

Dear Father and Ralph,

Much and perhaps all of the dispute about needing to prove immaterial existence before doing metaphysics stems from not appreciating two facts about the relation of logic to science. The first is that logic is a second-order discipline in relation to disciplines like philosophy and mathematics that are first order. I will come back to this.

The second is something Ralph has called to our attention (*The Logic of Analogy*, p. 37, n. 3). When someone says, as Aquinas does, that learning logic should precede learning a first order science like the philosophy of nature, logic's priority in the order of learning (*in via addiscendi*) does not mean that knowledge of logic must precede knowledge of the other science in the order of discovery (*in via inventionis*). At least, no one, Aquinas included, should mean that.

Consider, for example, Aquinas's statement in the *Commentary on the Metaphysics*, that we need to learn the method a science will use to investigate its subject before learning the science. What if someone said 'In order to get knowledge about whales, you first must understand the methods that need to be used to get knowledge about whales'? I proposed that statement to a colleague trained in modern philosophy of science; he laughed. And well he should. How can you possibly know what methods you will need to use to investigate whales except to the extent that you ALREADY know something about whales? How do I know that in order to learn about whales I need to go to the ocean rather than to the desert? Because I already know that whales are aquatic, not land based and certainly not arid-land based.

Not everything we need to know about something before we know what methods we must use to acquire further knowledge of them need be knowledge classifiable as scientific. But before we can acquire ANY knowledge about scientific method itself in the science we call 'logic', we must possess SOME scientific knowledge belonging to a science other than logic. In order for logic to be able to reflect on scientific knowledge, some scientific knowledge outside of logic must already exist. So before we have made at least some DISCOVERIES of a scientific nature, we can't possibly know anything about the methods

needed to make such discoveries. The second-order nature of logic now starts to be relevant. We acquire knowledge of a scientific method, in the first instance, by reflecting on existing first-order examples of the method and its results. If you first had to know the method of a science before you made any discovery in any science, you would never make any discovery in any science. For you would have to have scientific knowledge of the method of a science without having any prior scientific knowledge to reflect on and analyze.

Without being an expert in the history of science, I can say without fear of contradiction that humans science did not get started in the following way. One of our ancestors had a thought something like

Hey, it might be interesting to start a science. Well, let's see what I'd have to do to start a science. Gee, the first thing I should do is to learn the method of the science; secondly, I should find some thing or things it would be suitable to apply that method to.

Once genuinely scientific discoveries have been made, however, reflecting on them leads to discoveries in a different science, logic. But once such first-order discoveries have been made, a first order science already exists in a genuine, if incomplete, sense. Of course, all human sciences are forever incomplete. So we don't have to wait for first-order science to be complete before reflexive, second-order discoveries about first-order science are made and so before the science of logic can exist in a genuine, if incomplete, sense. Still, why would Aquinas say we must learn the logic of scientific method before we learn a science?

That statement appears in an early section of a commentary on a PEDAGOGICAL instrument. Aquinas would have considered Aristotle's *Metaphysics* to have been originally planned as a book; we consider it to have originally been a collection of classroom lectures. Either way it is a pedagogical instrument, an instrument not for making the initial discoveries that establish a science's existence, though it may certainly contain some new discoveries, but for teaching an already discovered and established science. We are *in via addiscendi*, not *in via inventionis*, with respect to a science. And for that purpose we should learn logic before learning the other sciences.

In *Being and Predication*, McInerny describes the movement from our original confused knowledge of *ens primum cognitum* to 'our investigation of the properties and causes of natural things' (p. 51). Significantly, the description occurs in an article entitled 'The Prime Mover and the Order of *Learning*' (my emphasis).

The movement described here is, of course, that of the philosophy of nature. What we first know intellectually are the quiddities abstracted from the data of sense experience. But *sensibilia* come and go and, while they are, they seem constantly in movement. Thus *ens mobile* emerges as the formal subject of the philosophy of nature."

It would be unfair to read McInerny as suggesting that the history of human science began with someone having second-order thoughts like

It might be interesting to start a science. What do I have to do to start a science? Well, you can't have a science without a formal subject for the science. Hey, look there! Some things are in movement. I think I've found something that could be the formal subject for a science, mobile being! Let's have a science of mobile being; I'll call it the philosophy of nature.

No, like Aquinas, he is leading up to a discussion of a pedagogical instrument for teaching the already begun philosophy of nature, Aristotle's *Physics*. He goes on

In the first book of the *Physics*, the principles of this subject are discovered . . . In the second book, the principles of the science are discussed. . . In the third book, the proper passion of the subject is demonstrated and the science proper is underway.

It would be unfair to McInerny to assume that his use of the verb 'discovered' indicates that he no longer considers himself to be speaking in the order of learning instead of the order of discovery. He certainly does not mean to imply, for example, that the 'science proper' could not have already been 'underway' until the first time someone had demonstrated that motion was the proper passion of the formal subject of the science. He certainly knows that someone could have already discovered, for example, a demonstration that what is continuous is potentially divisible to infinity and is divisible to infinity *only* in a potential

sense. Whenever any kind of demonstration like that had been discovered, the science proper would have been underway.

And he would not deny that someone could even have thought of the proof for the prime mover before logical second intentions like science, formal subject of a science, proper passion of a subject of a science, and proof itself had been explicitly articulated, and therefore before logic as a science could be learned. So far, so good, then, for McInerny's discussion of the relation of the Prime Mover to "the order of *learning*."

But why would he go on to say, concerning the demonstration of the Prime Mover that occurs in the eighth book of the *Physics*:

For the first time, the intellect sees that there is a *possibility of a science of being as being* which is distinct from the philosophy of nature. Prior to such a proof . . . being as being would be a more universal consideration, certainly, but would not the universality be simply of predication? The universality of metaphysics, however, is not simply a more general way of addressing ourselves to material being. And prior to a proof that being is not synonymous with material being, this could only be a *desirable* concern if one preferred confusion to exactness in knowledge (my emphases).

Apply that text to our problem: "Must you prove the existence of the immaterial before you can discover the demonstration that whatever exists, simple or complex, must be undivided?" Does the person who makes that or any other metaphysical discovery do so because she started by asking a second-order question about the existence of a science distinct from the philosophy of nature? Or is she more likely to have started with a first-order question like "Must everything that exists be undivided?" In general, do we make scientific discoveries by starting with second-order questions about logical objects like science or first-order questions about pre-logical objects? Does scientific knowledge start from our *desire* to know the answers to second-order questions about the possible existence of this or that science of things rather than first-order questions about the things?

McInerny had still better be in the order of learning, not discovery, when he makes these remarks. Here, McInerny may intend to still be in the order of learning

There's something that might be a formal subject for a science. I think I've found a subject for a science, mobile being!") You have to be kidding me. This sounds as if he's saying

\*\*\*\*\*

maybe I should first identify some thing or things that would be a suitable subject for a science. No, I can't start there, because I'd already have to know something about those things. But I can't learn about things scientifically until I know the method the science will use to acquire scientific knowledge of those things. Who in their right mind would say "hey let's see if we can establish a science. Gee whiz. to do that we better know the method of the science. And then we better decide which things as science deals with. Or maybe we better identify the things because the method might vary from thing to thing. No we can't do that because we have to know the method before we consider the things we apply the method to.

This is our first demonstrative knowledge that 'being' has a wider extension than material being.