

The Fallacy of Fallacies

JAAKKO HINTIKKA

*The Florida State University
Department of Philosophy
Tallahassee, FL 32306–1054
U.S.A.*

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1. ARISTOTELIAN FALLACIES WRONGLY SO-CALLED

The title of this paper does not mean that I am proposing to add a new superitem to the list of traditionally recognized fallacies.¹ What I shall do instead is to show that these so-called fallacies originally were not fallacies at all in our twentieth-century sense of the term, that is, in the sense of being mistaken inferences. They are not mistaken inferences, not because they are not mistaken, but because they need not be inferences, not even purported ones. The error in thinking that the traditional fallacies are faulty inferences is what I propose to dub “the fallacy of fallacies”. It is the fallacy whose recognition will, I hope, put a stop to the traditional literature on so-called fallacies.

Instead of being mistaken inference-types, the traditional “fallacies” were mistakes or breaches of rules in the knowledge-seeking questioning games which were practiced in Plato’s Academy and later in Aristotle’s Lyceum.² Accordingly, they must not be studied by reference to codifications of deductive logic, inductive logic, or informal logic, for these are all usually thought of as codifications of inferences. Such inferences have much less to do than is generally recognized with the kinds of *faux pas* that, e.g., Aristotle dealt with under the heading of sophisms in refutation. Instead, the so-called traditional fallacies are best studied by reference to the theory of information-seeking questioning processes (interrogative games) which I have defined and studied elsewhere.³ The kinds of discussions of “fallacies” which are found in textbooks of traditional and informal logic do not do this. Hence they are both systematically and historically speaking but a colossal mistake, a super-fallacy worth the title of this paper. The best way of exposing this fallacy is to show that traditional fallacies can be discussed from the vantage point of the interrogative model in a more interesting way than in conventional expositions. That is what I shall try to show in this paper, using as my primary case study material the most traditional of all traditional fallacies, those discussed by

Aristotle in *De Sophisticis Elenchis*. As a bargain the reader will thus also receive a crash course in the basic theory of interrogative inquiry.

2. WHY A SEPARATE THEORY OF FALLACIES?

This does not mean, of course, that no Aristotelian fallacy can be interpreted as a false pretender to the throne of valid logical inference. Several of them can often be thought of as mistaken logical or conceptual inferences. Cases in point are perhaps most clearly the fallacy of the consequent and the fallacy of accident (*De Soph. El.* iv, 166 b 20–27). Other so-called fallacies are not related especially closely either to mistakes in inference or to mistakes in questioning. In this case the mistakes due to different kinds of ambiguity or multiplicity of senses, more generally, with the fallacies which Aristotle says are related to language. However, the hard core of Aristotelian fallacies includes in any case several mistakes which have insinuated themselves into the lists which are found in virtually all textbooks of “Aristotelian”, “traditional”, or “informal” logic. This group of fallacies is especially important in that it alone motivates from a philosophical viewpoint the treatment of fallacies as a special chapter of logic, separate from the study of deductive inferences. For mistaken inferences like affirming the consequent are more naturally treated as a part of deductive logic. It is after all only there that we can find ways of actually proving the fallaciousness of such fallacies. In brief, if traditional fallacies were in fact mistaken inferences, the study of such fallacies would be nothing more and nothing less than one particular way to approach the theory of inference.⁴

Likewise, purely linguistic mistakes, such as the use of ambiguities, are most appropriately dealt with in the context of meaning theory, and hence do not motivate a separate theory.

Construed as a separate study, the traditional theory of fallacies depends for its *raison d'être* on the treatment of nondeductive and non-linguistic fallacies. If they, too, really ought to be studied in a different chapter of logic, the entire complex of inherited “fallacies” should be broken up and its different ingredients be assigned to their natural places elsewhere. And this is what I shall try to show in this paper. The critical group of so-called fallacies should be studied in the theory of interrogation which in turn is a part of the logic and semantics of questions and questioning processes.

3. ARISTOTELIAN *ELENCHUS*

An even more sweeping point can be made here. It is not just that some Aristotelian fallacies are naturally thought of in inferential terms and

others as mistakes in questioning procedures. The entire study of so-called fallacies in Aristotle is part and parcel of his discussion of the theory and practice of interrogative games. For that is what *Topica* and *De Sophisticis Elenchis* together amount to. As the very title of the second of these treatises shows, Aristotle strives in these works to be the Hoyle of Socratic *elenchus* or, rather, of its academic descendant. Thus in a sense all Aristotelian fallacies are essentially mistakes in questioning games, while some of them are accidentally mistakes in deductive (more generally, logical) reasoning.

Aristotle indicates this by saying that the non-verbal fallacies all “arise because no definition has been given of what a syllogism is and what a refutation (*ἐλεγχος*) or that there is some defect in their definition” (167a 21–23). Or, as Aristotle also sometimes puts it, all the fallacies here relevant can be thought of as variants of a single one, of the *ignoratio elenchi*, i.e., as being due to “a false conception of refutation (*ἐλεγχος*)”. Now no perceptive reader of the *Topica* and of *De Sophisticis Elenchis* can fail to realize that *elenchus* comprises much more than logical inferences in any sense of inference (deductive, inductive, abductive, statistical, or whatnot), however wide. Indeed, it is clear that *elenchus* was for Aristotle quite as genuinely a questioning procedure as the Socratic *elenchus* had been. I shall return to this matter in sec. 19 below and provide further evidence for it there.⁵

4. THE INTERROGATIVE MODEL AS A CODIFICATION OF ACADEMIC *ELENCHUS*

The first item on my agenda is obviously to outline the interrogative model of inquiry which will serve as the conceptual framework of my examination of some of the main traditional fallacies. This model follows in fact closely its Socratic paradigm. What is the structure of the famous Socratic *elenchus*, as it is illustrated by the early Platonic dialogues or, for that matter, what is the structure of the dialectical exercises practiced in Plato’s Academy? The outlines of an answer are fairly obvious.⁶ Two persons are involved. One is the questioner, the other answerer. I shall call the two parties, anachronistically, “the Inquirer” and “the Answerer” or “the Oracle”, sometimes “Nature”, respectively. The Inquirer can put questions to the Answerer, who will answer them best he can.

In Aristotle’s work on such interrogative “games”, he came to realize that the answers to certain questions do not really depend on the Answerer, on what he knows, believes, or hopes. They are the questions which any rational being must answer in the same way. Those are the questions whose answers logically follow from what has been established before. In getting such questions answered, the Answerer is in this sense irrelevant.⁷

Hence in my interrogative model I have given such steps a special

status, even though they did not originally enjoy one in ancient Greek dialectic. I am allowing, at each stage of the interrogation, the Inquirer the option of forgetting the Answerer and, instead of asking a question, of drawing a logical inference from what had been initially assumed or established earlier in the course of the questioning process.

The Answerer's replies are in the simplest version of the interrogative model assumed to satisfy the conclusiveness condition I have discussed in my theory of questions and answers. For instance, it does not help to answer the question

(4.1) Who robbed the bank?

by saying

(4.2) The richest man in town

if the questioner doesn't know who the richest man in town is. In general, a who-question

(4.3) Who, e.g., x , is such that $S[x]$?

will have as its conclusive answer "b" only if it is true that the questioner knows who b is.⁸

In more complicated versions of the questioning model, partial answers may also be admitted. They are not needed in this paper, however.

5. THE AIM OF THE GAME. THE DUAL ROLE OF QUESTIONS.

It is in the spirit of the spirited Platonic encounters to call these dialectical exercises "games" and use game-theoretical terms and game-theoretical concepts in discussing them. Thus I can formulate my slightly artificial dichotomy by saying that, at each stage of the interrogative game, the Inquirer has a choice between two kinds of moves, *interrogative* moves and *deductive* moves. In an interrogative move, the Inquirer addresses a question to the Answerer, who provides an answer if he (she, it) can. In a deductive move, the Inquirer draws a deductive conclusion from the theses so far obtained.

It is natural to formalize such a questioning process by means of a Beth-like *tableau*.⁹ The Answerer's replies are entered into the left column, and the *tableau* construction rules (deductive rules) are set out in such a way that no traffic or formulas between the two columns take place. The usual *tableau* terminology will be used in the following, and some suitable set of *tableau* construction rules (deductive rules) will be assumed. It is assumed that these rules conform to the so-called sub-formula principle.¹⁰

The purpose of an interrogative game could be to prove a given

conclusion C. Then C would be the lone initial entry in the right column of the *tableau*. In a typical ancient Greek setting, what the questioner was trying to establish was the falsity of an initial thesis H which he had undertaken to defend. Then $C = \sim H$.

In another variant, the aim of the game is to establish either B or $\sim B$ for a given B, i.e., to answer the question "B or not-B?" (This might be called the Shakespearean variant of a questioning game.) Then the Inquirer will have to keep an eye on two lines of reasoning, each of which can be formalized by a separate *tableau*.

Notice that in Shakespearean interrogation questions play a dual role: the Inquirer is trying to answer a "big" initial or principal question by putting a lot of "small" questions to the Answerer and by using their answers as additional premises. Thus a distinction between "big" and "small" questions is needed in order not to trivialize the process completely. (Otherwise the Inquirer could simply put the principal question to the Answerer and be done with the entire process).

6. PRESUPPOSITIONS OF QUESTIONS. INITIAL ASSUMPTIONS.

One important way in which different questions differ from each other is in terms of their respective presuppositions.¹¹ Before the Inquirer may ask a question, its presupposition must have been established, i.e., must occur in the left column of the game *tableau*.

An interrogative game may also involve an initial theoretical assumption T, which will be the sole first entry into the left column of a game *tableau*. It plays an especially important role in the questioning process in that it is the ultimate source of the presuppositions of most questions. It is sometimes assimilated to presuppositions. Yet it is important in principle to keep the concepts of initial premise and presupposition clearly distinguished from each other.

Both of them have to be distinguished from the conditions which conclusive answers have to satisfy and which were touched on in section 4 above. You might perhaps want to call these conditions, too, "presuppositions". But then it is advisable to draw a clear line between the presuppositions of questions and the presuppositions of answers. The two are not unrelated.¹² For instance, for multiple questions, the conclusiveness condition which the first part of an answer a question like "For whom did Mary buy what?" has to satisfy, is that the presupposition of the remaining question, e.g., "For whom did Mary buy this book?", is fulfilled. In other words, it must be true that Mary bought this book. Yet, in spite of these interrelations, the two kinds of presuppositions have to be kept apart in the interest of clarity. (Cf. sec. 18 below.)

7. INTERROGATIVE MODEL AND ARISTOTELIAN SCIENCE

Even though my idealized interrogative games thus involve some amount of regimentation, they are very close to their historical predecessors. They can even be used to discuss actual historical questioning games.

For instance, contemporary logical theory of interrogative games shows its usefulness by prompting corrections to the detailed views of even those scholars who have in general terms recognized the role of questioning games in Greek logic and philosophy. Thus Gilbert Ryle writes of the dialectical exercises practiced in the Academy:

So the questioner's questions have to be properly constructed for "yes" or "no" answers. This automatically rules out a lot of types of questions, like factual questions, arithmetical questions, and technical questions. Roughly it leaves us only conceptual questions, whatever these may be. (*Collected Papers*, vol. 1, p. 90.)

This is a *non sequitur*. It may or may not be true that the only acceptable questions in, say, Plato's Socratic dialogues are yes-or-no questions. However, there is no reason why yes-or-no questions could not be factual, mathematical or technical. More importantly, at least in the case of Aristotle, it is not true that questioning processes were addressed exclusively to conceptual problems. On the contrary, it is important to realize that for Aristotle the first premises of each science were arrived at by means of a kind of interrogative process.¹³ Then the questions of the Inquirer could not any longer be thought of as being addressed to an actual interlocutor, even though such an idea is not far below the surface of Aristotle's *Analytica Posteriora*.

Indeed, this hidden agenda surfaces occasionally in a manner which would otherwise be hard to understand. For instance, in *An. Post.* I 10, 76 b 23–34 Aristotle distinguishes between a hypothesis and a postulate (*ἀρχήματα*) according to whether the learner accepts the assumption in question or not. The only way in which this distinction can be relevant to Aristotle's study of how the first premises of a science are arrived at is to realize that Aristotle thinks of a scientist as being logically speaking in the same position as a student who sometimes has to work on an interim hypothesis which he does not accept. Indeed, this generalization is signalled by Aristotle by saying that a postulate can also be "any provable proposition that is assumed and used without being proved" (b 32–34). Small wonder, therefore, that some perceptive Aristotelians have maintained that *Analytica Posteriora* really deals with the way in which science is to be taught according to Aristotle.¹⁴ Though perceptive, this view is mistaken, for the questions Aristotle is really dealing with are not a teacher's questions to a student but a scientific inquirer's questions to his source of information.

How closely connected Aristotle's remarks on hypotheses and postu-

lates are with the theory of fallacies is, is shown by the fact that *ἀλήθεια* was later often translated into Latin as *petitio*, as in *petitio principii*. (Cf. secs. 10 and 13 below.)

The questions which in Aristotle lead one to the *arkhai* of a science may be addressed to the established body of *endoxa*, to our natural environment, or even to reliable witnesses, who for Aristotle included his own main predecessors.¹⁵ In other words, Aristotle uses the interrogative approach in the same way as I have done, not only to analyze interrogative dialogues between actual persons, but also as a model of scientific knowledge-seeking. The main difference is that for us the knowledge-seeking questions are addressed to nature. In Aristotle, they are addressed to the established body of information which an inquirer has available for critical examination and which is codified in the *endoxa*.

When it comes to the details, it is admittedly a difficult question as to how precisely Aristotle thought the first premises of a science to be obtained. Later, after having developed his syllogistic theory, Aristotle seems to have emphasized more the role of the method he called induction (*epagoge*) in reaching at least one class of *arkhai* of a science and less the role of dialectic. It is not clear, however, that this emphasis is incompatible with the role of questioning in reaching the basic assumptions of any one science, especially in reaching its highest generic premise. The entire matter requires further examination.

8. THE VERSATILITY OF THE INTERROGATIVE MODEL

This illustrates in fact one of the most important features of the interrogative model. The Answerer need not be a human interlocutor; the source of an answer can be an empirical observation or a controlled experiment. Then the Answerer might as well be called "Nature". But the source of answers can also be the database stored in a computer, in one's own memory, or in a clinical handbook. Equally well it can be a witness in a court of law or a patient engaged in a diagnostic consultation with a physician. The remarkable fact (which I am trying to demonstrate and to illustrate elsewhere) is that the interrogative model applies in all these different situations.

The following example may illustrate this versatility of the interrogative model. Aristotle's procedure in eliciting the first principles of some one science from a body of *endoxa* may be compared to an application of the interrogative model to a situation in which the Answerer is a database stored in the memory of a computer which the Inquirer elicits step by step by putting to it suitable questions. This example resembles Aristotle's enterprise also in that the contents of a database are initially known by the Inquirer only tacitly. For Aristotle clearly thinks of the process of finding

the first principles of a science as a process of activating potential knowledge already present, albeit only potentially. "All teaching and learning that involves argument proceeds from pre-existing knowledge." (*An. Post.* A 1, 71 a 1–2.) This observation is closely connected with the fact that the process in question had for Aristotle the character of conceptual analysis whose product is a definition. "Moreover, the basic premises of demonstrations are definitions." (*An. Post.* B 3, 90 b 23–24.) Thus we can see that the true reasons for the conceptual-analysis character of Aristotelian *elenchus* are far subtler than the one Ryle suggested for it.

The distinction made above between interrogative and deductive moves is calculated to facilitate applications in which the Answerer is nature. For nature does not carry out our deductions for us; the Inquirer has to draw his logical inferences himself.

However, the interrogative model need not have precisely the same fine structure in all of its different applications. In fact, what I have called "the interrogative model" is merely a framework of constructing a number of closely related but not identical models. For instance, one possible further specification concerns the maximal logical complexity of the available answers, as measured by the quantifier prefix of the answers.¹⁶ We are dealing with a long spectrum of different logics of questioning here. At the one end, we have the unlimited case where no structural restrictions are imposed on answers. (They may of course be subject to other restrictions.) At the other end is the case in which answers are restricted to quantifier-free propositions, which in effect means a restriction to (negated or unnegated) atomic propositions. This case is characterized by what I shall call the Atomistic Postulate. Between the two extremes, there are, e.g., the A-case (the maximally complicated quantifier is of the form $(\forall x_1)(\forall x_2) \dots (\forall x_i)$) and the AE-case, in which the prefix cannot be more complicated than $(\forall x_1)(\forall x_2) \dots (\forall x_i)(\exists z_1)(\exists z_2) \dots (\exists z_j)$

Modern philosophy of science is characterized, by and large, by the Atomistic Postulate, whereas Aristotle believed also in the availability of A-answers in empirical science. The unlimited case is what is the most interesting one here. It is approximated in real life, e.g., by clinical inquiry where a physician can look up his handbook for general laws governing biological processes and use them in his reasoning over and above the patient's answers and clinical test results. Even though Aristotelian science is most naturally thought of as being characterized by A-answers, in discussing the various kinds of question-answer dialogues he was considering it is safest to construe them as cases of unlimited questioning.

9. DEFINITIONS AND QUESTIONING

One possible further development of the interrogative model is to allow

the Inquirer or perhaps the Answerer to introduce definitions into the argument, subject to suitable presuppositions.¹⁷ This does not detach the interrogative model from its ancient precedents, for in them ample cognizance was frequently taken of the role of definitions in the academic questioning duels. This is illustrated, e.g., by *Top.* VI 4.

Admitting definitory moves into interrogative games is much more interesting than might first appear. The reason for their importance is that the introduction of an explicit definition of a new term may actually enhance the power of an interrogative argument. In this respect, interrogative arguments differ significantly from purely deductive arguments, for the scope of deductive inference cannot be increased by the introduction of (explicit) definitions. This result might in fact serve as a basis of a reconstruction of the traditional distinction between nominal and real definitions.

10. ARISTOTELIAN FALLACIES ANTICIPATED: *PETITIO PRINCIPII*

On the basis of the interrogative model, it is possible to predict what some of the Aristotelian fallacies were, assuming that they were violations of the rules of questioning games not unlike the ones which are codified in my model. Perhaps the most important feature of interrogative games which is easy to get confused about is the dual role of questions registered above in sec. 5. On the one hand, the aim of the entire game can be to answer a "big" initial or principal question; on the other hand, this "big" question is to be answered by means of a number of replies to "small" questions the Inquirer puts to his or her interlocutor. If a distinction between the two is not maintained, one can try to trivialize the entire questioning procedure by posing the "big" question to the Answerer without further ado. If a conclusive answer is forthcoming, the entire game is reduced to one single move.

It is therefore important to enforce a sharp distinction between the two kinds of questions. What happens if the Inquirer asks ("petitions") the principal question instead of raising a number of "small" ones? The pun provides the answer: the Inquirer is guilty of *petitio principii*. That this so-called fallacy was for Aristotle indeed not a fallacy in our sense but a breach of the rules of interrogative games has been shown convincingly by Richard Robinson.¹⁸ Here I shall try to push his line of thought further and also straighten a couple of points which are not made satisfactorily in Robinson's paper.

After having pointed out, correctly, that by *petitio principii* Aristotle meant primarily a violation of "a rule in an old-fashioned competitive game", Robinson concludes that an injunction against this alleged fallacy is as irrelevant in the scientific search of truth "as to obey the Queensberry

rules when attacked by a murderer.” This is a mistake on Robinson’s part. On the contrary, interrogative games turn out to be an excellent model of the scientific search of truth. What is more, the very dimension of restrictions on available answers which can be taken to be exemplified by a prohibition against *petitio principii* (restrictions in terms of logical complexity) can be shown to be crucial for understanding the actual methods of science. Thus Richard Robinson is a useful guide to Aristotelian interpretation, but not to the contemporary logic of science.

Secondly, Robinson does not bring out fully the etiology of *petitio principii* as a confusion between two kinds of questions. In other words, he does not emphasize that what Aristotle forbids is the asking of the initial question. This is what *begging* the (initial) question means. Indeed, Aristotle’s term for “begging” is *αἰτέω*, which means asking for or demanding something, not taking something for granted. Admittedly, Aristotle also uses sometimes the verb *λαμβάνω* (e.g., 166 b 25, 167 a 36, 168 b 22, etc.) which is normally translated as “assuming”. However, this term is ambiguous in that it can as its literal meaning have “to receive” and not only “to take”. Hence it can mean only that an initial premise has been given to the inquirer as an answer to the principal question. Be that as it may, in any case Aristotle uses the unequivocal term *ἐρωτῶν* (questioner) in discussing *petitio principii* in *Top.* VIII 13, 162 b 31–32.

11. FROM INTERROGATIVE GAMES TO DEDUCTIVE LOGIC

The so-called fallacy of *petitio principii* illustrates several interesting features of Aristotle’s views on the nature of the traditional “fallacies”. As Robinson noted, Aristotle does in *An. Pr.* B 16 treat *petitio principii* as if it were a *bona fide* inferential mistake, and in *Top.* VIII 13, 162 b 31–33 he even refers to the *An. Pr.* B 16 as his official account of “begging the question”. Now there is nothing strange or surprising that Aristotle should have looked upon the same sort of breach of rule sometimes in interrogative terms, sometimes in inferential terms. For it is fairly obvious that Aristotle’s theory of logical inference developed as a special case out of his treatment of interrogative games.

It is in fact easy to see, both in terms of the interrogative model and in historical terms, how this development took place and what the special position is that deductive arguments occupy as a result. They are the arguments one can carry out in accordance of the interrogative model without putting any questions to one’s interlocutor. Or, perhaps I should say more cautiously that such deductive conclusions are the ones which any rational interlocutor will agree to, when asked. As Evans puts it,¹⁹ “It is impossible for something to be a proof if it is such that it could be conceived not to be convincing to *anyone*.” Hence such steps do not

depend on any particular interlocutor or on that interlocutor's answers. Such deductive arguments were important for Aristotle to recognize and to study, for it is very handy to be able to establish one's conclusion independently of one's opponent's answers (if any). This is how deductive logic grew out of Aristotle's earlier and much more general theory of interrogative argumentation.²⁰ Aristotle indicates this special role of what he calls demonstrative (*apodeiktikon*) arguments by saying that in them one reasons "from the principles appropriate to each branch of learning and not from the opinions of the answerer" (*De Soph. El.* ii, 165 b 1–3).

12. INTERROGATION AND DEDUCTION PARTLY ANALOGOUS

But it is not only the genesis of Aristotle's theory of deduction out of his more general theory of interrogative argumentation that makes it difficult to keep the two apart in his writings. There is an interesting intrinsic reason why the theory of deduction (logicians' "proof theory") and the theory of interrogative games cannot be completely disentangled from each other. The main point is clear enough, and can be brought home by considering the two different ways in which the Inquirer can use, e.g., an existential sentence $(\exists x) S[x]$ that has been established, i.e., that occurs in the left column of a *subtableau*.

(i) This sentence can be used either as the target of a purely deductive move of existential instantiation. Such a move results in the introduction of a formula $S[\alpha]$ where a new dummy name " α " replaces the variable.

(ii) However, $(\exists x) S[x]$ can also serve as the presupposition of a wh-question. If an answer is forthcoming, it is of the form $S[b]$, where "b" is the proper name of some individual in the world where the game is played.

The latter case (ii) is *ceteris paribus* more advantageous to the Inquirer than the former (i). For instance, the Inquirer can, e.g., hope to ask questions later in terms of the real name "b" which one cannot do in terms of a mere dummy name.

Since other kinds of moves prompt similar observations, we can conclude that each non-trivial deductive move has a parallel interrogative move.²¹ Moreover, if this interrogative move actually yields an answer, it is the preferable move for the Inquirer to make.

Hence there obtains a striking parallelism between deduction and interrogation. This parallelism is the closer, the more kinds of questions there are that the Answerer will actually provide (conclusive) answers to. One of the manifestations of this structural kinship of interrogation and deduction is that in an interrogative game with structurally unrestricted answers the strategy selection in interrogation and in deduction follows closely similar principles. As far as strategies are concerned, the logic of

unrestricted questioning (i.e., questioning where the logical complexity of answers is not restricted) is proof theory (deductive logic). Now Aristotle is keenly interested in the strategies of interrogative argumentation. Even in his syllogistic writings, Aristotle frequently pays attention to strategies of argumentation.²² Since it is not very natural to assume that any sharp structural restrictions were imposed on answers in the Academic questioning games, we can thus see that it was not only possible but almost inevitable that Aristotle should have considered the principles of deduction and those of questioning together and that he should have failed to make any sharp distinction between the two.

I shall return to this point after having diagnosed *petitio principii* somewhat more fully.

13. AVOIDING *PETITIO PRINCIPII*

How is *petitio principii* to be exorcised from the interrogative games? Not only one but two possible ways of doing so are implicit in what I have said. On the one hand, structural or other interesting restrictions on answers may prevent the Inquirer from receiving an immediate answer to the initial question, e.g., when this question has an appreciable quantificational complexity. On the other hand, the presupposition of the initial question is seldom available to the Inquirer.

Which one of these weighed most heavily on Aristotle's logical mind? The answer is not clear. Aristotle was fully aware that asking the initial "big" question is a mistake, but he never offers a real diagnosis of the reasons why this is not acceptable. The closest he comes is in his remarks on self-evidence in *An. Pr.* B 16; see sec. 20 below.²³

The status of the objection to *petitio principii* which turns on restrictions on answers, especially restrictions on their quantificational complexity, naturally depends on what the restrictions are that Aristotle in effect operated with. His own preference seems to have been an A-logic, which does in fact rule out many "beggings of the question" because the answers to the "begged" initial questions would have too great a quantificational complexity. However, the fact was also registered above that the general tenor of academic questioning games seems to have been against quantificational restrictions. Hence the verdict is not unequivocal, and *petitio principii* may have been ruled out by Aristotle in the end because it violated the need of the presupposition which has to be established before a question is asked.

Both these ways of ruling out *petitio principii* are intrinsically interesting. The former, i.e., the complexity restriction that may have to be imposed on available answers, is also closely related to what Aristotle says about avoiding *petitio principii*. For in discussing this mistake apparently

as an inferential mistake, Aristotle blames it on the original premise's not being self-evident: "... whenever a man tries to prove what is not self-evident by means of itself, then he begs the original question" (*An. Pr.* B 16, 64 b 36—37). If the premise in question is obtained as an answer to an actual or notional question, then restrictions on premises in terms of their self-evidence are equivalent to restrictions on questions in terms of the obviousness of their answers. For this obviousness can of course be thought as the answerability of the questions in question. Hence Aristotle's discussion of *petitio principii* apparently construed as an inferential mistake need not in the last Aristotelian analysis differ essentially from treating *petitio principii* in interrogative terms, that is, by diagnosing the mistake as a violation on the general conditions on the answerability of questions in the special case of the initial (principal) question of an interrogative game.

14. PETITIO PRINCIPII AND PROOF THEORY

There is also a great deal of potential interest in the other way of avoiding *petitio principii*, viz. by claiming that the presupposition of the "big" initial question of an interrogative game usually is not available. This way out seems to be virtually vacuous for any interesting propositional question can surely be answered by means of a series of yes-or-no questions. For instance, in order to answer the question

$$(14.1) \quad S_1, S_2, \dots, \text{ or } S_k?$$

it surely suffices to answer the yes-or-no questions

$$(14.2) \quad S_i \text{ or } \sim S_i? \quad (i = 1, 2, \dots, k).$$

While (14.1) has a nontrivial presupposition

$$(14.3) \quad (S_1 \vee S_2 \vee \dots \vee S_k),$$

the yes-or-no question (14.2) seems to have only the vacuous presupposition

$$(14.4) \quad (S_i \vee \sim S_i).$$

The interesting fact here is that, while tautological premises (14.4) do not increase the deductive power of any given premise T, they do increase what can be derived from T interrogatively.²⁴ Hence Aristotle's strictures against *petitio principii* are from a systematic viewpoint related closely to the important role of premises of the form (14.4) in interrogative knowledge-seeking.

Paradoxically enough, we are also in the vicinity of the central ideas of proof theory, in spite of the fact that in pure deduction tautological

premises (14.4) do not enable us to prove any new conclusions. The use of such arbitrary tautological disjunctions (14.4) is in proof theory the greatest common denominator which characterizes those inference rules not satisfying the subformula principle. Such rules include unlimited *modus ponens*, the cut rule, etc. The first major result of modern proof theory, Gentzen's first *Hauptsatz*, establishes the eliminability of such inference rules as violate the subformula principle.²⁵ This result is significant because the forbidden rules otherwise have a great deal of power, enabling a logician to shorten and to simplify his or her proofs.

As the reader can see, forbidding *petitio principii*, construed as introducing illicit extra premises of the form (14.4), is the interrogative counterpart to restricting deductive arguments to methods satisfying the subformula principle. This ancient pseudo-fallacy thus turns out to be a veritable next of kin to the basic ideas of twentieth century proof theory.

Admittedly Aristotle never points out in so many words the role of tautological premises (14.4) in questioning. His remarks on *petitio principii* nevertheless shows amply his sensitivity to the issues discussed in this section. Even if he did not anticipate Gentzen's problem, he came remarkably close to it.

15. "MANY QUESTIONS"

Other Aristotelian fallacies likewise allow for a "transcendental deduction" on the basis of the interrogative model. The breach of the rules of questioning games which undoubtedly is the most common in actual questioning procedures is to disregard the need of presuppositions. This is common, because by so doing the questioner can extract from the answerer unintended and damaging admissions. Aristotle calls such a violation of game rules the "fallacy" of many questions and illustrates it as follows (*De Soph. El.* v, 168 a 7–9):

Or again, where part is good and part bad, [asking] "Is the whole good or bad?" For whichever answer he gives, it can be taken to expose him to an apparent refutation.

Logically speaking, the trouble here can be traced to the fact that the presupposition of the question had not been secured, viz. that the whole thing is either all good or all bad.

It is not clear in Aristotle's writings that the so-called fallacy of many questions is thought of by him just as a violation of presuppositions of questions. This role was given to the "fallacy of many questions" later in the history of philosophy in much firmer terms.²⁶ One indication of this is the appearance of the notorious leading wh-questions of the type "When did you stop beating your wife?" as examples of the "fallacy" of many questions. Aristotle clearly did not yet have a cut-and-dried conception of

presupposition. Maybe such a requirement was too genteel, too Marquis-of-Queensberry, to be applicable to the rough-and-tumble of ancient questioning games. In fact, there need not be anything wrong with such a disregard of the requirement of antecedently established presuppositions. It is perfectly possible to set up interrogative games in such a way that a question may be asked even though its presupposition has not been ascertained by the Inquirer. Then the Answerer must be offered a chance of denying the presupposition of the question instead of answering it. Such a variant seems to be eminently congenial to Aristotle who (in the context of other “fallacies”) considers “demolishing the original question” as a viable way of dealing with his problems. (See, e.g., *De Soph. El.* xxiv, 179 b 7 ff.)

Besides revealing the absence of a fully developed idea of presupposition in Aristotle, the history of the fallacy of many questions shows other things. In giving it the name “the fallacy of many *questions*”, Aristotle tacitly thought of the missing presupposition as being obtained (in a fallacy-free argument) as an answer to an antecedent question. (This need of an antecedent answer is what makes the objectionable question “many” and not “one”.) But if one assumes this, one does not obtain a fully general treatment of presuppositions. For a missing presupposition may very well be obtained by means of a deductive step and not only an interrogative step. Hence a codification of violations of presuppositions in a “fallacy” of many *questions* cannot be a complete or completely satisfactory one in the last analysis.

However, one thing is clear of the so-called fallacy of many questions. It cannot by any wildest stretch of the imagination be construed as a mistake in inference. It will thus bring home to the most hardened skeptic the impossibility of seriously construing Aristotelian “fallacies” as fallacies in the twentieth-century sense, i.e., as tempting but invalid inferences.

16. “BABBLING”

Even the least interesting-looking of the Aristotelian pseudo-fallacies, the so-called fallacy of babbling (*ἄδολεσχεῖν*) suddenly makes sense. (See *De Soph. El.* xiii, 173 a 32 ff. and xxxi 181 b 25 ff.) What it amounts to is a closed loop (as computer scientists would say) else a fruitless or infinite regress in the questioning process. Aristotle’s examples of this fallacy are typically from the field of definitions, e.g.:

Again, “Is not ‘desire’ the same as ‘desire of pleasure’?” Now desire is an appetite for pleasure; therefore [the answer amounts to] “desire is an appetite for pleasure of pleasure” [and so on]. (*De Soph. El.* xiii, 173 a 38–40.)

Once again, no mistakes need occur at any one move of the game, but the

purpose of the game has nevertheless been frustrated. This alleged fallacy is especially interesting in that it does not even mean a breach of any of the questioning rules (rules of the game), much less of any of the deductive rules. It means using a bad questioning strategy, a strategy which does not further the purpose of the game. As Talleyrand would say, it's worse than a crime, it's a mistake. As such, it bears eloquent witness to Aristotle's concern with the strategies of questioning over and above the correctness of particular interrogative moves.

Aristotle's warning against "babbling" is not entirely trivial, either. In purely deductive arguments, the possibility of moving in a circle is easily ruled out, e.g., by requiring conformity with the subformula principle. However, in interrogative games it is not equally easy to see how moving in a circle can always be avoided. For one thing, we cannot always conform to the subformula principle in such games without reducing the strength of the interrogative procedures. This subject matter has even been discussed recently from the modern viewpoint.²⁷

17. ARGUMENTS *AD HOMINEM*

Other traditional fallacies, not explicitly listed by Aristotle, likewise begin to make sense in the light of the interrogative model. For instance, what is supposed to be wrong with the so-called *ad hominem* fallacy?²⁸ Surely it is fair game to use a man's admissions in an argument against him — at least after you have warned that "anything you say will be used against you". This was precisely what Socrates was doing: "he used to ask questions but never answered them" (*De Soph. El.* xxxiv, 183 b 7–8). Aristotle himself admits that "accordingly it sometimes becomes necessary to attack the speaker and not his position", if only as a last resort against an abusive answerer (*Top.* VIII 11, 161 a 21–22).

But what is meant by an allegedly fallacious *argumentum ad hominem*, anyway? Some scholars have tried to trace it back to Aristotle more specifically, to *De Soph. El.* xx, 177 b 33–34; xxii, 178 b 17; and xxxiii 183 a 21.²⁹ But what is at issue in these passages is not an argument that might or might not be *ad hominem*, but the status of solutions to fallacy-like puzzles. What is interesting about these passages is that they illustrate the development of deductive logic from a more general theory of interrogative games which was briefly discussed in sec. 11 above. (I owe this observation to Russell Dancy). Aristotle is in these passages making a distinction between such solutions of "fallacies" as are addressed to a particular person and such solutions as are addressed to the form of the argument. But a diagnosis of a mistaken answer can refer solely to the respective forms of the question and of the answer only if the same answer must be given by any rational answerer to anybody who asks that ques-

tion. And this is the case only if the answer follows logically from the theses adopted earlier. Addressing a solution to the form of the question or of the answer therefore means moving from the sphere of interrogation to the ambit of logical inference. What these Aristotelian passages hence foreshadow is not the so-called *ad hominem* fallacy in any size, shape or form, but rather the idea of deductive (inferential) validity.

In a wider perspective it is nevertheless possible to see what the point of an alleged *ad hominem* fallacy is in its later sense and in what sense Aristotle was in fact dealing with such fallacies. Suppose, for the sake of argument, that I conduct a Socratic discussion with Theaetetus and end up concluding on the basis of his answers that knowledge is true belief accompanied by *logos*.³⁰ Have I proved this conclusion? Only *ad hominem* (*ad* Theaetetus). Admittedly, it is in principle by this very kind of questioning procedure that Aristotle derives the *arkhai* of the various sciences he studies. But in order for such an *elenchus* to yield intended conclusions, Aristotle's imaginary interlocutor must both be a repository of all the *endoxa*, of the entire relevant collective experience that has crystallized in our predecessors' and contemporaries' well-founded opinions, and also be free from misperceptions and other mistakes. No actual *homo* can do this, not even that Frank Ramsey of Plato's Academy, Theaetetus. To assume that he could, would be to commit the mistake of arguing *ad hominem*.

Even though Aristotle does not use a special label for this "fallacy", he shows what he thinks of it at the end of *De Soph. El.* In order to explain the rationale of both *Topica* and *De Soph. El.* he writes that he "proposed as the purpose of our treatise . . . also the discovery how . . . we are to defend a thesis by means of the *most generally accepted principles* in a consistent manner" (*De Soph. El.* xxxiv, 183 b 1–6). Here we can also see why Aristotle did not list *argumentum ad hominem* as one type of fallacy among many. For the only way of dispelling it would be to give an account of how the first premises of a science can be reached dialectically. And this cannot be done by any one neat recipe which would uncover the mistake in one fell swoop and show what an inquirer should do instead. Aristotle's attempt to exorcise *ad hominem* reasoning is the entire *Analytica Posteriora*.

It is also interesting to see that Aristotle himself characteristically begins the examination of any one problem *ad hominem*, that is to say, by listing his predecessors' opinions about the problems and by using them as raw materials for his own solution.³¹ Is this to argue *ad hominem*? Only if Aristotle does not in the end succeed in exposing the biases and contradictions that lurk in the *endoxa* he is studying or if the body of *endoxa* he is relying on is not comprehensive enough.

18. MENO'S PARADOX

But what about the other side of the interrogative coin, answers to questions? Do their precise character and the requirements that have to be imposed on them (cf. sec. 4 above) figure in Aristotle's thinking? They do not seem to enter Aristotle's discussion in *De Soph. El.*, but the conditions that have to be imposed on satisfactory (conclusive) answers do play a major part in another famous ancient conceptual puzzle, known as Meno's paradox.³² The "paradox" is in fact a corollary to what was said in sec. 4 above of requirements that have to be imposed on conclusive answers, when applied to the special case of definitory or identificatory questions. Suppose Meno asks

(18.1) What is b?

and receives the reply

(18.2) b is d.

As I pointed out in sec. 4, (18.2) is a completely satisfactory (conclusive) answer only if the questioner (in the example, Meno) can truly say

(18.3) I know what d is

But if so, no progress seems to be possible. For, in order to profit from the reply (18.2) to the question as to what b is, Meno has to know what d is, that is has to know what the entity b is whose definition or *logos* he was seeking. In brief, you have to know already what you are seeking. This is a natural reconstruction of Meno's puzzle as one can find, and it seems to be a mere corollary to the criterion of conclusive answerhood that ensues from my theory of questions and answers.

The fallacy — if that is the appropriate word — in Meno's "paradox" lurks in the innocent-looking word "already". For *when* is it that Meno must know what d is, i.e., be in a position to utter (18.3) truly? Meno's paradox would indeed be a genuine difficulty if he had to know what d is *before* the reply to the question (18.1) is given. But there is no reason to require this. The resolution of Meno's puzzle lies in an important insight into the semantical and logical role of replies to wh-questions. It is not always sufficient for the answerer to provide the kind of information which in the case of definitory answers is codified in a response like (18.2), that is, to name or otherwise specify an entity of the desired kind. The answerer is also responsible for making sure that the conclusiveness condition, in my example (18.3), becomes true (if it is not already) in the mouth of the questioner.³³ Thus replies to questions have two distinct functions, which may perhaps be called providing an answer and making sure that it is conclusive. Meno's paradox arises when the second function is overlooked or, rather, thought of as a precondition of the question

rather than as a part of the answerer's task. Thus in a way Meno's paradox is due to confusing the presuppositions of questions and the "presuppositions" of (i.e., conclusiveness conditions on) answers.

Once again we can thus see how close interesting ancient puzzles are to the leading ideas of the interrogative model.³⁴

19. THE INTERROGATIVE MODEL AND ARISTOTELIAN INQUIRY

We have seen that several of the traditional "fallacies" and other traditional conceptual problems can be put to an interesting light by means of the interrogative model. But that is not the end of my ambition in this paper. What I want to show is that Aristotle's entire enterprise in *De Sophisticis Elenchis* belongs to the study of interrogative dialogues. Since *De Soph. El.* is topically speaking (no pun intended) but a part of the *Topica*, the same will be true of that larger work, too.

This thesis was in effect put forward above in sec. 3. Here I shall provide some evidence for it. One source is Aristotle's conception of argument. In *De Soph. El.* ii, 165 a 38 ff. he lists four kinds of arguments (or reasonings, *logoi*) used in discussion, viz. didactic, dialectical, examination-arguments, and contentious arguments. None of these types of arguments as much as resembles a series of deductive inferences; all of them are dialogical; and the examination-arguments (*πειραστικοί*) Aristotle mentions are nothing but familiar Socratic examinations where an interlocutor's views are put to test by means of questioning. Aristotle discusses dialectical arguments in the *Topica*. They are not deductive arguments; what Aristotle is dealing with in the arguments he mentions are interrogative games played in the Academy (knowledge-seekings by questioning another person or another source of information), their rules, and the strategies to be used in them.³⁵

Further evidence is easily forthcoming. For instance, the nature of Aristotle's inquiry in *De Soph. El.* is seen clearly when he gives specific tactical rules for the kinds of exercises he is examining. This happens *inter alia* in xv, 174 a 17 ff. Then it quickly becomes patent that what he is studying are academic questioning games, for his advice is squarely focused on the choice and formulation of tactically advantageous questions.

Perhaps the most telling passage is *De Soph. El.* xxxiv, 183 a 37 ff., where Aristotle summarizes what he thought he had accomplished in the *Topica* and *De Soph. El.* He says that his purpose was to discover "the *dynamis* which enables one to reason on the problem set before us from the most generally accepted premises that exist; for that is the *ergon* of dialectic in itself and of the art of examination (*πειραστική*)". What that involves in practice becomes clear when Aristotle says that he has

indicated the different cases of dialectic and the materials used in them, “moreover also how questions must be asked and . . . the arrangement of questions in general, and about answers and solutions applicable to the reasoning employed” (183 b 10–12). This quote shows, not only that in his theory of dialectic Aristotle was essentially concerned with interrogative argumentation, but also that he was interested in the strategies of such argumentation (i.e., in “the arrangement of questions in general” or, in his words *τακτέον τὴν ἐρώτησιν πᾶσαν*).

Thus Aristotle’s entire discussion of so-called fallacies is an integral part of his theory of question-answer dialogues.

20. FALLACIES AND LOGICAL *AKRASIA*

A few further comments may help the reader to appreciate what has been said. It is highly significant that Aristotle does not characterize his “fallacies” as mistakes about what follows from what, as he could have done perfectly easily. Instead, he says that they are in effect violations of the definition of refutation.³⁶ Now if this process involves essentially wh-questions, then it only has to be expected that the fallacies will turn out to be for the most part violations of the rules on questioning.

In order to put the entire matter of Aristotelian fallacies in perspective, it is relevant to recall that Aristotle does in fact discuss a closely related matter in the case of syllogistic inferences. In *An. Pr.* B 21 and in *An. Pr.* A 32 Aristotle discusses the question whether, and if so in what sense, one can have premises of a valid syllogism and yet fail to draw the conclusion. This problem is in Aristotle precisely parallel to the problem of *akrasia*, that is, the problem as to whether (and if so, how) a person can act against his or her better judgment. For Aristotle construes this problem as a question concerning a person who knows both the major and the minor premise of a practical syllogism and yet does not draw the conclusion, i.e., not do what the *akrates* knows he or she ought to do.³⁷ This is parallel with the case of a man who knows the premises of a theoretical syllogism but does not draw the conclusion.

The most interesting aspect of Aristotle’s discussion of the possibility or, rather, of the impossibility of logical *akrasia* in *An. Pr.* B 21 and A 32 is what is *not* said there.³⁸ For one thing, Aristotle does not evoke the distinction between perfect and imperfect syllogisms, contrary to what his own explanations of these concepts might make us to expect. What is even more relevant, Aristotle does not as much as mention his precious “fallacies”. This would be incomprehensible if Aristotelian “fallacies” were mistakes in inference. For then such fallacies would constitute a partial answer to Aristotle’s question in these two chapters, viz. to the question: How can one fail to believe the consequence of a valid syllogism when one

believes its premises? The expected answer which Aristotle does not give is: by committing a fallacy.

This silence is not fortuitous, either. For, as I have argued on an earlier occasion, the basis of Aristotle's theory of logical inference is his theory of thinking.³⁹ To think of X means for the form of X to be realized in one's soul. Hence, whatever necessarily accompanies X must likewise be realized in the soul. Hence, if one knows in the fullest active sense of the word the premises, one cannot fail to know its necessary consequences. Hence there cannot in an important sense be any fallacies in connection with strictly deductive (logically necessary) inference, quite as little as, according to Aristotle, there can be cases of moral *akrasia* other than those in which the agent is like a madman or drunk.

Hence Aristotle's general thinking about thinking and about logical inference prompts the expectation that according to him fallacies must all be traceable either to the factors that might cloud one's knowledge of the premises or of the conclusion or else to the dialectical processes which are needed to find the premises of a purely logical (syllogistic) inference. What I am arguing (on grounds independent of the general perspective just sketched) in this paper is that this expectation concerning the nature of Aristotelian "fallacies" is amply justified.

21. FALLACIES AND KNOWLEDGE-SEEKING

In sec. 1 above, it was suggested that the traditional treatment of fallacies as inferential mistakes ought to be replaced by a theory based on the interrogative model of inquiry. The examples I have given of what such a theory can accomplish nevertheless might still leave a critical reader cold. For there might seem to be little unity in my treatment of the different so-called fallacies. Some of them have turned out to be, *prima facie*, violations of the reasonable rules of interrogative games, some others instances of bad strategy in the same games. This does not seem to amount to a unified theory. Moreover, what is so special about the rules of questioning games? Are they not at least partly arbitrary?

We have seen that the interrogative games are not arbitrary past-times, but realistic models of knowledge-seeking processes. Thus breaches of rules of these games will in practice amount to trying to do the impossible.

This idea can be used to bring together the different so-called fallacies, interrogatively interpreted. Instead of disallowing certain kinds of attempted moves altogether, it is often more instructive to associate such a heavy "cost" (negative influence on the payoffs of the game by certain types of attempted moves) that in practice no reasonable player will make them. For instance, one might require that the Inquirer is allowed to "buy" the presupposition of any question, but only for a very stiff fee

which may, e.g., grow rapidly with the quantificational complexity of the presupposition.

Such a procedure would lend flexibility to the interrogative model and make the discussion of strategy selection more general. It would also make the interrogative theory of fallacies more uniform. For then all so-called fallacies discussed in this paper could be interpreted as strategic mistakes. Thus the spirit, if not necessarily the letter, of the theory of fallacies presented here is an epistemic one: fallacies are mistakes (instances of a bad strategy or a bad tactic) in knowledge-seeking. There will no longer be any crimes left, only mistakes.

By so extending the interrogative model, we can also leave the door open for the identification of previously unnoticed strategic mistakes, in other words, of new “fallacies”.⁴⁰ We can also see that a taxonomic theory of fallacies, understood as a classification of certain particular moves or kinds of moves as exemplifying certain “fallacies” cannot be more than a partial or approximative theory of mistakes in knowledge-seeking. For we know from game theory that in the last analysis we can associate definite values (payoffs) only with entire strategies, not with particular moves (except via the strategies which that move can be a part of). Hence a move-oriented rather than strategy-oriented theory, like the traditional theory of fallacies, can only yield partial truths.⁴¹ The real basis of any satisfactory theory of fallacies can only be a strategy-oriented theory of knowledge-seeking like the interrogative model of inquiry.

22. INTERROGATIVE GAMES AND ARISTOTLE'S METHODOLOGY

The character of interrogative games as knowledge-seeking procedures can be thrown into a sharper relief by spelling out how it can throw light on Aristotle's theory and practice of scientific and philosophical argumentation. Aristotle describes his method in *Topica* I 2, 101 a 25—b 4 (cf. note 13 above). According to Aristotle, the “ultimate bases of each science” are arrived at dialectically “through the generally accepted opinions on each point”. This alleged role of *endoxa* as the source of the first principles of each science was emphasized by G. E. L. Owen (op. cit., note 15 above) but has scarcely been fully appreciated. It must be admitted that *prima facie* this role of *endoxa* seems paradoxical. How can the opinions of the multitude serve as the foundation of the first premises of each science? In terms of the interrogative model, this means that the *endoxa* serve as answers to an Aristotelian inquirer's questions. But, surely, they are far too unreliable guides to basic scientific truths, it might appear.

The role of *endoxa* as *phainomena* in Aristotle has in fact prompted puzzlement and denials. For instance, Martha Nussbaum has sought to modify and fill in Owen's account.⁴² But even in her perceptive account

the precise way in which *endoxa* enter into Aristotle's argumentation eludes us. What lends Aristotle's dialectical enterprise its characteristic flavor is not just that Aristotle's notion of experience is wider than ours (or Bacon's) in that it also includes well-established communal beliefs or that Aristotelian *phainomena* are concept-laden and belief-laden. Their peculiar nature lies in the role they play in the interrogative process by means of which Aristotle arrives at his conclusions.

In order to see what this role is, I have to extend the interrogative model further in one crucial respect. We have to give up the initial assumption that all of the Answerer's replies are true. We have to countenance the possibility of their being true only with a certain probability.⁴³ Then we also must allow the Inquirer to retract one of his or her earlier moves, of course together with all the subsequent moves dependent on it, and even to re-accept the same answer if and when further evidence (further answers) turn out to support it. Then the Inquirer's best strategies will depend on the probabilities of the truth of the Answerer's answers and on the interdependencies of these probabilities.

The resulting embarrassment of conceptual riches mostly remains to be examined. Certain general features of the extended interrogative games are nevertheless obvious. In spite of allowing for the uncertainty of the knowledge-seeking, the resulting processes differ sharply from the usual inductive inferences. Inductive steps are uncertain (nondeductive) inferences from what is taken to be (at least for the sake of the inductive argument) certain premises; in extended interrogative games we are dealing with certain (deductive) inferences from uncertain premises.

The relevance of this extension of the interrogative model to Aristotle's methodology is amply clear. Aristotle is indeed treating *endoxa* as answers to the questions by means of which he is conducting his inquiry. But they are not accepted uncritically by Aristotle. On the contrary, the real philosophical inquiry typically begins from the contradictions and other *aporia* to which *endoxa* give rise. For "if we are able to raise difficulties on both sides, we shall more easily discern both truth and falsehood on every point" (*Top.* I 2, 101 a 35–37).

This is in fact the typical structure of Aristotle's own discussion of any one philosophical or scientific problem. He begins by surveying the doctrines of his predecessors plus other well-founded opinions and well-known facts. They give rise to various problems. Sometimes the different opinions of Aristotle's predecessors contradict one another. Sometimes one of them is hard to reconcile with well-known *phainomena*. Aristotle arrives at his own views by solving these problems, often by making a conceptual distinction or some other kind of conceptual point. One of the *desiderata* of the solution is that it has to do justice to the different *endoxa* that led to the problem situation.

Now we can see what the logic of Aristotle's method is: interrogative

reasoning extended by allowing answers that are true only with a certain probability. Even though the details of this interrogative logic have not yet been systematically investigated, the match with Aristotle's argumentative practice is unmistakable. For instance, understanding this logic shows us that Aristotle's dialectical theory in the *Topics* and his actual philosophical and scientific argumentation agree with each other remarkably closely. For another thing, it is obvious that in the interrogative games false but probable answers may still have to be taken into account. Moreover, the interrogative model enables us to understand the characteristic role of *endoxa* in Aristotle's thought. They are for him "evidence", but not incorrigible evidence; they are a source of problems, rather than indubitable premises; and yet they are the source material on the basis of which he arrives at his conclusions, prominently including the first principles of different sciences. In particular, neither the acceptance nor the rejection of any particular *endoxon* need be final.

An example will illustrate this point. Nussbaum calls attention to Aristotle's rejection of Socrates's view that nobody does wrong willingly, only through ignorance: "This *logos* is obviously at variance with the *phainomena*."⁴⁴ What lends this apparent rejection of the Socratic view its peculiar flavor is that Aristotle himself ends up asserting as his own conclusion a version of the very same Socratic paradox, in that *akrasia* is according to him impossible if the agent really knows what he ought to do, and not only knows it in a lower-level potential sense in which even a madman or a drunk can know something. Is this conclusion any less contrary to the relevant *phainomena* than the Socratic paradox? Surely not. But why does Aristotle then accept it? Not because it squares with the *phainomena*, since it disagrees with them almost as blatantly as Socrates's view, but because it is the conclusion of his entire argument.

Here we are beginning to see how a deeper understanding of Aristotle's theory of so-called fallacies can lead to a deeper understanding of his entire methodology. Of course, the same understanding could be reached by examining Aristotle's positive advice to the players of the knowledge-seeking interrogative games, not just by analyzing his negative maxims. The positive advice is largely codified in the *topoi* which lent the *Topica* its name. Examining them goes beyond the purview of this paper, however.⁴⁵

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NOTES

In quoting Aristotle's *Topica* and *De Sophisticis Elenchis* I shall use the Oxford texts and the Loeb Library translations (Harvard University Press, 1960 and 1955).

¹ The best general discussion of traditional fallacies is C. L. Hamblin, *Fallacies*, Methuen, London, 1970. Cf. also here Douglas N. Walton, *Logical Dialogue-Games and Fallacies*, University Press of America, Lanham, 1984, and John Woods and Douglas N. Walton, *Argument: The Logic of the Fallacies*, McGraw-Hill, Toronto & New York, 1982.

² For these games, see, e.g., Gilbert Ryle, "Dialectic in the Academy", in R. Bambrough, editor, *New Essays on Plato and Aristotle*, Routledge & Kegan Paul, London, 1965, pp. 39–68; J. D. G. Evans, *Aristotle's Concept of Dialectic*, Cambridge University Press, 1977; G. E. L. Owen, editor, *Aristotle on Dialectic*, Clarendon Press, Oxford, 1968; E. Kapp, *Greek Foundations of Traditional Logic*, New York, 1942.

³ See here my papers "Knowledge Representation and the Interrogative Approach to Inquiry", forthcoming; "What is the Logic of Experimental Inquiry?", forthcoming; "A Spectrum of Logics of Questioning", *Philosophica* vol. 35 (1985), pp. 135–150; "The Logic of Science as Model-Oriented Logic", in P. Asquith and P. Kitcher, editors, *PSA 1984*, vol. 1, Philosophy of Science Association, East Lansing, Michigan, 1984, pp. 177–185; (with Merrill B. Hintikka) "Sherlock Holmes Confronts Modern Logic", in E. M. Barth and J. L. Martens, editors, *Argumentation: Approaches to Theory Formation*, Benjamins, Amsterdam, 1982, pp. 55–76. For the theory of questions and answers, see Jaakko Hintikka, *The Semantics of Questions and the Questions of Semantics* (Acta Philosophica Fennica, vol. 28, no. 4), Societas Philosophica Fennica, Helsinki, 1976.

⁴ This view is in fact adopted in such old-fashioned works as Alfred Sidgwick, *Fallacies: A View of Logic From the Practical Side*, Kegan Paul, Trench & Co., London, 1883. — What this observation means is that the very concept of logic was originally so wide as to comprise all of the theory of knowledge-seeking by means of question-answer dialogues.

⁵ In *De Soph. El.* ii Aristotle distinguishes from each other four types of refutations, viz. didactic, dialectical, examination-arguments (*peirastikoi*) and contentious ones. Didactic arguments are said not to proceed from the opinions of the answerer (*ἀποκρινόμενος*). *The answerer?* Where does he come from? Clearly Aristotle is in all these kinds of arguments thinking of a questioning procedure. The differences between the four types pertain to the different sources of answers. For instance, examination-arguments are said to be "based on opinions held by the answerer" (165 b 4–5). Hence Aristotle recognizes in his very definition of "arguments used in discussion" that they are essentially questioning procedures.

⁶ Cf. here Richard Robinson, *Plato's Early Dialectic*, second edition, Clarendon Press, Oxford, 1953; G. X. Santas, *Socrates: Philosophy in Plato's Early Dialogues*, Routledge and Kegan Paul, London, 1979, Part II.

⁷ Aristotle once describes a special class of answers by saying that they are "necessarily known to one who claims knowledge of the subject involved" (*De Soph. El.* ii, 165 b 5–6). When the subject matter is left unlimited, this special class of answers becomes the set of replies that any rational person would have on tap. Thus Aristotle argues (*Met. T 4*) for his basic logical principle, the law of non-contradiction, not by trying to prove it, but by refuting its critics. For this, Aristotle says, we only need that "our opponent answers our question" (1007 a 8).

⁸ This condition on conclusive answers is obviously but a special case of the restrictions that have to be imposed on existential generalization in epistemic logic. These restrictions are in turn little more than consequences of the adoption of a model-theoretic approach to epistemic concepts. The question as to how the conditions of conclusive answerhood is to be extended to questions more complicated than (4.1) nevertheless requires further discussion.

⁹ Beth's original exposition of the *tableau* method is still the freshest; see E. W. Beth,

"Semantic Entailment and Formal Derivability", *Medelingen van de Koninklijke Nederlandse Akademie van Wetenschappen*, Afd. Letterkunde, N.R., vol. 18, no. 13, Amsterdam, 1955, pp. 309–342; reprinted in Jaakko Hintikka, editor, *Philosophy of Mathematics*, Oxford University Press, 1969, pp. 9–41.

¹⁰ Applied to the *tableau* method, this principle says that each formula F_2 introduced in the course of *tableau* construction by a rule must be a subformula of the formula F_1 to which the rule was applied (or a substitution-instance of such a subformula).

¹¹ For the presuppositions of questions, see *The Semantics of Questions* (note 3 above), especially ch. 2, sec. 5.

¹² See *The Semantics of Questions* (note 3 above), ch. 8, sec. 2.

¹³ In *Top.* I 2, 101 a 36 – b 4 Aristotle writes:

Further, it [Aristotle's inquiry in the *Topics*] is useful in connection with the ultimate bases ($\tau\alpha$ $\pi\rho\omega\tau\alpha$) of each science; for it is impossible to discuss them at all on the basis of the principles peculiar to the science in question, since the principles are primary with respect to everything else, and it is necessary to deal with them through the generally accepted opinions ($\xi\omega\delta\omicron\xi\alpha$) on each point. This process belongs peculiarly, or most appropriately to dialectic; for, being of the nature of an investigation, it lies along the path to the principles of all methods of inquiry.

Now the dialectic Aristotle mentions here involves studying "how questions must be asked and . . . the arrangement of questions in general, and . . . answers and solutions applicable to the reasoning employed" (*De Soph. El.* xxiv, 183 b 10–12; cf. Aristotle's reference to dialectic in 183 a 39 and to "the most generally accepted premises" in 183 b 5–6).

¹⁴ See Jonathan Barnes, "Aristotle's Theory of Demonstration", *Phronesis* vol. 14 (1969), pp. 123–152; reprinted (with revisions) in Jonathan Barnes et al., editors, *Articles on Aristotle*, vol. 1, Duckworth, London, 1975, pp. 65–87.

¹⁵ See here G. E. L. Owen, "Tithenai ta Phainomena" in S. Mansion, editor, *Aristote et les problèmes de méthode*, Louvain, 1961, pp. 83–103; reprinted in Barnes et al. (note 14), pp. 113–126.

¹⁶ Cf. here "A Spectrum of Logics of Questioning" and "What Is the Logic of Experimental Inquiry?" (note 3 above).

¹⁷ These are of course precisely the usual requirements on explicit definitions. For instance, if

$$(*) \quad (\forall x)(\forall y)(f(x) = y \leftrightarrow D[x, y])$$

is to be a definition of the function f , the following conditions have to be satisfied:

- (i) The only free variables in $D[x, y]$ are x and y .
- (ii) f does not occur in $D[x, y]$
- (iii) The following must have been proved or otherwise established:
 - $(\forall x)(\exists y)D[x, y]$
 - $(\forall x)(\forall y)(\forall u)((D[x, y] \& D[x, u]) \supset y = u)$

¹⁸ Richard Robinson, "Begging the Question 1971", *Analysis* vol. 31 (1971), pp. 113–117. For recent discussions of this fallacy, see, e.g., John Woods and Douglas Walton, "Petitio principii", *Synthese* vol. 31 (1975), pp. 107–127; John Biro, "Rescuing 'Begging the Question'", *Metaphilosophy* vol. 8 (1977), pp. 257–271; D. Sanford, "Superfluous Information, Epistemic Conditions and Begging the Question", *Metaphilosophy* vol. 12 (1981), pp. 145–158; John Biro, "Knowability, Believability, and Begging the Question", *Metaphilosophy* vol. 15 (1984), pp. 239–247; J. A. Barker, "The Fallacy of Begging the Question", *Dialogue* vol. 15 (1977), pp. 241–255.

¹⁹ *Op. cit.* (note 2 above), p. 74.

²⁰ The details of this development need a lengthier discussion than what can be undertaken here. (Cf. sec. 17 below for a couple of items of additional evidence.)

²¹ This parallelism breaks down if it is extended beyond those deductive procedures which conform to the subformula principle.

²² See, e.g., *An. Pr.* B 1, 52 b 34–53 a 1.

²³ Aristotle's discussion of *petitio principii* in *An. Pr.* B 16 is often taken to be his official account of this so-called fallacy. Moreover, this discussion is sometimes claimed to show that the *petitio* was for Aristotle really a fallacy, that is, a mistake in inference. Whatever the truth is in the former matter, the latter claim is not proved by the text of *An. Pr.* B 16. What Aristotle actually says there is that it is a mistake in the selection of the proper premises. It consists in something to be "knowable through itself" which isn't. Now a proposition's, say S's, being knowable through itself can be taken to amount to its being knowable as an answer to the question "S or not-S?", while its not being knowable through itself means that answers to other questions are needed to come to know it. Indeed, this way of reading Aristotle lends his words a much better sense than on the assumption that he is thinking of coming to know S through an inference. For to infer to S from S is not even to do anything.

²⁴ Cf. here "Knowledge Representation and the Interrogative Model of Inquiry" (note 3 above).

²⁵ For Gentzen's result, see any introduction to proof theory or M. E. Szabo, editor, *The Collected Papers of Gerhard Gentzen*, North-Holland, Amsterdam, 1969.

²⁶ See here Hamblin (note 1 above), pp. 38–40.

²⁷ John Woods and Douglas Walton, "Arresting Circles in Formal Dialogues", *Journal of Philosophical Logic*, vol. 7 (1978), pp. 73–90.

²⁸ The twentieth-century sense of *ad hominem* argumentation (see Hamblin, op. cit. note 1 above, pp. 41–42) is a complete anachronism. The correct sense is given by John Locke in a passage quoted by Hamblin, op. cit. p. 160:

A third way is to press a man with consequences drawn from his principles or concessions. This is already known under the name *argumentum ad hominem*.

Notice that this characterization refers to something like an interrogative game, as is seen from words like "concessions" and "principles".

²⁹ Cf. here Hamblin, op. cit. (note 1 above), pp. 161–162.

³⁰ Cf. Plato, *Theaetetus* 201 D.

³¹ Cf. here G. E. L. Owen, note 15 above, and Jaakko Hintikka, "Aristotelian Infinity", *Philosophical Review* vol. 75 (1966), pp. 197–212, reprinted in Jaakko Hintikka, *Time and Necessity*, Clarendon Press, Oxford, 1973, ch. 6.

³² See Plato, *Meno* 80 D–81 A. There exists an extensive literature on Meno's paradox.

³³ See here *The Semantics of Questions* (note 3 above), ch. 3, secs. 2–3.

³⁴ Indeed, Aristotle's solution to Meno's puzzle is not entirely unrelated to the one offered by the interrogative model. This solution is expounded by Aristotle in *An. Post.* I 1, 71 a 29 ff. It is a variant of Aristotle's often-repeated idea that we may ask *why* something is the case only after we have ascertained *that* it is in fact the case. (See, e.g., *An. Post.* II 1, 89 b 29–31.) This idea is the closest Aristotle came to the realization of the need of satisfying the presupposition of a question before asking it.

³⁵ This is seen most quickly in Book VII of the *Topica*, which Aristotle begins by saying:

Next we must speak about the arrangement and the way to ask questions.

³⁶ Cf. sec. 3 above. There it was argued that the cash value of the failure to abide by the definition of refutation an syllogism that Aristotle mentions is a violation of the rules of interrogative games.

³⁷ See *Eth. Nic.* VII 1–9.

³⁸ Cf. here Jaakko Hintikka, "Aristotle's Incontinent Logician", *Ajatus* vol. 37 (1978), pp. 48–65.

³⁹ Op. cit. (note 38 above).

⁴⁰ Some of these previously unrecognized and unnamed fallacies (in a wide sense of the word) have a great deal of relevance to the actual practices of argumentation. The proper framework in investigating such argumentative fallacies is often offered by the symmetrical questioning games proposed and studied, e.g., in Jaakko Hintikka, "Rules, Utilities, and Strategies in Dialogical Games", in Lucia Vaina and Jaakko Hintikka, editors, *Cognitive Constraints on Communication*, D. Reidel, Dordrecht, 1984, pp. 277–294.

There is, for instance, what might be called "the fallacy of the snowjob", where a player in an interrogative game keeps on introducing facts (i.e., obtains "small" answers from his or her interlocutor) which do not constitute steps toward an answer of the initial "big" question. The fallaciousness of this "fallacy" is shown by the strategic uselessness of the attempted snowjob.

One way of coping with attempted fallacies of this kind is to allow the fallacier's opponent to challenge the questioner and to say, in effect, "What's the relevance of your question?". It might, e.g., be stipulated that a successful challenge of this sort will induce a change of sides and perhaps give the challenge an additional penalty turn at questioning.

Here we can see once again what a close connection there is between bad questioning strategies and breaches of suitable rules in questioning games, when these games are formulated appropriately, so as to capture the structure of certain information-acquisition procedures.

⁴¹ In this respect, the traditional theory of fallacies is on a par with Grice's theory of conversational maxims. These maxims, like the concept of fallacy with its different sub-species, apply to particular moves in conversational "games", not to strategies. Hence they can at best be approximative generalizations, but not in principle strict or fully explanatory principles. This point is argued in Jaakko Hintikka, "Logic of Conversation as a Logic of Dialogue", in Richard E. Grandy and Richard Warner, editors, *Philosophical Grounds of Rationality*, Clarendon Press, Oxford, 1986, pp. 259–276.

⁴² Martha Craven Nussbaum, "Saving Aristotle's Appearances", in M. Schofield and M. Nussbaum, editors, *Language & Logos: Studies in Ancient Greek Philosophy Presented to G. E. L. Owen*, Cambridge U.P., 1982, pp. 267–293.

⁴³ See here Jaakko Hintikka, "The Interrogative Approach to Inquiry and Probabilistic Inference", *Erkenntnis* (forthcoming).

⁴⁴ Quoted by Nussbaum, *op. cit.*, p. 268.

⁴⁵ It might very well turn out that the traditional *topoi* are less interesting philosophically than their modern counterpart which can be "deduced" from the interrogative model. For instance, the vindication of the old idea of consilience which is given in my paper "The Interrogative Approach to Inquiry and Probabilistic Inference" (note 43 above) might be said to establish a new "*topos* of consilience".

ABSTRACT. Several of the so-called "fallacies" in Aristotle are not in fact mistaken inference-types, but mistakes or breaches of rules in the questioning games which were practiced in the Academy and in the Lyceum. Hence the entire Aristotelian theory of "fallacies" ought to be studied by reference to the author's interrogative model of inquiry, based on his theory of questions and answers, rather than as a part of the theory of inference. Most of the "fallacies" mentioned by Aristotle can in fact be diagnosed by means of the interrogative model, including *petitio principii*, multiple questions, "babbling", etc., and so can Aristotle's alleged anticipation of the fallacy of *argumentum ad hominem*. The entire Aristotelian conception of inquiry is an interrogative one. Deductive conclusions caught Aristotle's attention in the form of answers that every rational interlocutor must give, assuming only his own earlier answers. Several features of Aristotle's methodology can be understood by means of the interrogative model, including the role of *endoxa* in it. Theoretically, there is also considerable leeway as to whether "fallacies" are conceived of as *mistakes* in questioning or as *breaches of the rules* that govern questioning games.