file system the crimes of which he became aware, see e.g. *A Case of Identity*, The Complete Stories, p. 153. See also K. HORVÁTH 2011, p. 91.

[62] Holmes' explanation was that the document had been written on a train: the readable parts at stations when the train was standing and the illegible parts of the writing scribbled as the train passed through railway switches. Moreover, it may have been a suburban line because there has been a quick succession of switches.

[63] PEIRCE 1998, p. 107.

If the abduction is logical in nature, it must be shown that there must be some description of it. Peirce gave the following formula, which became famous but proved rather meaningless:[64]

The surprising fact, C, is observed.
But if A were true, C would be a matter of course.
Hence, there is reason to suspect that A is true.

I can't deal with the critique of this scheme, many have already done so.[65] I would make only four remarks to support the finding that abduction as an inference (logical operation) is not characteristic of Sherlock Holmes' thinking. (i) The link between A and C is "matter of course", but it is an empty term that cannot explain the relationship.[66] (ii) The formula contains at least one intuitive element: how A gets into the picture. How did the mind chose A and connected it to C? In the absence of a profound explanation, this is basically nothing but an intuitive process wrapped in a seemingly logical formula. (iii) In the example above, it cannot be said that if A is true (the letter was written on a train), then C would also be true (i.e. some parts of the writing are illegible). C's relationship with A is not necessary, but is probability-based (it is possible that someone can write legibly on a train). This relationship would only be necessary if A were a general statement of universal truth (and not only a hypothesis in the form of a story). (iv) An unusual fact in a detective's story may arise not only when the detective observes, but also indirectly becomes aware of facts (data) to be explained.

All this suggests that abduction (as adopting a hypothesis) is simply a psychological phenomenon. If this is the case, then there are already concepts that express it. For example, Dr. Watson called it intuition, Holmes imagination. There is no need to introduce a new concept for all this.

According to Peirce, *abduction seeks a theory* (while induction seeks for facts to substantiate an idea).[67] This feature of abduction may fit scientific hypotheses because science typically works with hypotheses appearing in the form of theories. However, it does not fit those hypotheses that emerge in a criminal investigation. In Holmes stories, hypotheses in the process of solving a problem appear in the form of explanatory stories or specific propositions (assumptions that state specific facts as causes). The detective's thinking, as opposed to abduction, does not seek a theory but *seeks a story* (even if Holmes frequently calls explanations theories). The essence of Peirce's abduction is to explain unexplained facts with general theorems, in which the unexplained facts are included in the scope of a general statement or theory (*concrete – general relation*). In detective stories, on the other hand, facts are typically explained by a story, which consists of concrete facts (data); that is, the detective ultimately seeks a specific system

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[64] PEIRCE 1998, p. 231.

[65] DOUVEN 2020. The unsustainability of the formula is the reason why *the inference to the best explanation* (or some version of it) is now considered more under abduction, which is contrary to Peirce's idea. In his view, this is already within the stage of testing a hypothesis.

[66] In the example above, Sherlock Holmes did not even attempt to explain how a man travelling by train is *logically* connected to a partially unreadable writing held in his hand.

[67] PEIRCE 1998, p. 106.

of relations of concrete facts and data (*concrete – concrete relation*). Based on the above, abduction plays a smaller role in a detective story than in science and is hardly suited to properly characterize Holmes' thinking with it.

IV. The puzzle model

The puzzle model is based on that the elements of the story explaining the mystery fit together, thus reinforcing each other and increasing the probability of each other as well as the whole story. Some hypotheses are sometimes justified not only by the additional facts and data revealed, but also by the fact that they fit together.[68] Thus, at the end of a successful investigation, there is a story (no longer as a hypothesis but as a conclusion to the case) that most likely (or on the verge of certainty) explains or solves the crime or other unusual event to be explained. The *explanatory story* unfolds in such a way that the known facts and data make sense in a single framework and in relation to each other. With a good story, everything will be verifiable and explainable. Thus, it is obvious that we perceive the elements of the story as pieces of a jigsaw puzzle, which are patiently matched to form a final picture where each piece has a place and significance.[69]

   The puzzle model reflects the detective's thinking well in some respects. On the one hand, some complex results are to be achieved in both. The detective strives to find a comprehensive explanatory story, while the puzzle player a detailed picture. On the other hand, the relationships concerning the details and the whole are similar in both. At the beginning of the puzzle game, there is no idea for the whole picture (unless, as a relief, the creator of the game has provided the picture to be assembled). Inserting a puzzle piece depends on whether it matches the pieces that have already been laid out. The step-by-step construction, in terms of method, changes slowly as ideas emerge about what a part of the image or the image as a whole, represents. An emerging idea will represent a new point of reference, making it increasingly purposeful to find what puzzle pieces to look for in the process of construction. The investigation by a detective reveals a similar pattern. At the beginning of the investigation, the individual clues and data themselves offer the direction of further progress. Later, the threads of the investigation may be torn apart, the clues must be sought more and more purposefully, and this will not go without hypotheses about what happened (which corresponds to the imagined picture or a detail of the picture in the puzzle).

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[68] Gehrke clearly thinks in a puzzle model, GEHRKE, CONSTANZE: *Schema und Variation in den Sherlock-Holmes-Stories von Arthur Conan Doyle.* Dissertation (2003/2004) Rheinisch-Westfälischen Technischen Hochschule. Aachen, pp. 174, 187, 281. source: http://publications.rwth-aachen.de/record/59476/files/59476.pdf (2020.12.29.) Bonfantini and Proni just point out that one simply needs to find a hypothesis that fits all known data, and this is perceived as a kind of combination puzzle; BONFANTINI, MASSIMO A. – PRONI, GIAMPAOLO: *To Guess or Not to Guess?* In ECO – SEBEOK 1983, pp. 127–128. The crime is considered to be a jigsaw puzzle by the famous German critic Helmut Heißenbüttel, or also by Isidore Ducasse and Roger Caillois; cf. PRILL, ULRICH: *Mir ward alles Spiel.* Königshausen & Neumann. Würzburg, 2002. 84. p. and GEHRKE 2003/2004, p. 11. For this approach in the Hungarian literature, see DECZKI SAROLTA: *Rejtélyes irodalom* [Mysterious literature]. Új Forrás 2010/7. p. 37.

[69] Cf. Watson's note: "I clearly perceived that Holmes was weaving it [i.e. the fact that Mr. Smith had been out for a walk the morning before] into the general scheme which he had formed in his brain." *The Adventure of the Golden Pince-Nez*, The Complete Stories, p. 693.

In other respects, the puzzle is far from being able to adequately represent what is happening in the investigation of a crime or other mystery. I see two significant differences. On the one hand, the number of individual pieces of the puzzle is finite, the pieces and their significance are unchanged throughout the game, and they can be matched in the same way. During the investigation, however, one has to face the fact that the data representing certain elements of the later explanatory story change. A partial hypothesis about them is overturned, a witness changes his or her testimony, or a specific clue takes on a new meaning or is shed new light. If it is a key data, it may upset the overall hypothesis (if it already exists) and a whole new idea needs to be sought. The final story is made up of hard facts and soft data subject to change. The variability of the latter must always be taken into account.

On the other hand, in the case of the puzzle, the picture is already given at the beginning of the game, which will be laid out by the successful player at the end. You have all the puzzle pieces, and you just need to find and insert them in the right place during the game. This is by no means always the case with detective stories. Even after, an investigation has begun, new evidence often emerges, new crimes or other mysterious events may occur, and there is a struggle between the detective and suspect to hide or uncover clues. These new events, data and evidence should be covered by the investigation, as a satisfactory explanation can only be given together. *Detective stories are in motion*. The range of evidence is not given, and due to subsequent events, not even the story that needs to be found as an explanation is final.

Exceptions, of course, are. In puzzle-like cases like the ones in which Doyle's hero investigated, there could in principle be a larger number of stories where events were closed and the puzzle became static (except for the escape of the perpetrators). For example, in the short story of *The Adventure of the Engineer's Thumb*, this is well observed (the engineer escaped from the site of the mysterious activity, the perpetrators set the house on fire and fled). The data had to be collected and put together with regard to what had happened. On the other hand, Holmes stories often enclose mysteries, often unrelated to a crime, that are based on protracted or repetitive activity and persist when the investigation commences (e.g. *The Yellow Face, The Creeping Man*). In fact, there are stories when Holmes and Watson began investigation in an ongoing criminal case (*The Adventure of the Speckled Band, The Five Orange Pips*). In some stories, they started investigating in order to solve some mysterious, unusual event, and it turns out that by solving it, some crime is prevented (e.g. *The Red-headed League, The Adventure of the Speckled Band*). It is not always possible to solve a mystery fast enough to prevent someone's death (*The Adventure of the Dancing Men, The Stock-broker's Clerk*). It is also the case that the commission of another crime does not add much new data to unravel the criminal mystery in which the investigation was launched (*The Five Orange Pips*).

Whatever the structure of a story may be, in the case of crimes and mysteries in motion, the detective's thinking cannot be simply paralleled with that of a puzzle player.[70] In such cases, not all the facts are given as a starting point, as some of them will only occur after the start of the investigation.

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[70] Cf. BLUTMAN 2019, pp. 141–147.

V. Concluding remarks

I examined three models used to describe or characterize a detective's thinking. I have shown that none of these models adequately reflect Sherlock Holmes' thinking as it appears in Conan Doyle's stories.

The famous detective's inferences are mostly inductive in nature. These are based on general statements that are not general truths, but are true only in a number of the cases. Their future occurrence is only to some degree probable, but not certain. Thus, the conclusions based on these premises are also based on probability. However, the degree of probability is not well measurable in practice. Thus, it depends on the detective's subjective conviction, whether to accept a conclusion based on probability as a starting hypothesis that determines the further direction of the investigation.

Another secret to a detective's success is intuition. In many cases, success does not depend on valid arguments, but on what data you use as the premise for these arguments. The data can come to the detective's knowledge in many ways, such as from observations, reports (testimonies), and so on. The point is how one evaluates the data and to which data one attaches relevance. This, in turn, depends on intuition, experience, and luck, which can no longer be described by logical means.

BLUTMAN LÁSZLÓ

A VIZSGÁLÓDÁS NYELVE ÉS LOGIKÁJA: NÉHÁNY ALAPVETŐ PROBLÉMA

(Összefoglalás)

A jogi szövegek elemzése alapvetően és kiindulásképpen nyelvi és logikai eszközökkel történik, amelyekkel feltárhatjuk a szövegek által közvetített gondolatokat és azok összefüggéseit. Mindez sok bizonytalanságot hordoz magában. A bizonytalanság nemcsak nyelvi jellegű (pl. mit jelent egy szó vagy kifejezés egy adott összefüggésben), hanem logikai is. Alapvető probléma, hogy a rendelkezésre álló logikai kategóriák felhasználásával hogyan lehet megfelelően leírni és értékelni a jogi szövegekben megjelenő gondolkodást, különös tekintettel a következtetésekre. Például bárki, aki megpróbált egy logikai térképet felvázolni egy bírósági döntés indoklásáról, érzékelhette a problémákat.

A gyakorlati nehézségek már a legalapvetőbb kérdéseknél elkezdődnek: pl. mi tesz egy következtetést deduktívvá, hogyan tudjuk mérni vagy kifejezni a valószínűség fokát egy induktív következtetésben. Ebben az írásban megpróbálok néhány hasonló, alapvető nehézséget bemutatni és elemezni. Ehhez egy terjedelmes, egy szerzőhöz kötődő, közismert, sokak által elemzett, ellentmondásos értékelések tárgyát képező szöveget választottam, amely

a problémák racionális megoldására irányul, vagyis valamiféle vizsgálatra, ami jellemző a jogi szövegekre is. A szokásos jogi szöveg nem felel meg e feltételeknek. A híres detektívfigura, Sherlock Holmes történetei azonban megfelelő szöveghátteret és elemzési alapot nyújthatnak. A detektív gondolkodásmódjának leírására tett kísérletek jó közvetítői bizonyos nyelvi és logikai kérdések tanulmányozásának, amelyek relevánsak lehetnek a jogi szövegek logikai elemzése szempontjából.