

Prologue

The Nature of Logic

Text from St. Thomas Aquinas

1. There is a twofold operation of the intellect, as Aristotle says in his book *On The Soul*. One is the understanding of simple objects, that is, the operation by which the intellect apprehends just the essence of a thing alone; the other is the operation of composing and dividing. There is also a third operation, that of reasoning, by which reason proceeds from what is known to the investigation of things that are unknown. The first of these operations is ordered to the second, for there cannot be composition and division unless things have already been apprehended simply. The second, in turn, is ordered to the third, for clearly we must proceed from some known truth to which the intellect assents in order to have certitude about something not yet known.

2. Since logic is called the rational science, it

must direct its consideration to the things that belong to the three operations of reason we have mentioned. Accordingly, Aristotle treats those [things] belonging to the first operation of the intellect, i.e., those conceived by simple understanding, in the book *Categories*; those belonging to the second operation, i.e., affirmative and negative enunciation, in the book *On Interpretation*; those belonging to the third operation in the book *Prior Analytics* and the books following it, in which he treats the syllogism absolutely, the different kinds of syllogism, and the species of argumentation by which reason proceeds from one thing to another. And since the three operations of reason are ordered to each other, so are the books: the *Categories* to *On Interpretation* and *On Interpretation* to the *Prior Analytics* and the books following it.¹

Lesson

Since logic is one of the most difficult disciplines to master, before we plunge into the subject we should take time to look at it in a general way. We should begin by seeing what we will be studying in logic, why we need to study it, and how we will study it.

St. Thomas refers to logic as both the art of reasoning and the rational science. Now every art and every science has a subject what it is about. For example, music makes beautiful sounds, biology looks at living things, and arithmetic studies numbers. Logic is about three things: words, thoughts, and things. Reasoning is a process of organizing our thoughts, but we can do that only by organizing our words. In turn, those words express our thoughts about real things. Perhaps we can best describe the subject of logic by saying that logic is about words insofar as they signify things through our thoughts.

Although logic is a difficult subject to study, it is absolutely fundamental to the life of the mind. One way to see the necessity of logic is to compare the mind to the hand. The hand is a universal tool, which can do just about anything, but few things well. My hand by itself is good for grasping, pushing, touching. In an emergency I could use my hands to fight, to rip things apart, to dig a hole. But it is much more convenient to fight with a gun, cut with a knife, and dig with a shovel. It is better to use my hands to make tools, which help me to do these things well.

The human mind is much like the hand. By itself it does a pretty good job of thinking about practical matters. No one needs to be a logician to know right from wrong, or to learn how to fix a car. When it deals with the highest questions, however – questions about the soul and God – by itself it rarely thinks well. Like the hand, the mind must make tools for itself that help

it to think well about philosophical and theological questions. It makes words that precisely represent its thoughts, it combines those words into statements, and it combines statements into arguments. These are all tools of the mind. The function of logic is to study these actions in order to make the intellectual tools more easily and without the fear of making mistakes. That is why in another place St. Thomas calls logic the tool of the speculative sciences.

Our study of logic will be divided into three parts. First, we will study simple apprehension, that act by which the mind grasps just what something is. Then we will look at composing and dividing, the act by which the mind knows the true and the false. Finally, we will study discursive reasoning, which enables the mind to move from the known to the unknown.

Modern philosophy has brought confusion to logic, but we will leave aside the many different “logics” floating around in the modern world. In this course we will study logic in the traditional way, following the doctrine of Aristotle. He is called the father of logic because in his writings he gives an almost complete overview of the subject. The beginning of each lesson in this course, then, will be a passage from one of the ancient philosophers, usually Aristotle, the middle an explanation of that passage, and the end a set of logical exercises. First, let’s examine Plato’s dialogue *Meno*, one of the earliest considerations of logical themes.

¹ Aquinas, Thomas. “Prologue.” Translated by Anthony Andres. *Commentary on Aristotle’s On Interpretation*. Hillsdale: The Arts of Liberty Project, 2014.

Lesson One
Plato's *Meno*

Selected Passages
translated by Benjamin Jowett

Meno. Can you tell me, Socrates, whether virtue is acquired by teaching or by practice; or if neither by teaching nor practice, then whether it comes to man by nature, or in what other way?

Socrates. O Meno, there was a time when the Thessalians were famous among the other Hellenes only for their riches and their riding; but now, if I am not mistaken, they are equally famous for their wisdom, especially at Larisa, which is the native city of your friend Aristippus. ... How different is our lot! my dear Meno. Here at Athens there is a dearth of the commodity, and all wisdom seems to have emigrated from us to you. ... And I myself, Meno, living as I do in this region of poverty, am as poor as the rest of the world; and I confess with shame that I know literally nothing about virtue; and when I do not know the "what" of anything how can I know its properties? How, if I knew nothing at all of Meno, could I tell if he was fair, or the opposite of fair; rich and noble, or the reverse of rich and noble? Do you think that I could?

Men. No, Indeed. But are you in earnest, Socrates, in saying that you do not know what virtue is? And am I to carry back this report of you to Thessaly?

Soc. Not only that, my dear boy, but you may say further that I have never known of any one else who did, in my judgment.

Men. Then you have never met Gorgias when he was at Athens?

Soc. Yes, I have.

Men. And did you not think that he knew?

Soc. I have not a good memory, Meno, and therefore I cannot now tell what I thought of him at the time. And I dare say that he did know, and that you know what he said: please, therefore, remind me of what he said; or, if you would rather, tell me your own view; for I suspect that you and he think much alike.

Men. Very true.

Soc. Then as he is not here, never mind him, and do you tell me: By the gods, Meno, be generous, and tell me what you say that virtue is; for I shall be truly

delighted to find that I have been mistaken, and that you and Gorgias do really have this knowledge; although I have been just saying that I have never found anybody who had.

Men. There will be no difficulty, Socrates, in answering your question. Let us take first the virtue of a man – he should know how to administer the state, and in the administration of it to benefit his friends and harm his enemies; and he must also be careful not to suffer harm himself. A woman's virtue, if you wish to know about that, may also be easily described: her duty is to order her house, and keep what is indoors, and obey her husband. Every age, every condition of life, young or old, male or female, bond or free, has a different virtue: there are virtues numberless, and no lack of definitions of them; for virtue is relative to the actions and ages of each of us in all that we do. And the same may be said of vice, Socrates.

Soc. How fortunate I am, Meno! When I ask you for one virtue, you present me with a swarm of them, which are in your keeping. Suppose that I carry on the figure of the swarm, and ask of you, What is the nature of the bee? and you answer that there are many kinds of bees, and I reply: But do bees differ as bees, because there are many and different kinds of them; or are they not rather to be distinguished by some other quality, as for example beauty, size, or shape? How would you answer me?

Men. I should answer that bees do not differ from one another, as bees.

Soc. And if I went on to say: That is what I desire to know, Meno; tell me what is the quality in which they do not differ, but are all alike; – would you be able to answer?

Men. I should.

Soc. And so of the virtues, however many and different they may be, they have all a common nature which makes them virtues; and on this he who would answer the question, "What is virtue?" would do well to have his eye fixed: Do you understand?

Men. I am beginning to understand; but I do not as yet take hold of the question as I could wish.

Soc. When you say, Meno, that there is one virtue of a man, another of a woman, another of a child, and so on, does this apply only to virtue, or would you say the same of health, and size, and strength? Or is the nature of health always the same, whether in man or woman?

Men. I should say that health is the same, both in man and woman.

Soc. And is not this true of size and strength? If a woman is strong, she will be strong by reason of the same form and of the same strength subsisting in her which there is in the man. I mean to say that strength, as strength, whether of man or woman, is the same. Is there any difference?

Men. I think not.

Soc. And will not virtue, as virtue, be the same, whether in a child or in a grown-up person, in a woman or in a man?

Men. I cannot help feeling, Socrates, that this case is different from the others.

Soc. But why? Were you not saying that the virtue of a man was to order a state, and the virtue of a woman was to order a house?

Men. I did say so.

Soc. And can either house or state or anything be well ordered without temperance and without justice?

Men. Certainly not.

Soc. Then they who order a state or a house temperately or justly order them with temperance and justice?

Men. Certainly.

Soc. Then both men and women, if they are to be good men and women, must have the same virtues of temperance and justice?

Men. True.

Soc. And can either a young man or an elder one be good, if they are intemperate and unjust?

Men. They cannot.

Soc. They must be temperate and just?

Men. Yes.

Soc. Then all men are good in the same way, and by participation in the same virtues?

Men. Such is the inference.

Soc. And they surely would not have been good in the same way, unless their virtue had been the same?

Men. They would not.

Soc. Then now that the sameness of all virtue has been proven, try and remember what you and Gorgias say that virtue is.

Men. Will you have one definition of them all?

Soc. That is what I am seeking.

Men. If you want to have one definition of them all, I know not what to say, but that virtue is the power of governing mankind.

Soc. And does this definition of virtue include all virtue? Is virtue the same in a child and in a slave, Meno? Can the child govern his father, or the slave his master; and would he who governed be any longer a slave?

Men. I think not, Socrates.

Soc. No, indeed; there would be small reason in that. Yet once more, fair friend; according to you, virtue is "the power of governing"; but do you not add "justly and not unjustly"?

Men. Yes, Socrates; I agree there; for justice is virtue. Soc. Would you say "virtue," Meno, or "a virtue"?

Men. What do you mean?

Soc. I mean as I might say about anything; that a round, for example, is "a figure" and not simply "figure," and I should adopt this mode of speaking, because there are other figures.

Men. Quite right; and that is just what I am saying about virtue – that there are other virtues as well as justice.

Soc. What are they? Tell me the names of them, as I would tell you the names of the other figures if you asked me.

Men. Courage and temperance and wisdom and magnanimity are virtues; and there are many others.

Soc. Yes, Meno; and again we are in the same case: in searching after one virtue we have found many, though not in the same way as before; but we have been unable to find the common virtue which runs through them all.

Men. Why, Socrates, even now I am not able to follow you in the attempt to get at one common notion of virtue as of other things.

Soc. No wonder; but I will try to get nearer if I can, for you know that all things have a common notion. Suppose now that some one asked you the question, which I asked before: Meno, he would say, What is figure? And if you answered "roundness," he would reply to you, in my way of speaking, by asking whether you would say that roundness is "figure" or "a figure"; and you would answer "a figure."

Men. Certainly.

Soc. And for this reason—that there are other figures?

Men. Yes.

Soc. And if he proceeded to ask, What other figures are there? you would have told him.

Men. I should.

Soc. And if he similarly asked what color is, and you answered whiteness, and the questioner rejoined, Would you say that whiteness is color or a color? you would reply, a color, because there are other colors as well.

Men. I should.

Soc. And if he had said, Tell me what they are? you would have told him of other colors which are colors just as much as whiteness.

Men. Yes.

Soc. And suppose that he were to pursue the matter in my way, he would say: Ever and anon we are landed in particulars, but this is not what I want; tell me then, since you call them by a common name, and say that they are all figures, even when opposed to one another, what is that common nature which you designate as figure – which contains straight as well as round, and is no more one than the other – that would be your mode of speaking?

Men. Yes.

Soc. And in speaking thus, you do not mean to say that the round is round any more than straight, or the straight any more straight than round?

Men. Certainly not.

Soc. You only assert that the round figure is not more a figure than the straight, or the straight than the round?

Men. Very true.

Soc. To what then do we give the name of figure? Try and answer. Suppose that when a person asked you this question either about figure or color, you were to reply, Man, I do not understand what you want, or know what you are saying; he would look rather astonished and say: Do you not understand that I am looking for the “like in the many”? And then he might put the question in another form: Meno, he might say, what is that “like in the many” which you call figure, and which includes not only round and straight figures, but all? Could you not answer that question, Meno? I wish that you would try; the attempt will be good practice with a view to the answer about virtue.

Men. I would rather that you should answer, Socrates.

Soc. Shall I indulge you?

Men. By all means.

Soc. And then you will tell me about virtue?

Men. I will.

Soc. Then I must do my best, for there is a prize to be won.

Men. Certainly.

Soc. Well, I will try and explain to you what

figure is. What do you say to this answer? – Figure is the only thing which always follows color. Will you be satisfied with it, as I am sure that I should be, if you would let me have a similar definition of virtue?

Men. But, Socrates, it is such a simple answer.

Soc. Why simple?

Men. Because, according to you, figure is that which always follows color.

(Soc. Granted.)

Men. But if a person were to say that he does not know what color is, any more than what figure is – what sort of answer would you have given him?

Soc. I should have told him the truth. And if he were a philosopher of the eristic and antagonistic sort, I should say to him: You have my answer, and if I am wrong, your business is to take up the argument and refute me. But if we were friends, and were talking as you and I are now, I should reply in a milder strain and more in the dialectician’s vein; that is to say, I should not only speak the truth, but I should make use of premises which the person interrogated would be willing to admit. And this is the way in which I shall endeavor to approach you. You will acknowledge, will you not, that there is such a thing as an end, or termination, or extremity? – All which words use in the same sense, although I am aware that Prodicus might draw distinctions about them: but still you, I am sure, would speak of a thing as ended or terminated – that is all which I am saying – not anything very difficult.

Men. Yes, I should; and I believe that I understand your meaning.

Soc. And you would speak of a surface and also of a solid, as for example in geometry.

Men. Yes.

Soc. Well then, you are now in a condition to understand my definition of figure. I define figure to be that in which the solid ends; or, more concisely, the limit of solid.

Men. And now, Socrates, what is color?

Soc. You are outrageous, Meno, in thus plaguing a poor old man to give you an answer, when you will not take the trouble of remembering what is Gorgias’ definition of virtue.

Men. When you have told me what I ask, I will tell you, Socrates.

Soc. Would you like me to answer you after the manner of Gorgias, which is familiar to you?

Men. I should like nothing better.

Soc. Do not he and you and Empedocles say that there are certain effluences of existence?

Men. Certainly.

Soc. And passages into which and through which the effluences pass?

Men. Exactly.

Soc. And some of the effluences fit into the passages, and some of them are too small or too large?

Men. True.

Soc. And there is such a thing as sight?

Men. Yes.

Soc. And now, as Pindar says, "read my meaning" color is an effluence of form, commensurate with sight, and palpable to sense.

Men. That, Socrates, appears to me to be an admirable answer.

Soc. Why, yes, because it happens to be one which you have been in the habit of hearing: and your wit will have discovered, I suspect, that you may explain in the same way the nature of sound and smell, and of many other similar phenomena.

Men. Quite true.

Soc. The answer, Meno, was in the orthodox solemn vein, and therefore was more acceptable to you than the other answer about figure.

Men. Yes.

Soc. And yet, O son of Alexidemus, I cannot help thinking that the other was the better; and I am sure that you would be of the same opinion, if you would only stay and be initiated, and were not compelled, as you said yesterday, to go away before the mysteries.

Men. But I will stay, Socrates, if you will give me many such answers.

Soc. Well then, for my own sake as well as for yours, I will do my very best; but I am afraid that I shall not be able to give you very many as good: and now, in your turn, you are to fulfill your promise, and tell me what virtue is in the universal; and do not make a singular into a plural, as the facetious say of those who break a thing, but deliver virtue to me whole and sound, and not broken into a number of pieces: I have given you the pattern.

Men. Well then, Socrates, virtue, as I take it, is when he, who desires the honorable, is able to provide it for himself; so the poet says, and I say too:

Virtue is the desire of good things and the power of attaining them.

Soc. And does he who desires the honorable also desire the good?

Men. Certainly.

Soc. Then are there some who desire the evil and

others who desire the good? Do not all men, my dear sir, desire good?

Men. I think not.

Soc. There are some who desire evil?

Men. Yes.

Soc. Do you mean that they think the evils which they desire, to be good; or do they know that they are evil and yet desire them?

Men. Both, I think.

Soc. And do you really imagine, Meno, that a man knows evils to be evils and desires them notwithstanding?

Men. Certainly I do.

Soc. And desire is of possession?

Men. Yes, of possession.

Soc. And does he think that the evils will do good to him who possesses them, or does he know that they will do him harm?

Men. There are some who think that the evils will do them good, and others who know that they will do them harm.

Soc. And, in your opinion, do those who think that they will do them good know that they are evils?

Men. Certainly not.

Soc. Is it not obvious that those who are ignorant of their nature do not desire them; but they desire what they suppose to be goods although they are really evils; and if they are mistaken and suppose the evils to be good they really desire goods?

Men. Yes, in that case.

Soc. Well, and do those who, as you say, desire evils, and think that evils are hurtful to the possessor of them, know that they will be hurt by them?

Men. They must know it.

Soc. And must they not suppose that those who are hurt are miserable in proportion to the hurt which is inflicted upon them?

Men. How can it be otherwise?

Soc. But are not the miserable ill-fated?

Men. Yes, indeed.

Soc. And does any one desire to be miserable and ill-fated?

Men. I should say not, Socrates.

Soc. But if there is no one who desires to be miserable, there is no one, Meno, who desires evil; for what is misery but the desire and possession of evil?

Men. That appears to be the truth, Socrates, and I admit that nobody desires evil.

Soc. And yet, were you not saying just now that virtue is the desire and power of attaining good?

Men. Yes, I did say so.

Soc. But if this be affirmed, then the desire of good is common to all, and one man is no better than another in that respect?

Men. True.

Soc. And if one man is not better than another in desiring good, he must be better in the power of attaining it?

Men. Exactly.

Soc. Then, according to your definition, virtue would appear to be the power of attaining good?

Men. I entirely approve, Socrates, of the manner in which you now view this matter.

Soc. Then let us see whether what you say is true from another point of view; for very likely you may be right: – You affirm virtue to be the power of attaining goods?

Men. Yes.

Soc. And the goods which mean are such as health and wealth and the possession of gold and silver, and having office and honor in the state – those are what you would call goods?

Men. Yes, I should include all those.

Soc. Then, according to Meno, who is the hereditary friend of the great king, virtue is the power of getting silver and gold; and would you add that they must be gained piously, justly, or do you deem this to be of no consequence? And is any mode of acquisition, even if unjust and dishonest, equally to be deemed virtue?

Men. Not virtue, Socrates, but vice.

Soc. Then justice or temperance or holiness, or some other part of virtue, as would appear, must accompany the acquisition, and without them the mere acquisition of good will not be virtue.

Men. Why, how can there be virtue without these?

Soc. And the non-acquisition of gold and silver in a dishonest manner for oneself or another, or in other words the want of them, may be equally virtue?

Men. True.

Soc. Then the acquisition of such goods is no more virtue than the non-acquisition and want of them, but whatever is accompanied by justice or honesty is virtue, and whatever is devoid of justice is vice.

Men. It cannot be otherwise, in my judgment.

Soc. And were we not saying just now that justice, temperance, and the like, were each of them a part of virtue?

Men. Yes.

Soc. And so, Meno, this is the way in which you mock me.

Men. Why do you say that, Socrates?

Soc. Why, because I asked you to deliver virtue into my hands whole and unbroken, and I gave you a pattern according to which you were to frame your answer; and you have forgotten already, and tell me that virtue is the power of attaining good justly, or with justice; and justice you acknowledge to be a part of virtue.

Men. Yes.

Soc. Then it follows from your own admissions that virtue is doing what you do with a part of virtue; for justice and the like are said by you to be parts of virtue.

Men. What of that?

Soc. What of that! Why, did not I ask you to tell me the nature of virtue as a whole? And you are very far from telling me this; but declare every action to be virtue which is done with a part of virtue; as though you had told me and I must already know the whole of virtue, and this too when frittered away into little pieces. And, therefore, my dear, I fear that I must begin again and repeat the same question: What is virtue? For otherwise, I can only say, that every action done with a part of virtue is virtue; what else is the meaning of saying that every action done with justice is virtue? Ought I not to ask the question over again; for can any one who does not know virtue know apart of virtue?

Men. No; I do not say that he can.

Soc. Do you remember how, in the example of figure, we rejected any answer given in terms which were as yet unexplained or unadmitted?

Men. Yes, Socrates; and we were quite right in doing so.

Soc. But then, my friend, do not suppose that we can explain to any one the nature of virtue as a whole through some unexplained portion of virtue, or anything at all in that fashion; we should only have to ask over again the old question, What is virtue? Am I not right?

Men. I believe that you are.

Soc. Then begin again, and answer me, What, according to you and your friend Gorgias, is the definition of virtue?

Men. O Socrates, I used to be told, before I knew you, that you were always doubting yourself and making others doubt; and now you are casting your spells over me, and I am simply getting bewitched and enchanted, and am at my wits' end. And if I may venture to make a jest upon you, you seem to me both in your appearance and in your power over others to be very like the flat torpedo fish, who

numbs those who come near him and touch him, as you have now numbed me, I think. For my soul and my tongue are really torpid, and I do not know how to answer you; and though I have been delivered of

an infinite variety of speeches about virtue before now, and to many persons – and very good ones they were, as I thought – at this moment I cannot even say what virtue is.¹

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. Write down every definition of virtue proposed in this dialogue, either by Meno or by Socrates. Then note what Socrates finds wrong with each one.
2. Give Socrates' definitions of color and figure. Why doesn't he like his definition of color?

¹ Plato. *Meno*. Translated by Benjamin Jowett. New York: C. Scribner's Sons, 1871.

Lesson Two

The Universal

The Beginning of Porphyry's *Isagoge*

It is necessary both for Aristotle's teaching about the Categories and for giving definitions to know what genus, species, and difference, and what property and accident are. And since speculative knowledge of them is on the whole useful in connection with division and demonstration, I shall make you a concise summary and try to show you briefly by way of an introduction what the ancients said. I shall keep away from the deeper questions but shall aim rightly at the simpler, i.e., I shall refuse to say whether genus and species are subsistent or are located only in naked concepts, and if subsistent, whether they are corporeal or incorporeal, and whether separate from sensible or subsisting in them and around them. That business is very deep and requires a greater examination. Nevertheless, I shall now try to show you how the ancients and especially the Peripatetics discussed this and the other proposed questions rationally.

Definitions

definition – an expression which signifies what something is.

subject – that of which something is affirmed or denied.

predicate – that which is affirmed or denied of something.

predicated of – affirmed or denied of something; said of.

said of – affirmed or denied of something; predicated of.

singular – one word predicated of only one thing.

universal – one word predicated of many things.

essential – signifies what a thing is.

accidental – does not signify what a thing is.

Lesson

The Nature of Definitions

The first act of the human mind is the act of simple apprehension, i.e., understanding what something is, and we think that we really know what something is when we can give a good definition of it. But, as we saw in *Meno*, giving a good definition can be difficult. We need logic to show us how to make a good definition.

It is clear from *Meno* that a definition must be universal, i.e., it must apply to every instance of the thing defined. The logic of the first act begins, therefore, with a consideration of the universal. And since the universal cannot be understood unless the distinction between subject and predicate is known, we will first examine the natures of the subject and the predicate.

Subject and Predicate

We learn something about subjects and predicates in grammar. The subject is that of which something is affirmed or denied, while the predicate is what is affirmed or denied of the subject. For example, in the sentence "Fido is a dog," 'Fido' is the subject and 'dog' is the predicate. Since a predicate is 'predicated of,' or 'said of,' a subject, we can say that 'dog' is something that is predicated of, or said of, 'Fido.' In the sentence "Fido is not a dog," 'Fido' and

‘a dog’ are the subject and predicate, but in this case ‘dog’ is denied of ‘Fido.’ In a similar way, in the sentence “Fido runs,” ‘Fido’ is the subject and ‘runs’ is the predicate.

The sentences above are simple, but more complicated sentences can also be divided into a subject and predicate. For example, the sentence “The dog which is running is white with black spots” can be divided into the subject, ‘The dog which is running,’ and the predicate, ‘is white with black spots.’ In this last sentence the subject and predicate are just more complicated than in the first two. We could of course further analyze this sentence, but for now we only need to divide it into these two parts.

The Universal

“Spot is a dog.” “Fido is a dog.” It is possible that both of these statements are true because the word ‘dog’ is a universal. That is, ‘dog’ is one word that can be the predicate for more than one subject. We can define the universal as a word that can be predicated of more than one subject. ‘White’ is also a universal since it can truly be predicated of more than one subject; e.g., “Fido is white” and “Spot is white” can both be true. On the other hand, the words ‘Fido’ and ‘Spot’ are singular. Each is only meant to be predicated of one subject, the individual dog it points out. Since every definition must be universal, the logician must be able to distinguish the singular from the universal.

The logician also distinguishes kinds of universals. There is an important difference between the way that ‘white’ is a universal and the way that ‘dog’ is. If I dyed Fido’s coat brown, he would stop being white, but he would still be Fido. The logician will say that being brown is *accidental* to Fido. If Fido stopped being a dog, however, he would no longer be Fido. That is, being a dog is *essential* to Fido; it is what makes Fido what he is. So we can conclude that not all universal words are universal in exactly the same way. In the next lesson we will look at the predicables, the five different ways in which a word can be universal.

In the passage at the beginning of this chapter, Porphyry asks three questions about universals: (1) Are universals real, or just constructions of our minds? (2) If they are real, are they corporeal, i.e., physical, or are the incorporeal? (3) If they are incorporeal, do they exist in physical things, or separately from them? As he notes, these are difficult questions, and so we too will postpone a discussion of them until we are more advanced in philosophy. For now, however, we will continue to investigate the logical characteristics of the universal.

Exercises

Exercise 1: *Circle the subject and underline the predicate.*

1. Bozo is a clown.
2. William Shakespeare was a playwright.
3. Squirrels are animals.
4. Horses are not squirrels.

5. Bats fly.
6. Red basketballs are triangular.
7. Salt is expensive and very hard to find.
8. The royal crown is made of gold and precious stones.
9. Red-blooded Americans sing the national anthem.
10. Criminals are repentant.
11. Horses are animals, which are vertebrates.
12. Martians are green men.
13. Watches that are broken are useless.
14. Prudent decisions are honorable.
15. Strange statements that are illogical are terrible.
16. Our parish published a directory including photos of all of the parishioners.
17. Pledging our lives and our honor, we signed the declarations of human rights.
18. Socrates, who for years past had angered the Athenians with his dialectical inquiries, was condemned to death by a jury of his fellow citizens.
19. Boldly the captain pursued the pirates.
20. Sweetly sang the nightingale.

Exercise 2: *State whether the given word is singular or universal.*

1. Socrates
2. man
3. this man
4. this whiteness in this shirt

5. white
6. rooster
7. belt
8. his favorite belt
9. William Shakespeare
10. athletic
11. living thing
12. funny
13. this noise
14. noisy
15. that clock
16. plant
17. number
18. animal
19. the current Secretary of State of the United States
20. Antarctica

Lesson Three

The Predicables

Text of *Porphyry*

It seems that neither genus nor species is said in one way alone. For a collection of some who are in a certain condition in relation to one something and to one another is called a genus or family. In another way again, the principle or beginning of any one's generation is called the genus or stock – whether the person who generated him or the place in which he was born. In still another way, that under which the species are arranged is called the genus – perhaps in likeness to the preceding. Thus, genus is spoken of in three ways; and the philosophers are interested in the third way. They give this in outline form and say that genus is that which is predicated in answer to “what is it?” of many differing in species, e.g., animal.

The form of each thing is called a species or visible form. That is also called species, which is under the given genus, and accordingly we are accustomed to say that man is a species of animal. Accordingly they give species thus: Species is that which is arranged under genus and of which genus is predicated in answer to “what is it?”. The summum genus is that genus above which there is no higher genus; the infima species is that species below which there is no lower species; but between the summum genus and the infima species are others which may be taken as genera or species, depending on how you look at it.

Universally every difference accruing to something makes it other; we must say that some differences are separable and others inseparable. Some of the inseparables are essential and others accidental. For rationality inheres in man essentially, and also mortality and ability to learn; while having an aquiline or a flat nose inheres accidentally and not essentially. There are some essential differences by which we divide genera into species; and there are others by which what is

divided is made specific. Thus, of all the essential differences of animal such as these – animate and sensitive, rational and irrational – the differences of animate and sensitive are constitutive of the substance of animal (for animal is an animate sensitive substance), while the differences of rational and irrational are differences that divide animal. For through them we divide genus into species; they are all called specific. Again they define difference thus: difference is predicated in answer to “of what quality?” of those differing in species; or, difference is what naturally separates those under a genus.

They divide property in four ways: for (1) it is what happens to some one species only, although not to all those in the species – as it happens to man to practice medicine or geometry; (2) it is what happens to a whole species, although not to it alone – as it happens to man to be a biped; (3) it is what happens to some one species, to all those in it, and at some particular time – as it happens to every man to get white hair in old age; and lastly, (4) it is that in which it concurs to be accidental to one species only, to all those in it, and at all times – as risibility to man.

Accident is what becomes and passes away without the destruction of the subject. It is divided into two: for some accidents are separable, and others are inseparable, e.g., sleeping is a separable accident, but blackness is an inseparable accident of the crow. Nevertheless, we may possibly conceive of a white crow without the destruction of the subject. They also define it thus: accident is what may contingently inhere or not inhere in the same, or what is neither genus, difference, species, nor property but is always subsistent in a subject.

Definitions

predicable – a classification of words according to how the word is universally related to another word.

genus – that which is predicated in answer to “What is it?” of many differing in species.

species – that which is arranged under genus; that which is predicated in answer to “What is it?” of many differing as individuals.

summum genus – a genus which is not a species.

infima species – a species which is not a genus.

difference – what makes something “other.”

specific difference – a universal that naturally separates those under the same genus.

property – a universal that happens to one species only, to all of that species, at all times.

contingent – what might or might not be or happen.

accident – a universal that belongs contingently to a species and to the individuals in that species.

Lesson

There are five predicables: genus, species, difference, property, and accident. We will begin by looking at the most easily understood predicables, genus and species.

Genus and Species

“Genus” comes from the Greek word for “race” or “family” and is related to words such as genesis and generation. By extension “genus” has come to mean “kind of thing.” In logic we use the word “genus” to refer to a kind of thing that has other kinds underneath it. An example will make this meaning clearer.

Living things are divided into two basic kinds, plants and animals. Animals themselves, however, are divided into kinds, e.g., dogs, men, horses, etc. Therefore, “animal” is a term that signifies a kind of thing that has other kinds under it. Animal, therefore, is a genus. It is the genus of dogs, men, horses, etc. In the same way, since there are different kinds of living things, but living thing is a kind of thing, then living thing is also a genus – the genus of plants and animals.

“Species” comes from the Latin for “outward appearance.” Since things with the same outward appearance are often the same kind of thing, by extension “species” has come to mean “kind of thing.” Unlike genus, however, a species as species is not divided into kinds. Rather, we speak of a kind of something as a species when we view it as coming below a genus. For example, “animal” is a genus for the species “man,” since man is arranged below animal. In the same way, “living thing” is a genus for the species “animal,” since animal is arranged below living thing. We call a species that which is arranged below a genus.

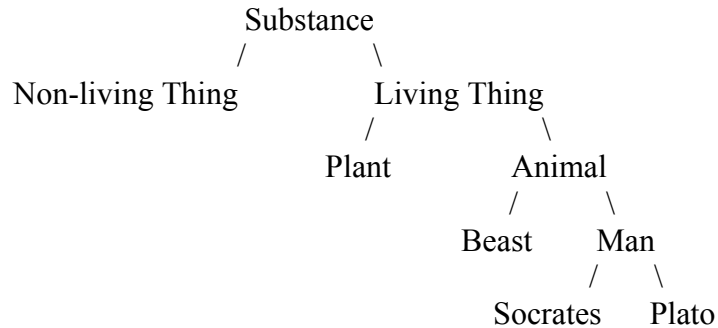
Although a species is not the species for *kinds* of things below it, it is a species of the *individuals* below it. For example, man is the species of Socrates, since Socrates is an individual, which comes below man. Species, then, comes below a genus but above individuals.

Genus and species have one more important feature. If we ask, “What is Socrates?” we do not answer, “Socrates is white,” even though it might be true that Socrates is white. We say instead, “Socrates is a man.” Similarly, if we are asked what a man is, we say that a man is a kind of animal. Species and genus, then, both answer the question “What is it?” Porphyry therefore gives the following definitions:

Genus is that which is predicated in answer to “What is it?” of many differing in species.

Species is that which is arranged under genus. Alternatively, species is that of which genus is predicated in answer to “What is it?”

It is possible to arrange terms in a chain of logical relations, starting from the highest genus and going down to the lowest species. Below is an example of such an arrangement, often called the “Tree of Porphyry”:



It is clear from the tree that the same term can be both a genus and a species. For example, “animal” is a genus in relation to “man,” but a species in relation to “living thing.” The only exceptions are the highest genus and the lowest species. The highest genus (or said in Latin, “*summum genus*”), since it is not below any other term, cannot be a species. Similarly, the lowest species (or, said in Latin, “*infima species*”) is not above any other, so it is not a genus. The only terms below it are the names of individuals, e.g., Socrates and Plato.

Although each genus or species is universal, they are not all equally universal. The summum genus is most universal because it is the term common to the greatest number of things. The infima species is least universal since it is common to the least number of things. Also, although each genus-species relation can be arranged into a Tree of Porphyry, they cannot all be arranged into one super-tree. Aristotle teaches that there are ten separate summa genera, each at the top of its own tree.

Difference

In its most ordinary meaning, “difference” signifies whatever causes one thing to differ from another. For example, dromedaries differ from Bactrian camels in the number of humps they have. In logic, “difference” has a special though related meaning.

Men and brute animals are both animals, but they are different species of animals. What makes man different from the brutes? It is primarily man’s rational powers; and so we call man the “rational animal.” Since reason is what makes man a different species of animal, we call “rational” the specific difference of man – and this is the kind of difference logic is concerned with. Porphyry thus gives the following definition of specific difference:

Specific difference is *what naturally separates those under the same genus.*
 Alternatively, specific difference is *predicated in answer to “Of what quality?” of those differing in species.*

We should notice that the specific difference is not always restricted to one species absolutely, but it is always restricted to one species under any given genus. For example, triangles are divided into scalene, isosceles, and equilateral triangles, while rectangles are

divided into oblongs and squares. The specific differences of the equilateral triangle and the square are the same: having all sides equal. But these figures differ from each other because they belong to different genera – triangles and rectangles.

Property

A property is a universal term that is predicated of a species, not of an individual. It does not tell us what a thing is, nor does it divide a genus into species. Rather, it signifies a characteristic peculiar to all of one species. The strictest definition of property follows:

*A **property** is what happens to one species only, to all those in that species, and at all times.*

An example of a property is risibility, i.e., the ability to laugh. All men are risible, only men are risible, and we all possess the power to laugh at all times (although it is true that we are not always laughing). Furthermore, although none of the brute animals laugh, the ability to laugh is not the root difference between man and the brutes. It is, however, closely connected with that root difference – rationality. Thus, “risible” is a property of man.

Many students confuse the property and the specific difference. In the peculiar case of man, it is true that his specific difference, “rational,” belongs only to him. In most cases, however, the specific difference belongs to things outside that species. As we saw before, both triangles and rectangles can be equilateral. Only triangles, however, have angles that add up to 180°. Equilateral is a difference, having angles that add up to 180° is a property.

Accident

The last predicable is the accident. “Accident” comes from the Latin for “happening.” Whatever just happens to be the case is an accident. Any term that denotes neither genus nor species nor difference nor property is an accident. For example, if Plato happens to have a tan, “tan” is an accident of Plato. Porphyry defines accident as follows:

***Accident** is what belongs contingently to a species and to the individuals of that species.*

Definition

We have seen that three predicables – genus, species, and difference – are predicated essentially of their subjects. Each tells us what a thing is. But St. Thomas teaches that a definition is an expression that signifies what a thing is. Our next task is to examine the relation between definition and the three essential predicables.

Suppose someone asks, “What is a square?” One could reply, “A square is a rectangle.” That reply, however, is incomplete, since not all rectangles are squares. One could reply, “A square is equilateral.” Once again, figures other than squares are equilateral. A complete reply to the question “What is a square?” would be “A square is an equilateral rectangle.” This reply combines the genus and specific difference, and, since it signifies what a square is completely, it is the definition of the square. We can conclude, then, that the definition of a species is a combination of its genus and specific difference. The pattern is: species = genus + specific difference.

A definition that follows these rules is able to avoid the problems that plagued Meno's definition of virtue. Recall that the *Meno's* definitions of virtue had the following faults: 1) one divided virtue into many kinds, instead of stating what was common to all virtue; 2) another applied to only some of the things called virtues, but not to others; 3) a third applied not only to virtues but vices as well; and 4) the last included a kind of virtue in its definition, making the definition circular. If we define virtue, however, according to its genus and specific difference, we can avoid all of these problems. We will define virtue as a whole, instead of dividing it into parts, and we will include all of the virtues, because the genus points out what is common to all virtues. We will avoid a definition of virtue that includes vice, because the specific difference will exclude all that is not virtue. Finally, since neither the genus nor the difference is a kind of virtue, we will avoid making the definition circular. The form of definition prescribed by Porphyry, then, solves the main problem of definition.

Of course, all that we understand so far is the correct general form of definition. A good form does not guarantee the truth of definition. In the next few lessons, then, we will be gathering tools that will help us discover true definitions.

Exercises

Exercise 1: *Construct a Tree of Porphyry with the following words (if you do not know what they mean, use a dictionary):*

terrestrial animal	vertebrate
invertebrate	pig
reptile	fish
dog	mammal
animal	

Exercise 2: *Indicate the logical relationship that best applies to the pairs of terms.*

Example: Man is an animal. – species / genus

1. Socrates is a man.
2. Cats are animals.
3. Man is rational.
4. Animals are rational.
5. Animals have sensation.
6. Plants are living things.

7. Animals are living things.
8. Socrates is short.
9. Men are able to write.
10. Triangles have 180° .
11. Figure ABC is a triangle.
12. Isosceles triangles are triangles.
13. Triangles are blue.
14. Triangle ABC is blue.
15. Triangles have two equal sides.
16. Isosceles triangles have two sides equal.
17. The United States Congress is a legislature.
18. Plane figures have three sides.
19. Water freezes at 32° Fahrenheit.
20. Animals can swim.

Exercise 3: *Underline the genus and circle the difference in the following definitions.*

Example: Man is a (rational) animal.

1. A kettle is a pot used for boiling.
2. A one-room house is a cabin.
3. Hydrogen is a gas that has one electron and one proton in each atom.
4. A jungle is a thick and tropical forest.
5. An accurate shooter is a marksman.
6. A book that explains words in alphabetical order is a dictionary.

7. A watch is a small, portable timepiece.
8. A very destructive event is a disaster.
9. A camel with one hump is a dromedary.
10. A map representing Earth spherically is a globe.
11. A fork is a pronged utensil.
12. A glove is an article of clothing that covers the hand and each finger individually.
13. A four-sided plane figure is a quadrilateral.
14. An area of land completely surrounded by water is an island.
15. A masculine parent is a father.
16. A football player who snaps the ball is a center.
17. A virtue is a good habit.
18. An animal is a sensate living thing.
19. A garbage can is a container made to hold trash.
20. A lake is a big, inland body of water.

Lesson Four

The Ante-Predicaments: Before the Categories

Selections from Aristotle's *Categories*

translated by E. M. Edghill

1a1 – 1b24

Things are said to be named “equivocally” when, though they have a common name, the definition corresponding with the name differs for each. Thus, a real man and a figure in a picture can both lay claim to the name “animal”; yet these are equivocally so named, for, though they have a common name, the definition corresponding with the name differs for each. For should any one define in what sense each is an animal, his definition in the one case will be appropriate to that case only.

On the other hand, things are said to be named “univocally” which have both the name and the definition answering to the name in common. A man and an ox are both “animal,” and these are univocally so named, inasmuch as not only the name, but also the definition, is the same in both cases: for if a man should state in what sense each is an animal, the statement in the one case would be identical with that in the other.

Things are said to be named “denominatively,” which derive their name from some other name, but differ from it in termination. Thus the grammarian derives his name from the word “grammar,” and the courageous man from the word “courage.”

Forms of speech are either simple or composite. Examples of the latter are such expressions as “the man runs,” “the man wins”; of the former “man,” “ox,” “runs,” “wins.”

When one thing is said of another, all that which is said of the predicate will be said also of the subject. If genera are different and co-ordinate, their differentiae are themselves different in kind. But where one genus is subordinate to another, there is nothing to prevent their having the same differentiae: for the greater class is said of the lesser, so that all the differentiae of the predicate will be differentiae also of the subject.¹

Definitions

name – a word which signifies a thing.

equivocal naming – giving many subjects the same name but according to different definitions of that name.

univocal naming – giving many subjects the same name according to the same definition.

denominative naming – giving a subject a name taken from some other name which differs in its ending.

simple expression – an expression whose parts do not signify by themselves.

complex expression – an expression whose parts signify.

Lesson

In the *Meno*, Plato teaches that a definition must perform two tasks. First, it must include every instance of the thing defined. For example, the definition of virtue must be applicable to all of the virtues. Second, the definition must show how that kind of thing is different from other, similar things. As Porphyry showed, that will involve the determination of a genus and specific difference. Since the genus itself must often be defined, and perhaps its genus defined, and so on, it would be helpful if the logician were provided with a list of all the summa genera, above which there are no genera. This is what Aristotle does in his book, the *Categories*.

Before he can find and explain the *summa genera*, or categories, he must determine how to find them. In the first part of the *Categories*, therefore, he finds his subject by a process of division, and then he gives rules for the use of categories.

Using Names

A word is said to “name” a thing when it points the mind to that thing. For example, the word “Socrates” names the man Socrates. The word “man” also names Socrates, but it names Plato and Aristotle as well. “Animal” names Socrates, Plato, Spot, Fido, and Shamu the Killer Whale. Thus, the more universal the word, the more things it names. Names, however, can be used in many ways. In this lesson we will examine the univocal, equivocal, and denominative uses of names.

Two things are named equivocally when, although they have the same name, the account of what the thing is differs for each use of the name. For instance, when I call Socrates a “man” and the statue of Socrates a “man,” the word “man” will have two different meanings. Obviously, these two uses of the word “man” do not fall under the same genus. Aristotle must leave aside the equivocal use of names when he looks for the categories.

Things are named univocally when they have the same name and same account of what the thing is. For instance, when I call Socrates a man and Plato a man, “man” is being used univocally because it has the same meaning in both cases. Thus Aristotle is searching for the *summa genera* of things univocally named.

Since he is searching for the *summa genera*, however, and genera always answer the question “What is it?” he is not interested in all things univocally named, but only those whose names are essential. It is true that Socrates is white and Plato is white, and that “white” has the same meaning in each sentence, but “white” does not point to the essence of either. Therefore, white cannot lead us to the summum genus of Socrates and Plato. But since Socrates and Plato are both essentially men, and “man” has the same meaning for both, it can lead us to their summum genus. Aristotle, therefore, is concerned with univocal names used essentially.

Finally, a thing is named denominatively when its name is derived from some other name, but it has a different ending. In such cases, the original word names some characteristic, and the denominative word names something that has that characteristic. For instance, the “virtuous” man is named denominatively from the characteristic of “virtue.” While it might be true that Socrates is virtuous, still he is not *essentially* virtuous, and so Socrates cannot be put in the genus “virtuous.” But justice *is* essentially a virtue, and so “virtue” is its essential predicate, the genus under which justice falls. In sum, when a word names something denominatively, it cannot be located in a genus. In the *Categories* Aristotle is concerned with essential predicates used univocally but not denominatively.

Simple and Complex Expressions

There are two kinds of spoken expressions. Some expressions are simple, others complex. Later, we will read how Aristotle makes a definite distinction between them, but for now, he is only pointing out that simple expressions are one word signifying one thing, while complex expressions include more than one word. For instance, “man runs” and “the shirt is

white” are complex expressions, while “man,” “white,” “shirt,” and “runs” are all simple expressions. The summa genera will be simple expressions.

Rules for the Use of the Summa Genera

When we work our way from the bottom to the top of a Tree of Porphyry, we are going from less to more universal predicates. Furthermore, we divide that tree by specific differences. Aristotle gives three rules that help us divide the tree most effectively.

1. *Whatever is said of some genus is also said of the species under it, and the lower species under those.* For example, men are not only animals, they are also living things, bodies, and substances.
2. *The specific differences of the higher genus are also said of the lower genera.* If the specific difference of animal is “sensitive,” then we can say not only that animals have sensation, but that man has sensation.
3. *The specific differences of equally universal genera will not be said of both genera.* For example, if animal is divided into rational and irrational, plants will not be so divided because they are on the same level as animal in the Tree of Porphyry.

Aristotle has now proposed most of the main tools he will use to find the summa genera, or categories. In the next lesson, we will acquire one final tool and begin discussing the categories themselves.

Exercises

Exercise 1: *State whether the two underlined words are being used univocally or equivocally, or whether one is naming something denominatively.*

1. Longitude is the distance east or west of the meridian.
A straight line is the shortest distance between two points.
2. Life is the time between birth and death.
A day is the time required for the earth to rotate once on its axis.
3. The stock is the butt of a rifle.
A clown is the butt of jokes in a circus.
4. Trust is the gift of confidence in God.
The holy man is confident in God.
5. Proof is the strength of alcohol.
Horsepower is the strength of an engine.

6. Vice is a bad habit.
The virtuous man is habituated to good actions.
7. Faith is trust in God's word.
Belief is trust in man's word.
8. Lime is a common mineral.
Vitamin A is an important mineral.
9. Chainmail is light, flexible armor.
A helmet is armor for the head.
10. A hoe is a pick with a long handle.
The first draft choice is the pick of football players.
11. Proof is the strength of alcohol.
100 proof alcohol is very strong.
12. A flowchart is a decision-making tree.
A palm is a tropical tree.
13. The text is the content of a book.
Happiness is complete content with life.
14. A sycamore is a deciduous tree.
A conifer is an evergreen tree.
15. Destruction is the change from existence to non-existence.
The movable body changes place.
16. Reparation is satisfaction for sin.
Appeasement is the satisfaction of an enemy.
17. Gorillas are apes.
Chimpanzees are apes.
18. A papal audience is a public appearance by the Pope.
A sunny countenance is a cheerful appearance.
19. Judges determine legal justice.
The temperate man is also just.

20. The root of evil is greed.
The wicked man is also greedy.

Exercise 2: *For each of the following indicate whether the expression is simple or complex.*

1. man
2. Socrates
3. hot water
4. blueness
5. horse
6. Aristotle
7. sitting
8. risible
9. bald man
10. ox
11. winged
12. aquatic
13. The ball is heavy.
14. Socrates is skilled in grammar.

¹ Aristotle. "Categories." Translated by E. M. Edghill. *The Works of Aristotle*, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Five

The Categories: Substance

Selections from Aristotle's *Categories*

1a20 – 4a20

Of things themselves some are predicated of a subject, and never are present in a subject. Thus “man” is predicated of the individual man, and is never in a subject. By “being present in a subject” I do not mean existing in it as parts exist in a whole, but I mean being incapable of existence apart from the said subject. Some things, again, are present in a subject, but are never predicated of a subject. For instance, a certain point of grammatical knowledge is present in the mind, but is not predicated of any subject; or again, a certain whiteness may be present in the body (for color requires a material basis), yet it is never predicated of anything. Other things, again, are both predicated of a subject and present in a subject. Thus while knowledge exists in the human mind, it is said of grammar. There is, lastly, a class of things which neither are present in a subject nor are predicated of a subject, such as the individual man or the individual horse.

Expressions which are in no way composite signify substance, quantity, quality, relation, place, time, position, outfit, action, or being acted upon. To sketch my meaning roughly, examples of substance are “man” or “the horse,” of quantity, such terms as “two cubits long” or “three cubits long,” of quality, such attributes as “white,” “grammatical.” “Double,” “half,” “greater,” fall under the category of relation; “in the market place,” “in the Lyceum,” under that of place; “yesterday,” “last year,” under that of time. “Lying,” “sitting,” are terms indicating position; “shod,” “armed,” outfit; “to lance,” “to cauterize,” action; “to be lanced,” “to be cauterized,” being acted upon.

Substance, in the truest and primary and most definite sense of the word, is that which is neither predicable of a subject nor present in a subject; for instance, the individual man or horse. But in a secondary sense those things are called substances within which, as species, the primary substances are included; also those which, as genera, include the species. For instance, the individual man is included in the species “man,” and the genus to which the species belongs is “animal”; these, therefore – that is

to say, the species “man” and the genus “animal” – are termed secondary substances.

Everything except primary substances is either predicable of a primary substance or present in a primary substance. This becomes evident by reference to particular instances which occur. “Animal” is predicated of the species “man,” therefore of the individual man, for if there were no individual man of whom it could be predicated, it could not be predicated of the species “man” at all. Again, color is present in body, therefore in individual bodies, for if there were no individual body in which it was present, it could not be present in body at all. Thus everything except primary substances is either predicated of primary substances, or is present in them, and if these last did not exist, it would be impossible for anything else to exist.

It is a common characteristic of all substance that it is never present in a subject. For primary substance is neither present in a subject nor predicated of a subject; while, with regard to secondary substances, it is clear from the following arguments (apart from others) that they are not present in a subject.

Another mark of substance is that it has no contrary. What could be the contrary of any primary substance, such as the individual man or animal? It has none. Nor can the species or the genus have a contrary.

Substance, again, does not appear to admit of variation of degree. I do not mean by this that one substance cannot be more or less truly substance than another, for it has already been stated that this is the case; but that no single substance admits of varying degrees within itself.

The most distinctive mark of substance appears to be that, while remaining numerically one and the same, it is capable of admitting contrary qualities. But it is by reason of the change which takes place within the substance itself that a substance is said to be capable of admitting contrary qualities; for a substance admits within itself either disease or health, whiteness or blackness. It is in this sense that it is said to be capable of admitting contrary qualities.

Definitions

substance – the ultimate subject of predication.

primary substance – that which neither is present in a subject nor is predicated of a subject.

secondary substance – the species and genera of primary substances.

accident – (1) whatever does not answer the question “What is it?”;

or, (2) a predicate which is not a genus, species, difference, or property;

or, (3) whatever is not a substance.

predicated of a subject – the subject *is* what the name signifies.

present in a subject – the subject *has* what the name signifies.

Lesson

The first part of logic shows us how to make good definitions. Since good definitions require us to know the genera of things, making good definitions requires that we know the summa (“highest”) genera. In this lesson, we see how Aristotle determines the summa genera, called “predicaments” in Latin and “categories” in Greek. Aristotle taught that there were ten basic kinds of things in the world. The ten categories are substance, quantity, quality, relation, place where, time when, position, outfit, action, and being acted upon. In this lesson, we will look at the first category and how it relates to the other nine categories.

Substance

Aristotle begins his consideration of the categories by looking at substance, because substance is the most basic category. The other nine categories are called accidents. As we noted before, “accident” comes from Latin for “happens.” The nine accidents are what happens to substance, and they are predicated of substance; substance itself is the ultimate subject of every predicate. For example, if I say that Socrates is white, “white” is an accident predicated of “Socrates,” the subject. Since Socrates is the most fundamental thing that white is predicated of, Socrates is called a substance. That is why Aristotle says that substance is that which is neither present in nor predicated of a substance.

When we see Socrates, however, we could also call him a man. And we might even say “The man is white.” So it seems that “man” is also a substance. Aristotle notes, however, that “man” can be predicated of a subject, namely Socrates: “Socrates is a man.” Therefore, Aristotle makes a distinction between two senses of the word “substance.” First, there is primary substance, the individual such as Socrates, which is never present in nor predicated of a subject. Then there is secondary substance, which is never present in a subject but is predicated of substances. Still, like primary substance, secondary substance is never predicated of another category. Instead, the secondary substances are the species and genera of primary substances.

Substances have three properties that are important for the logician to consider. First, a substance never has a contrary, an opposite. There is no opposite of Socrates, or man, or animal, or stone. Each is simply some real thing. Second, substances do not admit of variation in degree. That is, one rock is no more “rockish” than another rock: they are both equally rocks. In the same way, no man is more a man than another man (though one man might be a better man). Finally, only substance can admit of contrary qualities by means of a change. That is, the rock might first

be cold, and then be hot. Cold and hot are contraries, and through a change in itself the rock first has one of these, then the other. This final characteristic happens to no other category. All of the other categories change only insofar as the substance they exist in changes.

Three Meanings of “Accident”

The English word “accident” comes from the Latin *accidere*, which means “to happen.” Thus, anything that “just happens” to another is said to be an accident. Unfortunately, since something just happens to another in a variety of ways, we have many different meanings for the term “accident.” We will now clearly distinguish the various meanings of the term “accident” which are used in logic.

1. Any predicate which does not answer the question “What is it?” about its subject is called an accident. In this meaning, even some properties are called “accidents.”
2. Any predicate which is not the genus, species, specific difference or property of its subject is called an accident. This includes whatever may or may not belong to a subject. This is the meaning of accident we discussed as a predicable.
3. Any predicate which is not a primary or secondary substance is called an accident. White and whiteness, since they are qualities, are accidents in this sense. “This whiteness” or “the whiteness of my shirt” are individual accidents. According to this meaning, the nine categories beside substance are accidental categories, or categories of accidents.

Predicated Of and Present In

Terms can be joined to their subjects in two ways. First, they can be predicated of the subject: “man” is predicated of Socrates when I say, “Socrates *is* a man.” Second, they can be said to be present in a subject: “wisdom” is said to be present in Socrates when I say, “Socrates *has* wisdom.” In sum, a name is predicated of a subject when we say that the subject *is* something, but it is said to be present in the subject when we say that the subject *has* something.

The “has” spoken of here is not the “has” which means “possesses private property.” Socrates might have a house, but that house is not present *in* Socrates. Instead, what is present in a subject is the characteristic or attribute which is incapable of existing outside that subject – for example, wisdom, knowledge, agility, etc.

Sometimes a term can be predicated of a subject, which term is never present in a subject. For example, I can say that something *is* a man, but I cannot say that a man is present in some other thing. Sometimes something is present in a subject, but cannot be predicated of a subject. My shirt *has* whiteness, but neither my shirt nor anything else *is* whiteness. Sometimes a term can be predicated of one subject, and can be present in another. Socrates *has* knowledge and wisdom *is* knowledge. Finally, some terms neither are predicate of a subject nor are present in one. I cannot say about any other subject either that it *is* Socrates or *has* Socrates.

Rules for Predicated Of and Present In

We can now see why Aristotle makes the distinction between being predicated of a

subject and being present in a subject. Individual, or primary, substances neither are present in nor are predicated of a subject. For example, “Socrates” is not predicated of anything other than Socrates. Instead, primary substances are the things that everything else finally is predicated of or present in. Secondary substances, that is, the universals in the category of substance, are predicated of other substances, but are not present in a subject. For example, I say that Socrates *is* a man, not that he *has* a man. Moreover, the species of accidents, expressed abstractly, exist in substances, but are not predicated of them. For instance, Socrates *has* wisdom. But accidents expressed denominatively are predicated of a substance, though not present in it. For instance, Socrates *is* wise. Finally, a genus of an accident expressed abstractly is only predicated of its species. I can say that justice *is* a virtue, but I can only say that Socrates *has* a virtue. And so, we can use these features as clues to help us narrow down into which category we should place a term.

Exercises

Exercise 1: *Indicate whether the thing is a primary substance, a secondary substance, or an accident.*

1. justice
2. horse
3. little Orville
4. rock
5. Shamu
6. knowledge
7. whiteness
8. Socrates
9. virtue
10. shape
11. quality

Exercise 2: *Indicate whether the thing is present in a subject, can be predicated of a subject, both, or neither.*

1. justice
2. horse
3. little Orville
4. man
5. Shamu
6. knowledge
7. the whiteness of my shirt
8. Socrates
9. snubness
10. Socrates' snubness
11. virtue

Lesson Six

The Categories: The Accidents

Selections from Aristotle's *Categories*

4b20 – 11b14

Quantity is either discrete or continuous. Instances of discrete quantities are number and speech; of continuous, lines, surfaces, solids, and, besides these, time and place. In the case of the parts of a number, there is no common boundary at which they join. For example: two fives make ten, but the two fives have no common boundary, but are separate; the parts three and seven also do not join at any boundary. Nor, to generalize, would it ever be possible in the case of number that there should be a common boundary among the parts; they are always separate. Number, therefore, is a discrete quantity.

A line, on the other hand, is a continuous quantity, for it is possible to find a common boundary at which its parts join. In the case of the line, this common boundary is the point; in the case of the plane, it is the line: for the parts of the plane have also a common boundary. Similarly you can find a common boundary in the case of the parts of a solid, namely either a line or a plane. Space and time also belong to this class of quantities. Time – past, present, and future – forms a continuous whole. Space, likewise, is a continuous quantity, for the parts of a solid occupy a certain space, and these have a common boundary; it follows that the parts of space also, which are occupied by the parts of the solid, have the same common boundary as the parts of the solid. Thus, not only time, but space also, is a continuous quantity, for its parts have a common boundary.

Quantities have no contraries. In the case of definite quantities this is obvious; thus, there is nothing that is the contrary of “two cubits long” or of “three cubits long,” or of a surface, or of any such quantities. Quantity does not, it appears, admit of variation of degree. One thing cannot be two cubits long to a greater degree than another. Similarly with regard to number: what is “three” is not three more truly than what is “five” is five; nor is one set of three more truly three than another set. The most distinctive mark of quantity is that equality and inequality are predicated of it. Each of the aforesaid quantities is said to be equal or unequal. For instance, one solid is said to be equal or unequal to another; number, too, and time can have these terms applied to them, indeed so can all those

kinds of quantity that have been mentioned.

Those things are called **relative**, which, being said either to be of something else or to be related to something else, are explained by reference to that other thing. For instance, the word “superior” is explained by reference to something else, for it is superiority over something else that is meant. Similarly, the expression “double” has this external reference, for it is the double of something else that is meant. So it is with everything else of this kind. Those terms, then, are called relative, the nature of which is explained by reference to something else, with the preposition “of” or some other preposition being used to indicate the relation.

It is possible for relatives to have contraries. Thus virtue has a contrary – vice (these both being relatives); knowledge, too, has a contrary – ignorance. But this is not the mark of all relatives; “double” and “triple” have no contrary, nor indeed has any such term. It also appears that relatives can admit of variation of degree. For “like” and “unlike,” “equal” and “unequal,” have the modifications “more” and “less” applied to them, and each of these is relative in character: for the terms “like” and “unequal” bear a reference to something external. Yet, again, it is not every relative term that admits of variation of degree. No term such as “double” admits of this modification. All relatives have correlatives: by the term “slave” we mean the slave of a master, by the term “master,” the master of a slave; by “double,” the double of its half, by “half,” the half of its double; by “greater,” greater than that which is less, by “less,” less than that which is greater.

By “**quality**” I mean that in virtue of which people are said to be such and such. Quality is a term that is used in many senses. One sort of quality let us call “habit” or “disposition.” Habit differs from disposition in being more lasting and more firmly established. The various kinds of knowledge and of virtue are habits, for knowledge, even when acquired only in a moderate degree, is, it is agreed, abiding in its character and difficult to displace. By a disposition, on the other hand, we mean a condition that is easily changed and quickly gives place to its opposite. Thus, heat, cold, disease, health, and so on are dispositions. For a man is disposed in one way or another with reference to these, but

quickly changes, becoming cold instead of warm, ill instead of well.

Another sort of quality is that in virtue of which, for example, we call men good boxers or runners, or healthy or sickly: in fact it includes all those terms which refer to inborn capacity or incapacity. Such things are not predicated of a person in virtue of his disposition, but in virtue of his inborn capacity or incapacity to do something with ease or to avoid defeat of any kind.

A third class within this category is that of sensible qualities and affections. Sweetness, bitterness, sourness, are examples of this sort of quality, together with all that is akin to these: heat, moreover, and cold, whiteness, and blackness are sense qualities.

The fourth sort of quality is figure and the shape that belongs to a thing; and besides this, straightness and curvature and any other qualities of this type – each of these defines a thing as being such and such.

One quality may be the contrary of another; thus justice is the contrary of injustice, whiteness of blackness, and so on. This, however, is not always the case. Red, yellow, and such colors, though qualities, have no contraries. If one of two contraries is a quality, the other will also be a quality. This will be evident from particular instances, if we apply the names. Qualities admit of variation of degree. Whiteness is

predicated of one thing in a greater or less degree than of another.

Whereas none of the characteristics I have mentioned are peculiar to quality, the fact that likeness and unlikeness can be predicated with reference to quality alone gives to that category its distinctive feature. One thing is like another only with reference to that in virtue of which it is such and such; thus this forms the peculiar mark of quality.

Action and **being acted upon** both admit of contraries and also of variation of degree. Heating is the contrary of cooling, being heated of being cooled, being glad of being vexed. Thus they admit of contraries. They also admit of variation of degree: for it is possible to heat in a greater or less degree; also to be heated in a greater or less degree. Thus action and being acted upon also admit of variation of degree. So much, then, is stated with regard to these categories. We spoke, moreover, of the category of **position** when we were dealing with that of relation, and stated that such terms derived their names from those of the corresponding attitudes. As for the rest, **time**, **place**, **outfit**, since they are easily intelligible, I say no more about them than was said at the beginning: that in the category of outfit are included such states as “shod,” “armed;” in that of place “in the Lyceum” and so on, as was explained before.

Definitions

quantity – category which answers the question “How much?” or “How many?”

discrete – quantity whose parts do not have a common boundary.

continuous – quantity whose parts do have a common boundary.

relation – category which refers one thing to another.

quality – category which answers “What kind?”

disposition – quality by which something tends to act.

habit – firm disposition.

capacity – qualities which incline one to acting well or poorly.

shape – quality which limits quantity.

sensible quality – quality which affects the senses.

Lesson

In the last lesson we examined the category of substance and the notion of an accident. We are now prepared to look at the other nine categories.

Quantity

Quantity is the answer to the question “How much?” There are two types of quantity: discrete and continuous. Continuous quantities have common borders between the parts. For

example, a line is a continuous quantity because its parts border on each other. The parts of discrete quantities do not share common borders. For example, the number five is discrete because there are no borders between its units.

Quantity has two marks. First, it does not have contraries. For example, there is no opposite of the number two. Second, it does not vary in degree. Thus, three plus two is no more five than four plus one. Finally, it has one property: only quantity has equality and inequality predicated of it. Strictly speaking, we do not say about relations, or qualities, that they are equal to each other.

Quality

Quality is that by which a thing is said to be such-and-such. Examples of quality are red, blue, hot, cold, just, unjust.

There are four kinds of quality:

1. Disposition is a quality by which we tend toward something. It has two sub-species: *habit*, which is a firmly established disposition, and temporary disposition, usually just called *disposition*. Virtue and indolence are habits, while health and sickness are dispositions in this second way.
2. Ability and inability are qualities that dispose things to acting well or poorly. Fitness and flabbiness are examples of this species.
3. Sense qualities are the qualities that affect the senses. Sweetness, heat and cold are examples.
4. Shape is the quality by which quantities are limited. Straightness and curvature are examples.

Quality, unlike substance and quantity, can have contraries and does vary in degree. Black is the contrary of white, and things can be more or less hot. The distinctive property of quality is that likeness and unlikeness are predicated with reference to qualities. Socrates is said to be like Plato because they have the same qualities; for example, they might both be wise, or tan, or round.

Relation

A relation is the reference that one thing has to another. For example, “better” is a relation because something is called better only because it is being compared to something else which is worse. Some relations have contraries, but others do not. Knowledge is the contrary of ignorance, but double has no contrary. Some relations vary in degree, others do not. For example, likeness is a relation, and one person can be more like another than a third person is. The distinctive mark of a relative term, however, is that it always has a correlative. For example, the worse is called the correlative of the better, and the better is the correlative of the worse.

Action

This category refers to the action of one thing on another. *Examples:* throwing, striking, burning, etc. Actions can have contraries and can vary in degree.

Being Acted Upon

This category is the opposite of the one above. *Examples:* being thrown, being struck, being burnt, etc.

Time When

Examples: during 1942, on last Monday, yesterday, etc.

Place Where

Examples: here, there, in London, on the moon, etc.

Position

Examples: sitting, lying down, kneeling, standing, etc.

Outfit

This category refers to how men put some other substance upon their bodies. *Examples:* being clothed, being shod, being armed, etc.

Exercises

Exercise 1: *State the primary category of each of the following terms.*

Socrates	clothed
horse	father
double	upside down
grey	triangle
gallon	knowledge
twenty-seven	virtue
hot	knower
lily	sitting
throwing	think
two o'clock	next to
on the roof	enduring
lying down	armed
suffering	just
this rock	loving
being eaten	in the town

Exercise 2. Give an accident in each category (if applicable) for the following substances:

Socrates

Plymouth Rock

quantity

quality

relation

acting

being acted upon

place

time

position

outfit

Lesson Seven

The Post-Predicaments

Selections from Aristotle's *Categories*

11b15 – 15a22

The proposed categories have, then, been adequately dealt with. We must next explain the various senses in which the term “**opposite**” is used. Things are said to be opposed in four senses: (i) as correlatives to one another, (ii) as contraries to one another, (iii) as privatives to positives, and (iv) as affirmatives to negatives. Let me sketch my meaning in outline. An instance of the use of the word “opposite” with reference to correlatives is afforded by the expressions “double” and “half”; with reference to contraries, by “bad” and “good.” Opposites in the sense of privatives and positives are “blindness” and “sight”; in the sense of affirmatives and negatives, the propositions “he sits,” “he does not sit.”

(i) Pairs of opposites which fall under the category of relation are explained by a reference of the one to the other, the reference being indicated by the preposition “of” or by some other preposition. Thus, double is a relative term, for that which is double is explained as the double of something. Such things, then, as are opposite the one to the other in the sense of being correlatives, are explained by a reference of the one to the other.

(ii) Pairs of opposites which are contraries are not in any way interdependent, but are contrary the one to the other. The good is not spoken of as the good of the bad, but as the contrary of the bad, nor is white spoken of as the white of the black, but as the contrary of the black. These two types of opposition are therefore distinct

(iii) “privatives” and “positives” have reference to the same subject. Thus, sight and blindness have reference to the eye. It is a universal rule that each of a pair of opposites of this type has reference to that to which the particular “positive” is natural. We do not call that toothless which has not teeth, or that blind which has not sight, but rather that which has not teeth or sight at the time when by nature it should.

(iv) that which is affirmed or denied is not itself affirmation or denial. By “affirmation” we mean an affirmative proposition, by “denial” a negative. Now, those things which form the matter of the affirmation or denial are not propositions; yet these two are said to be opposed in the same sense as the affirmation and denial,

for in this case also the type of antithesis is the same. For as the affirmation is opposed to the denial, as in the two propositions “he sits,” “he does not sit,” so also the thing which constitutes the matter of the proposition in one case is opposed to that in the other, his sitting, that is to say, to his not-sitting.

There are four senses in which one thing can be said to be **before** another. Primarily and most properly the term has reference to time: in this sense the word is used to indicate that one thing is older or more ancient than another.

Secondly, one thing is said to be before another when the sequence of their being cannot be reversed. In this sense “one” is before “two.” For if “two” exists, it follows directly that “one” must exist, but if “one” exists, it does not follow necessarily that “two” exists: thus the sequence subsisting cannot be reversed.

In the third place, the term before is used with reference to any order [of knowledge], as in the case of science and of oratory. For in sciences which use demonstration there is that which is before and that which is posterior in order; in geometry, the elements are before the propositions; in reading and writing, the letters of the alphabet are before the syllables.

Besides these senses of the word, there is a fourth. That which is better and more honorable is said to have a natural priority. In common parlance men speak of those whom they honor and love as “coming first” with them.

Yet it would seem that besides those mentioned there is yet another. For in those things, the being of each of which implies that of the other, that which is in any way the cause may reasonably be said to be by nature before the effect.

Thus the word “before” may be used in five senses.

There are six sorts of **movement**: generation, corruption, increase, decrease, alteration and local motion. It is evident in all but one case that all these sorts of movement are distinct from each other. But in the case of alteration it may be argued that the process necessarily implies one or other of the other five sorts of motion. This is not true, for we may say that all affections, or nearly all, produce in us an alteration, which is distinct from all other sorts of motion.

Definitions

correlatives – two things opposed as mutually corresponding relatives.

contraries – the things most different in the same genus.

possession – attribute naturally present in the subject.

privation – lack of the attribute normally and naturally present in the subject.

contradictories – the being and not-being of an attribute.

generation – the coming to be of a substance.

corruption – the passing out of existence of a substance.

increase – gaining in quantity.

decrease – losing in quantity.

alteration – change in quality.

local motion – change in place.

rest – the opposite of motion.

Lesson

Let's remember why we looked at Aristotle's *Categories*. Our goal is to discover the art of definition, and every definition requires a genus and specific difference. If the genus, however, is unknown, then the definition remains unknown. To ensure that we find good definitions, then, we need to have at our fingertips the "ultimate" genera, the *summa genera*. That is what the categories are.

But it is not enough to know the categories; we must also be able to put each thing into its proper category. This is what the post-predicaments help us to do. First, they show us how to divide the genera. The division of the genera requires a discussion of opposites. Second, they show us how to order the genus-species relationship. This requires that we discuss the kinds of order – the kinds of before and after. Hence, the two topics we take up here are the kinds of opposites and the meanings of "before" and "after." Finally, Aristotle discusses the kinds of change, since these are determined in relation to the categories.

Opposites

Aristotle identifies four opposites, three of which are intimately related. Let's reverse Aristotle's order and begin with the most basic kind of opposition, contradiction.

1. Contradiction is what occurs when statements are related as affirmative and negative. For example, "Socrates is sitting" and "Socrates is not sitting" are affirmative and negative statements, respectively. This would not seem to belong to the teaching of the *Categories*, since that book only concerns words, not statements. Aristotle points out, however, that something parallel happens with words: a word takes a contradictory meaning when "not" is added to it. So in a way, the terms "sitting" and "not-sitting" are also contradictories. This is the most basic kind of opposition.
2. Privation and possession are related much like negation and affirmation, but with this difference: affirmation and negation do not assume that the subject that has or lacks the attribute is apt to have that attribute, while privation and possession do.

For example, even though both lack sight, we call an animal blind, but not a rock. The reason is that an animal ought to be able to see, while this is not true of the rock. The animal, unlike the rock, is deprived of sight, and so it has the privation blindness attributed to it.

3. Contraries are the third type of opposition. Like privation and possession, things that are contrary are opposites belonging to the same kind of subject. But unlike privation and possession, contraries are both positive realities. While blindness is not something real, but merely a lack of sight, black is something real and not just the lack of its contrary, white. Thus, we define contraries as those things most opposed in the same genus.
4. Finally, we must speak about correlatives. Correlatives are opposed relative terms that refer to each other and are known simultaneously. In some way, they can also be possessed simultaneously: one man can be both a parent and an offspring, though of two different people. Therefore, unlike the first three opposites, correlatives do not imply some sort of contradiction.

Before and After

Aristotle next speaks about the ordering of species under genera. But every order is a relation of before and after, so Aristotle must distinguish the meanings of before and after (“before” and “after” are sometimes translated as “prior” and “posterior”).

1. First, before and after refer to time: Monday is before Tuesday, five o’clock before six o’clock. This is the most obvious meaning of the terms before and after, but not the only one.
2. Sometimes, we refer to before and after in the existence of things. For example, we say that the number nineteen comes before the number twenty. Do nineteen things always come before twenty things in time? No – sometimes twenty things come into being all at once: a machine that slices bread cuts twenty slices at once, not one at a time. Yet we still say that nineteen comes before twenty because, if I have twenty things, I will also have at least nineteen, but when I have nineteen things, I might not also have twenty. Nineteen can exist without twenty, but twenty cannot exist without nineteen. When a first thing can exist without the second, but the second cannot exist without the first, we say that the first is before the second in existence.
3. Another meaning of before and after refers to our knowledge. I cannot know the species without knowing the genus, but I can know the genus without knowing the species. So the genus comes before the species in knowledge.
4. The fourth meaning of before and after is in goodness. Athletes chant that their team is “number one,” that it is the first team in the league and comes before all of the other teams. And they say that it comes before all the other teams because they think that their team is the best. So in the fourth sense something comes before another because it is better than the other.
5. Finally, there is a sense of before and after proper to the relationship between

cause and effect, even when the cause and effect come into being at the same time. For example, the truth of the statement “I am standing” comes into being as soon as I stand. Yet my standing comes before the truth in another sense, in the sense of causality. So the cause is always said to be before the effect.

Together

There are four corresponding senses of the term “together” or “simultaneous.” Things that happen at the same time are together, things that cannot exist without each other are together, things that cannot be known without one another are together, and things that are equally good are together. Obviously, the cause and effect are never together in causality.

Motion

Near the end of the *Categories* Aristotle identifies six kinds of motion or change. For our present purposes, we are taking motion and change as interchangeable terms. Since change is always related to one of the categories, he relates each kind of motion to the category to which it reduces.

1. Change in the category of place he refers to as local motion. Local motion is the most obvious kind of change; it is simply change from place to place.
2. Change in the category of quality he calls alteration. Alteration just means becoming other, not being like what it used to be, and since likeness is the property of qualities, so is the losing of likeness.
- 3.&4. Change in quantity can go two ways: a thing can get bigger or smaller. The first is called increase, the second decrease.
- 5.&6. Finally, there can be a change in the category of substance. When a brand new thing comes to be, this is called generation. When the old thing stops existing, this is called corruption.

Motion is subject to opposition in an unusual way. The genus as a whole has one opposite, but each species also has its own. The opposite of the whole genus motion is rest, but the opposite of generation, for example, is corruption, and the opposite of increase is decrease. We need to keep this in mind when thinking about motion or change.

Exercises

Exercise 1: *State which kind of opposition the following exemplify:*

1. black – white
2. hot – cold
3. wet – dry

4. blind – seeing
5. father – son
6. knower – known
7. just – unjust
8. rational – irrational
9. big – small
10. big – not-big
11. deaf – hearing
12. bald – hairy
13. sick – healthy
14. fun – not-fun
15. employer – employee
16. mute – speaking

Exercise 2: *Identify the kind of before and after, or together, that each pair exemplifies.*

1. 1498 A.D. – 1998 A.D.
2. parent – child
3. triangle – isosceles triangle
4. two – three
5. heat – fire
6. plant – animal
7. man – doctor
8. man – having an immortal soul

9. triangle – rectilinear figure with angles equaling 180°
10. statue – shape of the statue
11. clay – shape of the statue
12. hitting – being hit

Exercise 3: *Identify the kind of motion.*

1. death
2. conception
3. getting taller
4. shrinking
5. tanning
6. running
7. being vaporized
8. getting hotter
9. expanding
10. ripening
11. falling
12. losing a limb
13. learning
14. becoming morally better

Lesson Eight

The Noun, Verb, and Statement

Selections from Aristotle's *On Interpretation*

translated by E. M. Edghill

16a1 – 17a8

First we must define the terms “noun” and “verb,” then the terms “denial” and “affirmation,” then “statement” and “sentence.” Spoken words are the signs of mental experience and written words are the signs of spoken words. Just as all men do not have the same writing, so all men do not have the same speech sounds; but the concepts, which these directly signify, are the same for all, as also are those things of which our concepts are the images.

As there are in the mind thoughts which do not involve truth or falsity, and also those which must be either true or false, so it is in speech. For truth and falsity imply combination and separation. Nouns and verbs, provided nothing is added, are like thoughts without combination or separation; “man” and “white,” as isolated terms, are not yet either true or false.

By a noun we mean a sound significant by convention, which has no reference to time, and of which no part is significant apart from the rest. The limitation “by convention” was introduced because nothing is by nature a noun or name – it is only so when it becomes a sign; inarticulate sounds, such as those which brutes produce, are significant, yet none of these constitutes a noun.

The expression “not-man” is not a noun. There is indeed no recognized term by which we may denote such an expression, for it is not a sentence or a denial. Let it then be called an indefinite noun. The expressions “of Philo,” “to Philo,” and so on, constitute not nouns, but cases of a noun.

A verb is that which, in addition to its proper

meaning, carries with it the notion of time. No part of it has any independent meaning, and it is a sign of something said of something else.

I will explain what I mean by saying that it carries with it the notion of time. “Health” is a noun, but “is healthy” is a verb; for besides its proper meaning it indicates the present existence of the state in question. Moreover, a verb is always a sign of something said of something else, i.e., of something either predicable of or present in some other thing.

Such expressions as “is not-healthy,” “is not-ill,” I do not describe as verbs; for though they carry the additional note of time, and always form a predicate, there is no specified name for this variety; but let them be called indefinite verbs, since they apply equally as well to that which exists and to that which does not. Similarly “was healthy,” “will be healthy,” are not verbs, but tenses of a verb; the difference lies in the fact that the verb indicates present time, while the tenses of the verb indicate those times which lie outside the present.

A sentence is a significant portion of speech, some parts of which have an independent meaning, that is to say, as an expression. Yet not every sentence is a statement; only such are statements as have in them either truth or falsity. Thus a prayer is a sentence, but is neither true nor false. Let us therefore dismiss all other types of sentence but the statement, for this last concerns our present inquiry, whereas the investigation of the others belongs rather to the study of rhetoric or of poetry.¹

Definitions

sign – something relative which points out another thing to a knowing power.

expression – a conventional vocal sign.

noun – simple expression which has no reference to time and is part of a statement.

verb – simple expression which does have reference to time and is part of a statement.

indefinite noun – noun joined with “not.”

indefinite verb – verb joined with “not.”

sentence – expression whose parts do have independent meaning.
statement – sentence which is true or false.

Lesson

Here in his book *On Interpretation*, Aristotle begins to teach us about the second part of logic. We saw earlier that the intellect performs three activities: grasping what something is, composing and dividing things understood, and reasoning discursively. For example, through the first operation we know what “dog” and “animal” are, through the second we know that dogs are animals, and through the third we reason that, since all animals are self-movers, dogs must also be self-movers. The second operation depends upon the first, the third upon the second. Since Aristotle has already discussed the first operation at length, he is now ready to move onto the second operation.

But there is a slight difficulty about the second part of the subject of logic. Aristotle claims that this part of logic is about the statement, or proposition. The statement, however, is a combination of words, and the second part of logic is supposed to be about the second operation of the intellect, composing and dividing. How can logic be about words?

Aristotle resolves this difficulty by reminding us of the function of words: words signify our thoughts about reality. The words may be different in different languages, but they all signify the same kind of thoughts because the thoughts are likenesses of the same reality. We take the statement as the subject of this part of logic, then, not because it is a combination of sounds, but because it points to the composing and dividing of thoughts in our mind.

In this chapter Aristotle also solves our previous difficulty about the simple and complex expressions. A simple expression, he says, is one whose parts do not have a significance by themselves, while the parts of a complex expression do. For example, the expression “The man runs” has parts, “man” and “runs,” which retain their meaning when severed from the whole. The “m” in man, however, does not retain its meaning when severed from the word “man.” Thus, “man” is simple, but “The man runs” is complex.

Noun and Verb

Before we can understand what the statement is, we must understand its parts. It may seem at first that we have already done this, since the parts of the statement are the simple expressions, which we studied in the *Categories*. Those simple expressions, however, have something added to their meaning when they become parts of the statement. So first we will look at simple expression as parts of the statement, then we will look at the statement itself.

The noun, Aristotle writes, is a simple expression that has no reference to time. That is, a noun does not tell us when the thing signified exists or acts. For example, merely by saying “dog” I give no indication of when the dog exists.

The verb, like the noun, is a simple expression, but it signifies *with* time. The verb in the strict sense will tell me when the action is happening or that the thing exists right now. For example, “is walking,” “hits,” “is healthy” are verbs in the sense defined by Aristotle.

Besides the standard noun, there are indefinite nouns and cases of nouns. The indefinite noun is the noun with “not” or “non” added to it. That is, it is the contradictory of the positive noun. The case of a noun is the noun that cannot be used as the subject of a statement, but rather

is intended to modify some other part of the statement. If I were to say “of the dog,” I could not use that as the subject of any statement.

Besides verbs in the strict sense, there are indefinite verbs and tenses of verbs. The indefinite verbs, like the indefinite nouns, are the contradictories of the definite verbs: they simply add “not” or “non” to the definite verbs. The tenses of a verb indicate a time other than the present.

Aristotle then relates the two basic parts of the proposition to each other: the noun is the subject of the statement, the verb is the predicate. The thing signified by the verb, therefore, is said of, or exists in, the thing signified by the noun. When we put the noun and verb together, we get a statement.

Statement

Now that Aristotle has defined the parts of the statement, he is ready to define the statement itself. One thing is already clear: the statement will not be a simple expression because its parts will have an independent signification. That is, the noun and verb in “Socrates is tan” both have an independent meaning. The genus of our definition, then, is “complex expression.”

But there are many kinds of complex expression. For example, “Let’s eat” or “Go to your room” are both complex expressions, but neither is a statement. How does the statement differ from these? The statement, says Aristotle, must be either true or false. Other complex expressions are never true or false. “Socrates is tan” is either true or false, but “Go to your room” is neither. The statement, then, is a complex expression which is either true or false.

Finally, we must ask ourselves why Aristotle only discusses statements in this part of logic. After all, even commands and prayers are complex expressions. The answer is that logic is ordered to knowledge of the truth. Other complex expressions are useful for practical activity, but since they are neither true nor false, they cannot lead us to a knowledge of the truth. Consequently, Aristotle focuses only on statements, the complex expressions which must be true or false.

Exercises

Exercise 1: *State whether the following sentences are statements.*

1. The dog is brown.
2. I hear the plane coming.
3. Let us pray.
4. Oh frabjous day, callooh, callay.
5. Who is that man?
6. That man is Socrates.

7. All bats fly.
8. The man with the blue hat is walking on the yellow sand.
9. Bill Clinton will go down in history as the greatest president of the USA.
10. Clean your room.
11. What a beautiful baby!
12. What do you think you are doing?
13. I am cleaning my room.
14. How can you clean your room with that music blaring?
15. We the people in order to form a more perfect union, establish justice, and ensure domestic tranquility do ordain and establish this constitution.

Exercise 2: *State whether the term is a noun or a verb.*

1. Socrates
2. man
3. is walking
4. thinks
5. is a bird
6. justice
7. rock
8. to walk

9. walking
10. walks
11. he
12. by Plato
13. Rover
14. of the dog
15. is a dog
16. was a dog

¹ Aristotle. "On Interpretation." Translated by E. M. Edghill. *The Works of Aristotle*, vol. 1, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Nine

The Division of Statements

Selections from Aristotle's *On Interpretation*

17a20 – 17b15

To return: of statements one kind is simple, i.e., that which asserts or denies something of something, the other composite, i.e., that which is compounded of simple statements. A simple statement is a sentence with meaning as to the presence of something in a subject or its absence, in the present, past, or future, according to the divisions of time.

An affirmation is a positive assertion of something about something, a denial a negative assertion. Now it is possible both to affirm and to deny the presence of something which is present or of something which is not, and since these same affirmations and denials are possible with reference to those times which lie outside the present, it would be possible to contradict any affirmation or denial. Thus it is plain that every affirmation has an opposite denial, and similarly every denial an opposite affirmation. We will call such a pair of statements a pair of contradictories. Those positive and negative statements are said to be contradictory which have the same subject and predicate. The identity of subject and of predicate must not be “equivocal.”

Some things are universal, others individual. By the term “universal” I mean that which is of such a nature as to be predicated of many subjects; by “individual” that which is not thus predicated. Thus “man” is a universal, “Callias” an individual. Our statements necessarily sometimes concern a universal subject, sometimes an individual.

By the expression “a statement of universal character with regard to a universal,” such statements as “every man is white,” “no man is white” are meant. As instances of statements made with regard to a universal, but not of universal character, we may take the statements “man is white,” “man is not white.” “Man” is a universal, but the statement is not made as of universal character; for the word “every” does not make the subject a universal, but rather gives the statement a universal character. If, however, both predicate and subject are distributed, the statement thus constituted is contrary to truth; no affirmation will, under such circumstances, be true. The statement “every man is every animal” is an example of this type.

Definitions

simple statement – statement which has a simple noun and a simple verb.

affirmation – statement which joins the noun and verb.

denial – statement which separates the noun and verb.

quality of a statement – whether a statement is an affirmation or denial.

quantity of a statement – whether a statement is universal or particular.

individual statement – statement whose noun is individual.

universal statement – statement whose noun is universal and is taken universally.

particular statement – statement whose noun is universal but is taken only in part.

distributed – the universal noun or verb when used universally in a statement.

undistributed – the universal noun or verb when used particularly in a statement.

Lesson

As we saw in the last lesson, logic does not study every type of complex expression, but only the statement, because only the statement is either true or false. Now that we have examined the nature of the statement and its parts, we are ready to examine the major kinds of statement.

The Division of Statements

Aristotle divides statements in four ways. First, he divides them into simple and complex statements. The simple statement, by affirming or denying one thing of one thing, points to a single fact. A complex statement, by joining simple statements, points to more than one fact. For example, “Socrates is sitting” is a simple statement, but “Socrates is standing and Plato is sitting” indicates more than one fact. Since a complex statement points to more than one fact, it can be reduced to two or more simple statements, each of which points to just one fact. For example, “Socrates is standing and Plato is sitting” can be reduced to “Socrates is standing” and “Plato is sitting.”

Aristotle calls attention to the fact that some statements that seem complex are actually simple. They seem complex, because either the noun or the verb has parts, but in truth these statements remain simple, because those parts combine to make one essence. For example, the statement “Man is a rational animal” seems to have a complex verb, “is a rational animal.” But the parts, “rational” and “animal,” actually have real unity since they define one kind of thing. Thus, in the case of phrases that are parts of a definition, the parts, forming a real unity, can form one noun or verb that becomes part of one simple statement.

Aristotle’s second division of statements is into affirmations and denials. The affirmation, of course, is not a statement that makes one feel good about oneself. Rather, the affirmation composes, or joins together, the subject and predicate. In contrast, the denial separates or divides the subject and predicate. For example, “Socrates is tan” is an affirmation, “Socrates is not tan” is the corresponding denial. Consequently, there is a denial properly opposed to every affirmation, and vice versa. Statements divided in this way are said to differ in *quality*, since this makes them like or unlike.

Aristotle’s third division of statements is into those whose subjects are universal nouns and those whose subjects are individual nouns. Since “Socrates” is an individual noun and “man” is a universal noun, then the statement “Socrates is tan” is an individual statement, while “Man is tan” is a statement about universals.

His final division concerns statements that have a universal subject. Some take the universal subject in all of its universality, and others take the universal subject only in part. That is, he divides such statements into those that start with “every” or “none” (or their equivalents) and those that start with “some.” For example, “Every man is an animal” and “No man is a plant” take the universal subject in all of its universality, while “Some men are tan” takes only part of the universal subject. The first kind of statement is called universal, the second particular. Statements that differ in this way are said to differ in *quantity*, that is, in how much they apply to.

Since complex statements can be reduced to simple statements, we will discuss them later. And since philosophy aims at knowledge of the universal, we will leave aside statements about individuals. Consequently, the divisions that are important to us are those between affirmation and denial, and between universal and particular. From this two-fold division there result the following four kinds of statements:

1. Universal Affirmation: Every B is (or has) A, A belongs to every B; Symbol – **A**
2. Particular Affirmation: Some B is (or has) A, A belongs to some B; Symbol – **I**

3. Universal Denial: No B is (or has) A, A belongs to no B; Symbol – **E**
4. Particular Denial: Some B is not (or has no) A, A does not belong to some B; Symbol – **O**

These, then, are the four most important kinds of statements. Two more points are worthy of notice. First, the particular affirmation does not imply the particular denial. That is, if I say “Some men are tan,” that does not imply, “Some men are not tan.” It merely states what is true about one part, and ignores what is true about the other part. Second, statements with universal nouns which do not state a quantity are called “indefinite.” For example, the statement “Men are animals” is indefinite. Usually, however, the quantity of such a statement is implied in the context. In the example above, it seems clear that the speaker means that “All men are animals.”

Distribution

The noun and verb in every statement are either distributed or undistributed. That is, if both the noun and verb signify universals, in the statement they can be taken either in all of their universality, or they can be taken particularly. As we saw above, the nouns in the universal affirmation and universal denial are taken universally, while the nouns in the particular statements are taken particularly. Yet we can also consider the verbs in those statements. Surprisingly, the verbs can also be taken universally or particularly, but not always in correspondence with the nouns.

For example, in the universal affirmation, “Every man is an animal,” the verb “is an animal” is not used universally, but particularly. That is, that statement affirms something about only *part* of animal, not the whole of it. It makes no claim about the remaining animals. Thus, we say that the verb in the universal affirmation is *undistributed*. However, when we say that “No man is a stone” we know about both the whole of man and the whole of stone that neither is the other. The verb in the universal denial is *distributed*. The verb in the particular affirmation is undistributed, because we know only about part of it, while the verb in the particular denial is distributed, since we know that all of the verb is separated from one part of the noun (although it might or might not be joined to the other part of the noun). The idea of distribution is used later to explain certain properties of discursive reasoning.

Exercises

Exercise 1: *Indicate the kind of statement using the symbols for them: A, I, E, O. If the statement is not simple, indicate that.*

1. Every dog is an animal.
2. Some dogs are living things.
3. All tigers are cats.

4. No dog is a cat.
5. Every triangle is three-sided.
6. Every fire produces heat but no ice produces heat.
7. Some animals do not fly.
8. Not every animal flies.
9. Every lizard does not fly.
10. Let us go to the beach.
11. Bats always fly.
12. Dogs never fly.
13. All roses are red and all violets are blue.
14. Squares are rectangles with four equal sides.
15. Some knights were not chivalrous.
16. The president is wearing a blue tie.
17. Socrates and Plato, why do you always eat broccoli?
18. If all shoes fit, you would wear them.
19. Man is a rational, sensitive, living, bodily substance.
20. A few shirts are white.

Lesson Ten

The Opposition of Statements

Selections from Aristotle's *On Interpretation*

17b3 – 17b26

If, then, a man states a positive and a negative statement of universal character with regard to a universal, these two statements are “contrary.” When, on the other hand, the positive and negative statements, though they have regard to a universal, are yet not of universal character, they will not be contrary, albeit the meaning intended is sometimes contrary.

An affirmation is opposed to a denial in the sense which I denote by the term “contradictory,” when, while the subject remains the same, the affirmation is of universal character and the denial is not. The affirmation “every man is white” is the

contradictory of the denial “not every man is white,” or again, the statement “no man is white” is the contradictory of the statement “some men are white.” But statements are opposed as contraries when both the affirmation and the denial are universal, as in the sentences “every man is white,” “no man is white,” “every man is just,” “no man is just.” We see that in a pair of this sort both statements cannot be true, but the contradictories of a pair of contraries can sometimes both be true with reference to the same subject; for instance “not every man is white” and “some men are white” are both true.

Definitions

contradictories – statements with same noun and verb, opposed in quantity and quality.

contraries – statements with same noun and verb, both universal, opposed in quality.

subcontraries – statements with same noun and verb, both particular, opposed in quality.

subalternates – statements with same noun and verb, same quality, opposed in quantity.

Lesson

We noted above that every statement has its proper denial. That is, two statements may have the same noun and verb, but one may deny what the other affirms. Such statements are said to be opposed as contradictories. But there are also other ways in which two statements can be opposed. Aristotle gives definitions for the first two ways in which statements are opposed, and we will give definitions for two more kinds of opposition noted by the medieval logicians.

First, Aristotle points out that contradictories are two statements opposed in both quantity and quality. That is, the universal affirmation is the contradictory of the particular denial and the universal denial is the contradictory of the particular affirmation. With a pair of contradictories, it is always the case that one is true and the other is false, although we may not know which is which. For example, if “Every man is an animal” is true, then “Some men are not animals” is false, and vice versa. Note well that this is a different meaning of “contradictory” from that used in the *Categories*.

Aristotle then writes that contraries are two statements, both universal, which are opposed in quality. That is, the universal affirmation and the universal denial are contrary statements. For example, “Every man is an animal” is the contrary of “No man is an animal.” Contraries cannot both be true, but they might both be false. In the example just given, only one statement can be true. On the other hand, if someone said “Every man is tan” and “No man is tan,” both

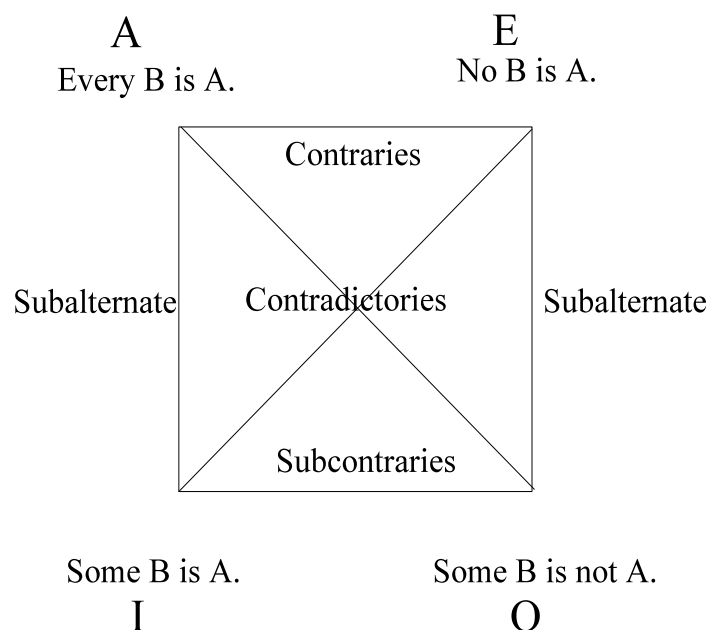
statements would be false. Once again, this is a different meaning of “contrary” from that used in the *Categories*.

The Medievals posited that particular statements, opposed in quality, are subcontraries. That is, the particular affirmation is the subcontrary of the particular denial. For example, “Some men are tan” is the subcontrary of “Some men are not tan.” Subcontraries work in a way opposed to that of contraries because both subcontraries can be true at the same time, but they cannot both be false at the same time. For example, it is true both that “Some men are tan” and also that “Some men are not tan.”

Finally, subalternates are statements that are of the same quality, but opposed in quantity. That is, the particular affirmation is subalternate to the universal affirmation, and the particular denial is subalternate to the universal denial. For example, “Some men are animals” is the subalternate of “Every man is an animal.” With subalternates, if the universal is true, the particular is true, but not vice versa. On the other hand, if the particular is false, the universal is false, but again not vice versa. For example, if it is true that “Every man is an animal,” then it is also true that “Some men are animals.” If it is false that “Some plants have sensation,” then it is also false that “All plants have sensation.”

The last two oppositions follow from the first two. That is, given the rules for contradictories and contraries, the rules for subalternates and subcontraries follow. For example, if “All men are animals” is true, then its contrary, “No men are animals,” is false. But if this statement is false, its own contradictory, “Some men are animals,” is true. Thus, the truth of the particular affirmation follows from the truth of the universal affirmation. The student of logic, then, must know the first two rules and be able to apply them to all statements.

This covers all the basic points for the division and opposition of statements. The chart below that summarizes these results is called the **square of opposition**:



Exercises

Exercise 1: *Indicate how the following statements are opposed. If they are not simple, or for some other reason not opposed, indicate that also.*

1. All A is B.
No A is B.
2. Some X is not Y.
Every X is Y.
3. Some goats are not friendly.
Some goats are white.
4. Some men are tan.
Some men are not tan.
5. No dog is a cat.
Some dogs are cats.
6. Let us go to the meadows.
Let us not go to the meadows.
7. Every dog does not fly.
Some dogs fly.
8. Every dog flies.
Some dogs fly.
9. All roses are red, and some violets are blue.
Some roses are not red, but all violets are blue.
10. A few men are wise.
A few men are not wise.
11. All stars twinkle.
Some stars do not twinkle.
12. Men are rational animals.
Men are not rational animals.
13. Every mover is moved.
Some movers are natural.

14. No incorporeal substance has a place.
Some incorporeal substances have places.
15. Few men are virtuous.
All men are virtuous.
16. All computers think.
No computer thinks.
17. Not every bird lays eggs.
Some birds do not lay eggs.
18. All crayons are wax.
Some crayon are wax.
19. Some logicians are geniuses.
Every logician is a genius.
20. No man is an island.
Some men are islands.

Lesson Eleven

Indefinite and Complex Statements

Selections from Aristotle's *On Interpretation*

19b5 – 19b28

An affirmation is the statement of a fact with regard to a subject, and this subject is either a noun or that which has no name; the subject and predicate in an affirmation must each denote a single thing. I have already explained what is meant by a noun and by that which has no name; for I stated that the expression “not-man” was not a noun, in the proper sense of the word, but an indefinite noun, denoting as it does in a certain sense a single thing. Similarly the expression “does not enjoy health” is not a verb proper, but an indefinite verb. Every affirmation, then, and every denial, will consist of a noun and a verb, either definite or indefinite.

When the verb “is” is used as a third element in the sentence, there can be positive and negative statements of two sorts. Thus in the sentence “man is just” the verb “is” is used as a third element, call it

verb or noun, whichever you will. Four statements, therefore, instead of two can be formed with these materials. Two of the four, as regards their affirmation and denial, correspond in their logical sequence with the statements that deal with a condition of privation; the other two do not correspond with these. Thus we have four statements. Reference to the table will make matters clear:

A. Affirmation

Man is just.

B. Denial

Man is not just.

Opposed

D. Denial

Man is not not-just.

C. Affirmation

Man is not-just.

Definitions

copula – the word “is” when it simply joins the subject and predicate of a statement.

conditional statement – combination of two statements which asserts that the second follows from the first.

antecedent – in a conditional, the statement from which another follows.

consequent – in a conditional, the statement which follows from another.

Lesson

In the previous lesson, we examined the kinds of simple statements and the oppositions between them. That examination gave us our first glimpse of how the truth or falsity of one statement is implicit in the truth or falsity of another. For example, if the statement “Every B is A” is true, then its contradictory, “Some B is not A,” is false, and vice versa. But this kind of opposition is only one way of relating statements; another compares them according to whether their verbs are definite or indefinite. Before we can understand the latter comparison, however, we need to examine Aristotle’s understanding of the copulative “is.”

Two Uses of “Is”

The word “is” has two uses. It can be a verb by itself in cases when a statement simply asserts that something exists. For example, if I wish to say that Socrates exists, I might simply say “Socrates is.” For the most part, however, we use “is” as a third part of the statement, as something which makes a simple expression become a verb and which joins the subject and

predicate of the statement, as when we say “Socrates is white.” When the verb “is” is used as the third part of the statement, it is called the copula, the joining word.

The Opposition of Definite and Indefinite Statements

When a simple expression is made a verb by use of the copula, there result four kinds of statements: two affirmations and two denials, two with the definite verb and two with the indefinite verb. If our terms are “man” and “white,” then the four statements are “men are white,” “men are not white,” “men are non-white,” and “men are not non-white.” Although the first and fourth seem equivalent, and the second and the third seem equivalent, Aristotle argues that they are not: it follows from “men are white” that “men are not non-white,” but it does not follow from “men are not non-white” that “men are white.” He later points out that, if it did follow, then it would follow from “the log is not a white man” that “the log is a non-white man.” The general rule is that the denial follows from the affirmation, but the affirmation does not follow from the denial. “Men are white” and “men are non-white” are the affirmations, while “men are not white” and “men are not non-white” are the denials.

Complex Statements

We have nearly completed the first two parts of the science of logic. The first part, as we have seen, deals with the simple expression; the second deals with the statement. The third part, as we shall see, considers discursive reasoning, or thought that runs from one statement to another. But not all discourses begin from simple statements – some begin with, and some conclude with, complex statements. Before we look at discourse, then, we should take time to look at the most important kind of complex statement.

The *conditional statement* is a complex statement in which two simpler statements are joined by an *if-then* conjunction; for example, “If a stone is a body, then it has weight.” The first part of the conditional is called the antecedent, and the second part is called the consequent; thus, the antecedent above is “a stone is a body,” while the consequent is “it has weight.” The conditional statement is true if and only if the consequent follows from the antecedent. That is, the whole conditional statement is true only if the truth of the antecedent is the cause of the truth of the consequent, not simply if they both happen to be true; in fact, it is possible that both parts of the conditional are false, and yet the whole conditional statement is true. All that is necessary is that if the antecedent is true, then the consequent is also true. Otherwise, the conditional statement is false.

Exercises

Exercise 1. *State what related statement, if any, follows from the following statements.*

1. Every soldier is a non-coward.
2. Some trees are not non-oaks.
3. Some men are non-veterans.

4. No Catholic is a non-Christian.
5. Not all cattle have horns.
6. Some dogs are non-brown.
7. No trees are non-plants.
8. Some dogs are not non-brown.
9. Some politicians are non-statesmen.
10. Not every cat is a lion.
11. Every cat is a non-dog.
12. A few men are not non-wise.
13. Some men are not wise.
14. Every man is rational.
15. Some cattle are non-horned.

Exercise 2: *Underline the antecedent in the following conditional statements.*

1. If a dog is domesticated, then it is not wild.
2. If every mover is moved, nothing would be moved.
3. The boy will get wet if he goes outside.
4. If my teacher weren't so boring, then I would learn my Latin.
5. When heavy rains fall in a desert, dry riverbeds become raging torrents.
6. A triangle has two angles equal when two sides are equal.
7. The vice president becomes the president should the president resign.
8. If essence and existence were really the same, then everything would be eternal.

9. Should the rain fall, it will save the crops.
10. I will finish my paper if I can get the computer working.

Lesson Twelve

Introduction to the Syllogism

Selections from Aristotle's *Prior Analytics*

translated by A. J. Jenkinson

24a10 – 25a25

We must first state the subject of our inquiry and the faculty to which it belongs: its subject is demonstration and the faculty that carries it out demonstrative science. We must next define a premise, a term, and a syllogism, and the nature of a perfect and of an imperfect syllogism; and after that, the inclusion or non-inclusion of one term in another as in a whole, and what we mean by predicating one term of all, or none, of another.

A premise then is a sentence affirming or denying one thing of another. This is either universal or particular or indefinite. By universal I mean the statement that something belongs to all or none of something else; by particular that it belongs to some or not to some or not to all; by indefinite that it does or does not belong, without any mark to show whether it is universal or particular, e.g., “contraries are subjects of the same science,” or “pleasure is not good.”

I call that a term into which the premise is resolved, i.e., both the predicate and that of which it is predicated, “being” being added and “not being” removed, or vice versa.

A syllogism is discourse in which, certain things being stated, something other than what is stated follows of necessity from their being so. I mean by the last phrase that they produce the consequence, and by this, that no further term is required from without in order to make the consequence necessary.

I call that a perfect syllogism which needs nothing other than what has been stated to make plain what necessarily follows; a syllogism is imperfect, if

it needs either one or more statements, which are indeed the necessary consequences of the terms set down, but have not been expressly stated as premises.

Every premise states that something either is or must be or may be the attribute of something else; of premises of these three kinds some are affirmative, others negative, in respect of each of the three modes of attribution; again some affirmative and negative premises are universal, others particular, others indefinite. It is necessary then that in universal attribution the terms of the negative premise should be convertible, e.g., if no pleasure is good, then no good will be pleasure; the terms of the affirmative must be convertible, not however, universally, but in part, e.g., if every pleasure, is good, some good must be pleasure; the particular affirmative must convert in part (for if some pleasure is good, then some good will be pleasure); but the particular negative need not convert, for if some animal is not man, it does not follow that some man is not animal. First then take a universal negative with the terms A and B. If no B is A, neither can any A be B. For if some A (say C) were B, it would not be true that no B is A; for C is a B. But if every B is A then some A is B. For if no A were B, then no B could be A. But we assumed that every B is A. Similarly too, if the premise is particular. For if some B is A, then some of the As must be B. For if none were, then no B would be A. But if some B is not A, there is no necessity that some of the As should not be B; e.g., let B stand for animal and A for man. Not every animal is a man; but every man is an animal.¹

Definitions

conversion – exchanging the subject and predicate of a simple statement while retaining its quality and truth.

syllogism – complex expression in which, certain things being given, something else necessarily follows because of these.

valid syllogism – a real syllogism; conclusion actually follows.

invalid syllogism – complex expression which appears to be a syllogism, but is not; the conclusion does not follow from the premises.

perfect syllogism – syllogism which needs no other statements to make its conclusion evident.

imperfect syllogism – syllogism which needs other statements to make its conclusion evident.

premise – a statement given in a syllogism.

conclusion – the statement which follows in the syllogism.

term – a simple expression which is part of a syllogism.

major term – predicate of the conclusion of a syllogism.

minor term – subject of the conclusion of a syllogism.

middle term – term which connects or separates the major and minor terms.

major premise – premise with the major term in it.

minor premise – premise with the minor term in it.

Lesson

As we saw at the beginning, logic has three main parts, corresponding to the three acts of the intellect. The first part of logic, which perfects the act by which the intellect understands what something is, studies the simple expression. The second part, which perfects the act of composing and dividing, studies the statement. Finally, the third part of logic, which perfects discursive reasoning, studies the syllogism and things akin to it.

Since “syllogism” is an unusual word, we should begin this part of logic by explaining its meaning. “Syllogism” is a Greek compound word, made up of “*syn*” (with, together) and “*logos*” (speech, reason). The word “syllogism,” then, means something like “reasoning with” or “reckoning.” Aristotle restricts the use of the word and gives the following definition: syllogism is a discourse in which certain things being given, something else necessarily follows because of these. For example, if every man is an animal, and every animal is a living thing, then every man is a living thing. The third statement, “Every man is a living thing,” follows necessarily because of the truth of the first two statements. This is the kind of complex expression studied in the third part of logic.

Our purpose in this part of logic, then, is to learn about the valid syllogism and avoid the invalid syllogism. That is, we should learn what orders and kinds of premises actually lead to conclusions, and which do not.

Conversion

Before we can understand the syllogism in detail, however, we need to know how to transform the propositions which make it up – that is, we need to know about the method of conversion. In this method, we take a simple statement and reverse the subject and predicate. If the original statement is true, the new statement will also be true (though the reverse is not always the case). For example, the statement “Some men are tan” converts into the statement “Some tan [things] are men.” In every conversion, the new statement has the same quality as the old statement, but it sometimes differs in quantity. The following are the rules for the conversion of simple statements.

1. *The universal denial converts universally.* – No B is A converts into No A is B.
 Since the universal denial separates the whole of the subject from the predicate, it also separates the whole predicate from the subject. Thus, every true universal denial converts into another true universal denial. No plant is an animal also implies that no animal is a plant.
2. *The universal affirmation converts into a particular affirmation.* – Every B is A converts into Some A is B.
 The universal affirmation connects the whole subject with the predicate, but it does not necessarily connect the whole predicate with the subject. We can only be sure that it connects part of the predicate with the subject. For example, every man is an animal, but not every animal is a man. It is true, however, that some animals are men.
3. *The particular affirmation converts into a particular affirmation.* – Some B is A converts into Some A is B.
 The particular affirmation connects part of the subject with the predicate. It must, then, also connect part of the predicate with the subject. For example, if some men are tan, some tan things are men.
4. *The particular denial does not convert.*
 We can easily show that the particular denial never converts. The particular denial separates one part of the subject from the predicate, but it does not necessarily separate any part of the predicate from the subject. For if the particular denial did convert, it would either convert into a particular denial or a universal denial. It certainly does not convert into a universal denial. For it is true that some human beings are not doctors, but it is certainly not the case that no doctors are human beings. Neither does it convert into the particular denial. For some animals are not men, but it is not the case that some men are not animals (in fact, all men are animals). Therefore, the universal denial does not convert at all.

As we said before, the rules of conversion only apply to true statements. If the statement is false, we might know nothing about the conversion of it. For example, it is false that all men are doctors, but it is not false that some doctors are men. In the case of the universal denial and the particular affirmation, however, when we combine conversion with the rules of opposition, we see that the conversion of the false statement is also false.

The Syllogism Itself

We are now ready to look at the basic structure of the syllogism. Let's look at an example of a syllogism:

If every animal is a living thing,
and every man is an animal,
 then every man is a living thing.

First, let us consider the parts. The most important parts of the syllogism are the premises. The premises are the statements that are given in the syllogism. In our example, the premises are “Every animal is a living thing” and “Every man is an animal.” The conclusion is the statement that follows from the things given in the syllogism. In this case, the conclusion is “Every man is a living thing.” Together the premises and conclusion form the matter of the syllogism.

Every simple statement, as we saw before, has at least two parts – the noun and the verb. The noun and verb are simple expressions that form the parts of a statement. When the statement becomes part of a syllogism, however, the parts of the statements are no longer called noun and verb. They are called the “terms” of the syllogism. They are called the terms because they are the simplest parts of the syllogism, and the analysis of the syllogism ends, or comes to a “term,” there. Every syllogism has three terms. In the example above, the terms are “living thing,” “animal,” and “man.” Terms and premises, then, are the parts of the syllogism.

Every syllogism is made of three simple statements, two premises and the conclusion. With three simple statements, it might seem possible to have six different terms. In fact, the force of the syllogism comes from it having only three terms, two appearing both in the premises and in the conclusion, the third appearing only in the premises. The term that is the subject of the conclusion is called the *minor term*. The term that is the predicate of the conclusion is called the *major term*. The term that appears only in the premises is called the *middle term*.

For example, in the syllogism above, the first two statements, “every animal is a living thing,” and “every man is an animal,” are the premises of the syllogism. “Every man is a living thing” is the conclusion of the syllogism. “Man” is the minor term, because it is the subject of the conclusion, “living thing” is the major term because it is the predicate of the conclusion, and “animal” is the middle term, which appears only in the premises and brings the subject and predicate together.

The names of the terms have a simple explanation. We must remember that the universal is one thing said of many. Therefore, the predicate of any statement, since it is said of the subject, always must be a universal. The subject itself, however, might or might not be universal. For example, in the syllogism above, we might substitute “Socrates,” an individual term, for “man,” a universal term, and the syllogism would still work. But we could not substitute “Socrates” or any other individual for the major term, “living thing.” The predicate, then, has more the character of a universal than the subject does. Since the predicate is more universal, it is called the “major,” that is, “larger” term. Since the subject is less universal, it is called the “minor,” that is, “smaller” term.

Notice that here we are leaving aside the real meanings of the terms and talking about them as merely parts of statements and syllogisms. In its meaning, the subject might be more universal than the predicate, but in its logical formality it has less of the character of universality *precisely because it is the subject*. Finally, the middle term has the function that a middle always does: it joins together or separates the beginning and the end, in this case the minor and major terms.

Just as the terms have special names, so do the premises. The premise that contains the major term is called the major premise, the premise which contains the minor term is called the minor premise. No premise ever contains both the major and minor term, but every premise contains the middle term.

Exercises

Exercise 1: *Convert the following statements. If they do not convert, indicate the reason.*

1. Every man is an animal.
2. Some men are living things.
3. All lions are cats.
4. No wolf is a cat.
5. Every triangle has three sides.
6. Every goat and cow eats either cattle feed or tin cans.
7. Some birds do not fly.
8. Not every bird flies.
9. Every bird does not fly.
10. Let us go to school.
11. Birds always fly.
12. Pigs never fly.
13. All roses are red and violets are blue.
14. All squares are rectangles with four equal sides.
15. Some knights were not chivalrous.

Exercise 2: *Mark the consequences TRUE, FALSE, or UNKNOWN. Use conversion or the opposition of statements, or some combination thereof.*

1. If all dogs are animals, then:
 - a) Some dogs are animals.
 - b) No dogs are animals.
 - c) Some dogs are not animals.

2. If no cows have horns, then:
 - a) All cows have horns.
 - b) Some cows have horns.
 - c) Some cows do not have horns.
3. If it is false that all cows have horns, then:
 - a) No cows have horns.
 - b) Some cows have horns.
 - c) Some cows do not have horns.
4. If some cars are blue, then:
 - a) Every car is blue.
 - b) No cars are blue.
 - c) Not every car is blue.
5. If it is false that some logicians are wicked, then:
 - a) All logicians are wicked.
 - b) No logicians are wicked.
 - c) Some logicians are not wicked.
6. If it is false that every man is tan, then:
 - a) Some men are tan.
 - b) Some tan things are men.
 - c) No tan things are not men.

¹ Aristotle. "Prior Analytics." Translated by A. J. Jenkinson. *The Works of Aristotle*, vol. 1, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Thirteen

Principles and Figures of the Syllogism

Selections from Aristotle's *Prior Analytics*

24b27 – 28a18

That one term should be included in another as in a whole is the same as for the other to be predicated of all of the first. And we say that one term is predicated of all of another, whenever no instance of the subject can be found of which the other term cannot be asserted: “to be predicated of none” must be understood in the same way.

Whenever three terms are so related to one another that the last is contained in the middle as in a whole, and the middle is either contained in, or excluded from, the first as in or from a whole, the extremes must be related by a perfect syllogism. I call that term middle which is itself contained in another and contains another in itself: in position also this comes in the middle. By extremes I mean both that term which is itself contained in another and that in which another is contained.

But if one term is related universally, the other in part only, to its subject, there must be a perfect syllogism whenever universality is posited with reference to the major term either affirmatively or negatively, and particularity with reference to the minor term affirmatively: but whenever the universality is posited in relation to the minor term, or the terms are related in any other way, a syllogism is impossible.

It is clear then from what has been said that if there is a syllogism in this figure with a particular conclusion, the terms must be related as we have

stated: if they are related otherwise, no syllogism is possible anyhow. It is evident also that all the syllogisms in this figure are perfect (for they are all completed by means of the premises originally taken) and that all conclusions are proved by this figure, viz., universal and particular, affirmative and negative. Such a figure I call the first.

Whenever the same thing belongs to all of one subject, and to none of another, or to all of each subject or to none of either, I call such a figure the second; by middle term in it I mean that which is predicated of both subjects, by extremes the terms of which this is said, by major extreme that which lies near the middle, by minor that which is further away from the middle. The middle term stands outside the extremes, and is first in position. A syllogism cannot be perfect anyhow in this figure, but it may be valid whether the terms are related universally or not.

But if one term belongs to all, and another to none, of a third, or if both belong to all, or to none, of it, I call such a figure the third; by middle term in it I mean that of which both the predicates are predicated, by extremes I mean the predicates, by the major extreme that which is further from the middle, by the minor that which is nearer to it. The middle term stands outside the extremes, and is last in position. A syllogism cannot be perfect in this figure either, but it may be valid whether the terms are related universally or not to the middle term.

Definitions

figures of the syllogism – the division of syllogisms into kinds according to the positions of the middle term.

dici de omni – said of all; a principle of the syllogism.

dici de nullo – said of none; a principle of the syllogism.

Lesson

In the last lesson we were introduced to the syllogism, the complex expression in which, certain things being given, something else necessarily follows. The statements that are given are called premises, and that which follows is the conclusion. In this lesson we will look at the principles, figures, and moods of the syllogism.

Principles of the Syllogism

The word “principle” is derived from the Latin word for beginning (*principium*). A principle, then, is just a beginning, or something that comes before everything else. Aristotle proposes two principles, or beginnings, of the syllogism: “said of all” and “said of none” (*dici de omni* and *dici de nullo* in Latin). They correspond to and explain the meaning of the universal affirmation and the universal denial, respectively.

For example, if “every man is an animal,” “animal” is predicated of the whole of man and no individual man can escape being an animal; if “no man is a plant,” then “plant” is said of no part of man, and no individual man can be a plant. A first, simple explanation of why these are the principles of the syllogism is apparent later, because every syllogism has at least one universal premise. Since in a universal statement, the predicate is said of all or none of the subject, then it is clear that every syllogism depends upon the relations “said of all” and “said of none,” and that one who does not understand what these mean cannot comprehend the syllogism.

But even before we examine the various kinds of syllogism, we can come up with some explanation of these principles by looking at the structure of the syllogism.

The syllogism has two premises and three terms, but the term that is most essential is the middle term, the term that connects or separates the other two and enables a conclusion to be reached. Obviously, the middle term can only connect the subject and predicate if it is itself already connected to both. For example, if no animals were living things, then “animal” could never connect “living thing” and “man.”

But the mere fact that they are connected is not enough. In a syllogism with an affirmative conclusion, if the subject and predicate are each connected to only a part of the middle term, they might be connected to different parts, and thus remain entirely unconnected to one another. For example, some animals are men and some animals are donkeys, but donkey and man remain entirely unconnected. The middle term, then, must be connected to (or separated from) the *whole* of at least one term and at least part of the remaining term. Therefore, the relation “said of all” is essential to the syllogism with an affirmative conclusion. Similarly, the relation “said of none” is essential to the syllogism with a denial for a conclusion. That is why these are called the principles of the syllogism.

Figures of the Syllogism

As you have probably already guessed, there are several kinds of syllogisms. The kinds of syllogisms are called moods, and these moods are arranged into three different figures according to the position of the middle term in the premises. In this lesson we will examine the figures of the syllogism, and in the next, the moods.

In the first figure, the syllogisms of which are perfect, the middle term is called middle for two reasons. First, it connects or separates the major and minor term, just as every middle term will do. But it also is middle in universality between the subject and the predicate. That is, in the premises it is the predicate of the minor premise and the subject of the major premise. Taking A to symbolize the major term, B the middle, and C the minor, the first figure is arranged as follows:

B is [or is not] A (major premise)
C is [or is not] B (minor premise)
 C is [or is not] A (conclusion)

Syllogisms in the first figure are called perfect because the middle term is middle in universality, and thus it is most apparent in such a figure that the conclusion follows from the premises.

In the second figure, the middle term still connects or separates the major and minor terms, but it is not middle in universality. Rather, the middle term is more universal than both the major and minor terms because it is the predicate of both premises. Consequently, it is not as easy to see that the conclusion follows from the premises in this figure. That is why syllogisms in this figure are called imperfect. The second figure is arranged as follows:

A is [or is not] B (major premise)
C is [or is not] B (minor premise)
 C is [or is not] A (conclusion)

Finally, in the third figure the middle term is the subject of both premises. The syllogisms in this figure are also imperfect. The third figure is arranged as follows:

B is [or is not] A (major premise)
B is [or is not] C (minor premise)
 C is [or is not] A (conclusion)

Why is there no fourth figure? In the fourth figure, the middle term would be predicate of the major premise and subject of the minor premise. That is, it would be both more universal than the major term and less universal than the minor term. It would thus be more and less universal than itself, which is impossible. In fact, all of the syllogisms which modern logicians have thought to be in the so-called “fourth figure” are really syllogisms of the other figures transformed in some way.

Exercises

Exercise One. *For the following syllogisms identify the major term, minor term, middle term, major premise, minor premise, conclusion, and figure. Note: not all of the examples are good syllogisms.*

1. Every triangle is three-sided.
Every triangle has 180°.
 Thus, some figures that have 180° are three-sided.
2. No dogs are cats.
Some animals are cats.
 Thus, some animals are not dogs.

3. No athlete is an invalid.
Some syllogisms are invalid.
Therefore, some syllogisms are not athletic.
4. Every phone is an appliance.
No phone is a book.
Therefore, some appliance is not a book.
5. Every vegetable is healthy.
All radishes are vegetables.
Therefore, all radishes are healthy.
6. Some books are not best-sellers.
Every mystery is a book.
Thus, some mysteries are not best-sellers.
7. Every lion is carnivorous.
Every lion is an animal.
Therefore, some animals are carnivorous.
8. Some Americans are patriotic.
No patriotic man is a scoundrel.
Thus, some Americans are not scoundrels.
9. Every laptop is also a computer.
Some laptops are very small.
Thus, some computers are very small.
10. Some glittering thing is not gold.
Everything valuable is golden.
Therefore, some glittering thing is not valuable.

Lesson Fourteen

The Moods of the Syllogism

Selections from Aristotle's *Prior Analytics* 25b39 – 42a1

If A is predicated of all B, and B of all C, A must be predicated of all C; we have already explained what we mean by “predicated of all.” Similarly also, if A is predicated of no B, and B of all C, it is necessary that no C will be A. But if the first term belongs to all the middle, but the middle to none of the last term, there will be no syllogism in respect of the extremes; for nothing necessary follows from the terms being so related; for it is possible that the first should belong either to all or to none of the last, so that neither a particular nor a universal conclusion is necessary. But if there is no necessary consequence, there cannot be a syllogism by means of these premises. As an example of a universal affirmative relation between the extremes we may take the terms animal, man, horse; of a universal negative relation, the terms animal, man, stone.

But if one term is related universally, the other in part only, to its subject, there must be a perfect syllogism whenever universality is posited with reference to the major term either affirmatively or negatively, and particularity with reference to the minor term affirmatively. Let all B be A and some C be B. Then if “predicated of all” means what was said above, it is necessary that some C is A. And if no B is A but some C is B, it is necessary that some C is not A.

Further in every syllogism one of the premises must be affirmative, and universality must be present: unless one of the premises is universal either a syllogism will not be possible, or it will not refer to the subject proposed, or the original position will be begged.

It is clear then that in every syllogism there must be a universal premise, and that a universal statement is proved only when all the premises are universal, while a particular statement is proved both from two universal premises and from one only: consequently if the conclusion is universal, the premises also must be universal, but if the premises are universal it is possible that the conclusion may not be universal. And it is clear also that in every syllogism either both or one of the premises must be like the conclusion.

It is clear too that every demonstration will proceed through three terms and no more, unless the same conclusion is established by different pairs of propositions; e.g., the conclusion E may be established through the propositions A and B, and through the propositions C and D, or through the propositions A and B, or A and C, or B and C. For nothing prevents there being several middles for the same terms. But in that case there is not one but several syllogisms.

Definition

moods – the ways in which syllogisms are made in each of the figures.

Lesson

In the last lesson we looked at the principles and basic organization of the syllogism. In this lesson, we will study all of the valid moods of the syllogism, beginning with those of the first figure.

The First Figure of the Syllogism

The universal syllogisms of the first figure are the easiest to comprehend, and syllogisms in the other figures are manifested by being reduced to the first figure. The first mood of the syllogism, called *Barbara*, states: if every B is A, and every C is B, then every C is A. This can

be explained by the principle of *dici de omni*. The premises are both universal, so the major is predicated of every instance of the middle, while the middle is predicated of every instance of the major. But since every instance of the major is a predicate of the middle, and every instance of that same middle is predicated of the minor, the major must also in every case be predicated of the minor. Therefore, we can conclude that every C is A.

The second mood of the first figure is called *Celarent*: if no B is A, but every C is B, then no C is A. This can be explained by the principles of *dici de omni* and *dici de nullo*; that is, the laws of predication require that for each instance of C, if C is B, but B is not A, then C is not A. The syllogism does not work if the premises are reversed in their quality: “No C is B” and “Every B is A” have no conclusion.

The third mood is called *Darii*: if every B is A, and some C is B, then some C is A. If the major premise is particular, however, the syllogism is invalid, since we do not know whether this instance of the middle term is joined to the major term.

The fourth mood is *Ferio*. If no B is A, and some C is B, then some C is not A. If we take one individual C, it might be B. Suppose that it is. Then it cannot be A. Thus, some C is not A. It does not work the other way, however. “Some B is A” and “No C is B” has no conclusion. There is no conclusion to that because, while no C is B, an A which is *not* B might inhere in C.

Notice that the names of the syllogisms have built into them the letters for the propositions. For example, the major premise of *Ferio* is an E, a universal denial, the minor premises an I, a particular affirmation, and the conclusion is an O, a particular denial. Later we will use these names to help in memorizing these and other syllogisms, and in reducing them to first-figure syllogisms. Here is a chart of every valid mood of the simple syllogisms:

FIRST FIGURE

1. Barbara	2. Celarent
Every B is A <u>Every C is B</u> Every C is A	No B is A <u>Every C is B</u> No C is A
3. Darii	4. Ferio
Every B is A <u>Some C is B</u> Some C is A	No B is A <u>Some C is B</u> Some C is not A

SECOND FIGURE

1. Cesare	2. Camestres
No A is B <u>Every C is B</u> No C is A	Every A is B <u>No C is B</u> No C is A
3. Festino	4. Baroco
No A is B <u>Some C is B</u> Some C is not A	Every A is B <u>Some C is not B</u> Some C is not A

THIRD FIGURE

1. Darapti	2. Felapton
Every B is A <u>Every B is C</u> Some C is A	No B is A <u>Every B is C</u> Some C is not A
3. Disamis	4. Datisi
Some B is A <u>Every B is C</u> Some C is A	Every B is A <u>Some B is C</u> Some C is A
5. Bocardo	6. Ferison
Some B is not A <u>Every B is C</u> Some C is not A	No B is A <u>Some B is C</u> Some C is not A

These are all of the valid syllogisms with simple propositions. Any such syllogism that does not fall into a mood of the first, second, or third figure is invalid. The first figure syllogisms are easy to comprehend, but those of the second and third figures are more difficult. That is why second and third figure syllogisms are called imperfect.

Two Ways to Check Syllogisms

In the *Prior Analytics* Aristotle checks the validity of first figure syllogisms by testing whether premises of the same kind are compatible with the truth of opposite kinds of conclusions. If they are not, then the syllogism is valid. If they are compatible, then the syllogism is invalid. For example, it *never* happens that “Every B is A and Every C is B” and yet “Some C

is not A.” Therefore, Barbara is a valid syllogism. But we find the opposite to be the case with the premises that have the form “Every B is A” and “No C is B.” For, the premises “Every horse is an animal” and “No horse is a man” have that form, and the true statement which links the major and minor term is “Every man is an animal,” which has the form “Every C is A.” On the other hand, the premises “Every man is an animal” and “No stone is a man” also have that form, and yet the true statement that links the major and minor term is “No stone is an animal,” which has the contrary form “No C is B.” Clearly, the conclusions of a valid syllogistic form cannot be contrary. Therefore, that possible mood of first figure syllogism has been shown to be invalid. Aristotle eliminates the other invalid moods of the first figure in precisely the same way.

Aristotle checks the validity of the second and third figure moods in two ways. First, he checks them in the way shown above, using examples that are compatible with opposite kinds of conclusions. Second, he checks them by showing that all valid syllogisms in the second and third figures can be reduced to first figure syllogisms. In the next lesson we will check the validity of the imperfect moods of the syllogism by reducing them to the perfect moods of the first figure.

Exercises

Exercise 1: *Find the major, minor, and middle terms of these syllogisms. Then identify the major and minor premises. Finally, state their figure and mood. If they are invalid, write "invalid" instead of giving the figure and mood.*

1. Every virtue is praiseworthy.
Some habits are virtues.
Some habits are praiseworthy.
2. No rectangle is round.
All squares are rectangles.
No squares are round.
3. Every millionaire is famous.
Some logicians are not famous.
Not every logician is a millionaire.
4. Every sergeant is a soldier.
Every soldier is a citizen.
Every sergeant is a citizen.
5. Some dogs are rodents.
Every dog is an animal.
Some animals are rodents.
6. No book is metal.
Every coin is metal.
No coin is a book.

7. Every worm is an animal.
Some animal is a substance.
Some substance is a worm.
8. Every pickpocket is a thief.
No hero is a thief.
No hero is a pickpocket.
9. No mouse is rational.
Every mouse is a rodent.
Some rodents are not rational.
10. Some Christians are American.
Every Christian is baptized.
Some Americans are baptized.

Lesson Fifteen

Reduction of Imperfect Syllogisms

Selections from Aristotle's *Prior Analytics* 25b1-29b25

It is possible also to reduce all syllogisms to the universal syllogisms in the first figure. Those in the second figure are clearly made perfect by these, though not all in the same way; the universal syllogisms are made perfect by converting the negative premiss, each of the particular syllogisms by reduction *ad impossibile*. In the first figure particular syllogisms are indeed made perfect by themselves, but it is possible also to prove them by means of the second figure, reducing them *ad impossibile*, e.g., if A belongs to all B, and B to some C, it follows that A belongs to some C. For if it belonged to no C, and belongs to all B, then B will belong to no C: this we know by means of the second figure.

Similarly also demonstration will be possible in the case of the negative. For if A belongs to no B, and B belongs to some C, A will not belong to some C: for if it belonged to all C, and belongs to no B,

then B will belong to no C: and this (as we saw) is the middle figure. Consequently, since all syllogisms in the middle figure can be reduced to universal syllogisms in the first figure, and since particular syllogisms in the first figure can be reduced to syllogisms in the middle figure, it is clear that particular syllogisms can be reduced to universal syllogisms in the first figure. Syllogisms in the third figure, if the terms are universal, are directly made perfect by means of those syllogisms; but, when one of the premisses is particular, by means of the particular syllogisms in the first figure: and these (we have seen) may be reduced to the universal syllogisms in the first figure: consequently also the particular syllogisms in the third figure may be so reduced. It is clear then that all syllogisms may be reduced to the universal syllogisms in the first figure.

Definitions

reduction – showing the validity of an imperfect syllogism by comparing it to a perfect syllogism.

reduction by contradiction – reduction of a syllogism through the contradiction of the conclusion.

simple conversion – conversion which results in a statement of the same quantity.

per accidens conversion – conversion which results in a statement of a different quantity.

mutation – in a reduction, switching the major and minor premisses because of the conversion of the conclusion.

Lesson

In the last lesson, we saw how Aristotle used instances to check the validity of possible syllogistic moods. In this lesson we will study how all second and third figure syllogisms are reduced to the first figure.

The Reduction of Imperfect Syllogisms

Aristotle remarks that the imperfect syllogisms need to have a premise added to them in order to see clearly that the conclusion follows from them. At first this seems to contradict the definition of the syllogism, which states that the conclusion follows because of the given premisses. The imperfect syllogism does not violate this definition because the conclusion does

follow immediately from the two premises. But the imperfect syllogisms need to compare one or both premises to another proposition in order for us to see that this is so. This process reduces the imperfect syllogisms to those of the first figure. An example will make this clear.

CESARE

Cesare is the first mood of the second figure of the syllogism. Cesare states:

No A is B
Every C is B
 No C is A

It is not immediately evident that the conclusion follows from these premises. The first premiss, however, since it is a universal denial, is convertible into “No B is A.” If we substitute that into the syllogism, we end up with the following:

No B is A
Every C is B
 No C is A

But this is Celarent, a first-figure syllogism. Thus, when we add another premise which follows from the first, we see that a conclusion does follow, because the syllogism has become a perfect Celarent. This process by which we show that an imperfect syllogism is valid by showing that it is equivalent to a perfect syllogism of the first figure is called reduction.

We are now in a position to understand why the syllogisms have been assigned their unusual names. As you can see, Cesare begins with C just like Celarent. The first letter of each of the moods of the second and third figures is the same as the first letter of that first-figure mood to which it reduces. The name has also further significance. The “s” in Cesare comes after the “e,” and it signifies that Cesare reduces by the simple conversion of the “e” premiss. The letters in the names of the mood have the following significance:

- B** – syllogism reduces to Barbara
- C** – syllogism reduces to Celarent
- D** – syllogism reduces to Darii
- F** – syllogism reduces to Ferio
- s** – reduce by a simple conversion of the previous premise, e.g., No A is B = No B is A or Some A is B = Some B is A
- p** – reduce by an accidental conversion of the previous premise (the “p” is for “per accidens”), e.g., Every A is B = Some B is A
- m** – change the places of the major and minor premises (the “m” is for “mutation”)
- c** – reduce by contradiction
- Other letters are not significant.

Not every syllogism reduces to the first figure as easily as Cesare. Some imperfect syllogisms must be reduced to perfect syllogisms by the more difficult process of contradiction. Reduction by contradiction is a kind of reduction to absurdity, a process which we will examine universally in a later lesson. For now, all we need to know is that when we reduce a syllogism by contradiction, we show that the contradiction of the conclusion cannot be true if the premises are true. Here is an example:

BOCARDO

Some B is not A
Every B is C
 Some C is not A

Let us suppose that Bocardo were not a valid syllogism. In that case, the premises could be true, but the conclusion could still be false. If the conclusion were false, the contradiction of the conclusion would necessarily be true. Let us suppose, then, that the premises are true, but the conclusion false. Then the contradictory of the conclusion, namely “Every C is A,” would be true. But “Every B is C” was already given as true. We can use these two statements as premises in the following syllogism:

Every C is A
Every B is C
 Every B is A

This syllogism is clearly a valid Barbara. But its conclusion cannot be true, since “Some B is not A,” which contradicts this new conclusion “Every B is A,” was given as true in one of the premises of our original syllogism. Therefore, one of the premises in the second syllogism must be false. But the minor premiss, “Every B is C,” we know to be true from the original syllogism. Thus, the statement “Every C is A” which we were trying to take as true must be false. It follows that its contradictory, “Some C is not A” is necessarily true. But that is the conclusion assigned to Bocardo. Bocardo, then, is reducible to Barbara and must be valid, since if its premises are true, its conclusion must also be true.

Finally, we should note that Aristotle is not satisfied with reducing the imperfect syllogisms. He points out that even the Darii and Ferio, the first figure syllogisms with particular conclusions, are reducible to the first figure syllogisms with universal conclusions. They are reducible to these, however, only by way of first being reduced to second figure syllogisms which themselves are reducible to those first figure syllogisms. Since Darii and Ferio are perfect syllogisms, however, it is not necessary in an introductory logic class to reduce them so.

Exercises

Exercise 1: *Reduce each of the second and third figure syllogisms to some first figure syllogism.*

Lesson Sixteen

The Abbreviated Syllogism

Selections from Aristotle's *Prior Analytics* 47a1 – 47b15

Our next business is to state how we can reduce syllogisms to the aforementioned figures: for this part of the inquiry still remains. If we should investigate the production of the syllogisms and had the power of discovering them, and further if we could resolve the syllogisms produced into the aforementioned figures, our original problem would be brought to a conclusion. It will happen at the same time that what has been already said will be confirmed and its truth made clearer by what we are about to say. For everything that is true must in every respect agree with itself. First then we must attempt to select the two premises of the syllogism (for it is easier to divide into large parts than into small, and the composite parts are larger than the elements out of which they are made); next we must inquire which are universal and which particular, and if both premises have not been stated, we must ourselves assume the one which is missing. For sometimes men put forward the universal premise, but do not posit the premise which is contained in it, either in writing or in discussion; or men put forward the premises of the principal syllogism, but omit those through which they are inferred, and invite the concession of others to no purpose. We must inquire then whether anything unnecessary has been assumed, or anything

necessary has been omitted, and we must posit the one and take away the other, until we have reached the two premises: for unless we have these, we cannot reduce arguments put forward in the way described.

If then the middle term is a predicate and a subject of predication, or if it is a predicate, and something else is denied of it, we shall have the first figure; if it both is a predicate and is denied of something, the middle figure; if other things are predicated of it, or one is denied, the other predicated, the last figure. For it was thus that we found the middle term placed in each figure. It is placed similarly too if the premises are not universal: for the middle term is determined in the same way. Clearly then, if the same term is not stated more than once in the course of an argument, a syllogism cannot be made: for a middle term has not been taken. Since we know what sort of thesis is established in each figure, and in which the universal, in which the particular is described, clearly we must not look for all the figures, but for that which is appropriate to the thesis in hand. If the thesis is established in more figures than one, we shall recognize the figure by the position of the middle term.

Definitions

abbreviated syllogism – syllogism in which a premise or conclusion is implied, not stated.

Lesson

Now that we have finished our analysis of the syllogism proper, we can apply that understanding to two closely related topics. First, we will take up the abbreviated syllogism, and show how we can test it through the use of our syllogistic principles. Then, in the next lesson, we will discuss a kind of discourse that is called a syllogism in a looser sense of the term – the conditional syllogism.

The Abbreviated Syllogism

So far in logic we have looked at the syllogism in an explicit form. In real life, whether in spoken discussion or written argumentation, the syllogism usually appears in a variety of

disguises. Sometimes premises or conclusions are implied rather than stated, and/or the quantity of the statements is hidden. In this lesson we will look at how Aristotle advises us to deal with these abbreviated syllogisms.

Suppose that someone presented you with the following argument: “Catholics are crazy. Since they worship the Blessed Sacrament, then they must be idolaters.” It would be useful to put this argument in syllogistic form, so that we could know exactly what this person was trying to say. First, we should look for the premises and distinguish the premises from the conclusion. Now the word “since” usually indicates that a premise comes after it, while “then” indicates a conclusion. Thus, the conclusion of this argument is “Catholics are idolaters,” and only one premise is stated: “Catholics worship the Blessed Sacrament.”

Since the middle term occurs only in the premises, then the middle term here is “worship the Blessed Sacrament.” Since the middle term is the predicate of the premise, the syllogism is in the first or second figure.

The other term in the premise is “Catholics.” Since “Catholics” is also the subject of the conclusion, it must be the minor term. The given premise is therefore the minor premise, and it could be in either the first or second figure.

The conclusion of the argument is affirmative, however, and the second figure only has negative conclusions. Consequently, the missing premise must state, at least, “Those who worship the Blessed Sacrament are idolaters.” Furthermore, the conclusion seems to be universal, and only **BARBARA** has a conclusion that is both universal and affirmative. Thus, both of the premises must be universal and affirmative. Furthermore, the middle term must be the subject of the hidden premise, while the predicate must be the major term. We can analyze the syllogism, then, as follows:

Every person who worships the Blessed Sacrament is an idolater.

Every Catholic worships the Blessed Sacrament.

Therefore, every Catholic is an idolater.

The missing premise in this case was “Every person who worships the Blessed Sacrament is an idolater.” Notice that the first part of the argument, “Catholics are crazy,” has no place in the syllogism. It is an extraneous assumption and can be ignored. Thus, we have completed and made explicit what was hidden or shortened in the first statement of the argument.

We can sum up Aristotle's procedure with the following rules:

1. *Find the two premises of the syllogism* (as distinct from the conclusion).
 - A. Premises are distinguished by words such as *since, because, for*. Conclusions are indicated by words such as *then, thus, so, therefore*.
 - B. If one premise is missing, find the position of the middle term.
 - C. Assign the proper figure according to the position of the middle term. (There may be more than one correct figure.)
 - D. Position the terms in the missing premise.

2. *Find the quantity of each premise by choosing a mood that leads to the desired conclusion. (There may be more than one correct mood.)*
3. *Omit unnecessary statements.*

Note that, by using Aristotle's rules, we should be able not only to do logical exercises, but also to see how normal people in our everyday lives use the syllogism when they reason, and to know whether they use it well.

Exercises

Exercise 1: *Fill in the missing premise to make the syllogism valid.*

1. Since angels do not have wings, they cannot fly.
2. Dogs have hair because they are mammals.
3. Since cats have nine lives, then they have souls.
4. Since some A is C, some A is B.
5. Every soul is immortal because it is invisible.
6. Since forms are immaterial, then forms are never in the physical world.
7. Knowledge is changeless, therefore knowledge is immaterial.
8. Since fish do not breathe air, not all swimming things are fish.
9. Since some battery-operated things are toys, some electronic things are toys.
10. Office chairs are not wooden; thus, some furniture is not wooden.

Lesson Seventeen

The Conditional Syllogism

Selections from Aristotle's *Prior Analytics* 41a21 – 41b5

It is clear then that the ostensive syllogisms are effected by means of the aforesaid figures; these considerations will show that reductions *ad absurdum* also are effected in the same way. For all who effect an argument *per impossibile* infer syllogistically what is false, and prove the original conclusion conditionally when something impossible results from the assumption of its contradictory; e.g., that the diagonal of the square is incommensurate with the side, because odd numbers are equal to evens if it is supposed to be commensurate. One infers syllogistically that odd numbers come out equal to evens, and one proves conditionally the incommensurability of the diagonal, since a falsehood results through contradicting this. For this we found to be reasoning *per impossibile*, viz., proving something impossible by means of an hypothesis conceded at the beginning. Consequently,

since the falsehood is established in reductions *ad impossibile* by an ostensive syllogism, and the original conclusion is proved conditionally, and we have already stated that ostensive syllogisms are effected by means of these figures, it is evident that syllogisms *per impossibile* also will be made through these figures.

Likewise all the other conditional syllogisms: for in every case the syllogism leads up to the proposition that is substituted for the original thesis; but the original thesis is reached by means of a concession or some other condition. But if this is true, every demonstration and every syllogism must be formed by means of the three figures mentioned above. But when this has been shown it is clear that every syllogism is perfected by means of the first figure and is reducible to the universal syllogisms in this figure.

Definitions

conditional syllogism – syllogism one of whose premises is a conditional statement.

reduction to the absurd (ad absurdum) – argument which proves a conclusion by showing that its opposite leads to an absurdity.

modus ponens – conditional syllogism which asserts the antecedent.

modus tollens – conditional syllogism which denies the consequent.

Lesson

After Aristotle has reduced abbreviated syllogisms to syllogisms of the three figures, he claims that he can in fact show that every syllogism is reduced to one of these three figures. Most modern logicians disagree. They claim that Aristotle has not accounted for the conditional, or hypothetical, syllogism, and that this kind is in fact more basic than the syllogisms which Aristotle gives. As we shall see, however, Aristotle's principles do account for the conditional syllogism. In this lesson, we will examine Aristotle's account of the conditional syllogism and a particular variety of it – the reduction to the absurd.

The Conditional Syllogism

In Lesson Eight we briefly examined the conditional statement. As you may recall, the conditional statement has two parts, the antecedent and the consequent. The whole statement is true only if the consequent follows from the antecedent. Thus, even if both parts of the

statements are true, if the second does not follow from the first, the whole statement is false. On the other hand, the whole statement can be true even if one or both of the parts are false, as long as the second follows from the first.

We must notice that the conditional statement, according to this explanation, seems very similar to the definition of the syllogism. The syllogism, as you recall, is a complex expression in which, the premises being given, the conclusion necessarily follows from them. In fact, when Aristotle gives the syllogisms, he gives them in the form of conditional statements with two antecedents: "If A belongs to every B, and B belongs to every C, then A also belongs to every C." This is a sign that the conditional syllogism will be related to the syllogisms in the three figures.

We can find clearer evidence of that relation by considering the conditional statement in itself. The consequent must follow from the antecedent in order for the whole statement to be true. But we can only prove that it follows by making a syllogism of one of the three figures, using the antecedent as a premise. We can conclude, then, that the conditional statement is usually just an abbreviated syllogism in which the explicit premise is not asserted, but merely proposed. An example will help to explain what we mean.

Take the conditional statement "If man were a plant, he would lack sensation." If we apply the rules of the abbreviated syllogism, we can see that the conclusion "Every man lacks sensation" follows from the explicit premise "Every man is a plant" and the implicit premise "Every plant lacks sensation." We see that the conditional is true because the implied syllogism is valid, even though its conclusion is false. In the same way, a conditional statement can be true even if its consequent and antecedent are false. Such a conditional statement still stands as true because it does not assert the antecedent as a truth. Rather, it asserts only that *if* the antecedent *were* true, the consequent would follow from it. That men are plants is only supposed; the consequent, men lack sensation, follows from that supposition.

A second derivation of the conditional statement, however, occurs when it is substituted for a confusing or elaborate simple universal statement. As we saw before, a statement is simple if the subject and predicate each form an essential unity, no matter how many words they contain. For example, "bodily, living, sensitive, rational substance" is a simple noun because it forms an essential unity, usually signified by the word "man." The statement "A bodily, living, sensitive, and rational substance is a man" is therefore a simple statement. To express such an elaborate simple statement, however, it is sometimes easier to use a conditional sentence whose subject is the remote genus of the thing being explained. Thus we say that, in the antecedent, the subject has certain properties, and in the consequent, it has other "properties" (e.g., the name of a thing we want to define) which follow from it having the first ones. For example, instead of stating, "Every bodily, living, sensitive, rational substance is a man," we might find it easier to state, "If a substance is bodily, sensitive, and rational, then it is a man." In this way we can substitute a conditional statement for a very long and complicated simple statement. The meaning is the same, but the conditional expression is more easily understood.

The conditional statement, then, is either 1) an abbreviated syllogism which does not positively assert its explicit premise or 2) a substitute for the universal statement. In either case, the conditional syllogism, of which the conditional statement forms the principle part, follows clear rules.

Now, the conditional syllogism has one conditional and one asserting premise, and it comes in two valid moods, called *modus ponens* (“the way of positing”) and *modus tollens* (“the way of removing”). The first, *modus ponens*, works by asserting the antecedent, which was only supposed in the conditional statement. For example, “If man is an animal, then he has sensation. But man is an animal. Therefore, he has sensation” proceeds according to *modus ponens*. The second, *modus tollens*, works by denying the consequent and thus denying the antecedent from which it follows. For example, “If man is a plant, then he lacks sensation. But man does not lack sensation, therefore he is not a plant” works by *modus tollens*.

The conditional syllogism is invalid if the consequent is asserted, or the antecedent denied. For example, the statement “If man is a beast, he will have sensation” is true, because the consequent follows from the antecedent. If I were to assert that man is not a beast, it does not follow that man does not have sensation. Similarly, if it is raining, the ground will be wet, but the ground being wet does not imply that it is raining, since the sprinklers can also make the ground wet. Thus, the only two valid moods of the conditional syllogism are *modus ponens* and *modus tollens*.

The following are the moods of the conditional syllogism:

CAUTION: In this chart, X and Y represent propositions, not terms.

Conditional Syllogisms	
Modus Ponens	Modus Tollens
<p>If X is true, then Y is true. <u>X is true.</u> Therefore, Y is true.</p>	<p>If X is true, then Y is true. <u>Y is false.</u> Therefore, X is false.</p>

Reduction to the Absurd

Reduction to the absurd is a kind of syllogism that proves something true by showing that its contradictory is false. Euclid often uses this method in his books on geometry. Aristotle teaches that the reduction to the absurd uses the conditional syllogism. Here is an example of such a reduction:

Either every two lines have a unit that measures both evenly, or some two lines do not have such a unit. If every two lines have such a unit, then the number of times that the unit that measures both the side of the square and its diagonal measures the diagonal is both even and odd. But no number can be both even and odd. Therefore, [by *modus tollens*] it is false that every two lines have such a unit. Thus, the contradictory, some two lines do not have a common unit, is a true statement.

In this example, Aristotle assumes the contradictory of what he wished to prove, using it as the antecedent in the conditional statement. Since the consequent of the conditional is false, the antecedent must also be false, by *modus tollens*. And, since the antecedent is the

contradictory of what he wished to prove, the intended conclusion must be true. Thus, the intended conclusion has been proven by a reduction to absurdity.

Since the conditional syllogism reduces to the syllogisms of the three figures, so does the reduction to the absurd. Thus, Aristotle states that every reduction to the absurd can be transformed into a direct proof, that is, into a syllogism of one of the three figures. Also, recall that the reduction of syllogisms by contradiction is an application of the method of reduction to the absurd. Both begin by assuming the opposite of what they intend to prove, and then show that that opposite is false.

Exercises

Exercise 1: *State whether the following syllogisms are valid or invalid.*

- | | |
|--|---|
| 1. If triangles have angles equal to 180 degrees, then squares have angles equal to 360 degrees.
<u>Triangles have angles equal to 180 degrees.</u>
Therefore, squares have angles equal to 360 degrees. | 5. If mathematics is wisdom, then children can be wise.
<u>Children cannot be wise.</u>
Therefore, mathematics is not wisdom. |
| 2. Should all goods come from virtue, no evil man possesses the good.
<u>Some evil men possess the good.</u>
Therefore, some goods do not come from virtue. | 6. Things are in a species when they have an essence.
<u>Nothing has an essence.</u>
Therefore, nothing is in a species. |
| 3. If every triangle has angles equal to 180° , then every square has angles equal to 360° .
<u>Every square does have angles equal to 360°.</u>
Therefore, every triangle has angles equal to 180° . | 7. If some logician is emotional, then some logician is not logical.
<u>Every logician is logical.</u>
Therefore, no logician is emotional. |
| 4. If virtue is knowledge, then virtue is teachable.
<u>But virtue is not knowledge.</u>
Therefore, virtue is not teachable. | 8. When cats have nine lives, then they have immaterial souls.
<u>Cats have nine lives.</u>
Cats have immaterial souls. |
| | 9. If a lion is an animal, then it has sensation.
<u>Lions are animals.</u>
Therefore, lions have sensation. |
| | 10. If a square were a circle, it would be a plane figure.
<u>The square is not a circle.</u>
Therefore, it is not a plane figure. |

Lesson Eighteen

Induction

Selections from Aristotle's *Prior Analytics* 68b7-68b37

For every belief comes either through syllogism or from induction.

Now induction, or rather the syllogism which springs out of induction, consists in establishing syllogistically a relation between one extreme and the middle by means of the other extreme, e.g., if B is the middle term between A and C, it consists in proving through C that A belongs to B. For this is the manner in which we make inductions. For example, let A stand for long-lived, B for bileless, and C for the particular long-lived animals, e.g., man, horse, mule. A then belongs to the whole of C: for whatever is bileless is long-lived. But B also ('not possessing bile') belongs to all C. If then C is convertible with B, and the middle term is not wider in extension, it is necessary that A should belong to B. For it has already been proved that if two things belong to the

same thing, and the extreme is convertible with one of them, then the other predicate will belong to the predicate that is converted. But we must apprehend C as made up of all the particulars. For induction proceeds through an enumeration of all the cases.

Such is the syllogism which establishes the first and immediate premise: for where there is a middle term the syllogism proceeds through the middle term; when there is no middle term, through induction. And in a way induction is opposed to syllogism: for the latter proves the major term to belong to the third term by means of the middle, the former proves the major to belong to the middle by means of the third. In the order of nature, syllogism through the middle term is prior and better known, but syllogism through induction is clearer to us.

Definitions

induction – argument which gathers particulars to draw a universal conclusion.

perfect induction – induction which gathers all particulars.

convertible – a statement whose subject and predicate can be universally predicated of each other.

Lesson

Because the conclusion of the syllogism follows from its premises *with necessity*, the syllogism is the most perfect form of discursive reasoning. But it is not the only form of discursive reasoning – besides the syllogism, there is induction, argument by example, and the enthymeme. Each of these forms is less perfect than the syllogism because its conclusion does not follow from its premises with necessity, but only with a degree of probability. Nevertheless, the logician cannot afford to neglect these forms, because the human mind more often proceeds with probability than with necessity. The syllogism may be more perfect, but induction is more common and more easily understood. In the next three lessons, then, we will examine these less perfect but nonetheless necessary tools of logic. In this lesson, we will closely examine induction.

Induction

We all know that dogs bark, but we would have a hard time finding a syllogism that proves it. The process by which we know that dogs bark is the process of induction. Through

induction, we gather together the particulars and draw from them a universal conclusion. For example, I know that Fido barks, and Spot barks, and Rover barks, and every other dog that I have ever seen barks. From that I draw the conclusion that all dogs bark. The induction looks something like this:

Fido, Spot, and Rover bark.
Fido, Spot, and Rover are dogs.
Therefore, all dogs bark.

Is this a valid syllogism? Clearly not, since the likely middle term, “Fido, Spot, and Rover,” is never used universally. Yet we naturally and rightly find this argument convincing. So not every form of discursive reasoning has to be a syllogism in order to be good.

Aristotle explains induction by comparing it to the syllogism. We could turn the induction above into a syllogism by exchanging the conclusion and the major premiss. Then we get the following BARBARA:

All dogs bark.
Fido, Spot, and Rover are dogs.
Therefore, Fido, Spot, and Rover bark.

What is the difference between the induction and the syllogism? First, the conclusion of the induction is a premise in the syllogism. Consequently, while the syllogism connects the major term to the minor term through the middle term, the induction uses the minor term to connect the major to the middle. And so Aristotle defines the induction as the argument that connects the middle term to one of the extreme terms through the other extreme.

We can think about induction in another way as well. Induction takes what seems to be a fairly representative selection of the universal and draws the conclusion from that selection. That is, the second premise in the induction is treated as convertible, although strictly speaking it is not. The example with Fido, Spot, and Rover was such an induction. We take Fido, Spot, and Rover as representative of all dogs and thus we treat the premise “Fido, Spot, and Rover are dogs” as if it were strictly convertible into “All dogs are Fido, Spot, and Rover.” Since we have not really exhausted the universal “dog,” however, the induction cannot conclude with certainty, but only with a degree of probability. In fact, the dingo dog of Australia does not bark, it only whines, and so it turns out that our previous induction did not give us a completely universal conclusion. Nevertheless, it was still a pretty good induction.

A perfect induction, however, does conclude with certainty. Take the following example:

All isosceles, scalene, and equilateral figures have angles equal to 180° .
Isosceles, scalene, and equilateral figures are triangles.
Therefore, every triangle has angles equal to 180° .

This induction is perfect because the particulars in this case exhaust the possibilities of the universal. That is, every triangle is either isosceles, scalene, or equilateral. Since the list of

particulars is convertible with the universal, the minor premise can be converted into “every triangle is either scalene, isosceles, or equilateral” and the list of triangles can be the middle term in a BARBARA syllogism. This is the most perfect kind of induction.

Exercises

Exercise 1. *Analyze the following inductions by converting them into syllogisms.*

1. Since Darwin, Galileo, Einstein, and Newton were not very religious, all great scientists are non-religious.
2. Democracies tend to turn into dictatorships. Think of Athens, Russia, and the Weimar Republic of Germany.
3. Aristotle, Plato, Kant – indeed, all of the great philosophers – wrote very long and very boring books.
4. Catholic universities just cannot compete with secular ones for scholarly prestige. Compare Notre Dame, Georgetown, and Loyola to Harvard, Yale, and Stanford.
5. Large, cold-blooded animals, such as the alligator, crocodile, and monitor lizard, must live in warm climates.

The Argument from Example

Selections from Aristotle's *Prior Analytics*

68b38-69a20

We have an “example” when the major term is proved to belong to the middle by means of a term which resembles the third. It ought to be known both that the middle belongs to the third term, and that the first belongs to that which resembles the third. For example let A be evil, B making war against neighbors, C Athenians against Thebans, D Thebans against Phocians. If then we wish to prove that to fight with the Thebans is an evil, we must assume that to fight against neighbors is an evil. Evidence of this is obtained from similar cases, e.g., that the war against the Phocians was an evil to the Thebans. Since then to fight against neighbors is an evil, and to fight against the Thebans is to fight against neighbors, it is clear that to fight against the Thebans is an evil. Now it is clear that B belongs to C and to D (for both are cases of making war upon one's

neighbors) and that A belongs to D (for the war against the Phocians did not turn out well for the Thebans): but that A belongs to B will be proved through D. Similarly if the belief in the relation of the middle term to the extreme should be produced by several similar cases.

Clearly then to argue by example is neither like reasoning from part to whole, nor like reasoning from whole to part, but rather reasoning from part to part, when both particulars are subordinate to the same term, and one of them is known. It differs from induction, because induction starting from all the particular cases proves (as we saw) that the major term belongs to the middle, and does not apply the syllogistic conclusion to the minor term, whereas argument by example does make this application and does not draw its proof from all the particular cases.

Definitions

example – argument which shows that the major term belongs to the minor by means of a term like the minor term.

Lesson

In the last lesson we looked at induction, a kind of argument that does not conclude with necessity, but only with probability. The next two lessons will also deal with two other kinds of arguments that do not conclude with necessity. These are the example and the enthymeme. We will follow Aristotle's order and take up the example first.

The Argument from Example

Perhaps the easiest way to understand the example is to look at an instance of it, and then analyze that instance. Aristotle's instance relates to Greek politics, so we will slightly modify the argument to make it more contemporary. Suppose that the President of the United States wishes to avoid a war against North Korea. He might want to convince us that such a war would be hard to win. Here is the kind of argument he might use: a war against North Korea would be hard to win because the war against Vietnam was hard to win. How would Aristotle analyze this argument? He would point out that it shows that the major term, “hard to win,” belongs to the minor term, “war against North Korea,” by means of a term, “war against Vietnam,” like the minor term. In other words, since a war against North Korea would be like a war against Vietnam, it would have the same qualities as such a war, namely that it is hard to win.

In what way would North Korea resemble Vietnam in the 1970s? They would both be Communist nations in Asia. There is an unspoken premise in the argument, that it is hard to win

wars against the Communist nations of Asia. “War against a Communist nation in Asia” is thus the middle term. How do we know that such wars are hard to win? Through a mini-induction which uses the term like the minor term. In other words, the example is a combination of a mini-induction that establishes the major premise, and a regular syllogism. We could analyze the argument more fully as follows:

Induction

War against Vietnam was hard to win.

War against Vietnam was war against a Communist nation in Asia.

Therefore, wars against Communist nations in Asia are hard to win.

Syllogism

Wars against Communist nations in Asia are hard to win.

War against North Korea is war against a Communist nation in Asia.

Therefore, a war against North Korea would be hard to win.

The example, then, combines a short induction with a syllogism. In the text at the head of this lesson Aristotle notes the way in which example differs from an induction, and the way it differs from both induction and syllogism. Example differs from induction first because example does not make any attempt to gather a large or complete collection of the particulars – one case is enough. Thus, the example is even less certain than induction. Also, induction does not apply the universal conclusion to the minor term, but an example does. That is, our example is not content to show that wars against Communist nations in Asia are hard to win, as an induction is, but it also applies that universal statement to the minor term, war against North Korea.

Finally, an example differs from both induction and syllogism in terms of the relation between whole and part. Inductions start with very particular premises, and conclude to something universal. Syllogisms start with universal premises, and often come to more particular conclusions. For example, Darapti has two universally affirmative premisses, but only a particular conclusion. But examples start from something particular and conclude to something particular. Therefore we can say that syllogisms argue from whole to the part, inductions argue from part to whole, but examples argue from part to part.

Exercises

Exercise 1: *Logically analyze the following arguments by example.*

1. Like Harvard, Dartmouth tends to attract very talented students.
2. I could not help thinking that George W. Bush, like his father George H.W. Bush, would be an unpopular president.
3. It takes lessons to draw well, just as it does to learn to play the piano.
4. Since moving furniture is such hard work, longshoremen must work very hard.
5. Belloc, like Chesterton, stimulates great enthusiasm among English-speaking Catholics.

Lesson Twenty

The Enthymeme

Selections from Aristotle's *Prior Analytics* 69b3 – 69b38

A probability and a sign are not identical, but a probability is a generally approved statement: what men know to happen or not to happen, to be or not to be, for the most part thus and thus, is a probability, e.g., “the envious hate,” “the beloved show affection.” A sign means a demonstrative statement necessary or generally approved: for anything such that when it is another thing is, or when it has come into being the other has come into being before or after, is a sign of the other's being or having come into being. Now an enthymeme is a syllogism starting from probabilities or signs, and a sign may be taken in three ways, corresponding to the position of the middle term in the figures. For it may be taken as in the first figure or the second or the third.

For example, the proof that a woman is with child because she has milk is in the first figure: for to have milk is the middle term. Let A represent to be with child, B to have milk, C woman. The proof that wise men are good, since Pittacus is good, comes through the last figure. Let A stand for good, B for wise men, C for Pittacus. It is true then to affirm both A and B of C: only men do not say the latter, because they know it, though they state the former. The proof that a woman is with child because she is pale is meant to come through the middle figure: for since

paleness follows women with child and is a concomitant of this woman, people suppose it has been proved that she is with child. Let A stand for paleness, B for being with child, C for woman. Now if the one statement is stated, we have only a sign, but if the other is stated as well, a syllogism, e.g. “Pittacus is generous, since ambitious men are generous and Pittacus is ambitious.” Or again “Wise men are good, since Pittacus is not only good but wise.” In this way then syllogisms are formed, only that which proceeds through the first figure is irrefutable if it is true (for it is universal), that which proceeds through the last figure is refutable even if the conclusion is true, since the syllogism is not universal nor is it correlative to the matter in question: for though Pittacus is good, it is not therefore necessary that all other wise men should be good. But the syllogism which proceeds through the middle figure is always refutable in any case: for a syllogism can never be formed when the terms are related in this way: for though a woman with child is pale, and this woman also is pale, it is not necessary that she should be with child. Truth then may be found in signs whatever their kind, but they have the differences we have stated.

Definitions

enthymeme – imperfect syllogism which takes a sign or a probability as a premise.

probability – statement which men know to be true for the most part.

sign – (1) something which makes another thing known; (2) a statement which shows some other statement to be true.

Lesson

The enthymeme is the last and most frequently misunderstood of the arguments akin to the syllogism. Like induction and example, enthymeme often concludes only with probability. Unlike those arguments, however, the enthymeme sometimes concludes with necessity. In this lesson we will consider the enthymeme and compare it to the syllogism.

The Enthymeme

The enthymeme has often been confused with the abbreviated syllogism, but Aristotle defines the two in entirely distinct ways. The abbreviated syllogism simply leaves one premise understood, but that premise has no special characteristics. The enthymeme, however, may either state both of its premises, or only one, but one of its premises has the distinct character of being either a probability or a sign.

A probability, he explains, is a statement that we know usually to be true, but to which there are exceptions. For example, most envious people hate others and most men show affection to those they love. But these are only probable statements, since sometimes the envious do not hate everyone, nor do those who love always show affection.

In this chapter Aristotle also defines a sign as a kind of statement. This use of the word “sign” is somewhat unusual, so we should compare it to a more basic meaning. In its first meaning, a sign is something that makes something else known. Store signs make known the location of stores, road signs make known the relevant traffic laws, words are signs because they make our ideas known. Through a secondary meaning, a statement is called a sign when it shows that some other statement is true. For example, illness is a state of the body that is often hidden from the external senses. The symptoms of illness – a fever, for example – are not hidden, and so can make known the hidden illness. The statement “This man has a fever,” then, is a sign, in the second sense of the word, that the statement “This man is ill” is true.

Notice that a sign and a probability are two different things. Some signs, such as that fever indicates illness, are not just probable, but necessary. Everyone who has a fever is ill; there are no exceptions. On the other hand, not all probable statements indicate something beyond themselves. In the statement “Envious people hate those they envy,” neither part of the statement makes the other known. In fact, envious people often hide both their envy and their hatred. What both the sign and the probability share, however, is the ability to lead us to a likely conclusion.

Aristotle defines the enthymeme as the syllogism that starts from a probability or a sign. The enthymeme, like the syllogism, has three figures. The middle term can either be the subject of the major premise and predicate of the minor, like the first figure, or the subject of both, like the third figure, or predicate of both, like the second figure.

In the first figure, when we have an infallible sign, we get an enthymeme that is also a true syllogism with a necessary conclusion. For example, if Joe has a fever, then Joe is sick, because fever is an infallible sign of sickness. The conclusion that Joe is sick follows necessarily from the premises. If we have a sign that sometimes fails, such as that a quick pulse indicates sickness (since a quick pulse might be the result of exercise), then we have a good argument with only a probable conclusion.

So much for enthymemes in the first figure. We might argue that good men are wise through a third figure enthymeme. Since the saints are good, and the saints are wise, we might conclude that all good men are wise. Notice, if we analyze this enthymeme syllogistically, we can only conclude with necessity to the particular, that some good men are wise. The enthymeme concludes with probability, but not necessity, to the universal, all good men are wise.

Finally, we might argue in the second figure that a man is sick because he is pale, and sick people are often pale. Again, such an enthymeme does not yield a necessary conclusion. Nevertheless, that the man is pale is a sign that he is probably sick. Thus, we arrive at our

conclusion with probability, not necessity.

Like induction and example, the enthymeme does not usually prove the conclusion, but it gives us good reason to believe that the conclusion is true. Since we have studied some logic, we may be tempted to try to make every argument a syllogism, and to find fault with every argument that is not a syllogism. But that tendency leads us astray; it makes it harder for us to understand the arguments of others and less able to find convincing arguments for our own positions. In fact, often the best argument we can make is merely probable. It is important, therefore, for the student trained in logic to know something about the probable forms argument, induction, example, and enthymeme.

Exercises

Exercise 1: *State whether the argument is a syllogism, an induction, an example, or an enthymeme. Be prepared to explain your answer.*

1. Genus, species, difference, and property exist only in the mind. Genus, species, difference, and property are predicables. Thus, the predicables exist only in the mind.
2. Since no animals contemplate, and no animals are happy, we can conclude that happiness is contemplation.
3. England, France, and Germany are orderly societies that have achieved the good life. Generally, then, orderly societies achieve the good life for their citizens.
4. Just as the body comes before the foot, so the state comes before the family.
5. The virtuous man gladly abstains from an unjust profit. Since Socrates gladly abstains from an unjust profit, he seems to be virtuous.
6. Since all men desire happiness, some who desire happiness are virtuous.
7. Food, clothing, and shelter are economic goods, and all three have two uses – their own use and exchange. Therefore, all economic goods have two uses: their own and for exchange.
8. Since friends possess all things in common, so should the citizens of the same country.
9. Just as stones cannot be trained to fall upward, so men cannot be trained to hate pleasure.
10. Since Socrates breaks out in hives when stung by a bee, he must be allergic to bee-stings.
11. Since the god-like man is rarely found, so also is the entirely brutish man rarely found.

12. The power outside the universe could only show itself by putting order within the universe. Since universe has order, there must be some power controlling the universe.
13. Iron is a metal, and so aluminum must also be a metal.
14. Since iron, steel, aluminum, and nickel can all be sharpened, all metals must be able to be sharpened.
15. Since aluminum is bright and shiny, aluminum must be a metal.
16. Just as some who act justly do not have the virtue of justice, so some who act wisely do not have the virtue of wisdom.
17. Frogs, toads, and newts are born with gills. Therefore, all amphibians are born with gills.
18. Since every state is a community, and every community aims at some good, every state aims at some good.
19. Since it is cloudy outside, it is going to rain.
20. Since the squares of one, two, three, and four differ from each other according to the series of odd numbers, so do all squares differ from each other according to the series of odd numbers.

Lesson Twenty-One
Plato's *Meno*

Selections: 80 – 100
translated by Benjamin Jowett

Soc. In order that I might make another simile about you. For I know that all pretty young gentlemen like to have pretty similes made about them – as well they may – but I shall not return the compliment. As to my being a torpedo fish, if the torpedo fish is numb as well as the cause of numbness in others, then indeed I am a torpedo fish, but not otherwise; for I perplex others, not because I am clear, but because I am utterly perplexed myself. And now I know not what virtue is, and you seem to be in the same case, although you did once perhaps know before you touched me. However, I have no objection to join with you in the enquiry.

Men. And how will you enquire, Socrates, into that which you do not know? What will you put forth as the subject of enquiry? And if you find what you want, how will you ever know that this is the thing which you did not know?

Soc. I know, Meno, what you mean; but just see what a tiresome dispute you are introducing. You argue that a man cannot enquire either about that which he knows, or about that which he does not know; for if he knows, he has no need to enquire; and if not, he cannot; for he does not know the very subject about which he is to enquire. [81]

Men. Well, Socrates, and is not the argument sound?

Soc. I think not.

Men. Why not?

Soc. I will tell you why: I have heard from certain wise men and women who spoke of things divine that –

Men. What did they say?

Soc. They spoke of a glorious truth, as I conceive.

Men. What was it? and who were they?

Soc. Some of them were priests and priestesses, who had studied how they might be able to give a reason of their profession: there have been poets also, who spoke of these things by inspiration, like Pindar, and many others who were inspired. And they say – mark, now, and see whether their words are true – they say that the soul of man is immortal, and at one time has an end, which is termed dying, and at

another time is born again, but is never destroyed; and the moral is, that a man ought to live always in perfect holiness.

“For in the ninth year Persephone sends the souls of those from whom she has received the penalty of ancient crime back again from beneath into the light of the sun above, and these are they who become noble beings and mighty men and great in wisdom and are called saintly heroes in after ages.”

The soul, then, as being immortal, and having been born again many times, and having seen all things that exist, whether in this world or in the world below, has knowledge of them all; and it is no wonder that she should be able to call to remembrance all that she ever knew about virtue, and about everything; for as all nature is akin, and the soul has learned all things, there is no difficulty in her eliciting or as men say learning, out of a single recollection all the rest, if a man is strenuous and does not faint; for all enquiry and all learning is but recollection. And therefore we ought not to listen to this sophistical argument about the impossibility of enquiry: for it will make us idle, and is sweet only to the sluggard; but the other saying will make us active and inquisitive. With such confidence, I will gladly enquire with you into the nature of virtue.

Men. Yes, Socrates; but what do you mean by saying that we do not learn, and that what we call learning is only a process of recollection? Can you teach me how this is?

Soc. I told you, Meno, just now that you were a rogue, and now you ask whether I can teach you, when I am saying that there is no teaching, [82] but only recollection; and thus you imagine that you will involve me in a contradiction.

Men. Indeed, Socrates, I protest that I had no such intention. I only asked the question from habit; but if you can prove to me that what you say is true, I wish that you would.

Soc. It will be no easy matter, but I will try to please you to the utmost of my power. Suppose that

you call one of your numerous attendants, that I may demonstrate on him.

Men. Certainly. Come hither, boy.

Soc. He is Greek, and speaks Greek, does he not?

Men. Yes, indeed; he was born in the house.

Soc. Attend now to the questions which I ask him, and observe whether he learns of me or only remembers.

Men. I will.

Soc. Tell me, boy, do you know that a figure like this is a square?

[Socrates asks numerous questions, and by the end, the slave boy figures out how to double a given square.]

Soc. What do you say of him, Meno? Were not all these answers given out of his own head?

Men. Yes, they were all his own.

Soc. And yet, as we were just now saying, he did not know?

Soc. But still he had in him those notions of his, had he not?

Men. Yes.

Soc. Then he who does not know may still have true notions of that which he does not know?

Men. He has.

Soc. And at present these notions have just been stirred up in him, as in a dream; but if he were frequently asked the same questions, in different forms, he would know as well as any one at last?

Men. I dare say.

Soc. Without any one teaching him he will recover his knowledge for himself, if he is only asked questions?

Men. Yes.

Soc. And this spontaneous recovery of knowledge in him is recollection?

Men. True.

Soc. And this knowledge which he now has must he not either have acquired or always possessed?

Men. Yes.

Soc. But if he always possessed this knowledge he would always have known; or if he has acquired the knowledge he could not have acquired it in this life, unless he has been taught geometry; for he may be made to do the same with all geometry and every other branch of knowledge. Now, has any one ever taught him all this? You must know about him, if, as you say, he was born and bred in your house.

Men. And I am certain that no one ever did teach him.

Soc. And yet he has the knowledge?

Men. The fact, Socrates, is undeniable

Soc. But if he did not acquire the knowledge in this life, then he must have had and learned it at some other time? **[86]**

Men. Clearly he must.

Soc. Which must have been the time when he was not a man?

Men. Yes.

Soc. And if there have been always true thoughts in him, both at the time when he was and was not a man which only need to be awakened into knowledge by putting questions to him, his soul must have always possessed this knowledge, for he always either was or was not a man?

Men. Obviously.

Soc. And if the truth of all things always existed in the soul, then the soul is immortal. Wherefore be glad, and try to recollect what you do not know, or rather what you do not remember.

Men. I feel, somehow, that I like what you are saying.

Soc. And I, Meno, like what I am saying. Some things I have said of which I am not altogether confident. But that we shall be better and braver and less helpless if we think that we ought to enquire, than we should have been if we indulged in the idle fancy that there was no knowing and no use in seeking to know what we do not know; that is a theme upon which I am ready to fight, in word and deed, to the utmost of my power.

Men. There again, Socrates, your words seem to me excellent.

Soc. Then, as we are agreed that a man should enquire about that which he does not know, shall you and I make an effort to enquire together into the nature of virtue?

Men. By all means, Socrates. And yet I would much rather return to my original question, whether in seeking to acquire virtue we should regard it as a thing to be taught, or as a gift of nature, or as coming to men in some other way?

Soc. Had I the command of you as well as of myself, Meno, I would not have enquired whether virtue is given by instruction or not, until we had first ascertained "what it is." But as you think only of controlling me who am your slave, and never of controlling yourself, such being your notion of freedom, I must yield to you, for you are irresistible. And therefore I have now to enquire into the qualities of a thing of which I do not as yet know the nature. At any rate, will you condescend a little, and allow

the question “Whether virtue is given by instruction, or in any other way,” to be argued upon hypothesis? [87] As the geometer, when he is asked whether a certain triangle is capable of being inscribed in a certain circle, will reply I cannot tell you as yet; but I will offer a hypothesis which may assist us in forming a conclusion: If the figure be such that when you have produced a given side of it, the given area of the triangle falls short by an area corresponding to the part produced, then one consequence follows, and if this is impossible then some other; and therefore I wish to assume a hypothesis before I tell you whether this triangle is capable of being inscribed in the circle – that is a geometrical hypothesis – and we too, as we know not the nature and qualities of virtue, must ask, whether virtue is or is not taught, under a hypothesis: as thus, if virtue is of such a class of mental goods, will it be taught or not? Let the first hypothesis be that virtue is or is not knowledge, in that case will it be taught or not? or, as we were just now saying, *remembered*? For there is no use in disputing about the name. But is virtue taught or not? or rather, does not everyone see that knowledge alone is taught?

Men. I agree.

Soc. Then if virtue is knowledge, virtue will be taught?

Men. Certainly.

Soc. Then now we have made a quick end of this question: if virtue is of such a nature, it will be – taught; and if not, not?

Men. Certainly.

Soc. The next question is, whether virtue is knowledge or of another species?

Men. Yes, that appears to be the question which comes next in order.

Soc. Do we not say that virtue is a good? This is a hypothesis which is not set aside.

Men. Certainly.

Soc. Now, if there be any sort of good which is distinct from knowledge, virtue may be that good; but if knowledge embraces all good, then we shall be right in thinking that virtue is knowledge?

Men. True.

Soc. And virtue makes us good?

Men. Yes.

Soc. And if we are good, then we are profitable; for all good things are profitable.

Men. Yes.

Soc. Then virtue is profitable?

Men. That is the only inference.

Soc. Then now let us see what are the things which severally profit us. Health and strength, and

beauty and wealth, these and the like of these, we call profitable?

Men. True. [88]

Soc. And yet these things may also sometimes do us harm: would you not think so?

Men. Yes.

Soc. And what is the guiding principle which makes them profitable or the reverse? Are they not profitable when they are rightly used, and hurtful when they are not rightly used?

Men. Certainly.

Soc. Next, let us consider the goods of the soul: they are temperance, justice, courage, quickness of apprehension, memory, magnanimity, and the like?

Men. Surely.

Soc. And such of these as are not knowledge, but of another sort, are sometimes profitable and sometimes hurtful; as, for example, courage wanting prudence, which is only a sort of confidence? When a man has no sense he is harmed by courage, but when he has sense he is profited?

Men. True.

Soc. And the same may be said of temperance and quickness of apprehension; whatever things are learned or done with sense are profitable, but when done without sense they are hurtful?

Men. Very true.

Soc. And in general, all that the soul attempts or endures, when under the guidance of wisdom, ends in happiness; but when she is under the guidance of folly, in the opposite?

Men. That appears to be true.

Soc. If then virtue is a quality of the soul, and is admitted to be profitable, it must be wisdom or prudence, since none of the things of the soul are either profitable or hurtful in themselves, but they are all made profitable or hurtful by the addition of wisdom or of folly; and therefore if virtue is profitable, virtue must be a sort of wisdom or prudence?

Men. I quite agree.

Soc. And the other goods, such as wealth and the like, of which we were just now saying that they are sometimes good and sometimes evil, do not they also become profitable or hurtful, accordingly as the soul guides and uses them rightly or wrongly; just as the things of the soul herself are benefitted when under the guidance of wisdom and harmed by folly?

Men. True.

Soc. And the wise soul guides them rightly, and the foolish soul wrongly.

Men. Yes.

Soc. And is not this universally true of human nature? All other things hang upon the soul, and the things of the soul herself hang upon wisdom, [89] if they are to be good; and so wisdom is inferred to be that which profits and virtue, as we say, is profitable?

Men. Certainly.

Soc. And thus we arrive at the conclusion that virtue is either wholly or partly wisdom?

Men. I think that what you are saying, Socrates, is very true.

Soc. But if this is true, then the good are not by nature good?

Men. I think not.

Soc. If they had been, there would assuredly have been discerners of characters among us who would have known our future great men; and on their showing we should have adopted them, and when we had got them, we should have kept them in the citadel out of the way of harm, and set a stamp upon them far rather than upon a piece of gold, in order that no one might tamper with them; and when they grew up they would have been useful to the state?

Men. Yes, Socrates, that would have been the right way.

Soc. But if the good are not by nature good, are they made good by instruction?

Men. There appears to be no other alternative, Socrates. On the supposition that virtue is knowledge, there can be no doubt that virtue is taught.

Soc. Yes, indeed; but what if the supposition is erroneous?

Men. I certainly thought just now that we were right.

Soc. Yes, Meno; but a principle which has any soundness should stand firm not only just now, but always.

Men. Well; and why are you so slow to believe that knowledge is virtue?

Soc. I will try and tell you why, Meno. I do not retract the assertion that if virtue is knowledge it may be taught; but I fear that I have some reason in doubting whether virtue is knowledge: for consider now and say whether virtue, and not only virtue but anything that is taught, must not have teachers and disciples?

Men. Surely.

Soc. And conversely, may not the art of which neither teachers nor disciples exist be assumed to be incapable of being taught?

Men. True; but do you think that there are no teachers of virtue?

Soc. I have certainly often enquired whether

there were any, and taken great pains to find them, and have never succeeded; and many have assisted me in the search, and they were the persons whom I thought the most likely to know. Meanwhile I will return to you, Meno; for suppose that there are gentlemen in your region too?

Men. Certainly there are.

Soc. And are they willing to teach the young? and do they profess to be teachers? and do they agree that virtue is taught?

Men. No indeed, Socrates, they are anything but agreed. You may hear them saying at one time that virtue can be taught, and then again the reverse.

Soc. Can we call those teachers who do not acknowledge the possibility of their own vocation?

Men. I think not, Socrates.

Soc. And what do you think of these Sophists, who are the only professors? Do they seem to you to be teachers of virtue?

Men. I often wonder, Socrates, that Gorgias is never heard promising to teach virtue: and when he hears others promising he only laughs at them; but he thinks that men should be taught to speak.

Soc. Then do you not think that the Sophists are teachers?

Men. I cannot tell you, Socrates; like the rest of the world, I am in doubt, and sometimes I think that they are teachers and sometimes not.

Soc. And are you aware that not you only and other politicians have doubts whether virtue can be taught or not, but that Theognis the poet says the very same thing?

Men. Where does he say so?

Soc. In these elegiac verses:

Eat and drink and sit with the mighty, and make yourself agreeable to them; for from the good you will learn what is good, but if you mix with the bad you will lose the intelligence which you already have.

Do you observe that here he seems to imply that virtue can be taught?

Men. Clearly.

Soc. But in some other verses he shifts about and says:

If understanding could be created and put into a man, then they [who were able to perform this feat] would have obtained great reward.

And again: [96]

Never would a bad son have sprung from a good sire, for he would have heard the voice of instruction; but not by teaching will you ever make a bad man into a good one.

And this, as you may say, is a contradiction of the other.

Men. Clearly.

Soc. And is there anything else of which the professors are affirmed not only not to be teachers of others, but to be ignorant themselves and bad at the knowledge of that which they are professing to teach? Or is there anything about which even the acknowledged “gentlemen” are sometimes saying that “this thing can be taught,” and sometimes the opposite? Can you say that they are teachers in any true sense whose ideas are in such confusion?

Men. I should say, certainly not.

Soc. But if neither the Sophists nor the gentlemen are teachers, clearly there can be no other teachers?

Men. No.

Soc. And if there are no teachers, neither are there disciples?

Men. Agreed.

Soc. And we have admitted that a thing can not be taught, of which there are neither teachers nor disciples?

Men. We have.

Soc. And there are no teachers of virtue to be found anywhere?

Men. There are not.

Soc. And if there, are no teachers, neither are there scholars?

Men. That, I think, is true.

Soc. Then virtue cannot be taught?

Men. Not if we are right in our view. But I cannot believe, Socrates, that there are no good men: And if there are, how did they come into existence?

Soc. I am afraid, Meno, that you and I are not good for much, and that Gorgias has been is as poor an educator of you as Prodicus has been of me. Certainly we shall have to look to ourselves, and try to find some one who will help in some way or other to improve us. This I say, because I observe that in the previous discussion none of us remarked that right and good action is possible to man under other guidance than that of knowledge (*episteme*); and indeed if this be denied, there is no seeing how there can be any good men at all.

Men. How do you mean, Socrates?

Soc. I mean that good men are necessary, useful, or profitable. [97] Were we not right in admitting this? It must be so.

Men. Yes.

Soc. And in supposing that they will be useful only if they are true guides to us of action, here we were also right?

Men. Yes.

Soc. But when we said that a man cannot be a good guide unless he have knowledge (*phronesis*), in this we were wrong.

Men. What do you mean by the word “true guide”?

Soc. I will explain. If a man knew the way to Larisa, or anywhere else, and went to the place and led others thither, would he not be a right and good guide?

Men. Certainly.

Soc. And a person who had a right opinion about the way, but had never been and did not know, might be a good guide also, might he not?

Men. Certainly.

Soc. And while he has true opinion about that which the other knows, he will be just as good a guide if he thinks the truth, as he who knows the truth?

Men. Exactly.

Soc. Then true opinion is as good a guide to correct action as knowledge; and that was the point which we omitted in our speculation about the nature of virtue, when we said that knowledge only is the guide of right action; whereas there is also right opinion.

Men. True.

Soc. Then right opinion is not less useful than knowledge?

Men. The difference, Socrates, is only that he who has knowledge will always be right; but he who has right opinion will sometimes be right, and sometimes not.

Soc. What do you mean? Can he be wrong who has right opinion, so long as he has right opinion.

Men. I admit the cogency of your argument, and therefore, Socrates, I wonder that knowledge should be preferred to right opinion or why they should ever differ.

Soc. And shall I explain this wonder to you?

Men. Do tell me.

Soc. You would not wonder if you had ever observed the images of Daedalus; but perhaps you have not got them in your country?

Men. What have they to do with the question?

Soc. Because they require to be fastened in order to keep them, and if they are not fastened they will play truant and run away.

Men. Well, what of that?

Soc. I mean to say that they are not very valuable possessions if they are at liberty, for they will walk off like runaway slaves; but when fastened, they are of great value, for they are really beautiful works of art. [98] Now this is an illustration of the nature of true opinions: while they abide with us they are beautiful and fruitful, but they run away out of the human soul, and do not remain long, and therefore they are not of much value until they are fastened by the tie of an account; and this fastening of them, friend Meno, is recollection, as you and I have agreed to call it. But when they are bound, in the first place, they have the nature of knowledge; and, in the second place, they are abiding. And this is why knowledge is more honorable and excellent than true opinion, because fastened by a chain.

Men. What you are saying, Socrates, seems to be very like the truth.

Soc. I too speak rather in ignorance; I only conjecture. And yet that knowledge differs from true opinion is no matter of conjecture with me. There are not many things which I profess to know, but this is most certainly one of them.

Men. Yes, Socrates; and you are quite right in saying so.

Soc. And am I not also right in saying that true opinion leading the way perfects action quite as well as knowledge?

Men. There again, Socrates, I think you are right.

Soc. Then right opinion is not a whit inferior to knowledge, or less useful in action; nor is the man who has right opinion inferior to him who has knowledge?

Men. True.

Soc. And surely the good man has been acknowledged by us to be useful?

Men. Yes.

Soc. Seeing then that men become good and useful to states, not only because they have knowledge, but because they have right opinion, and that neither knowledge nor right opinion is given to man by nature or acquired by him – Do you imagine either of them to be given by nature?

Men. Not I.

Soc. Then if they are not given by nature, neither are the good by nature good?

Men. Certainly not.

Soc. And nature being excluded, then came the question whether virtue is acquired by teaching?

Men. Yes.

Soc. If virtue was wisdom [or knowledge], then, as we thought, it was taught?

Men. Yes.

Soc. And if it was taught it was wisdom?

Men. Certainly.

Soc. And if there were teachers, it might be taught; and if there were no teachers, not?

Men. True.

Soc. But surely we acknowledged that there were no teachers of virtue?

Men. Yes.

Soc. Then we acknowledged that it was not taught, and was not wisdom?

Men. Certainly.

Soc. And yet we admitted that it was a good?

Men. Yes. [99]

Soc. And the right guide is useful and good?

Men. Certainly.

Soc. And the only right guides are knowledge and true opinion; these are the guides of man; for things which happen by chance are not under the guidance of man, but the guides of man are true opinion and knowledge.

Men. I think so too.

Soc. But if virtue is not taught, neither is virtue knowledge.

Men. Clearly not.

Soc. Then of two good and useful things, one, which is knowledge, has been set aside, and cannot be supposed to be our guide in political life.

Men. I think not.

Soc. And therefore not by any wisdom, and not because they were wise, did Themistocles and those others of whom Anytus spoke govern states. This was the reason why they were unable to make others like themselves – because their virtue was not grounded on knowledge.

Men. That is probably true, Socrates.

Soc. But if not by knowledge, the only alternative which remains is that statesmen must have guided states by right opinion, which is in politics what divination is in religion; for diviners and also prophets say many things truly, but they know not what they say.

Men. So I believe.

Soc. And may we not, Meno, truly call those men "divine" who, having no understanding, yet succeed in many a grand deed and word?

Men. Certainly.

Soc. Then we shall also be right in calling divine those whom we were just now speaking of as diviners and prophets, including the whole tribe of poets. Yes, and statesmen above all may be said to be divine and illumined, being inspired and possessed of God, in which condition they say many grand things, not knowing what they say.

Men. Yes.

Soc. And the women too, Meno, call good men divine, do they not? and the Spartans, when they praise a good man, say “he is a divine man.”

Men. And I think, Socrates, that they are right; although very likely our friend Anytus may take offence at the word.

Soc. I do not care; as for Anytus, there will be another opportunity of talking with him. To sum up our enquiry, the result seems to be, if we are at all right in our view, that virtue is neither natural nor acquired, [100] but an instinct given by God to the

virtuous. Nor is the instinct accompanied by reason, unless there may be supposed to be among statesmen some one who is capable of educating statesmen. And if there be such an one, he may be said to be among the living what Homer says that Tiresias was among the dead, “he alone has understanding; but the rest are flitting shades”; and he and his virtue in like manner will be a reality among shadows.

Men. That is excellent, Socrates.

Soc. Then, Meno, the conclusion is that virtue comes to the virtuous by the gift of God. But we shall never know the certain truth until, before asking how virtue is given, we enquire into the actual nature of virtue. I fear that I must go away, but do you, now that you are persuaded yourself, persuade our friend Anytus. And do not let him be so exasperated; if you can conciliate him, you will have done good service to the Athenian people.¹

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What is the problem that Meno proposes at the beginning of this reading?
2. How does Socrates attempt to answer this problem?
3. How does Socrates argue that virtue is knowledge?
4. How does Socrates argue that virtue is not knowledge?
5. What does Socrates think that the difference between knowledge and true opinion is?

¹ Plato. *Meno*. Translated by Benjamin Jowett. New York: C. Scribner’s Sons, 1871.

Lesson Twenty-Two

Demonstration: Its Definition

Selections from Aristotle's *Posterior Analytics*

translated by G. R. G. Mure

71a1 – 72a8

All instruction given or received by way of argument proceeds from pre-existent knowledge. This becomes evident upon a survey of all the species of such instruction. The mathematical sciences and all other speculative disciplines are acquired in this way, and so are the two forms of dialectical reasoning, syllogistic and inductive; for each of these latter make use of old knowledge to impart new, the syllogism assuming an audience that accepts its premises, induction exhibiting the universal as implicit in the clearly known particular. Again, the persuasion exerted by rhetorical arguments is in principle the same, since they use either example, a kind of induction, or enthymeme, a form of syllogism.

The pre-existent knowledge required is of two kinds. In some cases admission of the fact must be assumed, in others comprehension of the meaning of the term used, and sometimes both assumptions are essential. Thus, we assume that every predicate can be either truly affirmed or truly denied of any subject, and that “triangle” means so and so; as regards “unit” we have to make the double assumption of the meaning of the word and the existence of the thing. The reason is that these several objects are not equally obvious to us. Recognition of a truth may in some cases contain as factors both previous knowledge and also knowledge acquired simultaneously with that recognition – knowledge, this latter, of the particulars actually falling under the universal and therein already virtually known.

For example, the student knew beforehand that the angles of every triangle are equal to two right angles; but it was only at the actual moment at which he was being led on to recognize this as true in the instance before him that he came to know “this figure inscribed in the semicircle” to be a triangle. For some things (viz., the singulars finally reached which are not predicable of anything else as subject) are only learned in this way, i.e., there is here no recognition through a middle of a minor term as subject to a major. Before he was led on to recognition or before he actually drew a conclusion, we should perhaps say that in a manner he knew, in a manner not.

If he did not in an unqualified sense of the term know the existence of this triangle, how could he know without qualification that its angles were equal to two right angles? No: clearly he knows not without qualification but only in the sense that he knows universally. If this distinction is not drawn, we are faced with the dilemma in the Meno: either a man will learn nothing or what he already knows.

We suppose ourselves to possess certain knowledge of a thing, as opposed to knowing it in the accidental way in which the sophist knows, when we think that we know the cause on which the fact depends, as the cause of that fact and of no other, and, further, that the fact could not be other than it is. There may be another manner of knowing as well – that will be discussed later. By demonstration I mean a syllogism productive of certain knowledge, a syllogism, that is, the grasp of which is in itself such knowledge. Assuming then that my thesis as to the nature of certain knowing is correct, the premises of demonstrated knowledge must be true, first, immediate, better known than and before the conclusion, which is further related to them as effect to cause. Unless these conditions are satisfied, the principles will not be “proper” to the conclusion. Syllogism there may indeed be without these conditions, but such syllogism, not being productive of certain knowledge, will not be demonstration.

The premises must be true: for that which is non-existent cannot be known – we cannot know, e.g., that the diagonal of a square is commensurate with its side.

The premises must be first and indemonstrable; otherwise they will require demonstration in order to be known, since to have knowledge, if it be not accidental knowledge, of things which are demonstrable, means precisely to have a demonstration of them.

The premises must be the causes of the conclusion, better known than it, and before it; its causes, since we possess certain knowledge of a thing only when we know its cause; before, in order to be causes; known before, this knowing before being not our mere understanding of the meaning, but knowledge of the

fact as well.

Now “before” and “better known” are ambiguous terms, for there is a difference between what is before and better known in the order of being and what is before and better known to man. I mean that objects nearer to sense are before and better known to man; objects without qualification before and better known are those further from sense. Now the most universal

causes are furthest from sense and particular causes are nearest to sense, and they are thus exactly opposed to one another. In saying that the premises of demonstrated knowledge must be first, I mean that they must be the “proper” principles, for I identify first premise and principle. A “principle” in a demonstration is an immediate statement. An immediate statement is one that has no other statement before it.¹

Definitions

certain knowledge (episteme) – knowledge of the cause of a fact as the cause of that fact and no other, and knowledge that the fact cannot be otherwise.

demonstration – a syllogism which gives us certain knowledge.

true – conforming with reality.

first – coming before everything, after nothing.

immediate – not known through a middle term.

indemonstrable – not able to be the conclusion of a demonstration.

cause – the reason why.

before – (1) as cause; (2) in knowledge.

better known – (1) in itself; (2) to men.

principle – first premise in demonstrative science.

Lesson

In the *Prior Analytics*, Aristotle taught about the validity of the syllogism. We must remember that a syllogism can be valid even if the premises and the conclusion are false, since a syllogism is valid merely when the conclusion follows from its premises. In the *Posterior Analytics*, Aristotle discusses a special kind of syllogism – that whose premises are known to be true. Such syllogisms are called demonstrations. For the next five lessons, then, we will be discussing Aristotle's theory of demonstration. In this lesson, we will analyze his definition of demonstration as the solution to the problem of Meno.

Meno's Problem

In *Meno*, Socrates and Meno discuss the problem of learning. If one does not already know a fact, Meno asks, how can one learn that the fact is true? It seems that we can only learn things we already know. But since there is no need to learn what we already know, it seems Meno is forced to conclude that learning is impossible.

Socrates tries to solve the problem using the theory of recollection. The soul already knows all things from its existence prior to birth; but it forgets that knowledge at birth and, so must painfully regain it during life on earth. But that answer, besides depending upon a dubious view of the human soul, does not explain learning, but rather explains learning away. In truth, learning is not uncovering what one already knows; instead it is gathering new knowledge. Thus, under the theory of recollection, no man truly learns, because no one goes from not knowing something to knowing it.

Aristotle gives a preliminary answer to Meno's problem that preserves the reality of

learning. He grants that the learner must know *something* before he learns, but he points out that the learner does not have to know the *same* fact that he learns. Instead, he must know some other fact through which he comes to know the fact which he learns. For example, the student of geometry knows that all triangles have 180° , but he does not know that triangle ZXY exists. When ZXY is shown to him, he learns that it has 180° . He learns that fact precisely because of his previous knowledge of another connected fact, that all triangles have 180° . His pre-existing knowledge, then, makes it possible to acquire new knowledge.

Definition of Demonstration

After he has given a preliminary solution to the problem of Meno, Aristotle goes on to give a fuller account. That fuller account is the theory of demonstration, the way to acquire certain knowledge. The word “demonstration” means “showing.” For example, when we demonstrate a gadget, we *show* how it works. Similarly, when we demonstrate a fact, we *show* that the fact is true. Aristotle points out that we get knowledge of a new fact when we are *shown* that fact through knowledge of an old fact.

Someone might ask, “How can we get knowledge of a new fact through our knowledge of an old fact?” Aristotle’s answer is the syllogism. If the new fact necessarily follows from two old facts, knowledge of the new fact comes from combining the old facts into a syllogism. For example, if I know that every triangle has three sides, and every three-sided figure will have 180° , by putting those two facts together in a syllogism, I get knowledge of the fact that triangles have 180° .

We can conclude, then, that the genus of the demonstration is the syllogism. Now we must identify the specific difference. In this case, Aristotle gives many specific differences, but in a certain order. He starts with what is clearest to us and moves to what is less obvious. First, demonstration differs from other syllogisms because, while others may give us good opinions, bad opinions, or even no opinions, demonstration gives us knowledge that is certain. The specific difference of demonstration, then, is that it “gives knowledge that is certain.”

What is certain knowledge? Aristotle explains that certain knowledge is knowledge of why something is true; that is, it is knowledge of the cause. For example, someone very trustworthy might tell me that triangles have angles equal to 180° . I might believe what he says, use it in my engineering class, and never have a problem. But I cannot be said to “know for certain” that this fact is true because I do not know *why* it is true. I know something, then, in the most complete way, when I know its cause – the reason *why* it is true.

Aristotle says that every demonstration gives certain knowledge. Consequently, not every set of premises can be used in a demonstration; and so we must ask what kind of premises a demonstration must have. Aristotle assigns three basic qualities to those premises: they must be true, they must be immediate, and they must come before the conclusion.

The premises must be true, but not just because the conclusion must be true. After all, we can get a true conclusion from false premises. The premises must be true because only through true premises can one *know* that the conclusion is true. But as the definition tells us, demonstration gives certain knowledge. Thus, the premises of a demonstration must be true.

The premises must also be immediate. Immediate means that they are not known through a middle term. Since every syllogism has a middle term, the conclusion of a syllogism is never

immediate. If premises were always the conclusion of a syllogism, they would have to be demonstrated themselves, and we would end up going back to the premises of premises of premises, *ad infinitum*. Therefore, we must come back to some first premises of demonstration, which are never themselves demonstrated. Such indemonstrable premises are called “principles” or “first principles.”

It is true that one can have a demonstration that proceeds from previously proven conclusions. For example, the later theorems in geometry use the earlier ones as premises. But they can do that only because the earlier ones had already been proven. Every theorem in geometry can finally be traced back to the first principles of geometry, which are not demonstrable.

Finally, the premises must come before the conclusion. As we saw in the first part of logic, the word “before” has four basic meanings. Aristotle uses two of them here. The premises must come before the conclusion as cause comes before effect. That is because the premises give us certain knowledge, and certain knowledge comes when we know through the cause.

Also, the premises must come before the conclusion in knowledge. That is, I must know the premises in order to know the conclusion, though I might know the premises and yet still not know the conclusion. For example, I might know that a triangle has three sides, yet I might not know that a triangle has angles equal to 180°. Notice that the “before” in knowledge is not the same as the “before” in time. In fact, I might come to know the premise at the same time as the conclusion. Yet if the premise can be known without the conclusion, it still comes before it in knowledge.

In working these things out, Aristotle points out a potential problem. What is more known to us is what is closer to our senses, since we come to know through our senses. But the first causes of all things are the things farthest removed from the senses. Therefore, what comes before in cause comes after in our knowledge, and what comes after in cause comes first in our knowledge. It seems, then, that no premise could ever be suitable for demonstration, and thus demonstration is impossible. We will look at Aristotle’s solution to this problem in Lesson 22.

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What is demonstration? Point out the genus and the specific difference.
2. How does demonstration solve Meno’s problem of learning?
3. What kind of premises must the demonstrative syllogism have?
4. Why must the principles of demonstration be true?
5. Why must the principles be immediate?

6. What does Aristotle mean when he says that the principles must “come before” the conclusion?
7. Given what Aristotle has said so far, could he demonstrate the existence of God?

¹ Aristotle. “Posterior Analytics.” Translated by G. R. G. Mure. *The Works of Aristotle*, vol. 1, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Twenty-Three

The Premises and Conclusions of Demonstration

Selections from Aristotle's *Posterior Analytics*

73a22 – 74a4

Since the object of certain knowledge cannot be other than it is, the truth obtained by demonstrative knowledge will be necessary. And since demonstrative knowledge is only present when we have a demonstration, it follows that demonstration is an inference from necessary premises. So we must consider what are the premises of demonstration – i.e., what is their character: and as a preliminary, let us define what we mean by an attribute “true in every instance of its subject”, an “essential” attribute, and a “commensurate and universal” attribute. I call “true in every instance” what is truly predicable of all instances – not of one to the exclusion of others – and at all times, not at this or that time only; e.g., if animal is truly predicable of every instance of man, then if it be true to say “this is a man,” “this is an animal” is also true, and if the one be true now the other is true now.

Essential attributes are (1) such as belong to their subject as elements in its essential nature (e.g., line thus belongs to triangle; for the very being or “substance” of triangle is composed of these elements, which are contained in the formula defining triangle); (2) such that, while they belong to certain subjects, the subjects to which they belong are contained in the attribute's own defining formula. Thus straight and curved belong to line, odd and even to number; and also the definition of any one of these attributes contains its subject – e.g., the definition of curved contains line, those of odd and even contain number. Extending this classification to all other attributes, I distinguish those that answer the above description as belonging essentially to their respective subjects; whereas attributes related in neither of these two ways to their subjects I call accidents or “coincident”; e.g., musical or white is a “coincident” of animal.

So far then as concerns the sphere of connections known with certainty in the unqualified sense of that term, all attributes which (within that sphere) are essential either in the sense that their subjects are contained in them, or in the sense that they are contained in their subjects, are necessary. For it is

impossible for them not to inhere in their subjects either simply or in the qualified sense that one or the other of a pair of opposites must inhere in the subject; e.g., in line must be either straightness or curvature, in number either oddness or evenness. For within a single identical genus the contrary of a given attribute is either its privative or its contradictory; e.g., within number what is not odd is even, inasmuch as within this sphere even is a necessary consequent of not-odd. So, since any given predicate must be either affirmed or denied of any subject, essential attributes must inhere in their subjects of necessity. Thus, then, we have established the distinction between the attribute which is “true in every instance” and the “essential” attribute.

I call an attribute “commensurately universal” which can be shown to belong to any random instance of that subject, and when the subject is the first thing to which it can be shown to belong. Thus, e.g., (1) the equality of its angles to two right angles is not a commensurately universal attribute of figure. For though it is possible to show that a figure has its angles equal to two right angles, this attribute cannot be demonstrated of any figure selected at random, nor in demonstrating does one take a figure at random – a square is a figure, but its angles are not equal to two right angles. On the other hand, any isosceles triangle has its angles equal to two right angles, yet isosceles triangle is not the primary subject of this attribute but triangle comes first. So whatever can be shown to have its angles equal to two right angles, or to possess any other attribute, in any random instance of itself and primarily – that is the first subject to which the predicate in question belongs commensurately and universally, and the demonstration, in the essential sense, of any predicate is the proof of it as belonging to this first subject commensurately and universally: while the proof of it as belonging to the other subjects to which it attaches is demonstration only in a secondary and unessential sense. Nor again (2) is equality to two right angles a commensurately universal attribute of isosceles; it is of wider application.

Definitions

necessary – a statement is necessary when it must be true or when it cannot be false.

true in every instance – when a subject belongs to every particular or individual at all times.

essential – statement in which (1) the predicate is in the definition of the subject; or (2) the subject is in the definition of the predicate; or (3) the predicate is related to the subject as the effect is related to its agent cause.

commensurately universal – when the predicate belongs to all of that subject and only that subject; the subject and predicate are convertible.

Lesson

In the previous lesson, we discussed the defining characteristics of the first principles of demonstration. In this lesson, we will look at the four properties of the statements in a demonstration. Three of these properties belong to both the premises and conclusion, while the fourth belongs to the first principles.

Certain knowledge is the goal of demonstration. But to be certain means to be stable and unchanging. Thus, demonstration must give us knowledge of facts that cannot be otherwise. These facts are called necessary truths. Thus, the conclusion of a demonstration is a necessary truth. We cannot, however, reason to necessary conclusions from premises that are not necessary. For example, we cannot know that all triangles have angles equal to two right angles if our only evidence for the fact is “This blue thing has 180°.” The blue thing might cease to have 180°, but triangles never cease to have 180°. Therefore, both the conclusion and the premises of a demonstration must be necessary truths.

Aristotle next identifies two characteristics of the necessary statement. Every statement in a demonstration is both true in every instance and commensurately universal. Although he primarily applies his findings to the premises, they are equally applicable to the conclusions of demonstration. Let us begin by examining “true in every instance”.

In an earlier lesson, we explained what *dici de omni* meant. If every dog is an animal, then animal is said of every dog. If every person in the room is sitting, then sitting is said of every person in the room. There is a difference between these two examples, however. The first example will always be true: all dogs will always be animals. The second is not always true: everyone may be sitting now, but later some will stand. A statement is true in every instance if and only if it is true all of the time. All dogs will always be animals, so this statement is true in every instance. Not everyone will always sit in the classroom, so that statement is not true in every instance, although it happens to be true now. Since every necessary statement is true at all times, it will also be true in every instance.

The conclusion of the demonstration must also be commensurately universal. Remember, we possess certain knowledge when we know that the cause is the cause only of that fact, not of another. But if the predicate belongs to more than the subject, it can only be because the premises describe a cause whose effects encompass more than that fact. Thus, if in the conclusion of a demonstration, the predicate were not commensurately universal with its subject, the demonstration would not give us knowledge of the cause of that fact. So demonstration in the strict sense never gives us a conclusion that is not commensurately universal. Or we could put it another way: demonstration always shows that some property (in the strict sense of the fourth

predicable) belongs to its subject. But in order for such a conclusion to be known to be commensurately universal, the premises must also be commensurately universal. Thus, both the premises and conclusion of a demonstration are commensurately universal.

For example, suppose that a syllogism concluded that the angles of an isosceles triangle are equal to two right angles. This syllogism would give as cause a fact that is more than the cause of *that* conclusion, since it could also be used to conclude that *scalene* triangles have angles equal to two rights. Therefore, we would not know the exact reason why isosceles triangles have angles equal to two rights. In fact, there is no exact reason, since having angles equal to two rights belongs to more than just isosceles triangles. Thus, no true demonstration proves this fact. The real demonstration proves that all triangles, and only triangles, have angles equal to 180° , because all triangles, and only triangles, have three sides. Thus, every statement in a demonstration is necessary, true in every instance, and commensurately universal.

Finally, the principles of demonstration must be essential. Aristotle gives three related meanings of essential. The first is the most easily understood: a statement is essential when the predicate is part of the very definition of the subject. For example, “Man is an animal” is an essential statement, since “animal” is part of the very definition of man. In the second sense, a statement is essential when the subject is in the definition of the predicate. For example, the statement “Some numbers are even” is an essential statement because the definition of even, “a number divisible by two,” contains the subject, number. Finally, a statement is essential when the subject is related to the predicate in the way that an agent cause is related to its effect. For example, “The slaughtered animal dies” is essential in this way, since being slaughtered is related to dying as an agent cause to its effect, just as fire is related to the heating of a nearby object. These are the three ways in which a statement is essential.

Statements essential in the first and third way are also going to be necessary. Predicates that fall in the definition of the subject always belong to a subject, and the agent cause and its actual effect are always together. For example, since rational falls in the definition of man, man is necessarily rational. Likewise, dying is always the effect of being slaughtered. And statements essential in the third way can be necessary, especially if they are conclusions that follow from premises that are essential in the first two ways. Thus, there is a close connection between the necessity, universality, and essential character of the premises and conclusions of demonstrations.

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What are the four characteristics of the premises in a demonstration?
2. What are the three properties of the statements in a demonstration?
3. Why must the statements in a demonstration be necessary?
4. Why must the statements in a demonstration be true in every instance?
5. Why must the statements in a demonstration be commensurately universal?
6. Why must the first principles be essential?

Lesson Twenty-Four

The Kinds of Demonstration

Selections from Aristotle's *Posterior Analytics* 78a22 – 79a15

Knowledge of the fact differs from knowledge of the reasoned fact. To begin with, they differ within the same science when the middle term is immediate, but instead of the cause the better known of the two reciprocals is taken as the middle; for of two reciprocally predicable terms the one which is not the cause may quite easily be the better known and so become the middle term of the demonstration. Thus, you might prove as follows that the planets are near because they do not twinkle: let C be the planets, B not twinkling, A proximity. Then B is predicable of C; for the planets do not twinkle. But A is also predicable of B, since that which does not twinkle is near – we must take this truth as having been reached by induction or sense-perception. Therefore A is a necessary predicate of C; so that we have demonstrated that the planets are near. This syllogism, then, proves not the reasoned fact but only the fact; since they are not near because they do not twinkle, but, because they are near, do not twinkle. The major and middle of the proof, however, may be reversed, and then the demonstration will be of the reasoned fact. Thus: let C be the planets, B proximity, A not twinkling. Then B is an attribute of C, and A – not twinkling – of B. Consequently A is predicable of C, and the syllogism proves the reasoned fact, since its middle term is the proximate cause.

Thus, then, do the syllogism of the fact and the syllogism of the reasoned fact differ within one

science and according to the position of the middle terms. But there is another way too in which the fact and the reasoned fact differ, and that is when they are investigated respectively by different sciences. This occurs in the case of problems related to one another as subalternate and superior, as when optical problems are subalternated to geometry, mechanical problems to stereometry, harmonic problems to arithmetic, the data of observation to astronomy. (Some of these sciences bear almost the same name; e.g., mathematical and nautical astronomy, mathematical and acoustical harmonics.) Here it is the business of the empirical observers to know the fact, of the mathematicians to know the reasoned fact; for the latter are in possession of the demonstrations giving the causes, and are often ignorant of the fact: just as we have often a clear insight into a universal, but through lack of observation are ignorant of some of its particular instances. As optics is related to geometry, so another science is related to optics, namely the theory of the rainbow. Here knowledge of the fact is within the province of the natural philosopher, knowledge of the reasoned fact within that of the optician, either *qua* optician or *qua* mathematical optician. Many sciences not standing in this mutual relation enter into it at points; e.g., medicine and geometry: it is the physician's business to know that circular wounds heal more slowly, the geometer's to know the reason why.

Definitions

knowledge of the fact – knowing that something is so without knowing the reason why.

knowledge of the reasoned fact – knowing that something is so and the reason why.

quia demonstration – demonstration which gives knowledge of the fact.

propter quid demonstration – demonstration which gives knowledge of the reason why.

subalternate science – science which takes its principles from the conclusions of a higher science.

Lesson

In the last lesson, we discussed the properties of premises in a demonstration. They must be necessary, true in every instance, essential, and commensurately universal. Furthermore, they

must be true, first, immediate, and prior to the conclusion both in causality and in knowledge. But we also came across a problem when we said that the premises should be prior to the conclusion both in causality and in knowledge. Since in most cases causes are less known than effects, the two requirements of the demonstrative premise are often in conflict with each other. In many cases the premise cannot both describe the cause of the conclusion and be better known than the conclusion. In the chapter from the *Posterior Analytics* quoted above, Aristotle solves this problem.

He does so by distinguishing two kinds of demonstration: demonstration of the fact (*quia*) and demonstration of the reasoned fact (*propter quid*). *Quia* demonstration begins from what is more known to us, *propter quid* from the cause. For example, suppose that we want to understand why the planets, as opposed to all the other stars, do not twinkle. We notice that when lights are relatively close, they do not twinkle, but when they are far away, they do. Therefore we make the following syllogism:

Every light that does not twinkle is relatively near.
Every planet is light that does not twinkle.
Therefore, every planet is relatively near.

Aristotle points out that this syllogism, while valid, reverses the order of cause and effect. Nearness is the cause of not-twinkling, not vice-versa; and yet nearness is in the conclusion, while not-twinkling is in the premises. Such a syllogism, he points out, does prove *the fact* of nearness, but it does not prove it *from its true cause*, which is nearness.

We can, however, take the above syllogism, and, by converting one premise and switching the other premise with the conclusion, make a syllogism that does proceed from the cause:

Every relatively near light does not twinkle.
Every planet is a relatively near light.
Therefore, every planet does not twinkle.

This second syllogism proceeds from the cause, since nearness is the cause of not-twinkling. But it does not proceed from what is better known to us, that is, from what is prior in our knowledge. For it is better known through the senses that planets do not twinkle, and it is less known that planets are near. Thus, in fulfilling one requirement of the demonstrative premise – priority in causality – we are prevented from fulfilling the other, priority in knowledge.

We can, however, in a way combine the two syllogisms into one argument. The first syllogism, a *quia* demonstration, will prove the fact of nearness, and the second, a *propter quid* will show that nearness causes non-twinkling. Thus, by using two syllogisms, we can approach what in other circumstances we might arrive at through one perfect demonstration.

In the opening text Aristotle also gives another situation that requires *quia* demonstration – when the *quia* and the *propter quid* demonstrations are divided between two different sciences. This happens when one science demonstrates the fact, but another, higher science demonstrates the reason why. For example, engineering demonstrates that the triangle is the strongest figure,

arguing from the premise that triangles with proportionate sides must have equal angles. But engineering cannot prove this premise; it can only assume it. In contrast, geometry has nothing to say about the strength of figures, but it can prove that triangles whose sides are proportionate are equiangular. The geometer does not know the fact that triangles are the strongest figures, but he does know the reason why; while the engineer does know the fact, but does not know the reason why. Because of this, Aristotle would say that engineering is a science that is subalternate (“under another”) to geometry.

Quia demonstrations, then, happen in at least these two circumstances: when our knowledge proceeds from effect to cause, rather than cause to effect, and when one science borrows its premises from the conclusions of another science. The *propter quid* demonstration, then, must proceed from the cause to the effect, and it must not borrow its premises from another science.

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What is the problem with the premises of demonstration both being better known than the conclusion and giving the cause of the conclusion?
2. How does Aristotle solve that problem?
3. What are the two situations in which *quia* demonstration is used?
4. What is a subalternate science?

Lesson Twenty-Five

Knowledge of the First Principles of Demonstration

Selections from Aristotle's *Posterior Analytics*

99b15 – 100a18

We have already said that certain knowledge through demonstration is impossible unless a man knows the primary immediate premises. But there are questions which might be raised in respect to the apprehension of these immediate premises: one might not only ask whether it is of the same kind as the apprehension of the conclusions, but also whether there is or is not certain knowledge of both; or certain knowledge of the latter, and of the former a different kind of knowledge; and, further, whether the developed states of knowledge are not innate but come to be in us, or are innate but at first unnoticed. Now it is strange if we possess them from birth; for it means that we possess apprehensions more accurate than demonstration and fail to notice them. If on the other hand we acquire them and do not previously possess them, how could we apprehend and learn without a basis of pre-existent knowledge? For that is impossible, as we used to find in the case of demonstration. So it emerges that neither can we possess them from birth, nor can they come to be in us if we are without knowledge of them to the extent of having no such developed state at all. Therefore we must possess a capacity of some sort, but not such as to rank higher in accuracy than these developed states. And this at least is an obvious characteristic of all animals, for they possess a congenital discriminative capacity which is called sense-perception. But though sense-perception is innate in all animals, in some the sense-impression comes to persist, in others it does not. So animals in which this persistence does not come to be have either no knowledge at all outside the act of perceiving, or no knowledge of objects of which no impression persists; animals in which it does come into being have perception and can continue to retain the sense-impression in the soul; and when such persistence is frequently repeated a further distinction at once arises between those which out of the persistence of such sense-impressions develop a power of systematizing them and those which do not. So out of sense-perception comes to be what we call memory, and

out of frequently repeated memories of the same thing develops experience; for a number of memories constitute a single experience. From experience again – i.e., from the universal now stabilized in its entirety within the soul, the one beside the many which is a single identity within them all – originates the skill of the craftsman and the knowledge of the man of science, skill in the sphere of coming to be and science in the sphere of being. We conclude that these states of knowledge are neither innate in a determinate form, nor developed from other higher states of knowledge, but from sense-perception. It is like a rout in battle stopped by first one man making a stand and then another, until the original formation has been restored. The soul is so constituted as to be capable of this process.

Thus it is clear that we must get to know the primary premises by induction; for the method by which even sense-perception implants the universal is inductive. Now of the thinking states by which we grasp truth, some are unfailingly true, others admit of error-opinion, for instance, and calculation, whereas certain knowing and intuition are always true; further, no other kind of thought except intuition is more accurate than certain knowledge, whereas primary premises are more knowable than demonstrations, and all certain knowledge is discursive. From these considerations it follows that there will be no certain knowledge of the primary premises, and since except intuition nothing can be truer than certain knowledge, it will be intuition that apprehends the primary premises – a result which also follows from the fact that demonstration cannot be the originative source of demonstration, nor, consequently, certain knowledge of certain knowledge. If, therefore, it is the only other kind of true thinking except certain knowing, intuition will be the originative source of certain knowledge. And the originative source of science grasps the original basic premise, while science as a whole is similarly related as originative source to the whole body of fact.

Definitions

intuition – induction which gives certain knowledge of the first principles of demonstration.

innate – a property with which we are born.

Lesson

At the very end of the *Posterior Analytics* Aristotle takes up the question of how we come to know the first principles of demonstration. Before we can understand Aristotle here, we should recall the problem of learning proposed by Meno. He argued that learning was impossible, since we could never recognize something that we did not know at all, nor could we learn something we already knew. Aristotle solved this problem by pointing out that we can learn a new fact if we already know other facts that can be joined as premises in a syllogism to reach a new fact as a conclusion. He called this kind of syllogism a demonstration. But that account fails to solve the difficulty entirely. After all, Meno could always respond by asking another question: “How do we learn the first premises of that demonstration?” In the chapter quoted above, Aristotle answers that question.

As we saw before, Plato tried to solve the problem with his doctrine of recollection. He claimed that we have always possessed such knowledge, but that, because we have been born into bodies, we have forgotten it. All learning, then, is merely recalling what we already knew in some way. Aristotle thinks that this solution is absurd. For, even though Plato acknowledges that, when we are born, we are not aware of possessing such knowledge, still Aristotle thinks it bizarre that we could know things so important, yet not be able to recognize that we know them. Thus Plato has failed to solve Meno’s problem.

For Aristotle, the solution lies in sense perception. Although sense perception is not the highest kind of knowledge, nonetheless we are born with it, and it is able to initiate the process of learning. All animals have it, and in the higher animals, it gives rise to memory, the ability to retain the sense impression after the thing sensed is gone. A dog, for example, remembers what his master looks like even when the dog does not see him. But in man, repeated sense impressions generate something more than memory – they generate a collection of compared memories, which Aristotle calls *experience*. For example, a small child sees Fido, then later Spot, and still later Rover. He collects and compares his remembered sense impressions, producing an experience of dogs. And from that experience, he moves to an understanding of dogs. That is, when in the process of comparing his memories of Fido, Spot, and Rover, the child grasps what is common to them all, he acquires his first vague understanding of the nature of dogs. Thus, sense experience is the natural knowledge that sets in motion the process of learning.

Of course, by this process the child has yet to acquire a first premise. But, in the same way that he came to a vague understanding of *dog*, he also, through seeing Fido, Silver the horse, Shamu the killer whale, and various spiders and insects, comes to an understanding of *animal*. He then uses induction to come to the first principles of demonstration. A child sees Fido, Spot and Rover, and sees both that they are dogs and that they are animals. By an induction, he comes to the conclusion “All dogs are animals.” This kind of induction gives us the content of the first principles of demonstration, and so completes Aristotle’s solution to the problem of learning.

But one might object that induction gives us only probable conclusions, while the principles of demonstration must be certain. The reply to this objection involves what Aristotle

calls “intuition.” The child arrives at a first principle, not only because he has made an induction, but because he sees that the predicate is rooted in the very nature of subject. In this case, he sees that “Every dog is an animal” because he sees that “animal” is in the very definition of “dog.” Thus, induction with intuition gives us certain knowledge of the first principles of demonstration. In sum, sense perception provides a pre-existing knowledge that, combined with experience, induction, and intuition, yields certain knowledge of the first principles.

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What is Meno’s problem of learning? Why doesn’t Aristotle’s previous doctrine of demonstration solve that problem?
2. What is Plato’s solution? Why doesn’t it work?
3. What kind of knowledge exists in us from birth?
4. How does sense perception help us to solve Meno’s problem?
5. By what process do we learn the first principles of demonstration?
6. Why does Aristotle call that process a kind of induction?

Lesson Twenty-Six The Dialectical Syllogism

Selections from Aristotle's *Topics*

translated by W. A. Pickard-Cambridge

100a18 – 101b4

Our treatise proposes to find a line of inquiry whereby we shall be able to reason from opinions that are probable about every problem propounded to us, and also shall ourselves, when standing up to an argument, avoid saying anything that will obstruct us. First, then, we must say what syllogism is, and what its varieties are, in order to grasp the dialectical syllogism: for this is the object of our search in the treatise before us.

Now the syllogism is an argument in which, certain things being laid down, something other than these necessarily comes about through them. (a) It is a 'demonstration,' when the premises from which the syllogism starts are true and primary, or are such that our knowledge of them has originally come through premises which are primary and true; (b) syllogism, on the other hand, is 'dialectical,' if it reasons from opinions that are probable. Things are 'true' and 'primary' which are believed on the strength not of anything else but of themselves: for in regard to the first principles of science it is improper to ask any further for the why and wherefore of them; each of the first principles should command belief in and by itself. On the other hand, those opinions are 'probable' which are accepted by everyone or by the majority or by the philosophers – i.e., by all, or by the majority, or by the most notable and illustrious of them.

Next in order after the foregoing, we must say for how many and for what purposes the treatise is useful. They are three – intellectual training, casual encounters, and the philosophical sciences. That it is useful as a training is obvious on the face of it. The possession of a plan of inquiry will enable us more easily to argue about the subject proposed. For purposes of casual encounters, it is useful because when we have counted up the opinions held by most people, we shall meet them on the ground not of other people's convictions but of their own, while we shift the ground of any argument that they appear to us to state unsoundly. For the study of the philosophical sciences it is useful, because the ability to raise searching difficulties on both sides of a subject will make us detect more easily the truth and error about the several points that arise. It has a further use in relation to the ultimate bases of the principles used in the several sciences. For it is impossible to discuss them at all from the principles proper to the particular science in hand, seeing that the principles are prior to everything else: it is through the opinions generally held on the particular points that these have to be discussed, and this task belongs properly, or most appropriately, to dialectic: for dialectic is a process of criticism wherein lies the path to the principles of all inquiries.¹

Definitions

dialectical syllogism – a syllogism that gives us opinion.

probable opinion – a statement accepted by all, by most, or by the wise; a statement accepted by all of the wise, or by most of the wise, or the wisest.

dialectical tool – method for finding the premises of the dialectical syllogism.

Lesson

Modern interpreters of Aristotle often find fault with the method he follows in his philosophical treatises. Since Aristotle was the first to define demonstration, they expect him always to proceed demonstratively. However, as he clearly states above, while demonstration

may be the most perfect method in itself, it is not always the best way to begin within a given discipline. In the *Topics*, Aristotle presents a less rigorous method of proceeding, a method which Plato called dialectic. In this lesson we will examine the basic features of Aristotle's dialectic.

Before we continue, however, we should see what the word *dialectic* means. *Dialectic* comes from the Greek *diálektos*, which means "discussion." Dialectic is a way of reasoning through the *give and take* of conversation. But Aristotle defines it more formally, as we shall see below.

The Definition of Dialectic

According to Aristotle, dialectic in the strict sense is a kind of syllogism. We saw before that demonstration was also a syllogism, but these two kinds of syllogism differ according to what they produce. Demonstration gives us certain knowledge, but a dialectical syllogism only gives us an opinion. In fact we can define dialectic as a syllogism that gives us opinion.

What does Aristotle mean when he says that dialectic gives us opinion? Suppose we held that bad men should not govern, and suppose we also held that the majority of men are bad. One might then syllogize to the opinion that democracy is a bad form of government:

No bad men should govern.

Every majority is made of bad men.

Therefore, no majority should govern.

If no majority should govern, democracy is a bad form of government.

Therefore, democracy is a bad form of government.

We might not have realized before, but our original opinions would force us to hold this new opinion. By the use of a dialectical syllogism, our opponent has, from our old opinions, produced a new opinion in our mind.

When Aristotle further defines demonstration, he argues that its premises must be first and true. In a parallel way, he argues here that, in order for the dialectical syllogism to produce opinion, its premises must be probable. A statement is probable when it is believed by all men, by most men, or by the wise, and among the wise, either by all, by most, or by the wisest of the wise. For example, all men hold the opinion that two physical objects cannot be in the same place at the same time, though few of them can give a reason for this; most men believe in God, though some do not; and finally, the wisest of the wise believe that happiness is contemplation. To varying degrees, then, all of these opinions are probable.

We should notice that, in contrast to the premises of demonstrations, probable opinions can contradict each other. For example, most men think happiness is pleasure, while the wise think it is contemplation. Since two contradictory opinions can each be probable, though for different reasons, the dialectician can always argue both sides of a question. This is the key to understanding the uses of dialectic.

The Uses of Dialectic

Compared to demonstration, dialectic might seem useless, since it cannot give us certain knowledge. Aristotle points out, however, that dialectic can perform certain functions that demonstration cannot. Demonstration always reasons from what is true and better known, and so it cannot argue for both sides of a point. But a debater must argue both sides of a point. Dialectic, then, is more useful than demonstration for debate and other forms of intellectual training.

Next, in casual conversation, people often fail to grasp first principles. Since we cannot use demonstration in these cases, we must use dialectic. For example, most educated men in our day speak as if they were moral relativists. But moral relativism is really a denial of the first principle of ethics, the universal nature of the human good. So the moralist cannot demonstrate any truth to a modern man; he must argue with him dialectically.

Finally, dialectic has two uses within philosophy. First, dialectic helps us to consider both sides of a difficult question. For example, when Aristotle tries to figure out whether time really exists outside the mind, he argues both sides of the question before he determines the truth. The dialectical consideration prepares the way for demonstration. Second, dialectic can be used to clarify first principles. As we have seen, we cannot demonstrate first principles. In fact, we seem often to assent to them in a rather indistinct way, and sometimes even to misunderstand them. But we can clarify the meanings of first principles by disputing them with dialectic. For example, the moral philosopher can use dialectic to manifest that the absolute nature of the good for man is implicit in every moral judgment.

The dialectical syllogism, then, has three important uses: intellectual training, casual conversation, and philosophical clarification. Because of the importance of these uses, it is important to touch on the nature of the dialectical syllogism, even in an introduction to logic.

Exercises

Exercise 1: *Give brief answers to the following questions.*

1. What is the difference between the demonstrative and the dialectical syllogism?
2. What makes a statement probable?
3. Why is it that the conclusions of dialectical syllogisms can contradict each other? Does this apply to demonstrative syllogisms?
4. What are the uses of the dialectical syllogism?
5. Why is dialectic important to philosophy, when only demonstration gives us certain knowledge?

¹ Aristotle. "Topics." Translated by W. A. Pickard-Cambridge. *The Works of Aristotle*, vol. 1, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Twenty-Seven

The Tools and Topics of Dialectic

Selections from Aristotle's *Topics*

105a20 – 109a38

The classes, then, of things about which, and of things out of which, arguments are constructed, are to be distinguished in the way we have said before. The tools whereby we are to become well supplied with syllogisms are four: (1) the securing of propositions; (2) the power to distinguish in how many senses a particular expression is used; (3) the discovery of the differences of things; (4) the investigation of likeness. The last three, as well, are in a certain sense propositions: for it is possible to make a proposition corresponding to each of them, e.g., (1) "The desirable may mean either the honorable or the pleasant or the expedient"; and (2) "Sensation differs from knowledge in that the latter may be recovered again after it has been lost, while the former cannot"; and (3) "The relation of the healthy to health is like

that of the vigorous to vigor." The first proposition depends upon the use of one term in several senses, the second upon the differences of things, the third upon their likenesses.

The tools whereby syllogisms are made are these; the topics, for which the aforesaid tools are useful, are as follows.

Of problems some are universal, others particular. In the case of accidents, there is nothing to prevent an attribute (e.g., justice or whiteness) belonging in part. Now one topic is to look and see if a man has ascribed as an accident what belongs in some other way. This mistake is most commonly made in regard to genera of things, e.g., if one were to say that white *happened* to be a color – for being a color does not happen by accident to white, but color.

Definitions

dialectical problem – a question which is a subject of inquiry in itself, or one that tends to the solution of another problem.

dialectical proposition – question which requests assent to an opinion which provides a premise for the dialectical syllogism.

dialectical tool – means by which we acquire dialectical syllogisms.

dialectical topic – means by which we make dialectical syllogisms.

Lesson

Demonstration, as we have seen, begins with statements that are true, primary, and essential. Though demonstration is difficult to achieve in practice, it is easy to see that a demonstrative syllogism must begin with first principles. But since a dialectical syllogism is not demonstrative, it is not at first clear to us where a dialectical syllogism should begin. What are the first principles of dialectic? This lesson addresses that question. Before we can answer it, however, we must distinguish the different kinds of statement used in dialectic.

Dialectical Problems and Propositions

A dialectical inquiry, like any inquiry, asks whether some predicate belongs to a subject; for example, whether virtue is knowledge. The conclusion of a dialectical inquiry, then, is an answer to a question. But in order to answer a question dialectically, we must find the relevant dialectical premises. The premises of a dialectical argument, as we saw before, are always opinions; and someone's opinion is discovered by asking him a question. Therefore, even the

premises in a dialectical argument are the answers to questions. The question that begins the inquiry is called the dialectical problem, while the questions which establish the premises are called dialectical propositions. Thus, dialectical reasoning begins with a dialectical problem and dialectical propositions.

The Tools of Dialectic

Dialectical arguments use the opinions of one's interlocutor as premises. But a random set of his opinions will not work – only particular opinions will allow us to resolve the problem. Thus the dialectician must have the means to find the premises of the dialectical syllogism.

The first aids to finding these premises are the dialectical tools. Aristotle distinguishes four tools of dialectic. We will briefly consider each.

1. **Securing propositions** – Aristotle recommends that we collect a large variety of opinions for later use in dialectical arguments, and that we classify them in two ways: first, according to the cause of their probability, that is, whether they are held by all, by many, or by the wise; second, according to their subject matter – whether they belong to ethics, natural philosophy, or logic. We should not only collect these opinions, but opinions that are like them, and we should only accept opinions that are universal in character. For example, when we note that Empedocles claimed all things are made of the four elements, we have collected the opinion of a wise man concerning natural philosophy.
2. **Distinguishing senses of a word** – The question to be resolved is stated in words, and words often have many meanings. Before we begin our argument, we should distinguish those meanings, so that the participants in a discussion are not unwittingly speaking about different things. For example, one man might use the term *common good* to signify Gross Domestic Product, while another might use it to signify the virtue and justice of the nation. If, without having distinguished these two senses, they conclude that less taxation promotes “the common good,” they will only seem to agree, since they are using the same words but speaking of different things.
3. **Discovering the differences in things** – Seeing differences between things is not always useful to the dialectician. The differences between things in widely divergent genera are so obvious that we cannot learn from them. For example, we can learn very little from the truth that colors are different from actions. But the differences among things in similar genera are usually very instructive. For example, music and painting are both arts, but music is more beautiful and also more orderly. The difference between music and painting helps us to see that the more orderly is more beautiful. Thus, the dialectician should strive to see the differences between things that are otherwise like each other.
4. **Discovery of the likenesses in things** – We can often argue that the predicate belongs to the subject by showing that a parallel predicate belongs to a parallel subject. For example, if sight compares to the eye as reason does to the soul, we can conclude that the soul knows invisible realities. This requires us to see similarities in things, such as the eye and

the soul, that we normally think of as very different. Thus, the collecting of likenesses between things is useful to the dialectician.

The Dialectical Topic

The dialectical topic is the means by which we find a middle term appropriate to the subject of inquiry. For example, should the dialectician wish to argue that the subject of hate is the appetitive part of the soul, he needs to find the right middle term. Now the right middle term is 'the subject of love' and we can use it to put together the following dialectical syllogism:

The subject of hate is always the subject of love

The subject of love is always the appetitive part of the soul.

Therefore, the subject of hate is always the appetitive part of the soul.

How does the dialectician find this middle term? He uses a dialectical topic: "Contraries are in the same subject." Since love and hate are contraries, they must also be in the same subject. Thus, if he knows the subject of love, he can also find the subject of hate. The dialectical topic is a statement that helps him to find the middle term of his dialectical syllogism.

There are too many dialectical topics to discuss in a logic textbook. Aristotle's *Topics* is filled with them. Boethius, the author of the *Consolation of Philosophy*, also organized the topics under general headings in his *Topical Differences*. Students interested in learning more about dialectical topics should refer to those two works.

Exercises

Exercise 1: Give brief answers to the following questions:

1. What is a dialectical problem? A dialectical proposition?
2. What are the differences between the principles of a demonstration and the principles of a dialectical syllogism?
3. What are the tools of dialectic? How are they useful to the dialectical syllogism?
4. What is a dialectical topic? How is it useful to the dialectical syllogism?

Exercise 2: Give a dialectical argument for and against each of the following statements. Explain how you obtained your premises.

1. Happiness is pleasure.
2. Virtue and knowledge are the same thing.
3. Nature acts for the sake of an end.
4. Justice is giving each man what is owed to him.

Lesson Twenty-Eight

Sophistical Refutations

Selections from Aristotle's *Sophistical Refutations*

translated by W. A. Pickard-Cambridge

164a20 – 166b19

Let us now discuss sophistic refutations, i.e., what appear to be refutations but are really fallacies instead. We will begin in the natural order with the first. That some reasonings are genuine, while others seem to be so but are not, is evident. This happens with arguments, as also elsewhere, through a certain likeness between the genuine and the sham. For physically some people are in a vigorous condition, while others merely seem to be so by blowing and rigging themselves out as the tribesmen do their victims for sacrifice; and some people are beautiful thanks to their beauty, while others seem to be so, by dint of embellishing themselves. Now for some people it is better worth while to seem to be wise, than to be wise without seeming to be (for the art of the sophist is the semblance of wisdom without the reality, and the sophist is one who makes money from an apparent but unreal wisdom); for them, then, it is clearly essential also to seem to accomplish the task of a wise man rather than to accomplish it without seeming to do so. To reduce it to a single point of contrast it is the business of one who knows a thing, himself to avoid fallacies in the subjects which he knows and to be able to show up the man who makes them; and of these accomplishments the one depends on the faculty to render an answer, and the other upon the securing of one.

There are two styles of refutation: for some depend on the language used, while some are independent of language. Those ways of producing the false appearance of an argument which depend on language are six in number: they are ambiguity, amphibole, combination, division of words, accent, form of expression. Of this we may assure ourselves both by induction, and by syllogistic proof based on this – and it may be on other assumptions as well – that this is the number of ways in which we might fall to mean the same thing by the same names or expressions. Arguments such as the following depend upon ambiguity. “Evils are good: for what needs to be is good, and evils must needs be.” For “what needs to be” has a double meaning: it means what is inevitable, as often is the case with evils, too (for evil of some

kind is inevitable), while on the other hand we say of good things as well that they ‘need to be.’

Examples such as the following depend upon amphibole: “I wish that you the enemy may capture.” Also the thesis, “There must be knowledge of what one knows”: for it is possible by this phrase to mean that knowledge belongs to both the knower and the known. Also, “There must be sight of what one sees: one sees the pillar: ergo the pillar has sight.”

Amphibole and ambiguity, then, depend on these modes of speech. Upon the combination of words there depend instances such as the following: “A man can walk while sitting, and can write while not writing.” For the meaning is not the same if one divides the words and if one combines them in saying that “it is possible to walk-while-sitting” and write while not writing.

Upon division depend the propositions that 5 is 2 and 3, and odd, and that the greater is equal: for it is that amount and more besides. For the same phrase would not be thought always to have the same meaning when divided and when combined, e.g., “I made thee a slave once a free man,” and “God-like Achilles left fifty a hundred men.” An argument depending upon accent it is not easy to construct in unwritten discussion; in written discussions and in poetry it is easier. Thus (e.g.) some people emend Homer against those who criticize as unnatural his expression “*to men ou kataputhetai ombro*.” For they solve the difficulty by a change of accent, pronouncing the “*ou*” with an acuter accent. Others come about owing to the form of expression used, when what is really different is expressed in the same form, e.g., when a quality is expressed by a termination proper to quantity or vice versa, or what is active by a passive word, or a state by an active word, and so forth with the other divisions previously laid down. For it is possible to use an expression to denote what does not belong to the class of actions at all as though it did so belong. Thus (e.g.) *flourishing* is a word which in the form of its expression is like *cutting* or *building*: yet the one denotes a certain quality – i.e., a certain condition – while the other denotes a certain action. In the same manner also in the other instances.¹

Definitions

refutation – a syllogism whose conclusion contradicts the conclusion of another syllogism.

sophist – one who wishes to appear wise without actually being wise.

sophistical reasoning – something which appears to be reasoning but is not.

fallacy – the means used in sophistical reasoning.

equivocation – fallacy which uses a word equivocally in a syllogism.

amphibole – fallacy which exploits an ambiguous grammatical construction.

composition and division – fallacy which changes the meaning of words in a phrase by combining them or separating them.

accent – fallacy which gives changes the meaning of a word through different accents.

form of expression – fallacy which changes meaning of a word through a parallel expression.

Lesson

All of us have been involved in unending arguments in which our opponent refuses to concede a point and brings up a multitude of dubious arguments to support his own view. Such a man seems to care more about winning the argument than finding the truth. To put it another way, such a man is more concerned to appear wise than to be wise. Someone who is concerned only to appear wise is called a sophist.

However, someone could appear wise by imitating the outward features of the wise man. Now, the wise man not only teaches his own opinions, but he can solve the objections brought against his opinions. In other words, he not only proves his own statements, but also refutes their contradictories. It is always hard to prove a statement, but it is much easier to refute the argument of another. Therefore, the best way to appear wise without actually being wise is to refute the arguments of another.

Just as it is easier to refute than to prove, so it is easier to appear to refute than to actually refute. A clever man will soon discover tricks that enable him to make others seem foolish, and which appear to show that others are wrong, when in fact they do not. Such apparent refutations, whose aim is not the truth but rather making the clever man appear wise, are called sophistical refutations.

Someone can appear to refute, but fail to do so, in three ways. First, he can give what looks like a syllogism, but is not. Second, he can start with premises that look true, or at least probable, but are not really true or even really probable. Third, he can reach a conclusion that looks like it contradicts his opponent's conclusion, but really does not. The sophist, then, will appear to speak like the demonstrator or the dialectician, but in fact will be neither.

The logician studies the tricks of the sophist for two reasons. First, he himself wants to avoid using those tricks. If we are unaware of the tricks of the sophist, we might unwittingly use them ourselves. The best way to guard against using them unwittingly, therefore, is to know them. Second, others try to use these tricks against the logician. He can expose those tricks for what they are if he has studied them beforehand. The logician, then, concludes the study of logic by studying sophistical refutations.

Fallacies of Speech

The tricks used by sophists are called fallacies, and they are divided into those that depend on the use of words and those that do not. We will begin with the easiest fallacies – those which come from the deceptive use of language.

1. Fallacy of Equivocation

The fallacy of equivocation occurs when the same word or phrase has two meanings, and when the different meanings are used in the same syllogism. For example, I might argue that baseball is a game that is inherently cruel to animals because baseball uses bats to hit the baseball, and all bats are animals. Baseball, then, uses animals to hit baseballs, which is inherently cruel. We solve the fallacy of equivocation by pointing out the difference between the two meanings of the same term. In this case, we point out that *bat* means both “nocturnal flying mammal” and “a wooden stick used to hit a ball,” and that the bat used in baseball is the latter.

The fallacy of equivocation is the most common fallacy dependent upon speech, and the other fallacies of speech happen because they resemble this first fallacy.

2. Fallacy of Amphibole

Sometimes words or phrases are not ambiguous in themselves, but become so through an ambiguous grammatical construction. For example, if someone told you right before surgery, “I hope that for your illness the doctors find a cure which is extremely painful,” you might be unsure whether this person was really a well-wisher. That is, it is not clear whether he wishes the doctors to cure you of a painful illness, or whether he wishes that the cure for your illness will be very painful. Such an ambiguity in grammatical construction is called an amphibole.

Like the fallacy of equivocation, we solve the amphibole by pointing out the different meanings of the grammatical construction.

3. Fallacy of Composition and Division

This fallacy occurs when expressions mean one thing when combined, another when separated. For example, if I said that John Smith is good because he helps the poor, and that he is the quarterback for the football team, I might be tempted to conclude that he is a good quarterback. The word *good*, however, means one thing when it is used by itself and another when it is combined with quarterback.

Again, the fallacy is solved by pointing out the difference in meaning between the terms separated and the terms combined.

4. Fallacy of the Accent

The fallacy of the accent is less common in English than in other languages, but it still occasionally is found. For example, the word “invalid” has different meanings when differently accented. Thus the syllogism “Some syllogisms are invalid, all invalids belong in a hospital, so some syllogisms belong in a hospital” commits the fallacy of the accent. Again, the fallacy is solved by pointing out that the difference in accent is accompanied by a difference in meaning.

5. Fallacy of the Form of Expression

Sometimes we assume that words with parallel forms have parallel meanings, but this is not always the case. For example, invalid means not valid, intolerant means not tolerant. So we might conclude that inflammable means not flammable. Thus, we make the following syllogism: “Gasoline is inflammable, what is inflammable cannot explode, therefore gasoline cannot explode – so it’s okay to throw my cigarette butts in the gas can.” This syllogism would lead to fatal results. But this can be avoided by pointing out that the parallel expressions have different meanings.

Exercises

Exercise 1: *Identify the kind of fallacy:*

1. A government website recently posted a list of poisons that children may drink at home. Since arsenic is on the list, your child may drink it at home.
2. I tell you that old man sitting over there can walk. Therefore he can both walk and sit at the same time.
3. When deacons incense a congregation, the members of the congregation become extremely angry.
4. Three and five are divisible by four, because three and five are eight, which is divisible by four.
5. The fathers of our country were passionate believers in freedom. Therefore, they lacked self-control.
6. Since the bloodhound can smell out a criminal, it must smell good.
7. It is better to act justly than unjustly. But murderers die justly while martyrs die unjustly. Therefore, it is better to be a murderer than a martyr.
8. If you say that Mr. Smith is a good cobbler and a bad man, it is clear that he is both good and bad at the same time.
9. Every child is both older and younger, for each child is father of the man.
10. Because they were irrational, the Greeks thought it was moral to eat the flesh of animals.

¹ Aristotle. “Sophistical Refutations.” Translated by W. A. Pickard-Cambridge. *The Works of Aristotle*, vol. 1, Edited by W. D. Ross. Oxford: Clarendon Press, 1928. (All subsequent lesson selections use this translation.)

Lesson Twenty-Nine

Fallacies Independent of Speech

Selections from Aristotle's *Sophistical Refutations* 166b19 – 168a12

Of fallacies, on the other hand, that are independent of language, there are seven kinds:

(1) that which depends upon Accident; (2) the use of an expression absolutely or not absolutely but with some qualification of respect, or place, or time, or relation; (3) that which depends upon ignorance of what 'refutation' is; (4) that which depends upon the consequent; (5) that which depends upon assuming the original conclusion; (6) stating as cause what is not the cause; (7) the making of more than one question into one.

Fallacies, then, that depend on Accident occur whenever any attribute is claimed to belong in like manner to a thing and to its accident. For since the same thing has many accidents, there is no necessity that all the same attributes should belong to all of a thing's predicates and to their subject as well. Thus (e.g.), "If Corsicus be different from Socrates, and Socrates be a man, then," they say, "he has admitted that Corsicus is not a man, because it so happens (*accidit*) that the person from whom he said that he (Corsicus) is different is a man."

Those that depend on whether an expression is used absolutely or in a certain respect and not strictly, occur whenever an expression used in a particular sense is taken as though it were used absolutely, e.g., in the argument "Suppose an Indian to be black all over, but white in respect of his teeth; then he is both white and not white." Or if both characters belong in a particular respect, then, they say, "contrary attributes belong at the same time." This kind of thing is in some cases easily seen by any one, e.g., suppose a man were to secure the statement that the Ethiopian is black, and were then to ask whether he is white in respect of his teeth; and then, if he be white in that respect, were to suppose at the conclusion of his questions that therefore he had proved dialectically that he was both white and not white.

Other fallacies occur because the terms 'proof' or 'refutation' have not been defined, and because something is left out in their definition. For to refute is to contradict one and the same attribute – not merely the name, but the reality – and a name that is not merely

synonymous but the same name – and to confute it from the propositions granted, necessarily, without including in the reckoning the original point to be proved, in the same respect and relation and manner and time in which it was asserted. Some people, however, omit some one of the said conditions and give a merely apparent refutation, showing (e.g.) that the same thing is both double and not double: for two is double of one, but not double of three. Or, it may be, they show that it is both double and not double of the same thing, but not that it is so in the same respect: for it is double in length but not double in breadth. Or, it may be, they show it to be both double and not double of the same thing and in the same respect and manner, but not that it is so at the same time: and therefore their refutation is merely apparent.

Those that depend on the assumption of the original point to be proved, occur in the same way, and in as many ways, as it is possible to beg the original point; they appear to refute because men lack the power to keep their eyes at once upon what is the same and what is different.

The refutation which depends upon the consequent arises because people suppose that the relation of consequence is convertible. For whenever, suppose A is, B necessarily is, they then suppose also that if B is, A necessarily is. It happens like this also in real reasoning; e.g., Melissus' argument, that the universe is eternal, assumes that the universe has not come to be (for from what is not nothing could possibly come to be) and that what has come to be has done so from a first beginning. If, therefore, the universe has not come to be, it has no first beginning, and is therefore eternal. But this does not necessarily follow: for even if what has come to be always has a first beginning, it does not also follow that what has a first beginning has come to be.

The refutation which depends upon treating as cause what is not a cause, occurs whenever what is not a cause is inserted in the argument, as though the refutation depended upon it. E.g., in the proof that the *soul* and *life* are not the same: for if coming-to-be is contrary to perishing, then a particular form of perishing will have a particular form of coming-to-be as its contrary: Now death is a particular form of perishing and is contrary to life: life, therefore, is a coming-to-be,

and to live is to come-to-be. But this is impossible: accordingly, the soul and life are not the same. Now this is not proved: for the impossibility results all the same, even if one does not say that life is the same as the soul, but merely says that life is contrary to death, which is a form of perishing, and that perishing has 'coming-to-be' as its contrary. Arguments of that kind, then, though not inconclusive absolutely, are inconclusive in relation to the proposed conclusion.

Such, then, are the arguments that depend upon the

consequent and upon false cause. Those that depend upon the making of two questions into one occur whenever the plurality is undetected and a single answer is returned as if to a single question. Or again, where part is good and part bad, "Is the whole good or bad?" For whichever he says, it is possible that he might be thought to expose himself to an apparent refutation or to make an apparently false statement: for to say that something is good which is not good, or not good which is good, is to make a false statement.

Definitions

accident – fallacy which confuses accidental and essential predicates.

absolute and qualified – fallacy which confuses predicates said simply with those said in a certain sense.

ignoring the issue – fallacy which refuses to address the issue in question.

begging the question – fallacy which uses the conclusion to be proved as a premise.

complex question – fallacy which appears to secure a premise by disguising two questions as one.

false cause – fallacy which assumes that what is said before the conclusion is reached is a premise in a syllogism.

consequent – fallacy which supposes that the antecedent of a conditional statement follows from the consequent.

Lesson

Since the fallacies dependent upon speech are fairly obvious, Aristotle takes those up first, as we saw in the last lesson. The more subtle fallacies do not depend upon speech, but rather assume something false about the ways things are. In this lesson, we will look at the fallacies that are independent of speech – that focus on the way things are.

1. The Fallacy of the Accident

Aristotle says that the fallacy of the accident occurs when an attribute is assumed to belong in a like manner to a subject and to that subject's accident. Recall that an accident might or might not belong to the subject, but a property, genus, difference, or species belongs to the subject necessarily. If the subject has both a property and an accident, in some sense we can attribute the property to the accident. That is, if a man is both white and able to laugh, it is true to say "A white thing is able to laugh." Aristotle warns us, however, that we cannot attribute the property to the accident as if it were a property of that accident, but only as accidentally related to the accident. That is, I cannot say that "able to laugh" is a property of white things, but only an accident of them. Thus, the following argument would be sophistical:

White things are men.

But it is a property of men to laugh.

Therefore, all white things laugh.

The ability to laugh is not a property of white things, but only sometimes happens to be a property of white things because some white things are also men. The argument above is a classic example of the fallacy of the accident.

The solution of the fallacy of the accident is to point out that attributes do not belong to subjects and their accidents in the same way. In our example, the ability to laugh does not belong to white things because they are white, but belongs only to the white things that happen to be men. The conclusion, then, does not follow.

2. Fallacy of the Absolute and the Qualified

The fallacy of the absolute and the qualified pretends that a predicate that belongs to a thing only in a qualified way really belongs to it absolutely. Since this fallacy assumes that it belongs absolutely, it leads the listener into seeming contradictions. An example will help us to understand.

Can a colored object be black and white at the same time? Our immediate answer is “No,” since black and white are contraries. But then the sophist gets us to admit the skunk is mostly black, but has a white stripe. Thus, the skunk is black and white at the same time. Of course, what the sophist has done is to confuse the absolute and the qualified. In an absolute sense a thing cannot be black and white at the same time, since as a whole a thing can only be one color at a time. But a thing can have two colors when one part is one color and another part is another color. Thus, the sophist in his questions has moved from the predicates “white” and “black” taken absolutely to the predicates taken in a qualified way.

We solve this fallacy by pointing out the conclusion reached does not really contradict our original opinion, but only another opinion which we never held. We never held that a thing could not be both partially white and partially black, only that it could not be both wholly white and wholly black.

3. Fallacies of Ignorance of Refutation

The sophist, wishing to appear wiser than others, seems to refute the views of other men, even though in fact he does not refute them. Aristotle defines a refutation as a syllogism whose conclusion contradicts the conclusion of another syllogism. In the cases above, the conclusion reached actually contradicts the original conclusion, but through a syllogism which only *seems* to be valid. In this fallacy of ignorance of refutation, however, the syllogism is valid, but the conclusion only seems to contradict the other conclusion.

The example Aristotle gives about the double is useful. Suppose I argued that the parallelogram is double the triangle with the same base and height. The sophist would get me to admit that the parallelogram is not twice as high as the triangle, since we stipulated that they have the same height. He would therefore triumphantly conclude that I had admitted that the parallelogram is not double the triangle, in contradiction to my previous assertion.

The solution to this kind of fallacy is to point out that second conclusion does not contradict the first, since the attribute was not denied of the subject in the same respect in which it was affirmed. In our example, I would point out that I had not said that the parallelogram was in every way double the triangle, but only in area, whereas the conclusion of the second syllogism was that it was not double in height. Therefore, the two conclusions do not really

contradict each other, but only seem contradictory.

4. Fallacy of the Consequent

This fallacy assumes that, if the consequent follows from the antecedent, the antecedent must also follow from the consequent. For example, if wet ground follows from rain, rain must also follow from wet ground. We can look at this fallacy as an invalid mood of the conditional syllogism.

We can solve this fallacy by pointing to instances of the consequent which were not accompanied by the antecedent. For example: the sprinkler was on, so the ground was wet though it had not rained.

5. Begging the Question

Aristotle says that the cause of this fallacy is our inability to distinguish the same and the different. For the conclusion of a syllogism must be different from the premises; but in this fallacy, we fail to see that our conclusion is actually the same as one of our premises. This can happen when the premise and conclusion are phrased differently, although they mean the same thing, or when there are so many premises that we fail to see that one is identical with the conclusion. We solve this fallacy, of course, by pointing out the premise that is identical with the conclusion.

For an example, let us take an argument in favor of legal abortion:

Since no reasonable person can deny a woman the right to regulate her fertility, the right to abortion must be a fundamental human right.

The sophist here wants us to think that the right to abortion follows from the right to “regulate fertility,” but when we ask him for a definition of “regulating fertility,” it turns out already to include abortion. The argument is not really an argument at all, since the conclusion is already contained in the premise, in a hidden way.

6. Fallacy of the False Cause

The fallacy of the false cause, or ‘reason why,’ applies only to reductions to the absurd. Recall that in a reduction to the absurd, we assume as a hypothesis the statement that we wish to contradict, and then we show that an impossible result follows from it. In the fallacy of the false cause, the sophist assumes what he wishes to refute, and then shows that some contradiction follows. The difference is that the contradiction does not follow from what he wished to refute, but from some other premise in the argument.

For example, suppose that the sophist wished to show that faith is irrational. He would assume, for the purpose of the reduction, that faith was rational. But then what is rational is beyond sensation, and what is beyond sensation is unreal. Therefore, whatever is rational is unreal, which is absurd. Thus, he concludes that faith is not rational. Now his reduction is sophistical because the original hypothesis, “faith is reasonable,” actually plays no part in reaching the absurd conclusion, “what is rational is unreal,” since the conclusion follows even without that hypothesis. And generally speaking, we solve the fallacy of the false cause by

pointing out that the supposedly refuted hypothesis did not play an actual role in bringing about the absurd conclusion.

7. Fallacies of the Complex Question

As we saw before, the dialectician gets his premises from the opinions of others. Therefore, he must ask his listeners to assent to a premise before using it. But the sophist cleverly combines two questions in one, so that the respondent means to assent to one part, but the sophist pretends he has responded to the other part. For example:

Attorney: "Do you beat your wife often?"

Witness: "No! Of course not!"

Attorney: "Ladies and gentlemen of the jury, the witness seems proud of the fact that he only beats his wife once in a while. What a despicable character!"

The attorney in our example has really asked two questions: "Do you beat your wife?" and "If so, do you do it often?" He has taken a negative to the first as a negative to the second, and thus has falsely secured a premise for his syllogism.

We solve the fallacy of the complex question by refusing to give just one answer. Rather, we answer each part of the question separately.

Aristotle numbers thirteen fallacies, but they all have something in common. He explains that, in a way, they can all be reduced to the fallacy of ignorance of what refutation is. A refutation is a syllogism that comes to a conclusion contradicting a previous conclusion. Each one of these fallacies, however, is deceptive only when the victim is ignorant either of what makes a syllogism valid, or of what makes one conclusion contradict another conclusion. For example, the fallacy of equivocation makes an invalid syllogism seem valid, while the fallacy of the qualified and absolute works only if the victim does not know that a qualified conclusion does not contradict an absolute conclusion. Aristotle similarly shows for every other fallacy that its effectiveness depends upon the victim not realizing what a refutation really is.

Finally, we should note that Aristotle considers one fallacy more dangerous than the others. The fallacy of the accident, he says, is the most common source of error both in practical and speculative knowledge. That is because it is very hard to distinguish between the accidental characteristics of a subject and the essential ones. Without such a distinction, however, even experts are led to treat the accidental as essential, and make universal statements on that basis. These universal statements become the premises that lead to false conclusions. In contrast, other fallacies, such as the fallacy of equivocation, are fairly easy to spot and are easily solved by the expert.

Exercises

Exercise 1: *State the kind of fallacy. All are independent of speech.*

1. Simpler animals come first in the fossil record.
If evolution is true, then simpler animals will come before complex animals.
Therefore, evolution is true.

2. Suppose abortion should be illegal.
Movie-going should also be illegal.
But making movie-going illegal will make people unhappy.
So, if we say abortion should be illegal, we should say that what makes people happy should be illegal.
Thus, abortion should be legal.
3. The human mind thinks.
Thinking uses the brain.
Therefore, the human mind is just the brain.
4. People should not be persecuted on the basis of their opinions.
Men cannot change opinions they in conscience hold.
So, everyone has a right to hold his own opinions.
5. Men are not irrational.
Animals are irrational.
Then men are not animals.
6. Are we always obliged to perform the most virtuous action?
No.
Then sometimes we are allowed to perform vicious actions.
7. Weight-lifters are human beings.
No human being can out-lift a gorilla.
Thus, weight-lifters are weak.
8. You have asserted that Walter Payton was a superior football player.
But then you admit that Joe Montana was better than Payton.
So, you think both that Walter Payton was better and worse than Joe Montana.
9. Is vicious action sometimes happy and pleasant?
Yes.
Then the vicious man can be truly happy.
10. A society cannot flourish unless the citizens have life, and a measure of liberty and private property.
Government aims at making society flourish.
The only purpose of government is the preservation of life, liberty, and property.

11. Suppose Monarchy is a just form of government.
Tyranny orders the nation to the private good of the tyrant.
But this is absurd, because the nation should be ordered to the common good.
We can conclude, then, that monarchy is not a just form of government.
12. Government should provide for the flourishing of society.
But better governments have lower taxes.
Thus, lower taxes mean better government.
13. You said that the criminal ran to the left.
But when you pointed the direction out to me, you pointed to my right.
Thus, the criminal ran both left and right.
14. If all bodies are made of atoms, then all bodies will expand when heated.
All bodies do expand when heated.
Therefore, all bodies are made of atoms.