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PH 101: Problems of Philosophy
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NOTES ON LOGIC

I. BASIC TERMS

§ 1. Statements. A *statement*, also called a *proposition*, is something expressible in a declarative sentence and capable of being either true or false. The following are statements: “The earth orbits the sun”; “ $2 + 3 = 23$ ”; “My dog has fleas.” The following are not statements: “Is this Tuesday?” (a question); “What a mess you’re making!” (an exclamation); “Please believe what I’m telling you” (a request); “The number 4 is more digestible than equality” (a senseless string of words).

§ 2. Arguments. As the term is used in logic, an *argument* is a sequence of statements, one of which is *inferred* from the others, meaning that it is taken to be true *because* the others are, supposedly, true. Another way to put the point is to say that an argument is a series of statements, one of which is taken to be *supported* by the others.

The definition of “argument” that is used in logic leaves out much that is important in actual argument, such as the concern with persuading a particular audience, explaining one’s meaning with examples, and so on. This is because logic is exclusively concerned with the element of *reasoning* in argumentation, that is, the inference of one statement from another.

§ 3. Premises and conclusions. A statement in an argument that is not inferred from any other statement in the argument is called a *premise*. A statement in an argument that is inferred from some other statement or statements in the argument is called a *conclusion*.

Illustrations. (1) “If he were at home, I would have heard footsteps. I have not heard footsteps. Therefore, he is not at home.” In this three-sentence argument, the first two statements are premises, while the third is a conclusion. (2) “Someone must be at home: the door is open.” In this one-sentence argument, the first clause is a conclusion, the second clause a premise.

§ 4. Intermediate and final conclusions; simple and complex arguments. It can happen in an argument that a conclusion is inferred from a statement that is itself inferred from other statements in the argument. An argument in which this occurs is called a *complex argument*. An argument in which it does not occur is called a *simple argument*. A conclusion from which a further conclusion is drawn is called an *intermediate conclusion*. A conclusion from which no further conclusion is drawn is called a *final conclusion*. Ordinarily, when one speaks of “the conclusion” of an argument, one means its final conclusion.

Illustration. Consider the following made-up (and, I hope, manifestly unconvincing) argument:

1. John Kerry looks French.
2. No one who looks French can be counted on to protect the interests of the United States.

3. Therefore, John Kerry cannot be counted on to protect the interests of the United States.
4. Anyone who cannot be counted on to protect the interests of the United States is unfit to be President.
5. Therefore, John Kerry is unfit to be President.

You will notice that steps 1, 2, and 4 are not inferred from any other statements in the argument (the question *how* one can make such a judgment is discussed below); thus, they are premises. But step 3 is a conclusion from 1 and 2, while step 5 is a conclusion from 3 and 4. Because 3 is a conclusion from which a further conclusion (namely step 5) is drawn, it is called an intermediate conclusion. Because 5 is a conclusion from which no further conclusion is drawn, it is called the final conclusion.

II. RECOGNIZING AN ARGUMENT

§ 5. When is a discourse an argument? I said earlier (§ 2) that an argument, as understood in logic, is a sequence of statements, one of which, called the conclusion, is inferred from the others, which are called premises—or, equivalently, a sequence of statements, one of which is taken to be supported by the others. Thus understood, an argument must consist of only two kinds of statement, premises and conclusions. But the actual discourses in which people give arguments contain many kinds of utterance besides premises and conclusions: they include questions, explanations, illustrations, and so on. For this reason, it is necessary to have some guidance in how to recognize whether a text contains an argument, and how to discern the structure of the argument in a text that does contain one. In this handout, I offer such guidance.

§ 6. How to recognize the presence of an argument. The essential mark of an argument is the occurrence of inference. The occurrence of an inference requires (i) that the speaker or writer affirm each of two or more distinguishable statements, and (ii) that one of those statements be offered as a conclusion from the others. In the sections that immediately follow (§§ 7–10), I shall elaborate on these requirements by contrasting arguments with four kinds of discourse with which they may sometimes be confused: *conditional statements*, *unsupported assertions*, *illustrations*, and *explanations*. As we shall see, each of these kinds of discourse bears some similarity to argument, but fails to meet one or both of the conditions just specified.

§ 7. What arguments are not (i): conditional statements. Conditional statements have a certain structural similarity with arguments, but their purport is entirely distinct. Consider, for example, the following pair of sentences:

- (A) If it's noon, we need to leave.
- (B) It's noon; so we need to leave.

A and B have obvious similarities, but they are not by any means equivalent. One can say that, in both of them, one statement, namely “We need to leave” (call this S_2), is made to depend in some way on another, namely “It is noon” (call this S_1). But to utter B is to assert both S_1 and S_2 , while to utter A is to assert neither of the two. To utter B is to make, in the logical sense, an argument, as one is both asserting S_1 and inferring S_2 from it (that is, taking S_1 to be true, and taking S_2 to be

true because S_1 is true). But the conditional structure of A—its use of an “if”-construction—makes it the case that what is asserted in it is neither S_1 nor S_2 , but a certain relation between the two.

§ 8. What arguments are not (ii): unsupported assertions. Although an argument consists of statements, not every group of statements is an argument. Consider the following passage, from one of our earlier readings:

Philosophy, like all other studies, aims primarily at knowledge. The knowledge it aims at is the kind of knowledge which gives unity and system to the body of the sciences, and the kind which results from a critical examination of the grounds of our convictions, prejudices, and beliefs. But it cannot be maintained that philosophy has had any very great measure of success in its attempts to provide definite answers to its questions.¹

Here, several distinct statements are made, but none of them is given as a reason for any of the others. The passage therefore contains no argument, but only a series of unsupported assertions.

§ 9. What arguments are not (iii): illustrations. Sometimes one statement may be given to *illustrate* another, that is, to explain its meaning by means of an example. For example:

A living option is one in which both hypotheses are live ones. If I say to you: “Be a theosophist or be a Mohammedan,” it is probably a dead option, because for you neither hypothesis is likely to be alive. But if I say: “Be an agnostic or be a Christian,” it is otherwise: trained as you are, each hypothesis makes some appeal, however small, to your belief.²

In this passage, the author makes a general statement (actually a definition of a term, namely “living option”), then makes two more-specific claims. The more specific claims are not offered in *support* of the general claim, nor as inferences from it; rather, they *illustrate* it. Thus the passage contains no argument.

§ 10. What arguments are not (iv): explanations. Another kind of discourse that may be mistaken for argument is that in which an *explanation* is offered for why something is so. Take, for example, the following passage, from a discussion of *The Adventures of Huckleberry Finn*:

In his earliest years Huck wasn’t taught any principles, and the only ones he has encountered since then are those of rural Missouri, in which slave-owning is just one kind of ownership and is not subject to critical pressure. It hasn’t occurred to Huck to question those principles. So the action, to us abhorrent, of turning Jim in to the authorities presents itself *clearly* to Huck as the right thing to do.³

In this passage, several statements lead up to a statement that is introduced by the word “so.” This may give the passage the *appearance* of an argument, as *if* the writer were reasoning as follows:

¹Bertrand Russell, “The Value of Philosophy,” PDF file, p. 1.

²William James, “The Will to Believe,” PDF file, p. 2.

³Jonathan Bennett, “The Conscience of Huckleberry Finn,” *Philosophy* 49 (1974): 125.

1. Huck was not taught any principles in his early years.
2. The only principles Huck is acquainted with are those of a slave-holding society.
3. It has not occurred to Huck to question those principles.
- ∴ 4. So turning Jim (the runaway slave who has become his friend) over to the authorities strikes Huck as clearly the right thing to do.

But it is evident that to take the passage in this way completely misrepresents the writer's intent. In the passage, the writer is not *arguing for the claim* that Huck thinks it right to turn Jim in. On the contrary, he takes that fact for granted. What he is offering is rather an *explanation* of that fact. The facts stated as steps 1–3 are supposed to be *reasons why it has happened* that Jim thinks it right to turn Jim in, not *reasons why we should believe* that that has happened. They should not therefore be represented as premises, nor should the last statement be represented as a conclusion.⁴

“Why” explanations are easily mistaken for arguments because they are frequently marked by the use of the same verbal expressions, such as “since,” “because,” “so,” “therefore,” etc. (on which more in a moment). This is because both kinds of discourse involve the statement of *reasons* for something. The crucial difference is that the reasons offered in an explanation are reasons *why something is so*, while in an argument, the reasons that are offered are reasons *for believing* that something is so.

§ 11. Marks of an argument. Granted that arguments are to be distinguished from conditional statements, unsupported assertions, illustrations, and explanations, the question remains: how does one make that distinction in practice? For this purpose, two kinds of evidence are relevant: the presence of certain verbal expressions called *inference indicators*, and the specific content and arrangement of statements in the text. I shall discuss each of these matters in turn.

Inference indicators are expression that are commonly used to indicate that an inference is being drawn or is about to be drawn. They are divided into two classes, *conclusion indicators* and *premise indicators*.

§ 12. Inference indicators (i): conclusion indicators. Expressions like “therefore,” “thus,” “so,” “for this reason,” “consequently,” and “it follows that” are frequently used to indicate that the statement that follows them (or in which they are embedded) is inferred from some statement or statements that have gone before—in other words, that the statement that they introduce is a conclusion. Such expressions are accordingly called *conclusion indicators*. The presence of one of these expressions in a text does not, however, always indicate that a conclusion is being drawn. This is because, with the exception of “it follows that,” such expressions may be used for other purposes. For example, in the sentence “Close the window, so it doesn't get cold in here” the word “so,” here short for “so that,” indicates a relation of purpose, not an inferential connection. (One does not *infer* that it won't get cold from the *order* to close the window.) In the sentence “She didn't pay the annual fee, and consequently her club membership was terminated,” the word

⁴In case anyone is interested in the terminology, something that explains something else is called an *explanans* (plural, *explanantia*), and something that is to be explained is called an *explanandum* (plural, *explananda*). Thus, the statements in 1–3 are not premises but explanantia, and the statement in step 4 is not a conclusion but an explanandum.

“consequently” indicates causal consequence, not inference. (The sentence is thus a “why” explanation, not an argument.)

§ 13. Inference indicators (ii): premise indicators. The other class of inference indicators consists of such expressions as “given that,” “because,” “since,” and (less commonly) “for” and “as.” These may be used to indicate that the statement that they introduce is a premise in relation to some other statement, which, except in the case of “for,” may come either before or after the statement that they introduce. (“For” can only be used with a statement occurring *after* the conclusion.) Such expressions are accordingly called *premise indicators*. As is the case with conclusion indicators, the expressions classified as premise indicators may be used for other purposes than to indicate the presence of a premise. For example, in the sentence “Since he had missed the 9:00 train, he stopped in the coffee house to kill time till the next one,” the “since” indicates the reason for an action, not an inference on the part of the speaker. The sentence thus offers a “why” explanation (see § 10), not an argument.

§ 14. Considerations of content. The occurrence of inference indicators within a text provides one consideration relevant to determining whether the text contains an argument. One cannot, however, rely solely on the presence or absence of such expressions in making that determination, for two reasons. One is that, as I have pointed out, the same expressions that are used to indicate the presence of an inference in one case may be used for other purposes in other cases. The other reason is that an inference may be drawn without the use of any inference indicator.

The point may be illustrated by a piece of advertising invented by Weston: “You should use Slapdash Services—we already have dozens of completely satisfied customers in your area!”⁵ It should be obvious which of the two statements in this one-sentence argument—that is, (1) “You should use Slapdash Services” and (2) “We already have dozens of completely satisfied customers in your area”—is the premise (namely, 2) and which is the conclusion (namely, 1). The interesting fact is that any reader who understands the terms “premise” and “conclusion” can easily make this determination, even though the passage contains no inference indicators. We are able to tell which is which because the first statement is an evaluative claim that stands in need of justification, while the second statement is a statement of plain fact (or supposed fact) which, if true, supports the first statement.

From this example we can draw the following general lesson: if a writer makes a statement that stands in need of support, and, in the surrounding text, makes other statements that provide such support, then, in the absence of verbal evidence to the contrary, one can and should presume that the writer is offering an argument, in which the supporting statements are premises and the supported statement the conclusion.

IV. ANALYZING AND EVALUATING ARGUMENTS

§ 15. Why analyze arguments? To analyze an argument, in the sense in which I shall be using that phrase, is to identify its conclusion, its premises, and the logical relations among these—what

⁵Anthony Weston, *A Rulebook for Arguments*, 3rd ed. (Indianapolis and Cambridge, Mass.: Hackett, 2000), p. 14.

is inferred from what. The purpose of doing this is to make the argument accessible to evaluation. If someone has provided a good argument, we need to know that, so that we can learn what the argument shows us; if someone has provided a bad argument, we need to know that too, so that we shall not be taken in by it, and so that we shall know where the author of the argument went wrong. Either way, we need to know whether the argument is good or bad, and for that purpose, we have to be able to explain how the argument works.

§ 16. Identifying the structure of an argument. The same considerations that show *that* a passage contains an argument show *what* the argument is. If one can identify one statement as a conclusion and other statements as premises supporting that conclusion, one has determined not only *that* an argument is present, but *what* its structure and content are. By the *structure* of an argument I mean the system of logical relations among its component propositions: which of them are inferred from which of them. By the *content* of the argument I mean those propositions themselves.

I would add one further piece of guidance in analyzing an argument, namely that it is usually most productive to identify the *conclusion* of the argument first, and then to seek out the statements from which that conclusion is inferred.

§ 17. Standard form for the analysis of an argument. When an argument is analyzed, there is a way of presenting it that is commonly used in philosophy. This way of presenting an argument is called *standard form*. The purpose of standard form is to make the content and the logical structure of an argument as clear as possible. Standard form is defined by three requirements:

§ 18. Requirements of standard form (i): premises and conclusions only. As I have said, texts that contain arguments will ordinarily contain much else besides, such as explanations, illustrations, questions, and so forth. In an argument presented in standard form, by contrast, *no sentence may express anything but a premise or a conclusion*. Statements of any other nature must be omitted.

§ 19. Requirements of standard form (ii): premises separate from conclusions. The second requirement for an argument in standard form is that *each premise and each conclusion must be expressed in its own separate sentence*. A premise and a conclusion may never be combined in a single sentence. For example, to put the one-sentence argument “It’s noon, so we need to leave” into standard form, one would have to separate the premise “It is noon” from the conclusion “We need to leave.”

§ 20. Requirements of standard form (iii): conclusions after the statements from which they are inferred. The final requirement is that *conclusions must be placed after the statements from which they are inferred, and premises before any conclusions that are inferred from them*. From this it follows that the *final* conclusion of the argument must be placed last. When the component statements of an argument are separated and ordered in this way, they are referred to as *steps*.

Here, by way of illustration, is another very short argument: “She must be at home; I heard her come in.” Here, “I heard her come in” is a premise, and “She must be at home” (or better, “She is at home”) the conclusion. The order, however, is not acceptable for presentation in standard

form. One would have to arrange the statements the other way around, with the premise before the conclusion: “I heard her come in (premise). She is at home (conclusion).”

§ 21. Other niceties: steps numbered and conclusion indicated. In addition to the three requirements stated above, there are two other features that are *usually* observed when arguments are presented in standard form. One is that the steps of the argument are numbered in separate lines, and for every conclusion in the argument a reference is provided to the numbers of the statements from which it is inferred. The second is that some mark is used to indicate the final conclusion of the argument, such as the sign “∴” affixed before it or a horizontal line drawn immediately above it, or the use of the word “therefore.” (Note, though, that, since the word “therefore” may be used before any conclusion, it does not necessarily distinguish the *final* conclusion from *intermediate* ones.) Thus, if the sample argument that I presented in § 4 were to be cast in standard form according to these last two rules, it would look like this:

1. John Kerry looks French.
2. No one who looks French can be counted on to protect the interests of the United States.
3. Therefore, John Kerry cannot be counted on to protect the interests of the United States.
(From 1 and 2)
4. Anyone who cannot be counted on to protect the interests of the United States is unfit to be President.
- ∴ 5. Therefore, John Kerry is unfit to be President. (From 3 and 4)

This arrangement allows the reader to identify which steps are premises, which are conclusions, what is the final conclusion, and from which steps the conclusions are inferred.

§ 22. Evaluating arguments. There are various respects in which arguments can be evaluated. One may evaluate an argument with respect to its degree of elegance, its originality, its interestingness, its likelihood of persuading a particular audience, and so forth. In philosophy, however, where arguments interest us primarily as means of inquiry rather than as means of persuasion, what we most care about is *the degree to which an argument provides us with reason to accept its conclusion*. This quality is called *cogency*. The greater the cogency of an argument, the better the argument for purposes of inquiry. There are, accordingly, two respects in which arguments may be evaluated for philosophical purposes:

- (i) They may be evaluated with regard to *the kind and degree of support that the premises provide for the conclusion*. That is, we may ask of an argument: *granted* that the premises are true, do they provide us with sufficient reason to accept the conclusion?
- (ii) They may be evaluated with regard to *the rational acceptability of the premises themselves*. We may ask whether the premises are true, or probable, or reasonable for us to accept.

For an argument to be good or successful for purposes of inquiry, it must have rationally acceptable premises that provide sufficient reason for us to accept the conclusion. An argument that fails to meet this condition is a failure as a piece of inquiry.

§ 23. Is there any value in a bad argument? Suppose that an argument is a failure according to the standards just presented, meaning that either at least one of its premises is unacceptable, or

the premises fail to provide sufficient support the conclusion, or both. Is such an argument therefore without value? No, for several reasons. First, if the argument is a complex one, then it may contain component arguments that are good ones. Second, the considerations that the author offers as premises, even if they fail to establish the conclusion, may be instructive observations in their own right. Third, even if the argument is unsuccessful as stated, it may be possible to correct its deficiencies and thus derive from it a good argument. And finally, the exercise of *showing how* an argument fails may be instructive in several ways. If the argument has any appearance of cogency at all, then, for one thing, by exposing its faults we have escaped being taken in by it, and made ourselves wiser, in this particular regard, than those who are taken in by it (such as, presumably, its author). Further, if we determine that the fault in the argument lies in its structure rather than in its premises, we shall have learned something valuable about the considerations adduced as premises in the argument, namely that they do not show what they may appear to show. Finally, in the context of a course like this, identifying faults in arguments is a useful exercise for acquiring the extremely valuable ability to detect faults in arguments in general. Thus, even a bad argument may be of value in certain ways and for certain purposes.