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philosophy and its relation to other disciplines, and reflects on the past, present, and future of the philosophical enterprise.

H. Johnstone, (ed.). *What is Philosophy?* New York: Macmillan, 1965. An anthology of pieces reflecting a variety of views on the nature of philosophy.

Stephan Körner. *What is Philosophy? One Philosopher's Answer.* London: Penguin Press, 1969. A treatment (which aims to be "intelligible to laymen and useful to beginners") of the several branches of philosophy, including reflections on its past and its contemporary situation.

Mark B. Woodhouse. *A Preface to Philosophy*, second ed. Belmont, Calif.: Wadsworth, 1980. A useful and readable account of the subject matter of philosophy as well as the doing, reading, and writing of philosophy.

*In addition, see several relevant articles in *The Encyclopedia of Philosophy*, ed. Paul Edwards. New York: Macmillan, 1967: "Philosophy," "Philosophy of Law," "Philosophy of Religion," "Metaphysics," "Epistemology," etc.

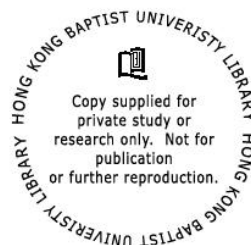
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A Little Logic

We have seen that philosophers, more than most people, strive to make their arguments, positions, and pronouncements *rational*, that is, well-conceived, well-evidenced, well-stated, and persuasive. To ensure this goal philosophers pay attention to the philosophical discipline of *logic*, which we have already defined as the study of right reasoning. Not that there is any choice about it. The philosopher can no more do without logic than the physicist can do without mathematics. It is the tool or, as someone has suggested, the "key" to philosophizing.

From the traditional logic first formulated by Aristotle to the various forms of contemporary symbolic and mathematical logic (which would seem to many like a foreign language), the science of logic has become a very complicated and sophisticated business. A real course in logic would have to take up many matters: the nature and uses of language, problems of definition, types of propositions, types of arguments, the construction and use of symbolic languages, probability theory, the nature of hypotheses and theories, etc. We cannot do much in the space of a single chapter, but a beginner in philosophy should be introduced at least to some of the bare elements of logic. An acquaintance with these is relevant not only for our thinking about the

Logic:
the key
to
philosophizing



ideas and positions represented in this book, but also for our thinking about everything, every day.

THE THREE LAWS OF THOUGHT

We might appropriately begin with the Three Laws of Thought, for in a sense they are the beginning of all thinking. Traditionally, these principles have been perceived as the rock-bottom principles of all thought and discourse, the principles that make thought and discourse even *possible*. It is important, therefore, to pay attention to these laws. They are:

1. *The Law of Non-Contradiction*
Nothing can both be and not be at the same time and in the same respect.
2. *The Law of the Excluded Middle*
Something either is or is not.
3. *The Law of Identity*
Something is what it is.

It is important to see that if these principles are not accepted as true, then nothing we think or say makes any sense, not even this very sentence. They make our ideas and words and language *stand still*, as it were, while we deal with them. Try to imagine making any claim about anything if any one of these principles did not hold. Go ahead, try!

Some comments on the Three Laws. First, at a technical level these principles actually turn out to be identical. Even so, you should try to appreciate that at the level of ordinary and practical discourse they get at very different issues. Next, as stated above these principles have a kind of metaphysical cast, expressing as they do what can or cannot *be*. They could just as easily be given an epistemological cast, expressing what can or cannot *be true*: A statement cannot be both true and false at the same time and in the same respect; a statement is either true or false; a true statement is true. Also, concerning the Law of Non-Contradiction the qualifying phrase "at the same time and in the same respect" must be emphasized. A table, for example, may indeed be red and not red at *different* times; or it may be rectangular and not be four-legged at the same time in these *different* respects; but it cannot both be and not be (anything) at the *same* time and in the *same* respect.

Further, as *fundamental* principles these cannot be shown to be true, since they are the principles by which all *other* claims may be shown to be true. It was, in fact, the Law of Non-Contradiction that Aristotle was speaking of when he said that it is the mark of an

Some comments

uneducated person not to realize that some things cannot be proved, otherwise *nothing* could be proved.

*Some, indeed, demand to have the law proved, but this is because they lack education; for it shows lack of education not to know of what we should require proof, and of what we should not. For it is quite impossible that everything should have a proof; the process would go on to infinity, so that even so there would be no proof.*¹

Do you see that there must be some "anchors" for our thinking and discoursing if our thinking and discoursing are to be ultimately meaningful? And that these anchors must be undemonstrable? Think of geometry. All its reasoning depends finally on its axioms. But there is no way to prove the axioms.

Finally, various objections to the Three Laws are inevitably raised, but they usually involve misunderstandings. *Against the Law of Non-Contradiction*: Aren't there situations which involve inherently self-contradictory factors? Answer: No. Factors in a situation may stand in *tension* with one another or in *opposition* with one another, but such conflicts do not constitute *self-contradictory* situations in which one and the same thing both is and is-not at the same time and in the same respect. *Against the Law of the Excluded Middle*: Is everything either black or white with nothing in between? Answer: That isn't a good example, for something may be *neither* black nor white; it may be gray. What the principle states is that either something is *X* or it is not-*X*, white or not-white, gray or not-gray, etc. *Against the Law of Identity*: Things change, don't they? Answer: Yes, but the principle has reference to *whole* ideas, including any change they might involve. Thus the fact that tables are always changing doesn't detract a bit from the truth that a table is a table.

Contemporary logicians sometimes question the exalted position that in the past has been bestowed on the Three Laws of Thought. It is now seen, for example, that the logical territory mapped out by these principles is only a part of the total territory. Nonetheless, they may be accepted as basic to the world of everyday discourse that most of us live in, and often crucial to philosophical reasoning as well. They still stand as important anchors of thought and discourse.

WHAT IS AN ARGUMENT?

When you see the word "argument" you might think of disagreements or quarrels, often accompanied by shouting, clenched fists, tears, and the like. Well, an argument might or might not involve these things. Consider the following interchange:

¹ Aristotle, *Metaphysics*, 1006a, tr. W.D. Ross, in *Basic Works of Aristotle*, ed. Richard McKeon (New York: Random House, 1941).

The Three Laws as
basic

Some
misunderstandings

A: Abortion is immoral.
 B: No it isn't!
 A: Yes it is!
 B: Well, what do *you* know about it?!
 A: I know more about it than you do!
 B: Oh yeah? You're an idiot!

Argument: premises, conclusion ...

There is plenty of disagreement and lots of noise here but no *argument*. An argument is an attempt to show that something is true by providing evidence for it. More technically, it is a group of propositions in which one is said to follow from at least one other. The proposition which follows from the others, that is, the "something to be shown," is called the *conclusion*; the propositions from which the conclusion follows, that is, the evidence, are called *premises*. Thus we have the argument

It is immoral to kill persons.
 Abortion is the killing of persons.

Therefore, abortion is immoral.

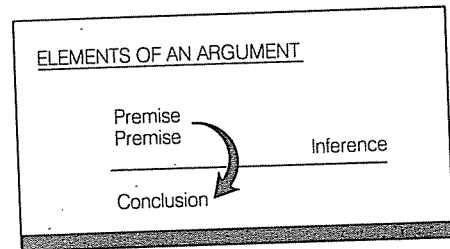
in which the first two propositions are the premises of the argument and the third is the conclusion. Naturally, in an argument not just any old propositions can serve as premises and conclusion, as in

In fourteen hundred and ninety-two,
 Columbus sailed the ocean blue.
 Switzerland exports many cuckoo-clocks.

Therefore, abortion is immoral.

... and inference

but there must be some *connection* between them. This connection, by which the conclusion is said "to follow" from the premises, is called an *inference*.



In ordinary discourse, arguments may be presented in a variety of ways. Usually, though, there are certain words or expressions that

introduce premises, and another set of words that introduce conclusions. We list here just a few of them:

Premise-signals Since, because, for, as, inasmuch as, otherwise, in view of the fact that, for the reason that.

Conclusion-signals Therefore, thus, accordingly, we may infer, which shows that, points to the conclusion that, as a result.

Can you separate the premises from the conclusion in the following argument?

... for a producer to convince the institutions which finance movies that his film will be profitable, he has to line up a "bankable" star; and if he has a project for a political movie, the star is unlikely to sign on if he doesn't agree with the film's politics. Which means that the political movies the public is getting from Hollywood today represent, by and large, the political thinking of actors.²

What is the nature of the connection between premises and conclusion—the inference—that results in arguments? Here the important distinction between *deductive* and *inductive* arguments comes into play. It is sometimes said that deductive arguments reason from the whole to the part, or from the general to the specific, as in

All humans are mortal.] ————— [universal proposition
 Socrates is a human.]
 Therefore, Socrates is mortal.] ————— [particular proposition

whereas inductive arguments reason from the part to the whole, or from the specific to the general, as in

Socrates is mortal.]
 Plato is mortal.]
 Aristotle is mortal.] ————— [particular propositions
 Vivaldi is mortal.]
 Tim is mortal.]
 :
 Therefore, all humans are mortal.] ————— [universal proposition

² Richard Grenier, "Jane Fonda & Other Political Thinkers," *Commentary*, June 1979.

Deductive and inductive arguments

While this is certainly true of *some* deductive and inductive arguments, it fails to express their real nature. What is more important, again, is the kind of connection that exists between premises and conclusion in deductive and inductive arguments. In a valid deductive argument the premises ensure, or *guarantee*, the conclusion: If the premises are true, the conclusion *must* be true also. It is a matter of necessity. In a good inductive argument, on the other hand, the premises *suggest* the conclusion ("to induce" means "to influence" or "to persuade"): If the premises are true, the conclusion is *probably* true. It is a matter of *probability*.

DEDUCTIVE REASONING

Let us consider deductive arguments a little further. What is this necessity we spoke of when we said that if the premises are true, the conclusion *must* be true? Why *must* the conclusion be true? Answer: By virtue of a relation of *entailment*, or logical implication, between terms or propositions in the premises. "To entail" means "to include" or "to involve." Thus deductive entailment has to do with the way in which a term or proposition may be included in another. And the way in which *this* may be done so as to result in a valid argument is specified by *valid argument forms*.

The most traditional and even yet one of the most common forms of a deductive argument is the *sylogism*. This is a type of argument consisting of two premises and a conclusion ("sylogism" comes from a Greek word meaning "propositions considered together").

The syllogism provides an excellent introduction to the essential nature of deductive reasoning. There are three kinds of syllogism. First, we have the *categorical syllogism*, so-called because both of the premises are categorical propositions, that is, propositions about *classes* of things, and which affirm or deny that one class is included in another class. An example of a valid categorical syllogism, or at least the *form* of one, is:

$$\begin{array}{l} \text{All } X \text{ are } Y. \\ \text{All } Y \text{ are } Z. \\ \hline \text{Therefore, all } X \text{ are } Z. \end{array}$$

A possible translation, or substitution for the symbols, might be:

$$\begin{array}{l} \text{All politicians are liars.} \\ \text{All liars are despicable.} \\ \hline \text{Therefore, all politicians are despicable.} \end{array}$$

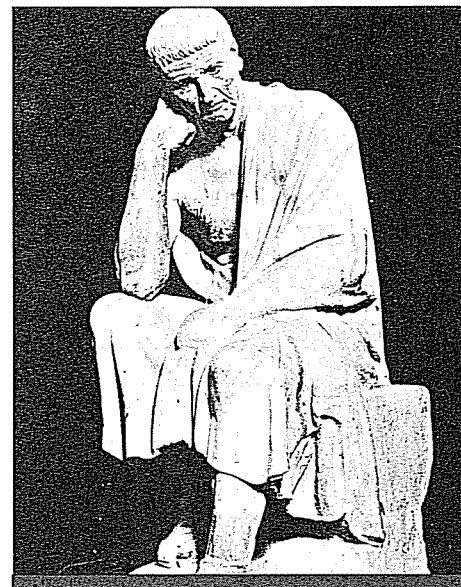
Next, there are four, and only four, forms of categorical propositions:

Logical entailment

The syllogism

The categorical syllogism

Aristotle, credited as the first to formulate systematically the principles of reasoning. His "logical works" were eventually collected and issued under the title *Organon*.



1. All *X* are *Y* (All politicians are liars).
2. No *X* are *Y* (No politicians are liars).
3. Some *X* are *Y* (Some politicians are liars).
4. Some *X* are not *Y* (Some politicians are not liars).

And there are rules, six of them, according to which categorical syllogisms may be judged valid or invalid; none of them may be violated.

- Rule 1.* A valid categorical syllogism must contain exactly three terms, each of which is used in the same sense throughout the argument.
- Rule 2.* In a valid categorical syllogism, the middle term (the term present in both premises and absent in the conclusion) must be distributed, or refer to all members of the class, in at least one premise.
- Rule 3.* In a valid categorical syllogism, if either term is distributed in the conclusion, then it must be distributed in the premises.
- Rule 4.* No categorical syllogism is valid which has two negative premises.

Rules for the
categorical
syllogism

Rule 5. If either premise of a valid categorical syllogism is negative, the conclusion must be negative.

Rule 6. No valid categorical syllogism with a particular conclusion can have two universal premises

Thus, some valid forms of the categorical syllogism are:

No X are Y .
All Z are X .

Therefore, no Z are Y .

Some X are Z .
All X are Y .

Therefore, some Y are Z .

Some X are not Z .
All X are Y .

Therefore, some Y are not Z .

Some *invalid* forms are:

All X are Y .
All Z are X .
Therefore, all Z are X .

All X are Y .
Some Z are not X .
Therefore, some Z are not Y .

No X is Y .
No Z is Y .
Therefore, no X is Z .

Do you see what makes these argument forms invalid? The first one violates *Rule 2*; the second violates *Rule 3*; and the third violates *Rule 4*. Study these examples until you see the fallacies (mistakes in reasoning) involved.

Second, we have the *disjunctive* syllogism. As with the categorical syllogism, the disjunctive syllogism takes its name from the kind of proposition it contains, namely, a disjunctive proposition. This is a proposition which poses alternatives—the alternatives, or “disjuncts,” being indicated by the words “either . . . or.” For example, “Either it rained last night or a street cleaner went by.” Unlike a categorical

The disjunctive
syllogism

proposition, a disjunctive proposition doesn’t “categorically” assert the truth of either of the alternatives; rather, it asserts that at least one of them is true, and possibly both. Thus we have the form of any valid disjunctive syllogism:

Either X or Y .
Not X .

Therefore, Y .

or

Either X or Y .
Not Y .

Therefore, X .

Possible translation:

Either it rained last night or a street cleaner went by.
It did not rain last night.

Therefore, a street cleaner went by.

There is only one rule that governs valid disjunctive syllogisms:

Rule. A valid disjunctive syllogism must contain in the premises a denial of one alternative while the conclusion affirms the other.

Rule for the
disjunctive syllogism

It is obvious how breaking this rule results in an invalid argument form:

Either X or Y .
 X .
Therefore, not Y .

Here, for all we know, X might be the case and Y too. The affirmation of one disjunct does not imply the denial of the other. Note that the argument

Either Terry is in Istanbul or he is in Bangkok.
Terry is in Istanbul.

Therefore, Terry is not in Bangkok.

which certainly appears to be valid, is no exception to this. For there is the implicit or hidden premise assumed here: “It is not possible for Terry

to be both in Istanbul and Bangkok at the same time." One must always be on the lookout for unexpressed premises.

The third form of the syllogism is the *hypothetical syllogism*, so named because the premises contain a hypothetical or *conditional* proposition. This is a proposition that involves an antecedent and a consequent, signaled by the words "if . . . then." For example, "If it rained last night [antecedent], then the streets are wet [consequent]." If both premises are conditional propositions, we have a *pure* hypothetical syllogism:

$$\begin{array}{l} \text{If } X, \text{ then } Y. \\ \text{If } Y, \text{ then } Z. \\ \hline \text{Therefore, if } X, \text{ then } Z. \end{array}$$

Possible translation:

$$\begin{array}{l} \text{If you water the lawn, then it will grow.} \\ \text{If the lawn grows, then you will have to mow it.} \\ \hline \text{Therefore, if you water the lawn, then you will have to mow it.} \end{array}$$

Rule. Any pure hypothetical syllogism is valid in which the first premise and the conclusion have the same antecedent, the second premise and the conclusion have the same consequent, and the consequent of the first premise is the same as the antecedent of the second premise.

If one premise is conditional and one categorical, then we have a *mixed* hypothetical syllogism. One valid form of the mixed hypothetical syllogism is:

$$\begin{array}{l} \text{If } X, \text{ then } Y. \\ X. \\ \hline \text{Therefore, } Y. \end{array}$$

Possible translation:

$$\begin{array}{l} \text{If it rained last night, then the streets are wet.} \\ \text{It rained last night.} \\ \hline \text{Therefore, the streets are wet.} \end{array}$$

Rule 1. Any mixed hypothetical syllogism is valid in which the categorical premise affirms the antecedent of the conditional premise, and the conclusion affirms its consequent.

One must be careful of confusing a valid argument-form with the clearly invalid

$$\begin{array}{l} \text{If } X, \text{ then } Y. \\ Y. \\ \hline \text{Therefore, } X. \end{array}$$

The fallacy is apparent in the possible translation:

$$\begin{array}{l} \text{If it rained last night, then the streets are wet.} \\ \text{The streets are wet.} \\ \hline \text{Therefore, it rained last night.} \end{array}$$

It takes no great intelligence to see immediately that the streets might be wet even if it didn't rain last night—maybe a street cleaner went by. This is called the *Fallacy of Affirming the Consequent*.

Another valid form of the hypothetical syllogism is:

$$\begin{array}{l} \text{If } X, \text{ then } Y. \\ \text{Not } Y. \\ \hline \text{Therefore, not } X. \end{array}$$

Possible translation:

$$\begin{array}{l} \text{If it rained last night, then the streets are wet.} \\ \text{The streets are not wet.} \\ \hline \text{Therefore, it did not rain last night.} \end{array}$$

Rule 2. Any mixed hypothetical syllogism is valid in which the categorical premise denies the consequent of the conditional premise, and the conclusion denies its antecedent.

Again, one must be on guard against confusing this valid argument form with the clearly invalid

$$\begin{array}{l} \text{If } X, \text{ then } Y. \\ \text{Not } Y. \\ \hline \text{Therefore, not } Y. \end{array}$$

And, again, the fallacy is obvious in the possible translation:

$$\begin{array}{l} \text{If it rained last night, then the streets are wet.} \\ \text{It did not rain last night.} \\ \hline \text{Therefore, the streets are not wet.} \end{array}$$

As before, a street cleaner might have gone by, leaving the streets wet

anyway. The argument commits the *Fallacy of Denying the Antecedent*.

In these pages we have tried to display the nature of deductive arguments. Focusing on the syllogism, we presented some of the most obvious of the valid argument forms and *invalid* argument forms. These must be taken as samples, but useful ones inasmuch as they figure prominently in philosophical arguments.

"A syllogism is a reasoning in which something different emerges with necessity from what has been laid down."

—Aristotle

One of the most important things to appreciate here is that deductive validity has to do with *form*, and *form alone*. What makes an argument valid is that it conforms to a valid argument *form*, either one of the above or some other. But there is a big difference between *validity* and *truth*. An argument may be absolutely valid even though every proposition in it is false:

All politicians are Communists.
Babe Ruth is a politician.

Therefore, Babe Ruth is a Communist.

It goes without saying that every proposition, including the conclusion, in an argument might be true, and the argument be invalid nonetheless:

All U.S. Presidents have been males.
Abraham Lincoln was a male.

Therefore, Abraham Lincoln was a U.S. President.

Obviously, what we are interested in is *both* validity and truth. We may call a deductive argument that is valid *and* whose premises are true a "sound" argument.

A "SOUND" ARGUMENT

A deductive argument that is valid and whose premises are true.

It is hardly possible to give a better example of the essential nature of inductive reasoning than that provided by the master sleuth himself, Sherlock Holmes, whose "powers of deduction" were actually powers of *induction*. Look at the procedure and kinds of evidence he employs in *The Hound of the Baskervilles*:

"So far as I can follow you, then, Mr. Holmes," said Sir Henry Baskerville, "someone cut out this message with a scissors——"

"Nail-scissors," said Holmes. "You can see that it was a very short-bladed scissors, since the cutter had to take two snips over 'keep away.'"

"That is so. Someone, then, cut out the message with a pair of short-bladed scissors, pasted it with paste——"

"Gum," said Holmes.

"With gum on to the paper. But I want to know why the word 'moor' should have been written?"

"Because he could not find it in print. The other words were all simple and might be found in any issue, but 'moor' would be less common."

"Why, of course, that would explain it. Have you read anything else in this message, Mr. Holmes?"

"There are one or two indications, and yet the utmost pains have been taken to remove all clues. The address, you observe, is printed in rough characters. But the Times is a paper which is seldom found in any hands but those of the highly educated. We may take it, therefore, that the letter was composed by an educated man who wished to pose as an uneducated one, and his effort to conceal his own writing suggests that that writing might be known, or come to be known, by you. Again, you will observe that the words are not gummed on in an accurate line, but that some are much higher than others. 'Life,' for example, is quite out of its proper place. That may point to carelessness or it may point to agitation and hurry upon the part of the cutter. On the whole I incline to the latter view, since the matter was evidently important, and it is unlikely that the composer of such a letter would be careless. If he were in a hurry it opens up the interesting question why he should be in a hurry, since any letter posted up to early morning would reach Sir Henry before he would leave his hotel. Did the composer fear an interruption—and from whom?"

"We are coming now rather into the region of guess work," said Dr. Mortimer.

"Say, rather, into the region where we balance probabilities and choose the most likely. It is the scientific use of the imagination, but we have always some material basis on which to start our

The example of
Sherlock Holmes

speculations. Now, you would call it a guess, no doubt, but I am almost certain that this address has been written in an hotel."

"How in the world can you say that?"

"If you examine it carefully you will see that both the pen and the ink have given the writer trouble. The pen has spluttered twice in a single word, and has run dry three times in a short address, showing that there was very little ink in the bottle. Now, a private pen or ink-bottle is seldom allowed to be in such a state, and the combination of the two must be quite rare. But you know the hotel ink and the hotel pen, where it is rare to get anything else. Yes, I have very little hesitation in saying that could we examine the waste-paper baskets of the hotels round Charing Cross until we found the remains of the mutilated Times leader we could lay our hands straight upon the person who sent this singular message.³

This is an excellent illustration of what goes on in inductive arguments: moving from particular facts here, analogies there, common threads and connections everywhere, to a conclusion that is suggested by all of that evidence.

We have seen above that in deductive arguments validity in the form results in a necessity of the conclusion. In the case of inductive arguments, however, it is not a question of validity at all, and therefore no logical necessity in the conclusion can be expected. What is aimed at is truth in the premises and probability in the conclusion. It cannot be stressed too strongly that no inductive argument can deliver a conclusion that is demonstratively certain. The most that can be hoped for is a degree of probability, though the more supportive the premises, the more reasonable and the higher the probability of the conclusion. Thus, as with deductive arguments, not just any old premises will do. Here too there must be an inference between premises and conclusion, just as in deductive arguments. On the other hand, whereas in deductive arguments the inference is a strictly *logical* one resulting in a *necessary* conclusion, in inductive arguments the inference is a *supportive* one resulting in a *probable* conclusion.

DEDUCTION AND INDUCTION

- *In a valid deductive argument:* If the premises are true the conclusion must be true, by virtue of a logically necessary inference.
- *In a strong inductive argument:* If the premises are true the conclusion is probably true, by virtue of a supportive inference.

³ A. Conan Doyle, *The Hound of the Baskervilles* (New York: McClure, Phillips & Co., 1902), pp. 46-48.

Not necessity but
probability

What is the connection, this "supportive inference," between premises and conclusion in an inductive argument that makes the conclusion at least reasonable and probable? We note here just two of the ways in which inductive arguments can take shape.

The first and most obvious form of inductive reasoning is to *generalize* on the basis of particular instances. The simplest of this kind of argument is called *universal generalization*, and has the form

Instance 1 of A is observed to be X.
Instance 2 of A is observed to be X.
Instance 3 of A is observed to be X.
Instance 4 of A is observed to be X.
Instance 5 of A is observed to be X.
:

Therefore, all A is X.

Quite different from the inductive methods of generalization is the method of *analogy*. This kind of reasoning can take many different forms, but its essential nature is indicated by

A is observed to be X and Y.
B is observed to be X and Y.
C is observed to be X and Y.
D is observed to be X and Y.
:

M is observed to be X.

Therefore, M is Y.

That is, if M is analogous, or similar, to A, B, C, D . . . in being X, it is probably also similar in being Y.

Naturally, one can make mistakes in inductive reasoning. But unlike mistakes in deductive reasoning, which have to do with the *form* of the argument, inductive mistakes are of a different character, as is apparent from these samples:

- *Hasty Induction:* Basing a conclusion on an insufficient number of premises or observations.
- *Lazy Induction:* Not drawing a conclusion as strong as the evidence suggests.
- *Forgetful Induction:* Neglecting some known data which, if recalled, would cast that total reasoning in a different light.

And, of course, one may be mistaken in his or her inductive reasoning even though the reasoning is done well. Consider the following argument:

The method of
generalization

The method of
analogy

Some inductive
mistakes

This swan is white.
That swan is white.
Every swan we've ever seen is white.
We've never heard of any swans that aren't white.

Therefore, all swans are white.

Based on the premises, the conclusion is surely a reasonable one. The generalization is overwhelmingly supported by the evidence. Knowing only what is given in the premises it would be foolish to reject the conclusion. Nonetheless, it is false. However great inductive evidence may be, it is always by its nature limited to the *actual* experience, observations, field trips, microscopes, and telescopes of a *limited* number of individuals. And a yet wider experience has revealed that there are, in fact, black swans. And who knows what will turn up next? Thus we return to an earlier point: No inductive arguments can be demonstratively certain.

Still, we must be careful not to overdo the limitations of inductive reasoning. To be sure, we must be attentive to its inherent limitations, but we can hardly do without it. Reasoning on the basis, say, of generalizations and analogies from our experience is one of the most obvious and powerful intellectual tools we possess. We employ it constantly in all spheres of our thinking. Where would Sherlock Holmes be without it? And where would *science* be without it?

THE DRAWBACK OF INDUCTION

All inductive reasoning is based on *particular* and *limited* observations. By its nature, therefore, it can never deliver *certain* and *universal* knowledge.

INFORMAL FALLACIES

We have already encountered logical fallacies. Those were *formal* fallacies, or mistakes in reasoning which resulted from breaking some rule of validity: mistakes with respect to the *form* of an argument. Informal fallacies are quite different. They are mistakes which arise from carelessness with respect to the relevance of ideas, or carelessness with respect to the clarity and consistency of our language. In fact, informal fallacies are usually classified as *fallacies of relevance* and *fallacies of ambiguity*. There are many such fallacies. We give here only some of the most common ones of each type. Mastery of

them will not only provide a chance to review a little Latin, but will prevent many unnecessary blunders in philosophical discussion, and, for that matter, any discussion whatsoever.

Fallacies of relevance

1. *Argumentum ad Baculum* (appeal to force) employs threat, intimidation, pressure, etc., as tools of persuasion.
2. *Argumentum ad Hominem: Abusive* (argument which directs abuse at the individual) irrelevantly attacks the person making a claim rather than attacking the claim itself.
3. *Argumentum ad Hominem: Circumstantial* (argument which appeals to the circumstances of the individual) seeks to undermine a claim by calling attention to the (irrelevant) circumstances of the one making the claim. When it specifically cites the origins or causes of someone's opinion ("You believe in God because you were raised as a Catholic") it is known as the *Genetic Fallacy*.
4. *Argumentum ad Ignorantiam* (argument from ignorance) affirms the truth of something on the basis of the lack of evidence to the contrary: *X* must be the case, since it has not been or cannot be shown to be false.
5. *Argumentum ad Populum* (appeal to popular opinion, or appeal to the "gallery") seeks to strengthen a claim by an emotional appeal to the passions and prejudices of the listeners.
6. *Argumentum ad Misericordiam* (appeal to pity) is a special form of *Argumentum ad Populum*, directing attention from relevant evidence by arousing pity and sympathy for the plight of someone.

LOGICAL FALLACIES

Formal

Mistakes in reasoning due to a failure in following the rules for the formal structure of valid arguments. These fallacies do not concern truth or falsity but validity.

Informal

Mistakes in reasoning due to carelessness regarding relevance and clarity of language. These fallacies bear directly on issues of truth and falsity.

7. *Argumentum ad Verecundiam* (appeal to authority) is an appeal to an unqualified expert or irrelevant authority.
8. *Petitio Principii* (begging the question) occurs when the conclusion of an argument is already present, usually disguised, in one of its premises. Circular reasoning ("What he claims must be true, because he always speaks the truth") is a good example of *Petitio Principii*.
9. *Accident* is the fallacy of applying a general rule to a specific situation in which some accidental condition makes it an exception to the rule.
10. *Converse Accident* or *Hasty Generalization* consists in generalizing on the basis of an inadequate number of instances or on the basis of atypical instances, and thus moves in the opposite direction from the Fallacy of Accident.
11. *False Cause* is the fallacy consisting either in (a) confusing an effect or feature of a condition with the cause of the condition (*non causa pro causa*, "taking what is not the cause for the cause") or (b) identifying *X* as the cause of *Y* merely on the grounds that *X* occurs before *Y* (*post hoc ergo propter hoc*, "after this, therefore, because of this").
12. *Complex Question* consists of posing a question which can be answered only on the basis of an answer to a prior and unasked question: "Where did you hide the money you stole?" clearly assumes an affirmative answer to the question, "Did you steal the money?"

Fallacies of ambiguity

1. *Equivocation* occurs when a word or expression changes its meaning in the course of an argument.
2. *Amphiboly* (literally, "thrown on both sides") is an ambiguous grammatical construction that can be understood in two ways: "Henry went out on the porch on the 4th of July and watched the fireworks in his pajamas." The fallacy occurs when something is concluded on the basis of the unintended meaning of the amphibolous expression.
3. *Misplaced Accent* consists of so emphasizing a word or expression, or omitting relevant information, as to yield a misleading sense.

SOME INFORMAL FALLACIES

Fallacies of Relevance

Argumentum ad Baculum
Argumentum ad Hominem:
Abusive
Argumentum ad Hominem:
Circumstantial
Argumentum ad Ignorantiam
Argumentum ad Populum
Argumentum ad Misericordiam
Argumentum ad Verecundiam
Petitio Principii
Accident
Converse Accident
False Cause
Complex Question

Fallacies of Ambiguity

Equivocation
Amphiboly
Misplaced Accent
Composition
Division

4. *Composition* results from attributing the characteristics of the parts of a whole to the whole itself: "If every player on the team is good, then it's a good team."
5. *Division* (the reverse of the Fallacy of Composition) attributes the characteristics of the whole to its parts: "The team is good, so each of its players is good."

Here are some examples of reasoning which involve informal fallacies. Can you identify them?

"I'm all for women having equal rights," said Bullfight Association president Paco Camino. "But I repeat, women shouldn't fight bulls because a bullfighter is and should be a man."

San Francisco Chronicle, March 28, 1972

In that melancholy book *The Future of an Illusion*, Dr. Freud, himself one of the last great theorists of the European capitalist class, has stated with simple clarity the impossibility of religious belief for the educated man of today.

John Strachey, *The Coming Struggle for Power*

The Moral Majority's Rev. Jerry Falwell . . . claims that Jesus Christ favored the death penalty. On the Cross, Falwell says, He could have spoken up: "If ever there was a platform for our Lord to condemn capital punishment, that was it. He did not."

Time, January 24, 1983

Mysticism is one of the great forces of the world's history. For religion is nearly the most important thing in the world, and religion never remains for long altogether untouched by mysticism.

John McTaggart and Ellis McTaggart, "Mysticism,"
Philosophical Studies

I also admit that there are people for whom even the reality of the external world and the identification leading to it constitute a grave problem. My answer is that I do not address them, but that I presuppose a minimum of reason in my readers.

Paul Feyerabend, "Materialism and the Mind-Body Problem," *Review of Metaphysics*, 1963

If elected, would you try to fool some of the people all of the time, all of the people some of the time or go for the big one: all of the people all of the time?

TV Guide cartoon

Pity the many teens who are influenced by atheism, humanism and secularism, who are swept along by vulgar dance and pornography and who party on drugs, tobacco and liquor. Sex is for marriage. Other ways breed heartache.

Letter to the Editor, *Time*, Dec. 30, 1985

LOTS of things are invisible, but we don't know how many because we can't SEE them.

"Dennis the Menace" cartoon

According to R. Grunberger, author of A Social History of the Third Reich, published in Britain, the Nazis used to send the following notice to German readers who let their subscriptions lapse: "Our paper certainly deserves the support of every German. We shall continue to forward copies of it to you, and hope that you will not want to expose yourself to unfortunate consequences in the case of cancellation."

Parade, May 9, 1971

"Who did you pass on the road?" the King went on, holding his hand out to the messenger for some hay.

"Nobody," said the messenger.

"Quite right," said the King: "this young lady saw him too. So of course Nobody walks slower than you."

Lewis Carroll, *Through the Looking-Glass*

As the loving mother of three happy children, I prefer the "silent scream" of the unwanted fetus to the reverberating cry of the unwanted child.

Letter to the Editor, *Time*, April 15, 1985

We have listed seventeen informal fallacies above, but there are many more. In fact, someone has distinguished *over a hundred*. The important thing, of course, is to be able to identify them even though we may not be able to name them. The following letter to the editor in *Newsweek* (Oct. 11, 1982) contains an informal fallacy not listed above. Can you identify it?

The Israelis leaned on their machine guns and did nothing to prevent the massacre of men, women and children in Lebanon. . . . These same Israelis condemn the Germans who, while living in a police state, were expected to speak up to Hitler about his atrocities. Lest Americans of any persuasion become smug in their condemnations, however, one remembrance of Vietnam or Hiroshima should restore a sense of perspective.

Or what about the familiar television commercial which announces:

The National Cancer Institute reports that research may suggest eating the right foods may reduce your risk of some kinds of cancer.

Or the newspaper headline:

CIGARETTES MORE ADDICTIVE THAN LSD

And what sorts of informal fallacies and abuses of language do you find in the following report of electioneering rhetoric (*Rocky Mountain News*, Oct. 30, 1982)?

SCHROEDER VS. DECKER

On the day he began his campaign against Rep. Patricia Schroeder in April, Republican Arch Decker said he was sure most Denver voters shared his "values," not Schroeder's.

Decker didn't define those values. But he kept that "moral" question simmering in the 1st District campaign.

It wasn't the only issue, of course. President Reagan's policies were always an issue—Decker pro, Schroeder con.

Decker said balanced budgets were the issue. Schroeder deplored the nuclear arms race and the dismantling of "necessary" welfare programs.

Decker, more than most of Schroeder's previous rivals, tried to appeal to key elements of her political base: elderly, minority and blue-collar voters.

Schroeder, in turn, aimed appeals at Decker's conservative base, advocating pay-as-you-go budgeting and a balance between military and other spending. She also opposed congressional tax breaks.

Underneath, the "moral" issue was always there.

A Denver magazine published by Decker said his backers want leaders "in tune with biblical principles of morality."

Later, Decker addressed the congregation of a large Denver church, and (according to witnesses who called Schroeder's office) questioned her religious convictions. (Schroeder has said she believes in God and considers herself "very religious.")

Last week the "moral" issue boiled over. In a TV debate, Decker charged that she voted to allow continued medical "butchery" of live fetuses.

Schroeder protested that such experimentation is illegal and isn't being done. Her backers called Decker's charge an act of desperation.

Decker said he only wanted to set Schroeder's voting record straight. His later "documentation" of the charge, at a press conference, consisted of unauthenticated statements by congressmen in the Congressional Record.

CHAPTER 2 IN REVIEW

SUMMARY

Traditionally, logic has been regarded as the primary tool or "key" of philosophizing. This is understandable inasmuch as philosophy aims at critical, coherent, and persuasive reasoning, and logic is the formulation of the principles of correct reasoning.

For a long time the Three Laws of Thought (Non-Contradiction, Excluded Middle, Identity) were regarded as the ultimate principles of all being and thinking. These principles do not now usually enjoy such an exalted status, but they still serve as important guides for ordinary as well as philosophical discourse. Is it not the case that failure to honor them would result in the greatest confusion? Can you imagine holding a meaningful conversation with someone who will not honor any one of them?

Still more relevant is the nature of *arguments*. If philosophers aren't good at arguing, what *are* they good at? A real argument is a carefully devised piece of reasoning involving premises (what is reasoned *from*), a conclusion (what is reasoned *to*), and an inference (the connection which yields the conclusion from the premises). But does the conclu-

sion follow from the premises necessarily or probably? This is the difference between a valid *deductive* argument, where the conclusion is *guaranteed* by the premises, and an *inductive* argument, where the conclusion is *supported* by the premises.

The classic example of deductive reasoning is the *syllogism*, a type of argument which comes in different forms and is governed by several rules, but always involves two premises and a conclusion. It is important to see that the power of deductive arguments—such as syllogisms—depends solely on their *form* and their ability to deliver *conclusions which follow validly*. Whether the conclusion of such an argument is *true* is an entirely different, but certainly a no less important, question. Of course we are interested in conclusions that follow validly *and* are true. Arguments which deliver such conclusions we have called "sound" arguments.

Very different from deductive reasoning is inductive reasoning. Here, as was just said, the conclusion is *supported* rather than guaranteed by the premises. The premises contain information derived from facts, observation, collection of data, and the like, and pass this along to the conclusion, which will be only as strong as the premises. The limitation of inductive reasoning is obvious: the premises, and therefore the conclusion, can never be certain. This, however, should not blind us to the importance and pervasiveness of this kind of reasoning.

Among the most important things to be learned from an introduction to logic are the informal fallacies. As opposed to *formal* fallacies, mistakes with respect to the formal structure of an argument, *informal* fallacies arise from inattention to the relevance or clarity of language. In fact, the several specific informal fallacies divide into the *fallacies of relevance* and the *fallacies of ambiguity*. Mastery of the informal fallacies will prove rewarding time and time again.

BASIC IDEAS

- Logic as the tool or key to philosophizing
- The Three Laws of Thought
 - Non-Contradiction
 - Excluded Middle
 - Identity
- The nature and elements of an argument
- Deductive reasoning
- Logical entailment
- Syllogism
- Categorical syllogism
- Rules for the categorical syllogism

- Disjunctive syllogism
- Rule for the disjunctive syllogism
- Hypothetical syllogism: pure and mixed
- Rules for the hypothetical syllogism
- Two formal fallacies
 - Affirming the Consequent
 - Denying the Antecedent
- The distinction between truth and validity
- Inductive reasoning
- The method of generalization
- Analogical reasoning
- Mistakes in inductive reasoning
 - Hasty Induction
 - Lazy Induction
 - Forgetful Induction
- The limitations of inductive reasoning
- The distinction between formal and informal fallacies
- Informal fallacies
 - Fallacies of relevance (twelve of them)
 - Fallacies of ambiguity (five of them)

TEST YOURSELF

1. What is an argument?
2. What is the relation of premises and conclusion in a deductive argument? In an inductive argument?
3. True or false: Syllogisms can yield conclusions which are only probably true.
4. What is the difference between a formal fallacy and an informal fallacy?
5. If either premise of a valid categorical syllogism is negative, the conclusion must be _____.
6. Evaluate the following. Is it an argument? Deductive or inductive? Is it a syllogism? If so, what kind? Or is it invalid? If so, what fallacy does it commit?

We know that if the music is played too loudly Tim will surely get a headache. He always does. And he does have a headache, so the music must be too loud.

7. State exactly what is involved in *logical necessity*. Consider the statement, "All barking dogs bark."
8. True or false: The Fallacy of Composition is a fallacy of ambiguity. Why or why not?
9. What is the difference between truth and validity? Why is it important to have both?
10. What kind of logician was Sherlock Holmes? Why?

QUESTIONS FOR REFLECTION

- Why is it often said that logic is the primary tool of philosophers? Why has it been called the "key" to philosophizing?
- Even though we have distinguished between deductive and inductive reasoning, how might they both play a part in a single argument? The conclusion may follow validly from the premises, but how might we come by the premises?
- Everyday talk is sometimes full of fallacies, especially informal fallacies. Can you spot and identify any in today's newspaper? You might pay special attention to the editorial pages and letters to the editor.

FOR FURTHER READING

Morris R. Cohen and Ernest Nagel. *An Introduction to Logic and Scientific Method*. New York: Harcourt, Brace & Co., 1934. An old but still standard treatment of both formal logic and applied logic and the scientific method.

Irving M. Copi. *Introduction to Logic*. Sixth ed. New York: Macmillan, 1982. The most widely used logic text, covering all aspects of the subject under the topics of language, deduction, and induction.

S. Morris Engel. *With Good Reason: An Introduction to Informal Fallacies*. Third ed. New York: St. Martin's Press, 1986. Full and often humorous discussion (cartoons, etc.) of the informal fallacies, prefaced by a discussion of the nature of logic, language, arguments, etc.

C. L. Hamblin. *Fallacies*. London: Methuen, 1970. Excellent treatment (at points technical) of both informal and formal fallacies as well as other topics such as the concept of argument and Indian logic.

Ronald Jager (ed.). *Essays in Logic from Aristotle to Russell*. Englewood Cliffs, N.J.: Prentice-Hall, 1963. A collection of classical statements dealing with various aspects of logic such as induction and deduction, formal and informal logic, methods of experimental inquiry, etc.

Lionel Ruby. *The Art of Making Sense: A Guide to Logical Thinking*. Second ed. Philadelphia: Lippincott, 1968. A well-known, lively, and non-technical discussion of all aspects of everyday logic.