

# The Nature of Metaphysics and Science: The Problem of the One and the Many in Thomas Aquinas

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## 1. Introduction

David Hume condemned both rationalist metaphysicians, such as Descartes and Leibniz, and empiricist metaphysicians, such as Locke and Berkeley. He argued against the rationalists that, while clear and distinct ideas supply a logical universality and necessity, relations of ideas themselves do not suffice to put the mind in contact with reality. Against Locke and Berkeley, he argued that on empirical grounds one could not justify the existence of substance and the reality of causal relations. As a result, neither rationalist nor empiricist metaphysics could meet the standard of necessity and universality as the conditions for science. Immanuel Kant considered Hume's objections and decided that, while the mind could contribute *a priori* necessity and universality to physical and mathematical sciences, its endeavor to apply such principles to metaphysics is epistemologically illegitimate.

Had Hume and Kant a greater familiarity with classical realist metaphysicians—such as Aristotle and Thomas Aquinas—they could have witnessed a model for metaphysics quite different from that of the rationalists and empiricists. Sadly, they did not intensively study realist metaphysicians on their own terms. To the extent that they were familiar with metaphysics before Descartes, they tended to read all metaphysicians—pre-modern and modern—through the rationalist or the empiricist lens. But such metaphysics is compromised by the belief that knowledge is about ideas. For empiricism too is no realism; instead it is a subjective idealism. Locke argues that knowledge is directly about ideas, not things. Descartes, too, must hold that the first object of consciousness is an idea in the mind. In contrast, the classical realism of Aristotle and Aquinas holds that the proper objects of knowledge are not ideas but actual things, which it is possible to know as they are *in themselves* (i.e., as they exist independently of our knowing them). Here we have a metaphysics different in kind from the modern variety.

The task of this article is to show that in classical metaphysics—especially in the work of St. Thomas Aquinas (1225-1274)—there is an account of realist knowledge which, escaping the skepticism of Hume and Kant, can explain metaphysics as a science. This is not science in name only. Instead it is the genuine article: knowledge of mind-independent realities consisting of necessity and universality. In order to justify this vision of metaphysics as a

science, Aquinas, following Aristotle, connects sense-realism with the problem of the one and the many.<sup>1</sup>

Broadly speaking, the problem of the one and the many, since ancient times, refers to a basic question of knowledge: how does our intelligence command a multiplicity? Of course, our intelligence accomplishes this by referring a multitude to a common principle. This principle shows that, in spite of the fact that things may be diverse in certain respects, they nonetheless are one. They are one because a single thing is predicable of each of them.

The ancient Greeks struggled over many centuries to solve the problem by bold alternatives. Such alternatives ranged from the Presocratics arguing that diverse things (a many) are reducible to a basic element (say, water) or set of elements (say, water, air, earth, and fire) to Socrates, Plato, and Aristotle arguing that diverse things (a many) ultimately are substances or relate to substances, whose formal principles or natures (unities) define them. What these alternative solutions have in common is an endeavor to achieve science: the demonstration that diverse things relate necessarily to a whole, a universal; in other words, the demonstration that one thing must be predicable of other things.

## 2. Aquinas and the Greeks

Aquinas' solution to the problem of the one and the many is significant, having far-reaching implications for our understanding of philosophy and science. In St. Thomas' writings one discovers not only a justification of metaphysics as a science, one discovers an account of the nature of science itself. He accomplishes this by showing how every science in particular applies analogically the principles that make metaphysics a science. In other words, Aquinas' account of the nature of science reveals that all other sciences adapt, in a partly similar and partly dissimilar way, the chief principles which ground metaphysical science.

A further consequence of Aquinas' achievement is to challenge the accepted view among historians of philosophy that the problem of the one and the many describes the philosophical activity of the ancient Greeks exclusively. If Aquinas' arguments are convincing, they show that all philosophy, and all science for that matter, not just ancient Greek philosophy or science, is really a working out of the problem of the one and the many. Whenever genuine philosophy or science takes place, the philosopher or scientist is predicating a one of a multitude.

It is a commonplace to say that Aquinas' philosophy depends significantly on the work of Aristotle. This commonplace, however, must not obscure that Aquinas had good reasons to break with the tendency of his time and prefer Aristotle over Plato. As a sense realist, Aquinas was committed to Aristotle's assertion that there is nothing in the intellect that is not first in the senses. Like Aristotle, Aquinas holds that the content-determining cause of information in the mind derives originally from our sense-awareness of actual physical things.<sup>2</sup> Given this view of knowledge, Aquinas cannot accept Platonism. While Plato begins

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<sup>1</sup> I would have been unable to write this essay without relying on the work of Etienne Gilson, Armand Maurer, Charles Bonaventure Crowley, and Peter Redpath. These scholars are the true pathfinders toward an understanding of St. Thomas' understanding of science and metaphysics in light of the problem of the one and the many.

<sup>2</sup> St. Thomas Aquinas, *De Veritate*, q. 2, a. 3, arg. 19. See Aristotle, *De Anima*, Bk. III, 429b 31-430a 2.

philosophical investigation with examples and circumstances known by the senses, he transcends these examples by arguing that the intelligibilities (forms or natures) which our intellects grasp have no *real* foundation in physical things. Reality for Plato must transcend bodies. Physical things, since unreal, fall outside the metaphysician's purview, since metaphysics is the science of reality. Since physical things *as physical* can supply no permanent intelligibilities, no necessity or universality, no science at all, let alone metaphysics, can have physical things as its object.<sup>3</sup>

In contrast, Aristotle argues that necessity and universality can define not only metaphysics but also physics. And Physics for Aristotle differs from modern physics. The latter is a quantitative, measurable, statistical description of natural phenomena. For Aristotle physics is about substances: their causes, their intrinsic principles (matter and form), and especially their movement. This science is achievable for Aristotle because the physical world is genuinely knowable, even though it is known most strictly through science (demonstration of the necessary and the universal). Judgments about contingent things can be true. But such knowledge does not constitute science. Science is knowledge in a stricter sense of the word: demonstration in terms of causes so as to supply universal and necessary knowledge. The search for causes is the essential task of philosophy. Since science, for Aristotle, is knowledge of causes, science and philosophy mean the same thing. Hence, Aristotle would object to the modernist tendency to separate science from philosophy.

### 3. Wonder

Philosophy, Aristotle says, begins in wonder.<sup>4</sup> It culminates in the discovery of causes. Aristotle does not start with wonder to make philosophy more appealing to those with a poetic temperament. No, his stress on wonder is all too prosaic. Wonder, he says, provokes fear because we are ignorant of wonder's object. Ignorance makes us fearful because what we do not know can endanger us. If we can remedy our ignorance, we will allay our fears. This observation about emotion is why Aristotle begins his *Metaphysics* with the conviction that human beings have a *natural desire* to pursue philosophy.<sup>5</sup>

St. Thomas expands on Aristotle's discussion of wonder in his *Commentary on the Metaphysics of Aristotle*. Fear, St. Thomas declares, is an irascible appetite that provokes arduous activity as we hope to overcome our fear. Alternatively, we may either attain a good (*bonum arduum*) or escape an evil (*malum arduum*).<sup>6</sup> St. Thomas goes on to say that fear, at first, discourages philosophical inquiry because our limitations and reluctance to commit error dispose us to withdraw from examining what presents itself in experience. But eventually a rational person knows that the only way to overcome fear and ignorance is to find causes, so as to explain why experience is as it is.

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<sup>3</sup> Plotinus in *Ennead* VI, 1-3 most famously makes the case that Platonism can only be a science of the non-physical world. Since, as a Neoplatonist, he is sympathetic with Plato, he condemns Aristotle for imagining that a science of physical things is possible.

<sup>4</sup> Aristotle, *Metaphysics*, Bk. I, 1, 980a 1-982a 10-15.

<sup>5</sup> *Ibid.*, Bk. I, 2, 982a 10-15.

<sup>6</sup> St. Thomas Aquinas, *Summa theologiae* I-II, q. 23, a. 1; q. 26, prologue.

Thus, there is a purpose to wonder: to end wonder by knowing a cause. In other words, wonder seeks its own elimination, its contrary, which is knowledge of a cause. For this reason, we do not wonder about what we already know. Nor are philosophers content to remain in a state of wonder.<sup>7</sup>

Speaking in general terms, we wonder *that* things are and *what* things are. In other words, wonder ultimately impels philosophy to its fundamental task: the analysis and understanding of beings. Since such analysis makes evident that there are principles all beings share, philosophy's most fundamental task is the study of being as being. In this effort to supply a comprehensive philosophy of being, Aristotle determines how to explain knowledge, the metaphysics of knowledge, if you will. In this context he develops an account of science itself that still has the ring of truth. As the heir to Aristotle's metaphysics, Aquinas deepens and refines the Stagirite's conception of science and metaphysics.

Knowledge terminates wonder. When knowledge is about causes science forms. It is important to recognize that, for Aristotle and St. Thomas, science is not a proposition or a set of propositions, a "body of knowledge," as it is sometimes called. Science is not an idea or a body of ideas in a system, as it is for many modern philosophers. Instead, for Aristotle and St. Thomas, philosophy or science is a *habit*. A habit is the perfection of a certain power or faculty to know or demonstrate skill in repeated ways. As a result, habit involves memory. By repetition of the operation of a faculty—senses, imagination, will, or intellect—habits form. Since philosophy on its most fundamental level is knowledge of beings, philosophy is the habituation of an intensive intellectual awareness of the principles of beings. This habitual awareness, this science of metaphysics, Aristotle and St. Thomas explain in terms of the one and the many.<sup>8</sup>

The above remarks require a clarification: strictly speaking, knowledge is not just the operation of a faculty, as though it were a discrete or disembodied power. Knowledge involves the entire knower. This is a crucial point concerning Aristotle's and St. Thomas' sense realism. Knowledge relies on the senses because the human person is an organic unity. The unitary knower exercises different faculties. But this is not to suggest that as the knower habituates one faculty, the other faculties are not involved. True, the nature of certain subject matter requires the focus, concentration, and habituation of a particular faculty. But this must not obscure that one and the same person always knows through the integrated action of his or her multiple powers. Hence, it is not just the intellect that knows metaphysics. Nor is it the case that when one hears it is only the ears that operate; it is the whole person who hears, exercising as an organic unity the power of the auditory. Etienne Gilson effectively stresses this point by saying that the human knower "senses with the intellect and intellectualizes with the senses." All ways of knowing are operating in diverse but integrated ways whenever the organic unity, the human knower, knows anything.<sup>9</sup>

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<sup>7</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, translated by John P. Rowan (Chicago, Illinois: Henry Regnery Company, 1961), BK I, 1, 3, n. 66.

<sup>8</sup> Aristotle argues that experience itself depends on memory, not just sensation, at *Metaphysics*, I, 1, 980a 27-980b 24.

<sup>9</sup> Etienne Gilson, *Thomist Realism and the Critique of Knowledge*, translated by Mark A. Wauck (San Francisco, California: Ignatius Press, 1986), pp. 171-215.

#### 4. Being and unity

Aristotle's key metaphysical insight toward his understanding of science is that being and unity are really the same. Their difference is only conceptual. Everything that is is one. This convertibility of being and unity explains why Aristotle devotes so much attention to unity in the *Metaphysics*. Since metaphysics is the science of being, and since unity is convertible with being, metaphysics will examine as many kinds of unity as there are beings.<sup>10</sup> If one considers a whole, say, a bar of gold, it is one. Should one divide it, each of its parts is a unit, a one. Even aggregate entities, such as choirs or armies, are unities. How can one think of a being without thinking of it as one? Even Aristotle's criticism of Plato depends on the insight that being and unity are identical. His central criticism of Plato is that his theory of Forms puts the unity of things outside their natures. Unity is required to give intelligibility to things (whereby things become a one), and yet Plato places their unity outside them.<sup>11</sup>

This criticism of Plato carries over into Aristotle's discussion of the requirements of demonstration in the *Posterior Analytics*. Demonstrative science, Aristotle declares, involves awareness of the way things are and why. To provide an explanation that is genuinely scientific, a philosopher must show that there is something, "a one," common to a plurality of things. This unity, or universal, becomes a middle term that, without equivocation, is predicable of many. When there is a one predicable of many beings demonstration is possible. As Aristotle puts it, demonstration requires that one thing exist "in many and about many."<sup>12</sup>

By reflecting on the connection between unity and being, Aristotle identifies the nature of science: knowledge of principles which relate to a subject matter in a necessary and universal way. In his *Commentary on the Metaphysics of Aristotle*, St. Thomas comments extensively on Aristotle's account of philosophy or science. If science is to study reality, it must study substance, that which primarily exists. Substance is the way that something exists as a separate and determinate unity. Everything that exists is either a substance or something inhering in a substance. Accordingly, science studies substance and its intrinsic principles and relationships. Another way to express this is that in science we examine a substance as a principle, a subject (or "subject-matter"), which is predicable of multiple relationships essential to it. Considering science in this way, Aristotle and Aquinas call the subject of any science "a genus," a unity predicable of a plurality of things. Demonstration consists in making evident the necessary principles united to the genus in question.<sup>13</sup>

Aquinas points out that this genus must be *proximate*, not remote. In order for science to occur the intellect must be able to judge how *per se*, or necessary, effects or intrinsic principles flow from the nature of the subject, or genus. However, a remote genus does not provide such a basis. It is not clear how a remote genus is relevant to these effects. Instead, it is incidental to

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<sup>10</sup> Aristotle, *Metaphysics*, Bk. IV, 2, 1003b 22-34; Bk. X, 1, 1052a 15-1053b 8; 2, 1053b 23-24.

<sup>11</sup> *Ibid.*, X, 2, 1053b 9-23.

<sup>12</sup> Aristotle, *Posterior Analytics*, Bk. 1, 11, 77a 5-9. St. Thomas Aquinas, *Commentary on the Posterior Analytics of Aristotle*, translated by F. R. Lacher, O.P., based on the Leonine text (Albany, New York: Magi Books, Inc., 1970), Bk. I, 1, 19.

<sup>13</sup> Aristotle, *Posterior Analytics*, Bk. I, 27, 87a 37-87b 4; 11, 77a 5-9. See also *Metaphysics*, Bk. 5, 24, 1023a 26-32, and 26, 1024a 29-1024b 4.

them. Hence a remote subject lacks necessity and cannot ground science.<sup>14</sup> For example, "Hippocrates the physician," not "Hippocrates the man," or "Hippocrates the writer," is the *per se*, proximate subject, and cause of healing (which is his necessary accident).

The expression "necessary accident" seems oxymoronic, but it is a permissible distinction to explain Aristotle's view of science. "Necessary" or *per se* accidents are those traits that intrinsically and actually flow from a substance. They are principles necessarily relating to a subject because of that subject's nature. The connection between a substance and its necessary accidents make science possible because the subject is a unity that belongs demonstratively to a multiplicity of principles. Science takes place when the intellect demonstrates a relationship between a subject and its *per se*, or proper, accidents. These *per se*, or necessary, accidents are not to be confused with accidents as merely *incidental* features of a thing.<sup>15</sup> The Aristotelian tradition distinguishes these two kinds of accidents, calling the former "properties," and the latter merely "accidents." For example, having 180 degrees is a *property* of a triangle; having red or blue sides is accidental (or incidental), irrelevant to the science of triangularity.

Accidents cannot be objects of science. No science can study accidents as accidents. To attempt to justify an accident by relating it to another accident would lead to an infinite regress, since accidents lack necessity. An accident cannot be a one, or a universal principle, to integrate a multiplicity into a science.<sup>16</sup>

To illustrate the difference between *per se* and incidental accidents, consider the design and building of an outdoor amphitheater, an example that an ancient Greek, like Aristotle, would appreciate. The finished structure could involve an infinite number of accidents. Some people might like the vista, its surroundings, its acoustics, its illumination by a full moon, etc.; others may not. Regardless, the designer's or architect's art concerns only those accidents, those essential properties, that the subject of amphitheater construction causally determines, such as its intrinsic three-dimensional magnitude and shape.

Accordingly, science consists in identifying a subject, a proximate genus, about which one can make demonstrations because that subject relates necessarily to its *per se* attributes. Some additional examples should clarify how these principles go together to form the basis of scientific demonstration. Take the case of geometry. The subject of wonder for the geometrician is the surface body. This is the substance body that is the proximate, and principal, subject of all plane figures. This genus, or principle, is the proper subject of all plane figures, which are its essential and necessary, or *per se*, accidents. By reasoning quantitatively about a surface body, the geometrician is able to intuit and infer all the properties that are attributable to the surface body. The science of Euclidean geometry exists because of the geometrician's speculative reflections on the surface body.<sup>17</sup>

Similarly, the doctor of medicine studies the healthy human body. The proximate principle of health is not the substantial, or surface body, but the biological human body. The human

<sup>14</sup> *Ibid.*, Bk. I, 11, 75a 18-37. See St. Thomas Aquinas, *Commentary on the Posterior Analytics of Aristotle*, Bk. I, 1, 14.

<sup>15</sup> Aristotle, *Posterior Analytics*, Bk. II, 2, 90b 14-16.

<sup>16</sup> Aristotle, *Metaphysics*, Bk., IV, 4, 1006a 32-1007b 17; Bk. VI, 1, 1026b 1-25; Bk. XI, 8, 1064b 30-1065b 4.

<sup>17</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. V, 1, 22, n. 1121; nn. 1125-1127; Aristotle, *Metaphysics*, Bk. V, 28, 1024b 10-13.

body as a living, sentient substance is the substance body, the subject matter, basis, of the science of medicine. The task of medical science is to determine how this subject body relates to a diversity of issues that concern it. These issues are from one perspective diverse, but from another perspective they are similar (have unity) because they *essentially* belong to the subject. Since unity-in-diversity is analogical judgment, Aristotle says that a science explains how principles relate to the subject-matter analogically, that is to say, in ways that are similar (because grounded in the subject) but in ways that are dissimilar (because they constitute distinct relations with the subject). Hence, Aristotle supplies his famous examples about the science of medicine, saying that “health” can be analogously predicable (1) of the thriving whole human organism, or (2) of urine as a sign of health, or (3) of diet and exercise as causes of health. These differences are all relevant to medical science as integrally related to the substance body, the healthy human organism.<sup>18</sup>

## 5. Opposites

Aquinas reveals that something else emerges when one thinks of the relationship of a substance body to its intrinsic principles in an analogical way. Since the subject body is a genus, it must involve opposites. A genus contains extreme differences, or contraries. Just as medical science studies health, it must also, correspondingly, as an extreme within the science’s genus, study disease. Consequently, Aquinas argues, an important dimension of the examination of any science is to study its principles and terms of opposition (contraries, relations, and differences). So, for example, the economist in studying the economic body, studies both wealth and its opposite, poverty. Likewise, the ethicist studies the moral body, the free human subject, who is the principle of moral actions, involving virtue but also its opposite, vice. The law student studies the legal and the illegal; the political scientist, war and peace; the grammarian, disagreement and agreement; and so on.<sup>19</sup>

In addition, consider the following examples and their opposites that pertain to modern empirical science. The meteorologist studies “the meteorological substance-body,” trying to describe, quantify, and predict the conditions of stable versus unstable weather. Likewise, the chemist studies “the chemical body,” determining how to predict the behaviors of stable versus unstable elements and compounds. Similarly, the botanist studies “the plant body,” trying to describe and measure the conditions that relate to plant vitality and death.

Curiously, on this matter of opposites, Aristotle and Aquinas argue that we actually derive our original concept of unity by first experiencing plurality. We become aware of unity as we negate its opposite. Aristotle and Aquinas embrace this conviction because of their sense realism. They insist that all of our knowledge, even our knowledge of unity, causes, substances, and principles, originates in the senses.<sup>20</sup> Our first primitive perceptions are of composite things. These appear to the senses as multiple and confused. And yet, they have some unity about them. Unity, Aquinas says, is order or lack of division.<sup>21</sup> We negate the divisiveness or plurality of composite things present in our experience. Thereby, we progressively unify the multiplicity of the sensorily experienced world. By the process of

<sup>18</sup> Aristotle, *Metaphysics*, IV, 2, 1003a 33-1003b 4.

<sup>19</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. IV, 2, 3, nn. 564-569.

<sup>20</sup> Aristotle, *Physics*, Bk. I, 1, 184a 17-21.

<sup>21</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. IV, 1, 2, n. 553.

cognitively integrating this information we arrive at the knowledge of the principle of unity as such. In return, unity spawns plurality, because as a genus, unity contains contrary opposites. Hence, unity in its relationship with plurality is fundamental for Aristotle: (1) plurality precedes unity; unity is the negation of plurality; (2) unity relates intrinsically to extremes within itself as a genus.<sup>22</sup>

## 6. Science and genera

If science is about being and being is unity, then science is about unity. With this in mind Aquinas explains that it is important to think of the subjects of science as genera. "A genus is a kind of whole, one which, for philosophy, or science, primarily refers to the immediate, proximate, first, or proper subject of different *per se* accidents, or unities, within the genus."<sup>23</sup> And as I indicated above, recognizing the subject of science as a genus also enables science to take into account opposites. Aquinas, however, realizes that this sort of language about genera is hazardous. One might confuse this sense of *philosophical* genera (unities of actual things) with *logical* genera (unities of ideas). Aquinas makes a special effort to address this difference:

This sense of genus is not the one that signifies the essence of a species, as animal is the genus of man, but the one that is the proper subject in the species of different accidents. For surface is the subject of all plane figures. And it bears some likeness to a genus, because the proper subject is given in the definition of an accident just as a genus is given in the definition of its species. Hence the proper subject of an accident is predicated like a genus.<sup>24</sup>

Aquinas here is saying that there is a risk in confusing philosophy with logic in these cases because, when the philosopher predicates a genus, the philosopher does so in a way that resembles logical predication. When a logician predicates a genus, it is included in its species' definition. So, for example, animal is included in the definition of human being. Likewise, when a philosopher predicates a genus of its "species" (a necessary accident connected to its genus-subject), the philosophical genus too is included in its species definition. For example, a surface body is included in all plane figures. However, the difference is that the logician is merely predicating a concept, a generic abstraction, of the species (another abstraction), whereas the philosopher is predicating things, necessary accidents and relationships, that actually exist.

In his *Commentary on the de Trinitate of Boethius*, St. Thomas says that "principles can be called common [=universal] in two ways: by [logical] predication, as when I say form is common to all forms because it is predicated of all; second, by causality, as we say that the sun, which is numerically one is the principle of all things subject to generation."<sup>25</sup> Hence, according to St. Thomas and Aristotle, philosophical universals are not logical universals, principles comprehending a many by forming an *idea* of sameness. Philosophical universals

<sup>22</sup> *Ibid.*, Bk. IV, 1, 3, nn. 564-566.

<sup>23</sup> Peter Redpath, "Virtue as Intensive Quantity in Aristotle," *Contemporary Philosophy*, March-April, 2001, p. 5.

<sup>24</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. V, 1, 22, n. 1125.

<sup>25</sup> Armand Maurer, editor. *Commentary on the de Trinitate of Boethius*, q. 5, a. 4, reply. *The Division and Methods of the Sciences* (Toronto, Canada: The Pontifical Institute of Medieval Studies, 1963), pp. 42-43.



are causal universals. They establish a universal relationship between a particular cause and the many effects of which it is the universal cause.<sup>26</sup>

Armand A. Maurer remarks on this difference between logical and philosophical predication by considering an example important to metaphysics:

From the point of view of the logician, material and immaterial things can be brought under the same genus (for example, substance), because he considers them only as concepts in the mind. From the point of view of the natural philosopher or metaphysician they do not come under the same genus because these philosophers consider the natures of things as they actually exist in reality, and in actual existence the substance of material things is not the same as that of immaterial things. Hence from a logical point of view, the genus of substance is predicated univocally of all substances; but from the point of view of the natural philosopher and the metaphysician it is predicated analogically.<sup>27</sup>

In reality, while material things and immaterial things are indeed substances, they differ so fundamentally in their mode of existence that we cannot speak of them as substance in the same sense. Metaphysics, in its endeavor to be precise about the way things are, must take these differences into account. Logic, however, which focuses merely on conceptual sameness, can prescind from such differences.

## 7. Substance, quantity, and quality

It is the business of metaphysics to investigate the intrinsic principles of beings. For Aristotle and Aquinas, this means that metaphysics is principally about the study of substances, because that which exists is either a substance or something inhering in a substance. Since we do not know substances directly, we must say that science studies substances through their intrinsic effects or aspects. The fact that some things exist because they inhere in substance makes science possible. Accordingly, Aristotle says that there are as many sciences as there are parts of substance.<sup>28</sup>

It is at this juncture that Aristotle identifies the two most basic attributes through which we know substance—quantity and quality—and judges that, since substance is known by these principles, quantity and quality are necessary conditions for science.<sup>29</sup> For one thing, quantity and quality actually inhere in a substance and remain with it as long as it exists. Secondly, all other accidents relate to substance by relating to its quantity and quality. Quantity and quality account for how in a variety of ways a substance can be actually and intrinsically a unity. Through quantity and quality we discern the *per se* relationships that a substance has.

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<sup>26</sup> Impressive work in a modern idiom on the causal efficacy of substances for science and on the deficiencies of Hume's account of causality has been done by Rom Harre and E. H. Madden, *Causal Powers: A Theory of Natural Necessity* (Totowa, New Jersey, Rowman & Littlefield Publishers, Inc., 1975).

<sup>27</sup> *Ibid.*, q. 6, a. 3, c., footnote 15.

<sup>28</sup> Aristotle, *Metaphysics*, Bk. XII, 1, 1069a 30-1069b 3. St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. IV, 1, 2, n. 563.

<sup>29</sup> *Ibid.*, Bk. V, 1, 15, n. 982. Aristotle, *Metaphysics*, Bk. X, 1, 1053a 24-27.

These intrinsic accidents emanate out of the intrinsic, constitutive principles of substance: matter and form. The centrality of quantity and quality is the reason that they immediately follow substance on the table of categories.<sup>30</sup>

Aquinas takes pains to show that, truth be known, quantity is the most basic of the intrinsic accidents. Arguably, quality is a kind of quantity. How so? To answer, Aquinas distinguishes two kinds of quantity: dimensive or bulk quantity (*molis*) and virtual or intensive quantity (*virtutis*).<sup>31</sup> While many students of Aristotle are familiar with the distinction between continuous and discrete quantity, they are less familiar with the more basic distinction between dimensive quantity and virtual quantity. Dimensive quantity is the effect of the matter of a natural substance producing its spatial extension. Continuous and discrete quantity are types of dimensive quantity. Continuous quantity, leaving a surface body undivided, yields the science of geometry. Discrete quantity, counting the divisible parts of a body, yields arithmetic.

Virtual quantity is an effect of the form of a natural substance, not its matter. Whereas dimensive spatiality comes about extensively, virtual quantity, otherwise known as *quality*, comes about intensively. Aquinas distinguishes these two types of quantity as follows: "Quantity is twofold. One is bulk (*molis*) quantity or dimensive (*dimensiva*) quantity, which is the only kind of quantity in bodily things. . . . The other is virtual (*virtutis*) quantity, which occurs according to the perfection of some nature or form." Quality admits of degrees. Such perfections have a quantitative measurability about them. However, their quantitative nature is not reducible to bodily extension. Their measurability lies in their intensity—the way they admit degrees, or more or less.<sup>32</sup> Such qualitative descriptions, Aquinas adds, are not reducible to dimensive matter and, thus, indicate a kind of "spiritual greatness just as heat is called great because of its intensity and perfection."<sup>33</sup>

Forms and qualities are measurable because they manifest certain kinds of magnitude and limits. But their magnitude and limit is not the same as measurable parts outside of parts

<sup>30</sup> Many modern empirical scientists and social scientists, working out of a paradigm according to which spatially extended matter alone exists (at least for purposes of scientific explanation) attempt to reduce all scientific explanation to dimensive quantity. This reduction is even evident in psychology. See the important work of E. C. Boring, *Physical Dimensions of Consciousness* (New York: The Century Company, 1933). Also consult the more recent work of Austen Clark, *Sensory Qualities* (Oxford, United Kingdom: Oxford University Press, 1996).

<sup>31</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. V, 18, n. 1037. See also *Summa theologiae*, I, q. 42, a. 1, ad 1; also I-II, q. 52, a. 1, respondeo. For an extensive treatment of the notion of virtual quantity in Aristotle and Aquinas, see Charles Bonaventure Crowley, *Aristotelian-Thomistic Philosophy of Measure and the International System of Units (SI)*, Peter A. Redpath, editor (Lanham, Maryland: University Press of America, 1996), pp. 25-47; 249-260.

<sup>32</sup> As an example of virtual quantity in modern physics consider this observation of Charles B. Crowley: "The quality 'energy' is a *quantitas virtutis* first found in the science of mechanics and thermodynamics, where it signified the capacity (i.e., the potency) to do "work" (another *quantitas virtutis*). The English term "energy" comes from the Greek *energeia*, originally meaning *interior actio*." *Ibid.*, p. 136. Crowley observes earlier that Newton realized that the mechanical principle of mass, too, involves intensive quantity, since it contains density, which, according to Newton, is not measurable by extensive quantity alone. *Ibid.*, p. 86.

<sup>33</sup> St. Thomas Aquinas, *Summa theologiae*, I, q. 42, a. 1, ad 1.

within a spatial continuum. Instead the quantitative aspect of forms and qualities lies in their greater or less intrinsic perfection, completeness, or intensity of what they are.<sup>34</sup>

Once one recognizes the primacy of substance, quantity, and quality in Aristotle's philosophy, it is no mystery why he divides speculative philosophy into three sciences: physics, mathematics, and metaphysics. His rationale follows upon his judgment that science is about substance. Substance is the principle grounding the essential conditions to relate a many to a one. In other words, science can exist only by means of unity. But something is one because it is. To exist is to be a substance or an attribute of a substance. If science is to be grounded in reality, it must have substance as its object. In short, unity is being, being is substance, and science is about substance.

## 8. The three speculative sciences

In light of this rationale, Aristotle and St. Thomas repeatedly assert that "there are as many parts of philosophy as there are parts of substance."<sup>35</sup> We know substance through its dimensive and virtual quantitative parts. We analyze, accordingly, the parts of substance as (1) substance itself, (2) substance as quantified, and (3) substance as qualified. Since these are the three ways in which the human intellect can examine substance speculatively, three speculative scientific subjects exist.

A speculative science is one in which the intellect aims to know for its own sake. Aquinas, following Aristotle, tells us that speculative science comes about under two conditions: (1) because of real, mind-independent *per se* elements of the object, elements which involve necessary relationships, and (2) because of the action of the human intellect which can focus on aspects of those elements for the single purpose of knowing them for their own sake. In other words, in speculation our intellects think about something from a distinctive point of view (formal object) so as to discern the necessary principles and relationships which define it, but only insofar as it interests the intellect's habit of speculation, i.e., knowledge pursued as an end in itself, not pursued practically (for doing something), or pursued productively (for making something). Clearly, then, the constitution of a science is determined partly by the mind-independent elements of something and the activity of the intellect through which the intellect seeks its own perfection (different ways of knowing; in the case of speculative knowing, knowing for its own sake).

In sum, the differentiation of the speculative sciences derives partly "from the side of the power of the intellect" and partly "from the side of the habit of science that perfects the intellect." So what aspects of substance are the *per se* proximate principles that activate our intellects (like color activates the eyes and sound the ears) so as to constitute the three speculative sciences?

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<sup>34</sup> Charles B. Crowley speaks analogously to Archimedes' discovery as involving intensive quantity in empirical science: "He weighed the amount of that displaced water, and thus he measured its *quantitas virtutis*, or intensity of the matter, i.e., he now had measured the number or the plurality of parts of matter as they are contained under their dimensions." Charles B. Crowley, *Aristotelian-Thomistic Philosophy of Measure and the International System of Units (SI)*, p. 93.

<sup>35</sup> Aristotle, *Metaphysics*, Bk. IV, 2, 1004a 2-3.

Physics studies a qualified body; mathematics, a quantified body. Physics and mathematics study accidents that essentially inhere in a substantial body, accidents that necessarily relate to that body. Such accidents flow by necessity from the form and matter of the substance. These accidents are signs evident to the sense-knower of the intrinsic, necessary, universal relationships within that bodily substance constituted of form and matter. These accidents indicate how the form relates to the substance's matter and how together matter and form determine the substance's activity.

The human intellect, St. Thomas explains, is both an active and a passive power. Both kinds of intellectual powers (the active and the receptive) are necessary in the constitution of speculative science. On the one hand, part of the formal object (the subject under examination from a precise point of view) is determined by information from what is known being received in the intellect. In other words, the intellect receives content as a passive power. On the other hand, part of the formal object is generated by the intellect's ability to dematerialize its object, so that it can consider information at a precise degree of abstraction. Because intellectual awareness is not bound by the constraints of matter—that is to say, because it can perform acts of abstraction whereby it separates in thought the way things exist from their material condition—the intellect can, by finessing degrees of abstraction, discriminate ways of speculative knowing, precisely detailing how physics differs from mathematics and how physics and mathematics differ from metaphysics.

Knowledge requires dematerialization because it involves identity of knower and known. If knowing really takes place, it is the union of two things in a living operation: the union of the knowing being and the thing known. Immateriality is necessary for this union to occur, otherwise a physical change occurs in the reception of the object. St. Thomas would argue this follows because of the old adage that “whatever is received into a receiver is received according to the capacity of the receiver.” If the reception of the object changes either the knower or the object received, then knowledge is reduced to mere representationalism or guesswork. The skeptic may be content with representationalism, but, as I argue at the close of this chapter (see note 35), the realist is under no obligation to embrace skepticism, especially in light of the fact that the philosopher can provide a coherent account of dematerialization. In my judgment, it is a modernist prejudice to discount dematerialization, a prejudice largely based on lionizing the problem of skepticism.

The formal object (the distinguishing point of view) of physics—that aspect of physics according to which the intellect discriminates it from other sciences—is substance abstracted from its individuality and contingency but not from its qualities and motion.<sup>36</sup> In his classic, *The Degrees of Knowledge* (subtitled “Distinguish To Unite”), Jacques Maritain expresses this kind of abstraction neatly:

The mind can consider objects abstracted from and purified of, matter but only to the extent that matter is the basis of diversity amongst individuals within a species, i.e., insofar as matter is the principle of individuation. In this way, the object remains; and remains to the very extent that it has been presented to the intellect, impregnated with all the notes coming from matter, and abstracts only from the contingent and strictly individual peculiarities, which science overlooks. The mind thus considers bodies in their

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<sup>36</sup> Motion for Aristotle and Aquinas does not signify merely locomotion, but any kind of transition from potency to act insofar as it remains in potency. Today, use of the term “motion” tends to be restricted to locomotion.

mobile and sensible reality, bodies garbed in their empirically ascertainable qualities and properties. Such an object can neither exist without matter and the qualities bound up with it, nor can it be conceived without matter. It is this great realm that the ancients called *Physica*, knowledge of sensible nature, the first degree of abstraction.<sup>37</sup>

An even more intensive degree of abstraction, takes the intellect altogether away from the conditions of quality and movement. At this "second degree of abstraction," the intellect considers a physical substance only from the point of view of its quantitative, not qualitative, nature. Of course, no physical substance can, in fact, exist without motion or quality, but the intellect is able to think of it as separate from sensible matter. Mathematics considers quantified material being, the surface body, as its proximate subject. The power of this "second degree" of abstraction not only separates dimensioned quantity from sensible matter but also can separate quantity from its imaginary matter, the extension, of geometrical things. In this act of abstraction one cognizes the essence, say, of lines and circles, the very principles on which geometrical objects are constructed.<sup>38</sup> Mathematics isolates within bodies—a property that remains when everything sensible is left aside—quantity, number or the extended taken in itself. This is an object of thought which cannot exist without sensible matter, but which can be conceived without it. For nothing sensible enters into the definition of the ellipse or of square root. This is the great field of *Mathematica*, knowledge of Quantity as such.<sup>39</sup>

Finally, it is only metaphysics that treats of that which both can exist separately from matter and is without motion.<sup>40</sup>

Finally, the mind can consider objects abstracted from, and purified of, all matter. In this case it considers in things only the very being with which they are saturated, being as such and its laws. These are objects of thought which not only can be conceived without matter, but which can even exist without it, whether they never exist in matter, as in the case of God and pure spirits, or whether they exist in material as well as in immaterial things, for example, substance, quality, act and potency, beauty, goodness, etc. This is the wide domain of *Metaphysica*, knowledge of that which is beyond sensible nature, or of being as being.<sup>41</sup>

Aristotle and St. Thomas coordinate these degrees of abstraction with certain principles of unity grounded in substance, quantity, and quality, so as to demonstrate that distinguishing the three speculative sciences is a further extension of solving the problem of the one and

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<sup>37</sup>Jacques Maritain, *The Degrees of Knowledge: Distinguish To Unite*, translated by Gerald B. Phelan (New York: Charles Scribner's Sons, 1959), p. 35.

<sup>38</sup> See W. D. Ross, *Aristotle* (London, U. K.: Methuen and Company, Ltd.), p. 158.

<sup>39</sup> Jacques Maritain, *The Degrees of Knowledge*, p. 35.

<sup>40</sup> Aquinas is a metaphysician but certainly no Platonist. Nonetheless, he holds that the human intellect has grounds to infer from experiential evidences that non-physical substances exist. This inference is possible because it moves from effect to cause. So, for example, because of the nature of motion or contingency in the universe, the intellect can infer that the insufficiency of such motion or contingency requires a cause that exists without matter. Such inferences are purely *a posteriori*; that is to say, they must be grounded in experience. To deny that such inferences are possible is odd since modern science depends on physical inferences from effect to cause. The denial of the possibility of metaphysical inference from effect to cause is usually based on Humean or Kantian assumptions. Hence, to adjudicate the issue ultimately, the debate with Hume and Kant understandably has to be engaged

<sup>41</sup> *Ibid.*, p. 36.

the many. When St. Thomas speaks of “the parts of substance,” he correspondingly speaks of “the parts of unity.” The substantial, qualitative, and quantitative necessitate certain distinct kinds of unities to demonstrate how their intrinsic principles and necessary accidents relate to their differing subject matters. To illumine further Aristotle’s discrimination of the speculative sciences and to reinforce his conviction that science concerns a single subject, taken as a genus because it is predicable of multiple properties, one must remember that there are as many species of unity as there are species of being. “Just as we can analogously predicate being of all genera, since being and unity are convertible notions, Aristotle thinks we can analogously predicate unity of all the different genera.”<sup>42</sup> Aquinas analyzes Aristotle’s position in these terms:

since being and unity signify the same thing . . . there must be as many species of being as there are species of unity, and they must correspond to each other. For just as the parts of being are substance, quantity, and quality, and so on, in a similar way the parts of unity are sameness, equality, and likeness. For things are the same when they are one in substance, equal when they are one in quantity, and like when they are one in quality. And the other parts of unity could be taken from the other parts of being, if they were given names. And just as it is the office of one science [first] philosophy to consider all the parts of being, in a similar way it is the office of this same science to consider all the parts of unity, i.e., sameness, likeness, and so forth.<sup>43</sup>

This is a significant passage because it expresses how there is a measure of unity appropriate for each of the speculative sciences: sameness (in the case of substance), equality (in the case of quantity),<sup>44</sup> and similarity (in the case of quality). As an example pertaining to substance, we might judge that the man, Socrates, is the same as the husband of Xanthippe. Equality, for example, is the measure for determining that two right angles have 180 degrees as does any triangle. As an example pertaining to quality, we can say that Newton and Einstein both have mathematical habits.

Correspondingly, since, as I observed earlier, every science must also take into account its opposites, difference, inequality, and dissimilarity are important for these sciences. Difference, inequality, and dissimilarity are measures of plurality in a science. This triad—similarity/dissimilarity, equality/inequality, and sameness/difference—express the principles of unity, plurality, and opposition in science.<sup>45</sup> They are the chief principles of *per se* accidents and opposition that belong to substances. These principles make it possible for substances to be objects of scientific habits and specific subjects of study.<sup>46</sup>

<sup>42</sup> Peter A. Redpath, “Post-Postmodern Science and Religion: A Critique,” *International Journal on World Peace*, Vol. 18, No. 1, March, 2001, p. 71.

<sup>43</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. IV, 1, 2, n. 56.

<sup>44</sup> Aristotle and Aquinas would salute Bertrand Russell’s definition of “equality” as an apt transfer and application of their view of quantity to modern mathematical expression: “There are, in fact, two ways of defining equality. Two terms may be said to be equal when their ratio is unity, or when their difference is zero.” (Bertrand Russell, *The Principles of Mathematics* [New York: Norton, 1943], p. 342.)

<sup>45</sup> For example, a gold bar and a silver bar are not the same substances, but they can be equal in weight; and yet, they could be dissimilar in quality, say, in shape. Then again, they have generic similarity in that they are both metals.

<sup>46</sup> Euclid says that mathematics itself is based on the principle of equality: “a whole is equal to the sum of its parts.” Because modern empirical science focuses on the quantitative, the equal and the unequal

## 9. Measure

We have seen that Aristotle's and St. Thomas' philosophy of proximate material substance depends on their philosophy of unity. Beings that belong to the same genus share a subject matter which constitutes a unit measure whereby we know them as one. It turns out that, just as sameness, equality, and similarity, are properties of unity, so is measure a property of unity.<sup>47</sup> In fact, Aristotle asserts that unity is the measure of all things. Aquinas explains that Aristotle says this by reflecting on the nature of plurality. Plurality is division or divisiveness. Unity, however, stops division. "That which is undivided brings division to an end, is that beyond which no further division exists."<sup>48</sup> When we divide a substance into its component parts, division comes to a stop. That is to say, each of those parts is a one, just as the whole substance is a one. Aristotle concludes that "the one is the measure of all things, because we come to know the elements in the substance by dividing the things either in respect of quantity or in respect of kind."<sup>49</sup>

Since the activity of the knower is involved in measuring, Aristotle says that in a way, or analogously, knowledge and perception measure things. Since knowledge cannot occur if an object is completely pluralized, our knowing powers must recognize that what is known is a one. Since measure is a property of unity, knowledge is a measure. To speak more precisely, Aristotle says that knowledge and perception are actually "measured rather than measure." He is careful to make this point because he does not want to compromise his sense-realism. The intellect's content comes from the object, whose unity the knower comes to know; the knower does not invent or construct the unity. Once he distinguishes in this way measure and the measured, Aristotle can expose the vapidness of Protagoras' famous dictum: thinkers like Protagoras, Aristotle declares, "say nothing . . . while they appear to say something remarkable, when they say 'man is the measure of all things'."<sup>50</sup>

One of the striking features of Aristotle's account of unity is that, while he concedes that our idea of measure derives from the genus of quantity, he recognizes that we must not confuse quantitative unity with metaphysical unity. In fact, Aristotle criticized Plato for failing to make this distinction. Plato mistook the opposite of plurality to be number: unity as discrete quantity. Unity, Aristotle insists, cannot be reduced to number because unity is convertible with being, which includes more than mere quantity.

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are central principles in empirical scientific measurement. Consider Archimedes' principles of mechanics—e.g., equal weights at equal distances are in equilibrium; or Avogadro's hypothesis in chemistry: Equal volumes of gases contain an equal number of molecules, provided there are the same conditions of temperature and pressure. Galileo's principle of uniform motion and acceleration in mechanics also comes to mind: the distances traversed by the moving particle during an interval of equal time, are themselves equal.

<sup>47</sup> Another instance of the demand for measure is in Einstein's relativistic physics, where he posits the speed of light, on account of its continuity, regularity, and swiftness, as the mathematical physical measure of time itself.

<sup>48</sup> Peter A. Redpath. "Post-Postmodern Science and Religion: A Critique," p. 77. St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. X, 1, 2, n. 1951.

<sup>49</sup> Aristotle, *Metaphysics*, Bk. X, 1, 1053a 24-27.

<sup>50</sup> *Ibid.*, Bk. X, 1, 1053a 32-1053b 3.

Accordingly, we must not confuse the genesis of our knowledge of measure (being derived from the genus of quantity) with the nature of measure itself. While it is true that measure enables us to originally know something's quantity, we learn to transfer the principle of measure to other genera. As a means to knowing quantity measure is a unit, a number, or a limit. This last, limit, with its implications involving intensive quantity, reveals how the knower can extend measure to include other genera. For one way in which something makes evident its limit is not just dimensionally but also qualitatively (virtually) or by virtue of its form, what it is essentially.<sup>51</sup> Because the form of something is both its formal and its final cause, St. Thomas, in a remarkable passage, expresses the teleological implications of measure:

Each thing is perfect when no part of the natural magnitude which belongs to it according to the form of its proper ability is missing. Moreover, just as each natural being has a definite measure of natural magnitude in continuous quantity, as is stated in Book II of *The Soul*, so too each thing has a definite amount of its own natural ability. For example, a horse has by nature a definite dimensive quantity, within certain limits; for there is both a maximum quantity and minimum quantity beyond which no horse can go in size.<sup>52</sup>

As a complex of matter and form, measure enables us to judge and predict something's limits, both in regard to its nature and in its purpose or function as a natural substance. This is further evidence that a philosophy of the natural world becomes impoverished if it reduces quantity to dimensive quantity only.<sup>53</sup>

## 10. Conclusion

Science examines substance as a proximate genus which grounds *per se*, or necessary, accidents. Hereby, substance provides universality (as a genus) and necessity (by its essential relationships to its properties or *per se* accidents). Science, then, is a one necessarily relating to many. Moreover, science and philosophy do not differ, since philosophy explains the problem of the one and the many so that science can occur. So, properly speaking, genuine science is the same as the philosophical search for causes. As Peter A. Redpath and Charles Crowley have argued, whenever science occurs, it transposes analogously the metaphysical principles of substance and its *per se* relationships to diverse subjects. Accordingly, the problem of the one and many was not just a peculiarity of ancient Greek philosophy. Instead, it is a problem

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<sup>51</sup> Charles B. Crowley, O.P. says the following about how measure makes modern empirical science possible, both in regard to dimensive and virtual quantity: "Whenever something is measured, by that very fact of being measured, it becomes quantified, or a quantum, and is called a 'quantity.' Then, once something has been quantified, the mathematical scientist can treat it as a quantum, and can use the principles of quantity and measure to formulate statements of the quantitative proportions involved. This allows him to use mathematics, which is the science of quantity, and its proportions, to 'explain,' i.e., to formulate measuring propositions as principles, from which quantitative conclusions can be drawn." (Charles Bonaventure Crowley, O.P., *Aristotelian-Thomistic Philosophy of Measure and the International System of Units*, edited with a preface by Peter A. Redpath (Lanham, Maryland: University of America Press, Inc., 1996), p. 42.

<sup>52</sup> St. Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, Bk. V, 18, n. 1037.

<sup>53</sup> For further examples of and for a profound, intensive, and groundbreaking application of Aristotle's and St. Thomas' philosophy of the one and the many to contemporary physical science of measurement, see Charles Bonaventure Crowley, O.P., *Aristotelian-Thomistic Philosophy of Measure and the International System of Units*.



descriptive of the entire history of philosophy or science. Central to this discussion is Armand Maurer's key distinction between logical and philosophical universals. A substance as proximate genus which relates to *per se* accidents is not to be confused with mere logical predication of an idea of a substance. A philosophical genus is not existentially neutral as are ideas of mere logic. Philosophical genera are about real things, not ideas.

An important corollary to this account of science follows. Because science examines a substance as a proximate genus for diverse *per se* accidents it follows that there is not one univocal science. Because there are as many sciences as there are substances serving as proximate genera, there is a diversity of sciences. Sciences differ analogically as they apply the principles of substance understood in metaphysics diversely. Again, as Aristotle said, "there are as many sciences as there are parts of substance." This point is crucial because it shows that Aristotle's and St. Thomas' view of science rejects outright any attempt after the fashion of Descartes to reduce science to one univocal system. Moreover, it rejects the modernist belief that "science" in the proper sense reduces to mathematical physics—the univocity of measurement in the physical sciences. Mathematical physics is just one science among a diversity of other possible sciences, including metaphysics. Sciences are diverse because substances as proximate genera and their relationships are diverse. So sciences are analogically similar because they all study substances as proximate genera, and yet they are different because reality consists of diverse substances or philosophical genera.

My discussion should have made evident that, in spite of its apparent detail, I have only scratched the surface of Aquinas' philosophy of the one and the many as a response to the philosophy of Aristotle. In spite of its brevity, my comments should indicate that philosophy anywhere and always must involve the problem of the one and the many. If philosophy is a search for causes or substances that divulge an order of *per se* accidents relating to them, then philosophy is an investigation of unity in plurality. If modern and contemporary philosophers have given up believing that philosophy can search for real causes and substances, then, one may doubt, based on St. Thomas' standards, whether they are really philosophers at all. If the problem of the one and the many becomes only a way of cohering ideas in a nominalistic system, then philosophy has ceased to be philosophy and has become a kind of systematic logic. At any rate, studying Aristotle's and Aquinas' account of the problem of the one and the many, an account that escapes modern skepticism and rests on sense realism, provides modern and contemporary philosophers a contrasting alternative. And, at the very least, it shows that, given their alternative example, a living philosopher is under no obligation to reduce philosophy to modernist nominalism, skepticism and anti-realism. Philosophy or science can be grounded in realism.<sup>54</sup>

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<sup>54</sup>Aristotle and Aquinas, who were familiar with ancient and medieval versions of skepticism, would see no reason to measure philosophy's success by answering the problem of skepticism. Skepticism is counter-intuitive. The skeptic's own position never really convicts him. This is so for many reasons, but two especially stand out: (1) skepticism is not something someone can *really* believe; skepticism militates against the skeptic's ability to live a practical life, and (2) skepticism presupposes what it denies, because the skeptic's worry about error presupposes a distinction between error and truth that he must first derive by relying on experience. As a result, the philosopher is, at least, under no obligation to acquit philosophy before the skeptic as judge.

There is an additional reason that Aristotle and Aquinas would reject skepticism. Taking skepticism seriously would compromise the role of abstraction in knowledge. For them, there can be

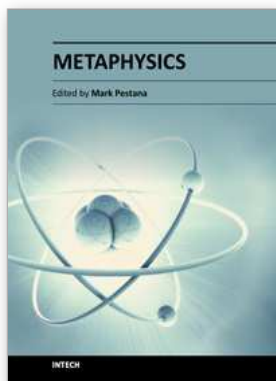
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communication between substances. In other words, the knower can grasp something about the natures of things. Once belief in abstraction is compromised, philosophy takes a turn prescribed by William of Ockham, who says that universals have an unknown origin (*natura occulte operator in universalibus*). Once Renaissance intellectuals go down Ockham's path, what passes as "philosophy" becomes nominalism. "Philosophy" becomes systematic logic, as thinkers strive to build systems of propositions—systems of "clear and distinct" ideas.

Aristotle and Aquinas stand stubbornly by their sense realism so as to escape the nominalist's fate. For them philosophy is not confused with systematic logic. Instead, philosophy is *aporetic* (from the Greek, *aporia*, meaning perplexity) Philosophy is an attempt to overcome difficulties (*aporiai*) provoked by wonder. Accordingly, philosophy is serially *aporetic*: the philosopher seeks to resolve one *aporia* after another without trying to situate *a priori* that resolution in a system. These solutions will be coherent, but not for the sake of building a system.



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It is our hope that this collection will give readers a sense of the type of metaphysical investigations that are now being carried out by thinkers in the Western nations. We also hope that the reader's curiosity will be peaked so that further inquiry will follow.

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