

## ARISTOTLE AND THE CONVENTIONAL LOGICIANS ON THE FOURTH FIGURE

*Anthony Andres*

The purpose of this essay is to answer the question of why Aristotle rejects the fourth figure of the syllogism when almost every conventional logic textbook accepts it. This question may seem trivial, but its answer shows us that Aristotle's notion of the syllogism, the central feature of deductive logic, is fundamentally different from that found in the textbooks.

The essay is divided into three parts. The first part examines why Aristotle assigns precisely three figures to the syllogism. The second part defends his rejection of a fourth figure from the doubts raised by the conventional textbooks of logic. The third part traces the different positions on this question to a deeper disagreement about the nature of the syllogism.

### Aristotle's Three Figures

Our first task is to consider why Aristotle assigns precisely three figures to the syllogism. That consideration will have two parts. The first part will lay out the prerequisites for understanding Aristotle's account, and the second will examine the account itself.

#### *Aristotle on the Syllogism and Its Parts*

Aristotle begins his discussion of the syllogism in the first chapter of the *Prior Analytics* by defining three things: the

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Anthony Andres is a graduate of Thomas Aquinas College. He is now Associate Professor of Philosophy at Christendom College.

premiss, the term, and the syllogism itself. He defines the premiss as "a sentence affirming or denying one thing of another."<sup>1</sup> For example, the sentence 'Every triangle is a three-sided figure' can be a premiss because one thing, the predicate 'three-sided figure,' is affirmed of another, the subject 'triangle.' A sentence which fails to affirm or deny, such as 'Take the garbage out,' or a sentence which affirms or denies many of one, one of many, or many of many, such as 'The clowns are acting and the elephants are rampaging,' cannot be a premiss. What Aristotle takes for granted here, but explicitly states in the *Posterior Analytics*, is that a premiss is an affirmation or denial insofar as it is part of a syllogism. Affirmations and denials which are not part of a syllogism are not premisses.<sup>2</sup>

A premiss must be part of a syllogism, but the parts of the premiss, the terms, are the most basic parts of the syllogism. The term, as Aristotle writes, is that "into which the premiss is resolved, i.e., both the predicate and that of which it is predicated, 'being' being added and 'not being' removed, or vice versa."<sup>3</sup> That is, the subject and predicate of a premiss, though not the 'to be' verb when used as a copula, are the terms of the premiss and the most basic parts of the syllogism. For example, in the premiss above the subject 'triangle' and the predicate 'three-sided figure' are terms, but the words 'every' and 'is' are not.

Having defined the premiss and the term, Aristotle is now ready to define the syllogism itself. He writes:

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

<sup>1</sup> Aristotle, *Prior Analytics* I, 24a16.

<sup>2</sup> For a discussion of the difference between a premiss (or proposition) and a plain affirmation or denial, and the parts of each, see my article, "The Place of Conversion in Aristotle's *Organon*," *The Aquinas Review*, Vol. 7, No. 1, 2000, 74.

<sup>3</sup> *Prior Analytics* I, 24b16.

consequence, and by this, that no further term is required from without in order to make the consequence necessary.<sup>4</sup>

Let us consider this definition part by part. First, a syllogism is discourse [logos], that is, it is defined as something made of words. This places the syllogism in the same class as the statement according to the latter's definition in *On Interpretation*. Second, the syllogism begins by stating things, namely, the premisses as defined above. "Things being stated" is in the plural because there is always more than one premiss. Third, what follows from the premisses, later to be called the conclusion, follows necessarily. That is, if the premisses are true, the conclusion cannot fail to be true. Fourth, there is a syllogism only when the conclusion follows necessarily by the power of those premisses with those terms, and not by the power of other terms. If we need to bring in another term in order to make it clear that the conclusion follows from the premisses, we do not yet have a syllogism. Finally, the conclusion must always be actually different from the premisses. There is no syllogism if the conclusion somehow merely repeats a premiss.<sup>5</sup>

An example will help to make the parts of the definition clear to us. The following is a valid syllogism:

Every three-sided figure is a figure with angles equal to two right angles.

Every triangle is a three-sided figure.

Therefore, every triangle is a figure with angles equal to two right angles.

<sup>4</sup> *Ibid.*, 24b18.

<sup>5</sup> This last point deserves clarification. Some inferences that modern logicians refer to as "syllogisms" do not fit Aristotle's definition because their conclusions are not different enough from their premisses. For example, the inference 'The whole is greater than its part, and therefore the circle is greater than its semicircle,' is not a syllogism because the conclusion is only a particular instance of the more universal principle which is the premiss. This distinction enables Aristotle to argue later that every syllogism has three terms.

In this example, the first two statements, 'Every three-sided figure is a figure with angles equal to two right angles,' and 'Every triangle is a three-sided figure,' are the premisses, while the last, 'Therefore, every triangle is a figure with angles equal to two right angles,' is the conclusion. All of the statements, that is, both premisses and the conclusion, have two terms. For example, the terms of the second premiss are 'triangle' and 'three-sided figure,' while the terms of the conclusion are 'triangle' and 'figure with angles equal to two right angles.' The whole example is a syllogism because the conclusion follows necessarily from the two premisses without the aid of any term not contained in the premisses, and yet the conclusion is actually different from the premisses. Our example displays all of the features of an Aristotelian syllogism.

We should notice one more feature in our example. There are three statements set forth, and each statement contains two terms, and yet the whole syllogism contains only three terms, not six. In the next section of this essay we will see Aristotle argue that the syllogism must have two premisses and one conclusion, but only three terms.

Let us briefly recall the main points of our preliminary discussion. A premiss is a sentence in a syllogism which affirms or denies a predicate of a subject, and the predicate and subject are the terms of that syllogism. The syllogism itself uses two premisses to produce its conclusion, a conclusion which follows necessarily from the premisses and yet is actually different from both of them. Now that we have understood Aristotle's definitions of the syllogism and its parts, we are prepared to look at why he assigns three figures to the syllogism.

#### *Aristotle Assigns Precisely Three Figures*

The first part of the *Prior Analytics* is a lengthy discussion of the many moods of the syllogism. He brings the discussion to an end by arguing that he has determined every possible form of the syllogism. That argument has three parts. The

first lays out the varieties of syllogisms, namely, the ostensive syllogism, the hypothetical syllogism, and the reduction to the absurd; the second shows that every ostensive syllogism is in one of three figures; and the third shows that every other kind of syllogism can be reduced to the ostensive syllogism. Our investigation must examine the second part of that argument.

Aristotle begins the second part by explaining why a syllogism must have three terms, one of them a middle connecting the two terms in the conclusion:

If then one wants to prove syllogistically A of B, either as an attribute of it or as not an attribute of it, one must assert something of something else. If now A should be asserted of B, the proposition originally in question will have been assumed. . . . So we must take something midway between the two, which will connect the predications, if we are to have a syllogism relating this to that.<sup>6</sup>

Every syllogism reaches a conclusion which is one statement, such as 'B is A,' relating one subject to one predicate. If a premiss merely contained that subject and that predicate, that is, merely stated that B is A, then the conclusion which the syllogism hopes to prove will have been assumed in a premiss, thus begging the question. Therefore, there must be at least one term in the premisses, C, that is not in the conclusion. But there can be only one such term. For if there were two terms, say C and D, then they would be powerless to connect the subject B and the predicate A of the conclusion unless some other syllogism connected them. Thus a basic syllogism, one that connects the subject and the predicate of a simple conclusion, is one which contains only three terms, the two contained in the conclusion and a third mediating term which appears in both premisses in order to connect the first two. It is in this passage that Aristotle concludes that every syllogism has three terms, the two in the conclusion and a

<sup>6</sup> *Prior Analytics* I, 40b 30-33 and 41a11-13.

third which is common to the two premisses. In the example given in the first section of this essay, the term 'three-sided figure' performed that mediating function. It was able to connect 'triangle' to 'figure with angles equal to two right angles' because it was joined to each one in a separate premiss.

Aristotle then argues that there are only three figures of the syllogism. He does not define the word 'figure,' but we can assign a working definition. The figure of a syllogism is the relation of predication between the mediating term in the syllogism and the two remaining terms. For this reason the differences in figures will be determined by the differences in the possible roles which the mediating term plays in the premisses:

If then we must take something common in relation to both, and this is possible in three ways (either by predicating A of C, and C of B, or C of both, or both of C), and these are the figures of which we have spoken, it is clear that every syllogism must be made in one or other of these three figures.<sup>7</sup>

Aristotle argues here that there are only three possible figures because there are only three ways in which the mediating term can be related to the other terms. Either the mediating term, C, plays different roles in both premisses, or it does not. If it plays different roles in the premisses, there is really only one possibility: the mediating term is the subject of one premiss, the predicate of the other; for instance, C is subject for the predicate A, and C is predicate for the subject B. If the mediating term plays the same role in both premisses, then it is either predicate in both (C is predicated of both A and B), or it is the subject in both (A and B are both predicated of C). Since there are only three possible roles for the mediating term, there are only three figures.

The following are examples of syllogisms in each of these three figures, as they would be numbered by Aristotle:

<sup>7</sup> Ibid., 41a14-17.

*First Figure*

Every three-sided figure is a figure with angles equal to two right angles.

Every triangle is a three-sided figure.

Therefore, every triangle is a figure with angles equal to two right angles.

*Second Figure*

Every Gothic cathedral is made of stone.

No skyscraper is made of stone.

Therefore, no skyscraper is a Gothic cathedral.

*Third Figure*

Every bird has feathers.

Every bird is warm-blooded.

Therefore, some warm-blooded things have feathers.

In our example of a syllogism in the first figure, the mediating term 'three-sided figure' is predicated of one of the terms in the conclusion, but has the other predicated of it. In our example of the second figure, the mediating term 'made of stone' is predicated of both remaining terms. In our example of the third figure, the mediating term 'bird' has both terms predicated of it.

Let us recall the main points of Aristotle's argument. Every syllogism has at least two terms, because it must connect the subject and predicate of the conclusion. It must have more than two, because something else must connect them. It can have only one more term, because what connects the terms in the conclusion must be related to both and so must be common to both premisses. Therefore, every syllogism has three terms, one of them mediating the connection between the two in the conclusion. But there are only three possible ways to relate that mediating term to the other two, and those ways define the figures of the syllogism. Therefore, the ostensive syllogism only comes in three figures.

## Aristotle Against the Proponents of the Fourth Figure

We have now seen the argument in which Aristotle maintains that there are precisely three figures of the syllogism. But both he and the later logicians make a further distinction among the three terms by naming them the major, minor, and middle terms. Proponents of the fourth figure assume that those distinctions require logicians to posit a fourth figure of the syllogism. The aim of this section of the essay is to show why Aristotle can reject that consequence. This section is divided into two parts. In the first we will look at the conventional way of making that distinction and why it results in a fourth figure. In the second we will see that Aristotle makes that distinction in a different way and why this does not result in a fourth figure.

*Conventional Account of the Four Figures*

Conventional textbooks in logic define the terms of the syllogism in the following way: the major term is the predicate of the conclusion, the minor term is the subject of the conclusion, and the middle term is the term which appears in both premisses.<sup>8</sup> If we use these definitions to analyze our first example of a syllogism, then 'figure having angles equal to two right angles' is the major term, 'triangle' is the minor term, and 'three-sided figure' is the middle term. This seems to be the easiest way, and is the most common way, to define those terms.

But this way of defining them results in a fourth figure of the syllogism. Recall that a figure of a syllogism is the way in which the mediating term in the syllogism is related as subject or predicate to each of the remaining terms. The middle term, as defined above, is the mediating term. Therefore, there will be as many figures of the syllogism as ways in which the mid-

<sup>8</sup> For a typical example, see Irving M. Copi, *Introduction to Logic*, 3rd ed., (New York: The MacMillan Company, 1968), 153.

dle term can be related to the major and minor terms of the syllogism. But there are four possible relations. On the one hand, the middle term can be related to the major and minor terms in the same way, and this encompasses two possibilities: either it can be predicated of both, or both can be predicated of it. On the other hand, the middle term can be related to the major and minor terms in different ways, and this also encompasses two possibilities: either the middle term can be predicated of the minor term and have the major term predicated of it, or the middle term can be predicated of the major term and have the minor term predicated of it. Thus there is a total of four possible ways in which the middle term can be related to the major and minor terms, and so there are four figures.

The first three possibilities are the three figures proposed by Aristotle, which were exemplified in the previous section of this essay. The fourth possibility, however, which was not included among Aristotle's figures, is exemplified below.

*Fourth Figure*

Every three-sided figure is a figure with angles equal to two right angles.

Every triangle is a three-sided figure.

Therefore, some figure with angles equal to two right angles is a triangle.

In this example, as in our example of a syllogism in the first figure, the middle term is 'three-sided figure' because it is included in both premisses. The major term is 'triangle' because it is the predicate of the conclusion, while the minor term is 'figure with angles equal to two right angles' because it is the subject of the conclusion. Since in the premisses the middle term is predicated of the major term and has the minor term predicated of it, our example is in the fourth figure. It is also clear that our syllogism in the fourth figure is valid: its conclusion is different from its premisses and necessarily follows

from them. Thus, the conventional way of defining the three terms requires the acceptance of a fourth figure.

Let me summarize our findings so far. We can distinguish the major and minor terms by their position in the conclusion. If we make that distinction, we can lay out four possible ways in which the middle term can be related to the major and minor terms. Each of these ways is a possible figure of the syllogism. In all four figures there are valid syllogisms, in which the conclusion necessarily follows from the premisses. Therefore, according to the conventional way of defining the terms, there must be four usable figures of the syllogism.

#### *Aristotle's Account*

Our next task, then, is to explain how Aristotle defines the three terms and why his definitions do not lead to a fourth figure. Let me anticipate the conclusions we will reach. Aristotle defines the major and minor terms, not by their position in the conclusion, but by the roles that they play in the premisses. As a consequence, he cannot define them until after he has defined the figures. Because he does not define them by their position in the conclusion, he is not forced to include a fourth figure. And because he defines them after he defines the figures, it is impossible for him to include a fourth figure.

First, we must see how Aristotle defines the major, minor, and middle terms. Since he defines them differently for each figure, we will have to examine three sets of definitions. In his discussion of the first figure he defines the middle term as that "which is itself contained in another and contains another in itself: in position also this comes in the middle."<sup>9</sup> We should notice the parts of Aristotle's definition. He first defines the middle term by its relation of predication to the other terms in the syllogism: it has one predicated of it and is itself predicated of the other. To this definition he then adds

<sup>9</sup> Ibid., 25b35.

the position of the middle term in the order of predication: it is a middle between the term which is first in predication and only a predicate, and the term which is last in predication and only a subject. In our example of a first figure syllogism 'three-sided figure' is the middle term because it is predicated of 'triangle' and has 'figure with angles equal to two right angles' predicated of it. Moreover, it is a middle in the order of predication, being both a subject and a predicate.

He then defines the major and minor terms: "I call that term the major in which the middle is contained and that term the minor which comes under the middle."<sup>10</sup> That is, the major term is that which is predicated of the middle term in the premisses, while the minor term has the middle term predicated of it. In our example 'figure with angles equal to two right angles' is predicated of the middle term, and thus is the major term. 'Triangle' has the middle term predicated of it and thus is the minor term. The major term is first in the order of predication because it is only a predicate, and the minor term is last because it is only a subject.

Notice that Aristotle makes no reference to the positions of terms in the conclusion when he defines the major and minor terms. These terms are defined strictly by the relation that they have to the middle term in the premisses. As we will see, the same is true for the second and third figures as well: the major and minor terms are defined by their relation to the middle term in the premisses, not by their positions in the conclusion.

This way of defining the major and minor terms, however, raises difficulties for Aristotle's account of the second and third figures. Let us begin our consideration by looking at his account of the second figure. Aristotle defines the middle term in the second figure as that "which is predicated of both subjects."<sup>11</sup> In the example of a syllogism in the second figure

<sup>10</sup> Ibid., 26a23.

<sup>11</sup> Ibid., 26b37.

given above, 'made of stone' is the middle term because it is predicated of both subjects, 'Gothic cathedrals' and 'skyscrapers.' He notes both that it is outside, rather than between, the other terms (which he calls "extremes") and that it is first in the order of predication, since it is always a predicate. Nevertheless, it still performs the function of connecting the two parts of the conclusion.

Notice that Aristotle's definition of the middle term in the second figure is different from that in the first figure. Conventional logic books simply say that the middle term is present in both premisses and not in the conclusion, and thus they give a definition of the middle term which is common to all figures. Aristotle is making the claim that what is meant by the phrase 'middle term,' or rather what it is to be a middle term, is something different for the first and second figures, and so the middle term has to be redefined for each figure.

Having redefined the middle term, he then goes on to give rather puzzling new definitions of the major and minor terms. He writes, "[I mean] by major extreme that which lies near the middle, by minor that which is further away from the middle."<sup>12</sup> This is where our difficulties begin: it is not clear what he means by saying that the major term is "near" and the minor term is "further away" from the middle term.

It might help, however, if we recall that the middle term is the first term because it is the predicate in both premisses. The term closer to the middle term, then, should be the term which participates in the character of being a predicate. In the premisses the major and minor terms are both subjects, but since both are universal terms, both could be predicates. But in a given context we could say that one term is *more apt* to be a predicate than the other. If so, that term would naturally be the major term, while the other would be the minor term. For example, although both 'Gothic cathedral' and 'skyscraper' are subjects in the second figure syllogism above, both are also

<sup>12</sup> Ibid., 26b38-39.

universal terms, and so are able to be predicates. But in some particular context we might consider 'Gothic cathedral' as more apt to be a predicate than 'skyscraper.' Then the former is the major and the latter the minor term of our syllogism.

A sign that this is what Aristotle meant by these definitions is that, when he is examining each possible mood of the second figure for validity, he always assigns the major term as the predicate of the conclusion and the minor term as its subject. And this fits his definitions. For since the major term is closer to the middle, and the middle is always a predicate, the major term, though a subject in its premiss, should be a predicate somewhere. The only place where the major term can be a predicate is in the conclusion. Since the minor term is farther from the middle, there is no need for it ever to be a predicate and thus it is assigned as the subject of the conclusion. To use our own example, if Aristotle were to take 'Gothic cathedral' as the major term, and 'skyscraper' as the minor, he would assign the following conclusion: No skyscraper is a Gothic cathedral.

Now a conventional logician might object that such an account makes Aristotle's definitions essentially equivalent to the conventional definitions of major and minor term; that is, they are the predicate and the subject of the conclusion. We should respond, however, that there remains an all-important difference in order. According to the modern definition a term is first the predicate of the conclusion and for that reason is the major term. According to Aristotle's definition a term is first the major term and for that reason becomes the predicate of the conclusion. The modern definition reverses the order of causality implicit in Aristotle's account. Thus, the two accounts remain essentially opposed. As we will see later, this opposition is an important sign of the difference in how each account understands what a syllogism is.

We can give an explanation of the definitions of the terms in the third figure similar to those given in the second. The middle term in the third figure is the subject of both the

major and minor term and is last rather than first in the order of predication. In this figure the minor term is defined as the term "near" the middle term, while the major term is defined as the term "further away" from it.<sup>13</sup> And because the minor term is closer to the middle, which is always a subject, the minor term is assigned as the subject of the conclusion, while the major term is assigned as the predicate. That is how Aristotle defines the terms in the third figure.

Let us sum up the differences between the definitions of the terms given in conventional logic textbooks and those given by Aristotle. First, conventional logic textbooks define the major and minor terms by their positions in the conclusion, while Aristotle defines them by their character in the premisses and uses this to determine their roles in the conclusion. Second, conventional textbooks give a common definition of the three terms that apply to all figures, while Aristotle gives definitions which vary for each figure. Thus, Aristotle must define the figures before the terms.

Our next task, then, is to explain why Aristotle's definitions do not require, but on the contrary render impossible, a fourth figure. That task is divided into two parts. First, we need to explain why the differences above make a fourth figure unnecessary for Aristotle. Second, we need to explain why these differences render a fourth figure impossible for Aristotle.

Explaining why Aristotle does not need a fourth figure is fairly easy. The number of possible figures is determined by the number of ways in which the middle term is related to the other two terms in the syllogism. The conventional textbooks distinguish the major and minor terms by their positions in the conclusion. Therefore, they find four possible relations between the middle terms and the major and minor terms. Aristotle does not distinguish the major and minor terms by their positions in the conclusion. Therefore, he does not need

<sup>13</sup> *Ibid.*, 28a14.

to distinguish more than three possible relations between the middle term and the undifferentiated other terms. He is not forced by his definitions into positing a fourth figure.

It is a little more difficult to see how Aristotle's way of defining the major and minor terms makes the fourth figure entirely impossible. Let me first present the argument in outline, and then explain each premiss. The fourth figure would have to include the major and minor terms in its definition. But Aristotle includes the figure in every definition of the major and minor terms. Therefore, any definition that Aristotle would give of the fourth figure would be a vicious circle.

We have already seen why the first premiss is true. The conventional textbooks distinguish the major term from the minor by their positions in the conclusion. This distinction allows them to define the fourth figure as that figure in which the middle term is predicated of the major term and has the minor term predicated of it. Thus, the major and minor terms are contained in the very definition of the fourth figure.

Aristotle, however, defines the major and minor terms by their relations to the middle term in the premisses. Recall that those relations, and therefore the definitions of the terms, depend upon first understanding in what figure the syllogism has been made. More precisely, the definition of a term differs according to the figure of the syllogism in which that term is contained. Therefore, the figure of the syllogism is always contained implicitly in the definitions of the major and minor terms.

If Aristotle were to try to posit a fourth figure, his definition of it would include the major and minor terms, and yet the definitions of those terms would contain the fourth figure. Therefore, any attempt to posit a fourth figure in the Aristotelian framework would result in a circular definition. It is, then, impossible for Aristotle to posit a fourth figure of the syllogism.

Another way to make this last point is by considering our example of the proposed fourth figure syllogism.



Every three-sided figure is a figure with angles equal to two right angles.

Every triangle is a three-sided figure.

Therefore, some figure with angles equal to two right angles is a triangle.

The conventional textbook definitions make 'triangle' the major term because it is the predicate of the conclusion, and 'figure with angles equal to two right angles' the minor term. Thus, in the premisses the middle term is predicated of the major term and has the minor term predicated of it. The syllogism is in the conventional fourth figure.

But Aristotle defines the first figure as that in which the term in both premisses is the subject for the first term and is predicated of the third. Since in the syllogism above the term 'three-sided figure' is the subject for 'figure with angles equal to two right angles' and is predicated of 'triangle,' that syllogism fits the definition of the first figure. Moreover, by Aristotle's definitions 'triangle' is the minor term, while 'figure with angles equal to two right angles' is the major term. Thus, the only difference between this syllogism and the ordinary syllogism in the first figure is that the terms are unnaturally positioned in the conclusion: the minor term is its predicate and the major term is its subject.<sup>14</sup>

Let us sum up Aristotle's answer to the proponents of the fourth figure. They distinguish the major and minor terms by the position of those terms in the conclusion before they distinguish the figures. Therefore, they find that there are four distinct ways in which the middle term is related to the other terms, that is, four figures. Aristotle defines the major and minor terms according to the character that they have in the premisses. But the character that they have in the premisses depends upon the figure of the syllogism. Since he must de-

<sup>14</sup> Scholastics call such conclusions "indirect." Aristotle discusses indirect conclusions of the syllogism in *Prior Analytics* I, 7 and *Prior Analytics* II, 1.

termine the figures of the syllogism before he distinguishes the major and minor terms, it is impossible for him to distinguish more than three figures. If Aristotle's way of defining the terms is correct, then there cannot be a fourth figure of the syllogism.

### Different Understandings of the Syllogism

The aim of the final part of this essay is to show that the difference between the way in which Aristotle defines the terms and the way in which the conventional textbooks define the terms is not accidental, but is rooted in a fundamental disagreement concerning the nature of the syllogism. Aristotle's definitions fit his thesis that the syllogism is a cause of our coming to know. The definitions in the conventional textbooks implicitly assume that the syllogism does not cause knowledge. Thus, our first task is to make the connection between Aristotle's understanding of the syllogism and his definitions, and our second task is to do the same for the conventional textbooks.

### *The Aristotelian Understanding*

First, let us recall Aristotle's definition of the syllogism. It is speech in which, certain things being given, something else necessarily follows, these being so. Then Aristotle explains, "I mean by the last phrase that they produce the consequence."<sup>15</sup> A more literal translation of the same passage is "I mean by 'these being so' that it follows *because of* [dia] these." Both translations, however, convey that the premisses are related to the conclusion as a cause is related to its effect. Aristotle's definition of the syllogism implies an order of causality between the premisses and the conclusion.

St. Thomas makes this same point more explicitly. He writes, "The principles are in a certain way the efficient cause

<sup>15</sup> *Prior Analytics* I, 24b21.

of the conclusion, as we say that demonstration is a syllogism making someone know."<sup>16</sup> In the second clause of this sentence, St. Thomas points out that Aristotle's definition of demonstration, which is a kind of syllogism, requires that the demonstrative syllogism be causally related to our knowledge of the conclusion. But in the first clause he makes the parallel point more directly related to our inquiry: the premisses of the syllogism are themselves the efficient cause of the conclusion. The premisses make the conclusion and make us know it.

If Aristotle and St. Thomas are right in their understanding of what a syllogism is, then Aristotle is right in defining the terms of the syllogism as he does and thus in rejecting the fourth figure. For every acting cause gives a form to its effect. The acting cause determines the character of its effect and is never itself determined by its effect. For example, if I use a drill to make a hole in a block of wood, the bit of the drill gives form to the wood. Therefore, the size of the bit determines the size of the hole in the wood, and not vice versa. Again, if I heat water over a fire, the heat of the fire determines the temperature of the water being heated, not vice versa. In the same way, if the premisses are the efficient cause of the conclusion, then the premisses give form to the conclusion. They determine the nature of the conclusion, and not vice versa. More precisely, if the premisses cause the conclusion through having their terms properly related, then the character which the terms have in the premisses causes them to have the positions that they have in the conclusion. Thus, a term should be a predicate or a subject in the conclusion because it already has that character in the premisses.

For example, if the term 'three-sided figure' is the subject for 'figure with angles equal to two right angles' and is predicated of 'triangle,' then the latter terms have the roles of predicate and subject in the premisses. But their roles in the premisses should be responsible for their roles in the conclusion. Thus

<sup>16</sup> St. Thomas Aquinas, *Summa Contra Gentiles* I, c. 57 (my translation).

the syllogism including them should conclude that 'Every triangle is a figure with angles equal to two right angles.' We could, of course, draw the further consequence that 'Some figure with angles equal to two right angles is a triangle,' but this is not the direct conclusion made by those premisses. Those premisses directly make 'triangle' be the subject and 'figure with angles equal to two right angles' be the predicate of the conclusion.

Aristotle's way of defining the terms of the syllogism fits this principle. Aristotle defines the major term entirely by the character which it has in the premisses, and that character determines the role it plays in the conclusion. For example, the major term is always defined as in some way participating in being a predicate in the premisses, either because it is a predicate, or because it is closer to the middle term when that term is a predicate, or because it is farther away when the middle term is a subject. This causes the major term to be assigned as the predicate of the conclusion. Aristotle's account of the terms follows from his seeing the premisses as an efficient cause.

The conventional textbooks, on the contrary, ignore the order of causality between the premisses and conclusion. For example, they define the major term as the predicate of the conclusion. Thus, the major term first has that role as part of the conclusion, and then that role is reflected back onto its existence in one of the premisses. In the conventional account, the conclusion in some way determines the premisses. From the Aristotelian point of view the conventional account of the terms and figures is defective, because it mixes up the order of causality in the syllogism.

To sum up what we have said so far: Aristotle and St. Thomas see an order of causality in the syllogism, in which the premisses are the efficient cause of the conclusion. Therefore, the natures of the premisses and their parts ought to determine the natures of the conclusion and its parts, and not vice versa. Aristotle's definitions of the terms make their roles

in the premisses determine their roles in the conclusion and thus are consistent with the premisses as efficient cause. The conventional textbooks, in contrast, make the parts of the conclusion determine the natures of the parts of the premisses, violating the order of causality. From Aristotle's point of view, his own definitions are superior to the conventional ones.

*The Roots of the Conventional  
Understanding of the Syllogism*

Have the conventional textbooks simply made a mistake in accepting the fourth figure? In this last section I want to argue that they have not. They accept that figure because of the way in which they define the terms of the syllogism. They define those terms as they do, however, because they have a fundamentally different understanding of what the syllogism is, an understanding that belongs to a philosophical tradition alien to that of St. Thomas and Aristotle. It goes beyond the scope of this paper to argue fully for this final point, but I will try to illustrate this claim briefly by considering the statements of John Locke on the function of the syllogism.

In his *Essay Concerning Human Understanding* John Locke identifies four "degrees" or functions of the reasoning power in man. He writes:

The first and highest is the discovering and finding out of truths; the second, the regular and methodical disposition of them, and laying them in a fit and clear order, to make their connection and force be plainly and easily seen; the third, is the perceiving of their connection; and the fourth, a making a right conclusion.<sup>17</sup>

That is, reason can find out the immediate connection of two ideas so as to perceive the truth of a statement; it can display truths in an order which makes a connection between two

<sup>17</sup> John Locke, *An Essay Concerning Human Understanding*, Book IV, ch. 17, no. 3, vol. 35 of *Great Books of the Western World*, ed. Robert Maynard Hutchins (Chicago: Encyclopedia Britannica, Inc., 1952), 372.

ideas easily perceived; it can perceive that mediated connection between ideas; and it can make a right conclusion.

Then Locke asks himself whether the syllogism is the proper instrument of the process of reason. Surprisingly, he answers that it is not:

The causes I have to doubt are these: —First, because syllogism serves our reason in but one of the aforementioned parts of it; and that is, to show the connection of proofs in one instance and no more; but in this it is of no great use, since the mind can perceive such connection, where it really is, as easily, nay, perhaps better, without it.<sup>18</sup>

That is, the syllogism is only useful for one function of reason, namely, displaying the connections between ideas so that the connections may be plainly seen. But Locke thinks that a syllogistic display is not necessary for perceiving those connections and that the syllogism is not even the best way of displaying them. Thus, the syllogism seems not to be very useful for the process of reasoning.

In fact, Locke makes it clear that the syllogism is quite useless. He writes:

Hence it is that men, in their inquiries after truth, never use syllogisms. . . . Because before they can put [ideas] into a syllogism, they must see the connection that is between the intermediate idea and the two other ideas it is set between and applied to, to show their agreement; and when they see that, they see whether the inference be good or no; and so syllogism comes too late to settle it.<sup>19</sup>

That is, in order to make a syllogism, a man must already perceive the connection of the middle idea to the two extreme ideas. But having seen that, he immediately sees the connection between the extremes. Only after he has done all this can he display these connections in a syllogism. Thus, the syllogism comes after the inference and is an image of the

<sup>18</sup> *Ibid.*, no. 4, 372.

<sup>19</sup> *Ibid.*, 374.

## ARISTOTLE ON THE FOURTH FIGURE

inference, but it is in no way the cause of the inference. The syllogism is useless for human reasoning.

According to Locke's view, then, a syllogism does not cause our knowledge, and the premisses are not the efficient cause of the conclusion. The syllogism is only an arrangement of words which displays a connection of ideas already perceived by reason. And since there is no order of causality among the parts of that arrangement, there is no necessity to respect the order of causality in the definitions of the parts of the syllogism. A consequence of this view is that the major and minor terms can be suitably defined in terms of their positions in the conclusion. According to this account, the fourth figure of the syllogism is as natural as the first, second, and third.

There are two ways, then, to view the syllogism. On the one hand, one can view the syllogism as an efficient cause of knowledge, and more particularly, the premisses as the cause of our knowledge of the conclusion. Accepting this understanding entails rejecting a fourth figure. This is the Aristotelian view. On the other hand, one can view the syllogism as an arrangement of words which displays a process of reasoning that has already been completed. According to this understanding, the syllogism is not an efficient cause of knowledge, and the premisses are not causes of the conclusion. The acceptance of this view is the deeper cause, I believe, of the acceptance of the fourth figure.

### Conclusion

And so the seemingly trivial matter of the fourth figure turns out to have implications that divide philosophical traditions. Aristotle's failure to present a fourth figure of the syllogism is not a simple oversight, an understandable mistake made by a pioneer in a new discipline. It is deliberate, rooted in a deep understanding of the nature of the syllogism. The conventional textbooks accept the fourth figure, for the most part, not simply because they have made a mistake, but because they have implicitly accepted the principles of a non-Aristotelian philosophical tradition.