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Logic as Theory of Validation  
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by

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## Abstract

### Logic, Reasoning, and the Analysis of Questions

by

Richard W. Paul

I defend each of the following claims:

- 1) that the matter/form distinction will not do as a means of accounting for the subject matter of logic. It is generally assumed that it is possible to distinguish the subject matter of the logician from the subject matter of the reasoner by claiming that the logician is concerned only with the "form" and not the "matter" of reasoning. I show that if the logician attempts to use matter/form distinction for this purpose, it is not possible to explain how it is that inductive logic, modal logic and deontic logic are taken to be fields of logic.
- 2) that the concept of validation conditions for assertions and settlement-conditions for questions will do as a means of accounting for the subject matter of logic. In order to support this claim I
  - a) make clear in what sense it is reasonable to talk of assertions as having "validation-conditions", b) make clear in what sense it is reasonable to talk of questions as having "settlement-conditions", c) make clear in what way the validation-conditions for assertions relate to the settlement conditions for questions, and d) make clear how it is that the concepts of validation-conditions for assertions and settlement-conditions for questions are relevant to a theory of

inference. This clarification paves the way for a recognition of the fact that the logician is already engaged in exploring the validation-conditions for certain classes of claims, though the use of the matter/form distinction and the truth/validity distinction obscures this fact.

3) that if logic is concerned to develop tools for the evaluation of reasoning and if reasoning consists in the attempt to support, justify, substantiate, or validate a claim by advancing evidence which bears upon that claim, then a) the truth/validity distinction and b) the deductive/inductive reasoning distinctions are misleading and oversimplified dichotomies which stand in the way of, rather than facilitate, the development of tools for the evaluation of reasoning.

4) that it is possible (though not ordinarily profitable) to cast any line of reasoning into "valid" deductive form. I claim that such a reconstruction of reasoning (or the possibility of such a reconstruction) bears little relation to both the problem of dividing reasoning up into types and the problem of evaluating reasoning (in the sense of determining whether the evidence advanced is both relevant and sufficient). Reasoning, it is claimed, is properly divided up into types, not upon the basis of whether or not "premises" entail a conclusion, nor upon whether or not evidence is conclusive or not, but rather upon the basis of the kind of claim that is made (and so upon the basis of the kind of validation-conditions which are relevant).

5) that the task of the logician (insofar as logic is concerned to develop tools for the analysis and evaluation of reasoning) is that of explicating the area of "the logic of language" which has been called "the logic of questions and assertions". I claim that there is an intimate relationship between meaning, validation, and proof, and that the intersection of these concepts comes in the assertion-making function of language. I argue that one cannot separate the tasks of clarifying precisely what a reasoner is claiming from the task of determining what is relevant to the substantiation of that claim, and so, that one cannot determine whether the evidence advanced is relevant and complete until one is clear as to what is relevant to the claim at issue, i.e., until one is clear as to the validation-conditions of the claim at issue.

## Chapter One

### THE PROBLEM OF ACCOUNTING FOR THE SUBJECT MATTER OF LOGIC

#### Introduction

The expression 'the problem of accounting for the subject matter of logic' is being used in this paper simply as a shorthand device for identifying a complicated and multi-faceted problem, a problem which has developed as a result of work by logicians and analysts in the 20th Century and is reflected in the philosophical usage of the word 'logic' which is now current. This problem (or complex of problems) has not been explicated, and, in its totality, has not been treated. A fuller understanding of the nature and demands of this manifold problem will pave the way for a recognition of the inadequacies of any attempt to base logic upon a matter/form distinction while yet maintaining its full-fledged application to the problems involved in evaluating evidence advanced in support of conclusions. By explicating this problem, it will be possible to see in relatively specific terms what minimum requirements must be met by any satisfactory theory of logic. With these requirements explicitly stated, it will be easier to see how and why present-day logical theory does not meet those requirements and also to begin to see what modifications are necessary to reach a more satisfactory account.



The three-fold usage of the word 'logic'

The word 'logic' has been used (and is being used) in a much more manifold way by philosophers working in the analytic tradition than it had been used by philosophers previous to the development of linguistic philosophy. This manifold usage can be broken down into three basic categories:

- 1) It is sometimes used as a name for a generalized field of inquiry in philosophy (generally contrasted with the areas of epistemology, metaphysics, and value theory).
- 2) It is used, in conjunction with a set of modifying adjectives, as a name for limited areas of this generalized field of inquiry. This usage suggests that the generalized field of logic can be partitioned up in at least three different ways:
  - a) on the basis of the nature of the data to be covered (e.g., 'deductive logic', 'inductive logic', 'modal logic', and 'deontic logic')
  - b) on the basis of whether or not symbols or mathematical devices are used (e.g. 'symbolic logic', 'mathematical logic',) and
  - c) on the basis of whether or not the area in question is "formal" or not ('formal logic' and 'informal logic').
- 3) It is used in the phrase 'the logic of X' (where the "X" can be replaced by a wide variety of linguistic phenomena) to indicate those particular elements of language which "have a logic" that can be studied and in some way explicated. This usage of the word 'logic' has become established in philosophy in the 20th Century. It has developed in conjunction with the development of analytic philosophy, though the extent to which all of its various forms would be accepted would vary to some extent from analyst to analyst and from logician to logician. In any case, one finds all of the following variations on the expression.
  - a) 'the logic of language' Here one is referring, presumably, to the total set of rules which implicitly govern the total set of concepts and syntactic signs which are available either within some particular language or within natural languages generally.
  - b) 'the logic of terms' Here one is referring, presumably,

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to the application conditions which govern particular words within language. This usage is sometimes particularized for specific terms or sets of terms, such as in the following: 'the logic of obligation', 'the logic of explanation', 'the logic of truth-functional connectives', ... The presupposition here is that it is possible to study the usage of particular words and to explicate the basic conditions under which those words are properly used.

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- c) 'the logic of statements' This expression has two distinctly different usages: 1) as a reference to the propositional calculus (a formalization of the truth-functional usage of words like 'and', 'or', 'if-then', 'not', ...) and 2) as a reference to classes of assertions which are verified or validated in different ways: 'the logic of scientific statements', 'the logic of legal statements', 'the logic of ethical statements', ...
- 3
- d) 'the logic of questions' This expression also has two broadly different usages with a number of sub-usages under each broad type: one is associated with the work of formalists on questions and the other connected with the notion of dividing questions up into classes according to basic differences in the conditions under which they are settled: 'the logic of scientific questions', 'the logic of legal questions', 'the logic of ethical questions', ...
- 4
- e) 'the logic of X reasoning' This expression is particularized in such forms as: 'the logic of ethical reasoning', 'the logic of philosophical reasoning', 'the logic of scientific reasoning', and so forth. The assumption here is that there are significant differences between the nature of reasoning as it is properly carried out in response to different kinds of problems and that it is possible for the analyst or logician to explicate these differences and so clarify the conditions under which reasoning in these various areas is properly carried out.

Let us now make clear what is suggested by this usage and the problems which arise from those suggestions. Two general suggestions are implicit in the first two usages of the word. The first is that

logic, like other disciplines, is not only a) a generalized field of inquiry with a generalized subject matter and objective, but also b) a field which is partitioned up into sub-fields, each, presumably, with a more particularized objective and more limited subject matter. Secondly, it suggests that the area covered by the general field of logic can be divided up, not only upon the basis of the subject matter covered, but also upon the basis of whether or not "symbols" or other "mathematical devices" are used and/or whether or not the area is concerned with "form".

Given these suggestions it is legitimate to raise the following questions (to which present-day logical theory should provide the answers):

- 1) What is the generalized objective of logic?
- 2) What is the generalized subject matter or data which logic, as a generalized inquiry, examines?
- 3) In what way do deductive, inductive, modal, and deontic logic partition up this general subject matter and objective logic?
- 4) Does this four-fold division of logic into sub-fields constitute an exclusive and exhaustive division of the subject matter and objective of logic?
- 5) If logic as a generalized field has the objective of providing tools for the analysis and evaluation of reasoning and all reasoning is either inductive or deductive, then how do modal logic and deontic logic qualify as fields of logic?
- 6) The terms 'symbolic logic' and 'mathematical logic' suggest that one can divide up the areas of logic into those which are "symbolic" or "mathematical" and those which are not, yet: a) What is non-symbolic logic?, b) How does it differ from symbolic logic?, and c) Is inductive logic non-symbolic or not?.
- 7) The term 'formal logic' suggests that some logic is formal and some is not, yet: a) What is informal or non-formal logic?

and b) Does this mean that only part of logic is to be based upon the matter/form distinction or what?

The third broad area of the usage of the word 'logic'

(in variations on 'the logic of X' locution) suggests that there is an intimate relationship between the subject matter of logic and the subject matter of those who are engaged in the study and analysis of "the logic of language". In particular all of the following questions are suggested:

- 8) To what extent is it the task of the logician to examine "the logic of language"?
- 9) To what extent is the logician a linguistic analyst?
- 10) If logic as a generalized field of inquiry is concerned with the "logic of language", how extensive a part of that logic is the logician concerned with and to what extent is that concern compatible with the logician's expressed interest in reasoning, inference, and evidence?

Given these questions, we are now in a position to formulate in relatively specific terms the requirements which must be met by logical theory if it is to solve the problem of accounting for the subject matter of logic. A few remarks about "inferences" and "the logical relations of propositions" or some statement to the effect that one only finds out what logic is by doing logic simply will not suffice. Those who are concerned with logical theory must confront the problem-set formulated above openly, explicitly, and as an interconnected group. Hence, the answers which they provide must fulfil the following requirements:

- 1) Sufficient theory must be developed to explain what the generalized subject matter and objective of logic are and

how this generalized objective and subject matter are partitioned up into sub-fields of logic. In particular this will require:

- a) a specific explanation of how it is that deductive logic, inductive logic, modal logic, and deontic logic partition up the subject matter and objective of logic, or, alternatively, a specific explanation of why they do not (if it is claimed that they do not).
  - b) a specific explanation or clarification of the sense in which logic as a generalized field is concerned to develop the tools for analyzing and evaluating reasoning or inference (evidence advanced for a conclusion). It is essential here to have a precise clarification of how the logician's concept of reasoning and inference compares with that of non-logicians. Only through such a clarification can perspective be gained as to what precisely has and has not been accomplished by the development of logic to date. For example, it is not at all clear at the present time to what extent logic has succeeded in the development of criteria for the evaluation of the "goodness" or the "weight" of evidence advanced in support of conclusions.
  - c) a specific explanation of the precise role which the matter/form distinction plays in accounting for the subject matter of logic as a generalized field of inquiry.
- 2) Sufficient theory must be developed to explain the extent to which logic as a generalized field is concerned with what language analysts call "the logic of language". In particular this will require:
- a) a specific explanation of the extent to which a concern with "the logic of language" is compatible with the logician's expressed interest in reasoning, inference, and the evaluation of evidence.
  - b) a specific explanation of the sense in which the logician is concerned with the logic of "words", "assertions", and "questions".
  - c) a specific explanation of the degree to which the

practical task of evaluating reasoning and inference is intertwined with problems of analyzing "meaning".

To what extent has the logical theory developed to date met these requirements?

Unfortunately, very little work has been done in logical theory which could be taken as fulfilling these requirements. If we look at these requirements for the moment from the point of view of the 13 questions above, this will be clearer. There are three basic sources to which one can go in attempting to determine present-day logical theory: a) essays in logical theory (what is generally called "philosophical logic"), b) reference books in philosophy (such as the recently published eight volume encyclopedia of philosophy), and c) textbooks and treatises in logic. What I have found in looking through these sources is as follows: of the 13 questions which I have used to define the problem, six are not discussed at all (questions three, four, five, six "c", seven "b", and eleven), three are discussed only by analysts who are not principally "logicians" (7, 8, and 10),<sup>5</sup> and two of them, those<sup>6</sup> treated by writers of texts and treatises in logic (1 and 2), are treated in a very superficial and perfunctory manner.

The most disappointing area is that of philosophical logic proper, where, one would think, extensive work on the subject matter of logic would have been done. But, as a matter of fact, it is extremely difficult to find any of these questions discussed at

all, let alone in a very detailed fashion. For example, of the 44 essays on logical theory by Quine which I examined, only two of them touched upon any of these questions in any noticeable way, and those were a short paper entitled 'On the Application of Modern Logic' and a review of Strawson's book on logical theory, 'Mr. Strawson on Logical Theory'. Some of his other essays seemed to presuppose an essentially formalistic account of the subject matter of logic and proceeded from that point (e.g. 'Set-theoretic Foundations for Logic', 'On ordered Pairs and Relations', 'Two Theorems about Truth Functions', 'On Boolean Functions', 'Whitehead and the Rise of Modern Logic', and so forth.). The remainder of his essays consist in the application of formalistic analytic tools and concepts to a variety of philosophical problems (e.g. 'Truth by Convention', 'On Carnap's Views on Ontology', 'Carnap on Logical Truth', 'On Mental Entities', 'Ontological Reduction and the World of Numbers', and so forth).<sup>7</sup>

This is the pattern that one finds in work in philosophical logic generally. It is not at all peculiar to those who are overtly associated with formalism. For example, Peter Strawson, who would ordinarily be taken to be associated with a non-formalistic orientation to analysis, nevertheless, seems as much given to presupposing a formalistic basis for logic as those who are overt formalists and seems almost as oblivious as Quine of the importance of taking up the 13 questions listed above (This must be qualified by noting that in his book Logical Theory he does to some extent consider questions

7, 8, and 10.). In his introduction to an anthology of essays in philosophical logic which he recently edited, it takes Strawson only five lines to assimilate "logic" to "formal logic". What is more, he does this with no apparent qualms or misgivings. He says:

...logic is the general theory of the proposition. It has a formal part and a philosophical part. The aims and concerns of the formal science of logic are various, though interrelated; but one quite basic aim is the systematic presentation of certain relations of deducibility or implication which hold among propositions. The formal logician is not concerned with the entire field of deducibility relations. He is only concerned with such of them as hold among the members of groups of propositions, when, and because, the members of such a group collectively exhibit certain structural or formal features. These features are represented in the logician's science by sets of schemata or logical skeletons of the kind with which every student of elementary logic is familiar. The schemata with which such a student is most familiar nowadays are, speaking roughly, made up of logical constants (or logical particles) on the one hand and sentence-letters, predicate letters and variables on the other.<sup>8</sup>

Notice how what Strawson says here rides rough-shod over the problems which have been explicated as defining the problem of accounting for the subject matter of logic:

- 1) He shifts back and forth from talking about "logic" in the sense of a generalized field to talking about "formal logic", which, one would have thought, is at best only a part of the generalized field of logic. But what is said by Strawson here suggests that there is no distinction between the generalized field of logic and formal logic. If nothing else one would have thought that such an assimilation would not have been attempted until something was done to explain in what sense "inductive logic" could



be conceived of as being "formal", since all reasoning which is "formal" is presumably dealt with by deductive logic.

- 2) There is no mention here of the relation of logic to reasoning or the evaluation of evidence, though one would assume that the general objective of logic does involve some such relation. The fact that Strawson does not mention this suggests that in his view the objective of systematically presenting "certain relations of deducibility or implication which hold among propositions" in itself guarantees the development of sufficient tools for the analysis and evaluation of evidence advanced for conclusions.
- 3) The assumption is made that philosophical logic or theory of logic is concerned only (or at least principally) with what is done in "formal logic" ("...logic is the general theory of the proposition. It has a formal part and a philosophical part.")

Furthermore, when Strawson comes to listing the typical questions in philosophical logic one finds none of the problem-set which was formulated above. He cites as typical the questions: 'What general elucidatory account can be given of the notion of a logical particle?', and 'What in general is the nature of the relation which holds between propositions when one follows from or is deducible from another?' Only the third question has any hint of a relation to the questions listed above.

In sum, Strawson suggests that logic is exclusively concerned with "formal features", "logical skeletons", "logical constants", and "deducibility relations" which "hold among the members of groups of propositions when, and because, the members of such a group collectively exhibit structural or formal features". He accepts essentially a formalistic conception of logic, without apparently recognizing the manifold difficulties of such a position or the need for its justification.

No significant difference is found when one moves from an examination of essays in logical theory to entries in dictionaries and encyclopedias of philosophy. For example, if one looks up the word 'logic' in the newly-published eight-volume Encyclopedia of Philosophy, one finds no entry for logic as a generalized field and no discussion of what the generalized object of logic is, what its generalized subject matter is, how that subject matter can be divided up into sub-areas, and so forth.<sup>9</sup> One finds, rather, only the various "subfields" discussed (an entry for "deductive logic", another and separate entry for "inductive logic", another and separate entry for "modal logic", and so forth). How these various fields intermesh, the respects in which they represent a particularization of the same generalized objective, how they divide up the generalized subject matter of logic into exclusive and exhaustive parts (if they do) is left up in the air. In addition, there is no discussion of the sense in which logic provides tools for the analysis and evaluation of

reasoning, no consideration or explanation of how the concept of inference or reasoning in logic relates to the non-formal use of those terms, and, of course, no discussion of the extent to which the logician is concerned with "the logic of language". On the other hand, there is detailed discussion of very specialized work being done in modal logic and very detailed description of the history of "modern logic" (i.e. "formal logic").

There is only one possible explanation that I can see for the fact that whereas there is no discussion of the problems involved in accounting for the subject matter of logic there is plenty of detailed explanation of particular fields within logic: a) that there is no recognition of the fact that there is a basic problem of accounting for the subject matter of logic (such as is explicated above) and b) it is generally assumed that a purely formalistic conception of logic is quite satisfactory.

#### Logic texts and treatises

A somewhat different situation is found when one examines logical texts and treatises with a view to determining to what extent the problem of accounting for the subject matter of logic is met. Here there is generally some discussion of the subject matter and objective of logic and, in addition, some discussion of the relation of logic to reasoning or inference. However, these matters are discussed with such brevity and in such vague terms that one

gets the impression that the writers of such texts and treatises tacitly assume that there are no serious problems in this area and that only a few remarks are necessary in order to clarify it. There is rarely any mention of any problems existing here and no attempt made to formulate any specifically if there happens to be some mention of difficulty.

In looking through approximately 25 randomly selected logic  
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texts and treatises, I found the following pattern emerging:

- 1) a tendency to identify "logic" with "formal" or "symbolic" logic.
- 2) some form of commitment to the premise that logic as a generalized discipline is concerned with the analysis and evaluation of "reasoning", "inference", or "evidence", but no discussion or clarification of how the logician's concept of reasoning compares with that of non-logicians (e.g., there is very little discussion of precisely how it is that a formalistic approach to logic can be reconciled with the task of developing tools for evaluating the weight, value, relevance and/or completeness of evidence advanced for some particular conclusion.).
- 3) a tendency to identify the task of analyzing and evaluating reasoning, inference, and evidence with the problem of separating out the "form" from the "matter" or "content" (however, with no discussion or specific explanation of how the matter/form distinction can account for the subject matter of inductive logic, deontic logic, and modal logic.).
- 4) a failure to provide anything approaching a detailed account of how logic as a generalized field relates to the analysis of the logic of language.
- 5) some form of commitment to the premises that all reasoning divides up into two types and to the premise that only one of these types is properly evaluated by considering its "form", but with no attempt made to reconcile this with what appears to follow from it, namely, an inconsistency between the notion of a purely formalistic logic, on the one

hand, and the notion that part of logic is concerned with a type of reasoning which is "valid" in some way other than in virtue of its "form", on the other.

- 6) a suggestion to the effect that there is an important relation between examining the "form" of reasoning and determining how good some evidence is for the conclusion advanced (i.e., the tendency to equate the term 'evidence' with the term 'premises' and to equate the term 'complete evidence' with the term 'premises which entail a conclusion').
- 7) a tendency to proceed in such a way as to suggest that the logician can carry out his task of developing tools for the analysis and evaluation of reasoning without engaging directly in developing tools for handling problems of "meaning" (i.e., the suggestion that the logician is concerned with problems of syntax and not problems of semantics).

Let us now turn to the texts and treatises themselves in order to see in more particular terms how this pattern arises.

Let us begin with the tendency to identify "logic" as a generalized inquiry with "formal" or "symbolic" logic. This is sometimes done simply by moving indiscriminately between expressions which suggest that one is talking about logic generally and those which suggest that one is talking simply about formal logic (or some more limited segment of logic). Three examples of this are Quine's Methods of Logic, Suppes' Introduction to Logic, and Eaton's General Logic."

The title of Quine's book suggests that he is concerned with logic generally and not simply with some limited segment of logic. However, it soon becomes clear that he is using the word 'logic' to be equivalent to 'modern logic' and that to be equivalent to 'formal

logic'. For example, he talks about "logic" in a generalized sense ("Logic, like any other science, has as its business the pursuit of truth.") but it is soon clear that the sorts of truth that "logic" (in Quine's sense) is concerned with are those which are "formally true": "Logical truths are statements on a par with the rest, but very centrally situated; they are statements of such forms as 'x = x', 'p or not-p', 'if p then p', 'if p and q, then q', if everything is thus and so, then something is thus and so' ... Their characteristic is that they not only are true but stay true even when we make substitutions upon their component words and phrases as we please." (XV) It is true that Quine makes some other statements which suggest that there might be something more to logic than "formalism", but it is difficult to determine from what he says what this might be. For example, he says "This book undertakes both to convey a precise understanding of the formal concepts of modern logic and to develop convenient techniques of formal reasoning", which suggests that there are some "informal" or "non-formal" concepts of modern logic and some reasoning which is not "formal", but we are not provided with any hint as to what this other area might be. (vii)

Suppes proceeds in a similar fashion. He titles his book  
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Introduction to Logic, which suggests that he is concerned with the generalized field of logic and not simply a segment of that

generalized field; however, like Quine, Suppes moves indiscriminately from the term 'logic' to the term 'modern logic' and 'formal logic'. He begins by announcing that his "book has been written to serve as a textbook for a first course in modern logic". (vii) His main objective, he says, is "to familiarize the reader with an exact and complete theory of logical inference". (vii) To this point, one is led to believe that Suppes is not limiting himself to one area of logic. But then, what follows is purely formalistic. The first part of the book deals with "formal principles of inference and definition", the second part with "elementary set theory".

The only sense in which Suppes does qualify himself here is by admitting that (formal) logicians have a multitude of interests beyond developing tools for the analysis and evaluation of reasoning. Within the area of developing tools for evaluating reasoning a purely formalistic approach is taken to be perfectly satisfactory. He puts it in this way:

Our approach shall be through a study of logic. In modern times logic has become a deep and broad subject. We shall initially concentrate on that portion of it which is concerned with the theory of correct reasoning, which is also called the theory of logical inference, the theory of proof, or the theory of deduction. The principles of logical inference are universally applied in every branch of systematic knowledge. (XV)

And again:

A correct piece of reasoning, whether in mathematics, physics or casual conversation, is valid by virtue of its logical form. Because most arguments are expressed in ordinary language with the addition of a few technical symbols particular to the

discipline at hand, the logical form of the argument is not transparent. Fortunately, this logical structure may be laid bare by isolating a small number of key words and phrases like 'and', 'not', 'every', and 'some'. (xvi)

It is pretty clear that when Suppes talks about logic being "a deep and broad subject" he is not intending to suggest that there is much more to the development of tools for the analysis and evaluation of reasoning than "formal logic", but only that the modern logician is concerned with more than the analysis and evaluation of reasoning.

Eaton titles his book General Logic which strongly suggests that he is concerned with the total field of logic, but then defines "logic" in such a way as to make it equivalent to "formal logic":

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Logic is the science that exhibits all the relationships permitting valid inferences that hold between various kinds of propositions considered merely in respect of their form. ... This definition covers both the Aristotelian treatment of the subject and the more generalized logic of the present day, as represented by Principia Mathematica. (8)

Other logicians do not simply "suggest" that logic as a generalized discipline is equivalent to formal logic, they assert it quite explicitly. Kalish and Montague, for example, in the first sentence of their book Logic: Techniques of Formal Reasoning assert without qualification, explanation, or attempted justification that "The expressions 'logic', 'formal logic', 'symbolic logic', and 'mathematical logic' are in the just acceptance synonyms." In their view, formal logic in and of itself is sufficient as a tool for the analysis and evaluation of reasoning: "To achieve the

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objective of mirroring everyday reasoning, we have sometimes had to sacrifice economy, though never precision." (IX)

Alonzo Church puts it this way in his book Introduction to Mathematical Logic:<sup>15</sup>

Our subject is logic---or, as we may say more fully, in order to distinguish it from certain topics and doctrines which have (unfortunately) been called by the same name, it is formal logic. (1)

In Church's view the only reason to use the qualifying expression "formal" is simply to prevent the reader from thinking that the logician is going to deal with what he ought not to deal with. Furthermore, like Suppes and Kalish and Montague, Church takes formal logic to be a sufficient tool in and of itself to develop a complete theory of proof: "Traditionally, (formal) logic is concerned with the analysis of sentences or of propositions or of proof with attention to the form in abstraction from the matter."<sup>16</sup>

Lewis and Langford, in their Symbolic Logic, put it in this way: "Symbolic logic ... is itself logic in an exact form."<sup>17</sup> The only reason which they see for using the qualifying term 'symbolic' is that of distinguishing modern logic which is precise from traditional logic which they deem to suffer from a lack of precision:

The study with which we are concerned in this book has not yet acquired any single and well-understood name. It is called 'mathematical logic' as often as 'symbolic logic' and the designations 'exact logic', 'formal logic', and 'logistic' are also used. None of these is completely satisfactory; all of them attempt to convey a certain difference of this subject from the logic which comes down to us from Aristotle and was given its traditional form by the medieval scholastics. This difference is not one of intent: so far as it exists it is accidental or

is due to the relative incompleteness and inexactness of Aristotelian logic... Thus the subject matter of symbolic logic is merely logic---the principles which govern the validity of inference. (3)

Further documentation of this tendency to identify logic as a generalized discipline with formal logic could be provided, but I will leave this to those who have some doubts about the extensiveness of this tendency. It is more important for us to spend some time documenting the fact that there is a tendency (connected with the tendency to identify logic with formal logic) to move without any explanation, clarification, or justification from talking in relatively neutral terms about a concern to develop tools for the evaluation of "evidence", "reasoning", "inference", or "argument" to the implicit commitment that this can be done by looking at "form" in abstraction from "matter" or "content". This move leads to an identification of "reasoning" with "the manipulation of truth-functional constants and quantifiers". It reduces the considerations which are deemed relevant to the evaluation of reasoning and evidence to those which bear upon sentential derivation.

Let us begin by listing some instances of what I have called "talking in relatively neutral terms about a concern to develop tools for the evaluation of 'evidence'...". Here are a few typical examples:

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1) Lionel Ruby in his Logic: An Introduction:

"Logic" is concerned with the type of thinking known as "inference"... Whenever we furnish evidence for our beliefs, whenever we answer the challenging question 'Why?' with a "Because" and state our reasons or evidence for believing as we do, we engage in the "logical type" of thinking.

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2) Copi in his Symbolic Logic:

Logic was discussed by its ancient founder, Aristotle, from two quite different points of view. On the one hand, he regarded logic as an instrument or organon for appraising the correctness of reasoning; and on the other hand he saw the principles and methods of logic as interesting in themselves. (vii)

The study of logic, then, is the study of the methods and principles used in distinguishing correct (good) from incorrect (bad) arguments. (1)

20

3) Cohen and Nagel in Logic and the Scientific Method:

Logic may be said to be concerned with the question of the adequacy or probative value of different kinds of evidence. Traditionally, however, it has devoted itself in the main to the study of what constitutes proof, that is, complete or conclusive evidence. (5)

When the logician talks in this way, the concept of "reasoning" or "inference" which he is using seems to be identical to the ordinary non-technical usage of those terms wherein one is reasoning whenever one advances any evidence with a view to supporting, substantiating, justifying, or warranting, a claim. There is nothing in this non-technical usage to suggest that what one is doing is claiming that one or more sentences can be obtained or derived from one or more other sentences simply by considering the displacement of truth-functional constants and quantifiers in those sentences.

Furthermore, there is nothing in this non-technical usage to suggest that when we answer the questions 'What do you have to go on?', 'What evidence do you have for that claim?', or 'What

justification do you have for that conclusion?' we are providing "premises" which "entail" a conclusion. Nevertheless, the logician typically makes the move from "neutral" talk about reasoning, inference, and evidence and their evaluation to a line of talk which makes a number of significant (and questionable) assumptions concerning the nature of reasoning, inference, and evidence and the proper way to evaluate them. One of these assumptions is that the proper way to evaluate reasoning or inference is to consider its "form" in abstraction from its "matter" or "content". This is sometimes qualified by allowing for "inductive reasoning" in which one supposedly considers something other than "form" (though what the other thing to be considered is quite unclear). Another of these assumptions is that the term 'evidence' is equivalent to (or should be made equivalent to) the term 'premise'. A third assumption very closely associated with this jump is the assumption that all reasoning and inference can be divided up into two types: that in which the evidence is complete (here it is assumed that these cases are equivalent to those in which the "premises" entail the conclusion) and that in which the evidence is incomplete but relevant. A fourth assumption is that there is some sort of radical difference in kind between considering the "validity" of reasoning and considering "truth". I shall argue in the course of this paper that each of these dichotomies (matter/form, inductive reasoning/

deductive reasoning, truth/validity) are misleading, oversimple categories (as they are drawn) which stand in the way of, rather than facilitate, a recognition of the problems which must be confronted in analyzing and evaluating reasoning.

We have already seen the sort of neutral talk with which the logician begins. Let us now see in more detail a sampling of statements which illustrate the move which is made to a formalistic approach to reasoning and the evaluation of evidence:

- 1) Lionel Ruby moves from neutral statements like "Logic is the study of the principles that determine whether inferences are justified or unjustified" and "The question which the logician asks is: 'Have we the evidence which is adequate to prove our conclusions?' " to statements which equate this concern for "valid inference" which is itself reduced to a concern with "deductive logic":<sup>22</sup>

Our discussion of valid inference, or deductive logic, is largely based upon the so-called "classical tradition" in logic that began with Aristotle. Though this logic was developed in the Middle Ages, it remained largely unmodified until the 19th Century. The prestige of the classical logic was once so great that it was believed that it does not cover all of the logical forms that can be investigated by a more generalized "symbolic" logic. The newer logic has also shown that the whole of logic may be systematized as a rigorous science in "mathematical" form.

The suggestion which is implicit in this but not made explicit is that all of the tools necessary to determining

whether "evidence" is adequate to prove a conclusion are provided by formal logic.

- 2) Copi, in a like manner, oscillates from talking about determining whether "premises constitute grounds or good evidence for the conclusion" to statements which identify "complete evidence" with formal entailment: "All arguments involve the claim that their premises provide evidence for the truth of their conclusion, but only a deductive argument claims that its premises provide absolutely conclusive evidence".<sup>23</sup> In other words, conclusively warranting, substantiating, or validating a claim are being taken to be significantly related to determining whether some sentence or proposition can be derived from some other sentence or set of sentence by means of the displacement of their truth-functional constants and quantifiers.

- 3) Cohen and Nagel make the identification in the following way:<sup>24</sup>

In all cases...of complete evidence or proof the conclusion is implied by the premises, and the reasoning or inference from the latter to the former is called deductive.

Concerning the identification of "complete evidence" with "deduction" and the relation between this and the division of reasoning into two types, Copi, as has been pointed out, says this:

"All arguments involve the claim that their premises provide evidence for the truth of their conclusions, but only a deductive argument claims that its premises provide absolutely conclusive evidence". Here we have a number of typical assumptions: 1) that every instance of reasoning is somehow "intrinsically" either deductive or inductive, 2) that when an argument or line of reasoning is "successful" or "correct" there is a special connection between whether or not the evidence advanced entails the conclusion or not (with the sister assumption that it is only when the latter condition holds that the evidence is complete), and 3) that it is proper to identify the term 'premises' with the term 'evidence'.

This assimilation of the term 'evidence' to the term 'premise' is made as a matter of course. Wesley C. Salmon in his Logic is typical.<sup>25</sup> First he says:

When people make statements, they may offer evidence to support them or they may not. A statement that is supported by evidence is the conclusion of an argument, and logic provides tools for the analysis of arguments. Logical analysis is concerned with the relationship between a conclusion and the evidence given to support it.

When people reason, they make inferences. These inferences can be transformed into arguments, and the tools of logic can then be applied to the resulting arguments. In this way, the inferences from which they originate can be evaluated. (1)

And then he says:

An argument consists of one statement which is the conclusion and one or more statements of supporting evidence. The

statements of evidence are called "premises". (3)

In line with the above tendencies is the tendency to ignore or underestimate the intimate relationship between problems of meaning and problems of evaluating reasoning. Copi's manner of dismissing the problem of meaning is typical:<sup>26</sup>

It has been explained that logic is concerned with arguments, and that these contain propositions as their premisses and conclusions. The latter are not linguistic entities, such as declarative sentences or statements, but rather the meanings of statements. However, the communication of propositions and arguments requires the use of language, and this complicates our problem. Arguments formulated in English or in any other natural language are often difficult to appraise because of the vague and equivocal nature of the words in which they are expressed, the ambiguity of their construction, the misleading idioms they may contain, and their pleasing but deceptive metaphorical style. The resolution of these difficulties is not the central problem for the logician, however, for even when they are resolved, the problem of deciding the validity or invalidity of the argument remains.

#### The Thesis

We have now seen the basic requirements which must be met by logical theory, if the problem of accounting for the subject matter of logic is to be solved, as well as having seen some documentation of the manner in which logical theory today stands in relation to these requirements. We are now in a position to spell out in some detail what the objective of this paper is (beyond that of demonstrating that there is a problem of accounting for the subject matter of logic as characterized above). With an



overall view of what we are aiming at, it will be easier to grasp how each part of the thesis is related to the thesis as a whole. The body of the dissertation can then be used to focus in upon particular areas within that whole.

In particular, the thesis as a whole will encompass a defense of each of the following claims:

1) that the matter/form distinction will not do as a means of accounting for the subject matter of logic. This claim will be defended from more than one point of view. For one, I will attempt to show that this distinction is misleading and oversimplified when used in the process of evaluating reasoning. For another, I will attempt to show that if logicians use this distinction to explain how logic as a discipline differs from other disciplines (the logician concerning himself only with the "form" and never the "matter" of reasoning) that it will not then be possible to explain how it is that inductive logic, modal logic, and deontic logic are taken to be fields of logic.

2) that the concept of validation-conditions for assertions and settlement-conditions for questions will do as a means of accounting for the subject matter of logic. In order to support this claim I will: a) define the concept of validation-conditions, b) make clear in what sense it is reasonable to talk of assertions as having validating-conditions, c) make clear in what sense it is reasonable to talk of questions as having settlement-conditions,

d) make clear in what way the validation-conditions for assertions relate to the settlement-conditions for questions, and e) make clear how it is that the concepts of validation-conditions for assertions and settlement-conditions for questions are relevant to a theory of inference. This classification will pave the way for a recognition of the fact that the logician is already engaged in exploring the validation-conditions for certain classes of claims, though the use of the matter/form distinction and the truth/validity distinction obscures this fact.<sup>27</sup>

3) that if logic is concerned to develop tools for the evaluation of reasoning and if reasoning consists in the attempt to validate a claim by advancing evidence sufficient to establish its truth, then  
a) the truth/validity distinction and the deductive/inductive reasoning distinction are misleading and oversimplified dichotomies which stand in the way of, rather than facilitate, the accomplishment of the announced objective of logic. I will attempt to show that the distinction between "truth" and "validity" is misleading as drawn by showing that what the logician accepts as a concern for validity is in fact a concern with the conditions under which a limited class of claims are true (the class of claims to syntactic entailment). I will also attempt to demonstrate that it is possible (though not ordinarily profitable) to cast any line of reasoning into "valid" deductive form. I will argue that such a reconstruction (or the possibility of such a reconstruction) bears little relation both to the problem of dividing instances of reasoning up into types

and to the problem of evaluating them (in the sense of determining whether the evidence advanced in any particular case is sufficient to establish what is claimed upon its basis). Reasoning, it will be claimed, is properly divided up into types, not upon the basis of whether or not "premises" entail a conclusion, nor upon whether or not evidence is conclusive or not, but rather upon the basis of the kind of claim which is made (and so upon the basis of the kind of validating-conditions which are relevant).

4) that it is not necessary to attempt to develop a logically exclusive and exhaustive set of categories for classifying reasoning into types in order to engage in developing tools for analyzing reasoning and in order to evaluate particular instances. I will argue that the problem of developing a set of categories for classifying instances of reasoning into types is equivalent to the problem of developing a set of categories which divides up all questions and assertions into types according to divergency in their basic settlement- and validation-conditions. I shall suggest, in other words, that there are not just two but rather a great multiplicity of different types of reasoning. This suggestion supports the development in analytic philosophy of such locutions as 'the logic of ethical reasoning', 'the logic of legal reasoning', and so forth.

5) that the traditional model used for the analysis of reasoning

which suggests that the proper way to analyze reasoning is to divide it up into two separable parts, its form and its matter is oversimplified and misleading. I shall argue that we need to recognize that a full analysis of reasoning requires an analysis of the question at issue sufficient to establish: a) whether the question is relevant in the context in which it is raised, b) whether the question is determinate, c) whether it is free from false assumptions, d) whether the evidence advanced for its settlement is relevant, and e) whether the evidence is sufficient to establish the claim made on its basis.

In this new model the notion of dividing reasoning into form and matter will be dropped, though the exercise of casting reasoning into deductive form will be retained whenever it is useful to force all assumptions into the open. Premises will be divided up into those which formulate "validation-conditions" or inference-rules and those which formulate evidence.

6) that logic is properly conceived as a descriptive and analytic discipline whose legitimate fundamental concern is the conditions which affect the "meaning" and not simply the "form" of assertions and questions. I will suggest that one cannot be said to understand the "meaning" of a sentence whose use in some context is open to truth or falsity unless one understands the conditions under which that claim could in principle be validated. I shall argue, in other words, that one cannot separate the tasks of clarifying precisely what a reasoner is claiming from the task of determining

the conditions under which his claim would be established as true. It is only when one knows the conditions under which a claim would be true that one can determine whether or not some evidence is sufficient to justify it. To put this into the terminology of this dissertation: it is only when one knows the validating-conditions for a claim that one can determine whether or not some evidence is sufficient to establish its truth (hence the phrase 'the validating-conditions for claim X' can be taken as a shorthand for 'the conditions which must be met in order for claim X to be true'). In short, I will argue that in the area of reasoning, there is no possibility of separating the problem of determining whether or not some claim is justified by some evidence from the problem of determining the "meaning" of that claim (sufficient to explicate its validating-conditions).

In this view, the standards which are relevant to determining whether or not some proposed evidence establishes the truth of the claim which is advanced on its basis are implicit in the manner in which words are used by speakers of language in the formulation of assertions. Consequently, I shall argue that the task of the logician (insofar as logic is concerned to explicate the general standards by means of which particular instances of reasoning can be evaluated) is that of explicating the area of "the logic of language" which has been called "the logic of questions and

assertions".

### The structure of the thesis

The remainder of this dissertation will be structured in the following way. Chapter Two will provide a sketch of the general theory of logic being developed in this paper and a more particular exploration of: a) the relation between questions and assertions, b) the concepts of validation-conditions (for assertions) and settlement-conditions (for questions), c) the relation between the "meaning" of an assertion and its validating-conditions, d) the various phenomena which function as validating-conditions for assertions, e) the manner in which validating-conditions can be explicated, f) the relation between making claims, solving problems, and reasoning, g) the notion of validating-conditions as the basis for inference-licenses, and h) the distinction between evidence and inference-licenses.

Chapter Three provides an overt attack on the usefulness of the matter/form and deductive/inductive distinctions. It begins with a brief summary of the logical theory which underlies these distinctions and then systematically attacks a set of assumptions which that theory involves: 1) the notion that the terms 'evidence' and 'premises' can properly be assimilated, 2) the notion that in sound deductive reasoning the evidence for a claim entails it, 3) the notion that information about whether or not evidence justifies

the truth of a conclusion can be obtained by examining syntax, and  
4) the notion that only some instances of sound reasoning can be  
laid out in deductive form.

Chapter Four provides a reexamination of the problem of  
classifying instances of reasoning into types. In this chapter  
it is argued: a) that there is no readily apparent means available  
for devising a priori a classificatory schema which will provide  
the relevant criteria for evaluating any instance of reasoning,  
b) that it is not necessary to have such a schema in order to  
evaluate instances of reasoning, c) that more important than  
assigning an instance of reasoning to a general type is the analysis  
of the settlement-conditions of the question at issue, and d) that  
nevertheless there is an important place in logic for the study  
of reasoning-types.

Chapter Five will provide a series of objections and replies  
designed to further clarify and defend the concept of logic which  
is being developed in this paper.

Chapter Six will provide a return to the problem of accounting  
for the subject matter of logic, summarizing the ways in which  
contemporary formalist logic is incapable of solving this problem  
and the reasons why logic as theory of validation does provide a  
satisfactory solution.

## Chapter One

### Notes

1

See, for example, Chapter Two in Lewis and Langford's Symbolic Logic, The Century Co., New York: 1932.

2

See, for example, Waismann's paper on "Language Strata" in Logic and Language (Second Series), Basil Blackwell Co., Oxford: 1961. In this paper Waismann argues that assertions can be divided up into a multiplicity of groups, each group having "a logic" of its own. Each group has its own logic because each group has distinguishably different verification or validation-conditions. Meaning, validation, and proof are intertwined and their bases vary from assertion type to assertion type:

We may next consider the statements themselves and ask what sort of logic is valid for them. By 'logic' I mean logic in the strict sense, the laws of inference. Aristotelian logic, including the modernized and refined form of its presentation in Principia Mathematica, has gone the same way as Euclidean geometry---a number of different 'logics' have grown up alongside it, more or less akin to it... And, notice, when we pass from the one logic to the other, we get an altogether different mathematics; which goes to show that the sort of logic we apply is an important characteristic ingrained in a certain field of propositions. Change the logic and then the propositions will take on new meanings.

Wisdom puts it in this way: "Enquiry as to the logical character of ... statements is directed toward gaining a clearer view of the procedure proper to the proof or refutation of them". In Paradox and Discovery, p. 115, Basil Blackwell Co., Oxford: 1965.

3

See, for example: David Harrah's "A Logic of Questions and Answers", Philosophy of Science 28 (1961), pp 40-46; C. L. Hamblin's "Questions", Australasian Journal of Philosophy, 30 (1963), 62-63.; and A. N. and M. L. Prior's "Erotetic Logic", Philosophical Review, 64 (1955), pp 43-59. On the second usage (as a reference to classes of questions which are settled in different ways) see Stephen Toulmin's Reason in Ethics, Part II, Cambridge University Press, Cambridge: 1964.

4

See, for example, Chapter Eleven in Toulmin's Reason in Ethics,



"The Logic of Moral Reasoning", Cambridge University Press,  
Cambridge: 1964.

5

For Example, Gilbert Ryle, John Wisdom, and Peter Strawson.

6

See any introductory logic text. Copi's Symbolic Logic is a  
good representative example.

7

21 of these essays are anthologized in Quine's The Ways of Paradox  
and Other Essays, 23 in Quine's Selected Logic Papers, Random  
House, New York: 1966.

8

Peter Strawson (ed), Philosophical Logic, p 1, Oxford University  
Press, Oxford: 1968.

9

Encyclopedia of Philosophy, Paul Edwards (ed), MacMillan, New  
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10

These texts included the following:

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- William H. Halberstadt, An Introduction to Modern Logic, Harper and Brothers, New York: 1960.
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- C. I. Lewis and C. H. Langford, Symbolic Logic, The Century Co., New York: 1932.
- Ruby Lionel, Logic: An Introduction, 2nd ed., Lippincott, Phil.: 1960.

<sup>11</sup> op. cit., p 10.

<sup>12</sup> op. cit.

<sup>13</sup> op. cit., p 1.

<sup>14</sup> op. cit.

<sup>15</sup> op. cit.

<sup>16</sup> op. cit.

<sup>17</sup> op. cit.

<sup>18</sup> op. cit.

<sup>19</sup> op. cit.

<sup>20</sup> op. cit.

<sup>21</sup> Actually, the concept of reasoning goes beyond those cases in which one actually advances evidence to validate a claim. It encompasses for example the attempt to formulate and distinguish problems or questions or claims. However, what is important for our purposes is that whenever one does advance evidence for a claim, he can quite properly be said to be reasoning, and, furthermore, the evaluation of the reasoning does not generally occur until it reaches this stage.

<sup>22</sup> op. cit.

<sup>23</sup> In his Symbolic Logic, op. cit., p 4.

<sup>24</sup> op. cit., p 7.

<sup>25</sup> op. cit.

<sup>26</sup> op. cit., p 7.

<sup>27</sup> However, I will show how these distinctions can be reconstructed.

## Chapter Two

### THE LOGIC OF QUESTIONS AND ASSERTIONS AND A THEORY OF INFERENCE

#### Introduction

Before I take up the task of developing a detailed criticism of contemporary logical theory, it will be helpful to clarify what is encompassed in the claim that the concept of validation-conditions for assertions and settlement-conditions for questions provide the basis for a theory of inference and to clarify how this claim relates to the general notion of language "having a logic". I will begin with a general sketch of the total theory, with a view to suggesting how the various particular recommendations which will be defended in the material which follows fit together into a cohesive whole. Then I will provide a more detailed explanation of some of the particular elements of this general theory. It should be noted that no attempt will be made in the first general sketch to provide reasons why this theory is to be preferred over the presently accepted theory. The total body of this paper is concerned with this justification.

#### The theory in general

There are a multitude of inference-rules which arise from the "meanings" of the assertions and questions which can be formulated in natural and technical languages. These derive from the nature of the claim which is made (in the case of a sentence which succeeds in making an assertion) and from the nature of the request formulated (in the case of a sentence which succeeds in ask-

ing a question). Whenever one reasons in such a way as to claim that some evidence establishes the truth of some claim, one is in effect asserting that the evidence advanced fulfils which I shall call the "validation-conditions" for the claim at issue (the claim which the evidence is taken to justify).

Whenever one succeeds in using a sentence in such a way as to make an assertion (which is purportedly open to truth or falsity), then there must be some set of conditions in theory expressible or teachable which make intelligible what it would be to establish the truth of that assertion. To say concerning some purported assertion that it is not perfectly clear what would establish its truth is to say that it is not perfectly clear what precisely is being asserted.

In the same way, whenever one succeeds in using a sentence in such a way as to ask a question, then there must be some set of conditions in theory expressible or teachable which make intelligible what it would be to establish the truth of some proposed answer to that question. That this is so derives, on the one hand, from the very nature of what it is to make and validate a claim, and, on the other hand, from the very nature of what it is to ask and settle an intelligible question. If the validating-conditions for a given claim or assertion are formulated explicitly in words, then one will have a formulation of one or more inference-rules which justify the move from evidence advanced for that claim to the claim itself. And again, if the settlement-conditions for some

given question are formulated explicitly in words, then one will have a formulation of one or more inference-rules which justify the move from evidence advanced in support of an answer to that question to the claim that that proposed answer is correct.

In other words, one can define the validation-conditions for a claim as: that set of conditions which, if met, make the claim true. Precisely what these conditions are will vary according to what is being claimed or asserted.

Practically speaking the relevant validating-conditions for a claim are rarely formulated explicitly. The general practice is to formulate merely the conclusion and the evidence: "E, therefore, C" or "C because E". Evidence properly so called, separated from the formulation of the validating-conditions for a claim, will never "entail" that claim. On the other hand, whenever one has gathered all of the evidence appropriate to establishing the truth of a claim, it is possible to present the reasoning in the form of an entailment by explicitly formulating the validating-conditions for the claim at issue and putting them into the premises.

The question as to whether some evidence or other is conclusive has nothing to do with the question as to whether the evidence entails the conclusion. Evidence is conclusive only insofar as it fulfils the appropriate validating-conditions for the conclusion advanced. This is a perfectly general phenomenon applicable to every type of claim which can be formulated. It is always possible to distinguish between the evidence advanced in support of a claim and the validating-conditions appropriate to that claim.

The reason for utilizing the expression 'settlement-conditions' for questions in addition to the expression 'validation-conditions' for assertions is to draw attention to the fact that there is a one-to-one correlation between validating an assertion and settling a question, such that reasoning, in being an attempt to validate an assertion, is at the same time an attempt to settle a question (though, clearly, it may not be conceived as such).

Dewey said, and quite correctly, that all reasoning is problem solving. He also said that the job of the logician was to inquire into and explicate the manner in which assertions are validated. In making these remarks he was not contradicting himself, but rather expressing himself in alternative ways. Every problem is expressible in a question and every settled question constitutes the validation of an answer to that question. The validating-conditions for a claim at issue in reasoning is therefore equivalent to the settlement-conditions of the question to which that claim is an answer. To see this one must see that every assertion is an implicit answer to a question and that every question is properly answered in the form of an assertion.

This ties in with the 'the logic of x' locution and the general notion that languages have a logic which is open to analysis and explication. To say that some given language has a logic is, roughly, to say that there are conditions, criteria, rules, and so forth, in principle expressible or teachable which are implicit in language usage and which must be learned in order to use that

language intelligibly.<sup>1</sup> Quite obviously, however, language is often used for purposes other than that of making assertions and asking and answering questions. For this reason, not all of the conditions, criteria, and rules implicit in the usage of language are relevant to the attempt to establishing the truth of an assertion. If we focus our attention upon those conditions, criteria, and rules which are relevant to such validation then we are focusing attention upon that aspect of the logic language which has been called "the logic of questions and assertions". To say that some assertion has a logic is simply to say that there are conditions in principle formulatable or teachable under which that question is appropriately settled. To this point logicians have concerned themselves with only a limited segment of the set of validation-conditions for assertions, and so have concerned themselves with only a limited set of the inference-licenses relevant to the validation of claims. Because of this the materials which logicians have explicated to this point have only limited application to the general problem of analyzing and evaluating and reasoning.

So much for the general theory. Now let us get down to particulars. We will begin with an analysis of the claim that every assertion is an implicit answer to a question and that every question is properly answered in the form of an assertion.

#### Questions and Assertions

To claim that every assertion is an implicit answer to a question and that every question is properly answered in the form of

an assertion is to claim that whenever one formulates an assertion it is possible to reconstruct the question to which that assertion is an answer and that the conditions which have to be met to validate that assertion are precisely equivalent to the conditions which have to be met to settle the constructed question. And again, whenever one does correctly answer a question the answer which is obtained can be put into the form of an assertion whose validation-conditions will be exactly equivalent to the settlement-conditions of the question to which it is an answer.

This is not to say: a) that whenever one formulates an assertion it is only after someone has implicitly or explicitly asked a question (I can certainly make an assertion when no one has a matter of fact asked any question whatsoever) or b) that whenever someone formulates an interrogative sentence that the response to that sentence is always in the declarative mood (such a claim as this would be patently absurd).

The relationship which we are after between questions and assertions can be seen both from a grammatical and a semantic point of view. First of all, there is a grammatical relationship between the interrogative and the declarative mood such that any sentence in the declarative mood can be translated into a sentence in the interrogative mood. This grammatical relationship is such that if the sentence in the interrogative mood is asked, the sentence in the declarative mood (from which the interrogative sentence has been constructed) is recognizable as an explicit answer to it.



For example, an assertion of the form 'S is P' can be transformed into a question of the form 'Is S P?'. This is a purely grammatical relation. On the other hand, semantics enters the picture in that whatever is relevant to validating the assertion 'S is P' is relevant to settling the question 'Is S P?'.

The grammatical relation is so clear-cut that transformational grammarians have been able to formulate detailed rules for translating any declarative sentences in the English Language into an interrogative sentence.<sup>2</sup> Paul Roberts puts it in this way:

All questions in English are transforms. That is, they all derive from and are related to underlying structures. The transform 'Are you going home?' is related to the kernel sentence 'You are going home.' It is obviously simpler to describe 'Are you going home?' as a sentence related to 'You are going home' than it would be to describe the two structures separately, as if there were no connection between them. We have already described the structure of statements like 'You are going home'. Instead of doing this all over again for questions, we simply give the rules by which statements are transformed into questions." (106)

Furthermore, it is possible to show how it is that the semantic relationship to which I refer is tied to the grammatical relation.

One can see this by noticing that, grammatically speaking, every question can be divided into two types: a) those whose form is such that when transformed into the declarative mood are complete sentences, and b) those whose form is such that when transformed into the declarative mood are propositional functions.

The former group have been called, among other things, yes/no questions; the latter W-questions. The yes/no type of question

can be understood as a question which requests that the assertion from which it is constructible be validated (in which case it is clear that, in the light of this request, its settlement-conditions will be equivalent to the validation-conditions of the assertion from which it is constructible). The W-question type, on the other hand, can be understood as a question that requests that the propositional form or function from which it is constructible be completed in such a way as to issue in a true statement or assertion, and, once again, in the light of this request, its settlement-conditions will be equivalent to the validation-conditions of the assertion from which it is constructed (when that assertion form is made into a complete assertion). For example, to settle questions of the form 'Is S P?' we have to validate either an assertion of the form 'S is P' or an assertion of the form 'S is not P'. To settle a question of the form 'Where is S?' we have to validate an assertion of the form 'S is X', where the "X" is filled in by some identification of place. To settle a question of the form 'When did S occur?', we have to validate an assertion of the form 'S occurred at time t'. To settle a question of the form 'Why did S occur?', we have to validate an assertion of the form 'S occurred because of X'. A similar statement can be made for every question of the W-question type.

Some further qualification must be added here. When it is said that every question is answered in the form of an assertion, it is not being claimed that every question can be satisfactorily answered in just one assertion. It may be that many assertions are needed to answer a question fully. In this kind of case, the

process of correctly answering the question can be construed as the process of validating all of those assertions which are needed to answer the question. For example, if I ask the question 'What were the causes of the riots in Detroit last year?', it is clear no one assertion will satisfactorily answer this question. The question is properly answered in a series of assertions which identify the variety of factors which together brought on the riots. Of course, it might be noted that this question suffers to some extent from indeterminacy. It is not at all clear from the words of this question whether one is looking for the immediate causes or the long range, "root" causes. Furthermore, it is not clear how detailed an answer is desired. Nevertheless, the general principle which is being defended still holds; the question is not answered until an assertion of the form 'The causes of the riots in Detroit were a,b,c, ...z' is validated. The point simply is that such an assertion may involve the validation of many independent assertions which can be individually formulated.

Two final qualifications. First of all, in saying that every question is properly answered in the form of an assertion and that the definitive settling of a question involves the validation of one or more assertions, it is not being claimed that every interrogative sentence is used to ask a question. It is certainly possible to use interrogative sentences in a variety of ways, and some of them do not involve the asking of questions. But in this respect interrogative sentences are quite like declarative sentences:

just as not every declarative sentence is used to make an assertion, so not every interrogative sentence is used to ask a question. Secondly, at times it is perfectly possible to answer a question without formulating an assertion. I am not claiming that every one does in fact put their answers to questions into the form of an assertion; only that, whenever they do answer a question they could put it into the form of an assertion, and that if a question is definitively settled the assertion which represents the correct answer to that question has been validated. For example, consider the question 'Where is my hat?'. Such a question as this might very well be answered by making a gesture. However, this is not to say that some questions are not properly answered by assertions but by gestures, but only to say that sometimes a gesture can be used to accomplish the same purpose that an assertion can. By gesturing in response to the question 'Where is my hat?' I put the questioner in a position to gather for himself the information which his question has requested. There is no need in such a case for the assertion which answers the question to be explicitly formulated.<sup>3</sup>

A similar explanation can be given for practical or deliberative questions which, one might say, are answered in an act or action. Certainly if we are faced with a problem as to what to do, we haven't actually solved that problem until we have carried out the act or action which resolves it. But it is equally true that if we express that problem in a question, the question itself can be answered without acting upon that answer. A question of the

form 'Shall I do X, Y, or Z?' can be answered with an assertion of the form 'I shall do X' or 'I shall do Y', without actually going ahead and acting upon that answer.

Of course, someone might object that the proper answer to a deliberative or practical question is not an assertion at all but simply a declarative sentence which formulates a decision as to what to do, and decisions in themselves are neither true nor false. Here it is to be noted that a question of the form 'Shall I do X, Y, or Z?' can be interpreted in two different ways: a) as a question which is simply calling for a prediction as to what is going to be done (independent of the wisdom of that decision), 'Will I as a matter of fact end up doing X or Y or Z?' or b) as a question which is calling for some sort of an evaluation of the alternatives from some point of view, 'Which alternative ought I to choose, X, Y, or Z?'. In both of these cases the question can be correctly or incorrectly answered. In the former case I may not correctly predict what I do in fact come to decide, and in the latter case, I may not correctly evaluate the alternatives, given my interests and objectives.<sup>4</sup>

Validation-conditions for assertions; settlement-conditions for questions

The justification for talking about assertions as having validation-conditions and questions as having settlement-conditions is based upon the same considerations which make it intelligible and reasonable to talk about the logic of language or the logic of assertions and questions as part of the logic of language.

Ultimately this line of talk rests upon the assumption that it is not intelligible to assume that language could be used meaningfully in social discourse if there were no rules, criteria, or conditions formulatable or at least teachable for using terms within that language intelligibly. In other words, the possibility of having an intelligible language is equivalent to the possibility of conventions being established which make possible meaningful utterances.<sup>5</sup> And again, in order for the very process of "teaching" someone a language to be intelligible, there must be some rules, criteria, or conditions which can be learned, and which, when learned, provide the means for determining when intelligible statements within that language are being made and when they are. not.

For example, in order for a sound to become an intelligible word in a language it is necessary that there be a) some conditions under which it applies or can be correctly used and b) other conditions under which it does not apply and cannot be correctly used.<sup>7</sup> Furthermore, if there are conditions under which words apply and others under which they do not, then it should be possible to formulate in words what those conditions are or at least be able to explain how one would teach someone how to use a given word so that that person could come to recognize conditions when the word could intelligibly be used or applied. It would be nonsense to say, "I know very well what this word means but I have no idea as to when it can be correctly used and when it cannot".

Finally, if one takes as an example, the set of words which are predicates, one could put it this way: every predicate which has an intelligible usage has criteria of application implicit in that usage.<sup>8</sup>

The notion of assertions having validating-conditions is nothing more than the extension of this same principle to assertions. After all, whenever a particular predicate is applied, a claim is made, an assertion formulated. In this kind of case, the claim or assertion is true if and only if the predicate in question does in fact apply to the case or instance to which application is claimed, i.e., if and only if the proposed case meets the application-conditions of the predicate. Hence, if it were true that every assertion in a given language consisted simply in the claim that some particular predicate applied to some particular case, then it would be true in that language that the validation-conditions for any given assertion would be equivalent to the application-conditions (or criteria of application) of some one predicate. Of course, it is not true that in natural languages such as English every assertion consists simply in the claim that some particular predicate applies to some given case or instance, and, as a result, the problem of explicating validation-conditions for assertions cannot be reduced to the problem of explicating application-conditions for particular predicates.<sup>9</sup>

In any case, this general notion that if a sentence succeeds in making an assertion, there must be some conditions under which it

can in theory be validated, along with the related notion that a recognition of these conditions (implicit or explicit) is a necessary condition of understanding what the assertion "means", are well-established principles of analytic philosophy. Strawson, to take one example, puts it this way:

Language is used for a variety of purposes. The normal use of some sentences is to give orders; of others, to ask questions; of yet others, to take oaths, to convey greetings, to make apologies, to give thanks. When sentences are used in any of these ways it makes no sense to inquire whether what is said is true or false. But the normal use of an indefinitely large number of sentences is to say things to which this inquiry is appropriate. Such sentences as these I have called, by an easily understood brachylogy, 'statement-making sentences'. To know the meaning of a sentence of this kind is to know under what conditions someone who used it would be making a true statement; to explain the meaning is to say what these conditions are.<sup>10</sup>

Furthermore, it is also to some degree recognized that the application-conditions for predicates and the validation-conditions for assertions involve or can be used to generate inference-licenses or warrants which justify going from data, evidence, or facts of some kind to the claims to which the application-conditions and validation-conditions apply. For example, speaking of what is involved in explaining what an assertion means by explaining the conditions under which it would be true, Strawson says:

One way of giving a partial account of these conditions is to say what some of the entailments of the sentence are. For to say that one sentence entails another is to say that a statement made by the use of the first is true only if the corresponding statement made by the use of the second is true. (211)



Now it should be noted that when Strawson talks about one statement or assertion entailing another, he is not claiming that the one can be derived from the other simply by reference to the displacement of truth-functional constants and quantifiers in those statements. Statements of the form 'S is a solid and it has eight faces' entail (in Strawson's sense) statements of the form 'S is an octahedron', but statements of the latter type cannot be derived from statements of the former type simply in virtue of the "logical constants" within those statements. It would certainly not be true to say that statements of the form 'S is a P and a q' entail statements of the form 'S is an r'.

In short, the validating-conditions for some given claim C represent the conditions which must be met in order for C to be true. If verbally formulated (and it will not always be possible to verbally formulate them)<sup>11</sup> they express the evidence which has to be gathered in order for some given claim to be true. A statement of the validating-conditions for a claim, can, therefore, always be put into some variation of the form 'If conditions a, b, and c are met, then claim C is true'. Sometimes there will be more than one set of validating-conditions for an assertion. If the claim in question is one which involves nothing more than the application of one predicate to a case, then the validating-conditions will be expressible in the form "If conditions, a, b, and c are met, then predicate P applies. " In any case, for each and every set of validating-conditions one inference-license can be

formulated. For example, if there are two sets of conditions, r and s, which independently establish the truth of some claim C, then one can formulate two inference-licenses by means of them: 1) "If conditions r are met, then the truth of C has been established" and 2) "If conditions s are met, then the truth of C has been established". An inference-license, in other words, is simply a verbal transformation of some set of validating-conditions for some assertion or assertion-type. When some set of validating-conditions is expressed in one or more inference-licenses, there is no "remainder", as it were. This is not to say, however, that the total "meaning" of an assertion is necessarily expressed in a verbalization of its validating-conditions.

Furthermore, just as it is true that any set of validating-conditions for a claim can be formulated as an inference-rule of the form "If conditions c are met, then claim X is true", so any inference-rule or license can be formulated as a set of validation-conditions for some particular claim or kind of claim. This holds as much for "formal" inference-rules as for those which are not.

For example, suppose that one takes the inference-license, "hypothetical syllogism": " $P \vee Q, \text{not-}P, \text{therefore, } Q$ ". This inference-license provides a symbolic representation of one set of conditions under which a claim concerning truth-functional syntactic relationships between sentences is appropriately validated. It could be verbally formulated as follows: "If one knows: a) that at least one of two assertions, 'P' and 'Q' are true, and also b) that

one of them, say 'P' is false, then one can conclude that the other of them, 'Q' is true." Each and every formal inference-license can be similarly translated.

In short, however many distinctive sets of validating-conditions can be formulated, there are precisely just that many inference-licenses (each justifying a move from some kind of evidence to some kind of conclusion); and for each and every inference-license, one has an implicit formulation of one set of validation-conditions (either for some particular claim or for some particular class of claims).

The "meanings" of assertions and validation-conditions

To this point I have argued for an "intimate" relation between the meaning of assertions and the conditions under which their truth is established, though I have carefully refrained from claiming any sort of universal equivalence. The reasons for refraining from this kind of claim are multiple.

First of all, one should note that there are many assertions which can be validated in a variety of ways. Hence, for any such assertion no one of its sets of validating-conditions would be equivalent to its meaning. Furthermore, it is often true that there are many distinguishably different sets of evidence which fulfil the same general validating-conditions. For example, one might say that there are two general ways in which one can prove that some person X is a US citizen: 1) by adducing evidence which established

the fact that X was born in the US and has not renounced his citizenship since that time or 2) by adducing evidence which confirms that X was naturalized as a citizen and has not renounced this naturalization. Consequently, one might reason in this way 'X has a valid US passport. Therefore, X is a US citizen' or in this way 'X was born in Osh Kosh Wisconsin and has lived there all his life. Therefore, X is a US citizen.' Clearly, there is a variety of possible evidence which would fulfil the validating-conditions for the claim that X is a US citizen. Nevertheless, it would not be true because of this that when one said of someone that he was a US citizen that one was saying that he had a valid US passport nor that he was born in Osh Kosh Wisconsin and so forth. Hence, one must remember that no particular set of conditions which establishes the truth of a claim will necessarily express by that fact the full meaning of that claim or even fully articulate its general validating-conditions.

Furthermore, it is sometimes true that to understand the full meaning of a claim one must understand not only its appropriate validation-conditions but also the theoretical models or concepts into which that assertion is placed. For example, one might know how to establish the truth of the claim that Hydrochloric Acid reacts with Sodium Hydroxide to produce Sodium Chloride and Water and yet not know fully what the present-day theoretical conception of that reaction is.

How various are the phenomena which function as validating-conditions  
for assertions?

It should be clear that there are a wide variety of phenomena which function as validating-conditions for assertions as well as a wide variety of processes or procedures used in fulfilling those conditions. In one case, we validate a claim by manipulating symbols in a formal system (e.g., in establishing the truth of ' $A \equiv \{A \cdot (A \vee B)\}$ '). In another, we carry out our validation by performing physical operations on a physical object (e.g., in 'The measurements of this room are 20 ft by 20 ft'). In a third, the validation is achieved by examining historical documents and relics (e.g. in 'Dionysius, the tyrant of Syracuse who consolidated the cities of Magna Graecia and stopped the Carthaginian expansion in Sicily, ruled from 431 to 367 B.C.'). In a fourth, we have to perform a conceptual analysis by investigating and recording the manner in which words are used (e.g., in 'A whale is not a fish'). And so it goes, particular procedures and conditions of validation varying from assertion-type to assertion-type.

It is not reasonable or helpful, therefore, to look for one word to characterize what validating-conditions are. What validation-conditions share in common is simply the fact that when "met" or "fulfilled" they establish the truth of the assertion whose validating-conditions they represent or express.

The formulation and explication of validation-conditions

Now, because validating-conditions for a claim arise from the

"meaning" of the claim (i.e., arise as a result of the fact that some definite assertion is being made), an explication of those conditions should have the feature of "obviousness" to those who understand the claim . This of course does not mean that those who understand the claim could have themselves formulated those conditions without going through some form of analysis. Furthermore, it does not mean that the conditions which are formulated will always be highly determinate and specific.

For example, we all have had the experience of asking and answering "practical questions", questions as to what we or someone else ought to do in some given circumstance. However, very few of us have thought about the logic of practical questions and claims or have made any attempt to formulate explicitly and precisely what a practical question is and the conditions under which that sort of question is settled. We in a sense know what is involved in settling these kinds of questions in that we can recognize in many cases when these questions have been settled and when they have not. As always, however, one can draw a distinction between knowing how to do something and being able to explicitly characterize verbally what is involved in that act.

In other words, if we were asked what the general conditions are under which questions of the form 'What should I do in such-and-such circumstances?' are settled we would in all likelihood have no ready answer. However, if we thought about and attempted to explicate what precisely questions of this form are attempting to

determine, we would find that we could begin to formulate what the conditions of settlement for such questions are. We would note, for example, that the appropriate answer to a question as to what some particular person "ought" to do in some particular circumstance is affected by a) the point of view from which the "ought" is being taken, and b) the context in which that decision has to be made. We would note that the general logic of the question is one which calls for a) a determination of the alternatives which are available to us (as possible modes of action) and b) some sort of an evaluation of the alternatives from the point of view which is relevant or which we have selected. We would note, furthermore, that one of the problems which arise in settling questions of this sort is that the "context" which one has to take into account is very often a dynamic changing context. We would see that some of these questions are "prudential questions", practical questions in which the point of view from which the alternative modes of action are to be evaluated is restricted to the needs, interests, aims and desires of the actor.

To the extent that we followed out this analytic process, to that extent could we come to formulate explicitly what the settlement-conditions are for practical questions and so, at the same time, to formulate explicitly what the validation-conditions are for practical judgments or claims. The knowledge which we would be making explicit would be nothing more nor less than what is implicit

in our ability to use sentences to formulate various distinguishably different claims and questions. How does one "know" that a question of the form 'What ought I to do in circumstances Y?' cannot be settled until one recognizes what distinctive point of view one is to use in evaluating the alternatives? Precisely because one has learned to use the word 'ought' in contexts in which distinctly different criteria were relevant. One has used and has heard others formulate claims of the form 'You ought to do X' in some contexts in which what was claimed was 'You are morally obligated to do X', in others in which what was claimed was 'You are legally obligated to do X', in others in which what was claimed was 'You would derive the most pleasure in doing X', in others in which what was claimed was 'It is in your best (long range) interest to do X', and so forth.

Making claims, solving problems, and reasoning

We generally speak of someone as "reasoning" only when that person is engaged in the process of attempting to solve some problem. On the other hand, logic has never been concerned to provide tools to evaluate the mental process which individual reasoners have gone through in their attempts to solve problems. What logicians have concerned themselves with rather is the evaluation of the completed process, to the extent that the reasoner, once he has completed the process, can set out the solution which he has arrived at and the considerations which he takes to justify that conclusion. In other words, what the logician is concerned with is developing



tools for determining whether or not the evidence which one has for a claim establishes its truth.<sup>12</sup>

Given this, it should be noted that the process of evaluating "reasoning" can be carried out whenever a person makes a claim and can back up that claim with evidence which he takes to establish its truth, independent of whether or not he "reasoned" his way to that claim, in the sense of having come to that claim as a solution to some problem which he had to solve. In point of fact, then, the logician is concerned to provide tools for determining the conditions under which evidence which can be formulated justifies some claim which can be formulated, independent of whether that claim represents a solution to some problem.

Very often, for example, one formulates the evidence for a claim only after that claim is challenged, and very often the claim which is challenged or questioned is not one which we originally approached as a problem. None of the instances below would ordinarily be taken to represent claims which were approached as problems:

A: "That chair isn't safe, don't sit there."

B: "Why?"

A: "It's got a broken leg."

A: "Arthur Ashe will not be able to play in Wimbledon tomorrow."

B: "How so?"

A: "He broke his leg in practice today."

A: "This figure isn't an octahedron."

B: "How do you know?"

A: "It only has seven sides."

In short, though we would ordinarily be interested in evaluating claims to the solution of problems, and not in evaluating the

evidence which one might have for claims which are unrelated to problems with which we are concerned, nevertheless, if we can evaluate evidence for a claim which represents a proposed solution to a problem, we have at the same time the means of evaluating evidence which does not represent a proposed solution to a problem but rather the justification of a non-problematic claim.<sup>13</sup> To put this another way, the logician is concerned with developing tools for determining the conditions under which any evidence justifies any claim, independent of whether or not the claim represents a solution to a problem. In this sense, he is concerned with the logic of assertions and questions generally, and not simply those questions which express problems or those assertions which represent proposed solutions.

#### The concept of making an inference

To provide a theory of inference, as I have already suggested, is not to provide an explanation of the conditions under which individuals mentally come to the conclusions to which they are committed; it is rather to provide an explanation of what justifies their going from some given set of data, information, or reasons to some given claim. I am suggesting that any justifiable move which can be made from any given evidence to any given conclusion is a function of that which gives "content" to the claim or conclusion, namely, the language-users understanding of the conditions under which that claim would (in principle) be true.

If this theory is correct, then whenever we know with determinacy and definiteness what we are claiming when we advance a conclusion,

we have, implicit in that knowledge, the inference-license or licenses which justify going from some given evidence to that conclusion. It is our implicit knowledge of what we are claiming or asserting and so of the conditions under which our claim would be true which guides us in seeking out certain data or information and not others in justifying our conclusion. We know, for example, with all the determinacy which we need for practical purposes what would have to be true of an object for it to be properly called a "clock" or a "typewriter" or a "school" or a "restaurant" or a "street" and so forth, and so we know when we can make the inference from certain features of an object to the claim that that object is a clock or a typewriter or a school or a restaurant or a street.

This theory, of course, does not imply that we always formulate definite and determinate claims, nor that we always recognize when our claims or conclusions are insufficiently supported by evidence. Furthermore, it does not imply that the validating-conditions for claims which are implicit in our usage of language are all highly definite and determinate. In many cases words are used in such a way that the validating-conditions for some supposed claim are only partially or only generally defined by that usage. Whether or not some given claim and hence the validating-conditions for that claim are sufficiently determinate to evaluate the reasoning is a matter to be decided only by the examination of particular cases.

Evidence (in the ordinary sense) is always properly distinguished from the inference-licenses which can be formulated through an analysis of the claim asserted.

For any claim or given class or claims it is always possible to distinguish between those "facts", "data" or "reasons" which do in fact justify, warrant, or establish that claim (or claims of that type) and a verbal formulation of the criteria or conditions which must be met in such a validation. This is so of every claim and every kind of claim. It holds, quite significantly, as much in the area of a claim to sentential derivation as in any other area.

One can distinguish, for example, between some given sentence or sentence set which might be used as a basis for deriving some further sentence or sentence set and the various inference-licenses (like modus ponens, modus tollens, destructive dilemma, universal instantiation, and so forth) which can be formulated after an analysis of the usage of words such as 'and', 'or', 'not', 'all' and so forth in the formulation of such claims.

Or again, if someone was attempting to prove that some democracies are not stable, one could distinguish between the evidence which that person might gather relevant to the establishment of that claim and the inference-licenses which would emerge from an analysis of the criteria of application of the predicates 'is a democratic state' and 'has an unstable government' as used in this particular context. It is true that if the reasoner was using the predicates 'is a democratic state' or 'has an unstable government' in an unusual manner, the inference-licenses which were formulated

as a result of an analysis of how he was using those terms might prove to be of limited usefulness in evaluating any future case of reasoning, but this is another matter. Ordinarily, of course, extraordinary uses of words would not be relevant. (The general problem as to how many inference-licenses the logician should attempt to explicate and how his task relates to one who is directly involved in solving the problems to which the inference-licenses are relevant will be taken up later).

In many cases the conditions under which particular claims are properly validated are well-known by users of a language and no attempt is made (nor is necessary) to formulate those conditions in words. Furthermore, if one does formulate those conditions in words and express them along with the "evidence", the reasoning which results may have a ring of triviality. Compare the following:

- A: "Anne has red hair"
- B: "How do you know?"
- C: "I've known her since she was two years old."
  
- A: "Anne has red hair"
- B: "How do you know?"
- C: "The appropriate way to validate a claim as to the hair color of a person is to observe the hair color of that person. I have observed the hair color of Anne since she was two years old. Therefore, I am justified in claiming that Anne has red hair."

The inference-licenses which are relevant may be very particular and of limited scope (e.g., that which emerges from making explicit the criteria of application of a predicate being used in a particular context in a very unorthodox manner) or they may be very general and of wide scope (e.g., those which emerge from an analysis

of the manner in which words like 'and', 'or', 'not', ... function). However, it does not matter whether or not the inference-licenses, when they are relevant to the validation of a particular claim, are of limited scope or of wide scope, nor whether they have a ring of triviality or not. What is important is that they be explicated when their functioning in a line of reasoning is important and that, as a general phenomenon, they be distinguished from the evidence which some particular reasoner may gather for some given claim. Stephen Toulmin characterizes the distinction in the following way:

Let it be supposed that we make an assertion, and commit ourselves thereby to the claim which any assertion necessarily involves. If this claim is challenged, we must be able to establish it--that is, make it good, and show that it was justifiable. How is this to be done? Unless the assertion was made quite wildly and irresponsibly, we shall normally have some facts to which we can point in its support: if the claim is challenged, it is up to us to appeal to these facts, and present them as the foundation upon which our claim is based. Of course, we may not get the challenger even to agree about the correctness of these facts, and in that case we have to clear his objection out of the way by a preliminary argument..but this complication we need only mention: supposing the lemma to have been disposed of, our question is how to set the original argument out most fully and explicitly. 'Harry's hair is not black', we assert. What have we got to go on? we are asked. Our personal knowledge that it is in fact red: that is our datum, the ground which we produce as support for the original assertion. Petersen, we may say, will not be a Roman Catholic: why?: we base our claim on the knowledge that he is a Swede, which makes it very unlikely that he will be a Roman Catholic. Wilkinson, asserts the prosecutor in Court, has committed an offense against the Road Traffic Act: in support of this claim, two policemen are prepared to testify that they timed him driving at 45

m.p.h. in a built-up area. In each case, an original assertion is supported by producing other facts bearing on it.

We already have, therefore, one distinction to start with: between the claim or conclusion whose merits we are seeking to establish (C) and the facts we appeal to as a foundation for the claim--what I shall refer to as our data (D). If our challenger's question is, 'What have you got to go on?', producing the data or information on which the claim is based may serve to answer him; but this is only one of the ways in which our conclusion may be challenged. Even after we have produced our data, we may find ourselves being asked further questions of another kind. We may now be required not to add more factual information as that which we have already provided, but rather to indicate the bearing on our conclusion of the data already produced. Colloquially, the question may now be not 'What have you got to go on?', but 'How do you get there?'. To present a particular set of data as the basis for some specified conclusion commits us to a certain step; and the question is now one about the nature and justification of this step.

Supposing we encounter this fresh challenge, we must bring forward not further data, for about these the same query may immediately be raised again, but prepositions of a rather different kind: rules, principles, inference-licenses or what you will, instead of additional items of information. Our task is no longer to strengthen the ground on which our argument is constructed, but is rather to show that, taking these data as a starting point, the step to the original claim or conclusion is an appropriate and legitimate one. At this point, therefore, what are needed are general, hypothetical statements, which can act as bridges, and authorise the sort of step to which our particular argument commits us.<sup>14</sup>

At this point, it should be clear as to how a general theory of inference emerges from a recognition of the fact that for every intelligible assertion and question that can be formulated, there are validating-conditions in principle formulatable or explainable for that assertion or question. Whenever one is reasoning one is attempting to validate a claim or assertion by advancing evidence for that claim.<sup>15</sup> The evidence is conclusive when it fulfils the validation-conditions for that claim. If someone makes a claim

and then backs it up by referring to some evidence or data, there is only one way to determine whether or not that evidence is relevant and conclusive and that is by making clear what the validation-conditions are for the claim at issue, and so by making clear what particular inference-licenses or warrants are relevant for going from some proposed evidence to this particular claim.



Notes

1

Of course, it would be absurd to suggest that anyone learns their first language by being given a set of rules for its usage. One learns the "rules" which underlie the established uses of language by exposure to their application to cases, not by exposure to their verbal formulation as rules. Furthermore, I am not suggesting that somehow we have a set of rules formulated somewhere in our minds by means of which we operate as language-using animals.

2

See Paul Roberts, English Syntax: a programmed introduction to transformational grammar, Harcourt, Brace, and World, New York: 1964, pp 97-142.

3

Of course, a response to a question might have some function besides that of "answering" a question which would not be served by a verbal formulation of an answer.

4

In some cases, of course, this would reduce down to the question "Which alternative would I most enjoy doing, X, Y, or Z?". This, however, is still a question that can be correctly or incorrectly answered.

5

This does not mean of course that someone must consciously lay down conventions or explicitly formulate them.

6

Of course, one must distinguish between utterances which are grammatically well-formed within a given language and utterances which succeed in serving the function for which they are formulated in some particular context. Furthermore, it should be noted that I am not suggesting that it is possible to formulate some mechanical test for determining when an utterance is "meaningful" (independent of its function). In this dissertation, I am interested solely in those occasions in which language can be used to formulate a claim or assertion.

7

It should be remembered that not every word is a predicate. Hence it can be misleading to speak of every word having "application-

conditions". I have no objection to using a more neutral term here such as "usage-conditions", though this term is somewhat awkward.

8

I am not saying that for every predicate it is possible to verbally formulate (in a satisfactory way) its application-conditions.

9

It is in part for this reason that it is not true that validation-conditions can be generally conceived as being formulations of "definitions".

10

Logical Theory, op. cit., p. 211.

11

In some cases, though it is possible to teach or train a language-user to recognize the conditions under which a given assertion is true, it is not possible to satisfactorily express in words what those validating-conditions are. For example, in the case of the assertion 'This is red'.

12

It might be thought that this makes no allowance for "inductive logic". I will argue that what have traditionally been called "inductive" arguments are just as much concerned with establishing the truth of a claim as any other. Different types of reasoning result not from the fact that in one case the reason in attempting to establish the truth of a claim while in others he is not, but rather from the fact that different kinds of claims are at issue. For example, the evidence which one has to gather to establish the truth of an assertion 'p' will differ from that which is relevant to establishing the truth of the assertion 'It is probable that p'.

13

By a "non-problematic claim" I mean simply a claim which has not been advanced as a proposed solution to some problem.

14

Stephen Toulmin, The Uses of Argument, Cambridge University Press, Cambridge: 1964, pp. 97 and 98.

15

It is of course appropriate to say of someone that he is reasoning whenever he is engaged in any stage of problem-solving.

However, the principal concern of logic has been in evaluating the culmination of that process, at the point where one is prepared to assert that some given evidence justifies some given claim or conclusion.

### Chapter Three

#### FORM AND MATTER; DEDUCTION AND INDUCTION:

#### TWO INADEQUATE DISTINCTIONS

##### Introduction

The form/matter and deductive reasoning/inductive reasoning distinctions are very closely related, though it is indeed important to distinguish the uses to which they are put. The two principal functions of the form/matter distinction are: 1) to provide some sort of theoretical explanation of how it is that the subject matter of logic is to be distinguished from the subject matter of other disciplines and 2) to indicate what the logician must consider in analyzing and evaluating reasoning and what he can ignore.

Given the form/matter distinction, it is assumed that one can readily account for the way in which the subject matter of the logician differs from that of those involved in other disciplines. The general line of thought runs as follows: for every instance of reasoning one can distinguish between its "form" and its "matter" or "content". The logician concerns himself only with "form". "Matter" or "content" is the sole responsibility of the various individual disciplines excluding logic.

The principal function of the deductive/inductive distinction, on the other hand, is to provide a means of classifying instances of reasoning into types. Given this distinction, it is assumed

that the logician can divide up all instances of reasoning into two types, each, presumably, with differing criteria of evaluation. Here is the general line of thought which is used to justify this position.

All reasoning can be divided into two types according to whether or not the reasoner is claiming that the evidence which he is advancing for a given conclusion is conclusive or whether it only consists in partial support for it. If the evidence is taken to be conclusive, then the evidence will entail the claim in the sense that the claim expressed as a sentence will be derivable from the evidence expressed in sentences simply in virtue of the manner in which certain truth-functional constants and quantifiers are distributed in those sentences. This is so because whenever there is such a relationship between sentences, the sentences are truth-functionally related (if the premises are true, then the conclusion will be true). By the same token, it is assumed that if evidence and conclusion are not so related in such a syntactic manner (when expressed in sentences), then one cannot depend upon the fact that the conclusion will be true, if and when sentences which express the evidence are true. If therefore, one limits consideration to those instances which claim conclusiveness, the standards are equivalent to the inference-licenses implicit in the usage of such words as 'and', 'or', 'not', . . . whose application-conditions express the truth-functional commitments between

sentences formulated by means of them.

If this is true, so the theory runs, then the only instances of reasoning for which standards of evaluation need to be developed are those in which the reasoner is not claiming that some given evidence is conclusive for some given claim but only that it provides some kind of partial support for it. Quite significantly, this latter "type" of reasoning is characterized in more than one way: sometimes as consisting in advancing evidence for a generalization; sometimes as consisting in advancing evidence for a probability-claim; and sometimes as consisting in advancing evidence for some individual "premise" rather than involving a claim concerning the relation of premises to conclusion.<sup>1</sup>

The fundamental theoretical weakness which underlies both of these traditional distinctions is the assimilation (or near-assimilation) of the problem of evaluating evidence to the problem of examining syntax. To talk about the "form" of an instance of reasoning (as that distinction is drawn in contemporary theory) is in fact to talk about the syntax of the sentences in which that reasoning is expressed. It is unjustifiably assumed, and this is what is crucial, that knowing the syntax of the sentences in which evidence for a conclusion is expressed provides the essential information which one needs in examining the soundness of reasoning.

To come at this in specific terms, I am claiming that the traditional logical theory which is implicit in the uses to which

the form/matter and deductive/inductive distinctions are put is defective in a number of ways: 1) it is assumed that the notion of providing evidence for a claim can be assimilated to the notion of "premises"<sup>2</sup>, 2) it is assumed that in some cases the evidence for a claim entails that claim in the sense that the claim expressed in a sentence can be derived by syntactic transformation from the evidence expressed in sentences, 3) it is assumed that the fact that some sentences are syntactically related in a truth-functional manner provides by that very fact information as to the evidence which justifies the claim expressed in the sentence which can be so derived from the others, 4) it assumes that there are some instances of sound reasoning which can be laid out in deductively valid form and others which cannot, and 5) it assumes that when a reasoner is claiming to have evidence for a partially supported conclusion, then his reasoning cannot in principle be laid out in deductively valid form.

I shall argue that each of these assumptions is, at best, misleading: 1) what is ordinarily meant by the term 'evidence' is not properly assimilated with the notion of premises in an argument laid out in deductive form (inference-licenses, for example, though they belong in among the premises in an argument laid out in deductive form are not properly called part of the "evidence" for a claim); 2) the fact that some sentence is so syntactically related to another sentence or sentences that it can be derived from them does not necessarily provide any information as to what evidence

conclusively validates the claim that the first sentence is being used to make; 3) every instance of reasoning in which the evidence claims no more than is justifiable can be put into deductively valid form (though it is not this form, nor the possibility of its being put into this form, which justifies the claim being made); and 4) if a given assertion is only partially supported by some set of evidence and the reasoner only claims partial support there is no reason in principle why the reasoning cannot be laid out in deductively valid form (though, again, it is not this form which establishes that fact that the reasoner has substantiated his conclusion).

What is it for an instance of reasoning to have a "form"?

Before we go further it is important that we make clear that when logicians talk about the "form" of an instance of reasoning, they are talking about the distribution of truth-functional constants and quantifiers in the sentences which express the reasoning. This becomes clear by the manner in which the notions of "form" and "formal validity" are explained.

These concepts are usually explained by means of examples.

After presenting cases such as

No capitalist societies are stable.  
Some capitalist societies are democracies  
Therefore, some democracies are not stable.

and

No negroes are popes.  
Some negroes are Mohammedans.  
Therefore, some Mohammedans are not popes.



as examples of "conclusive" reasoning, it is pointed out that the similarity between these arguments and the source of their "validity" is revealed by replacing the expressions 'popes', 'negroes', and 'Mohammedans' in the latter case and 'capitalist societies', 'stable', and 'democracies' in the former case with letters. The form of the reasoning is thus said to be revealed in the following sentence frames:

No A's are B's.  
Some A's are C's  

---

Therefore, some C's are not B's.

This is the "form", we are told, which the deductive logician examines and evaluates. But of course this is simply to say that when the deductive logician is talking about the form of a sentence he is talking about the displacement of truth-functional constants and quantifiers in that sentence with respect to predicates and terms, and that when he is talking about evaluating the "validity" of some instance of reasoning, he is talking about determining whether or not some given sentence can be obtained from some other sentence or sentences simply in virtue of the manner in which those constants and quantifiers are distributed syntactically. The presupposition is that there are rules of usage implicit in the manner in which words like 'all', 'some', 'not', 'and', 'or', 'if-then', and so forth are used and that by making these rules explicit one can determine whether or not one sentence can be derived from others on

the basis of the manner in which these words are distributed.

Suppes, for example, puts it in this way:<sup>3</sup>

1)" . . . our first step will be rather similar to drawing up the rules of a game. We want to lay down careful rules of usage for certain key words: 'not', 'or', 'if... then...', 'if and only if', which are called sentential connectives. The rules of usage will not, however, represent the rules of an arbitrary game. They are designed to make explicit the predominant systematic usage of these words; this systematic usage has itself arisen from reflection on the ways in which these words are used in ordinary, everyday contexts."

2)"In this chapter we turn to the theory of logical inference. The rules of inference governing sentential connectives turn out to be quite simple. You may find it helpful to think of the rules introduced in this chapter and Chapter 4 as the elaborate statement of how to play a not-too-complicated game. The game shapes up as follows: we begin with a set of formulas which we call premises. The object of the game is to apply the rules so as to obtain some other given formula (the desired conclusion). The set of premises corresponds to the initial position of a player in a game. By a succession of moves, each move being sanctioned by a rule, we reach a winning position: the sought for conclusion.

A crucial question for us, in the light of the above, is this: Under what conditions is a determination of whether or not some sentence can be derived from others in virtue of their syntax equivalent to a determination of whether or not some evidence advanced for a claim is complete justification for that claim? And the answer to this question which we shall argue for is this: in just

those circumstances in which a reasoner is claiming that some given sentence is a derivation from or transformation of some other sentence or sentences. We shall argue that the class of claims to sentential derivation or transformation is just one of many kinds of claims for which conclusive evidence can be advanced. We shall argue that what is relevant as evidence turns in all cases upon the precise meaning and therefore upon the validating-conditions for the principal claim advanced. If the principal claim is a claim to sentential derivation, then and only then, are the inference-rules reducible to the rules for the manipulation of truth-functional constants and quantifiers.

#### Evidence and Syntax

It has already been pointed out that evidence for a claim or conclusion can always be properly distinguished from the inference-licenses which justify going from that claim to that conclusion.<sup>4</sup> Now, I shall go further and claim that the evidence for an assertion or a conclusion never justifies that conclusion simply in virtue of the syntax of the sentences which express the evidence, but always in virtue of the validating-conditions of the conclusion.

To see that this is so we must first see that the kinds of cases which are usually given as examples of "conclusive reasoning" in logic texts turn out to be cases which, as they stand, beg the question at issue rather than cases which illustrate the practice

of advancing conclusive evidence for some given claim or conclusion.

Consider the following case:

- 1) Anne is Jack's sister.
- 2) All of Jack's sisters have red hair.
- 3) Therefore, Anne has red hair.

This case is typical of the kinds of cases which I have in mind here.

There is indeed a syntactic relationship between the sentences 'Anne is Jack's sister', 'All Jack's sisters have red hair', and the sentence 'Anne has red hair', and the relationship is such that it is perfectly proper to say that if the first two sentences are true then the third sentence will be true. However, this does not mean that it is proper to say that the first two sentences can properly be called "evidence" for the third. To see why this would be misleading one must remember that reasoning arises 1) in some context in which there is a claim or question at issue (i.e., in some context in which there is some need to advance evidence to establish the truth of some claim or answer some question), and therefore, 2) the problems with which the reasoner is concerned are those problems which stand in the way of the validation of the claim or conclusion which is the raison d'etre of his reasoning. Because of this the reasoner would not attempt to use as evidence for his conclusion, claims which are themselves more difficult to establish than the direct validation of his conclusion. And in particular, it is inappropriate to label as "evidence" for a claim sentences

which simply presuppose the truth of the claim at issue or include that claim as part of the "evidence". Notice the absurdity of the following:

A: Richard Nixon does not have a chance to be elected President in the coming election.

B: What's your evidence for that?

A: It's two-fold. Number one, Washington was the first president of the United States and secondly Richard Nixon does not have a chance to be elected President in the coming election.

B: But you haven't provided any evidence for your claim you have merely restated your claim along with another unrelated to the first.

A: Nevertheless, isn't it true that if the sentences 'Washington was the first President of the United States, and Richard Nixon does not have a chance to be elected President in the coming election' are true, then the sentence 'Richard Nixon does not have a chance to be elected President in the coming election' must be true?

The difference between this absurd case and the case we are considering is simply that in the latter case the conclusion is obviously presupposed in the "premises" while in other case the presupposition is less overt. The premises 'Anne is Jack's sister' and 'All Jack's sisters have red hair' could be used as evidence only insofar as their truth had been established, but, in order to validate the claim 'All Jack's sisters have red hair', one would have had to have validated (in the process) the claim 'Anne has red hair'. Furthermore, if the reasoner had established the truth of the claim 'All Jack's sisters have red hair' and so had already validated the claim that 'Anne has red hair', he would simply say

'I know that Anne has red hair because I have seen her'. There would be no reason whatsoever to make any statement about all of Jack's sisters.

I am claiming, in short, that there is no necessary connection between sentences which are truth-functionally related (due to the displacement of syntactic constants within them) and sentences which express evidence for a claim which is sufficient to demonstrate its truth. More precisely, the fact that some sentence is syntactically related to other sentences does not ordinarily provide any information as to what evidence is relevant to the substantiation of the claim which those sentences are being used to make. One reason for this is that it is perfectly possible to formulate sentences which entail another (in this syntactic way) without analyzing the nature of the claim which the latter sentence is being used to make (either characteristically or in some particular context). If one is concerned to support a claim of the form 'X is P', one can with little thought formulate two sentence forms which syntactically entail it: 'All S is P' and 'X is an S'. This in itself is not to provide information about the evidence which is relevant to the validation of some particular instance of the form 'X is P'. Precisely what some instance of the form 'X is P' is asserting depends entirely upon what is put in the place of 'X' and 'P' and upon the context in which the assertion is uttered.

For example, if the claim 'Justice Hugo Black is Senile' is at

issue in some context, I have not provided any information as to what evidence is relevant to establishing its truth by pointing up that the sentences 'All the justices on the Supreme Court are senile' and 'Hugo Black is a justice on the Supreme Court' syntactically entail that claim. Furthermore, it would be grossly misleading to characterize this syntactic relationship (if it were being used as a justification for the claim) by saying, "The argument which you present is perfectly conclusive. All we need now worry about is whether or not your premises are true." It would be much more accurate to characterize it in this way: "We began with the problem of determining what evidence would conclusively validate the claim that Hugo Black is senile. What you have done is to multiply our problems by extending them to cover not only the claim with which we have started but a set of further claims equally difficult to validate."

This case reflects a perfectly general set of phenomena: 1) it is always possible and quite easy to formulate one or more sentences or sentence forms which will syntactically entail any given sentence form which one might choose to formulate, without entering into the problems involved in analyzing the precise meaning of some instance of that sentence form, 2) to determine, on the other hand, what evidence would validate a claim made by that sentence, it would be necessary to determine precisely what that sentence "means" (what precisely it is asserting)<sup>5</sup>, and 3) the particular sentences

which might be formulated in such a way as to syntactically entail the claim would be of use to the evaluation of reasoning directed toward substantiating that claim only insofar as they succeeded in formulating in words a) the validating-conditions for the claim at issue and b) evidence which fulfils those conditions. It is not the syntactic relationship per se which is of importance, but rather the nature of what is being asserted by the sentences in that syntactic relationship.

Every instance of reasoning in which the evidence advanced is being used to claim no more than is justifiable can be reconstructed in principle in deductively valid form.

Another assumption which the distinction between deductive and inductive reasoning is based upon is the premise that there are some instances of reasoning which can be laid out in deductively valid form and other instances which (though they represent sound reasoning) cannot be so laid out. The theory is that if we have complete evidence for a conclusion then the evidence will entail it and so can be set out in deductively valid form. If, on the other hand, we have only partial or incomplete evidence for our conclusion, then (we are told) it will not be possible to lay out the reasoning in deductively valid form because our evidence in this case will not entail our conclusion. Whenever we make a probability claim or advance evidence for a generalization (excluding those generalizations based upon complete enumeration of instances)



that evidence will be incomplete and, therefore, the reasoning will not be open to representation in deductively valid form. Consequently, the theory runs, there must be some other standards available for the evaluation of these latter types of argument which are based upon incomplete evidence and so cannot be evaluated by whether or not they are deductively valid.

I claim, in opposition to this theory, that it is always in principle possible to lay out a sound line of reasoning in deductively valid form, though, as I have already suggested, it is not this form which makes the reasoning sound.

To show that this is so I shall: 1) develop a general argument in support of this position and 2) demonstrate in a couple of particular cases how this argument applies.

The fundamental point emerges from an explicit recognition of the common objective which all reasoners share (talking now about those who have reached the point at which they are ready to conclude that they have solved the problem at issue in their reasoning). In each and every case, there is an attempt being made to establish the truth of a claim by means of evidence. The claim at issue may be a very qualified one, a very general one, very broad or very narrow; it may be an ethical claim, a legal claim, a mathematical claim, a philosophical claim, a scientific claim, or what have you. Nevertheless, the reasoner is successful precisely insofar as the evidence which he has gathered fulfils the validating-conditions for his particular claim, whatever that claim happens

to be. This, of course, is simply to say that one is justified in claiming that some conclusion is true only if the evidence which he has advanced for that conclusion fulfils or meets those conditions which establish its truth. If claim alpha is true only under conditions beta, then a reasoner is justified in claiming alpha only when he has met beta.

Now, no one has, to my knowledge, denied that this is so, but certain elements of traditional logical theory seem at times to suggest that it is not so. For example, don't inductive arguments, one might ask, make a more limited claim? Don't they merely claim to have part of the evidence which is needed to establish the truth of an assertion or conclusion? Don't they merely claim that some evidence renders a given conclusion probable?

The resolution of this paradox is quite simple. Yes, it is possible to claim that some evidence merely renders the truth of some conclusion probable and does not establish it unequivocally, but the important thing to realize is that in these cases there is still an assertion whose truth the reasoner is claiming to have established, namely, an assertion of the form 'It is probable that...'. As in the evaluation of any kind of reasoning, we must first make explicit that it is this precise claim which the evidence is taken to establish, and then we must evaluate the evidence advanced by determining whether or not it fulfils the validating-conditions for this claim.

To put this on a more abstract level, whenever reasoning is successful or sound, it can be presented in the following form:<sup>4</sup>

- a) The conditions which must be met in validating claim C are a, b, c, . . . .
- b) Evidence E (which has been gathered meets conditions a, b, c, . . . .)
- c) Therefore, claim C is validated (its truth is established)

No reasoner is ever justified in claiming that he has validated (established the truth) of a conclusion when he has not. If a reasoner has only partially validated some given assertion, then all he is entitled to claim is partial validation. When this claim to partial validation is expressed in the form of an assertion, then and only then has one identified the reasoner's "conclusion".

A claim to partial validation can be reconstructed in either one of two ways (both deductively valid): one in which it is made explicit that the claim is one of partial validation and another in which this is not made explicit. For example, one might lay out any claim to partial validation in the following form or some modification of it:

- a) The conditions which must be met in validating claim C are a, b, c, . . . .
- b) To fulfil either "a" alone or "b" alone or "c" alone, or some combination other than the totality of a, b, and c is only to partially validate C.
- c) Evidence E meets conditions a, and b, but not c.
- d) Therefore, claim C is partially validated (i.e., part but not all of the evidence which is necessary to establish its truth has been gathered)

Or again, one might lay it out in the following form (which obscures the fact that the claim being established constitutes a partial

- a) The conditions which must be met in validating claim C' are a or b or c (excluding the combination a, b, and c).
- b) Evidence E meets conditions a and b.
- c) Therefore, claim C' is validated (Claim C' is, of course, equivalent to a claim to partial validation of claim C.)

Certainly, there would be no sense in reasoning in this way:

- a) The conditions which must be met in validating claim C are a, b, c, . . .
- b) Evidence E meets a and b but not c.
- c) Therefore, evidence E is sufficient justification for claiming C.

To put this in a somewhat different way, it makes no sense to say: I am advancing the following, E, as evidence, but I am not claiming that the truth of any claim is established by it. One cannot begin to evaluate evidence until one knows what one is claiming to justify by means of it, what i.e., one is claiming to be true in the light of it.<sup>5</sup>

In saying this I am not claiming that a reasoner as a matter of fact always has determinate knowledge (either implicit or explicit) of the validating-conditions for some claim whose truth he is attempting to justify. Furthermore, I am not claiming that the task of explicating validation-conditions for any given claim or class of claims is easily carried out. Certainly, it happens time and again that assertions are formulated in which it is exceedingly difficult to clarify the conditions under which they would properly be established as true, and it is also doubtless true that there are classes of claims whose validating-conditions are subject to dispute (e.g. ethical claims).<sup>6</sup> Nevertheless, these qualifications,

important though they may be in themselves, do not in any way impugn the theoretical possibility of laying out reasoning for any given kind of claim in deductively valid form.

So much for the abstract and theoretical considerations. Let us now show how these considerations are borne out in the cases.

First of all, let us consider an example which would ordinarily be taken to be a paradigm of reasoning which could not justifiably be put into deductively valid form: "Skyraider has beaten Native Dancer five consecutive times without a defeat, so it is highly probable that she will beat her again Saturday in the Preakness." If one commented on this case in the spirit of traditional logical theory one would say something like: The fact that Native Dancer has been beaten by Skyraider five consecutive times does not entail the conclusion that she will be beaten once again on Saturday. Hence, it would be unreasonable to attempt to lay out the reasoning in deductively valid form.

The problem with this commentary is simply that it does not at all follow that because there is no relation of syntactic entailment between 'Skyraider has beaten Native Dancer five consecutive times' and 'She will beat her in the Preakness of Saturday' that the reasoning cannot properly be laid out in deductively valid form.

As always, before we can begin to evaluate any instance of reasoning we must know a) precisely what the claim at issue is and b) precisely what the evidence is which is taken to justify the

truth of that claim. Furthermore, we can carry through our evaluation only insofar as we can make clear what the validating-conditions are for the claim at issue. Until these conditions are explicated, we are in no position to explicitly determine whether or not the evidence advanced fulfils them.

Now, presumably in this case the claim at issue is not 'Skyraider will beat Native Dancer in the Preakness on Saturday' but rather a claim something of the form 'It is probable that Skyraider will beat Native Dancer in the Preakness on Saturday'. The crucial question to answer in evaluating any evidence advanced with a view to establishing the truth of this particular probability-claim is this: What are the validating-conditions for this claim? If we can agree on a set of validating-conditions, then we can evaluate the evidence advanced to see if they meet these conditions. If we cannot agree on a set of validating-conditions, then we simply cannot evaluate it at all.

Furthermore, once we do establish some set of validating-conditions, then, if the evidence advanced fulfils them, we can lay out the reasoning in deductively valid form. Here is an example of how the reasoning might be laid out:

- 1) If a horse, X, beats another horse, Y, five or more consecutive times without a defeat, then if there has been no change in the physical condition of the respective horses, it is probable that X will beat Y the next time that they meet.
- 2) Skyraider has beaten Native Dancer five consecutive times without a defeat.
- 3) There has been no change in the physical condition of the respective horses (Skyraider and Native Dancer) since their

last meeting.

- 4) Therefore, it is probable that Skyraider will beat Native Dancer in the Preakness on Saturday, unless their respective physical conditions change significantly in the interim.

The real problem in this case is, then, not that of deciding whether or not the reasoning can be cast into deductively valid form, but rather the problem of deciding what the precise validating-conditions are for the claim at issue and in making fully explicit all of the information or evidence which the reasoner is using to justify his conclusion. These problems can be solved only by considering the reasoning in the full context in which it was formulated. Once they are solved, through an analysis of the context, then the reasoning (if sound) can be presented in deductively valid form.

For example, suppose it was argued in some particular circumstance that "because some worker, X, was inefficient, he ought to be fired." Notice, first of all, how difficult it would be to make any progress in evaluating this reasoning according to traditional theory. Is this inductive reasoning or deductive reasoning? It's not a claim to probability or a generalization (at least, it doesn't appear to be) so by these definitions it would have to be called deductive. On the other hand, if we conceive of it as deductive, it would seem that we should have to judge it invalid, as the evidence advanced does not entail the conclusion. Or again, if we conceive of it as being "inductive", in the sense of advancing "partial" evidence for a conclusion, then it would seem

that the reasoner has expressed himself inaccurately, for the words as they stand suggest that being inefficient is sufficient grounds for firing X. Notice how the reasoning might be reformulated in such a way as to suggest merely a claim to partial evidence: "X is an inefficient worker. Therefore, we ought to consider the possibility of firing him."

Our problem is resolved when we move from the categories of traditional logic to the revised theory which we are recommending. The problem is simply this: before any evaluation of this reasoning could take place it would be necessary to consider the context in which it was being used in order to provide a specific analysis of the appropriate validating-conditions for the claim being made by the sentence 'X ought to be fired'. Before one can determine whether or not some particular worker is to be fired, one has to determine (from the point of view from which that decision is to be made) what particular considerations will be relevant to that decision. One could easily imagine contexts in which being inefficient alone would not justify a decision to fire and other contexts in which it would. For example, one could imagine a context in which one might properly reason in that way: "True, X is inefficient, and that is to be deplored, but still we ought to retain him because he is the only person on the staff who can keep the Watkins account happy." Or again, "True, X is inefficient, but then his family has contacts which we cannot afford to lose." Or again, "True X is inefficient now, but consider the fact that he has been with



the company for 30 years and has certainly made a tremendous contribution in the past." It is not enough to know that we are dealing with a sentence which indicates that some evaluation has taken place. The context must be sufficiently analyzed to clarify the precise criteria of evaluation which are relevant in this case. Only with those criteria clarified are we in a position to determine whether or not the evidence advanced in this case is sufficient to warrant or justify the conclusion advanced. Furthermore, once the criteria are explicated it will be possible to lay out the reasoning in deductively valid form: a) if criteria a, b, and c are satisfied, then X ought to be fired, b) Criteria a, b, and c are satisfied, Therefore c) X ought to be fired.

#### An Objection

I will close out this chapter by considering an objection which will suggest itself to some readers. It is this: "Your criticism of logical theory may hold for the diehard formalist logicians who have largely ignored the advances made in non-formal analytic theory (e.g., in the ordinary language or Oxford schools of philosophy), but surely it does not hold for those logicians (like Strawson) who do appreciate this analytic advance and take it into account in their treatises in logic."

I claim, in opposition to this objection, that there has been very little done by logicians like Strawson to break down the traditional distinctions of logic. The usefulness of the matter/form

distinction and that between deductive reasoning and inductive reasoning is as uncritically accepted by Strawson (I claim) as it is by the formalist logicians. I say this not to denigrate Strawson's work in logic, but rather to point up the degree to which the traditional distinctions (and the assumptions which underlie them) are entrenched in the thinking of philosophers.

For example, if one examines what Strawson has had to say about the classification of reasoning into types, one will find that he accepts and defends the traditional matter/form and deduction/induction distinction and does not give any evidence in his discussion of being aware of the questionable assumptions which underlie his defense of these distinctions. He says:

Of a piece of deductive reasoning one can inquire: Is it valid or invalid? Do the premises entail the conclusion, or do they not? These are questions to which a 'Yes-or-No' answer is possible. If the sense of the argument is clear enough to admit of an answer it admits of a clear-cut answer: the argument is valid; or it is not . . . . The phrase 'moderately valid argument' has no sense.

Deductive reasoning is not the only kind of reasoning, or even the most common kind. We make deductive steps when we do pure mathematics and, sometimes, when we argue philosophically. We make such steps in less rarefied regions as well: when we do the arithmetic of everyday; when we turn one form of words into another, when we make a precis, when we try to show that our opponent in argument does not proceed by steps of this kind, but of another; though a single train of argument may involve moves of both sorts. Thus the detective and the historian, when they draw conclusions from their premises, their evidence, often draw conclusions which are not entailed by those premises. There would often be nothing self-contradictory in accepting the premises, and rejecting the conclusions, of their arguments. But it does not follow from the fact that an historian's or a detective's argument is, by deductive standards, invalid, that it is in any sense unsound. It may be an argument to which deductive standards are inappropriate: it may make no claim to be deductively valid. Deductive standards are not the only standards of a good argument; for deductive reasoning is not the only kind of reasoning.

The reasoning of the experimental scientist, like that of the historian or the detective, is, in differing degrees, non-deductive. Of course the scientist may make many deductive steps; but if these were the only permissible steps, experimental science would be impossible. For it is part of the scientist's function to establish conclusions which are not entailed by his data, his evidence. An example of a well-established scientific statement might be one giving the melting-point of a certain metal: 'Under pressure-conditions x, m always melts at y degrees.' The evidence on which such a statement was based might consist of one or two experimental tests, together with the fact that no known metal has, so far as has been observed, a variable melting-point under constant-pressure conditions. These 'premises' do not entail the conclusion that m always melts at y degrees under conditions x. There would be nothing self-contradictory in conjoining them with the prediction that the next piece of m, melted under these conditions, will melt at y + 50 degrees. Yet the evidence may be quite conclusive, though the 'argument' is not deductively valid. Of course, one could introduce an argument which would be deductively valid. We could introduce as a premise the general statement: 'All metals have constant melting-points under constant-pressure conditions.' This statement, together with that recording the result of just one experimental test, would entail a conclusion of the form: 'Under pressure conditions x, m always melts at y degrees.' The general statement introduced as a premise might itself be a consequence of some other theoretical statement accepted as well as well established. But as some point we should inevitably come to a Theoretical statement based ultimately upon the evidence embodied in statements recording the results of particular observations: statements which did not entail the theoretical statement. No number of statements recording particular observations can ever entail a theoretical statement of this kind; for the theoretical statement is, while the particular observation-statements are not, exposed to the logical risk of refutation by statements recording the results of similar particular observations which may be made in the future.

Examples of this sort are perhaps better avoided. For most of us know little of natural science. Fortunately, we need go to nothing so elevated as history, science, or detection to find examples of non-deductive reasoning. Ordinary life provides enough. Consider

- (a) He's been travelling for twenty-four hours, so he'll be very tired.
- (b) The kettle's been on the fire for the last ten minutes, so it should be boiling by now.
- (c) There's a hard frost this morning: you'll be cold without a coat.

Plainly the statement made by the first clause of each sentence is

regarded as a reason for accepting the statement made by the second clause. The second statement in each case is in some sense a conclusion from the first; the first can in some sense be called a premise. But the premise does not entail the conclusion. . . On the other hand, though the premise does not entail the conclusion, it is a perfectly adequate reasoning for accepting the conclusion in each case. The arguments, though not deductively valid, are perfectly sound arguments.

As before, we might be tempted to explain the apparently non-deductive soundness of the arguments by saying that they were really deductive arguments with a suppressed premise. And it certainly is true that we can, for each of the arguments (a) - (c), construct a corresponding and valid deductive argument by introducing a fresh premise: e.g., for (a) 'People who travel for twenty-four hours are always tired afterwards'; for (b), 'Kettles always boil within ten minutes of being put on the fire' . . . But by regarding these general statements as suppressed premises of arguments (a) - (c), we do not get rid of the general problem of explaining how we can reasonably draw conclusions from premises which do not entail them. We merely shift its emphasis to the narrower question: How do we establish general propositions such as these? For these are not logically necessary propositions. If they had been, arguments (a) - (c) would have been deductively valid.

Note Strawson's assumptions: 1) that the notion of having "evidence" or "data" for a claim can be assimilated to the notion of having "premises" in a reconstructed line of reasoning, so that whenever one has data or evidence for a claim, that evidence is equivalent to the premises one is using, and whenever one has a premise, that represents part of the evidence, and 2) that sometimes the evidence which justifies a claim entails it and sometimes it does not. Strawson, like traditional logicians, does not note that whenever one has a set of premises which entail a claim, then one of two situations will obtain, either a) the premises will presuppose the truth of the conclusion or b) the premises will consist in both sentences which express evidence (in the proper sense of that term) and sentences which express validating-conditions. He

is very careful to point out that evidence formulated by historians, detectives, scientists, etc. . . . characteristically does not entail the conclusions they draw, but he fails to note that evidence for a claim to sentential entailment or formula transformation (or other formalistic derivation) entails its claim or conclusion only if one presupposes the rules of transformation or manipulation. He does not note that if the phrase 'inductive reasoning' is to apply to any case in which evidence for a claim does not entail it (in and of itself), then manipulations of formulas in an axiomatized system can be properly said to consist in inductive reasoning (the inferences following only via presupposed rules).

Consider Strawson's example of scientific reasoning. Suppose a scientist raised the question as to whether a given metal, m, always melted at a given temperature, Y, under some specifiable conditions, x. It would be appropriate to ask the question as to whether or not the validation-conditions for such a claim are agreed upon. Now, if the validating-conditions were agreed upon, and if the evidence which the scientist had gathered fulfilled those conditions, then there is no reason why he could not lay out his reasoning in deductively valid form. On the other hand, if the validating-conditions were not agreed upon, then he simply couldn't judge for certain as to whether or not he had or had not validated his claim. Both of these cases, furthermore, would be needed to be distinguished from a case in which the scientist had only partially validated a claim.

To be certain that one has at least partially validated a claim it is necessary to know what the validating-conditions are for that claim or at least part of those conditions. The scientist could conceivably be forced to reason in this way: 1) I am not perfectly sure as to what the total set of validating-conditions are for claim C, but I am sure that they will include meeting conditions "a" and "b", 2) I have gathered the evidence necessary to claim fulfilment of conditions "a" and "b", 3) Therefore, I am justified in claiming that I have at least partially validated "C", and, if these conditions turn out to be the complete set, then I have fully validated "C" (though I cannot at this point claim complete validation). Strawson makes no attempt to distinguish between these cases.

I should also like to call attention to the fact that, though there is no suggestion in Strawson's original characterization of the deductive/inductive distinction that it rests upon the character of the validating-conditions appropriate to the claim at issue, he comes to argue for the distinction upon essentially these grounds. He notes, for example, that one might reconstruct the reasoning of the scientist in deductively valid form, but he takes as a sufficient objection to such a construction the fact that "no number of statements recording particular observations can ever entail a theoretical statement of this kind . . . ". What he is commenting upon are the conditions under which one advances adequate evidence for a special class of claims, namely, theoretical claims. Now his comment

here is true but not significant precisely because, as we have already mentioned, evidence for any claim, separate from the validating-conditions for that claim, will never entail it. But this is not what I want to point out here; what is important here is that he is saying that the only way you can determine in the last analysis whether or not a given line of argument is inductive or not is by considering the character of the conclusion and premises in such a way as to determine the conditions under which such a claim is validated (if the evidence which is appropriate entails the claim, it is deductive; if it does not, it is inductive). Notice, however, that waiving the other difficulties in this position, it entails the conclusion that reasoning of the form 'All men are mortal, Socrates is a man, Therefore, Socrates is mortal' is inductive, for it is certainly true that the evidence which is appropriate to the validating of the claim 'All men are mortal' would not in itself entail that claim. This becomes explicit when, in commenting upon cases (a) - (c) above he says (after noting how they might be cast into deductively valid form):

But by regarding these general statements as suppressed premises of arguments (a) - (c), we do not get rid of the general problem of explaining how we can reasonably draw conclusions from premises which do not entail them. We merely shift its emphasis to the narrower question: How do we establish general propositions such as these? For these are not logically necessary propositions. If they had been, arguments (a) - (c) would have been deductively valid.

Given what he says here one would assume that ultimately he is resting the distinction between deductive and inductive reasoning upon

whether or not the premises, or at least the premise which expresses validation-conditions is "logically necessary". The question 'How do we establish general propositions . . .?' is a question about the validation-conditions appropriate to a class of assertions. If this is what Strawson takes the subject matter of inductive logic to be concerned with, that is perfectly satisfactory. But it should not be assumed from the fact that logicians are not agreed as to what the appropriate validating-conditions are for this class of claims that in principle reasoning presented in support of such a claim cannot properly be put into deductively valid form. Furthermore, I suggest that it would be very difficult to divide up validating-conditions for claims-in-general into two types; those which are "logically necessary" and those which are not. After all, are the inference-licenses which derive from an analysis of the manner in which words like 'and', 'or', 'not', . . . and so forth are used "logically necessary"? It is not clear what this question is asking. It is true that the inference licenses derive from facts about how words are used, but it would seem that in some sense all inference licenses will emerge from an analysis of how words are used. Finally, let us consider cases (a) - (c) which Strawson takes to be paradigms of inductive reasoning:

- (a) He's been travelling for twenty-four hours, so he'll be very tired.
- (b) The kettle's been on the fire for the last ten minutes, so it should be boiling now.
- (c) There's a hard frost this morning; you'll be cold without a coat.



Concerning each of these cases we can properly ask, 'Does the reasoner take himself to have validated the claim which he has overtly made, or is he really only prepared to claim that he has partially validated that claim?'<sup>9</sup> Strawson, of course, does not raise these questions, and so is not led to see why the distinction between deductive and inductive reasoning which he is defending is defective.

Notes

1

The fact that there are these differing characterizations is significant because they are not in fact equivalent. When one closely examines the differences one finds that the total class of instances of reasoning is divided into either a very narrow category or a very large, heterogenous category. This will be taken up in the next chapter.

2

This holds for what is said about "inductive logic" as well as for what is said about "deductive logic". In fact, no logic book to my knowledge even raises the question as to whether it is misleading to assimilate the notion of "evidence" to that of "premises".

3

Introduction to Logic, op. cit., pp 3 and 20.

4

It should be noted that though instances of reasoning in this form are deductively valid, they do not beg the question at issue (as do most instances of reasoning presented as examples of "sound" deductive reasoning in logic texts). Compare

- 1) All capitalist states are unstable.
- 2) Some capitalist states are democracies.
- 3) Therefore, some democracies are unstable.

and

- 1) The criteria for what constitutes a democratic state are a, b, c, . . .
- 2) The criteria for what constitutes an unstable government are a', b', c', . . .
- 3) Countries X, Y, and Z satisfy both a, b, c, . . . and a', b', c', . . .
- 4) Therefore, some democratic states are unstable.

In both cases we have reasoning directed toward establishing the truth of the same conclusion and in both cases we have reasoning which is deductively valid. The difference is, however, that in the first case the question at issue is begged (the truth of the conclusion being presupposed in the premises), while in the second the reasoning presents a prima facie case for establishing its truth. In other words, perfectly "valid" deductive form can represent "defective" reasoning if the conclusion whose truth is to be established is presupposed in the premises, such that it would be more difficult

to establish the truth of the premises than it would be to establish the truth of the conclusion directly.

5

See the first objection discussed in Chapter Five, "Objections and Replies", for a fuller discussion of this point.

6

I am not suggesting that particular ethical claims are never validated, but only that there is philosophical debate concerning what the general validating-conditions are for ethical claims. Unfortunately, this debate tends to be carried out on an exceedingly high level of generality and abstraction, with little detailed analysis of the actual usage of ethical terms in the contexts in which they function. Little work has been done making clear what particular considerations are in fact taken into account in attempting to validate particular ethical claims in particular contexts. In my judgment it is unreasonable to expect a satisfactory analysis of the logic of ethical assertions and questions to emerge from debate as to the answers to highly general questions concerning what in the last analysis ethical claims come down to. It would be more reasonable to work out extensive analyses of the multiplicity of ethical claims which do arise in particular contexts which makes clear what sort of evidence is in fact advanced in support of such claims. By such a line of investigation, one can begin to sort out the range of factors which are properly considered in various particular cases. Whether or not it is reasonable to hope for a reduction of this de facto multiplicity to some one basic factor (I like "what will bring the greatest good for the greatest number") is determinable only insofar as it is clear what range of factors are being assimilated together by such a proposed reduction.

7

Logical Theory, op. cit., pp 233-236.

8

For example, consider the reasoning 'X is an octahedron because it has eight sides and is a solid'. We can lay out this reasoning in deductively valid form in the following way:

- 1) X is a solid and has eight sides. (evidence)
- 2) Any figure which is solid and has eight sides is an octahedron. (inference-license)

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- 3) Therefore, X is an octahedron (claim for which the evidence is advanced)

However, if one wanted to present this reasoning in a purely formalistic manner, making explicit all inference-licenses which can properly

be said to be operative, one would have to reconstruct the reasoning so that the premises included two further inference-licenses, modus ponens ( $P \supset Q, P, \text{ therefore } Q$ ) and universal instantiation ("Any substitution instance of a propositional function can validly be inferred from its universal quantification"). Hence, if we use the symbol 'Sx' to represent the expression 'x is a solid' and 'Fx' to represent the expression 'x has eight sides' and 'Ox' to represent 'x is an octahedron', then using the conventional techniques of formal logic the argument can be presented symbolically in the following form:

- |                                      |  |
|--------------------------------------|--|
| 1) $(X) (Sx \cdot Fx) \supset (Ox)$  | (The above inference-license symbolized) |
| 2) $Sa \cdot Fa$                     | (The above evidence symbolized)          |
| 3) <u>Therefore, <math>Oa</math></u> | (The above conclusion symbolized)        |

Formalistically speaking this inference follows only in virtue of an acceptance of the inference-licenses of modus ponens and universal instantiation.

9

The point, of course, is that one of these two cases must be applicable and, in either case it will be possible to set out the reasoning in deductively valid form, according to one of the two models presented above (one in which we lay out evidence which fulfils all the conditions which are necessary to establishing the truth of the claim, the other in which we lay out evidence which partially fulfils those conditions.)

## Chapter Four

### A REEXAMINATION OF THE PROBLEM OF CLASSIFYING INSTANCES OF REASONING INTO TYPES

#### Introduction

In the previous chapter it was argued that it is not possible to satisfactorily divide up instances of reasoning into types by utilizing the distinction between deduction and induction. It is proper, therefore, to re-explore this problem of classification anew to determine: a) whether indeed it is necessary to develop any sort of general classificatory schema in order to analyze and evaluate instances of reasoning and b) what positive work needs to be done in the way of developing classificatory categories of use to the logician as a critic of reasoning.

In this chapter, I shall argue for the following: a) that there is no readily apparent means available for devising a priori a classificatory schema which will provide (by means of it) the relevant criteria for evaluating any instance of reasoning, b) that it is not necessary to have such a schema in order to engage in the task of evaluating any instance of reasoning, c) that more important to the analysis of any given instance of reasoning than its assignment to some generally conceived category is the analysis of the specific question-type which can be formulated by abstracting from those particulars in question (at issue in the reasoning) whose presence does not play a role in the settlement-conditions relevant; and d) that, none-the-less, it is perfectly appropriate for logicians

to divide up reasoning into types according to the divergent kinds of validation-conditions which are relevant to establishing the truth of claims of different logical types. Overall, I will attempt to show that though it is not indeed necessary to attempt to fabricate a logically exclusive and exhaustive set of categories for classifying reasoning into types in order to engage in the development of tools for the analysis of reasoning (and in order to engage in the practical task of analyzing and evaluating particular instances), it is never-the-less perfectly proper for logicians to engage in a piece-meal analysis of the logic of general classes of questions and claims (and so to engage in a piece-meal analysis of the logic of variable types of reasoning). The fundamental danger to be avoided, as I see it, is the assimilation of divergent settlement-conditions of a field of particular questions to an oversimplified model.

To what extent is the classification of an instance of reasoning into a general type required for the analysis and evaluation of the "validity" of that reasoning?

First off, it is salutary to remember that the practice of analyzing and evaluating reasoning is much older than and is many ways independent of the development of logic as a discipline. Reasonable men did not have to wait for professional logicians to come to the scene in order to achieve any measure of skill in discerning defectiveness and cogency in the reasoning with which they were concerned. This in itself is enough to indicate why it

is not necessary to classify an instance of reasoning into a general type in order to analyze and evaluate it. Furthermore, we have seen how the appropriate way to evaluate evidence advanced for a claim is by means of the validating-conditions proper to that claim. This recognition explains how it was and is possible for individuals unschooled in "logic" to nevertheless develop considerable ability in the criticism of reasoning. Anyone who has a good grasp of what is being claimed by a conclusion advanced in a line of reasoning is potentially in a position to evaluate the evidence advanced in support of that conclusion. The very process, therefore by which one is trained to speak a language, involves in an implicit way training in the validating-conditions for claims formulated within that language. The logician, if he is to analyze and evaluate instances of reasoning, can do no better than to make explicit this very information to which every language-user who can formulate and understand determinite claims in an area is implicitly exposed. And just as it is not necessary for the individual language-user to learn general categories for the classification of assertions and questions in order to grasp when evidence advanced in support of a claim is irrelevant or insufficient, so, by the same token, it is not necessary for the logician to have such general categories available to him.

In most cases, one can get by quite satisfactorily by simply transforming the particular question at issue in the reasoning into a question frame by replacing the particular terms in those

questions, whose place does not have a bearing upon the settlement-conditions which are relevant, by variables. For example, if the question at issue is 'Should Arthur Ashe be chosen as a member of the American Davis Cup team?' one can formulate, as the focus of attention, the question frame 'Should X be chosen as a member of Davis Cup team Y?'. Putting the question into this frame enables one to abstract from consideration the particular person being evaluated and the particular team for which he is being evaluated, neither consideration of which properly plays any role in determining what the settlement-conditions are for the question. Or again, if the question at issue in some line of reasoning was 'What is the statistical probability that Petersen, a randomly selected Swede, is also a Catholic?', then, it would be proper, for the purposes of explicating its settlement-conditions, to generalize this question into the following frame: 'What is the statistical probability that X, some randomly selected member of national group G, is also a member of religion Y?'.<sup>2</sup>

However, though it is indeed helpful for the purposes of analysis to put particular questions such as these into a family of questions which has the same logic or settlement-conditions, it is not in fact necessary. And, in any case, this modest form of "classification", whereby one formulates a question-frame which highlights a family of questions with the same general logic, is a far-cry from developing a priori a general classificatory schema which is taken to encompass



all assertion-and question-types (in a manner sufficient to evaluate the evidence advanced in support of any particular instance of those types).

This is not to say, of course, that useful information cannot be obtained which will prove of value to the logician in the analysis and evaluation of particular cases of reasoning by conducting investigations into the logic of general classes of assertion-and question-types. It is perfectly appropriate for the general field of logic to be partitioned up into sub-fields in which special attention is given to the problem of explicating the settlement-conditions of questions within some limited class. The more general information which is accumulated concerning the settlement-conditions of large classes of questions, the more easily, directly, and efficiently will be the analysis of particular instances which fall into those classes. This can be illustrated.

For example, it is helpful to recognize when faced with the task of analyzing some given question (at issue in some instance of reasoning) that it is, say, evaluative, even though of course the class of evaluative questions is an extremely broad class. For if one recognizes from the outset that some given question is evaluative and recognizes also that there can be no process of evaluation carried out without: a) some point of view from which the evaluation is being carried out, b) some set of standards by which the object to be evaluated is judged, and c) some set of "good-making" or "bad-making" features possessed by the object being

evaluated, then one knows in general what kind of information must be gathered in order to describe the logic of the particular question under analysis.<sup>1</sup>

Or again, suppose that one were faced with the task of analyzing and evaluating an instance of reasoning in which the question at issue was one of the following:

- 1) Can a man keep a promise by mistake?
- 2) Is an infinite number a number?
- 3) Is a whale a fish?
- 4) Is the Neanderthal man a man or an ape?
- 5) Is a tomato a fruit or a vegetable?
- 6) Is playing chess without the queen playing chess?
- 7) Is an American flag with 55 stars an American flag?

There is no theoretical reason why one could not come to grips with the logic of these questions without being guided in that analysis by knowledge of the general logic of questions of this kind (Border-line Questions). But, to the extent that one did have such knowledge, the analysis could proceed more efficiently and the results of that analysis could be expressed in a manner which brought out explicitly the peculiar sort of problem which is presented in attempting to settle a question of this sort. The peculiar problem in these cases derives from the fact that each question is calling for the application of a predicate to an instance which partially fits and partially fails to fit what might be called paradigm instances of those predicates. Because the instances both significantly match the paradigm cases and yet significantly diverge from them, one is drawn in conflicting directions (both to apply the predicate and to deny its application). Recognizing this, one is in a position to see

that (speaking generally) there are three kinds of considerations relevant to the settlement of borderline questions: 1) the nature of the similarities between the case at hand and the paradigm cases, 2) the nature of the differences, and 3) the purpose behind the usage of the term (which should be implicit in the context in which the question is raised).

There has, of course, been a growing interest among analytic philosophers (especially among those of a non-formalist bent) to study and describe the general conditions under which questions and claims of various types are properly settled and validated. In many cases, the analysis which has been provided has been developed in the light of an extensive examination of particular cases (without a view to settling some a priori question about the nature of knowledge at the same time). Consequently, there is a growing body of information upon which the logician, when interested in the logic of some given class of questions, can draw.<sup>2</sup> Nevertheless, it is absolutely essential that the analysis and evaluation of instances of reasoning not be so carried out in such a way as to sacrifice the particular logical features of the question or claim at issue by forcing that question or claim to fit some oversimple general model.

What problems stand in the way of the development of a classificatory schema for questions and claims which is exclusive and exhaustive and yet useful as a tool in the analysis and evaluation of reasoning?

I have argued that it is not necessary to develop a general system of classifying instances of reasoning into types in order to analyze

and evaluate particular cases when they occur in particular contexts. I have also pointed out, however, that it can be very helpful to have some knowledge concerning the general kind of question or claim at issue. Clearly, the ideal circumstance would be that in which we did have available to us an exclusive and exhaustive set of categories into which all instances of reasoning could be put and which, when so classified, could be definitively analyzed and evaluated by virtue of our knowledge of the settlement-conditions and validation-conditions proper to questions and claims of these various types. In this section, I will attempt to point out the sense in which it is possible to approach this ideal as well as the sense in which (practically speaking) it is impossible to realize.

Each of the following facts constitute significant obstacles to the realization of this ideal: 1) questions can be classified at various levels of generality, 2) it is often possible to classify the same question in more than one way, 3) the more generally conceived the class into which some particular question or claim is put, the less likely that the description which is appropriate to every member of the class (of settlement-or validation-conditions) will be sufficiently particularized to fully characterize the logic of any given member of the class, 4) the set of questions and claims which can (in theory) be formulated in a natural language is indefinite or open, 5) the classificatory categories for questions and assertions which are presently available differ considerably in

their levels of generality and overlap in a wide multiplicity of ways, and 6) reasoning can be evaluated differently according to the purpose for which that reasoning is being conducted and the purpose for which the evaluation is being carried out.

Remembering these facts, one can see what in general would have to be done to develop an exclusive and exhaustive classificatory schema sufficient to achieve the ideal which we have characterized: First of all, one would need some criteria for determining the level of generality of any given class of questions. However, at this point I can see no way of satisfactorily developing such criteria. For example, though it is clear that the class of "scientific questions" is more broad and encompassing than is the class of "biological questions", it is not at all clear whether or not it is more or less encompassing than is the class of "evaluative questions". The reason for this is relatively evident: in the first case the defining criteria for the classes (the notion of what it is to be a question in science, on the one hand, and the notion of what it is to be a question in biology, on the other) provide a basis for making a judgment of relative generality. By definition, every question properly raised in the discipline of Biology is a question in "science", but not every question in "science" is a question in Biology. In the second case, however, the criteria simply do not interrelate. There is nothing in the notion of a question which calls for an evaluation to provide any basis for saying that it encompasses

more or less than what is encompassed by the class of scientific questions. It would appear, then, that the only way in which some comparison could be made would be by means of a study of the field of cases which do in fact fall under these two general classes, a study which (if nothing else) would be extremely laborious and time-consuming.

Secondly, it would appear that one would need a field of categories for each generality-level that one could distinguish. One would have a certain number of categories for classifying questions when considered at generality-level alpha (supposing that one decided by some means that this was the highest level of generality at which it is helpful to classify questions and claims). And another and more multiple set for classifying questions when considered at generality-level beta (the next level down in particularity). A third, and again more multiple, set of categories for classifying questions at generality level gamma. And so forth, down to the lowest level of generality at which one judged it useful to classify particular questions, without simply considering every particular question to be a class or set of simply one member.

Thirdly, the notion of sufficiently studying the members of each and every category in the classificatory schema in order to determine to what extent these categories overlapped (assuming that there would be many areas in which one could not determine extent of overlap by means of the criteria themselves) is a staggering idea. Think of the great multiplicity of terms which are presently available

for classifying questions and claims into types: scientific, ethical, philosophical, evaluative, esthetic, legal, borderline, practical, theoretical, factual, verbal, religious, historical, psychological, mathematical, and so forth and so on. The job of sorting out just how these classes interrelate would be a fantastically complex and laborious one.

Finally, when one adds to this the fact that it is always possible for new kinds of questions to be generated as new disciplines develop and new conceptual frameworks emerge, it should become clear that it is highly doubtful that the ideal which has been described can ever be in the fullest sense realized. The best that can be hoped for, it would seem, is a schema which provided the outlines or basic skeleton structure of the settlement-conditions for any particular question under analysis, a skeleton structure which would have to be filled in in such a way as to meet the demands of the detailed features (including contextual considerations and those of purpose) of that particular case. Such a schema would provide a highly useful tool which would indicate what particular kinds of features to look for in identifying and explicating the logic of questions and claims which fall under the various general categories developed. Such a schema could not be used in a mechanical manner, however, for it would seem that one would always have to allow for the possibility that some question under analysis would prove to diverge significantly from any given codified pattern.

Isn't it possible to develop various exclusive and exhaustive categories for classifying questions and claims? How useful are such categories for the purpose of analyzing and evaluating instances of reasoning?

It is of course always possible to fabricate a classificatory system which theoretically divides up every particular in some given class into exclusive and exhaustive categories. The problem is that such a classification is satisfactory if and only if it can be effectively used to accomplish the purposes for which that classification was devised. Herein lies the difficulty of using a priori categories for dividing up instances of reasoning into types: though they may be quite satisfactorily exclusive and exhaustive, they do not provide the kind of particular information concerning the logic of the questions and claims which fall under them which is necessary for the analysis and evaluation of reasoning directed toward the settlement of those questions (or validation of those claims).

For example, one could definitively divide up all questions into two types simply in virtue of their grammatical form. Every question is either of the yes/no type (potentially containing all of the elements necessary for a completed declarative sentence, except cast in the interrogative mood) or of the W-question type (containing only enough elements to construct a propositional function).<sup>3</sup> Every yes/no question can be construed as a request for the validation of the assertion from which it is constructed. Every W-question can be construed as a request to validate the propositional function when transformed into a completed assertion. However, to have this information concerning any given question is not to know anything



concerning the settlement-conditions of the assertions in question.

Or again, consider the traditional distinction of all instances of reasoning into those in which conclusive evidence is advanced versus those in which something less than conclusive evidence is advanced. This distinction is sometimes in effect reduced to the distinction between those instances of reasoning in which a claim to sentential derivation is advanced as against all of those instances of reasoning in which a distinguishably different claim is advanced. The result is one very homogenous and narrow category and another very heterogeneous and broad category. In this case, the distinction only serves to mislead the logician into thinking that a significant advance has been made in the explication of standards appropriate to the analysis and evaluation of reasoning, when in reality only a very limited class of claims has been covered.<sup>4</sup>

Finally, consider the notion that all claims and questions can be divided up into those which are "factual" and those which are "verbal". This distinction can be made exclusive and exhaustive by defining "verbal questions" as "all questions which can be settled simply by gathering or making explicit, information concerning the respective criteria of application of the predicates which are utilized in formulating the question" and by defining "factual questions" as "all questions which cannot be settled simply by gathering information concerning the criteria of application of the predicates by means of which the question is formulated". Hence, given that the predicates 'is a triangle' and 'has three sides' are not being used

in an unorthodox manner, the question 'Does every triangle have three sides?' is properly classified as being "verbal" (as would a question such as 'Does every molecule of water consist of two atoms of Hydrogen and one of Oxygen?', given that their predicates are being used in an orthodox manner). However, it is important to see that what we have succeeded in creating is, once again, a dichotomy in which one category is relatively narrow and homogeneous, while the other is extremely broad and heterogeneous. The term "factual question", in being defined negatively in terms of its not being settled simply by obtaining information as to the criteria of application of the terms which make it up, covers a large segment of the questions covered by the terms historical question, ethical question, scientific question, legal question, esthetic question, practical question, philosophical question, theoretical question, and so on ...

If, on the other hand, we define a "factual question" as one which is settled by "observation", then we have a multiplicity of problems: 1) we no longer have an exclusive and exhaustive distinction, 2) the notion of settling a question by "observation" is extremely vague (Does it matter what is being observed? Is the collection of data concerning language usage a form of "observation"? If so, aren't all questions "matter of observation". If, on the other hand, a question is "verbal" just in case it is a "matter of words", then, in some sense aren't all questions "verbal"? Isn't the truth or falsity of the assertion 'This is a cow'

dependent upon how the word 'cow' is being used?), and 3) in any case, one cannot derive any information concerning the specific kinds of settlement-conditions proper to, say, ethical questions as against historical questions simply by using this distinction.

It would, I think, be useful to note that every question and claim might be described as having a "linguistic" and "non-linguistic" aspect.<sup>5</sup> This was implicitly brought out in drawing a distinction between the "evidence" which can be advanced in support of a claim and the validating-conditions which provide the inference-license for going from that evidence to that claim (as a conclusion). Validating-conditions and the inference-licenses which derive from them are a result of the way in which words are used. On the other hand, the process of gathering the evidence which fulfils these is a matter of having the relevant "information or data".

Consider, for example, the question-type 'Is it statistically probable that X, who is a member of national group G, is also a member of religious group Y?'. Is this question simply a matter of "words" or is it a matter of "fact". Clearly, it is both. The manner in which it is appropriately settled is a function of how the words which constitute it are being used, but the manner in which they are being used requires that certain "information" be collected. Notice the various phases relevant to settling a question of this type (Note how they can be seen as either a "matter of how words are used" or a "matter of gathering facts"):

- 1) clarify the criteria for being a member of G (a matter of words)
- 2) clarify the criteria for being a member of Y (a matter of words)
- 3) clarify the identification criteria for X ( a matter of words)
- 4) collect statistics concerning the number of members of G (a matter of gathering facts)
- 5) collect statistics which determine the number of members of G which are also members of Y (a matter of gathering facts)
- 6) express the percentage of members of G which are also members of Y (a matter of 'words?')
- 7) verify the fact that X is a randomly selected member of G (a matter of gathering facts)
- 8) in the light of "6" express the statistical probability that X, as a randomly selected member of G, will also be a member of Y (putting things together)

In any case, I can see nothing to be gained by saying of this question that "it is simply a matter of words" or "it is simply a matter of facts". If one wants to use this kind of locution, one should say "It's both a matter of words and a matter of facts".

In short, the only help that one gets in the task of analyzing questions and claims from the distinction between verbal and factual questions and assertions is an emphasis on the fact that there are two very general but distinguishably different considerations which condition whether or not some claim has been validated: a) considerations as to how the words which express the claim are being used (in the generation of validating-conditions) and b) considerations as to whether or not sufficient information, data, or "facts" have been gathered to fulfil those conditions. In the practical problem of analyzing and evaluating particular instances of reasoning this is little help indeed.

Conclusion: the place of classification in the development of logic

The above analysis, if essentially sound, has a number of implications concerning the place of classification in the development of logic: 1) little can be gained by attempting to develop a priori a limited set of categories into which all instances of reasoning are to be put in the process of determining the validation- or settlement-conditions proper to the claim or question at issue in some reasoning, and 2) nevertheless, it is perfectly proper for logicians to engage in the analysis and explication of the settlement-conditions proper to questions of divergent types, for insofar as their analysis is sound, useful information will be made available for those who are engaged in the practical task of evaluating instances which fall into those types.

There is, however, one very significant danger to be avoided in the analysis of the logic of general classes of claims and questions, and that is the danger (to which philosophers, I suggest, are in general especially prone) of assimilating the multiplicity of differences between particular questions which fall into some general type by becoming wedded to an oversimplified model of the logic of that class. Generalizations concerning the general logic of a class of claims are useful only insofar as they contribute to our understanding of the particular features of the cases which they cover, and the kinds of claims and questions which can be formulated are exceedingly multiple and diverse.

Chapter Four

Notes

1

See Paul W. Taylor's Normative Discourse (Prentice-Hall, Englewood Cliffs, N.J.: 1961) for a relatively detailed analysis of the logic of evaluative claims and questions. Whether or not this analysis is sufficient is not nearly as important as the fact that it attempts to make explicit what kinds of evaluative questions do in fact arise and what, as a matter of fact, we do take to be relevant to their settlement in the light of the purposes for which those questions are raised.

2

There have been numerous investigations into the logic of questions and claims of various logical types recently. Here are some examples: 1) John Passmore's attempt to describe six types of arguments which are peculiar to philosophical reasoning (Philosophical Reasoning, Duckworth and Co. Ltd., London: 1961), 2) Waismann's work on the logic of two types of mathematical questions (The Principles of Linguistic Philosophy, Chapter XX, 'Towards a logic of questions', pp 387-405, Macmillan, London: 1965), and 3) Gauthier's work on the logic of practical questions and claims (Practical Reasoning, Oxford University Press, Oxford: 1963).

3

See pages 41 and 42 of Chapter Two.

4

This is not to say that "deduction", in the sense of syntactic or sentential transformation, is used in only a limited number of instances of reasoning. See objection 7 in the chapter on objections and replies below.

5

Though it would, of course, be misleading in some cases.

## Chapter Five

### OBJECTIONS AND REPLIES

#### Introduction

In this chapter I will explicitly answer some of the objections which might be raised to the conception of logic and reasoning which has been developed in this dissertation. This set of objections and replies is not taken to be in any way exhaustive. Some objections have already been implicitly taken up in the body of the paper, and, of course, still other objections and questions could be raised. The objections dealt with in this chapter are simply those which seem to me to be natural ones. The value of treating these objections explicitly is not simply to provide a further defense of the logical theory which has been developed in this paper but also to make more determinate what is and is not encompassed in that theory.

1) Objection: Aren't you in some sense oversimplifying the variety of claims which can be made in reasoning? Don't we have a plurality of words to use in formulating the relation between evidence and the truth of some assertion or conclusion, words like 'justify', 'verify', 'substantiate', 'support', 'confirm', 'validate', and so forth?

Reply: Variety enters the picture, not so much as a result of the fact that there are many different relations which can be claimed between evidence and the truth of some assertion, but rather as a

result of the fact that there are many different kinds of claims which can be made with many different kinds of validating-conditions.

There are at least five distinguishably different relations possible between some given evidence E and the truth of some given claim C:

- 1) E may be simply irrelevant to the process of proving C true.
- 2) E may be relevant but not sufficient to the process of proving C true.
- 3) E may be sufficient to prove C true, though not exhaustive.
- 4) E may be exhaustive, containing all of evidence which might be considered, more than what would ordinarily be necessary to prove C true.
- 5) E may render the truth of C probable, and may or may not be part of the evidence which is relevant to proving C true in an unqualified form.

Relations 1 and 2 are, I believe, clear. Relations 3, 4, and 5, however, may need some explanation. First 3: there are many cases in which one could have enough evidence to demonstrate the truth of a claim without having considered all of the "facts" which may relate to an issue. For example, one might conclusively prove that X killed Y by producing six irrefutable witnesses to the slaying. On the other hand, there may be other evidence which though it is not needed to prove that X killed Y, would nevertheless corroborate this fact. This is the sort of case I have in mind in 3. 4 relies on this same distinction.<sup>1</sup>

To see what makes 5 a possibility one should note, for example, that one might prove that it is probable that some particular person is not a Catholic by pointing out that the person is Swedish and



that less than 5 per cent of the Swedish people are Catholic. This is a case in which the evidence which is relevant to proving probability is irrelevant to proving unqualified truth.

Now as it happens, the various predicates which we do have available to us for characterizing a relation between evidence and a conclusion are used to express 3 and sometimes 5 but never 1, 2, or 4. In other words, if one takes the sentence frame 'Evidence E \_\_\_\_\_'s (justifies, supports, verifies, substantiates, validates, confirms) conclusion C', one finds that no matter which of these various predicates are used either 3 or 5 (and usually 3) is meant. More precisely, the words 'justify', 'substantiate', 'verify', and 'demonstrate' are ordinarily used in such a way that 3 is meant, while the words 'confirm' and 'support' can be used to express 3 or 5. Philosophers, of course, usually limit these latter two words to 5.

This fact is confirmed by the manner in which the usage of these words is recorded in dictionaries. In Webster's New Collegiate Dictionary, for example, an examination of the entries for 'justify', 'substantiate', 'verify', 'demonstrate', 'validate' and 'confirm' indicates that insofar as these words can be used in the frame 'Evidence E \_\_\_\_\_'s conclusion C', they are roughly synonymous. "To justify" by this dictionary is "to prove". "To substantiate" is "to establish the existence of the truth of by proof or competent evidence" or "to verify". "To verify" is "to prove to be true", "to confirm", or "to substantiate". "To validate" is "to test or

prove the validity of" or "to confirm". "To confirm" is "to verify" or "to strengthen". "To support" is "to verify or substantiate".

In other words, though ordinary usage provides a variety of terms, it does not provide for an equally large variety of distinctions between evidence and some conclusion. The reason for this is that there is no need for such a set of terms. Reasoners advance evidence when they are attempting to justify a claim either fully or partially.

In any case, the important thing to note that there is nothing in our description of what is crucial to the evaluation of reasoning (determining whether evidence fulfils the validating-conditions for the claim which the reasoning purports to justify) which oversimplifies the various relationships noted in 1 through 5 above. To say that in evaluating reasoning one must always determine whether or not the evidence advanced fulfils the validating-conditions for the claim at issue is not to say that the claim at issue in reasoning is always of one type. It is only saying that whatever the focal claim of the reasoning is, one tests that reasoning by determining whether the evidence for that claim is sufficient. For example, one might succeed or fail to succeed in justifying one or more of all of the following claims: 1) that some evidence is sufficient to prove an assertion true, 2) that some evidence is relevant, 3) that some evidence is irrelevant, 4) that some evidence is exhaustive, and so forth. But in each case the claims are different kinds of claims and will have differing validating-conditions because of this.

This multiplicity is not in any way oversimplified by the theory which has been defended in this paper. The fundamental premise of this theory is that there are many different standards or criteria that evidence must meet according to what it is that is being claimed. It has, therefore, multiplicity built right into it, and in no way suggests that there is only one set of standards to be used or only one kind of claim. What is claimed is simply this: that it is unintelligible to advance evidence without having some assertion which one is claiming to justify by virtue of that evidence.

2) Objection: Suppose the question 'Is Petersen a Catholic?' is raised in some context, and suppose further that the response to that question is 'Petersen is probably not a Catholic because he is Swedish for, as you know, less than 5 per cent of Swedes are Catholics.' Has the respondent "answered" the original question or has he "actually answered" the question 'Is it probable that Petersen is a Catholic?'. Is the first question at issue in the reasoning or not?

Reply: One must distinguish the following: 1) the de facto response which is given to a question, 2) a response which satisfies the questioner (given his purpose for asking the question), and 3) a response that satisfies the logic of the question as it was formulated (i.e., a response which, when translated into the interrogative, "matches" the question asked). Each of these constitute a basis for different but useful notions of "answering" a question. In the first sense, one might "answer" a question posed, by refusing to "answer" it in the latter two senses. One could imagine, for

example, the following response to a question: 'My answer to your question as to where I was last night is that it is none of your business'. Furthermore, it should be noted that there is no necessary connection between any of these senses. A given de facto response may or may not satisfy the questioner, and what might satisfy a questioner may or may not overtly satisfy the logic of the question as posed.

Now let us look at the case presented in this objection. Note the following: 1) in the first sense, the respondent did answer the question (i.e., he responded to it), 2) in the second sense, he may or may not have satisfied the questioner's purpose (his purpose in asking the question may be such that just to know that it is highly probable that Petersen is not a Catholic is enough; or, it may be that he needs more than this, in which case he might make this purpose explicit by saying 'I didn't ask you whether it was probable that Petersen is not a Catholic; I asked you whether or not he was. Probability in this case is not enough'), and 3) in the third sense, the respondent did not "answer" the question.

This third sense of "answering" a question is an important one to maintain in evaluating reasoning, because, as has been pointed out, a necessary condition for the evaluation of any evidence is a determination of the precise claim which that evidence purportedly justifies. Whenever one can characterize two or more distinguishably different questions which might be at issue in some reasoning under evaluation, questions which have distinguishably different

conditions of settlement, then one simply cannot evaluate the reasoning until one knows which set of settlement-conditions one can properly use in testing the sufficiency of the evidence. This general principle holds for every case, including of course the example formulated in the objection being considered. Consider the following instances of reasoning:

- 1) Just last week Petersen became a member of the Southern Baptist Church. Here is his baptismal certificate dated Monday of last week. Hence, it is clear that Petersen is not a Catholic.
- 2) Petersen is a Swede and less than 5 per cent of the Swedes are Catholic. So it is highly probable that Petersen is not a Catholic.
- 3) Petersen is a Swede and less than 5 per cent of the Swedes are Catholic. So Petersen is not a Catholic.

In the first two cases, we have valid reasoning. In both these cases the evidence advanced matches what is called for by the validating-conditions of their respective conclusions. In the third case, the conclusion simply goes beyond what can justifiably be claimed, given the evidence.

Furthermore, it is interesting to note that if the objective is to insure that it has been validated that Petersen is or is not a Catholic, and so demanding an answer which satisfies the logic of the question as it is formulated, then it would be misleading to say that knowing that less than 5 per cent of the Swedes are Catholics helps us to go part of the way toward this validation, for the conditions which must be met to validate the claim that Petersen is or is not a Catholic are not even partially met by

finding out that less than 5 per cent of Swedes are Catholics. Even knowing this, we would still have to go through the same process that we would have had to have gone through without knowing it. What this general statistic tells us is nothing more than the likelihood of a particular outcome once we do go through the validating process. It does not in any way shorten the process or partially complete it.

This is not to say, of course, that when a question of the form 'Is X a member of religion Y?' is asked the questioner should never be satisfied with a response of the form 'Probably not, because of a, b, and c.' It may very well be that probability is perfectly satisfactory given the purpose of the questioner. However, this does not change the fact that finding out that less than 5 per cent of Swedes are Catholic does not consist in "partially" validating or justifying the claim that Petersen is not a Catholic.

3) Objection: How does what you are claiming in claiming that every determinate assertion has validating-conditions differ from what the positivists were claiming when they claimed that for every cognitively significant assertion there must be some observation-conditions which when fulfilled verify it? The two claims sound very much alike.

Reply: To see the differences most clearly between the position which I have adopted and that of the positivists, one must notice

the differing implications which are drawn from those positions. Positivists believed that by virtue of the verification principle they succeeded in a) saying something significant as to how claims are validated, b) providing the means by which the impossibility of metaphysics can be demonstrated, c) providing the means by which one can demonstrate that empirical science is the only method by which knowledge can be obtained, and d) demonstrating that there are only two types of claims and questions.

I, on the other hand, think that none of these claims is justified. I would say rather the following: a) to say that if a claim is determinate there must be some conditions under which that claim can be validated is not to say anything significant as to how claims are validated, b) it in no way demonstrates that traditional philosophical claims are meaningless, c) it does not imply that empirical science is the only means to knowledge, and d) it does not imply that there are only two types of assertions or questions. In fact, as I have tried to make clear I would claim that there are many types of assertions and questions with distinguishably different validation- and settlement-conditions. I reject the notion that it is helpful to try to characterize in general terms how claims or questions are validated or settled.

4) Objection: At times it sounds as if you conceive of language as consisting of a massive set of inference rules. Isn't this to attribute too much "structure" and "determinacy" to natural languages?

Reply: I would agree that it is misleading to conceive of language as a massive set of formulated rules of a highly determinate

sort. It would be much better to conceive of language as a massive set of loosely established practices which require the development of certain abilities. Its "structure" exists, as it were, in the abilities of speakers to use it effectively for a variety of purposes. Nevertheless, where there is effective practice, such as the ability on the part of speakers to formulate determinate claims in an area, then it is also true that one can explicate the conditions under which such claims could in principle be validated. This is not to say, of course, that humans formulate determinate claims with determinate validating-conditions whenever they use a declarative sentence with a view to making an assertion. It is certainly possible (and very frequently happens) that language is used to formulate "claims" which are relatively indeterminate.

5) Objection: You have suggested that every individual set of validating conditions provides one inference-rule for going from evidence for a claim to that claim. Are you saying that we do in fact somehow have these rules in our mind? Secondly, do the inference-rules when formulated exhaust the validating-conditions or not?

Reply: First of all, I am not saying that we have somewhere embedded in our minds formulated rules for validating claims. I have no interest in attempting to characterize how validating-conditions are held in the mind. I am only concerned to point out that our knowledge of what is meant by a claim is intertwined with our knowledge of the conditions under which that claim is validated. The



form in which that knowledge is comprehended (if such a locution makes sense at all) is irrelevant.

Secondly, since one must fulfil the total set of conditions (excluding those cases where one has a set of alternative validating-conditions), there is one inference-license for every distinctive claim, an inference-license of the form "If conditions a, b, and c are fulfilled, then X is true." For example, "If some given figure is solid and has eight sides, then it is an octahedron."

Notice, however, that when our knowledge of validating-conditions for a type of claim is the result of having been exposed to a wide variety of defining cases, it may be exceedingly difficult to put into specific terms the validating-criteria which are implicit in those cases. For example, consider claims of the form "X is acting selfishly." If one attempts to formulate a general inference-rule which makes explicit the validating-conditions for such a claim one would probably have to make do with something like the following: "If in some given circumstance or situation, a person X acts in such a way as to fail to take into account the legitimate needs, rights, feelings, or desires of another person Y, then X is acting selfishly with respect to Y." However, in any given situation one would still have to determine what is to count as a legitimate need, right, feeling, or desire. It is for this reason that in case of such an assertion as "X is acting selfishly" the best way to clarify the appropriate validating-conditions is not simply by formulating in words a set of criteria (though this may be of some help even here) but rather

by characterizing those cases which are relatively clear-cut but which bear some form of significant similarity to the case under consideration. In other words, for some kinds of claims one properly characterizes the validating-conditions by characterizing those cases which give content to the claim. The verbal description of those cases may be helpful only in conjunction with those cases.

6) Objection: If you "validate" a claim in your sense of that term, could it then turn out to be false because you failed to consider some evidence which was relevant?

Reply: It could prove to be false only if one had either misdescribed what is sufficient to validate the claim at issue or had made a mistake in the gathering of evidence. In other words, suppose that we characterized the validating-conditions for claim X as being a, b, and c, and suppose that we afterward fulfilled conditions a, b, and c and so claimed validation. Suppose further that some new evidence d, was presented which we had not considered which we had to admit overturned X, then one of two things are true: a) we have in some sense modified the meaning of X, or b) we did not originally do a satisfactory job of describing the validating-conditions. In short, to say that some set of conditions, say a, b, and c, are sufficient conditions for the validation of claim X is to say that if a, b, and c are fulfilled X is true. It is true because the meaning of X is given in terms of the fulfilment of a, b, and c. This does not mean, of course, that

one might not make a mistake in the process of validation.

7) Objection: You suggest that what the deductive logician accomplishes by explicating the inference-rules implicit in the usage of syntactic words such as 'and', 'or', 'if-then', and so forth is nothing more than the explication of the validating-conditions for a limited class of claims. This makes it sound as if we used such words in only a limited number of instances of reasoning and that "deduction" in the sense of "sentential transformation" rarely occurs. This seems misleading.

Reply: I would agree that it would be misleading to claim that syntactic words like 'and', 'or', 'some', and 'not' are used only in reasoning in which the claim advanced was simply a claim to sentential transformation. I would agree also that "deduction" or sentential derivation (on the basis of the rules of manipulation of truth-functional constants and quantifiers) frequently occurs in reasoning, even if the central claim is not reducible to one of sentential derivation. Furthermore, calculation, generally speaking, is an extremely important human tool which finds a use in the process of settling many different kinds of questions.

Nevertheless, this does not change the fact that the inference-rules implicit in the usage of truth-functional constants and quantifiers can be used to test "validity" (i.e., whether or not a prima facie case for validation has been achieved) only in those cases in which the focal claim at issue is a claim to sentential derivation. If the claim at issue is other than a syntactic claim and yet involves a syntactic claim, then these syntactic inference-rules can be used to test

that part.

I would welcome a study which concerned itself with moving toward an answer to the following problem: 'To what extent and in what ways do the inference-rules implicit in truth-functional constants and quantifiers play a part in the validation of claims of various types?' Unfortunately, little systematic work has yet been done on this problem.

8) Objection: You have suggested that one weakness of the matter/form distinction as a means of accounting for the subject matter of logic is that given it, it is not possible to account for how it is that inductive, modal, and deontic logic can be included as sub-fields of logic. Precisely, how do you justify that claim?

Reply: Given the analysis which has been provided in this dissertation, it should be clear that:

- 1) The field of deductive logic is taken to deal with all of those cases of reasoning whose validity is justified in virtue of "form" alone.
- 2) Inductive logic, on the other hand, is assumed to deal with reasoning whose validity or goodness cannot be justified in virtue of "form" alone.
- 3) The term 'form' is in fact given content by explicating the rules for the manipulation of truth-functional constants and quantifiers.
- 4) Modal and deontic logic, on the other hand, are concerned with the inference-rules which are generated by a set of non-syntactic concepts: (which are neither truth-functional constants nor quantifiers): necessity, possibility, impossibility, obligation, and permissibility.

If one brings these four facts together it should be clear that it is

not possible both to claim that logic is concerned only with the "form" of reasoning and to claim that logic includes inductive, modal, and deontic, as well as deductive logic.

Furthermore, it should also be clear at this point how each of these areas of contemporary logic can be accounted for under a conception of logic as theory of validation. Deductive logic is properly understood as a study of the validating-conditions (and therefore the inference-rules) appropriate to claims to sentential derivation. Inductive logic can be understood in any one of three ways (which are not equivalent): 1) as a study of the validating-conditions (and so the inference-rules) appropriate to probability-claims, 2) as a study of the validating-conditions (and so the inference-rules) appropriate to establishing the truth of generalizations, or 3) as a study of the validating-conditions (and so the inference-rules) appropriate to establishing the truth of non-syntactic claims.<sup>2</sup> Modal logic can be understood as a study of the validating-conditions (and so the inference-rules) appropriate to establishing the truth of claims of the form: a) 'It is possible that p', b) 'It is necessarily true that p', and c) 'It is impossible that p'.<sup>3</sup> And finally, deontic logic can be understood as a study of the validating-conditions (and so the inference-rules) appropriate to establishing the truth of claims of the form: a) 'It is obligatory that p' and b) 'It is permissible that p'.<sup>4</sup>

9) Objection: You have suggested that every sound instance of reasoning

can in principle be reconstructed in deductively valid form, though (you say) it is not this form which renders the reasoning sound. What then is the value, if anything, in casting reasoning in deductively valid form?

Reply: As I see it, the one value to putting reasoning into deductively valid form (excluding of course the case where one is dealing simply with reasoning involving syntactic claims) is that it forces the reasoner to make clear to himself what he is willing to commit himself to and what he is not.

For example, suppose we were confronted with the following reasoning in some particular context: 'X is inefficient, so he ought to be fired'. As the reasoning stands here we would not have enough information to evaluate the reasoning. We could not simply assume that the reasoner is prepared to commit himself to the principle that inefficiency in itself is a sufficient condition in all cases for firing a worker, for, upon being pressed, the reasoner might move to a variety of possible commitments.

He might, for instance, accept the following:

- 1) Generally speaking, if a worker is inefficient, then he ought to be fired.
- 2) X is an inefficient worker.
- 3) Therefore, X probably ought to be fired.

On the other hand, the reasoner may claim that it is not merely probable that X ought to be fired but certain because, though there are circumstances and cases in which an inefficient worker ought not to be fired, X's case is not one of them. In such a case, we could

set out his reasoning in the following form:

- 1) Unless the circumstances are exceptional, an inefficient worker ought to be fired.
- 2) X is inefficient and his case is not exceptional.
- 3) Therefore, X ought to be fired.

Or again, upon being pressed the reasoner might claim to be able to spell out all of the exceptional conditions, in which case we would set out his reasoning in the following form:

- 1) If a worker is inefficient, then he ought to be dismissed, except in circumstances a, b, c, ...
- 2) X is an inefficient worker, but circumstances a, b, c, ... are not present in his case.
- 3) Therefore, X ought to be dismissed.

Or, finally, upon being pressed, the reasoner may respond in this way: "There are surely some cases in which an inefficient worker ought not to be dismissed, and I can think of some of these cases, though I doubt that I or anyone else could definitely list all of them." In this case we could represent his reasoning in the following way:

- 1) There are cases in which inefficient workers ought not to be dismissed.
- 2) In all other circumstances, an inefficient worker ought to be dismissed.
- 3) It is not possible to list a priori all of the exceptional cases (each case must be decided when it arises)
- 4) X's case, upon examination, proves to have no extenuating features.
- 5) Therefore, X ought to be dismissed.

What is clarified in each case is the reasoner's interpretation of one set of validating-conditions for the claim 'X ought to be dismissed'. It should be noted, therefore, that the logician's work is not completed when he can lay out the reasoning in one of the above

(deductively valid) forms. He must still decide which of these forms (if any) provide a legitimate description of the validating-conditions appropriate to the claim at issue.

10) Objection: In what precise sense does your account of the subject matter of logic make logic a "descriptive" discipline?

Reply: Part of the problem of accounting for the subject matter of logic is that of making intelligible what the source is that the logician makes use of in analyzing and evaluating reasoning. How is it, that is, that the logician is able to tell us what the standards are by which to evaluate our reasoning? What data does he have at his disposal which makes it possible for him to gather information concerning the inference-licenses which are sufficient to go from evidence to conclusion when we make claims upon the basis of evidence? The theory of inference which has been developed in this paper (and which is implicit in the "ordinary language" or "Oxford" school of linguistic analysis) provides a general answer to these questions.

The standards which are appropriate to the evaluation of reasoning are implicit in the conditions under which words are intelligibly used in human contexts to make assertions or claims which are understood or understandable by other speakers of the language used. Inference-rules proper to claims of sentential derivation for example are implicit in the usage of such words as 'and', 'or', etc. ... By the same token, if logicians provide a careful study of the field of cases and contexts in which, say, generalizations are formulated and



validated, then it should be possible to make progress in the direction of explicating what the validation-conditions and their implicit inference-rules are which are operative in those cases and contexts. There may be, of course, many particular problems which will have to be solved in developing and refining techniques for the analysis of language usage before it will be possible to formulate any definitive judgments in areas such as these. But in any case, the general intelligibility of the operation should be clear. In developing tools for the analysis and evaluation of reasoning the logician is engaged in the down-to-earth task of examining and describing the behavior of symbols which have an established usage, a usage which is antecedent to the logician's concern with that usage and independent of his will or personal predilections.

The logician fulfils his responsibility only to the degree that he examines all of the linguistic data which are relevant to a faithful description of how it is that the symbols with which he is concerned do behave (in the contexts in which they function). For example, the fundamental responsibility of the deductive logician is to empirically explicate those rules of manipulation of the words 'and', 'or', 'not', and so forth implicit in our usage of these words. It is perfectly proper to say that these words had a logic before they were ever studied by any logician. These words, and countless others, have been properly manipulated many countless thousands of times before any logician concerned himself with them. Furthermore, it was certainly possible to recognize proper manipulation of them and improper manipulation of

them without having the rules or inference-licenses implicit in that usage explicated for us by logicians. These facts are, of course, not peculiar to this limited class of words. They are applicable to language usage generally. The ability of language speakers to frame intelligible assertions and questions and to recognize implicitly as part of their understanding of those assertions and questions what is and is not relevant to the validation and settlement of them antedates and is totally independent of the will or fiat of any logician. In fact, if it were not possible for speakers of a language to recognize when intelligible assertions and questions are formulated and what is proper to their validation and settlement, there would be no data for the logician to analyze and therefore no possibility of his making explicit what the various inference-licenses relevant to the validation of claims of various types are. The inductive logician, for example, cannot simply stipulate by fiat that such-and-such are the conditions under which generalizations and/or probability-claims are validated. His task is a descriptive one in the sense that he must explicate the validation-conditions which are implicit in those clear-cut cases of proper generalization which we can (presumably) already in some sense recognize without that explication. If we could not be sure of any cases, then we would have no way of telling when some proposed explication was successful. The same holds for the modal logician and the deontic logician. The logician is not free to stipulate by fiat whatever validation-conditions he fancies for claims of the form 'It is necessary that p', 'It is impossible that p', 'It is possible

that p', 'It is obligatory that p', 'It is permissible that p'. These validation-conditions are in some sense implicit in the established usage of the concepts of 'necessity', 'impossibility', 'possibility', 'obligation', and 'permissibility'. We can already validate some particular claims in each of these general types. What we don't have is an explicit formulation of the inference-rules which we are using when we do properly carry out such validation. The task of the logician is to provide such explication and so bring out into the open what is already implicit in our practice.

For this reason, it is important in each area of logic that the logician take special care to assemble a large sampling of particular claims of the various general types with whose validation-conditions he is concerned and to develop explicit techniques for analyzing such a sampling of cases. Logicians, because they have not explicitly recognized the nature of the task which they face in developing tools for the evaluation of reasoning, have not really attended to the multiple problems involved in collecting and analyzing sets of linguistic data relevant to a faithful description of the validation-conditions of classes of claims of differing logical types. Only in deductive logic, where by far and away the most progress has been made, have logicians paid very close attention to what might be called the relevant linguistic data (in this case, the manner in which 'or', 'and', 'not', and so forth are used).

Putting this in broader terms, logic, as a generalized discipline, is or should be descriptive in the sense of having the responsibility

of explicating a definable though complex area of the logic of language, of bringing out into the open through systematic and neutral case examination those rules of language which express or govern the conditions under which claims of various types are properly validated. Logic does not simply have the task of considering only the "form" of language (whatever that would mean). Nor is there any way in which logic can avoid problems in the analysis of meaning or in making judgments concerning the conditions under which assertions are validated.

11) Objection: You have suggested that the contemporary model for the analysis of reasoning does not sufficiently take into account the full complexities involved in analyzing and evaluating reasoning. Could you compare the model which you are recommending with the presently accepted model in such a way as to make explicit why this is so?

Reply: Contemporary logicians, insofar as their logic texts indicate their positions, tend to fall into two groups: those who more or less explicitly defend a purely formalistic conception of logic and those who, though mainly concerned with deductive (formal) logic, yet make explicit allowance for the premise that there are instances of reasoning whose soundness is not a function of their "form" (or of formal characteristics).

The purely formalistic model for the analysis of reasoning would essentially be this. For any instance of reasoning:

- 1) Write out the set of sentences which express the premises of the reasoning.

- 2) Write out the sentence which expresses the conclusion of the reasoning.
- 3) Ignore the question as to whether the sentences which express the premises and conclusion are individually true.
- 4) Translate the sentences which express the premises and conclusion into symbols so that the displacement of truth-functional constants and quantifiers with respect to predicates and terms is properly represented.
- 5) By considering the various legitimate inference-licenses which are implicit in the usage of 'and', 'or', 'not', ... determine whether the symbolic formulas which express the conclusion can be derived from the symbolic formulas which express the premises.
- 6) If the formula which represents the conclusion can be so derived, then the conclusion is entailed by the premises and so the reasoning is valid. If the formula which represents this conclusion cannot be so derived, then the conclusion is not entailed by the premises and the reasoning is invalid.

The "dualistic" model would differ from the above only in the sense that the analyst would first decide whether the reasoner is claiming to be conclusively justifying his conclusion or only partially justifying it. If the former, then the formalist model applies. If the latter, then, presumably some other set of standards apply. However, since there is no agreement among logicians as to the appropriate standards for evaluating "non-deductive reasoning", this latter area is largely ignored in logic texts. The net result is that the model for the evaluation of reasoning which most students of logic pick up is the formalist model.

However, if one comes back to the notion that reasoning consists in the attempt to substantiate claims with evidence and to a recognition of the fact that a) the term 'evidence' is not properly taken to

be equivalent to the term 'premise', b) that reasoning is successful to the degree that the evidence which is advanced fulfils the validating-conditions for the claim at issue, and c) that the clarification of the "meaning" of a sentence which purports to make an assertion is intertwined with a clarification of the conditions under which that assertion could in principle be validated or falsified, then one is in a position to see that the process of evaluating reasoning is (or should be) much more complex than what is suggested by traditional theory. An attempt to substantiate or justify a claim or conclusion upon the basis of evidence may misfire in any of the following ways:

- a) The justification or substantiation of a claim arises, practically speaking, in some context in which such justification is deemed of importance. It should be recognized therefore that it is possible for someone to raise a question or to argue for a conclusion which is not indeed relevant or significant in the context in which it is raised.
- b) Claims and evidence are formulated in words or symbols of some kind. If, therefore, the formulation of a claim or the formulation of the evidence upon which the claim is based is in some way "defective", then the reasoning itself is in some sense defective. There are at least two distinctive ways in which the formulation of a claim can be defective:
  - 1) if it is unclear as to what precisely is being claimed (and so unclear as to what evidence would in principle be relevant to its validation), and
  - 2) if the assertion is so formulated as to suggest or presuppose something to be true which as a matter of fact is false or questionable.

- c) The reasoner will not succeed in his objective to validate or justify his claim if the evidence which he has advanced in its support is either insufficient or irrelevant.
- d) The reasoner will not succeed in his objective if he has not properly gathered the evidence which he is advancing in support of his claim.

Recognizing this, one can construct a new model for the analysis of reasoning, one which draws attention to the various ways in which an attempt to justify a conclusion upon the basis of evidence can fail. One can express this model as a series of questions whose correct answers bear upon whether or not any particular reasoner has succeeded in justifying or validating his claim:

- 1) Is the claim which is being advanced relevant and significant in the context in question?
- 2) Is the sentence which expresses the conclusion "determinate" in the context in which the conclusion is being advanced? (i.e., is it sufficiently clear as to what is being claimed to be able to formulate what evidence would in principle validate or falsify that claim?).
- 3) If the sentence which expresses the conclusion is sufficiently determinate, are there any assumptions implicit which are subject to question?
- 4) If the sentence which expresses the conclusion is determinate and free from questionable assumptions, what are the conditions under which such a claim is properly validated or justified?
- 5) Are the sentences which express the supposed evidence themselves determinate and free from questionable assumptions?
- 6) Have the sentences which express the evidence been themselves properly validated or justified?
- 7) Does the reasoning contain sentences which express evidence and others which express the validating-conditions for the claim at issue? (If the reasoning simply contains sentences which presuppose that the conclusion has already been validated, is that significant in the context in question?)

- 8) Are the sentences which express the validating-conditions accurate and complete?
- 9) Does the evidence expressed (if true) fulfil or meet the validating-conditions described (if accurate and complete)?

Of course, it should be noted that some of these questions can be set aside. For example, for one purpose or another the logician may properly abstract from the question as to whether some particular claim is relevant and significant in the context in which it is advanced, or from the question as to whether the claim advanced suggests or implies some questionable assumption, or again, from the question as to whether the sentences which express the evidence have themselves been properly validated or justified. On the other hand, one cannot ignore the question as to whether or not the claim or evidence are determinate, nor the problem of explicating the validating-conditions for that claim.

13) Objection: Independent of whether or not the form/matter and truth/validity distinctions are fully satisfactory, they have nevertheless provided some sort of a prima facie explanation of how it is that the subject matter of logic is to be distinguished from that of other disciplines. Since you reject these distinctions as they are presently drawn, what can you put in their place? How is it possible, given the theory of logic which you have been defending, to distinguish logic from other disciplines?

Reply: I suggest that it is possible to give both the truth/validity and the matter/form distinctions a new construal, one which will serve



to indicate in general how the domain of the logician differs from that of the particular disciplines without at the same time suggesting an oversimple picture of the variety of considerations which are relevant to the evaluation of reasoning.

Traditionally, the truth/validity and matter/form distinctions are drawn in such a way as to suggest that there are only two basic questions which can be raised concerning the soundness of reasoning, one of which (Are the premises true?) falls outside of the domain of the logician. This leaves the logician with the question 'Is the conclusion entailed by the premises?'. If we replace these two questions with the nine questions listed above, it is possible to describe in much more detailed form what sorts of tasks fall outside of the area of competence of the logician and what would not.

In general the special competence of the logician (given the theory of logic developed in this essay) is that of a language analyst, specializing in the analysis of the assertion-making, question-answering function of language. In order to develop skill in the analysis and evaluation of reasoning, the logician needs:

- a) special competence in sorting out language usage which formulates claims from language usage geared to other functions,
- b) special competence in rendering explicit the validating-conditions appropriate to claims of divergent logical types (special competence in rendering explicit the settlement-conditions for questions of divergent logical types),
- c) special competence in laying out reasoning in such a way as to make explicit whether or not a prima facie case for validation has been established,

- d) special competence in distinguishing claims and questions which differ with respect to their validation- and settlement-conditions,
- e) special competence in locating indeterminacy in the formulation of claims or evidence for claims,
- f) special competence in the classification of questions and claims into types according to the kinds of problems which arise in settling those questions and validating those claims.

What the logician does not have is:

- a) special competence in the formulation of problems within any particular domain. (For example, the logician is in no position to tell, say, physicists or historians or economists, what problems they ought to be concerned with.)
- b) special competence in the development of concepts, tools, principles, or procedures for the solution of problems within some particular discipline. (Only physicists, historians, and economists, for example, are qualified to develop the conceptual frameworks and the procedures by which problems in their respective areas are solved).
- c) special competence in the gathering of evidence or data to be used in solving problems within any given domain. (For example, the logician's special training as a language analyst would not entitle him to claim special competence in the gathering of evidence within physics or historical or economic research.)

The logician's task, then, insofar as he involves himself in analyzing and evaluating instances of reasoning which occur within some specialized discipline such as physics would be purely analytic and ex post facto. The logician can enter the picture only after problems have been formulated and concepts, principles, and procedures developed for handling those problems. His job, with respect to any given instance of reasoning, would be that of analyzing out from established practice what the relevant validating-conditions are for the claim at issue in the reasoning, along with an explication in particular terms

of the evidence advanced for that claim. If he can carry out these analytic tasks he can then determine whether the reasoner in question has a prima facie case for validation or not.

In other words, the logic of physics, as well as the logic of all questions which physicists formulate is implicit in the practice of physicists. It is implicit in the concepts they utilize, the problems they formulate, the principles, techniques, and procedures by which they go about attempting to solve those problems. If some decision is to be made to change that logic, to modify the validating-conditions for some kind of claim within physics, and so to modify the inference-licenses which justify going from data of some kind to some given type of claim or conclusion, that decision is properly made not by logicians (not even by those who study the logic of physics), but by physicists themselves.

It is possible, therefore, to distinguish two different senses of the word 'valid' when applied to a line of reasoning. On the one hand, to say that a given line of reasoning is valid is to say that the reasoner has succeeded in validating or justifying his claim. This is to say that the reasoning is without defect, that each of the various ways in which an attempted validation can fail or misfire has been checked. This is the broad sense of that term. On the other hand, the word 'valid' can also be used to say that some given instance of reasoning meets the conditions appropriate to establishing a prima facie case for validation. In this latter sense, one is not claiming in an unqualified form that the assertion at issue has been validated,

but rather that the evidence advanced (if properly gathered) meets the presently accepted validating-conditions for a claim of its type. It is in this latter sense of 'valid' that one can say of an instance of reasoning that it is in proper "form". Being "formally" correct, on this view then, constitutes being in the proper validation-form, not in being in some given syntactic form.

In short, the task of determining whether or not a given instance of reasoning is "formally valid" would be that of determining whether or not it could be put into the form:

- 1) The validating conditions for claim X are a, b, c, ...
- 2) Evidence E which has been gathered meets conditions a, b, c, ...
- 3) Therefore, claim X is justified (validated).

In each case, the job of putting a line of reasoning into a form which tests its "validity" (in the narrow sense) requires filling out the above schema with the appropriate information for the case in question (a formulation of validating-conditions, a formulation of evidence, a formulation of the precise claim being made). The "content" of the reasoning with which the logician does not deal is a) the actual gathering of the evidence which purports to fulfil the appropriate validating-conditions and b) the actual development of validating-conditions for the claim.

## Chapter Five

Notes

<sup>1</sup> Whether or not it is possible from a practical point of view to claim that one has considered all possible evidence with respect to a conclusion I leave as an open question. It would appear that in some cases this would be a possibility, while in others, not.

<sup>2</sup> John Stewart Mill is one who characterizes inductive logic in such a way as to assign to it the investigation of the validation-conditions proper to generalizations. "Induction", he says, "may be defined as the operation of discovering and proving general propositions". Of course, he also holds that "individual facts" are validated or verified in the same way that "general facts" are: "It is true (as already shown) that the process of indirectly ascertaining individual facts is as truly inductive as that by which we establish general truths." See his A System of Logic, Longmans, Green and Co., London: 1961., p 186.

As an example of one who defines inductive logic as dealing with the conditions under which probability-claims are established, see Copi: "It is customary to distinguish between deductive and inductive arguments. All arguments involve the claim that their premises provide evidence for the truth of their conclusions, but only a deductive argument claims that its premises provide absolutely conclusive evidence." In his Symbolic Logic, op. cit., p 4.

For an example of one who considers inductive logic an inquiry into the conditions under which an individual premise is justified as against the conditions under which a move from a set of premises to conclusion is justified, see Bernard F. Huppe and Jack Kaminsky's Logic and Language, Alfred A. Knopf Co., New York: 1957, p 164: "Deductive logic is primarily concerned with the relationship between premises and conclusion... (But) the best kind of argument depends upon both logical relationships and reliable premises. Inductive logic concerns the means of attaining reliable beliefs".

<sup>3</sup> "Modal logic", says A. N. Prior, "studies the logical features of necessity, possibility, and impossibility and related concepts." These concepts, he claims, "are primarily expressed by certain adverbs and auxiliary verbs and verb phrases---possibility by forms like 'Possibly p', 'It is possible that p', 'It could be that p'; necessity by 'Necessarily p', 'It is necessary (necessarily true) that p', 'It is bound to be the case that p', 'It must be that p'." Encyclopedia of philosophy, op. cit., p 5, vol. 5.

Two qualifications should be noted here. I am not claiming that every project engaged in by logicians under the label of "modal logic" will consist in an inquiry which is in fact properly construed as a study of the validation-conditions for claims of the form 'It is

possible that p' ... and so forth. Secondly, I am not here claiming that it is possible to set out one set of validating-conditions which hold for every claim of the form 'It is possible that p' or for every claim of the form 'It is necessarily true that p' or 'It is impossible that p'. Before we would be in a position to make such a claim we would have to have analyzed the variety of cases in which such assertions occur and are substantiated. To see what constitutes a beginning to such an analysis, see Stephen Toulmin's analysis of the use of expressions of the form 'It is probable that p' (Chapters One and Two, "Fields of arguments and modals" and "Probability" in his The uses of Argument, op. cit.).

4 Prior characterizes deontic logic in a manner quite similar to that of modal logic:

Deontic logic, or the logic of obligation, is the area of thought in which we formulate and systematize such "principles" as that nothing can be obligatory and forbidden at once and that whatever we are committed to by doing what is obligatory is itself obligatory. It differs from ethics in that it does not pronounce upon questions concerning what is in fact obligatory... and from pure formal logic in that it formulates principles specific to the concept of obligation and allied problems... (Encyclopedia of Philosophy, op. cit. p 509, vol. 4)

If a context arises in which a question of the form 'Is it obligatory that p?' or 'Is it permissible that p?' arises, then the evaluation of the attempt to justify an answer to that question by advancing evidence will depend upon the logician's ability to make clear the conditions under which such a question is appropriately settled and its answer validated. Now whether the attempt to systematize such principles as 'Nothing can be obligatory and forbidden at once', 'Whatever we are committed to by doing what is obligatory is itself obligatory', and so forth aids in such evaluation I leave as an open question.

Finally, we should note why it is that the subject matter of neither modal logic nor deontic logic can be construed as a concern with the "form" of reasoning in exclusion to its "matter" or "content". The notion of reasoning having a form, you will recall, was given specific content by deductive logicians in terms of the possibility of deriving or transforming sentences from one another in virtue of the displacement within those sentences of truth-functional constants and quantifiers ('and', 'or', 'not', 'if-then', 'all', 'some',...). But the set of concepts whose usage forms the subject matter of modal and deontic logic ('necessary', 'possible', 'impossible', 'obligatory', 'permissible') are neither truth-functional constants nor quantifiers. Their application-conditions cannot be given by truth tables and it is doubtful that it makes any sense to claim that whatever application-conditions they have makes it possible for us to formulate the conditions

under which sentences can be derived or transformed simply in the light of their displacement in those sentences (in a manner analogous to that of truth-functional constants and quantifiers). If one makes a claim of the form 'It is possible that p', for example, I would argue as does Toulmin, that evidence for that claim cannot be determined to be either relevant or sufficient without an analysis of the meaning of 'p'. The criteria which determine the relevance and completeness of evidence for the claim 'It is possible that Arthur Ashe will be chosen as a member of the Davis Cup team' emerges from an analysis of this particular assertion and would differ significantly from that proper to the claim 'It is possible that we will have an earthquake in California in the next three days.'

## Chapter Six

### THE SUBJECT MATTER OF LOGIC REVISITED: SUMMARY AND CONCLUSION

#### Introduction

This dissertation was begun with a relatively detailed analysis of the problem of accounting for the subject matter of logic. An attempt was made to explicate the full complexity of this problem, along with the requirements which must be met for its solution. Two general requirements were characterized: a) the development of a clear explanation of what the generalized subject matter and objective are and of how (if at all) this generalized subject matter and objective are partitioned up into sub-fields, and b) the development of a clear specification of the extent to which logic as a generalized field is concerned with "the logic of language". Each general requirement was in turn broken down into more specific requirements. The first was divided into the three-fold need for: 1) a specific explanation of the sense in which deductive logic, inductive logic, modal logic, and deontic logic partition up the subject matter of logic, 2) a specific explanation of the sense in which logic as a generalized field is concerned to develop the tools for analyzing and evaluating reasoning, and 3) a specific explanation of the precise role which the matter/form distinction plays in accounting for the subject matter of logic. The second requirement was in turn divided into the three-fold need for: 1) a specific explanation of the extent to which a concern with "the logic of language" is compatible with the



logician's expressed interest in reasoning, inference, and the evaluation of evidence, 2) a specific explanation of the sense in which the logician is concerned with the logic of "words", "assertions", and "questions", and 3) a specific explanation of the degree to which the practical task of evaluating reasoning and inference is intertwined with problems of analyzing "meaning".

In the body of this paper I have systematically attacked traditional logical theory at the same time that I was systematically defending an alternative conception of logic. With this criticism and defense in the background, we are now in a position to review the requirements for a solution to the problem of accounting for the subject matter of logic, indicating why it is that traditional logic cannot (while the theory which we have developed can) meet them.

#### Contemporary logical theory

For all of the talk of formalist logicians concerning the necessity for self-consciousness in the utilization of assumptions, there has been little critical attention given to the extent to which logicians are making seemingly incompatible statements about the subject matter of logic. On the one hand, the general objective of logic is identified as being the development of tools for the analysis and evaluation of reasoning (evidence advanced for a conclusion), while, on the other hand, the claim is made that logic deals only with the "form" or "validity" of reasoning (which we find upon examination is in fact a concern not with evidence as such but with syntax). On the

one hand, it is claimed that the subject matter of logic can be accounted for by means of the matter/form distinction (the logician dealing with form alone and not with "matter" or "content") and yet, on the other hand, it is admitted that logic deals in part with "inductive reasoning" which, we are told, is not justified in virtue of its "form". Contemporary logical theory highlights the fact that inference-rules are implicit in the usage of syntactic words like 'and', 'or', 'if-then', 'not', and so forth, but at the same time misses the fact that the logic of natural and technical languages extend much beyond the usage of this limited set of words. Allowance is made for modal and deontic logic (which focus, presumably, on the inference-rules peculiar to the concepts of necessity, possibility, impossibility, obligation, and permissibility), but there is no allowance made for the logic of any other concepts (or for the inference-rules implicit in their usage).

The result is a theory of logic which is fragmented, inconsistent, and incapable of providing a cohesive and coherent account of the overall subject matter of logic. The theory is plausible only if one isolates and compartmentalizes its various parts. If, however, one brings these parts together (as the problem of accounting for the subject matter of logic demands) reconciliation and consistency is not possible. For example, if one accepts the fact that inductive logic, modal logic, and deontic logic are all parts of the total subject matter of logic, then it is not possible to maintain at the same time that logic

as a generalized field is concerned only with the "form" and never the "matter" or "content" of reasoning. Secondly, if one accepts what logicians say of the generalized objective of logic (namely, that the fundamental goal is the development of tools by which one can determine when evidence advanced in justification for a conclusion is satisfactory and when it is not), then it is not reasonable to maintain the claim that logicians must restrict their attention to "form" and "syntax".

Furthermore, there is no way to reconcile the claim that logic is concerned with conditions which justify inferences with the practice of studying only a very limited set of inference-rules (those implicit in the usage of truth-functional constants and quantifiers). Both our practical experience as reasoning-beings and our growing appreciation of the fact that both natural and technical languages have a sophisticated logic (which cannot be reduced to syntactic manipulations) argues against the formalistic notion of logic which dominates the work of professional logicians today. The model for the analysis and evaluation of reasoning which has been developed by these logicians grossly oversimplifies the multiplicity of considerations which must be raised in facing up to the actual problems which stand in the way of the successful evaluation of evidence advanced in the justification of a conclusion.

Of course, there is no reason why formalist logicians could not back off from the wide-ranging claim that they are developing

tools for the evaluation of "conclusive reasoning" wherever that reasoning occurs, and explicitly limit themselves to the study of syntactic relations between sentences, formal systems, and uses for formalistic concepts and tools. These are, in fact, the projects upon which they do work. Given their practice, therefore, it would seem quite reasonable for formal logicians to admit that the discipline in which they are working is no longer centrally concerned with the general problem of developing tools for the analysis and evaluation of reasoning.

There are two basic reasons, in my judgment, why this admission has not been forthcoming: 1) formal logicians are still included in departments of philosophy and so must in some sense justify their work in relation to the recognized interests and objectives of philosophers (logic as an instrument for the evaluation of reasoning clearly qualifies, while logic as a purely formalistic discipline is questionable), and 2) most formalist logicians still believe that analysis and evaluation of the "form" or "syntax" of reasoning is the crucial task to carry out in evaluating reasoning (all that is left, they tell us, is the determination of the "truth" of the premises and that is not the task of the logician).

#### Logic as theory of validation

To conceive of logic as theory of validation (in contrast to a formalistic notion of logic) is to provide a cohesive and coherent solution to the problem of accounting for the subject matter of logic.

It explicitly recognizes that the inference-rules implicit in the usage of truth-functional constants and quantifiers are only a small part of the many multiple inference-rules which are implicit in our usage of natural and technical languages; in this way it accounts for the inference-rules generated by traditional deductive logic, while at the same time putting the significance of them into perspective. It squares with our practical experience of engaging in the evaluation of attempts to justify conclusions on the basis of evidence. It can be used to account for the inclusion of inductive, modal, and deontic logic as sub-fields of logic, while at the same time indicating what is unsatisfactory with taking these fields to be exclusive and exhaustive. It accounts for how logic relates to 'the logic of X' locution (the field of logic dealing with that area of the logic of language called "the logic of questions and assertions").<sup>1</sup> It accounts for how it is that logic as a general discipline relates to the analysis of language and its "logic" (in doing so, it provides a means of seeing in relatively clear terms what data the logician properly examines as a basis for explicating the conditions which evidence for various claims must meet). It indicates in fairly explicit terms what direction logic should follow to further refine the tools available to us for the analysis and evaluation of reasoning.

What is more, given this theory of logic each of the faulty assumptions implicit in contemporary theory can be removed and a defensible one put in its place:

- 1) We can explicitly recognize that not all premises in reasoning express evidence.
- 2) We can explicitly recognize that no evidence for a conclusion (when distinguished from the validating-conditions for that conclusion) ever entails it.  
  
And furthermore, we can explicitly recognize that it is always in principle possible to lay out an instance of reasoning in deductively valid form if one puts a verbal formulation of the validation-conditions for the claim at issue within the premises and if the evidence fulfils these conditions.
- 3) We can explicitly recognize the limited function of examining the syntactic form of the sentences in which reasoning is expressed.
- 4) We can cease to be troubled by the notion that probability - claims or generalizations have a special problem of justification which "deductive reasoning" does not. (The problem of justifying an inference from evidence to conclusion is always the problem of making explicit what the validating-conditions are for that conclusion. This may be more difficult in some cases than in others, but it is the same kind of problem in each case.)

In short, in a wide variety of ways a theory of logic explicitly based upon a recognition that evidence advanced in justification of

a claim is sufficient to establish its truth if and only if it fulfils the validating-conditions for that claim is superior to a theory of logic which is based on the matter/form distinction and the notion that there are only two types of reasoning. By bringing the concept of validation-conditions implicit in language usage into the foreground, it is possible to render the general task of the logician intelligible. On this theory, the logician is simply a language analyst, albeit one who limits his analysis to the statement-making, question-answering function of language. He has no special intuitive access to the nature of "proof" and needs no such special access. The logic of assertion- and question-types which he studies and explicates are implicit in established usage. Hence, the process of justifying a conclusion is no more mysterious than is the process of learning how to use words and symbols to formulate determinate claims. It is not possible in principle to separate the process of teaching someone what some claim "means" from that of teaching the conditions under which that claim is validated. If such conditions cannot be taught or formulated, then a determinate claim has not been made. If one fulfils those conditions for some given claim, then one can properly claim justification for it. The logician simply makes this process and the various ways in which it can misfire, explicit.

## Chapter Six

### Notes

<sup>1</sup>It should be clear in broad terms what the justification is for using 'the logic of X-reasoning' locution ('the logic of ethical reasoning', 'the logic of legal reasoning', 'the logic of mathematical reasoning', and so forth). For example, ethical reasoning is reasoning directed toward the validation of an ethical conclusion. Ethical claims represent a distinctive logical type insofar as they have distinctive validating-conditions and so distinctive inference-licenses operative in going from some given set of evidence or data to an ethical conclusion. To talk therefore, of the logic of ethical reasoning is to talk of the standards appropriate to the evaluation of evidence advanced in justifying an ethical claim. If logic is concerned to develop tools for the analysis and evaluation of reasoning, it must (as part of that effort) devote itself to a study of the class of ethical claims and the evidence and inference-rules appropriate to that class.



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