

A NOTE ON NAMING GOD

ut supra probatum est, habet esse secundum totam virtutem ipsius esse.³³

What has the perfection in composition with something else, then, as wisdom is had by creatures as a quality inhering in a substance, is had only imperfectly. It is shared in or participated in, because what shares or participates takes something of what it shares or participates in, but does not exhaust it, as the name "participate" indicates, deriving as it does from "partem capere," "to take part." What is had not by reception, but is removed from all composition, is therefore had as a whole or perfectly. Thus, the way we name God and creatures arises from, and is a sign of, the fact that creatures participate in God.

³³ *Summa Contra Gentiles* I, Ch. 28. Cf. also Ia, Q. 50, a. 2, ad 4; *In I Sent.*, D. 3, Prologus; D. 48, a. 1, c.; *De substantiis separatis*, Ch. 14.

THE PLACE OF METAPHYSICS IN THE ORDER OF LEARNING

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The idea that metaphysics comes first in the teaching and learning of philosophy, while rarely defended in writing, is frequently implemented in practice. When called to account for this policy, its advocates are in no short supply of reasons for it. Despite the fact that Thomas Aquinas holds the opposite view, the proponents of "metaphysics first" are usually Thomists of a kind, probably because few besides Thomists believe in any such thing as metaphysics anymore. This opposition between Thomas and many contemporary Thomists is the occasion for this article, which I have chosen to present in the form of an isolated Thomistic inquiry:

Quaestio Unica:

*Is Metaphysics the Part of Philosophy that is
First in the Order of Learning?*

It might appear so for many reasons . . .

(1) The axioms—that is, the self-evident principles which are common to many disciplines—are first in our knowledge. Therefore the science which studies the axioms must be the first science for us to learn. But the science which studies the

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axioms is metaphysics, as Aristotle shows in *Metaphysics* 4.3. Therefore metaphysics is the first science for us to learn.

(2) Besides, no one paralyzed by objections to the principles of a science can begin to learn that science. And yet all beginners in philosophy today have heard many objections to the principles of every philosophical science. Therefore, prior to the learning of the particular philosophical sciences, one must first learn how to defend the principles of philosophy. But the task of defending the principles of philosophy falls to metaphysics—hence Aristotle defends the first of all the axioms in *Metaphysics* 4. Therefore metaphysics is the first science for us to learn.

(3) Moreover, what naturally enters into all our knowledge must be first in our knowledge. But the conception of “being” enters into all our knowledge, since we cannot conceive of anything without conceiving it as a being of some kind, or as some kind of privation of being. Hence “being” must be the first conception we form, and the first thing we know, and indeed this is the opinion of Thomas Aquinas.

Plainly we should study first what comes first in our knowledge. Since “being” comes first into our knowledge, the study of being must be the first. But the study of being is metaphysics. Hence, metaphysics is the first discipline for anyone to learn in a philosophical formation.

And this too appears to be the opinion of Thomas Aquinas, who opens the *De Ente et Essentia*, a metaphysical work and his first work in philosophy, with these words: “Because a little error in the beginning is great in the end . . . , and being and essence are the things which are first conceived by the understanding . . . , therefore, lest we should happen to err out of an ignorance of these, to uncover their difficulty, it must be said what is signified by the names *essence* and *being*, and how they are found in diverse things, and how they compare to logical intentions, namely genus, species, and difference.”

(4) Again, the more universal comes before the less universal in our knowledge, as Aristotle says in *Physics* 1.1. Therefore the science with the most universal subject matter is the first science to learn. But the science with the most universal subject matter is metaphysics, whose subject is being as being. Therefore metaphysics is the first science for us to learn.

(5) Nor is that all. Whenever there is an abstract science and another science which is more concrete and which applies the results of the abstract science, the abstract science is prior to its concrete application in the order of learning. Hence we learn geometry before we learn optics, and biology before medicine. But the particular philosophical sciences are applied metaphysics, since they all consider being, but not as being, but as this or that particular kind. Metaphysics, in other words, is a more abstract science, of which all other particular disciplines are but concrete applications. Hence metaphysics is prior to the particular sciences in the order of learning.

(6) What is prior in our knowledge is more certain to us. Hence the more certain science is prior to the less certain in the order of learning, and so we learn mathematics before we learn ethics. But the science with the simpler subject is more certain.¹ Hence the science of the unit, which has no location and is thus simpler than the point, is more certain than the science of the point—a sign of which is that the principles of geometry have been disputed more often than the principles of number theory have. Again, mathematics considers pure quantity, whereas natural science considers quantity in sensible things, and mathematics is more certain than natural science. But the science with the simplest subject is metaphysics, since its subject is being as being, without any further addition, while every other science considers being with some addition, such as “quantified” or “mobile.” Hence metaphysics

¹ See *Posterior Analytics* I.27.

is also the most certain of the sciences, and must therefore be first for us in the order of learning.

Moreover, Thomas Aquinas himself appears to make this very argument: "By however much sciences are naturally prior, by so much are they more certain: which is clear from the fact that those sciences which are said by addition to others are less certain than sciences which include fewer things in their consideration, as arithmetic is more certain than geometry, since the things which are in geometry are by addition to the things which are in arithmetic. . . . But particular sciences are by nature posterior to universal sciences, because their subjects add to the subjects of the universal sciences: as it is clear that mobile being, which natural philosophy is about, adds on to being simply, which metaphysics is about, and on to quantified being, which mathematics is about: therefore that science which is about being, and about things most of all universal, is the most certain."²

(7) The certainty of science and demonstration results from knowledge of the cause.³ For example, if we see in various instances that the angle drawn inside a semicircle is right, we might begin to suspect this is true of all angles drawn inside a semicircle, but we will not be sure until we discover why this must be so. Hence, the science which considers the cause of a cause will be more certain than the science which merely considers the cause, and the science which considers the first of all causes will be the most certain of all. But that science is metaphysics or wisdom, and hence it is a mark of the wise man that he has the greatest certainty.⁴ But we have the greatest certainty about what is first in our knowledge, this being the cause of all our subsequent certainty. Therefore, metaphysics is the first science in our knowledge.

² Commentary on Aristotle's *Metaphysics*, I.2, L. 2, n. 47 Marietti.

³ Cf. *Posterior Analytics* I.2, 71b9ff., and Thomas Aquinas' foreword to his commentary on the *Metaphysics*.

⁴ *Metaphysics* I.2.

(8) It is impossible (except by luck) to begin a philosophical formation from the right science without knowledge of which science is the right one to learn first. Therefore the first science to learn must be the one which considers which science to learn first—that is, the science which orders the sciences. But this is metaphysics.⁵ Therefore metaphysics is the science to learn first.

(9) The knowledge of how to go about knowing things precedes the knowledge of those things.⁶ But it falls to metaphysics to consider, universally, the natural method by which man comes to know all things, and to consider the principles by which to determine which methods are appropriate to the various particular sciences and by which to determine the limitations of human knowledge. Thus it is in his *Metaphysics* (Book 2) that Aristotle considers how human reason compares to the task of knowing all truth, and it is right after a division of the sciences (which pertains to metaphysics) that Boethius (and Thomas Aquinas, commenting) distinguishes the various proper methods of the sciences.⁷ Therefore metaphysics is the first science for us to learn.

(10) Aristotle and Thomas Aquinas both call mathematics and natural science *parts* of metaphysics.⁸ But they also agree that these are the only three speculative philosophical disciplines. Therefore it is impossible, in their view, to begin speculative philosophy except with some part of metaphysics.

(11) The very name of the science, namely "First Philosophy," implies that it ought to be learned first, before any other part of philosophy.

⁵ Cf. *Metaphysics* I.2 982a18-19, and VI.1.

⁶ Cf. *Metaphysics* II.3 995a12.

⁷ *De Trinitate* QQ 5-6.

⁸ *Metaphysics* II.4.

ON THE CONTRARY, however,

(1) The very name "Metaphysics" implies that the science is learned after natural philosophy. It derives from *ta meta ta phusika*, meaning the doctrines which come after the doctrines concerned with nature.

(2) Besides, mathematics and natural science have always been commonly accepted as legitimate disciplines in one way or another, despite particular objections that have been raised against both. Hence they are today taught throughout our schools and in an authoritative fashion. Metaphysics, however, is not commonly recognized as a legitimate body of rigorous and objective knowledge. This is a sign that its subject is less known to us than the subjects of the other sciences, and hence should be studied after them.

(3) And then there is the authority (for those moved by it) and the reasoning of Thomas Aquinas, who says:

This science, which is called wisdom, although it is first in dignity, is nevertheless last in learning.⁹

All other sciences are ordered to it [i.e. wisdom or metaphysics] as to an end.¹⁰

The ultimate happiness of man consists in the best activity of man, which is that of the supreme power, namely the intellect, with respect to the best intelligible. But because an effect is known through the cause, it is manifest that a cause by its nature is more intelligible than the effect, even if sometimes for us effects are more known than causes because we get the knowledge of universal and intelligible causes from particulars falling under sense. Hence it is necessary that, simply speaking, the first causes of things be in themselves the greatest and best intelligibles, because they are most of all beings and most of all true since they are

⁹ Comm. on *Metaphysics* 1.2, L. 2, n. 46 Marietti.

¹⁰ Comm. on *Metaphysics* 1.2, L. 3, n. 58 Marietti.

the cause of being and of truth for other things, as is clear from the Philosopher (in *Metaphysics* 2), although such first causes are known less and later on for us, since our intellect compares to them as the eye of a little owl to the light of the sun which it cannot perceive on account of the excessive brightness. Therefore it is necessary that the ultimate happiness of man which can be had in this life consist in the consideration of the first causes, because that little bit which can be known about them is more lovable and nobler than all the things which can be known about inferior things, as is clear from the Philosopher (in *The Parts of Animals* 1). . . .

And so it is that the aim of the philosophers was chiefly to arrive, through all the things which they considered in things, at a knowledge of the first causes. Hence they ordered the science about first causes last, to whose consideration they set aside the last period of their life, beginning first from logic, which imparts the method of the sciences, proceeding second to mathematical science of which even young men can be receptive, third to natural philosophy, which requires time on account of [the need for] experience, and fourth to moral philosophy, of which a young person cannot be a [profitable] hearer, and last they pursued divine science, which considers the first causes of beings.¹¹

[Aristotle] raises this question: why a young man can become a mathematician¹² but he cannot become a wise man

¹¹ From the opening of his Commentary on the *Book of Causes*.

¹² One of history's greatest mathematical minds was Carl Friedrich Gauss. When Gauss was a little schoolboy, one of his teachers wanted to keep him and his schoolmates busy and quiet, so the teacher gave them a difficult assignment: add up all the numbers from one to a hundred. About six seconds after the assignment was given, while all the other children were still doing the tedious work of addition, little Gauss placed the correct sum on the teacher's desk: 5050. How did he do it? Little Gauss noticed that $1 + 100 = 101$, and $2 + 99 = 101$, and $3 + 98 = 101$; in short, the sum of all the numbers from 1 to 100 was equal to the sum of 50 pairs of numbers, with each pair equalling 101. The total sum was therefore 50 times 51, which is 5050. When Gauss was only 19 years old, he discovered how to construct a regular pentagon having 17 sides

(that is, a metaphysician) or a physicist (that is, a naturalist). To this the Philosopher answers that the former, i.e. mathematical things, are known by an abstraction from the sensible things of which there is experience; and so not much time is needed to know such things. But the natural principles which are not abstracted from sensible things are gathered by experience, for which much time is required.

And with regard to wisdom, he adds that the young do not believe sapiential (that is, metaphysical) things, that is, they do not reach them with the mind, although they might speak them with the mouth; but in regard to mathematical things, the "what it is" is not hidden to them, because the natures of mathematical things are of imaginable things, but sapiential things are purely intelligible. Now the young can easily receive the things which fall under the imagination. But they do not reach with the mind those things which exceed sense and imagination, because they do not yet have an understanding trained for such considerations, both on account of the littleness of time, and on account of the many changes of nature.

Therefore the fitting order of learning will be that first young men be instructed in logical things, because logic teaches the method of the whole of philosophy. Second, they should be instructed in mathematics, which neither needs experience nor transcends the imagination. Third in natural

(called a "heptadecagon"), using nothing but straight lines and circles, which is the way Euclid constructs regular polygons in the fourth book of his *Elements*. No one in mathematical history had ever suspected that this polygon, with a prime number of sides, could be constructed by Euclidean means. More shocking, he discovered a general formula which determined precisely which regular polygons having a prime number of sides could be constructed and which could not. All this when Gauss was still a teenager. Similarly, Blaise Pascal, at the tender age of 16, discovered his famous collinearity theorem about random hexagons inscribed in circles. Great mathematicians often display prodigious talent when they are very young, and can lose their edge when they grow older. Great philosophers, on the contrary, come into their prime toward old age, and there simply is no such thing as a philosophical whiz-kid, or a great philosophical discovery that was made by a young child.

things, which, even if they do not exceed sense and imagination, nevertheless require experience. Fourth in morals, which require experience and a soul free from passions, as is written in the first [book of the *Ethics*]. And fifth in sapiential and divine things, which transcend the imagination and require a strong understanding.¹³

I ANSWER THAT the three primary matters¹⁴ of metaphysics are the first causes, being as being, and the axioms. And each of these is a reason why metaphysics comes last in the order of learning.

THE FIRST CAUSES

As for the first of these primary matters, namely the first causes, they most obviously do not come first in the order of learning philosophy, but after learning other disciplines better fitted to the human mind.

Since the human mind is made to understand the natures of things sensible and imaginable, these are the first objects of our intellect, and the sciences about them are first for us in the order of learning. And hence the first causes, which are neither sensible nor imaginable, are last in our knowledge. And although the things of logic are also neither sensible nor imaginable, they are better proportioned to our mind, since our mind is the cause of the things logic studies, and hence can fully understand them. Moreover, logic must be learned first, despite its difficulty, since it directs the use of reason in all the sciences.¹⁵

Again, since the human mind begins in pure potency to all understanding, and what begins in potency and ends in

¹³ Commentary on Aristotle's *Ethics*, Book 6, Ch.8.

¹⁴ For an extensive treatment of what are the three primary matters of metaphysics, and what are its three secondary matters, and its three tertiary matters, see "The Matter and Order of Wisdom," by Duane Berquist, published in *Philosophia Perennis*, Vol. 3, No. 2, Fall 1996.

¹⁵ See Thomas Aquinas' Commentary on Boethius' *De Trinitate*, Q6 A1, response to the third objection in the second set of objections.

act goes from the imperfect toward the perfect, and from the less perfect to the more perfect, hence our mind naturally understands first the intelligibles which perfect it less, and only later the greater intelligibles which perfect it more. Hence the first causes, which are the greatest intelligibles, are last in our understanding, coming after an understanding of lesser intelligibles such as the natures of natural things and mathematical things.

Moreover, the most universal cause is understood through the most universal effect, namely being as being. But it can be difficult to see that being as such needs a cause—what is more known to us is that becoming needs a cause (and for this reason all four kinds of cause are first defined by motion or becoming). It is plain to us that a house, for example, needs a cause in order to come to be, but it is not clear at all that it depends upon an agent cause simply in order to be. Hence the very effect of the first cause is difficult for us to grasp as an effect. Much more will the cause itself be difficult for us to understand.

And the knowledge of the first causes is not only more difficult for us than the knowledge of natural and mathematical things, but it also in some measure presupposes and depends on the knowledge of those things that are more known to us. We cannot arrive at a knowledge of the first causes without a prior understanding of secondary causes, for example—as when we discover the existence of a cause above nature through the fact that natural things act in ways that depend on intelligence, and yet they do not themselves possess intelligence. The knowledge of supernatural causes, then, presupposes and depends upon the knowledge of natural causes, which must therefore be studied first. Metaphysics must be studied after, not before, the philosophy of nature.

Again, although the immateriality of reason, learned in the philosophy of nature, need not be a premise in every argument for the immateriality of the first intelligence, nonetheless it must be learned first. We must see the immateriality of

the one kind of intellect that we do experience, namely our own, before we are ready to see the immateriality of a kind of intellect that we do not at all experience. The knowledge of the first intelligence, then, presupposes and depends upon the prior study of the human soul.

Moreover, we understand the substance of the first causes chiefly by negation. But we need a distinct understanding of the things studied in logic, mathematics, and natural philosophy before we can understand the reasons why these things must be negated of the first causes. For example, to understand the intelligence of the first causes, we must negate of them that they understand the truth discursively, or even by forming statements. And to understand the indivisibility of the immaterial substances, we must negate that it is the same as the indivisibility of a point; and to understand the unity of an immaterial substance, particularly that of the first substance, we must deny that it is the same as the “one” which is the beginning of number. And in the philosophy of nature we become strong in our understanding of many things which must be negated of the first cause, such as being in place and time, being mobile, being material, and many other such things. Hence the learning of logic, mathematics, and natural philosophy—although not all in the same degree—is a necessary preliminary to the study of the first causes.

In the order of learning, therefore, both logic and the particular philosophical sciences precede metaphysics by reason of the first primary matter of metaphysics.

BEING AS BEING

As for the second primary matter of metaphysics, which is its subject, namely being as being, this too must come after a study of the other parts of philosophy, although this is not as obvious as in the case of the first causes. Nonetheless, a glance at some of the chief parts of the study of being as being will bring this to light.

The study of being as being is principally the study of substance, which is being in the fullest sense. But how can it not pertain to the universal study of substance to ask whether every substance is a body? Or whether every substance exists in time and place? Or whether every substance is mobile or material? The study of being as being strives to say what does and what does not pertain to being as being. Hence it pertains to that science to show that being in place does not belong to a being as a being, but as a body—which cannot be done apart from showing the existence of beings that are not bodies. And this is accomplished only in the last part of philosophy, not the first, for the reasons given just above. Therefore the study of being as being comes at the end of philosophy.

And the universal study of the “one” pertains to the study of being as being, because every being, as a being, is one. But what is this “one” which is convertible with being? Is it the same as the “one” which is the beginning of number? It is hard to see how anyone could think otherwise unless he had learned, in mathematics and the science of nature, that the number which is in the genus of quantity is based on measure, and hence on the homogeneity of the units, and hence on matter as a principle individuating things alike in kind. Moreover, he would have to have learned that immaterial things exist, and that these cannot have a homogeneous measure since they are not alike in kind, and hence their “number” is not in the genus of quantity. Without these prior considerations, we could not help but think that the “one” convertible with being was something in the genus of discrete quantity, a mistake that the Pythagoreans and Platonists made. And hence the correct understanding of the “one” that is convertible with being must come after the discovery of immaterial things, and after the study of matter as the principle of individuation, and after the study of number. Therefore the study of the “one” which is convertible with being also comes at the end of philosophy.

The perfections of being as being also come under the study of being as being. Hence the universal study of the good be-

longs to it. But it is not evident that “good” belongs to being as being, or that every being is good, until the end of philosophy. The reason is that, among familiar things, whether moral or natural, the good cannot be found or be understood apart from motion: it is that for the sake of which something moves or changes or comes to be. Hence the good does not function as a cause in mathematics, since there is no motion in mathematical things. It is only after learning the existence of activities which are not motions, and which belong to immobile substances, that one can understand the good to exist beyond the realm of mobile being. Hence the universal study of “good” is inextricably connected to the study of immaterial substances, and hence must come at the end of philosophy.

Again, one of the main parts of the study of being as being is the division of being into potency and act. Clearly, then, it belongs to the study of being as being to ask whether every being contains a mixture of both potency and act. But this is the same as to ask whether there is anything in existence which is purely act—which is the same as to ask about the first cause. Hence, the universal study of act and potency must come at the end of philosophy, where one learns of the existence of something which is pure act.

Again, is potency, as such and universally, the same as material potency? This question is connected to the existence of immaterial substances between ourselves and the first cause, substances which come into our knowledge toward the end of philosophy. Hence the universal study of potency, which is part of the science of being as being, comes at the end of philosophy.

We cannot even recognize the existence of a science of being as being as anything other than natural science or the study of bodies until we learn the existence of incorporeal beings.¹⁶ Prior to such a discovery, all talk of “beings,” for

¹⁶ Cf. Thomas Aquinas' *Commentary on the Metaphysics*, Book 6, L. 1, n. 1170 Marietti.

all we know, might be no more than a pointlessly abstract way of saying "bodies." It is true that even before learning about the immaterial substances we can see that "being" does not mean the same thing as "body," but it does not follow from this that we can see the possibility of a science of being as being that is distinct from the science of bodies. After all, "being" is not synonymous with "one," either—and yet it does not follow that there is a study of being as being which is distinct from the study of being as one, nor does it follow that there can be a being which is not one. Similarly, from the mere fact that "being" and "body" are not synonyms, it does not follow that there can be a being which is not a body, or a science of being which is not a science of body.

And since we cannot think without an image or without time and the continuous, and only corporeal substances are in any sense imaginable and only these exist in time and place, therefore the human mind is very much inclined to think that "to be" is just an incomplete way of saying "to be a body," and "to be one" is the same as "to be continuous," and "to act" is the same as "to move or cause change." The prevalence of these opinions among philosophers and non-philosophers alike shows how inclined we are to think in these ways. Without first seeing the existence of immaterial substances, then, the study of being as being is an empty concept game—a mass of words which students may memorize, but not understand.

Nonetheless, it does not follow that *no* universal consideration of being belongs at the beginning of philosophy. After all, it is not just metaphysics that considers being in all its universality, but logic, too, in its own way. The logician's division of being into the ten genera comes at the beginning of philosophy, even before one learns the definition of "argument." And this division is in aid of forming definitions in all the parts of philosophy to come, and helps to bring at the outset some precision to our idea of being, which does indeed enter into all our conceptions in one way or another. Nor does this constitute an excursion into metaphysics, as some have said,

but it remains properly a logical consideration of being. The metaphysician considers being as being, and hence considers it as it is found outside the soul and apart from our signification and conception, and also he studies it for its own sake and in order to understand it in its own principles as much as possible. The logician's consideration of being is quite distinct. He considers what can be said about being based on the figures of predication (the remote foundations for which are found in being outside the soul, and which are brought to light only in metaphysics). For example, when the metaphysician distinguishes the ten categories, he might enlist the logician's help, but he will not restrict himself to figures of predication. The metaphysician will distinguish the genus of quantity from the genus of quality, for instance, by pointing out that quantity follows upon the matter of a substance, and quality follows upon the form. This way of distinguishing goes to the principles of these modes of being as they are found in reality, and presupposes a study of the philosophy of nature. The logician, by contrast, is content to say that some predicates answer the question "How much?" and others answer the question "What sort?" That is a properly logical manner of distinguishing these genera. And the logician is competent sometimes to be more specific. For instance, he can subdivide the genus of quantity into continuous and discrete quantity, since these species answer distinct questions: "How much?" and "How many?" On the other hand, the logician cannot distinguish the main genera of substance—notice that Aristotle refuses to do this in the *Categories*—and this is because the distinction between corporeal and incorporeal substances does not correspond to any distinct figures of predication, which in turn has to do with the fact that incorporeal substances are not primary objects of our understanding, and our minds are not well adapted for knowing them.

So there is indeed the need for a universal consideration of being at the beginning of philosophy, only it is the consideration of the logician (who considers, as it were, being as true,

or as conceived by reason), and not the consideration of the metaphysician who studies being as being.

THE AXIOMS

As for the third primary matter of metaphysics, namely the axioms, this too must come after a study of the other parts of philosophy, although this is the case most difficult to see.

DEFINITION OF 'AXIOM.' By 'axioms' I do not here mean 'arbitrary assumptions,' in the modern logician's sense. I mean a certain type of self-evident statement. By a 'self-evident' statement I mean a statement such that anyone who adequately understands what the subject is and what the predicate is will automatically understand the truth of the statement, without reasoning, whether it is an affirmation or a negation. For instance, *Congruent triangles contain equal areas* is such a statement, and so is *No prime number is perfect*. An 'axiom,' more particularly, is a statement that is self-evident to everyone, and hence it is one whose subject and predicate are known to everyone, containing terms drawn exclusively from common experience. For this reason, the subject and predicate of an axiom must be very general things, not highly specific notions which fall outside the consideration and experience of many people. For example, *Every whole is greater than any one of its parts* and *Equals added to equals make equals* are axioms. And because of the generality of the terms in the axioms, they are not of special use in only one discipline, but belong to more than one part of philosophy. For example, *Every whole is greater than its part* is used in logic, in mathematics, in natural philosophy, in ethics, and in metaphysics.

Now precisely because these statements are known to everyone, and are of need in many or all of the parts of philosophy, it seems especially odd to say that their study belongs to the last part of philosophy rather than to the first part. So perhaps it is best to begin with what is more known, and say what knowledge of the axioms does indeed come at the beginning of philosophy.

The Knowledge of the Axioms Prior to Metaphysics

First and foremost, the natural knowledge which everyone has of the axioms is at the beginning of philosophy—indeed it is before philosophy, and no philosophy is possible without this natural knowledge.

Moreover, the study of what an axiom is belongs to the first part of philosophy: logic. So too the study of how the axioms are principles of demonstration and of science belongs to logic, although this consideration is general in the sense that it does not take up all the axioms one by one and say specifically of what conclusions they are causes. This belongs more to the particular sciences which actually use the axioms and form demonstrations with them according to the rules given by the logician.

And the statement of the axioms relevant to its subject matter pertains to each particular science. Hence Euclid enunciates that "The whole is greater than the part," and the like. And of course the use of the axioms, in the degree that each is relevant to a particular matter, pertains to each of the particular sciences.

Moreover, the logician trains us in dialectic, which is a technique useful for identifying the axioms and the other self-evident principles, and for defending them from objections.¹⁷ And logic comes before all other parts of philosophy.

And each part of philosophy prior to metaphysics can make use of dialectic to discover or manifest its own proper principles (with the possible exception of mathematics, which has little or no need of dialectic, since its subject matter suits our minds so well). For instance, the philosopher of nature uses dialectic to discover and manifest the principles of nature.¹⁸

A particular science can also be said to defend an axiom, but only in part, and not in the full range of the universality of the axiom. If an axiom is attacked by the principles proper

¹⁷ Cf. Aristotle's *Topics*, I.2 101a37ff.

¹⁸ Cf. Aristotle's *Physics*, I.1-7.

to a particular science, then it is up to that science to resolve the fallacious objection. For example, it is possible to misreason from the principles of geometry and conclude that every triangle is isosceles, from which it can be made to follow that the whole is equal to the part. And it is possible to misreason from the principles of arithmetic and conclude that 3 is equal to 2, from which it follows that a whole is equal to its part. It belongs to mathematics to undo these attacks on the axiom that the whole is greater than the part. In doing so, however, the mathematician is defending the axiom only insofar as it applies in his particular subject matter.¹⁹ The principle that the whole is greater than the part is also of use in logic, for example, but the mathematician cannot defend its use there, or defend its use even in mathematics if its use there is attacked with principles foreign to mathematics.

The Metaphysician's Knowledge of the Axioms

Just as the particular sciences make a particular study of beings while the metaphysician makes a universal study of them, so the particular sciences make a particular use and defense of the axioms—only the ones they need, and only in the measure that they need them, and only in the measure that their proper principles can resolve the objections—while the metaphysician makes a universal study of them. The metaphysician studies *all* the axioms, not just those useful for studying some particular genus of things. And the metaphysician studies and defends each axiom in the full range of its applicability, not just its applicability to this or that genus of beings.

The metaphysician's consideration of the axioms includes the following tasks: (1) To distinguish and order all the axioms themselves, as when Aristotle states the first of all the axioms

¹⁹ "Since even the mathematician uses the common axioms only in a special application, it must be the business of first philosophy to examine the principles of mathematics also." Aristotle, *Metaphysics* 11.4 1061b18 (W.D. Ross translation).

and proves that it is the first, (2) To distinguish and order all the central meanings of the words in the axioms (which enables us to distinguish and order all the interpretations that can be given to the axioms, and in how many ways each can be applied), as Aristotle does to some extent in the fifth book of his *Metaphysics*, (3) To defend the axioms in the full range of their universality, and not just insofar as they are applied to this or that genus of things. (Aristotle, for example, does this with the first of all the axioms in the fourth book of his *Metaphysics*.) This last task is largely served by distinguishing and ordering the meanings of the terms in the axioms, since the objections to the axioms are very often based on the fallacy of equivocation.

As for (1), no one is competent to distinguish and order all the axioms unless he knows what they all are—he is not even competent to try unless he has had some experience in all the parts of philosophy, and in all sciences which begin from axioms. The natural knowledge of the axioms we all share is not distinct enough to enable us to say, distinctly, what all the axioms are, much less to put them in order. Therefore this universal study of the axioms must come after learning something of all the particular sciences, which each explicitly articulate and use whichever axioms they need.

As for (2), no one is competent to distinguish the range of meanings which a very universal word includes unless he has an experience of its different senses in the various disciplines. Hence this consideration of the axioms comes at the end of philosophy. And since *sapientis est ordinare*, and since it is especially the work of wisdom to order all things or to order very universal things, therefore the work of ordering the meanings of a very universal word (like "being" or "one" or "whole" or "nature") is especially the work of the wise man. But a man becomes wise or approaches this toward the end of philosophy, not at the beginning.²⁰

²⁰ One can easily verify the difficulty of ordering the meanings of a

As for (3), defending an axiom in its full universality, this too must belong chiefly to the last part of philosophy. The truth of any self-evident statement is made evident principally by making known the meanings of its terms. Since none but a universal science drawing from an experience of all the sciences is competent to explain the full range of the meanings of an axiom, it follows that none but the last science in philosophy is competent to manifest the full universality of the truth of an axiom. This is chiefly what is meant by saying that the particular sciences draw their principles from metaphysics.²¹

Of course, if the attack made on an axiom or some other self-evident principle comes exclusively from the principles of a particular science, then indeed it belongs to that particular science, not metaphysics, to resolve the objection. But to attack an axiom from the principles proper to a particular subject matter is to attack it as if it were a proper principle, while attacking it on universal grounds is more commensurate with the universal nature of the axiom itself. And only a universal science can resolve an argument made in terms as universal as those in an axiom, and this leaves us with either logic or metaphysics.²² There are indeed times when it falls to logic to resolve the objection made to an axiom, namely when the universal grounds for the objection are made in

word well. Take any word whose meanings Aristotle and Thomas have wisely distinguished and ordered, such as the word "in" or "before," and ask someone—perhaps not even a student of philosophy, but a teacher—whether he can come up with the central meanings of the word among its myriad senses. Then see whether he can order them properly. There are few who are capable of this task of philosophy on their own.

²¹ Cf. Thomas Aquinas' commentary on Aristotle's *Metaphysics*, Book II, L. I, n. 2151 Marietti.

²² See Thomas Aquinas' Commentary on Aristotle's *Physics*, Book I, L. 2, near the middle, in which he says that a particular discipline does not defend its own principles from attacks based on foreign principles, but they are defended by a higher particular science, or else by a universal science, such as logic or metaphysics.

terms proper to logic. For example, when people reject the axiom "What begins to be needs a cause," they sometimes do so on the grounds that it cannot be self-evident, since the predicate is not part of the meaning of the subject. This is in part a logical attack, and it falls in part to the logician, whose duty it is to define the self-evident and to distinguish its kinds and causes, to show the error in this thinking. But since it is the metaphysician who considers the meanings of "cause" in all its universality, it falls to him most of all to consider this axiom, what makes it evident, and to resolve attacks made upon it as an axiom.²³

When logic alone is used to defend an axiom from an attack based on the principles of beings, however, since the logician does not get into the principles of being as being, his defense is dialectical, and proceeds from probabilities. When a metaphysician destroys universal objections to an axiom, his destruction proceeds from proper principles and has demonstrative force.²⁴

But since an axiom is a self-evident truth, and since its evidence is not needed in any particular science except in the measure that it applies to that science, there is no general need for the universal consideration of it until one arrives at the universal science of being. Hence, in regard to all three ways in which the metaphysician considers the axioms, his kind of knowledge of the axioms is not first in philosophy, but last in the order of learning.

Nor does this leave a teacher of a particular science without recourse when a student is troubled by an objection to an axiom or proper principle needed in that science. If the objection is based on the principles used in that science, it pertains to that science to resolve it. If it is based on univer-

²³ Cf. Thomas Aquinas' Commentary on Aristotle's *Metaphysics*, Book 4, L. 5, n. 595 Marietti.

²⁴ Cf. Thomas Aquinas' Commentary on Aristotle's *Metaphysics*, Book 4, L. 4, where he compares and contrasts the dialectician or logician and the metaphysician (nn. 572-577 Marietti).

sal considerations which exceed the scope of the particular science, it is best to resolve it dialectically or by the use of logic, since logic precedes the particular sciences in the order of learning. Besides, dialectical arguments, which can proceed from our students' own opinions, are more easily understood and more persuasive to them than an argument based on a metaphysical doctrine which is difficult and foreign to them.

On occasion, without doing significant violence to the order of learning, a teacher might also address an objection by appealing to the principles of a science that is later in the order of learning. For example, someone learning geometry might object that it is not always possible to draw a straight line between two points, since the two points might be touching. Since the objection is not made on grounds peculiar to points and straight lines, but could as well apply to two "nows" in time or two moments in a motion, the resolution to this objection comes from the science that considers contact and the continuous universally, which is the philosophy of nature, a particular science which comes later in the order of learning.²⁵ But the relevant principles of the later science and the way they apply in order to answer the difficulty at hand might be possible to convey in a sufficiently short time to justify a brief excursion into the matter of that later science for the benefit of removing obstacles to the earlier one.

This kind of excursion can be done well or badly, for good reason or for insufficient reason, but even when done well and with good reason, it does not bear on the order of the sciences, since it is precisely a departure from the natural order for the sake of addressing a disorder in the mind of a student. The cause of this way of proceeding is not the nature of the human mind, nor the natural order in which it approaches diverse matters, but contingent circumstances—while teaching must in general follow the natural order, it is a practical endeavor dealing with individual students, and cannot ignore

²⁵ Cf. Aristotle's *Physics*, Book 6, Ch. 1.

their individual dispositions and circumstances. Hence Aristotle, before addressing the opinion that being is one and immobile in his *Physics*, insists that this is not a question for natural philosophy, and that the natural philosopher does not as such need to address the question, since it is evident to him through induction or mere experience that many things that exist by nature are in motion.²⁶ Nevertheless, he thinks it best to address the opinion in some way, keeping as much as possible to the principles pertinent to natural philosophy and to logic, which, although it is not part of natural philosophy, at least has the advantages of being prior to it in the order of learning and of being by its nature a tool for each of the sciences.

SECONDARY MATTERS OF METAPHYSICS

The secondary matters of metaphysics²⁷ do not concern *things* so much as our knowledge of things—namely how well the human mind is suited to the understanding of truth, what the natural order is in which the human mind comes to understand the truth, and the division of the sciences and the distinction of their proper methods. Since these matters are clearly secondary, the placement of metaphysics in the order of learning is not based primarily on these, but on the primary matters discussed above.

Besides, the universal and scientific consideration of these matters also belongs at the end of philosophy, and not at the beginning, since this consideration presupposes an experience of how the human mind understands all the different kinds of things considered by all the particular sciences.

Nonetheless, some of these matters can and should be addressed at the beginning of philosophy, although not in the

²⁶ *Physics* 1.2 184b25-185a20.

²⁷ For an explanation of the secondary matters of metaphysics, see Duane Berquist, "The Matter and Order of Wisdom," *Philosophia Perennis*, Vol. 3, No. 2, Fall 1996.

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manner appropriate to wisdom. For example, it is healthy and even necessary for a student beginning philosophical studies to be taught the influence of custom upon thought and how to counteract this, and to be told that our understanding moves from the sensible to the intelligible and how to respect this. A student can see these things inductively, or by signs and examples, even if he cannot in the beginning appreciate the universal implications of these principles or see the ultimate causes of them. Similarly, a student must learn at the beginning of philosophy that we understand what things are by defining them with genera and species-making differences. But *why* we understand things in that way, and what are the remote foundations in reality for this way that we understand, cannot be understood until after many other things have been considered, such as the immateriality of reason, the principle of individuation, and the like. Hence the study of the foundations of logical intentions both in reality and in the nature of the human soul belongs more to the end of philosophy, not the beginning.

There is in logic, however, a universal consideration of the sciences and of how the human mind knows, which belongs to the beginning of philosophy and not to the end. But it is more superficial than the universal consideration of the metaphysician, which comes at the end, since the logician does not study the proper methods of the sciences, but only the common method, and since the logician does not study his own method's foundations in human nature and reality.

TERTIARY MATTERS OF METAPHYSICS

The tertiary matters of metaphysics²⁸ concern not so much our knowledge of things as the dispositions of will and emotion disposing us well (or ill) toward a knowledge of things—

²⁸ For an explanation of the tertiary matters of metaphysics, see Duane Berquist, "The Matter and Order of Wisdom," *Philosophia Perennis*, Vol. 3, No. 2, Fall 1996.

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chiefly wonder, docility, and the love of wisdom. Since these matters are clearly tertiary, the placement of metaphysics in the order of learning is not based primarily on these, but on the primary matters discussed above.

One can still see, however, that the perfect consideration of these matters belongs at the end of philosophy. Who is most competent to say what the love of wisdom is if not the one who understands wisdom, and who is this if not the metaphysician? Similarly, he will be most capable of explaining the wonder and the docility that are conducive to acquiring wisdom.

Nonetheless, students can and should understand something of these dispositions in the beginning—they should in fact possess them. But a vague grasp of wisdom is sufficient for the understanding of these dispositions in the beginning. A perfect grasp of these dispositions, however, requires a perfect understanding of wisdom, which comes only at the end of philosophy. For instance, to understand why we need docility means to understand the difficulty or impossibility of acquiring wisdom by ourselves, which no one can understand perfectly and through its causes without a distinct knowledge of the matters of wisdom themselves and of the relationship of the human mind to those matters—which knowledge comes at the end of philosophy.

CONCLUSION

According to all these considerations, then, the study of metaphysics should come last in the order of learning philosophy, although the earlier disciplines often touch on matters pertaining to metaphysics in a partial or imperfect way, appropriate to their particular lights. This is hardly surprising, since the sciences prior to metaphysics are participations in wisdom, or partial philosophies.²⁹

²⁹ Cf. Aristotle's *Metaphysics*, Book 11, Ch. 4, 1061b34.

This does not altogether preclude the occasional excursion into metaphysical matter prior to the first formal teaching of metaphysics, as explained above, although this must always be done with prudence and a kind of intellectual temperance. Nor does the order of the disciplines require that everything of the prior sciences be learned first, before going on to the next science in the order of learning—that would indeed be impossible. Who would claim, for example, to know everything whatsoever that pertains to logic? Or to mathematics? Nor, were it possible, would it be desirable to know all of the earlier discipline before going on to the later one, if the earlier one is of lesser dignity and could occupy nearly all of one's life. Rather, what is required is that the general order in the study of the disciplines be observed in the teaching of them, and that the student learn whatever is of main importance and necessary for what comes later before proceeding to the next science.

Nor is the order of the disciplines so rigid as to exclude any motion back and forth. One might learn enough logic to proceed to math and natural science, for example, but then find that the difficulty of metaphysics requires a return to the study of logic before an advance into metaphysics is reasonable: the higher the tree grows, the deeper it must send its roots. And perhaps some imperfect acquisition of mathematics is necessary before one can truly learn logic, since an experience of defining and demonstrating is necessary before one can understand these well in logic.

In a similar way, it is right to say that plane geometry should precede solid geometry in the order of learning, but this does not mean that all of plane geometry must be learned before one can go on to study solid geometry, or that solid geometry can never in any way be of use in plane geometry.

Responses to Objections:

(1) It is true that some knowledge of the axioms must be first in our knowledge—it does not follow that every knowledge

of them is first in our knowledge. The natural knowledge of them is indeed before any science. Moreover, the knowledge of what an axiom is belongs to the science which is naturally first in philosophy, namely logic. But the perfect knowledge of the axioms that includes all the axioms, distinguished and placed in order, with the full range of their meanings distinguished and placed in order, pertains to wisdom, which comes last in the order of learning.

(2) Some objections to the self-evident principles of a particular science are drawn from other principles of that science, and can be answered from within that science, without any appeal to metaphysics. This happens, for example, when Aristotle resolves the motion paradoxes of Zeno by principles proper to the natural philosopher's consideration of the continuous.

Other times, objections to a particular science's self-evident principles are drawn from foreign principles, in which case the particular science itself cannot answer them. As long as the attacked principles are self-evident, though, their evidence within the particular science does not depend upon answering the foreign objections to them. For example, people have objected to Euclid's Fifth Postulate by saying that it does not hold true of straight lines in physical space. As long as the mathematician understands what he means by 'straight line' and 'right angle,' he may shrug his shoulders at what the physicists are saying and know that what he is saying remains true and self-evident. If he happens to know how to resolve the objection, this is not in light of mathematical principles alone, but in the light of principles drawn from a higher science, and one later in the order of learning, namely metaphysics, the science that distinguishes the proper subjects and methods of the various sciences.

Hence the earlier science does not depend upon the later one in order to know its principles or to proceed from them, but only for their defense from objections drawn from later sciences. It remains true, then, that the sciences in need of this kind of defense can be learned before the sciences which

provide their defense. Therefore it does not follow that metaphysics must be learned first.

(3) Just as one knowledge of the axioms comes at the beginning of philosophy, and another knowledge of them comes at the end, so too one knowledge of being comes at the beginning of philosophy, and another knowledge of it comes at the end.

Prior to the beginning of philosophy comes the natural understanding of the axioms, and at the beginning of philosophy comes the logical study of axioms. Similarly, prior to the beginning of philosophy comes the natural understanding of being, and at the beginning of philosophy comes the logical study of being.

Therefore, insofar as the objection says that a universal grasp of being and a universal study of being must come at the beginning of philosophy, this may be conceded. But it is a further point to say that the properly metaphysical way of studying being must come at the beginning of philosophy, for which the objection offers no reason.

As for the text of Thomas Aquinas drawn from the opening of the *De Ente et Essentia*, he nowhere says or implies there that the study he is undertaking in that work should come at the beginning of a philosophical formation. He directly contradicts this in other texts, cited above. And so, when he says that "a little error in the beginning is great in the end," by "in the beginning" he does not mean "in the beginning of philosophy." (Neither, incidentally, was this meant by Aristotle, whom Thomas is here quoting.) Rather he means "in regard to the beginning," and the particular 'beginning' he has in mind is our universal conception of being. So the sense is this: "If we make a mistake in regard to a beginning of all our knowledge, such as *being* which enters into all our knowledge, then all our knowledge can be adversely affected by such a mistake." One could say the same thing about the axioms. And just because 'being' is a beginning of all our knowledge,

it does not follow that the metaphysician's way of studying it comes at the beginning of philosophy—just as it does not follow from the fact that 'the whole is greater than the part' is a beginning of nearly all our knowledge that the metaphysician's particular way of studying and defending this beginning comes, in the order of learning, before the mathematician's way of using it.

(4) The principle that the more universal comes first in our knowledge is primarily about the simple act of grasping what things are, and not about the formation of true statements articulating universal properties, which is the principal concern of science.³⁰ It is important to place this limitation on the principle since the reason for the principle is this: our knowledge naturally moves from the less perfect understanding toward the more perfect understanding. Now a more universal grasp of what a thing is constitutes a less perfect understanding of that thing than a more particular grasp of it does, while a more universal statement indicates a more perfect understanding than a more particular statement does. Put otherwise, the more universal the *predicate* in our statements, the less perfect an understanding it will reflect, but the more universal the *subject* in our statements, the more perfect an understanding it will reflect, generally speaking.

For example, if I place an animal before you, you express a less perfect and more confused understanding of it if you identify it as an "Animal" than if you identify it as a "Marmoset." The more particular grasp is more perfect, because it is less confused with other things, and more distinct.

But if you say "Nature acts for an end," this reflects a more perfect understanding than if you say "Animal nature acts for an end" or "Human nature acts for an end." Likewise if you say "Every triangle has an angle sum of two rights," this reflects a more perfect understanding than if you say "Equilat-

³⁰ Cf. Thomas Aquinas' Commentary on the *Metaphysics*, Book I, L. 2, nn. 45-46.

eral triangles have an angle sum of two rights." The more universal statement is superior because (1) the most universal subject of a given property contains the true cause for that property, and our knowledge is best when we know through the cause, and (2) the one who knows the more universal statement by that very fact already knows the less universal one, too, in potency, but the one who knows the less universal statement does not, by that fact, have any knowledge of the more universal one.³¹

Therefore metaphysics, which studies the properties of the most universal subject of all—being—will study the most universal truths, the understanding of which is the greatest understanding, and the most difficult for us. It is for this reason that one of the principal tools of *manuductio* is "less universal propositions," which divide up a statement too universal for a student to grasp all at once into more particular truths, like a parent cutting up food into smaller parts easier for a child to chew and swallow. A more particular statement like "Natural things act for an end" is more known to us and closer to our experience than a more universal statement like "Every agent acts for an end." It is not even clear to us in the beginning that this second statement is more universal than the first. And when a teacher says "The received is received in the mode of the receiver," or "When something belongs to two things, but to one of them because of the other, it belongs more to the cause," these statements are typically too universal for anyone to understand and digest without the help of more particular statements that fall under them.

Now when we say it is more difficult for us to understand universal truths, and that we tend to proceed from particular truths to more universal ones, and hence metaphysics comes last in the order of learning, none of this is contrary to admitting that natural science is characterized by proceeding from the universal to the particular. In a science that resolves its

³¹ Cf. Aristotle's *Posterior Analytics* I. 24.

judgments to sense experience, the study of more particular things will require greater experience, and hence will be more difficult to acquire. Hence it is especially characteristic of natural science³² to proceed from the more universal to the less universal in the order in which it considers things. And this does not constitute a motion from a more perfect understanding to a less perfect understanding, since in following this order we typically proceed toward statements that have not only more particular subjects, but also more particular predicates. For example, we proceed from "Every natural thing acts for an end" in the general part of the science of nature to "This animal acts for this end in this way" in a more particular part of the study of nature—we do not move merely to "This animal acts for an end." Because both the subject and the predicate are more particular, one cannot easily say which is a "more perfect understanding," but it is easy to see that the more particular statement is more difficult for us to know, because it requires a more intimate experience of natural things.

There is no special reason to think that this order of the more general to the more particular should characterize every science. Metaphysics, for example, proceeds from studying what is common to all beings toward studying the immaterial substances, which is a motion from the more universal in predication to the less universal in predication (but more

³² Cf. Thomas Aquinas, *De Trinitate* Q6 A1 1st question, about the way in which natural science proceeds by way of reason: "In a third way a procedure is called rational from the rational power, namely inasmuch as in proceeding we follow the proper mode of the rational soul in knowing, and thus the rational procedure is proper to natural science. For natural science in its procedures preserves the proper mode of the rational soul with regard to two things. First with regard to this, that just as the rational soul takes a knowledge of intelligible things which are more known by nature from sensible things which are more known to us, so natural science proceeds from things which are more known to us and less known by nature, as is clear in *Physics* I.1. . . . And so the rational mode is observed in natural science most of all . . ."

universal in causality). And the reason is again because we are proceeding to what is more difficult for us to know, not so much because it requires more experience, however, but because it is further removed from our experience. And mathematics will occasionally proceed from the more universal to the less, as when we define "angle" before we define "right angle," but the science as a whole is more characterized as moving from the simple to the composed, and from the equal to the unequal.

Nor is there any special reason to say that the order of the sciences should go from those with more universal subjects to those with less universal ones. On the contrary, generally speaking it will be more difficult for us to see the truth of statements whose subjects are more universal, if the predicates remain the same, as just explained above.

This suffices for a first response to the fourth objection. Since the universal precedes the particular primarily in the simple acts of grasping natures, and not in the acts of understanding of truths, it does not follow that the science which studies more universal truths should precede the science studying less universal ones.³³

Even with regard to the simple grasping of what things are, however, the universal understanding does not precede the more particular one in every way. Students recognize this from their own experience, and hence typically resist the idea that the more universal precedes the less universal in our understanding at all. The very names for extremely universal things are less known to us than many far more specific things, and sometimes a very universal thing has no name at all—as "being" has no single and all-inclusive name in Chinese.

There can be no doubt that the concept of "figure" must be grasped before the concept "triangle." If you have no no-

³³ This is basically the same answer that Thomas Aquinas gives to the present objection. See his commentary on the *Metaphysics*, Book 2, L. 2 nn. 45-46 Marietti.

tion at all of "figure," then you cannot even begin to have a notion of "triangle," since a triangle is a figure of some kind. But—and this is what students see—it is easier to say what a triangle is than to say what a figure is. That is, when it comes to defining these things, and grasping them distinctly, it is often more difficult to achieve a distinct knowledge of the more universal thing. More people can define "triangle" ("three sided plane figure") than can even attempt a definition of "figure" ("dimensional quantity contained by a boundary or boundaries"). And a child can point out some things that distinguish the particular animals familiar in his experience before he can name something that distinguishes animals from plants—it is easier to distinguish "dog" from "goldfish" than to distinguish "plant" from "animal."

In short, it is the vague and confused universal that comes before the particular in our grasp of what things are. And any confusion remaining in the universal will translate into some confusion about the particular. But we can still arrive at a kind of distinctness about the particular while leaving the general idea above it in some confusion. For example, we can define "triangle" without becoming very clear about what a "figure" is or what "number" is, even though these are elements in its definition. This is analogous to studying a form in some detail while leaving our understanding of its correlative matter rather vague and indistinct.³⁴ Aristotle does something similar when he defines nature by motion, and only later defines motion. He says that we cannot understand the definition of nature perfectly without being able to say distinctly what motion is—but he must think we can and should understand the

³⁴ Nothing prevents us, for example, from studying the human soul, and getting into some detail about it, without studying the human body in corresponding detail. Nonetheless, it is impossible to understand the human soul at all without some understanding of the human body. Hence Thomas Aquinas will say that we can study the soul "in a kind of abstraction" from the body. See his commentary on the *De Sensu et Sensato* of Aristotle, L. 1, n. 2 Marietti.

definition of nature in some way before defining motion, or else he would not have defined it first.

It appears to be true, then, that while the more universal precedes the less universal in our simple conceptions, this is true primarily of the natural and confused understanding of the more universal. And it also follows that a perfect understanding of the more particular is impossible without a perfect understanding of the more universal first. Nonetheless, a partly distinct understanding of the particular, in which the more universal concept plays a role but is left indistinct, seems to be in many cases more easily reached by our understanding than a distinct understanding of the more universal.

Hence nothing prevents us from conceiving of "dog" with the kind of distinctness afforded by the science of nature (and logic) before conceiving of "being" with the kind of distinctness afforded by metaphysics, even though "being" enters into our conception of "dog." Accordingly there is no reason to learn metaphysics first even as regards the order of knowing in simple grasping.

(5) Although the particular sciences have subjects that are more particular and concrete than that of metaphysics, it is not true that they are applications of metaphysics. Mathematics has a more particular subject than being, and yet it does not proceed by applying the conclusions of the science of being as being, but by applying its own proper principles appropriate to its limited matter, and by applying the axioms in the measure that they apply to its matter. Similarly for the philosophy of nature.

The reason for this is that metaphysics not only has a more general subject than the particular sciences, but it also considers that subject in a more general way, namely *as being*. (Metaphysics also studies certain beings in particular, namely immaterial substances.³⁵ But this is because they are beings most

³⁵ See Thomas Aquinas' Commentary on Aristotle's *Metaphysics*, Book

of all, and because they are the first principles of all beings.) But the reason that particular properties belong to a particular kind of being is not because it is a being, but because of the kind of being that it is. Hence the particular sciences, which study particular beings as such, cannot reach their own conclusions by applying the conclusions of the science of being as being. And hence the fifth objection proceeds from a false premise, namely that the particular sciences are applications of metaphysics.

(6) Metaphysics has a simpler subject even than mathematics, but it does not follow that metaphysics is more certain *to us* than mathematics (although some, such as Descartes, have thought so).³⁶

As some things are more intelligible in themselves, but less intelligible to us, so some things are more certain in themselves, but less certain to us. Those things are more certain in themselves which are more necessary and further removed from the causes of contingency, namely matter and motion. We do not find within such things any cause for uncertainty in knowledge about them. But it does not follow that the knowledge of such things is more certain to us, since the power of the mind to seize upon such things is another cause of certainty, and this is weak in our case in regard to the most necessary and unchangeable beings. Hence the matter of metaphysics is the most certain of all, as regards causes of certainty on the side of the matter, but it is most difficult for us to acquire certainty about such things.

And when it is said that the wise man has the greatest cer-

7, L. 11, n. 1526 Marietti. See also in the same commentary: Bk 3 L.4 n. 384, Bk 3 L.6 n. 398, Bk 6 L.1 n. 1170, Bk 11 L.1 nn. 2158-2159, Bk 12 L.2 n. 2427.

³⁶ Cf. Thomas Aquinas' Commentary on Boethius' *De Trinitate*, Q6 A1, toward the end of the response to the second question (whether in math we should proceed *disciplinabiliter*), where he says that mathematics is easier and more certain than natural philosophy and metaphysics.

tainty, this does not mean that he has more certainty of his subject than a mathematician has about his. What is meant is (i) that of all those who know all things in some way, he is wiser who has a greater certainty about these, (ii) that his subject is in itself the most free of causes of uncertainty, and (iii) that he has the most perfect knowledge of the axioms, which are the cause of all our certainty.

The sixth objection, however, cannot draw its conclusion unless the science with the simpler subject is always more certain to us—which is false. And that is why Thomas Aquinas, in the passages quoted in the sixth objection, says more than once that the science which is “naturally prior” is more certain—but for Aquinas the “naturally prior” means what is by its nature more perfect, not always or even usually what is before in our knowledge. Hence God is “naturally prior” to creatures, but posterior to them in our knowledge.

(7) It is true that “science” in the strictest philosophical sense means the most perfect mode of reasoned-out knowledge, in which certainty results from knowing the cause of the truth. But “a science” means not a mode of knowledge, but a unified body of conclusions about one subject matter which can at least sometimes be known in the scientific mode, but in which it might not be possible to know all the conclusions in the most perfectly scientific manner, i.e. through the cause of their truth. In mathematics the conclusions are almost always known in a perfectly scientific way, namely through the real reason why they are true. But in the science of nature, such a mode of knowledge is rare, and we generally know effects first and their causes afterward. And while the most perfect kind of certainty is through knowledge of the cause, whenever effects are better known to us than their causes nothing prevents us from knowing the effects with certainty before we know anything of their causes. For instance, we can know with certainty that a crime has taken place before knowing who did it or for what motive. Likewise we can be certain

that natural causes exist before knowing the cause of natural causes, or even that they require a prior cause. Therefore the objection proceeds from a false premise, namely that all our certainty results from knowing the causes of things, or that the more something is a cause, the more known it is to us. This is true for us only in some matters, not in all, and it is not true about the first causes. Hence the conclusion does not follow.

(8) We can follow the directions of the wise without being wise ourselves. Therefore, without relying on luck, but relying on the wisdom of those more advanced than ourselves (whose wisdom we recognize at first only imperfectly and by signs and by the endorsement of trustworthy authorities), we can begin philosophy at the beginning and proceed in the right order without ourselves knowing perfectly well the reasons behind the order we are following. In a similar way, if we have reasons to trust the directions someone gives us to a place we have never driven to before, then it is not just by luck that we begin well and go through the right steps and in the right order on the way to our destination. And just as we can confirm that we are heading in the right direction by certain signs along the way, without having a perfect knowledge of the road until we reach the end, the same goes for one's progress in philosophy. Hence the objection proceeds from a false premise, namely that it is impossible to follow an order without having at first a perfect understanding of the reasons behind that order.

(9) Just as we can follow the order of the sciences without understanding perfectly what the ultimate reasons are behind that order, so we can follow the order and way of proceeding within a science, by adhering to the instructions of wise teachers, without yet knowing perfectly the reasons behind that order and behind that way of proceeding. Nor are we left in the dark as we proceed, but we can see that we are

making progress, and see by signs and probable reasons that the method we are adopting is appropriate. Hence the ninth objection fails for the same reason as the eighth.

(10) The word "part" has at least three distinct senses. The first sense corresponds to the whole which is composed of, but not said of, its parts. For example, body and soul are "parts" of a man in this sense, or head, torso, and limbs are "parts" of the body. The second sense corresponds to the whole which is said of, but not composed of, its parts. For example, dog and cat are "parts" of the genus "animal." The third sense corresponds to the whole of some power or perfection, as the powers of the soul are called "parts" of the soul, because no one power exhausts the whole power of the soul. The soul, however, is neither composed of these parts, nor said of them. Similarly, all creatures exhibit "parts" of the perfection of God, but God's perfection is not composed of the perfections of creatures, nor said of them. In a similar sense, too, the instincts of animals or the senses might be called "parts" of intelligence, or participations in it, and lower forms of argument might be called "parts" of the categorical syllogism.

It is in this third sense of "part" that Thomas Aquinas and Aristotle call the particular sciences "parts" of metaphysics, since each particular science exhibits something of the perfection of wisdom, but not all of it. Each one, for example, covers a certain part of being, and is like a partial wisdom, or a wisdom about that kind of being. Each one, too, studies the first principles and causes in a certain genus of things. But from this it does not follow that metaphysics is composed of these sciences, or said of them. Hence one is not studying metaphysics when one studies any of these other sciences, and so the objection fails by committing the fallacy of equivocation in regard to the word "part."

(11) Metaphysics is called "First Philosophy" not because it is first in the order of learning, but because it is first in dignity,

and deserves the name "philosophy" or "wisdom" more than the other parts of philosophy. Therefore the eleventh objection, like the tenth, fails on account of equivocation, in this case on the word "first."

Since all these objections fail, it remains that metaphysics should be taught to philosophy students last, not first. That there is some difficulty in seeing this, however, is plain from the number of objections that arise. There is more than one cause of this difficulty. One is that the nature of metaphysics is difficult to grasp, and therefore the reasons why it should be studied last are difficult to grasp. Another cause for difficulty is the current state of the other parts of philosophy. Today, even among Thomists, there is a widespread disbelief in the philosophy of nature: there are the specialized branches of natural science, and then there is the metaphysician's knowledge of nature, and that is all. And mathematics is not regarded as "a speculative philosophy," but as something altogether irrelevant to philosophy. And logic, in the measure that it is about categories of being and about self-evident truths, is often not distinguished from metaphysics. Hence there remains little besides ethics for a philosopher to study except metaphysics—speculative philosophy becomes identified with metaphysics.

Since the order of things consists in the relations of before and after among them, and since nothing is before or after itself, it follows that order presupposes distinction, and the knowledge of order presupposes the knowledge of the distinction of the things ordered. It is impossible, accordingly, to see the order in which the sciences must be learned without first seeing clearly the distinction among the sciences. Little wonder, then, that today, when the distinction of the sciences is widely misunderstood, and is often considered merely a matter of convention or convenience or a division of labor, the order in which the sciences should be taught is also ill understood.

FINALITY IN NATURE IN ARISTOTLE'S
PHYSICS II, CHAPTER 8

Marcus R. Berquist

The second book of Aristotle's *Physics* is a general account of the method of natural science. This involves the consideration of two questions: what is the subject of this science, and by what causes does it demonstrate? After determining the subject of the science, in the first two chapters, Aristotle proceeds to determine the kinds and modes of cause in nature in the remainder of the book.

An adequate general consideration of the causes requires a discussion of *luck* and *chance*. For since we all speak of certain things coming about *by* luck or chance, one naturally wonders whether these are included among the kinds and modes of cause already distinguished, or whether they require a separate treatment. (Chapters 4, 5, & 6) Further, since many doubt whether the *end* ("that for the sake of which") is a cause in nature, or rather is unique to human, voluntary action, a further consideration of the end is necessary. (Chapter 8) Finally, there must be a consideration of the sort of necessity found in nature, for the kinds of causality recognized will determine the sort of necessity to be expected in natural processes. (Chapter 9)

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