

Expert Witnesses in Legal Argumentation

GHITA HOLMSTRÖM-HINTIKKA

*Boston University
Dept. of Philosophy
7045 Commonwealth Avenue
Boston, MA 02215
U.S.A.*

INTRODUCTION

In this paper I will discuss the role of expert witnesses in legal argumentation connected with litigation and trial. As one can easily demonstrate, the interrogative model of inquiry developed by Jaakko Hintikka proves useful for this purpose. There are, admittedly, components in the practice of using experts which fail to fall into place within this model, components for which other explanations have to be found. However, when it comes to interrogating witnesses – the ones in the own party or those in the opponents' – the interrogative model is the most useful tool.

WHAT IS THE ROLE OF EXPERT WITNESSES?

A lorry driver named John Preece was charged with murder, and was convicted by the majority of a jury after an eight-day trial in Edinburgh in June 1973. He was sentenced to be imprisoned for life.

The conviction of Preece was to set in motion a sequence of extraordinary events that would ultimately lead to a searching examination of the role of forensic scientists in the criminal justice system and their ethical obligations to the courts of law (J. M. Phillips, J. K. Bowan, 1985, p. 3). It was scientific evidence that brought about Preece's conviction. Scientific evidence of biological fluids, hairs, fibers, grass seeds, and other material was said to link Preece to the victim. The evidence was presented by Dr. Alan Clift, a forensic scientist with twenty years of experience in the Home Office and a founding member of the Forensic Science Society. Such facts had to make a psychological impact on the majority of the jury members.

Dr. Clift's evidence covered three main subjects – biological fluids, hairs, and fibers – but its most significant aspect was his evidence that the deceased had stains from an individual who was both blood group A and a secretor on her clothing. (A secretor is a person who secretes some of the ingredients of blood into body fluids.) The prosecution was able to show that the accused – like 40% of the population – was blood group A and in

addition a secretor. What Dr. Clift *did not* tell the jurors was that the victim was also blood group A and a secretor. *Nobody asked him*. And there is no doubt that he knew this fact because he had included this information in his initial report to the English police. (Ibid., p. 4.)

This case prompts a couple of interesting questions. Some of them concern the quality of scientific evidence in general – and of Dr. Clift’s evidence in particular. Others are connected with the problem of what the adequate questions are. Neither of these kinds of questions will be discussed here. There are, however, also a number of questions which concern the *role* of the expert witnesses. Some of them will be dealt with in this paper.

Several years after Preece was imprisoned, an investigation performed by Dr. Pereira showed that Dr. Clift’s evidence in this case, as in several other cases, “fell short of the standards of accuracy and objectivity required of an expert witness” (p. 5), and had the whole of the available evidence been known of the trial Dr. Clift’s evidence would have been rejected.

Dr. Margaret Pereira who was working on six other of Dr. Clift’s cases stated in her report on Dr. Clift that:

In many ways Dr. Clift’s attitudes reflect those of the very early forensic scientists who saw their function as helping the police and not as, I would believe, a modern forensic scientist would see it, namely to assist the police in their investigations and secondly, to assist in the cause of justice in the courts. He does not seem to have tuned his mind to the possibilities of his evidence incriminating innocent people – trusting that the police were always right in their initial suspicions. (Cf. Phillips and Bowan, 1985, p. 5)

This passage brings into the open two lines of thought regarding the role of expert witnesses. One being that the expert is brought in to help one party against the other, be it the police or some other party. And even if the quoted passage tends to give another picture of the attitude of modern experts, there still are remainders of a tendency, I would claim, to convince and mentally overpower the opponent.

Then there is also the view as here expressed by Dr. Pereira that modern expert witnesses see their function as a member of a team and as such assist in the joint effort of truth-seeking. Looking on things in this way we can also see two separate models for argumentation: one is the ill-reputed rhetoric of Socrates’ time, whereas the replacing model is the very Socratic model of analysis.

THE INTERROGATIVE MODEL OF INQUIRY

For a better understanding of the future discussion, a brief presentation of a Socratic model of analysis from contemporary philosophy, the interrogative model of inquiry, is in order here. This is a model developed by Jaakko Hintikka (in particular, see J. Hintikka and J. Bachman, 1990). On this model, truth-seeking inquiry is thought of as a game, not unlike

game-theorists' "games against Nature". There are at least two parties involved in this game, the questioner or "Inquirer" and the answerer or "Nature", sometimes also called the "Oracle". The "Oracle" is in other words thought of as being the source of information. The "Inquirer" may both ask questions and, when he receives an answer, derive further true propositions from that answer, by means of the common deductive rules. Initial premises, received answers, derived inferences are all listed in one and the same bookkeeping table. "Nature" is supposed to give true answers, but sometimes "Nature" can fail to answer – which, of course, also is an answer in a wider sense. Further answers and derived true propositions may be added to previous premises.

In the simplest case the arguer or inquirer begins from some given set of premises, T , and tries to establish, by means of interrogative as well as deductive steps, a fixed ultimate conclusion, C_U . A more common case is one in which the inquirer is trying to establish either one of two contradictory conclusions, say B or not- B .

In a table model we can display this in the following way:

	T	C
(Initial premise)	$IP = P_1 (IM)$	C_U
(Initial premise)	$IP = P_2 (IM)$	
	...	
(conclusion)	$C_1 (LI)$	
	...	
(answer to question)	$P_3 (IM)$	
(tacit knowledge)	$P_4 (IM)$	
(ultimate conclusion)	$C_U (LI)$	

In this table, the left-hand side is truth preserving and the right-hand side is falsity preserving. What this amounts to is that all answers by the "Oracle" on the left-hand side are thought of being true, and the inferences (LI), deduced by means of logical or deductive rules are valid. Premises are taken to be statements which justify a logical inference (LI). Thus premises in this sense can be initial premises, answers to questions, tacit knowledge etc. But a derived conclusion may also be thought of as a premise in a new inference. When the ultimate conclusion, C_U , coincides with the final conclusion on the right-hand side, the whole inference is valid. The interrogative moves (IM), such as P_1, P_2, \dots , could be either initial premises (IP), answers and questions put to "Nature", tacit knowledge which has to be spelled out, etc. When the conclusion on the left-hand side is the same as the ultimate conclusion on the right-hand side we say that there is a bridge from the left to the right. The task of the arguer is to try to establish this bridge.

A simple example, taken from the Hintikka-Bachman textbook, may illustrate this method.

Argument:

There is no justification for the astronomical salaries paid to professional athletes these days. Even players who might never find their way into a game earn six-figure salaries, whereas there is not an elementary school teacher in the entire country who earns anywhere near this amount. Are the services rendered by a professional jock really of greater value to the country than an effective school teacher? Of course not. But what other standard for determining salaries is superior to one based upon the worth of the job performed? So unless one is willing to grant that elementary school teachers deserve more money than back-up athletes are currently being paid, a suggestion no one can take seriously, one cannot escape the conclusion that these athletes should be earning less.

TABLE ANALYSIS

Premises, Interrogative Moves, and Logical Inference Moves	Conclusion
1. Athletes frequently earn more than teachers. (premise or <i>IM</i>)	7. Athletes are overpaid. (<i>C_U</i>)
2. The job performed by athletes is of less value than that performed by teachers. (premise or <i>IM</i>)	
3. Persons should be paid in proportion to the value of the work performed. (premise or <i>IM</i>)	
4. School teachers should earn more than athletes. (<i>LI</i> from 2 and 3)	
5. School teachers should not earn as much as athletes currently earn. (<i>IM</i>)	
6. Athletes are overpaid. (<i>LI</i> from 1, 4, and 5)	

We may consider lines 1–3 in the table to be initial premises or, alternatively, to be answers to questions put to various oracles, i.e., sources of information. Line 4 follows by means of a logical inference step from lines 2 and 3. Line 5 can be considered an answer to a question put to an oracle. Line 6 follows by means of a logical inference step from lines 1, 4, and 5. The table is closed; i.e., the conclusion appears in the open path on the left side of the table and also in the open path on the right side. If we assume that the initial premises and all answers to questions are true, then the inquiry has been successful (Hintikka and Bachman, p. 50ff.).

We may also admit a division of labor between two inquirers, perhaps so that one is trying to establish whether *B* whereas the other one is trying to prove that not-*B* the Shakespearian inquiry as Hintikka names it. This is easily illustrated by the activities of the two opposing attorneys in a court room, where the prosecutor and the defence attorneys try to establish whether the defendant is guilty as charged or not guilty as charged. The aim of the process is just to answer the Shakespearian question, i.e., guilty as charged or not guilty as charged. As I have discussed elsewhere, what

all this amounts to is that the task of the inquirer is divided (see Holmström-Hintikka, 1992). In other words the adversary system in Anglo-Saxon criminal law is nothing but a division of labor in a Shakespearian inquiry. The jury, however, has to draw the ultimate conclusion, which in a criminal case might be “guilty as charged”.

If we were to apply the model to the two attorneys trying to establish whether the defendant is guilty or not guilty, the division of labor carried out by these attorneys can be demonstrated in the table for instance in the following way (W_1, W_2, \dots , stand as shorthand for witness 1, witness 2, \dots , or, for the oracle):

	T	C
1.	P_1 (IP)	C_1
2.	P_2 (IM , oracle: observation)	
	\dots	
3.1	P_3 (IM , or: W_1)	3.2 P_4 (IM , or: W_2)
4.1	P_5 (IM , or: W_2)	4.2 P_6 (IM , or: W_3)
5.1	C_1 guilty (LI , 3.1, 4.1)	5.2 C_2 not guilty (LI , 3.2, 4.2)

As in other cases of Shakespearian inquiry, the division of labor can be seen in the split path on the left side. The task of the jury is to establish, on the basis of the whole hearing and inferences they are allowed to draw, which of the inferences in the split path is valid and thereby establish the bridge to the ultimate conclusion, say C_1 .

One additional comment on the attorneys’ division of labor may be needed. If we think of a real life situation, it sometimes seems clear that the two attorneys are not just trying to build a bridge to the ultimate conclusion. Rather it appears that the defense is trying to prevent the prosecution from persuading the jury – i.e., those who in the last instance are the ones who connect the two bridgeheads – by an argument or argument sketch of the prosecutor’s conclusion “guilty as charged”.

At this point we need to remind ourselves that in the process of questioning the witnesses, there must in general not be any conclusions drawn by the witnesses themselves or by the attorneys. The witnesses are supposed to answer questions and give facts, and in that respect we can see the similarities to the model, the witnesses give the factual answers or abstain from answering if they cannot do so. However, there is one point at which the division of labor in a courtroom is more restrictive than the interrogative model. The witnesses are not in general allowed to draw inferences. Inferences can be drawn by the jury in its eventual deliberation. As I say elsewhere (Holmström-Hintikka, 1992, p. 264)

What this means is that the variant of interrogative inquiry that a criminal process is, is of a very special and restrictive kind. In it, all the questioning steps (interrogative steps) must precede the inferential steps. Such a “normal form” of interrogative inquiry is usually

impossible. In other words, some conclusions are in most cases impossible to reach without letting certain inferences be drawn before the crucial questions are asked. The main reason for this impossibility is that often the presupposition of a question, which must be established before the question can be asked, cannot be so established without suitable antecedent inferences. In the model the “Inquirer” can derive new true propositions from previously established premises by means of the rules of logic, i.e., the rules of inference.

One case in which this kind of normal form is possible (or at least easier to achieve than in other cases) is when all available answers state particular conditions (quantifier-free, as logicians would say). The tacit assumption that such a normal form is available is in effect made in the case law system when all the inferences proper are supposed to be left to the jury. This is undoubtedly encouraged by the over-optimistic idea, also built into the jury system, which says that the witnesses are supposed to give facts and only the facts, that is, only particular propositions. This assumption is one of the weak points of the jury system and has in effect prompted the problem of expert witnesses.

DEFINITION

What then is an expert? From Webster’s Dictionary we find that an expert is one who is very skillful or well-informed in some particular field. Peter Dorram in his book *The Expert Witness* adds that “an expert is someone whose statements impartial parties are prepared to accept and for whose opinions and attestations someone else is prepared to pay money”. In this context he also says that “the expert possesses knowledge not commonly available to a person not skilled in the art, and possesses the necessary qualifications to be considered by the court to be an expert” (p. 1). In Finnish and Swedish legal systems – which for historical reasons have far going resemblances – the rules governing experts also are in their main parts similar. Here the concept of expert as used in legal context means:

a person – physical or legal – who has been assigned by one of the parties or by the court the task of giving an opinion in a question for the judgement of which particular knowledge or expertise is needed. (Edelstam, 1991, p. 21; my translation.)

Edelstam also acknowledges that Hassler is suggesting the following definition:

An expert is (. . .) a person, who possesses some certain knowledge (or skill) [my addition] which does not fall under the realm of common knowledge or life experience, and which in a trial contributes to the findings through opinions based on said knowledge. (Hassler, 1951, p. 75; my translation.)

THE PURPOSE OF EXPERT TESTIMONY

“The purpose of expert testimony is to provide findings of facts for the decision-making process of semijudicial or judicial bodies such as boards of adjustment, boards of taxation . . . or to provide the various courts of law with factual information on which to base a resolution, a ruling, or a verdict” (Dorram, p. 2).

The United States Federal Rule of Evidence requires “a demonstrated expertise prior to the testimony” (Rule 702) but does not specify the depth and breadth of such expertise.

In Finland and in Sweden the institution of expert witnesses is considered a means of evidence. Most importantly, experts form a category of evidence separate from evidence through eye witness testimony, or any other evidence such as physical evidence or the testimony by the parties involved. Another important point is that the experts may be employed either by the court, “court experts”, or by either or both of the parties, “party experts”. (Cf. Edelstam, 1991, p. 24 f. See also p. 74.) One also has to distinguish the use of an expert as a means of evidence and expert delegates in the court.

In Anglo-Saxon legal system, where expert delegates in court are non-existent entities, the use of expert witnesses is widespread. In practice almost all experts are “party experts” although theoretically the court – or the trial judge – can employ an expert of his own. This happens in particular if the parties’ experts are contradicting each other.

In previous times, in Anglo-Saxon law lay witnesses were not allowed to express opinions nor draw inferences. This difficulty prompted the use of expert witnesses who are allowed to suggest inferences within their area of expertise and even when it comes to the ultimate question at hand. Although there nowadays are a few occasions where even the lay witness may express his opinion and draw inferences, his possibilities are strongly restricted by Rule 701 (Federal Rule of Evidence) which states that (1) the witness’s testimony must be based on a rational perception of that witness and (2) the opinion or inference she/he is expressing must be helpful to a clear understanding of the fact. The Rule states:

If the witness is not testifying as an expert, his testimony in the form of opinions or inferences is limited to those opinions or inferences which are (a) rationally based on the perception of the witness and (b) helpful to a clear understanding of his testimony or the determination of a fact in issue. (Pub. L. 93-595, sec. 1, Jan 1975 88 Stat. 1937)

Due to this limitation of the eyewitness, i.e., the factual witness’s testimony, expert witnesses may need to be brought in. In particular this is the case:

if the evidence goes beyond that which may be perceived by a lay witness and require a background not generally found in the average lay witness. (Dombroff p. 3)

The activities of an expert witness are governed by Federal Rule of Evidence, Rule 702, which states that:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise. (Pub. L. 93-595, sec. 1. Jan 2, 1975, 88 Stat. 19)

THE ROLE OF AN EXPERT WITNESS

The primary role of an expert is to express an opinion. She/he also has to provide findings of facts for the decision-making instances of semijudicial and judicial bodies. For the sake of simplicity, let us here concentrate on the use of an expert for a judicial body.

In many cases experts are used only to *testify* in trials. But however important this role is, there are also other phases of the truth-seeking process in which the opinion of an expert is extremely valuable. What I have in mind is the process of preparation of a case for trial, the litigation. Parts of these preparations concern exactly such matters which belong to the scope of the imagined expert. She/he can in fact provide invaluable input in all phases of the litigation. Consequently, she/he may suggest questions to be put, to himself in the trial but also to other witnesses and in particular to the opponent's expert(s). She/he can also inform and educate the attorney and thus help him discover important facts and connections about the case, connections of which he otherwise might not have been aware. Further the expert may be helpful in drafting complaints or answers to complaints not to mention the invaluable role she/he can play in preparing lay witnesses for deposition.

Here again, the practice in Sweden and Finland shows some major differences from that in the United States. By reading Edelstam one gets the impression, and this probably is a correct exposition of practice as it currently is in these countries, that the expert's main and perhaps only role is to provide the court with a written opinion about the case at hand. This is the case in particular if she is employed by the court. The expert, so it seems, collects relevant information, either provided by the lawyers or by investigations of her own such as e.g. inspecting the scene of the crime. According to the law the expert has to submit a written statement to the court before the main trial takes place. This gives the defence and prosecution a possibility to adjust their standpoints in accordance with the statement.

If the expert is employed by either party, she might in the pre-trial preparations reveal her opinion, judgement or conclusion to her employer ahead of time. The attorney then has the right to choose whether he wants to include all of the expert's opinion in his own exposition. In particular if

this opinion is negative for the defendant (or plaintiff) he might want to suppress that information. What seems to be missing in the legal practice in Finland/Sweden, is the use of experts as experts on the right questions to ask. In other words, there is no indication that the trial lawyer would use the expert's services in litigation, when preparing himself or his witnesses for court, or in hearing the opponent's experts in a pretrial disclosure or a disclosure of his own witness or expert to the opponent's lawyer for that matter.

One explanation to this nonuse is the fact that the witnesses are considered tabu. Any preparation of witnesses is considered inappropriate, a way of influencing the witnesses.

One common feature, however, remains in both systems. The expert witness informs, perhaps even educates, the attorney about matters in the field of her expertise relevant to the case. In what follows the Anglo-Saxon adversary system is what we in general have in mind, unless stated otherwise.

THE MODELS PUT TO WORK

In legal reasoning, whether it is a matter of legislation or judges' expressed opinions, traditional models have been the deductive, inductive or argument by analogy. To this selection I want to add the interrogative model of inquiry, a model that I am concentrating on throughout this paper.

Let me, however demonstrate by means of some simple examples the first three mentioned, since they continue to play an important role in legal as well as in other kinds of reasoning. (For an elaborate exposition of these ways of legal argumentation see Golding, 1984.)

The deductive method is essentially based on the Aristotelian syllogistic logic. So is for instance the following deduction an example of simple *modus ponens*:

I Deduction

1. If the deceased had stains from an individual which correspond to that individual's body fluids (blood group A and secretor) that individual is guilty
2. The deceased had stains from an individual which correspond to that individual's body fluids (Blood group A and secretor)

3. Therefore: That individual is guilty

The inductive model does not in a strict sense provide a logical inference. However, for many practical purposes, in science as well as in everyday life the inductive method of generalization serves many good purposes.

II Induction

- (1). At time t_1 when the deceased had stains from an individual which correspond with that individual's body fluids that individual was guilty
 - (2). At time t_2 when . . . that individual was guilty
 - - - - -
 - (n). At time t_n when . . . that individual was guilty
-
- (n+1). Therefore: At time t_{n+1} when . . . that individual is guilty.

We are clearly not dealing with a logical inference here.

There is, however, some value in this kind of reasoning, although even in the best case some qualifications must be introduced:

- (a) there must not be any known counterexamples.
- (b) the higher the number n is, the greater is the expectation that the next outcome at t_{n+1} is similar.
- (c) the higher the number n is, the greater is the expectation of always obtaining a similar outcome. I.e., the likelihood for generalization grows when the number n grows.
- (d) *a/one counterexample* typically lowers the expectations for a similar outcome at t_{n+1} . With only one counterexample and n a high number the expectation is still distinguishably high.
- (e) one single counterexample proves the generalization wrong.

III Argument by analogy

1. In case X body fluids correspond with those of the suspect's
 2. In case Y body fluids correspond with those of the suspect's
 3. In case X the suspect was guilty
-
4. Therefore: In case Y the suspect is guilty

Golding points out that a presupposition for this kind of argument to be of any use is the similarity of the relevant known features of the two cases (the number of cases is unrestricted.) In our example there is only one relevant feature, the correspondence of body fluids. The absence of counterexamples is another important factor that has to be kept in mind, Golding says. As exemplified on line 3 the familiar case (modelcase if you so wish), X , shows additional features which we then, given the similarity in all the other features, "derive" by analogy as our conclusion,(4).

In general in a legal case we think of two parties trying to establish whether or not the defendant is guilty as charged. In the process it is reasonable to think that each party retains and perhaps employs their own experts to assist them in different phases of the case. For instance as was mentioned earlier the defendant's expert may play an important role in the initial phase of preparation for litigation, both when it comes to documents as, for instance, in the formulation of complaints and in the recog-

dition of factual defenses available for his employer in his area of expertise (cf. Dombroff p. 4). If involved at this early stage, he is also capable of identifying the strengths and weaknesses of the case. In a similar way the opposing party, the plaintiff, may hire his expert for assistance in bringing in facts which may strengthen his case and which thus contribute to the process of finding justice and truth in the actual case.

What else is this than an example of the interrogative model? In the simple model answers are added to questions in interrogative moves. If the path splits, for logical or other reasons (like division of labor), the same answer is added to each open path until it either bridges to the ultimate conclusion, C_U or closes by contradiction.

<i>T</i>	<i>C</i>
1. $P_1: A$ (<i>IP</i>)	9. $C_U: D$
2. $P_2: B \vee C$ (<i>IM: or: observation</i>)	
3. B	4. C (<i>LI</i> from 2 by rule of logic)
5. $\neg B$	6. $\neg B$ (<i>IM: or: W1</i>)
7. x	8. D (<i>IM: or: W2</i>)

The inference is said to be valid when all paths are closed, i.e., either closed by contradiction, x , as 7 or bridge as 8 to 9.

Let me illustrate this with an example. Although, in general we don't spell out the imagined questions, it might be helpful to do so here. When it comes to legal reasoning we even formulate questions to witnesses, experts and parties although we scarcely spell out our questions to physical objects and other kinds of evidence.

<i>T</i>	<i>C</i>
1. $P_1: A$ A woman is found dead close to a highway. (<i>IP</i>)	9. $C_U: D$ The defendant murdered the victim.
$Q_1: Q_1:$ How did the woman die?	
2. $A_1: P_2:$ She was either run over or she was murdered (<i>or: observation</i>)	
3. She was run over	4. She was murdered (<i>LI</i> from 2 by rule of logic)
$Q_2: Q_2:$ Was she run over?	5. She was not run over (<i>IM: or: W1</i>)
5. $A_2:$ She was not run over	$Q_3: Q_3:$ Who murdered her?
7. x (= contradiction 3, 5)	8. $A_3:$ The defendant murdered her (<i>or: W2</i>)

In the legal case where we enter the courtroom we have a similar situation. Here A, B, C are different statements than in the previous case. Let

A = there are stains on the victim, B = the defendant is guilty, C = the victim is a secretor.

T	C
1. $P_1: A$ (IP)	10. $C_v: \neg B$
2. $P_2: B \vee \neg B$ (IM: tacit or common sense)	
Prosecutor	Defense
3. B	4. $\neg B$ (LM: from 2, LR)
5. C	6. C (IM: or: W1)
7. $\neg B$	8. $\neg B$ (IM: or: W2)
9. x (LI, LR)	

The logical inference has in this case been replaced by a legal move (LM) for instance a legal rule of procedure (LR). The logical inference in step (9) and the bridging from (8) to (10) is a task for the jury.

But things are not as simple in real life as the model suggests. As soon as a complex statement enters the picture, it usually calls for an inference before further questions can be asked. Since this is not permitted, the pre-suppositions for further questions are unavailable. This is the place where expert witnesses enter the arena. With their expertise and experience they can bring in new evidence, express opinions, and draw inferences which are necessary for establishing the missing link in the interrogation as the table below illustrates.

T	C
1. $P_1: A$	(IP)
2. $P_2: B \vee \neg B$	(IM; or: observation)
.	
.	
Prosecutor	Defense (LM)
3. A	4. A (IM; or: W1)
5. $A \rightarrow B$	6. $A \rightarrow B$ (IM; or: EW)
7. $\neg A$	8. B (LI, RL, 5)
11. x	9. $\neg A$ 10. B (LI, RL, 6)
	12. x (LI, RL, 4, 9)

(This table is only a part of the left hand side of the whole argument.) Line 5 and line 6 are the crucial points in the argument where the expert needs to establish that if A is the case then according to his experience or scientific knowledge B follows. Thereby the expert witnesses can assist the jury in its task of constructing a valid argument which – as is hoped – leads to the just and ultimate conclusion as it should have been in John Preece’s case: not guilty.

Explanations for the tables

<i>EW</i> stands for	Expert Witness
<i>IM</i>	Interrogative Move
<i>IP</i>	Initial Premise
<i>LI</i>	Logical Inference
<i>LM</i>	Legal Move
<i>RL</i>	Rule of Logic
<i>LR</i>	Legal Rule

BIBLIOGRAPHY

- Dombroff, M. A.: 1987, *Expert Witnesses in Civil Trials, Effective Preparation*, Rochester, N.Y., Lawyers Co-operative Publishers Co, San Francisco.
- Dorram, P.: 1982, *The Expert Witness*, Planners Press, Chicago.
- Edelstam, H.: 1991, *Sakkunnigbeviset*, Justus förlag, Juridiska föreningen i Uppsala, Uppsala.
- Golding, M.: 1984, *Legal Reasoning*, Alfred A. Kopf, New York.
- Hassler, Å.: 1951, *Bevisrätten och de extraordinära rättsmedlen* (third ed.), Stockholm.
- Hintikka, J. and J. Bachman: 1990, *What If . . . ? Towards Excellence in Reasoning*, Mayfield.
- Holmström-Hintikka, G.: 1992, 'On Argumentation in Legal Contexts', in F. Vandamme (ed.), *Communication and Cognition*, Vol. 25, Gent, Nr 2/3, pp. 259–268.
- Holmström-Hintikka, G.: 1993, 'Practical Reason, Argumentation and Law', in G. Haarscher (ed.), *Chaim Perelman et la Pensée Contemporaine*, Bruxelles, pp. 179–194.
- Phillips, J.M. and J.K. Bowan: 1985, *Forensic Science and the Expert Witness*, The Law Book Company Limited, London, Ontario, Karachi, Singapore.