

An Analysis of  
the Thomistic-Aristotelian Concept of Demonstration

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The final cause of anything having a purpose is always its most important cause, because it determines the natures of the material, formal, and efficient causes. A house, for example, in order to be a protection against the outdoors, must be built of worthy material, must have an orderly external formation, and must have a man as its builder. So also is the case with demonstration, which may be defined through its final cause as follows: demonstration is a scientific syllogism, that is, a syllogism which produces science or which causes us to know.<sup>1</sup> St. Thomas placed a very definite meaning on the expression "to know"; to him it meant to recognize or understand something perfectly, or to apprehend the truth of a thing perfectly; therefore, in order to know, one must recognize the cause of a thing and also the application of that cause to its effect; that which is truly known must be so certain that its impossibility of being otherwise is clearly evident. This is the type of knowledge which demonstration can produce.

To bring about this desirable effect, the premisses of a demonstrative syllogism must have six attributes. They must be, in themselves, true, first, and immediate; in regard to their conclusion, they must be more known and prior to it, and causes of it.<sup>2</sup> Since "to be" and "to be true" are convertible, knowledge which is false is not knowledge at all; hence, it is impossible to know that which is false, since

that which is false is not, and knowledge can only be of reality. Likewise the premisses must be first and immediate, which means that they must be clearly seen as true without any need of being proven. Only premisses which have previously been demonstrated or which are so evident that they cannot be proven can be used to prove a further conclusion. Since science is had only by a recognition of causes, it is clear that the premisses of a demonstration must be causes of the conclusion, and, because every cause is prior and more known in nature than its effect, it follows that the premisses are prior and more known in nature than the conclusion. It may be that the conclusion is prior and more known as regards our knowledge of it, since it may be easily verified by our senses; yet, speaking according to the nature of the things involved, the premisses, being causes, are prior and more known. A mere syllogism can be composed of premisses not having these attributes, although they are necessarily found in a demonstrative syllogism.

Some knowledge must be had before we can compose a demonstrative syllogism. Since the conclusion of a demonstration always consists of a predicate attributed to a subject, it is clear that we must understand beforehand what the subject and predicate are. Of the subject we must likewise know that it does exist, since we cannot demonstrate an attribute of a perhaps non-existent subject. However, we do not need to know that the predicate exists, because, being an accident,

it cannot exist unless it has a proper subject in which to inhere, and this inherence is precisely what is being demonstrated. If we should perhaps be demonstrating the existence of a subject, we cannot know exactly what it is beforehand, since the question "whether it is" precedes the question "what is it"; in such a case, we would substitute the nominal definition or the signification of the name of the subject involved.<sup>3</sup> Besides knowledge of the subject and predicate, we must also foreknow that the two premisses are true. Evidently, we must know that the premisses are true if we are to conclude to the truth of the conclusion.

In the material definition of demonstration, we said that demonstration must flow from immediate propositions. Since the strength of a demonstration depends wholly on the strength of its immediate propositions, it is well to develop this topic further. An immediate proposition may be defined as a proposition than which there is no other prior.<sup>4</sup> Every demonstrable truth is demonstrated through truths prior to it, since all knowledge comes from pre-existing knowledge; those truths, however, which have nothing prior, since they have no medium through which they can be proven, are called immediate truths, or immediate propositions. A proposition itself may be defined as one part of an enunciation, in which one thing is predicated of one other thing.<sup>5</sup> An enunciation embraces both parts of a contradiction, that is, both the affirmation and the negation; a demonstrative proposition, however, cannot

indifferently choose one part or the other, as a dialectical proposition can. It must always choose the true part of the contradiction, since only then can science be had.

Immediate propositions can be divided into two types. The first type, called axioms, are those which are true and seen to be true by all, since their predicate is included in the definition of the subject, and the terms are such that they can be grasped by all, e.g., being and non-being. Such propositions clearly admit no proof, and must be accepted by a student if he wishes to progress in demonstrative science. The second type, ignorance of which does not constitute a total bar to a student's progress, is called by St. Thomas a "positio,"<sup>6</sup> which might be translated into English as "thesis" or simply "laying something down."<sup>7</sup> A "positio" sometimes does not assert the existence or non-existence of a thing, e.g., a definition; sometimes, however, it does, and then it is called a "suppositio," or "hypothesis," since it is presented as having truth.

Concerning our knowledge of first immediate propositions, the fact that they must be more known than their conclusion can be shown by several reasons. First, since we know the conclusion only because of the propositions, it follows that our knowledge of the propositions must be more certain than that of the conclusion, since that on account of which a thing is such is itself more so. Secondly, it is clearly impossible that a conclusion should be more known than its

principles, because, if such were the case, a man would know that which he does not know as yet (the conclusion) better than he knows that which he already knows (the principles). Of course, if a conclusion is made known by some means other than demonstration, it is not necessary that the principles be more known. In demonstration, however, this is necessary, and from this it follows that any propositions opposed to these first immediate propositions are immediately known to be false. There can be no doubt over anything opposed to these first principles, for, as Aristotle says, "...the conviction of pure science must be unshakable."<sup>8</sup>

In order to attain necessary, scientific conclusions, demonstration must use necessary propositions; necessary propositions, however, can be had only when the predication involved therein has certain characteristics. Predication always concerns a predicate being attributed to a subject. A necessary proposition must have its predicate said of its subject "de omni," that is, everything contained under the given subject must have that particular predicate predicated of it. Likewise, there must never be a time when the predicate is not said of the subject.<sup>9</sup> A necessary proposition must also have its predicate said of its subject "per se," that is, the predicate must in some way be caused by the subject itself. If the predicate pertains to the form of the subject, that is, if it names a formal perfection of the subject (and hence would be either part or the whole of the

definition of the subject, since a definition always signifies the form and essence<sup>10</sup>), it is clear that such a predicate is said "per se" of its subject. This is called the first mode of perseity, i.e., when the definition or part of the definition is predicated of its subject. The second mode is based on material causality, and is found whenever an attribute is said of its subject as of its proper matter. The attribute predicated in this second mode will always be a property in the strictest sense of the word, will always find its cause in the very essence of its subject, and will be defined only if its subject is included in its definition. It may be called a proper accident or a proper passion of a subject, since it belongs only and always to that subject. The third mode of perseity is not actually a mode of predicating, but rather a mode of existing. In this case, "per se" signifies a particular thing which exists in its own right and does not depend for its existence on any subject of inherence, i.e., a particular substance. For example, "walking," as such, cannot exist of itself but must inhere in a subject; "man," on the contrary, needs no such subject, but can exist of himself and is therefore said to exist "per se."<sup>11</sup> Finally, if a predicate said of a subject is caused efficiently by that subject, the predication involved is "per se," in the fourth mode. This is a mode of causing "per se," rather than of attribution "per se," and shows the essential dependence of the effect upon its cause.

A necessary proposition, besides containing "de omni" and "per se" predication, must also have its predicate said of its subject "primo." By this it is meant that the predicate must be said directly and immediately of its subject. Any subject having superiors which include it (as "isosceles triangle" is included in "triangle") may have attributes which it shares in common with its superior; however, such attributes are said "primo" of the superior, because they would not be directly caused by the inferior as inferior.

In general, then, the propositions of a demonstration must make use of these three types of predication (de omni, per se, and primo.) The predicate in each case must be validly termed a universal in the strictest sense, that is, it must never be found without its subject nor may its subject be ever found without that predicate, for only then is necessary knowledge, the aim of demonstration, had and known to be had.

There are, however, two types of demonstration. "Propter quid" demonstration proves a conclusion by explicitly giving the proper cause of that conclusion; "quia" demonstrations prove a conclusion without assigning a proper cause. The individual requirements for the two types will therefore differ. The first requisite for "propter quid" demonstration is that the premisses must be necessary. This is due to the very nature of demonstration, since scientific knowledge, which cannot be other than it is, can be concluded only from

necessary truths. Although a necessary conclusion can be accidentally concluded from non-necessary premisses, nevertheless, it is entirely impossible that a conclusion should be known to be necessary unless it has been derived from necessary premisses. Aristotle likewise shows that the premisses must be necessary from the fact that they must use "per se" predication;<sup>12</sup> this argument, however, cannot be taken strictly as a proof, since later Aristotle proves that demonstration must concern "per se" predication because it concerns only necessary truths. Thus Aristotle would be guilty of a circular proof. According to St. Thomas, Aristotle, in this first instance, uses this argument only as an "ad hominem" argument, and not as a strict proof.<sup>13</sup> Further, the premisses are the causes of the conclusion. But if causes are removed, so are their effects. Premisses which are not necessary can be removed, but this would also remove the conclusion. Demonstrated conclusions, however, are not movable, since they must be necessary, and therefore it follows that the premisses too must be necessary. More directly, the middle term is the cause of the conclusion; it also must be necessary if the syllogism is to arrive at necessary truth. If the middle term is not necessary, the syllogism can be neither a "propter quid" nor a "quia" demonstration, since that which is necessary cannot be known through that which is not necessary.

The second requisite for a "propter quid" demonstration is that both the conclusion and the premisses must con-

tain "per se" predication. This is true of the conclusion because those attributes of a subject which are not "per se" are neither always nor necessarily found in that subject; if demonstration were of these, the conclusion would not always be necessary. For this reason demonstration can be only of properties, or "per se" attributes, since only these necessarily inhere in a subject. That the premisses too must have "per se" predication is proven by the fact (already shown) that the premisses must be necessary. Since demonstration gives us science, its premisses must be necessarily true; but those which are not "per se" are not necessarily true, since no accidental predication can be necessary. Therefore, the propositions of a demonstration must contain "per se" predication. Even if the premisses are invariable (but not "per se") and the conclusion is actually necessary, no one can know it to be necessary nor know why it is necessary, so long as the premisses are not "per se."

The third requisite for a "propter quid" demonstration is that it proceed from principles proper to the subject-genus. This merely means that premisses used for demonstrations in one science cannot be used as premisses in another science (unless, perhaps, the one science is contained under the other). This is evident from what has gone before: since demonstration must consist of "per se" predication, demonstration cannot be brought about if the premisses pass from one genus to another. In a conclusion of a demonstration, the

predicate is shown to be a "per se" attribute of the subject because both subject and predicate are shown to be "per se" connected with a middle term; clearly, then, these "per se" connections are impossible unless the subject, predicate, and middle term are all contained under the same subject-genus. Every demonstration has its own proper subject-genus concerning which it demonstrates; it cannot pass to another. Further, a science cannot always demonstrate concerning the accidents of its own subject-genus, unless those accidents are also of the same genus. For example, geometry can demonstrate many things concerning lines, but it cannot demonstrate whether a straight line is the most beautiful of lines, although beauty is an accident belonging to lines. Beauty is not of the same genus as lines, and therefore the science of lines cannot demonstrate concerning it.

Just as demonstration cannot use extraneous principles, neither can it use changeable principles. Principles which are changeable are sometimes true, sometimes not; the predication involved therein would therefore not be "de omni" predication. The subject and predicate of a principle may well be changeable things, but the connection between them, taken as subject and predicate, must be changeless and incorruptible; otherwise, the conclusion arrived at cannot have scientific truth.

Demonstration likewise cannot make use of common principles; rather, its principles must be proper to that con-

cerning which the demonstration is made. The middle term, because of which the conclusion is brought about, cannot be shared with a heterogeneous subject; if it is, the knowledge which it gives to us is, at best, "per accidens" knowledge, since the middle term applies equally to many subjects. However, in sciences which are subordinated (as music can be considered an inferior of arithmetic, since it measures sound) the inferior science can demonstrate by using principles taken from the superior. In such a case, this difference will obtain: the inferior science will be able to demonstrate "quia," using this foreign middle, but not "propter quid"; only the science to which the middle term properly belongs can use it to prove "propter quid." Since, then, demonstration in any science does not properly proceed from common principles, it follows that no science can demonstrate its own principles. These common principles of all the particular sciences are considered under one science, which St. Thomas calls "prima philosophia."<sup>14</sup> The subject of this science (metaphysics) is, simply, being; indeed it must be such, for if its principles are common to all sciences, so must its subject be. Metaphysics is clearly the greatest of all the sciences, since the principles of all other sciences are proven through it, while it itself needs no prior science for the proof of its own principles.

"It is hard to be sure whether one knows or not; for it is hard to be sure whether one's knowledge is based on the

basic truths appropriate to each attribute..."<sup>15</sup> For this reason Aristotle investigates further the difference between common and proper principles. Principles themselves may be defined as those things in any genus which, although they are true, cannot be demonstrated.<sup>16</sup> These principles are distinguished from other truths by the fact that these other truths must be demonstrated before they can be accepted as true. Here is an example of a common principle: if equals are added to equals, equals remain. This type of a principle can be used in demonstration, but always analogically, that is, in proportion to the science in which it is used. In other words, common truths may be used to demonstrate, but only in so far as they pertain to the subject-genus concerning which the science is. The definition of the subject of a science would be an example of a proper principle. Since such a definition has no application outside its own science, it is said to be proper to it.

Common principles can likewise be divided among themselves. The first type, called "common conceptions of the mind," are in themselves true, and are also evident to all as being true. They cannot be proven, nor do they need to be proven, for no one can possibly have certitude of their contraries. Such principles, as "the same thing cannot both be and not be at the same time," may indeed be denied in word, but cannot be denied by an ordered intellect; even in the case of an intellect blinded by a perverse will, such principles

must be acknowledged, at least in the practical order.

The second type of common principles are called by St. Thomas "suppositiones" (hypotheses) and "petitiones" (postulates).<sup>17</sup> Both of these are demonstrable, but not within their own sciences; therefore, when they are used within their own sciences, they are accepted as indemonstrable. Their distinction is based on their acceptance by a pupil: if such a principle seems probable to a pupil and he accepts it, it is called a "suppositio"; if, however, the pupil holds the contrary or has no opinion at all concerning the principle, it is termed a "petitio."

Among these common principles are found some first principles, as the principle "an affirmation and negation are not true at the same time." This principle is not used in demonstration, because to both affirm and not deny a middle term of the major or the minor does not add any more certitude to the conclusion. In other words, to say that "man is an animal and is not a not-animal" adds nothing over saying, simply, that "man is an animal." The common first principle "concerning everything there is either a true affirmation or negation" is used by demonstrations in which there is a reduction to the impossible, that is, in demonstrations whose conclusion is shown to be true by proving its opposite false. Both opposites could be false, were it not for this principle. However, it is not necessary always to use this principle in demonstrations which reduce to the impossible, nor is it

necessary to use it in its universality, but only insofar as it is sufficient in the particular genus at hand.

Common principles actually form the starting-point for all the particular sciences; from them all sciences proceed, although no science can use them to demonstrate anything of its own particular subject, except the science of metaphysics, which, in considering being, its proper subject, likewise considers the common principles of all being. There are two other exceptions to this rule: logic, studying the intentions of reason, which are common to all sciences, will likewise be concerned with common principles, and dialectics, which, although also treating of the intentions of reason, sometimes argues concerning those things which are most common, such as being, non-being, whole, and part, and must therefore argue concerning common principles, whose truth is dependent on the knowledge of these terms.

Every particular science must be built upon principles proper to it; otherwise, it would not be a particular science. Every science has its own proper questions, because its questions are merely its propositions put into an interrogative form. The proper questions of a science are those questions due to which something is demonstrated either pertaining to that science, or using the principles of that science. Every science also has its proper responses, since a response is always made to a question, and since a disputation arises from questions and answers, every science likewise has

its proper disputations. Each science too has its proper deceptions, which are caused by an incorrect application of its principles, or by using syllogisms either faulty in form, or containing a term used equivocally.

Thus we have seen the requirements for a "propter quid" demonstration. The requisites for a "quia" demonstration differ somewhat, since it proves only that a certain proposition is true, and does not give the proper cause for its being true. Within one science, there are two differences between a "quia" and a "propter quid" demonstration. Firstly, a "quia" demonstration may have as its middle term an effect of the conclusion, rather than its cause. The premisses must be immediate, and, to us, they must be more known than the conclusion; otherwise, they would not make us know. That an effect be more known to us than its cause is very possible, since an effect may be evident to our senses while the cause perhaps must be arrived at by posterior reasoning. Certainly every cause is by nature more known than its effect, but in regard to us, the effect may well be more known. Such a conclusion, brought about by a middle term which is an effect rather than a cause, will give us validly demonstrated knowledge, but the cause of the truth of the conclusion will not be known. In some demonstrations of this type, a "propter quid" demonstration can be produced by reversing the major and the middle term; in others, this reversal is not possible. The importance and strength of this type of demonstration can

be gauged from the fact that all the metaphysical proofs for the existence of God are "quia" demonstrations, through effects.

The second type of "quia" demonstration within one and the same science is that in which the middle term is a non-immediate cause of the conclusion. The middle may be considered a non-immediate cause when it is not convertible with the major term. St. Thomas uses this example: everything that breathes is an animal; no wall is an animal; therefore, no wall breathes. The middle term here, "animal," is not convertible with the major term, "everything that breathes," since there are some animals which do not breathe. Hence, the immediate cause is not given, and the demonstration cannot be called "propter quid." If, instead of the middle "animal," we would take as middle "everything having lungs," a "propter quid" demonstration would result, since to have lungs is the immediate cause of breathing.<sup>18</sup>

Among diverse sciences, sometimes it is found that one science can demonstrate the truth of a conclusion (a "quia" demonstration) while depending on another science to show the cause of that conclusion (the "propter quid" demonstration). Most often this happens in sciences which are subordinated as superior and inferior, either because the subject of one science is a species of the subject of a superior science, or when the subject of the inferior is compared to the subject of a superior as matter to form (as music applies

formal numbers to its particular matter, which is sound.) In both of these cases, the superior science has abstracted from matter, while the inferiors apply its formal principles to their own particular matter. For this reason, "propter quid" demonstration can be had only in the superior science. However, if an inferior science has inferiors of its own, it can demonstrate "propter quid" with regard to those inferiors.

Up to here our treatment has been of the matter of demonstration, that is, of its propositions and principles. The form of a demonstrative syllogism must now be considered. There are three forms, or figures, which a syllogism can take, depending on the position of the middle term. In the first figure, the middle term has the major term predicated of it and is itself predicated of the minor term. In the second figure, the middle is predicated of both the major and the minor term. In the third figure, the middle term has both the major and the minor term predicated of it. A "propter quid" demonstration demands that the middle term be the cause of the property which is predicated of the subject in the conclusion; likewise it demands that every proposition be in one of the four modes of perseeity. The first figure supplies all of these demands and is in no way limited, whereas the second figure is limited to negative conclusions, due to the need of distributing the middle term at least once, and the third figure is limited to particular conclusions, since the minor term in the third figure is always used particularly. Only in the

first figure can the middle term be presented as combining in itself the proper cause of the predicate of the conclusion and the essence of the subject of the conclusion and thereby prove the "per se" connection of that same subject and predicate. Likewise, the first is the only figure which can be used to investigate the subject of definition, which holds a very important place in regard to demonstration, as will be shown later. Finally, the second and third figures are developed from the first and have need of it whenever a mediate proposition needs to be reduced to an immediate proposition; this can be done only by introducing a middle term for the proposition itself (as distinguished from the middle term of the syllogism) and thus can be brought about only in the first figure, for there the middle term is between the two extremes. From these reasons we conclude that "propter quid" demonstration especially takes place in the first figure.

Since the first figure can proceed using one negative proposition, we now ask how a negative proposition can be immediate. Once more, an immediate proposition is a proposition which does not have a middle term through which it can be demonstrated. A negative proposition, one term of which is in a whole of some kind, as a species in a genus, and the other term not in any whole, will be a mediate proposition; so also will be the case if both terms are in some whole, provided that the wholes are diverse. For example, the proposition "no line is white" is mediate, since "line" is in the "whole"

of quantity, and "white" is in the "whole" of quality. The middle term which could be used to prove this proposition could be either quantity or quality. If, however, both terms of a negative proposition fall into the same whole, the proposition will be immediate, as "nothing rational is irrational." Moreover, a negative proposition will be immediate if neither extreme is in any whole, and one extreme is not in the other. Such a proposition could not be proven in the first figure, since therein the minor proposition must be affirmative, and therefore the minor term must have some whole, or genus; in the second figure, at least one proposition must be affirmative, so therefore at least one term must be in a whole; nor could the third figure demonstrate such a proposition, since it can never arrive at a universal conclusion, which a negative immediate proposition would be. Thus the proposition is clearly immediate.

Having now examined demonstration itself, both materially and formally, it remains to investigate the foundations, as it were, upon which demonstration rests, that is, those ultimate principles from which the truths proven by demonstration come forth. All demonstrative knowledge is acquired by means of two such principles: the middle term and the first indemonstrable propositions. The middle term, as its name itself denotes, is that medium or means through which a proposition is proven to be true; thus it follows that every search for science necessarily involves a search for a middle

term. In searching for science, however, we seek to know only that which we do not already know; therefore, a middle term is useful only in regard to things concerning which there can be a doubt or a question. This is clear since that which is known with certainty has need neither of proof nor of any questioning. All possible questions are reduced by Aristotle to four types: whether a proposition is true (quia est); why a proposition is true (propter quid); whether a thing exists (an est); what is the nature of a thing (quid est).<sup>19</sup> Everything which we can ask, as well as everything that we can know, is reducible to one of these four questions. The third question (an est) concerns only a noun and a verb, as the question "Does a centaur exist?" It is therefore called a simple question, and is said to be in the first mode of enunciation. The question "quid est" immediately follows this question, since, having determined that a thing does exist, we next ask what that thing is. This question too is a simple question. However, the first question (quia est) concerns more than a noun and a verb; it is concerned with the truthfulness of an attribute's being predicated of a subject, e.g., the truth of the proposition "man is white." This question is considered a composite question, and is said to be in the second mode of enunciation, due to the introduction of a third term. When the question "quia est" is answered, we seek to know "why" or "on account of what"; therefore, the question "propter quid" immediately follows the question "quia est," and falls into

the same mode of enunciation.

All four of these questions have a direct reference to a middle term. When we ask "an est" or "quia est," we are really asking whether a middle term exists by means of which we can demonstrate the answers to these questions. When we next ask "quid est" or "propter quid," we are asking for the nature of that middle term which has been shown to exist by the first two questions. It is true that when we ask these questions we may not be even thinking of a middle term, but it is likewise true that such a question cannot be answered unless a middle term through which the answer can be proven does exist.

Since to know scientifically is to recognize causes, and since knowledge had through demonstration is had through the middle term, it follows that the middle term must be the cause of the conclusion. This can be shown through an example. When we ask whether the moon is eclipsed, we are asking whether a cause for the moon's being eclipsed actually exists. The existence of this cause is obviously the middle term through which it can be proven that the moon is eclipsed. When we ask why the moon is eclipsed, we are asking what that middle term is, or, equivalently, what the cause of the moon's being eclipsed is. Therefore it follows that the middle term used in both modes of enunciation must be the cause of the conclusion; the existence of the cause is used in proving "quia est" or "an est" whereas the nature of the cause is

used in proving "propter quid" or "quid est."

When we ask "quid est" of a property or "propter quid" of a proposition predicating that property of its subject, our answers are identical. For example: an eclipse may be defined as a privation of light from the moon due to the interposition of the earth between the sun and the moon. But this is precisely the reason why the moon undergoes an eclipse. Since these two are the same, it is clear that in either mode of enunciation the same thing is being sought, namely, the middle term, or the cause of the conclusion.

From this it may seem that we are using the definition of the predicate of a demonstrated conclusion as the middle term, rather than the definition of the subject of that conclusion. However, it must be remembered that a definition of a property cannot be had without a definition of the subject of that property. Likewise, the principles which the definition of the subject contains are also the principles of that subject's properties. We conclude therefore that the middle term of a "propter quid" demonstration must be the definition of the subject, although the definition of the property is more or less included in that definition.

Further proof that all search for knowledge is a search for a middle term can be found in instances where the middle term is sensible. If, for example, we could see the earth come between the sun and the moon and cause an eclipse, we would immediately know the answers to all four of our

questions concerning an eclipse. This is so since the middle term--the intervention of the earth--would be immediately known by our senses. Here again we see that to know "quid est" of an eclipse is the same as to know "propter quid" of an eclipse.<sup>20</sup>

The middle term of a strict "propter quid" demonstration must always be the definition of the minor term. A definition, however, always signifies the essence of a thing. The questions now arise: how is the essence of a thing made known? can an essence be demonstrated, or must it be merely assumed? An essence can be proven through a dialectical syllogism by using as a middle term a definition derived from an extrinsic cause of a thing; for example, the essence of a house can be proven by means of its final cause. In such cases, the thing involved must have two definable natures (as a house can be defined materially or finally); one can be dialectically proven by means of the other, but this second definition must be assumed.

Before we are able to know the essence of a thing, we must know that that thing actually exists, for it is impossible to know what a thing is without knowing that it is. There are two ways of knowing that a thing exists without knowing what it is: by knowing some accident of the thing, as perhaps its motion, or by knowing a part of the thing's essence, as if, perhaps, we would know a thing to be rational, without knowing it to be animal also. From knowledge of an

accident alone we cannot proceed to knowledge of the essence; we have certain knowledge only that the accidents exist and we can in no way arrive at the essence of the subject from those accidents alone. However, we can discover the whole essence of those things which we know to exist by knowing some part of their essence. Let us take this example. If we prove that the moon undergoes an eclipse because the earth intervenes between it and the sun, we have demonstrated both that there is such a thing as an eclipse and why there is such a thing as an eclipse. Furthermore, we have shown what an eclipse is. If we had proven that there is such a thing as an eclipse because sometimes, although the moon is visible in the sky, no shadows are made by objects standing erect upon the earth, we would indeed know that an eclipse can exist, but we would not know why, nor would we know what an eclipse is. This demonstration would be a "quia" demonstration, not "propter quid." Indeed, if it were "propter quid," we would likewise know what an eclipse is, because to know "propter quid" of a property's inherence is the same as to know "quid est" of that property, as has been shown above. The middle term, therefore, which is precisely the term showing "propter quid," will likewise give the definition of the major term.<sup>21</sup> This is exactly what we have been looking for: a way to determine explicitly the essence of a thing. The middle term primarily defines the minor term, but since the principles contained in the definition of the minor term are likewise the

principles of the major term, the middle term also defines the major term. Lest it be thought that there can be a strict demonstration of an essence, it must be remembered that in a demonstration which manifests an essence, that essence is in no way a part of the conclusion. There can be no demonstration of essences, since demonstration is only of properties; nevertheless, essences are made manifest through demonstration, since the medium of a "propter quid" demonstration is likewise the definition of the major term. Thus, though it is impossible to demonstrate an essence, it is also impossible to know an essence without demonstration.

A definition itself may be said to be a notion, or a concept, or some kind of a rational representation which signifies the essence of a thing. A second type of definition is the nominal definition, that is, a notion or concept which shows the signification of a name. Another type of definition can be considered as a concept manifesting the cause of a thing's existence; this type of definition will be a quasi-demonstration of a thing's essence, differing from a valid demonstration only in the order of terms and propositions. The first type of definition will signify the essence of a thing, although it will not demonstrate it. For example, to say "thunder is a sound in the clouds" is to use a definition of the first type, but to say "thunder is the sound of fire being extinguished in the clouds" is to use a definition of the third type, since it tells why thunder comes about.

There are three types of definition used in regard to demonstration. The first is the definition of immediate things, that is, of things not having a cause; such a definition is merely an indemonstrable setting down of their essence, since such definitions must be taken as immediate principles. The second type is that definition which is a quasi-demonstration and which differs from demonstration only in the placing of the words, as shown above. The third type is that definition which signifies only the essence of a thing, and not the reason for that thing; this type can be the conclusion of a demonstration.<sup>22</sup>

Having now examined the middle term and how it is made known, we return to the second foundation upon which demonstration rests, that is, the first indemonstrable propositions. Demonstration is wholly dependent on these first immediate propositions, for, unless they are known, demonstration is impossible. Aristotle first investigates whether we come to a state of knowing these principles from a state of not knowing them, or whether they are innate in us, but are at first unnoticed. This last possibility must be ruled out, for it would mean that one would possess knowledge more certain than that had through demonstration and would be unaware of it. Even the possessor of demonstrated knowledge must know that he has science, since he must realize that his conclusions cannot be otherwise; therefore, all the more he who has knowledge of first immediate principles must know that he

possesses such knowledge. However, the first possibility too cannot be accepted, because it is quite impossible to learn, that is, to come to a state of knowledge, from a state of knowing absolutely nothing, which would be the case here, since even the first immediate principles are presumed to be unknown. Moreover, even supposing pre-existing knowledge, first immediate principles cannot be learned, since there is nothing more certain than they through which they can be learned. We conclude, therefore, that there must be in man a knowing power, which exists before his knowledge of first principles and through which he comes to such knowledge. Three grades of a knowing power, or a capacity to know, are found in nature. The first grade is the power of sensation, which is naturally innate in all animals. Some animals are able to retain a sense impression after the sensible thing is no longer present, whereas others are not; those that have this power, as all perfect animals, are said to have memory. The third grade of knowledge is found in man, who alone of all the animals is able to reason concerning that which remains in his memory.

Memory, then, comes about from sense impressions which remain in the knower after the sensible thing has departed. From repeated memories concerning the same thing, there comes experience, which, of itself, lacks any reasoning power. Man, however, by his power of reason, can take from the many particular things in which he has experience the one

common principle which he sees therein, and can consider it apart from the consideration of its particular instances. This principle, proven by experience, becomes a universal principle of some art or science. This is the process by which man comes to know first common principles; therefore, we conclude that this knowledge is neither innate in him, nor is it had by means of previous knowledge, but rather it is had by means of pre-existing sense powers, coupled with an intellect, which is able to abstract universals from particulars. Sense powers and memory are not sufficient for the recognition of first principles; an intellect is needed, more explicitly an agent intellect, which is capable of abstracting universal principles from the particular instances in which they are based. More clearly, if many singular instances are taken which are indifferent in regard to a "oneness" or "commonness" existing in all of them, that "oneness" in which they do not differ, when received into the intellect, becomes the universal.

Our senses, though they properly and "per se" know only singular things, also apprehend the universal nature existing in the particular thing; otherwise we could not come to the knowledge of universals from the apprehension of the senses. It is clear, then, that we use the method of induction in coming to know first principles, since our movement is from particulars to universals.

Strictly speaking, there can be no science of first

common principles, because science, by definition, is knowledge had through demonstration, with whose principles we are now concerned. Clearly the first principles of demonstration cannot themselves be demonstrated. The intellectual habit under which these principles are included is therefore not science, but the habit of understanding ("intellectus," according to St. Thomas).<sup>23</sup> Understanding is the habit of first principles, and is therefore the beginning of science. Opinion and reasoning, though sometimes true, can also at times be false; science, however, is always true, and since the principles of demonstration must be more known than their conclusion, understanding must likewise always be true. The habit of understanding embraces the common principles of all science; understanding is therefore related to first principles in just the same way as science is related to all reality.

## FOOTNOTES

1. St. Thomas Aquinas, Commentaria in Posteriora Analytica Aristotelis, book I, chapter 4, paragraph 9: "...demonstratio est syllogismus scientialis, idest faciens scire."

2. Ibid., book I, chapter 4, paragraph 10.

3. St. Thomas Aquinas, Summa Theologiae, I,2,2,2m.

4. St. Thomas Aquinas, Commentaria in Posteriora Analytica Aristotelis, book I, chapter 5, paragraph 2: "...immediata propositio est qua non est altera prior."

5. Ibid., book I, chapter 5, paragraph 3.

6. Ibid., book I, chapter 5, paragraph 6.

7. Aristotle, Posterior Analytics, book I, chapter 2 (72a21).

8. Ibid., book I, chapter 2 (72b3).

9. St. Thomas Aquinas, Commentaria in Posteriora Analytica Aristotelis, book I, chapter 9, paragraph 5: "Et ideo in definitione dici de omni, duo ponit: quorum unum est, ut nihil sit sumere sub subjecto cui praedicatum non insit...Aliud est, quod non sit accipere aliquod tempus in quo praedicatum sub-  
jecto non conveniat."

10. Ibid., book I, chapter 10, paragraph 3: "...definitio significat formam et essentiam rei..."

11. Ibid., book I, chapter 10, paragraph 6: "...cum dico ambulans vel album, non significo ambulans vel album, quasi aliquid per se solitarium existens, cum intelligatur aliquid aliud esse quod sit ambulans vel album. Sed in his, quae significant hoc aliquid, scilicet in primis substantiis, hoc non contingit."

12. Aristotle, op. cit., book I, chapter 6 (74b6).

13. St. Thomas Aquinas, op. cit., book I, chapter 14, paragraph 3: "...non est vera demonstratio, sed est ostensio ad hominem, apud quem notum est quod demonstratio sit eorum quae sunt per se."

14. Ibid., book I, chapter 17, paragraph 4.

15. Aristotle, op. cit., book I, paragraph 9 (76a25).

FOOTNOTES (continued)

16. St. Thomas Aquinas, op. cit., book I, chapter 18, paragraph 3: "...principia in unoquoque genere sunt illa quae, cum sint vera, tamen non contingit ea demonstrare..."

17. Ibid., book I, chapter 19, paragraphs 3 and 4.

18. Ibid., book I, chapter 24, paragraph 4.

19. Aristotle, op. cit., book II, chapter 1 (89b25); St. Thomas Aquinas, op. cit., book II, chapter 1, paragraph 2.

20. St. Thomas Aquinas, op. cit., book II, chapter 1, paragraph 11: "Et ex hoc exemplo concludit quod idem est scire quod quid est et propter quid."

21. Ibid., book II, chapter 7, paragraph 8: "Et sic patet quod accipiendo propter quid, per demonstrationem accipimus quid est, quia ipsum medium ostendens propter quid, est ratio definitiva primi termini, idest maioris extremitatis."

22. Ibid., book II, chapter 8, paragraph 10.

23. Ibid., book II, chapter 20, paragraph 15.

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