St. Thomas Aquinas

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THE DIVISION AND METHODS OF THE SCIENCES

Questions V and VI of his Commentary
on the De *Trinitate* of Boethius
translated with Introduction
and Notes

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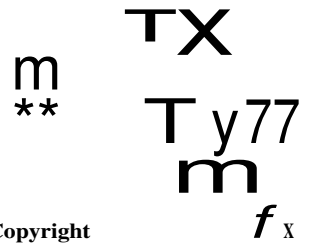

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CONTENTS

INTRODUCTION

I

ST. THOMAS AQUINAS gives his views on the hierarchy of the sciences and their methods in several of his works, but his most extensive and penetrating treatment of these subjects is to be found in the two Questions translated in this little book. They are taken from his unfinished Commentary' on Boethius' *De Trinitate*. Question Five deals with the division of the speculative sciences, Question Six with their methods. The Questions were w-ritten early in St. Thomas' career, very likely between 1255 and 1259,l so that they are not always his last word on the subject; what he says in them should be studied along with his statements in his later works. Yet, because he never again took up the problems in such detail, they are of exceptional value in giving us an appreciation of his views on these topics.

It may appear strange that St. Thomas treats of the division and methods of the sciences while commenting on Boethius' book on the Trinity. However, he is simply taking his cue from Boethius himself, who, before considering the mystery of the Trinity, touches upon certain preliminary points concerning faith, theology and the place of theology in the scheme of the sciences. A few brief remarks of Boethius about the division of the speculative sciences and their methods of procedure form the basis of St. Thomas' lengthy discussions on these points.-

1. See *Thomas ton Aquin, In* Librum Boethii de *Trinitate. Quaestiones Quinta et Sexta,* ed. P. Wyser, Einleitung, pp. 17-18. M. D. Chenu proposes the date 1256. See his La date du commentaire de sair.t Thomas sur le De Trinitate de Boece Rerue des sciences philosophiques *et théoloffiques,* 1941-42. pp. 432-434.2
2. See Boethius, De Trinitate 2 *PL 64. 1250AB).

The circumstance of the Commentary also helps to explain the limited perspective of St. Thomas in the two Questions. In the first place, they are concerned specifically with the speculative and not with the practical sciences. It is true that he has some important things to say in them about practical knowledge and science, but these are incidental to his main theme. They are simply meant to throw more light on the nature of speculative science. No attempt is made to give the hierarchy of practical science?

Moreover, the nature of theology as the science of Sacred Scripture is not considered in these Questions. They contain a few incidental remarks about it, but these are only to contrast it with metaphysics. St. Thomas had already treated the science of Sacred Scripture in the earlier Questions (I-II1). Here his perspective is that of the sciences attainable through the natural light of reason.

In order to appreciate the aim and significance of the present work, the reader must understand St. Thomas' notion of science. It will be apparent at once that it differs significantly from that current in our own day. The very fact that he uses the terms *science* and *philosophy* as synonyms warns us of this and at the same time points to his ideal of science. Today, no one would think of equating philosophy and science, even though there is little agreement as to what the distinction between them is. Science in general is thought of as any reasoned knowledge that is universal and systematic. The ideal of scientific knowledge is to be found in an exact science such as mathematical physics, which uses precise mathematical calculations and a highly refined method involving experimentation, formation of hypotheses and their verification.* Whatever philosophy may be, it obviously does not answer to this description.

X On this subject, see J. Maritain. Les Degrés du *aavoir,* pp. 618-627; Annexe VU, pp, 873-896.

4. On the modern notion of science and its method, see Claude Bernard. An Introduction to *the Study of Experimental Medicine;* Henri Poincaré. *The Foundations of Science;* Albert Einstein, On *the Method of Theoretical Physics;* A. Einstein and Leopold Infeld. The Evolution *of Physics;* Max Planck, "The Meaning and Limits of Exact

St. Thomas' ideal of science is quite different. For him, science in general is knowledge of things through their causes? As Aristotle said before him, it is knowledge, not only of fact, but of reasoned fact? It reaches its ideal, not simply when it records observable connections in nature and calculates them in mathematical terms, but rather when it accounts for observable phenomena and the properties of things by bringing to light their intelligible relations to their causes. Metaphysics reaches this goal when, for example, it explains the contingent universe through God, mathematics when it explains the properties of a triangle through its definition, natural philosophy when it accounts for change through efficient and final causes and the intrinsic principles of bodies, matter and form.

In other words, scientific inquiry for St. Thomas at its best is philosophical. It does not aim simply at empiriological knowledge gained through controlled observation and measurement of the physical world, but rather at knowledge of the very being and essential structure of things. Its goal is *ontological* rather than *empiriological knowledge.*[7]

It is true that St. Thomas was acquainted with genuine empiriological inquiry, although its range was very limited and its methods remained simple and undeveloped. During his lifetime, St. Albert the Great carried out observations in biology and zoology which still evoke the admiration of the scientist, Peter of Maricourt wrote his treatise on the magnet, and Roger Bacon observed and measured the rainbow and

Science", *Scientific Autobiography and Other Papers,* pp. 80-120. For varying appreciations of modern science by philosophers, see A. N. Whitehead, *Science and the Modem World;* Philipp Frank, *Modern Science and its Philosophy;* Morris Cohen and Ernest Nagel, Ah *Introduction to Logic and Scientific Method;* Jacques Maritain, *Les Degrés du savoir;* Vincent Smith, *Philosophical Physics.*

5. See *Contra Gentiles* I, 94

6. See *Posterior Analytics* I, 2, 71b8ff; I, 13.

T. For a Further explanation of the meaning of these terms, see J. Maritain *Philosophy of Nature, pp. 73S.* By contrasting these two types of knowledge we do not mean to imply that ontological knowledge is in no sense the result of experience and observation. All our knowledge begins in the senses, although the type of experi-

other phenomena of light/ It is not surprising, then, to find St. Thomas' description of the method of natural science quite correctly laying stress on the role of the senses in such knowledge, on the verification of its judgments in sense data, and on reasoning from signs and effects to causes.[8] What is more, he gives us the best analysis of physico-mathematical science written in the Middle Ages. He knew of this type of science in a very rudimentary form from the ancients and also from his contemporaries, such as Robert Grosseteste, Roger Bacon and Witelo, who cultivated it chiefly in the field of astronomy and the mathematical study of light (optics). He calls these *intermediary sciences* because they are situated between mathematics and physics and partake of the character of both.[10] Sciences of this sort, however, remained largely undeveloped in the Middle Ages and their method was not adequately understood. They play a very minor role in St. Thomas' scheme of the sciences.

The center of attraction for St. Thomas and his contemporaries was not empiriological or mathematical science, but

ence and observation used in philosophy is different from those used in the other sciences. In brief we can say that philosophical analysis of sensible reality begins in the senses and ascends towards intelligible being, while empiriological analysis begins in the senses and descends, in the resolution of its concepts, towards the observable and the measurable as such. See J. Maritain, op. cit., pp. 74-76.

The growth in modem times of empiriological science, as distinct from philosophy in its formal object and method, renders impossible a physical theory which would be applicable in a univocal way to both. Such a theory, which denies the distinction between ohilosophical and empiriological analysis, has been proposed by R. Nogar. "Towards a Physical Theory." *The New Scholasticism*. Oct., 1951. pp. 397-438.

8. See G. Sartan. *Introduction to the History of Science* II; for St Albert, pp. 934-944; for Peter of Maricourt 'Petrus Peregrinus), pp. 1030–1032; for Roger Bacon, pp. 952-967. St. Albert's emphasis on personal observation in the sciences is particularly worthy of note. He writes: "What I have to say (on the various plant species) is partly proven by experience *(experimento)*, and partly taken from the reports of those whom I have discovered^ do not readily make statements that are not proven by experience." De Vegetabilibue et *Plantis* VI, L L ed. A. Borgnet (Paris, 1891), voL 10, pp. 159-160.

9. See below, pp. 52-53.

10. See below, pp. 33-35.

rather ontological or philosophical knowledge, which attains the very being and intelligible structure of things. Indeed, so great was the attraction towards this type of knowledge in the Middle Ages that the other sciences suffered from it. Not only did they fail to flourish and to achieve their independence as distinct kinds of knowledge, but all too frequently problems which can be solved only by their methods were approached with the methods of ontological science or philosophy. In general there was too great an optimism in the mind's ability to understand the ontological structure of things ot their intelligible natures. The consequence of this optimism was the extension of philosophical analysis to areas in which it fails to achieve results. We know all too well the consequences of this; the corpse of mediaeval physics is there to warn us against the error.[11]

The beginning of the modern era witnessed a revolt against the physics of the Middle Ages. The empiriological and physico-mathematical sciences gradually established themselves as distinct scientific ways of knowing and their scope and methods w'ere carefully defined. At first these sciences were taken as a substitute for the napiral philosophy of the Middle Ages. Newton, for example, called his monumental work "The Mathematical Principles of Natural Philosophy." It was only much later, indeed within the last century, that their non-philosophical character has been clearly recognized. This clarification not only benefits the scientist, who no longer takes bis work to be a philosophical one, but it also helps the philosopher to appreciate better the limits of his own disci-

11. Mediaeval physics included, parts which properly belong to the philosophy of nature and parts which belong to the science of nature. I am here referring to the latter and not to the former, at least in so far as they were not contaminated by incorrect science. The analysis of changeable beings in terras of form and matter, and of change itself in terms of act and potency, are examples of a sound philosophical explanation of nature. On the other hand, the mediaeval attempt to explain the particular movements in nature through tendencies towards natural places (See Q. 5. a. 2. note 25) is an instance of the misuse of the philosophic method in the domain of science.

pline. As a result, he too benefits from the separation of science from philosophy.

The tragedy was that the revolt against mediaeval physics turned against, not only the bad physics of the Middle Ages, but against philosophy itself.[12] .The methods of the sciences of controlled observation and measurement were hailed as the only ones which enable us to understand maqjrtid. the universe. The method of ontological analysis, proper to philosophy, was denied all validity. The advent of positivism, with its repudiation of any ontological implication in science and its glorification of the positive sciences as the only valid method of knowing, gave these notions definite form and fixed them indelibly in the modern mind. It should be added, however, that a reaction to positivism began as early as the nineteenth century, led by such philosophers as Emile Meyerson[13] and Edmund Husserl, the founder of phenomenology.

With positivism the modern world had its revenge on the Middle Ages, but not without itself suffering a loss. For if the methods of empiriological science are successful in dealing with many problems about the physical universe, they are equally unsuccessful in handling many others, and these indeed the most important of all, such as the very intelligibility of the universe, the nature of man, his ultimate origin and destiny, good and evil, and God. In fact, the methods of these sciences do not even enable us to investigate the meaning and value of science itself, and to evaluate the various types of knowledge and science.

There is need, then, for a better understanding and appreciation of the ontological or philosophical method of knowing. And it is just for this reason that the philosophy of St. Thomas, and the present work in particular, are well worth our attention today. His analysis of the hierarchy of the sciences and of their methods is itself an excellent example of the ontologi-

12. See J. Maritain, Philosophy of *Nature,* pp. 41 *fl·* "The Conflict of Methods at the End of the Middle Ages . The *Thamist,* Oct, 1941 pp. 527-533.

IX See his De FExpÜcaüon dans l«s sciences.

cal method. It is not his aim to draw up a detailed and complete classification of the sciences, but rather to exhibit the main divisions of the sciences known in his day in the light of the causes, both on the side of the object and on the side of the subject, which give rise to them. In fine, his inquiry is a strictly philosophical one. The product of an age quite different from our own, it does not always give us ready-made answers to our problems. St. Thomas knew nothing about our new types of science, and so his analysis of the sciences and their methods could not take them into account. But he sets before us a model of how such an analysis should be made, as well as the broad principles of being and knowing which, because they are true, are as relevant today as they were in his century.

II

In this brief Introduction it would be impossible to comment on all the topics considered in these questions and the many problems they raise. The topics include such important ones as logic,[1] the liberal arts,[2] ethics,[3] practical science in general,[4] the subalternation of science,[5] and intermediate science.[6] Here we will confine our remarks to the two central themes of the Angelic Doctor: the hierarchy of the speculative sciences and their methods.

St. Thomas divides these sciences into three branches: natural philosophy or science, mathematics, and theology or divine science. It will be noticed that he uses the terms *natural science, physics* and *natural philosophy* as synonyms. Like all ancient and mediaeval philosophers, he makes no

1. See below, Q. 5, a. 1 Reply to obj. 2 and 3, pp. 9-10.
2. Loc. cit. Reply to obj. 3, pp. 10-12.
3. Ibid.
4. Loc. cit. Reply to obj. 4. pp. 12-14.
5. Loe. cit. Reply to obj. 5, p. 14.
6. See below. Q- 5, a. 3 Reply to obj. 6 and 7, pp. 34-35.

distinction between them.7 By *theology* is here meant first philosophy or metaphysics, not theology in the sense of the science of Sacred Scripture.89

This threefold division of the speculative sciences stems from Aristotle? It was handed down to the Middle Ages by Boethius and adopted by St. Thomas. Each of these sciences is defined by its subject of inquiry and by its method of procedure. St. Thomas followed Boethius on this point too, but not without significant additions and alterations.^According UxBoethius, the sciences are concerned with *forms,* and the hierarchy of the sciences corresponds exactly to the hierarchy of forms in the real world in various degrees of separation from matter. 6Thus natural science studies the forms of bodies along with the bodies themselves in which they exist. Mathematics studies apart from matter forms of bodies which must exist in matter *(e.g.* lines, circles, numbers). Theology studies forms which are entirely separate from matter *(e.g.* God).l011

It is clear from this that Boethius' division of the sciences, to some extent like that of Plato,11 is based upon an objective division of reality. <9Tach science has for its object a type of form more or less independent of matter. xThe branches of science exactly correspond to the order of forms themselves arranged in the real world according to their separation from matter. In such a view, there is little need to investigate the *subjective acts* by which the different objects of the sciences are grasped. AThe intellect follows more or less passively the division of forms it finds ready-made in the world. TOnly in

7. Indeed, as late as the nineteenth century bocks in physics were railed treatises on natural philosophy. Since then. the scope and method of science in the modern sense have been more clearly distinguished from those of natural philosophy. See J. Maritain.' *Philosophy of Nature; Let Degrés du savoir,* pp. 11Ü-112, 120-123. 265-397 Science *and Wisdom,* pp. 34-69.

8. For the distinction between the two meanings of theology, see below Q. 5. a. 4, pp. 41-42.

9. See Aristotle, Metaphysics XI. 7, 1064bl-6.

10. See Boethius, De Trinitate 2 (PL 64, 1250A>.

11. See Plato, Republic VI, 509-511.

the case of mathematics is there opportunity for discussing the act whereby the object of the science is attained, for, while existing in matter, mathematical forms are *considered* separate from matter. Yet Boethius does not exploit this opportunity, as St. Thomas does in his important third Article of Question Five.

In this Article St. Thomas shows the essential role played by the operations of the intellect in the determination of the subjects of the sciences.ri^The sciences are no longer considered as differentiated according to a distinction of forms ready-made in the world, but according to distinctions the mind itself makes in the course of its investigation of reality. · Thus he changes the very notion of the object of a science. It is no longer a *form* in the Boethian sense, even though he sometimes uses the language of Boethius. Each science is said to have its own *subject (subjectum),* which differentiates that science from every other. By the subject of a science St. Thomas does not simply mean the things considered by the science, or its subject-matter. ^The term also designates the formal perspective *(ratio)* under which these things are considered in the science.13

The analogy which St. Thomas sees between a science and its subject and a faculty of the soul or a *habitus* and its object may help to clarify this point.'A-He says, "The relation between a science and its subject is the same as that between a faculty or a *habitus* and its object. Now, properly speaking the object of a faculty or a *habitus* is that under whose formal perspective *(ratio)* all things are referred to that faculty or *habitus;* as man and stone are referred to sight in that they are colored. Hence 'colored thing' is the proper object of

12 The pages which follow (xv-xxvii) are an analysis of this Article. The reader should also consult St. Thomas. In. I P^ys. L m 1-3; In Meta. Prooemium, trans, below, ■ ■ — Meta-.Yect: V' Jb 158 ΓΠ lect. 7 n 405. XI. lech 7, n. 22a9-22S7; Summa Theol. I, 40,

U "U?'*, 7; a sàeAce see SV Themas. In I Post. Anal. lect. 2. I? » Sa "S Sn.2; ta ««·» Prooemium. >> >> Mo».

pp~ 30-83.

sight."[14] Completing this analogy, we can say that the subject of a science is that under whose formal perspective all things are studied in that science; as in metaphysics all things are considered from the point of view of being. Consequendy, the subject of metaphysics is being according as it is being.

Once this viewpoint of the subject of science is adopted, it becomes imperative to study the operations of our intellect and the different distinctions it makes in considering reality(1.Now the human intellect, St. Thomas says, has basically two operations. The first is the understanding or apprehension of intelligible objects, by which we know more or less distincdy *what* things are, or in other words their essences. The second operation is judgment, by which we compose or divide what we have grasped in simple apprehension. For instance, having understood what green and grass are, we unite the two in affirming, "Grass is green"; or having grasped what man and stone are, we divide the two by denying, "Man is not a stone." In judgment, then, the intellect does not simply know *what* things are; rather, it grasps them in their very existence. For when we affirm that grass *is* green, we understand how grass exists, namely as green; and when we judge that man is not a stone, we understand how man does not exist, namely as a stone. ''That is why St. Thomas says that the first operation of the mind is directed to the essence of a being, whereas judgment is directed to its existence.[15])

'"Xj Now, St. Thomas goes on to say, we can distinguish or abstract through both these operations of the intellect.[16] Abstraction through simple apprehension is the absolute consideration of some intelligible essence or nature; for instance, the consideration of animality in man without considering his rationality. This way of abstracting, connected as it is with simple apprehension, takes no account of the existence or nonexistence of these objects of thought. It is simply concerned with them as distinct intelligible natures. The second way of abstracting, however, does take existence into account, for it is accomplished through judgment. Thus if we judge, "Man is not a stone," we abstract or separate man from stone in such a way that we deny their identity, not simply as intelligible objects of thought, but in existence.

"k Once we grasp this distinction in the ways the intellect abstracts, it is not difficult to see that the laws of abstraction differ in the two cases. Obviously, the intellect cannot abstract or separate *in judgment* what is united in reality. This would be contrary to the truth, for in order that judgment be true, it must conform to the way things are. But if we judge, "The man is not white," separating in this way white from man, although in reality the man exists as white, then our judgment is false. As a consequence, we can only unite in our judgments what is united in existence, and separate or abstract in our judgments what is separate in existence.

This is not true, however, of abstraction through simple apprehension. In this operation of the intellect, we can, at least in some cases, abstract what is not separate in reality. As long as the intelligible object can be conceived apart, it can be considered by itself, even though it does not and cannot exist separately. For example, it is possible to consider human nature without considering the various individual men in whom that nature exists. For human nature is an intelligible object which ran be conceived apart from individual men, although it cannot exist separately from them in reality.

In St. Thomas' view, the Platonic doctrine of separated Forms resulted from a confusion of these two modes of

ti. Summa *Theol.* I, 1, 7.

15. See below, Q. 5. a. 3. pp. 26. 27. See also In I Sent. 19, 5, I. ad 7"; 38, 1. I Also J. Maritain. Existence *and* the Existent, pp. 10-19; E. Gilson. *Being and Some Philosophers,* pp. 190-215; G. B. Phelan, "Venun Sequitur Esse Rerum", *Mediaeval Studies,* 1939, pp. 11-22.

16. See below, Q. 5, a. 3, pp. *ZIfL* Also *Summa Theol,* I, 85, 1, ad 1", 2". Abstraction has both a negative and positive aspect. It involves a detaching or separating, but primarily it is a positive concentration of the mind on some intelligible object or aspect of a thing without considering other objects or aspects of the same thing. Ta abstract is not primarily to leave something out, but to take something in, and this is the reason why abstractions are knowledge." E. Gilson, *The Unity of Philosophical Experience,* pp. 144-fc>. See J. Mantain, A

abstraction. Because the intellect can *consider* a nature or essence without thinking of the individuals whose nature it is. Plato thought that it must *exist* separate from them. So he confused the order of intelligibility and the order of existence. Because an object of thought is intelligible in itself, Plato thought that it must exist in itself. In fact, what is one in existence can be conceived in multiple fashion in simple apprehension. Only in negative judgment do we grasp the separation of one thing from another *in existence.* So the fact chat we can consider a nature without considering the individuals in which it exists is no indication of the separate existence of that nature.

The immediate relevance, however, of the distinction between abstraction through apprehension and judgment goes beyond a refutation of Plato's theory of separate Forms. It enables us to distinguish between the subjects of natural philosophy and mathematics on the one hand, and that of metaphysics on the other. For according to St. Thomas the former grasp their subjects through abstraction in simple apprehension, while the latter attains its subject through a kind of abstraction accomplished in a negative judgment. In order to emphasize this difference he calls the latter sort of abstraction *separation,* reserving the term *abstraction* in the proper sense for that effected through simple apprehension.[17]

Let us now examine briefly the subjects of these sciences and the operations of the intellect whereby they are grasped.[18]

The abstraction of the natural philosopher is described as the abstraction of a whole: *abstractio totius.* By this is meant the absolute consideration of some essence without considering the individuals whose nature it is. The individuals are, as it were, "parts" from which the nature as a "whole" is abstracted. An abstraction of this sort is legitimate because these parts are accidental to the whole, in the sense that individuals as such are not contained in the definition of the nature. St.

17. See beîow. Q. 5. a. 3, p. 31.

B. See, *In Meta.* Prooemium; trans, below, pp. 80-83, *In I Phu*,* le<?t 1. n. 1-3; Summa Theol. I. 85. 1, ad 2".

Thomas explains that all the sciences use this type of abstraction, for they all leave aside the individual and accidental features of their object of study and concentrate on those that belong to it necessarily and universally. However, it is especially characteristic of natural philosophy, which studies the natures of material things. The natural philosopher cannot abstract from the essential "parts" of his subject-matter, namely those which necessarily belong to it and are included in its definition. He cannot, for example, leave out of consideration form or matter, for both are necessary parts of the nature of a material thing. He can, however, abstract from the individual as such, for this is not a necessary part of the nature. In studying man, for example, he cannot leave out of consideration flesh and bones, but he can abstract from *this* flesh and *these* bones.

The abstraction of the mathematician is an abstraction of form: *abstractio formae.* What is the meaning of "form" in this expression? It is not substantial form, for this cannot be conceived apart from matter, since it bears an essential relation to it: matter is included in the very definition of form. We can only abstract a form from matter when its essence can be understood without matter, not, however, when its essence depends on it. For this reason we cannot abstract accidental form from substance, for an accident by definition is that whose nature it is to exist in a substance as in a subject. So it is impossible to abstract such a form from substance and understand it apart. Accidents, however, by nature inhere in substance in a definite order: quantity first, then quality, and only after that action and passion. So it is possible to conceive quantified substance without considering qualities, although the converse would be impossible. Consequently, the abstraction of form in mathematics is not an abstraction of the accidental form of quantity apart from substance. It does concern the form of quantity (at least if the mathematics in question is arithmetic or Euclidean geometry—the only types known to St. Thomas), but not apart from substance in which it inheres. Quantity is not abstracted from substance, but

from the *sensible* qualities and the activities and passions of material substance.19*

The abstraction used *by the metaphysician to* grasp his subject is properly called separation: *separatio.* This is a radically different mode of abstraction from those we have *already discussed, for it is effected* through negative judgment, not through *simple apprehension. We* are thus forewarned that the subject of metaphysics will be radically different in character from those of natural philosophy and mathematics. For judgment is primarily *pointed to the act of existing of things,* whereas *simple* apprehension has to do rather with their essences or natures. As a result, the subject of metaphysics will have an existential character not found in those of the ocher two speculative sciences.10

Why, however, must the subject of metaphysics be grasped in a negative judgment? To understand this we must realize that for St. Thomas the subject of this science is universal being *(ens commune},* or being as being *(ens inquantum ens}.* It also deals with the transcendental properties of being, such as goodness and truth, as well as with God, who is the first cause of universal being." Now none of these depends on

19. See below, Q. 5, a. 3, p. 29. See also *Summa Theol.* I, 40, 3; *In III Meta.* lect 7, n. 405.

20. This is also evident if we remember that for St Thomas the act of existing *(esse)* is the supreme value of being, the actuality of all acts and the perfection of all perfections. *(De Potentia* VÜ. *Z ad* 9"). Hence metaphysics, which studies being from the point *of* view of being, or in other words from the point of *vie·*·. *of* that which is most perfect in being, is necessarily existential. See G. B. Phelan. "A Note on the Formal Object of Metaphysics". *Essays* tn *Modern Scholasticism,* pp. 47-51; R. J. Henle. *Method* m *Metaphysics,* pp. 51-58.

2L See St Thomas, *In Meta.* Prooemium, trans, below, pp. 80-83: *In IV Meta,* lect 1. n. 529-533. God is therefore not the subject of metaphysics, but the cause of its subject He is not contained in being in general *(ens commune).* but transcends it See St Thomas Swnnw *TheoL* 1. 105. 5; 1-11. 66, 5, ad 4" See also J. D. Robert. "La métaphysique, science distincte de toute autre discipline philosophique selon saint Thomas d'Aquin", *Dims Thomas.* 1947. pp. *36-222* God, however, is the principal object studied in metaphysics and the whole of that science is ordained to a knowledge of Hun. tSee below. Q. 5, a. L P- 8. *Contre Gentries* III. 25). That *is* why St Thomas gives as its first name theology or divine science. (See *in Meta.* Prooemium; trans. below, p. 83. below. Q. 5, a.

nutter and motion for its existence, as do the objects of natural philosophy and mathematics. Some of them *can* exist in matter and motion, as for instance being, goodness, act and potency; but these can also be found apart from matter in spiritual beings. God, of course, exists absolutely independent *of* matter and movement. We can conclude, therefore, that the objects with which the metaphysician is concerned either actually exist or can exist without matter. And it is this truth which is grasped by him in a negative judgment in which he denies that being is necessarily bound up with matter and material conditions. Through a judgment of this son he grasps being in its pure intelligibility, and primarily in its value of existence, and forms the metaphysical conception of being as being.22

From this it should be clear that St. Thomas never envisaged one type of abstraction common to all the sciences which admits simply of three *degrees.* As Jacques Maritain has said, each of the speculative sciences attains its subject by a mode of abstraction which is *sui generis* and irreducible to any ocher. One does not simply continue the others along the »me line, as if mathematical abstraction lays hold of a subject simply more abstract and general than that of natural philosophy, and metaphysical separation lays hold of one simply more abstract and general than that of mathematics. In other words, the term abstraction" does not have a univocal meaning. It

L, p. 8. On the other hand, the theology of Sacred Scripture has God for its subject (See below, Q. 5, a. 4, p. 41).

There is no distinction for St Thomas between a general metaphysics or ontology and philosophical theology. The theology of the philosophers and the primary philosophy or metaphysics are one and the same science. See J. Owens, "Theodicy, Natural Theology, and Metaphysics", *Modern. Schoolman,* Jan. 1951, pp. 126-137.

» As stated above (note 16), every abstraction has a positive as well as a negative aspect This is true of abstiaction through judgment

in which being, and particularly the act of existing. are

. pp. 24-28.

is analogical, signifying activities of the intellect which are essentially diverse from each other, although proportionately the same. Each of the modes of abstraction is a distinct type of "eidetic visualisation"'—to use an expression of J. Maritain—a distinct way in which the intellect lays hold of reality. At the same time, each implies a distinct way of distinguishing one thing from another, or one aspect of a being from another aspect of the same being.[23] The difference between the mode of abstraction pertaining to metaphysics on the one hand, and those pertaining to mathematics and natural philosophy on the other, is especially marked, for the former is accomplished through negative judgment, whereas the latter are the work of simple apprehension. It is this difference to which St. Thomas wishes to draw our attention when, in the present work, he calls the former *separation* and the latter *abstraction*. Both of these are said to be ways in w'hxch the intellect *distinguishes,* so that distinction appears as a quasi-genus of which separation and abstraction are diverse modes.[21]

It is true that in his later writings St. Thomas does not adhere to this terminology'. For example, in his *Sumina Theologiae* he speaks of two modes of *abstraction,* one through judgment, the other through apprehension. The term "separation" does not appear.*[3] But this is not surprising, since even in his Commentary on the *De Trinitate* he uses the verb "to abstract" to designate the act of "separating."*· St Thomas sometimes uses terms in a wide sense and not with their precise meaning. But despite this difference of terminology there is no indication that he abandoned the views

21 Although J. Maritain uses the expression "degrees of abstraction", he warns us that there is not simply a difference of degree between these activities of the intellect. See Philosophy *of Nature, p.* 24: also *Existence and the Existent,* pp. 28-30. On this question, see the prudent remark of L. M. Régis in "Un livre ... La philosophie de la nature. Quelques apories". *Etudes et Recherches. Philosophie I.* 193HS. p. 141. note X See also R. Allers, "On Intellectual Operations". *The New Scholasticism, Jan.* 1952. pp. 25-28.

24. See below, pu 31.

25. See St. Thomas. *Summa Theol* L 85. 1, ad 1", 2*.

28. See below. Q 5, a. 3. p. 27

expressed in his early work—views which are so closely in accord with his fundamental philosophical principles.

It would be erroneous, however, to see no importance whatsoever in his effort at precision in terminology in his Commentary on the *De Trinitate.* As he himself says, words are signs of concepts; and a philosopher's struggle to make his vocabulary more precise can generally be taken as an indication that he is doing the same with his thoughts.

That this is true in the present case is evident from St. Thomas' autograph manuscript of his Commentary on the De *Trinitate.* A study of the manuscript reveals that he began the Reply to Question Five, Article Three, several times, and that the final redaction was achieved only after great effort at precision of thought and terminology.[2τ]

In the first redaction St. Thomas makes no mention of the distinction between apprehension and judgment: the distinction which later becomes the keystone of his solution. His thought moves entirely in the order of essence or quiddity and the various ways in which the intellect becomes assimilated to it. A threefold division is attempted on the basis of the simultaneity, anteriority and posteriority of essences and their various elements, and again on the basis of their dependence on, or independence of each other. But no conclusion is reached along these lines, and he takes up the question again in a second redaction. Here at once he introduces the fundamental distinction between apprehension and judgment, but it still does not play the important role assigned to it in the definitive redaction. He speaks of "modes of abstraction" instead of "modes of distinguishing" as in the final writing; and the explanation of the three modes tends as before to remain on the level of simple apprehension, essences and their elements, their simultaneity, anteriority and posteriority. Only in the final redaction does he bring out the crucial importance of judgment and the act of existing *(esse)* grasped

27 See the study of these redactions by L·. B. Geiger, art. cit. They have been edited by P. A- Ucceili, S. Thomae *Aquinatis* i» Boetium de Tmutate *Expositiones* 'Rome. 1880>. pp. 335-33«.

between the intellectual operations by which the metaphysician lays hold of his subject and those by which the natural philosopher and mathematician lay hold of theirs.

The direction in which St. Thomas' mind was moving in these various redactions is clear. He was progressively realizing the central role of judgment and existence in the solution of his problem, as well as the eminently existential character of the subject of metaphysics.

In recent years historians of St. Thomas' philosophy have become more fully conscious of these aspects of his thought which for a long time remained quite obscured and forgotten.[28] Indeed two of his outstanding followers in the sixteenth and seventeenth centuries, Cajetan and John of St. Thomas, taught a doctrine of abstraction and division of the sciences based on it which leaves out of consideration the very features St. Thomas took such pains to emphasize: the role of judgment and existence. They distinguish between "total abstraction" and "formal abstraction." What is abstracted in the former is as a universal whole with respect to that from which it is abstracted; what is abstracted in the latter is as a form of that from which it is abstracted. All the sciences, they add, use total abstraction, but they are diversified according to modes of formal abstraction."

it is beyond the scope of this Introduction to attempt an adequate study of their doctrine and an evaluation of it as a faithful continuation of St. Thomas'. But this at least should be pointed out: For St. Thomas, abstraction of a whole, although common to all the sciences, is especially characteristic of natural philosophy, whereas for Cajetan and John of ■^in that act. Only here does he establish the basic difference; „—/St. Thomas, total abstraction is used by all die sciencesVbut^

28. Among other works, see E. Gilson, Le *Thomisme,* pp. 43-SL, 123-139: *Being and Some Philosophers.* J. Maritain, *A Preface to Metaphysics; Existence and the Existent.* J. de Finance, *Etre et agir dans la philosophie de s. Thomas.* G. B. Phelan. "Being and the Metaphysicians", *From an Abundant Spring,* pp. 423-447.29

29. See Cajetan, *In De Ente et Essentia,* Prooemium, Q. 1, n. 5, pp. β, 7; De *Nominum Analogia* 5, p. 50. John *of* St. Thomas, *Ars Logica* II, Q. 27, a. L pp. 818-830.

properly defines none of them. Again, for St. Thomas abstraction of form is proper to mathematics, while for his two commentators formal abstraction belongs to all the sciences, which are diversified by its various modes.[30] Finally, and most important of all, these commentators fail to explain the essential role negative judgment plays in St. Thojnas' memphysics, and the existential character of its subject. There are grounds to suspect, therefore, that behind the difference in the terminology of St. Thomas and his commentators there is a difference of doctrine.[31] This much at least is certain: without a direct contact with the works of St. Thomas, especially with his Commentary on the *De Trinitate,* it is impossible to appreciate his authentic teaching.

St. Thomas' conception of abstraction and the hierarchy of the sciences owes much to Aristotle. Yet it should be pointed out that he adds notions of his own and that even the ones he borrows from the Greek philosopher generally take on a quite original meaning in the context of his philosophy. This is not the place to attempt an elaborate exposition of Aristotle's doctrine in comparison with that of St. Thomas. Aristotle's views on these subjects are extremely difficult to understand and no brief account could do them justice. However, it might be helpful to the reader to say a few words on this topic. Some suggested readings will help him to carry on the study for himself.[33]

It should be remarked, first of all, that when Aristotle uses the term "abstraction" in connection with the sciences, it does not have the analogical character it has for St. Thomas. There

30. The terms themselves ("formal abstraction", "total abstraction") are not equivalent to St Thomas' "abstraction of a whole" and "abstraction of a form." Total and *formal* qualify the act of abstraction; *of a whole* and *of a form* designate the object of the abstraction.

3L See L. M. Régis, *art. cit.,* pp. 138-140. The opposite view is expressed by J. Maritain, *Existence and the Existent,* p. 30, note; also by M. V. T^roy "Le Savoir spéculatif", *Jacques Maritain, son oeuvre philosophique,* pp. 328-339.

32. See M. D. Philippe, "Abstraction, addition, séparation dans la philosoohie d'Aristote", *Revue Thomiste* 48 (1948), pp. 461-479. J Owens *The Doctrine of Being* in *the Aristotelian Metaphysics,* pp. 239-24L

is no doctrine of "degrees" of abstraction in Aristotle's philosophy of the sciences.[33] For him, abstraction in the technical sense means the act by which mathematical entities are grasped; namely those which are not separate from sensible things, but which are considered by the mathematician as separate. The mathematician subtracts and leaves out of consideration sensible forms, retaining only quantity.[34] The natural philosopher, on the other hand, attains his object by addition; for in his science forms are grasped, not as separated, but as immanent in the matter which they determine. Hence they must be understood with the addition of matter, which enters into the definition of the objects of this science.[35]

To appreciate the import of addition in Aristotle's philosophy, we must realize that for him the form or essence of a material thing does not include matter. Only the concrete entity does. [36] And since it is this concrete entity or substance which is defined by the natural philosopher, an act of addition is required to grasp form and matter together. St. Thomas, however, does not require such an operation, for according to him the essence of a material thing at once includes both form and matter.[37]

Aristotle is not so explicit in designating the intellectual

33. See J. Owens, op. cit., p. 240.

34. See M. D. Philippe, art. cit., pp. 461-466; J. Owens, op. cit., p. 239.

35. See M. D. Philippe, art. cit., pp. 466-469: J. Owens, op. cit., pp. 239-240.

36. See Aristotle, *Metaphysics* VII. 7. 1032bl-2. b!4; 10, 1035al7-22: 11, 1037a25-29. See also J. Owens, op. cit., pp. 222-225.

37. See below. Q. 5. a. 2, p. 19 and note 16. St. Thomas refers to addition when commenting on Aristotle (See *In III De Caelo et Mundo*. lect. 3, n. 4). It finds no place, however, in his personal doctrine.
St. Thomas' conception of essence is not identical with that of Aristotle. The Mediaeval Arabian philosopher Averroes followed Aristotle's notion of essence as form without matter. (See Averroes, *In VU Meta.* t c. 21, fol. 1711; t. c. 34, fol. 1S4D). St. Thomas criticizes Averroes for teaching that the whole essence of a species is the form alone without matter, but he does not recognize this doctrine as Aristotelian. Rather, he benignly interprets Aristotle's doctrine as in accord with his own. See St. Thomas. In *VII Meta.* lect. 9. n. 1467-1469. See also A. Maurer. "Form and Essence in the Philosophy of St Thomas", *Mediaeval Studies*. 1951. pp. 165-176.

activity characteristic of primary philosophy or metaphysics. However, he does describe it as an act of contemplation; and this act would seem to imply a separation, for its object is either separated in reality from the material world, like the separated substances, or it is at least capable of being separated in thought, like being, act, potency, etc.[38] Nothing explicit is said, however, about these objects being attained through a negative judgment of separation; and they lack the existential character which they have in St. Thomas' metaphysics.

These observations should put us on our guard against speaking without qualification of an "Aristotelico-Thomistic" doctrine of abstraction and scheme of the sciences. Although St. Thomas owes much to Aristotle on these points, to link together in this way the views of the two philosophers is a simplication which loses sight of important divergences in doctrine.[39]

We come now to the main theme of Question Six: the special methods of the speculative sciences. This will give us a new criterion for distinguishing these sciences: they not only have distinct subjects of inquiry; they also have their own characteristic methods of procedure in harmony with their subjects.

It will be noticed at once that St. Thomas adopts a pluralist attitude towards scientific method; he does not propose one method for all sciences. He recognizes, of course, that they have a common method in that they follow the same basic laws of logic;[40] but besides this he maintains that each science has its own special way of inquiring after truth. Because scientific methods are not equal in the certitude they yield, there will always be a temptation to deny this and to extend one method to all the sciences because of its excellence. St. Thomas saw that there is a particular temptation to single

38. See M. D. Philippe, *art. cit.,* pp. 469-479; J. Owens, op. cit., pp. 240-241.

39. See the remarks of L. M. Régis, *art.* cit., pp. 128-138.

40. See St Thomas, *In II Meta,* lect 5, n. 335; also below. Q. 5, a. 1. Reply to obj. 2 and 3, pp. 9-11: Q. 6, a. 1. Reply to obj. 3, p 56.

out the mathematical method for this role, since it is the most exact and certain. But he warns against this, insisting on the specificity of method in each of the sciences.[41]

The physico-mathematical sciences are no exception to this rule. Although they were merely in their infancy in the thirteenth century, St. Thomas recognized their epistemological type and describes it with a greater acumen than anyone else in his day. He calls them "intermediate sciences" because they are located between natural science and mathematics and thus share the characteristics of both. He names astronomy, optics and harmony or music as examples. Sciences of this sort study the physical universe, but by means of mathematics. So mathematics plays a formal role in their structure, while physical reality plays a material role.[42] But even though the rule of analysis and deduction in these sciences is mathematical, their method is not simply that of mathematics. Since they are physical sciences on their material side, they must be fed through a contact of the senses with material things. As a result, they have a method distinct from that of natural science and mathematics, although it shares to some extent in the methods of both.

In describing the methods of the main branches of the sciences, St. Thomas adopts the classical terminology of Boethius. The philosophy of nature, he says, proceeds *rationabiliter,* mathematics *disciplinabiliter,* and metaphysics *intellectualiter.*[43] For want of better terms, these Latin words have been translated respectively: "according to the mode of

41. See *In II Meta.* led. 5, n. 335-337; also below, Q. 6, a. 2, p. 65: " . . . they are in error who try to proceed in the same way in these three parts of speculative science." Here St. Thomas opposes the notion, which has become prevalent in our day, that science is essentially one, with the same scientific method. Descartes did much to introduce this conception into modern thought. See J. Maritain, *The Dream of Descartes,* pp. 48-57; also E. Gilson, *The Unity of Philosophical Experience,* pp. 142-151. The latter is an historical study of what happened to philosophy when methods other than its own were applied to it.

42. See below, Q- 5, a. 3, Reply to obj. 5, 6 and 7, p. 33, and note 19.

43. See below. Q. 6. a. L P· 46. and note 2.

reason" or "rationally," "according to the mode of learning," and "according to the mode of intellect," or "intellectually." Some explanation of these terms, however, is required.

The terms "reason" and "intellect," with which the methods of the philosophy of nature and metaphysics are respectively related, are almost synonyms, although we associate reason more particularly with the power of drawing conclusions from principles and intellect with the power of simply knowing or understanding. For St. Thomas, reason and intellect are not really distinct powers of man. They are one and the same intellectual power by which we know in different ways. Through reason we move from the known to the unknown, advancing from one thing to another in our conquest of truth. Through intellect we grasp an intelligible truth simply and intuitively, without any movement or discourse of the mind. So the act of reason is compared to that of intellect as movement to rest, or as the reaching out for something to the actual possession of it. Again, they are compared as the imperfect to the perfect, as a circle to its centre, as time to eternity.[44]

Reasoning is especially characteristic of man, for he must acquire knowledge through inquiry and discovery. That is why he is properly a *rational* animaL But he also knows by understanding. Indeed every movement of his reason begins and ends in understanding, just as every step we take in walking begins and ends at a position of rest. And just as every step we take brings us closer to our goal, so the movement of reason leads to a deeper understanding of truth, which is the object of our intellect.

It is quite different with the angels. They do not have to reason. Intellectual beings by nature, they grasp intuitively a multitude of truths in the unity of a single idea.[41] In this respect they resemble God, who simply by knowing His essence knows all things. Human reason, on the other hand, as the most imperfect of all intellects, must grasp unity in multiplicity rather than multiplicity in unity. Human know-

44. See St Thomas, *Summa Theol.* I, 79, 9.

45. See St Thomas, *op. cit.,* I, 58, X

ledge begins in the senses, which present reason with a vast variety of data; but in this multiplicity it sees unity and thus gathers simple truths from it. At the end of its reasoning, therefore, the human mind approaches the angelic intellect in gathering up a multitude of truths in the unity of simple principles or ideas. St. Thomas says: . . it is distinctive of reason to disperse itself in the consideration of many things and then to gather one simple truth from them." And he quotes with approval the words of Dionysius the pseudo-Areopagite: 'Souls have the power of reasoning in that they approach the truths of things from various angles, and in this respect they are inferior to angels; but inasmuch as they gather a multiplicity into unity they are in a way equal to the angels."[40]

It is against the background of this distinction of reason and intellect that we must understand St. Thomas' views on the methods of the sciences. Natural philosophy, he tells us, uses a method most in harmony with our natural way of knowing as rational beings.[47] For this reason its method is properly called *rational.* To begin with, this science deals with the changing sensible world, which is our first and most congenial object of knowledge: the one which our reason is best adapted to understand. It stays closest to this world in its changing and sensible character, and in the multiplicity of data it presents to us. Hence the very method it uses is characterized by the analysis of manifold data and by movement and progression from one thing to another. Then too, as rational beings, all of whose knowledge originates in the senses, we must investigate the properties of things and their sensible appearances in order to know their natures. We must inquire into effects in order to discover their causes. This movement of reason from effect to cause, from sign to thing signified, is particularly characteristic of natural philosophy and most connatural to us as rational animals. What is more, unlike mathematics, natural philosophy does not move simply

46. See below, Q. 6, a. 1. Reply to the Third Question, p. 57.

4L See below, Q. 6, a. L Reply to the First Question, pp. 52-53.

from one object of thought to another logically distinct object of thought. It is concerned with existing changing beings in their diversity and interrelations. In other words, it not only demonstrates by way of formal causes, but also through efficient and final causes, one of which is entirely external to the other. On this score, too, it uses a method which is rational in the proper sense of the word, for it follows most closely the human reason's natural way of knowing.

St. Thomas also attributes a major role to reasoning in mathematics.[48] In this respect it is like natural philosophy. The difference in their methods lies in the causes employed in reasoning. Mathematical demonstrations begin with definitions and principles, from which conclusions are deduced by way of formal causality. For example, a certain property of the triangle is shown to follow from its very definition. Unlike natural philosophy, mathematics does not demonstrate through final or efficient causes.

Following Boethius and a long-established tradition, St. Thomas says that mathematics proceeds "according to the mode of learning" *(disciplinabiliter).* This does not describe the mathematical method intrinsically, as "rational" describes that of natural philosophy. It simply designates that the mathematical sciences are the easiest to learn, for they are most exact and certain. The antiquity of this notion is indicated by the very etymology of the word "mathematics". It comes from the Greek *matbein* which means "to learn". Its equivalent in Latin is *discere,* from which *disciplina* and the English "discipline" are derived.

St. Thomas always maintained that we achieve our greatest certitude in mathematics.[49] It is more certain than natural philosophy because it abstracts from motion and the sensible qualities of material things. Natural philosophy must take

48. See below, Q. 6, a. 1, Reply to the First Question, p. 53; Reply to obj. 4 of Second Question, p. 57.

49. See below, Q. 6. a. 1, Reply to the Second Question; also *In II Meta.* lect. 5, n. 336. From the point of view of the simplicity of its objects, metaphysics is the most certain science (See *In I Meta.*

all of these into account, and so it is more difficult and less certain. The demonstrations of this science often hold good only in the majority of cases: there are exceptions because of the contingency of matter.

Furthermore, although natural philosophy studies material things, we do not know their substantial essences in themselves. Whatever knowledge we can have of them is attained through their accidental characteristics—their quantity, qualities, operations, etc — which are simply signs of their essential properties. In other words, the natural philosopher knows his objects of study very imperfectly through their sensible appearances.[50] This is why St. Thomas qualifies so strictly the type of certitude we can expect in natural science. He does not deny that some of its reasonings furnish adequate proof and are true demonstrations; but others are simply "suppositions", which explain sensible appearances without being necessarily true. For example, St. Thomas considers that although the Ptolemaic system of astronomy "saves the appearances", it is not necessarily true, since the appearances of the stars might conceivably be "saved" in still another way not yet known to man.[51]

The mathematical method is also more certain than that of metaphysics, but for another reason. The objects of metaphysics, like God, the angels, being, goodness, truth, are too lofty for the human reason. They can be known only with

lect 2, n. 47). It is not the most certain science, however, with reference to us, or subjectively, owing to the weakness of our intellects. For the different meanings erf certitude, see St Thomas, *Summa TheoL* II-II, 4, 8.

50. See St Thomas, De *Ente et Essentia* S; Eng. trans, p. 52: 'Out even in the case of sensible things the essential differences themselves are unknown to us; hence, we have to signify them by the accidental differences which arise from the essential, as we designate a cause by its effect.** See also De *Spiritualibus Creaturis* 11, ad 3", Eng. trans. p. 132; Summa *Theol.* I, 29, 1, ad 3m; I, 77, 1, ad 7"; In I De Anima, lect. 1, n. 15, Eng. trans, pp. 49-50; *Contra Gentiles* I, 3. See J. Maritain, Les Degré» *du savoir,* pp. 347-350; 407-414.

5L See St Thomas. In I De Caelo et *Mundo,* lect 3, n. 7; 11, lect 17, n. 2; *Summa Theol.* L 32. L ad 2". See also J. Maritain, *Les* Degree du *savoir,* p. 123, note; *Réflexions sur l'intelligence,* p. 195, note.

the greatest difficulty and hence with a lesser degree of certitude than mathematical entities. However, there is this consolation for the metaphysician: the little he can know about these most lofty matters is of greater value than the vast amount that can be known about those that are mundane.[52]

Indeed, in the realm of metaphysics the human intellect is strained to its utmost and is forced to adopt a method little congenial to it: the method of intellectual insight. For in this science it deals with objects, some of which transcend itself, and all of which are purely intelligible and as such do not fall under the senses or the imagination. In knowing these objects it must use a method which is not *rational,* but rather resembles that of the angelic intelligences. The method of metaphysics, St. Thomas says, is properly *intellectual* because it stays closest to the mode of knowing characteristic of intellect, as the method of natural philosophy is properly rational because it stays closest to the mode of knowing proper to reason.[53] By this he does not mean that metaphysics makes no use of reasoning, or that natural philosophy makes no use of intellectual insight. It is simply a question of greater emphasis on one or the other phase of human knowledge. In natural philosophy the movement of reason predominates, in metaphysics the unwavering grasp of fundamental truths through simple insight or intuition.[54] If metaphysics uses discursive reasoning, and moves from principles to conclusions, its conclusions are closest to its principles and so its reasoning most closely resembles intellectual intuition. Its method is accordingly more simple and less complicated than that of either natural philosophy or mathematics. It is a method

52. See St. Thomas, *Expositio super Librum de Causis,* lect. 1; trans, below, p. 84.

53. See below, Q. 6, a. 1, Reply to the Third Question, p. 57.

54. As a consequence, natural philosophy progresses in a different way than metaphysics. Movement from one thing to another and change of doctrine are more accentuated in natural philosophy than in metaphysics, which develops rather by penetrating more and more deeply into the same truths which are ever ancient and ever new. J. Maritain remarks that a treatise on natural philosophy can at the most endure a lifetime, and even then it must be periodically revised

of synthesis rather than analysis, for it is not so much a *gleaning of simple truths from* a multitude of data, as seeing a multitude of truths in the unity of simple truths. For metaphysics comes at the end of man's natural knowledge as its crown and completion, just as intellectual insight comes at the end of reasoning. The analytic movement of reason in all the sciences finds its ultimate term in the intellectual insights of metaphysics, whether the object under consideration is God as the first cause of all things, or being and the properties of being as being as the most universal of all conceptions. [55]

St. Thomas throws further light on the methods of the speculative sciences in Article Two of Question Six. The specific problem raised there is whether metaphysics must in any way use the imagination; but the solution involves the more general problem of the relation of the sciences to the senses, imagination and intellect.

In resolving this problem, he points out first that all our knowledge begins in the senses. So the starting-point of all the sciences must be the same: they must all originate in the senses. Our knowledge, however, ends in an intellectual judgment, and this judgment is made in different ways in the different sciences. In natural philosophy the judgment "terminates" in the senses. By this St. Thomas means that the judgment is made in the light of what the senses reveal: their evidence is the final court of appeal for the veracity of the scientific judgment. In mathematics the judgment "terminates" in the imagination, in the sense that the mathematical judg-

to take into account new data. This is not true of metaphysics, whose rythmn of development is different because of its greater independence of the natural sciences. On the other hand, science in the modern sense moves and changes in its theories with a greater rapidity than natural philosophy. The distinction between the methods and development of natural philosophy and metaphysics is verified proportionately between philosophy as a whole and science in the modern sense of the word. See J. Maritain, Science and Wisdom, p. 64, *A Preface* to Metaphysics, pp. 2-16.

55. In the sense in which these terms are defined below. Q. 6, a. 1. Reply to the Third Question, p. 58.

56. See below, Q. 6, a. L Reply to the Third Question, pp. 58-59.

ment looks to the evidence presented by the imagination. When he says this, St. Thomas is thinking of such mathematical sciences as Euclidean geometry, in which the mathematical entities are directly imaginable, and the judgment of the mathematician is directly verified by an appeal to the imagination. The problem of non-Euclidean geometries, in which a direct appeal to the imagination is impossible, did not arise in his day.[37] Finally, the judgment of the metaphysician "terminates" in the intellect alone. It could not possibly terminate in the senses or the imagination, for these faculties grasp things under their qualitative and quantitative aspects, whereas the objects of metaphysics are separated from matter and material conditions both in existence and in thought. Its objects are purely intelligible; and it is only the intellect which apprehends things under this aspect. Of course the metaphysician must use his senses and imagination as the source of his knowledge, but he makes his judgments in the light of what the intellect reveals about things, not according as they are grasped by the lower faculties of the soul. This final observation gives us a new criterion for distinguishing the speculative sciences from each other, and it offers new evidence that it would be a mistake to think that they must all use the same method.

In broad outline this is the picture of the hierarchy of the speculative sciences and of their methods drawn by St. Thomas in the present work. We leave the reader to fill out the many details by a careful reading of the text, including the illuminating answers to objections. Abundant notes are appended to direct him to other writings of the Angelic Doctor for additional clarification of his doctrines. Reference is also made wherever possible to works on St. Thomas' philosophy

57. The conclusions of non-Euclidean geometries are not directly verifiable in the intuition of the imagination. but only indirectly and analogically. The mathematical entities of Euclidean geometry and arithmetic are *real beings,* in the sense that their concepts have an immediate foundation in reality. The entities of non-Euclidean geometries are beings of reason *(entia rationis), constructed on* the foundations of the Euclidean and translatable in terms of them. See J. Maritain, *Les Degrés du savoir,* pp. 107-110, 285, 325-326.

which throw light on the more difficult passages. With their assistance it is hoped that the modern reader will be able to make contact with his thought and share in its order and wisdom.

' The translation has been made from the edition of the autograph manuscript of St. Thomas' Commentary on Boethius' *De Trinitate,* published by Father Paul Wyser, O.P.[58] I wish to thank Father Wyser and the Société Philosophique de Fribourg for granting permission to use their edition. I am also grateful to Dr. Anton C. Pegis, President of the Pontifical Institute of Mediaeval Studies, for his generous assistance in preparing the translation. There is an old saying that a translator is a traitor *(traduttore traditore).* If I am in any measure innocent of this quite justifiable charge, it is largely due to his constant criticism and correction.

58. *Thomas von Aquin, In Librum Boethii de Trinitate, Quaestiones Quinta et Sexta,* ed. Paul Wyser, Fribourg and Louvain, 1948.

QUESTION FIVE

The Division of Speculative Science

There are two questions here.[1] The first concerns the division of speculative science which the text proposes,- the second the methods it attributes to the parts of speculative science.

With regard to the first question there are four points of inquiry:

1. Is speculative science appropriately divided into these three parts: natural, mathematical and divine?
2. Does natural philosophy treat of what exists in motion and matter?
3. Does mathematics treat without motion and matter of what exists in matter?
4. Does divine science treat of what exists without matter and motion?

ARTICLE ONE

Is Speculative Science Appropriately Divided Into These Three Parts: Natural, Mathematical and Divine.[2]

He proceed thus to the first article: It seems that speculative science is not appropriately divided into these three parts.

Objection 1. For the parts of speculative science are those habits perfecting the contemplative part of the soul. But the Philosopher says in the *Ethics*[3] that the scientific part of the soul, which is its contemplative part, is perfected by three

1. The beginning of Chapter 2 of Boethius' De *Trinitate* (PL 64. 1250A), the point St. Thomas has reached in his Commentary.
2. The text of Boethius, *ibid.*
3. Aristotle. *Niconiachean Ethics* VI, 1, 1139al2ff; 3. 6 and 7, 1139b14ff. 1140b31ff. 1141a9ff.

habits, namely, wisdom, science and understanding. Therefore these are the three divisions of speculative science, not those proposed in the text.[4]

Objection 2. Again, Augustine says[5] that rational philosophy, or logic, is included under contemplative or speculative philosophy. Consequently, since no mention is made of it, it seems the division is inadequate.

Objection 3. Again, philosophy is commonly divided into seven liberal arts, which include neither natural nor divine science, but only rational and mathematical science. Hence natural and divine should not be called parts of speculative science.

Objection 4. Again, medicine seems to be the most operative science, and yet it is said to contain a speculative part and a practical part. By the same token, therefore, all the other operative sciences have a speculative part. Consequently, even though it is a practical science, ethics or moral science should be mentioned in this division because of its speculative^ part.

Objection 3. Again, the science of medicine is a branch of physics, and similarly certain other arts called "mechanical", like the science of agriculture, alchemy, and others of the same sort. Therefore, since these sciences are operative, it seems that natural science should not be included without qualification under speculative science.

Objection 6. Again, a whole should not be contradistinguished from its part. But divine science seems to be a whole in relation to physics and mathematics, since their subjects are parts of its subject. For the subject *of divine* science or first philosophy is being; and changeable substance, which the natural scientist considers, as well as quantity, which the mathematician considers, are parts of being. This is clear in the *Metaphysics?* Therefore, divine science should not be contradistinguished from natural science and mathematics.

4. The text of Boethius, *ibid.*
5. St. Augustine, De *Civitate Dei* VUI. 4 fCSEL 40, L 359).
6. Aristotle. Metaphv«« III. 2, 996bl4-23; see VI, 1, 1025b26-28. 1026a7-16; XI, 3. 1061b4-U; *4,* 1061bl7-33.

Objection 7. Again, as it is said in the *De Anima*,[7] sciences are divided in the same manner as things. But philosophy concerns being, for it is knowledge of being, as Dionysius says.[8] Now being is primarily divided with reference to potency and act, one and many, substance and accident. So it seems that the parts of philosophy ought to be distinguished by such divisions of being.

Objection 8. Again, there are many other divisions of beings studied by sciences more essential than the divisions into mobile and immobile and into abstract and inabstract: for example, the divisions into corporeal and incorporeal and into living and non-living, and the like. Therefore differences of this sort should be the basis for the division of the parts of philosophy rather than those mentioned here.

Objection 9. Again, that science on which others depend must be prior to them. Now all the other sciences depend on divine science because it is its business to prove their principles. Therefore Boethius should have placed divine science before the others.

Objection 10. Again, mathematics should be studied before natural science, for the young can easily learn mathematics, but only the more advanced natural science, as is said in the *Ethics*.[9] This is why the ancients are said to have observed the following order in learning the sciences: first, logic; then mathematics before natural science; after that moral science; and finally the mature studied divine science. Therefore, Boethius should have placed mathematics before natural science. And so it seems that this division is unsuitable.

On the contrary, the Philosopher proves the appropriateness of this division in the *Metaphysics*,[10] where he says, There will be three philosophical and theoretical sciences: mathematics, physics and theology."

7. Aristotle. *De Anima* HL 8, 431b24.
8. Pseudo-Dionysius, *Epistola VU,* 2 (PG 3, 1080B).
9. Aristotle, *Nicomachean Ethics* VL 8, 1142all-19.
10. Aristotle, *Metaphysics* VI, L 1026al8.

Moreover, in the Physics'[11] *three methods of the* sciences are proposed which indeed seem to *belong to these three.*

Moreover, Ptolemy also uses this division in the beginning of his Almagest.'[12]

Reply: The theoretical or *speculative intellect is properly distinguished from the operative or practical intellect in this, that the speculative intellect has for its end the* truth under consideration, while the practical intellect directs the truth under *consideration to operation as to its end. So the* Philosopher says *in the De Anima* [13] *that they differ* from each other with regard to their end. And he says in the *Metaphysics,* [14] "The end of speculative *science is* truth, while the end *of practical science is action".*

/Now since the matter must be proportionate to the end} the *subject* matter of the practical sciences must be those things which can be achieved through our own efforts, so that we can *direct the knowledge of them to operation as to* an end. On the other hand, the subject matter of the speculative sciences must be those things which are nor produced through our efforts, so our investigation of them cannot be *directed to* operation as to an end. *And it is according as these things are distinguished from each other that the speculative sciences must be divided.*

Now we must understand that when habits or powers are ^distinguished according to their *objects, they are not distinguished according to just any differences of objects, but according to* those which essentially characterize rhe objects as *objects.* [16] *For instance, to be* either an animal or plant is

11 Aristotle. *Physics* Π. 2 193b23ff; 194514.

12 Claudius Ptolemaeus. *Syntaxis Mathematica* I, 1 *(Opera Omnia* I, 5,15

13. Aristotle. *De Anima* ΠΙ. 10. 433aI4.

14. Aristotle. *Metaphysics* H, 1 993520.

15. For the distinction between speculative and practical knowledge St. Thomas, *Summa Theol.* I. 1 4; I. 14. 16; *De Veritate* 2 8; 13· *In I Eth. lect.* 1 and 2 See also *J. Maritain. Les Degrés du savoir* pp. 618-625: Annexe VII pp. 879-896; Yves Simon. Critique *de la* con- f *naissance morale.*

16. *For the distinction of powers* and habits according to objects.

acddental to a sensible thing as sensible; and so the distinction of the senses is not taken from this difference, but rather from the difference of color and sound. Consequently, the speculative sciences must be distinguished according to the differences among objects of speculation precisely as objects of speculation. Now an object of this kind—that is to say, an object of a speculative power—possesses one characteristic on the side of the intellectual power and another on the side of the habit of science perfecting the intellect. On the side of the intellect it belongs to it to be immaterial, because the intellect itself is immaterial. On the side of the habit of science it belongs to it to be necessary, because science is of the necessary, as is proved in the *Posterior Analytics.'*[17] Now whatever is necessary, is as such immobile; for, as is said in the *Metaphysics,'*[18] everything which is moved, in so far as it is moved, can be or not be, either absolutely or in a certain respect. Therefore, separation from matter and motion, or connection[19] with them, essentially belong to an object of speculation, which is the *object* of speculative science. Consequently the speculative sciences are distinguished according to their disposition *(ordinem)* with reference to separation from matter and motion.

Now there are some objects of speculation which depend on matter with respect to their existence, for they can only exist in matter. And there is a distinction among these. Some depend on matter both with respect to their existence and their concept. This is the case with those whose definition contains sensible matter and which, therefore, cannot be under-

St Thomas. *Summa Theol.* I, 77, 3; I-Π, 54, 2 *In I Phys.* lect. L nn. 1-3. Eng. trans, p. 13.

17. Aristotle, *Posterior Analytics* I, 6, 7455-75alî.

13. Aristotle, *Metaphysics* IX, 8, 1050511-15. See St Thomas, *In IX Meta.* lect 9. n. 1869.

ArmPcatio St Thomas here refers to the connection or relation Ctween the universal natures considered by natural science and *7?* individual things from which they are abstracted. This cwi- known through an act of reflection, is necessary *for*

See below. Q. 5, a. 2 and Reply to obj. 4. p. 22

stood without sensible matter; as, for instance, it is necessary to include flesh and bones in the definition of man. Physio or natural science studies things of this sort. There are some objects of speculation, however, which although depending on matter with respect to existence, do not depend on it with respect to their concept, because sensible matter is not included in their definitions. This is the case with lines and numbers—the sort of things mathematics studies. There are still other objects of speculation which do not depend on matter with respect to their existence because they can exist without matter. This is true, whether they never exist in matter, *e.g.,* God and the angels, or whether they exist in matter in some things and in others do not, *e.g.,* substance, quality, being, potency, act, one and many, and the like. Theology or divine science (so called because God is the principal thing known in it) deals with all these. It is called by another name "metaphysics", that is to say, "transphysics", because in the order of learning it comes after physics for us who must rise from sensible things to what is beyond the sensible. It is also called first philosophy"[30] in so far as all the other sciences take their principles from it[21] and so come after it. It is impossible, however, for some things to depend on matter with respect to their concept and not with respect to their existence, for the intellect by its very nature is immaterial. So there is no fourth kind of philosophy besides the ones mentioned.

20. For a similar explanation of the three names of this science, see the *Prooemium* to St. Thomas' Commentary on the *Metaphysics.* trans, below p. 83. Divine science and theology are here used as synonymous with metaphysics. They are not the theology of Sacred Scripture. as St. Thomas explains below in Q. 5, a. 4. p. 41. Aristotle himself calls this science primary philosophy *or* theology. The name "metaphysics" does not come from him, but from either Andronicus of Rhodes or some earlier editor of Aristotle's works in the first century RC. who placed the treatises on primary philosophy after the *Physics* and therefore called them the treatises after the *Physics.* It is also possible that the name was coined to signify that metaphysics goes beyond the order *of* physics. See W. Ross. *Aristotle's Metaphysics* I. pp. xxxi-xxxii; W. Jaeger, *Aristotle* pp. 378-379.

21. Of course the other sciences have their own proper principles, which can be known without an explicit knowledge of the principles

Reply to obj. 1. In the *Ethics*,[22] the Philosopher considers the intellectual habits in so far as they are intellectual virtues. Now they are called virtues from the fact that they perfect the intellect in its operation; for virtue makes its possessor good and renders its work good. So he differentiates between virtues of this sort according as such speculative habits perfect the intellect in different ways. Now, in one way the speculative part of the soul is perfected by understanding, which is the habit of principles, through which some things become known of themselves. In another way it is perfected by a habit through which conclusions demonstrated from such principles are known, whether the demonstration proceeds from inferior causes, as in science, or from the highest causes, as in wisdom. But when sciences are differentiated in so far as they are habits, they must be distinguished according to their objects, that is, according to the things of which the sciences treat. And it is in this way that both here and in the *Metaphysics*[23] speculative philosophy is distinguished into three parts.

Reply to obj. 2. As is evident in the beginning of the *Metaphysics*,[24] the speculative sciences concern things the knowledge of which is sought for their own sake. However, we do not seek to know the things studied by logic for themselves, but as a help to the other sciences. So logic is not included under speculative philosophy as a principal part but as something brought under speculative philosophy as furnishing speculative thought with its instruments, namely,

of metaphysics. Hence these sciences do not directly depend on metaphysics; they are autonomous in their own spheres. Yet the principles of metaphysics are the absolutely universal and primary principles. AH the others can be resolved into them. It is in this sense that all the other sciences are said to take their principles from metaphysics, and that this science is said to explain the principles of all the sciences. See below, Reply to obj. 9. p. 16; Q. 6, a. L Reply to the Third Question, p. 59. See also *In I Post. Anal.* lect. 17, rm. 4-5; J. Maritain, *Introduction to Philosophy,* pp. 113-114.

22. Aristotle, *Nicomachean Ethics* VI, 3β. 1139bl4ff.

23. Aristotle, *Metaphysics* VI. L 1026al8.

24. Aristotle, op. eit. L L 981b21. 982al; 2, 982al4-17.

syllogisms, definitions and the like, which we need in the speculative sciences. Thus, according to Boethius,[25] logic is not so much a science as the instrument of science.

Reply to obj. 3. The seven liberal arts do not adequately divide theoretical philosophy; but, as Hugh of St. Victor says,[26] seven arts are grouped together, leaving out certain other ones, because those who wanted to learn philosophy were first instructed in them. And the reason why they are divided into the trivium and quadrivium[27] is that "they are as paths introducing the eager mind to the secrets of philosophy".[28] This is also in harmony with what the Philosopher says in the *Metaphysics,*[29] that we must investigate the method of scientific thinking before the sciences themselves. And the Commentator says in the same place[30] that before all the other sciences a person should learn logic, which teaches the method of all the

25. Boethius, In *Isagogen Porphyrii Comm.,* ed. secundae, I, 3 (CSEL 48, 142); Eng. trans, p. 77.
Sometimes St. Thomas calls logic a science because it proceeds by demonstration. (See *In I Perih.* lect. 1, n. 2; *In I Post. AnaL* lect 1, n. 2; *In IV Meta.* lect. 4, n. 576). At other times he calls it an art. because it involves the construction of syllogisms and the like, and it has a practical purpose, namely the direction of the human reason in its movement towards truth. Art is defined as the determined ordination of reason by which human actions through determined means arrive at their due end. Logic is the art by which reason directs itself so that it will reach its due end, which is, truth. Indeed, it is the "art of arts", because it directs reason itself, from which in turn all the arts proceed. See *In I Post. Anal.* lect. L nn. 1-3; John of St Thomas, Ars *Logica* II, Q. 1, a. 2, pp. 256 ff; J. Maritain. *Introduction to Philosophy,* pp. 142-148. See also below, note 40.

26. Hugh of St Victor, *Didascalion* HI, 3, p. 52, L 29-p. 53, L 8.

27. The trivium includes grammar, rhetoric and logic; the quadrivium arithmetic, geometry, astronomy and music. Inherited from the classical culture *of* Rome through the writings of Cicero and Quintillian. they became the foundation of mediaeval education. See L. J. Paetow, *The Arts Course at Mediaeval Universities icith Special Reference to Grammar and Rhetoric;* Hastings Rashdall. *The Universities of Europe in the Middle Ages,* ed. by F. M. Powicke and A. B. Emden. I. *pp.* 34-37; G. Paré, A. Brunet P. Tremblay, *La Renaissance du* rti' siècle, pp. 98-108; R. McKeon. "Rhetoric in the Middle Ages" *Speculum.* <1942). pp. 1-32.

28. Hugh of St Victor, *ibid.*

29. Aristotle, *Metaphysics* II, 3, 995a12-14.

30. Averroes, *In II Meta.* X t. e. 15, fol. 35FG.

sciences; and the trivium belongs to the domain of logic. The Philosopher further says in the *Ethics*[31] that the young can know mathematics, but not physics, which requires experience. So we are given to understand that we should learn mathematics, to whose domain the quadrivium belongs, immediately after logic. And so these are as paths preparing the mind for the other philosophic disciplines.

We may add, too, that these are called arts among the other sciences because they not only involve knowledge but a certain work which is directly a product of reason itself; for example, producing a composition, syllogism or discourse, numbering, measuring, composing melodies and reckoning the course of the stars. Other sciences, like divine and natural sciences, either do not involve a work produced, but only knowledge, and so we cannot call them arts, because, according to the *Metaphysics*,[32] art is called "productive reason"; or they involve a material product, as in the case of medicine, alchemy and other sciences of this sort. These latter, then, cannot be called liberal arts because such actions belong to man on the side of his nature in which he is not free, namely, on the side of his body.[31] And although moral science is

3L Aristotle, *Nicomachean Ethics* VI, 8, 1142all-19.

32. Aristotle, *Metaphysics* VI. I, 1025b22. Aristotle defines art as a habit which is directed to making and which involves a true course of reasoning. (See *Nichomachean Ethics* VI, 4. 1140al0). Following Aristotle. St. Thomas defines it as an operative habit accompanied by right reason. (See *In VI Ethic,* lect. 3, n. 1153). Again, he says that art is nothing else than right reason about works to be made. (See *Summa Theol.* I-II. 57, 3). On this point, consult J. Maritain, *Art and Scholasticism,* p. 9.

Alchemy is the art of transmuting base metals into pure ones, such as silver and gold. For the history of alchemy and its relation to rhemictry, see F. Sherwood Taylor, *The Alchemists, Founders of Modem Chemistry.* St Thomas' views on alchemy are treated on pp. 96-100, but they are drawn from the Commentary on Book III of the *Meteors* which is not the work of St Thomas but of his disciple, Peter of Auvergne. (See St. Thomas. *Opera Omnia* ed. Leonine III o xxxiii). Lvnn Thorndike draws from the same source in describing St Thomas' views on alchemy. See his *A History of Magic and Experimental Science* II, p. 607.

For this reason they are called mechanical or servile arts, in d:stinct'on to the liberal arts, which, although they involve a work produced directly by reason itself, do not exist for the sake of that

directed to action, still that action is not the act of the science but rather of virtue, as is clear in the *Ethics*.[35] So we cannot call moral science an art; but rather in these actions virtue takes the place of art. Thus, as Augustine says,[36] the ancients defined virtue as the art of noble and well-ordered living.

Reply to obj. 4. As Avicenna says,[37] the distinction between theoretical and practical is not the same when philosophy is divided into theoretical and practical, when the arts are divided into theoretical and practical, and when medicine is so divided. For when we distinguish philosophy and likewise the arts into theoretical and practical we must do so on the basis of their end, calling that theoretical which is directed solely to

work, but rather are ordained to knowledge. St. Thomas says, "Only those arts are called liberal which are ordained to knowledge. Those ordained to some utility to be achieved through action are called mechanical or servile." (*In I Meta.* lect. 3, n. 59). "Even in speculative matters there is something by way of work: *e.g.*, the making of a syllogism or of a fitting speech, or the work of counting or measuring. Hence whatever habits are ordained to such works of the speculative reason are, by a kind of comparison, called arts indeed, but *liberal* arts, in order to distinguish them from those arts that are ordained to works done by the body; for these arts are, in a fashion, servile, inasmuch as the body is in servile subjection to the soul, and man, as regards his soul, is free [liber]." *Summa Theol.* I-II, 57, 3. Reply to obj. 3. See M. D. Chenu, "Arts 'mécaniques' et oeuvres serviles," Revue des sciences ph.il. et *théol.,* 1940. pp. 313-315.

35. Aristotle. *Nicomachean Ethice* VI, 13, 1144bl7-30. There is a distinction between the moral science of right conduct and the moral virtues, which are the proximate principles of right conduct. Moral science or ethics is a practical science because its purpose is to direct human action; but it guides man only in a remote way, because as a science it deals with human actions in general and not directly with the particular action to be done here and now. The moral virtue of prudence is the immediate guide to action in the moral order. See J. Maritain, *Les Degrés* du *savoir,* pp. 618-624: Annexe VU, pp. 878-896; *Introduction to Philosophy,* pp. 264-267.

36. St Augustine. De *Civitate Dei IV,* 21 (CSEL 40, L 188); XIX, 1 (CSEL 40, II. 364). Referring to this statement of St. Augustine. J. Maritain says that the virtue of prudence, "which discerns and applies the means of attaining our moral ends," can be called an art only metaphorically. For art in the proper sense of the word, is directed to the good work which the artist produces, whereas the virtue of prudence is directed to the good of the agent. See J. Maritain, Art and *Scholasticism,* p. 14.

37. Avicenna. Canon *Medicinae* I, fen. 1, doctr. L prologus (Venice, 1608. I, 6, a 33-40).

knowledge of the truth, and that practical which is directed to operation. However, there is this difference when we distinguish the whole of philosophy and the arts on this basis: We divide philosophy with respect to the final end or happiness, to which the whole of human life is directed. For, as Augustine says,[38] following Varro, "There is no other reason for a man philosophizing except to be happy." And since the philosophers teach that there is a twofold happiness, one contemplative and the other active, as is clear in the *Ethics,*[39] they have accordingly also distinguished between two parts of philosophy, calling moral philosophy practical and natural and rational philosophy theoretical. But when they call some arts speculative and some practical, this is on the basis of some *special* ends of those arts; as when we say that agriculture is a practical art while dialectic is theoretical.[40]

However, when we divide medicine into theoretical and practical, the division is not on the basis of the end. For on that basis the whole of medicine is practical, since it is directed to practice. But the above division is rather made according as what is studied in medicine is proximate to, or remote from, practice. Thus we call that part of medicine practical which teaches the method of healing, for instance, that medicines of such and such a kind should be given for such and such abscesses. On the other hand, we call that part theoretical which teaches the principles directing a man in his practice, although not proximately; for instance, that there are three virtues,[41] and that there are so many kinds of

38. St Augustine, De *Civitate Dei* XIX, 1 (CSEL 40, II, 366). St. Augustine refers to Varro's *Laber de Philosophia,* which is not extant

39. Aristotle, *Nicomachean Ethics* X, 7-8, H77al2 ff.

40 Logic or dialectic is not properly a speculative science, but rather a liberal art, sine*» it is ordained to knowledge and it involves the construction of syllogisms, definitions, etc. (See above, note 34). But its special end is to serve the speculative sciences of which it is the instrument. Hence it can be called speculative or theoretical by reduction. (See above, note 25).

41 St Thomas refers to the classical division of virtues in medicine

fever. Consequently, if we call some part of a practical science theoretical, we should not on that account place that part under speculative philosophy.

Reply to obj. 5. One science is contained under another in two ways: In one way, as its part, because its subject is part of the subject of that other science, as plant is a part of natural body. So the science of plants is also contained under natural science as one of its parts. In another way, one science is contained under another as subalternated to it. This occurs when in a higher science there is given the reason for what a lower science knows only as a fact.[42] This is how music is contained under arithmetic.

Medicine, therefore, is not contained under physics as a part, for the subject of medicine is not part of the subject of natural science according to that character *(ratio)* by which it is the subject of medicine. For although the curable body is a natural body it is not the subject of medicine in so far as it is curable by nature, but in so *far* as it is curable by art. But because art is nature's handmaid in healing (in which art too plays a part, for health is brought about through the power of nature with the assistance of art), hence it is that the reason for the practices used in the art must be understood from the properties of natural things. So medicine is subalternated to physics, and for the same reason so too are alchemy, the science of agriculture, and all sciences of this sort. We conclude, then, that in itself and in all its parts physics is speculative, although some practical sciences are subalternated to it.

into vital, natural and animal. See Avicenna, *Canon Medicinae* I. fen. L doctr. 6 (Venice, 1608, I, T0 b 40-44).

42. When one science is subalternated to another, it is inferior to it and borrows principles from it as from a superior science. It cannot explain those borrowed principles by itself. Only the higher science can do that. It assumes that they are true without knowing why they are true. For St Thomas' doctrine of the subalternato., of science, see *In Boetium de Trinitate* II. 2. Reply to obj. 5; In *I Sent.* ProL Q. I. a. 3, quest 3, sol. 2; *In I* Post. *Anal.* lect 25. See also John of St Thomas. *Ari Loffica* II. 36. 2. pp. 795-802.

Reply to obj. 6. Although the subjects[43] of the other sciences are parts of being, which is the subject of metaphysics, the other sciences are not necessarily parts of metaphysics. For each science treats of one part of being in a special way distinct from that in w'hich metaphysics treats of being. So its subject is not properly speaking a part of the subject of metaphysics, for it is not a part of being according to that character *(ratio)* by which being is the subject of metaphysics. But from the point of view of this character it is a special science distinct from the others. However, the science treating of potency, or that treating of act or unity or anything of this sort, could be called a part of metaphysics, because these are considered in the same manner as is being, which is the subject of metaphysics.

Reply to obj. 7. These parts of being require the same manner of consideration as being in general *(ens commune)* because they too are independent of matter. For this reason the science dealing with them is not distinct from the science of being in general.

Reply to obj. 8. The other diversities of things mentioned in the objection do not differentiate those things essentially as objects of knowledge. So the sciences are not distinguished according to them.

Reply to obj. 9. Although divine science is by nature the first of all the sciences, with respect to us the other sciences come before it.[44] For, as Avicenna says,[49] the order of this science is that it be learned after the natural sciences, which explain many things used by' metaphysics, such as generation, corruption, motion, and the like. It should also be learned after mathematics, because to know the separate substances metaphysics has to know the number and disposition of the heavenly spheres, and this is impossible without astronomy,

41 For the meaning of the subject of a science, see above, Introduction. pp. xv, xvi.

44. The punctuation of this sentence in the Wyser edition has been slightly changed.

45. Avicenna, *Metaphysics* I, 3, fol.

which presupposes the whole of mathematics;[48] while other sciences, like music, ethics, and the like, contribute to its fulness of perfection.

Moreover, that this science presupposes some things as proved in the other sciences while it itself proves the principles of those other sciences, does not necessarily involve a vicious circle. For the principles which another science (such as natural philosophy) takes from first philosophy do not prove what the same first philosopher takes from the natural philosopher. Rather, they are proved through other self-evident principles. Similarly the first philosopher does not prove the principles he gives the natural philosopher by principles he receives from him, but by other self-evident principles. So there is no vicious circle in defining.

Moreover, in the beginning the sensible effects from which the demonstrations of natural science proceed are more evident to us. But when through them we come to know the first causes, from these latter there will become evident to us the reason for the effects on which the proof of the demonstrations of fact *(quia)*[47] rest. In this way natural

46. According to Aristotle, the separate substances or intelligences are the movers of the heavenly spheres and are equal in number to them. See Metaphysics XI, 8, 1073a32ff). Although St Thomas thought that the angels move the heavenly bodies, he does not restrict their number to the number of those bodies. See *Summa Theot.* I, 50. 3: De Substantiis Separatis II, η. 12, p. 13L See also below, Q. 5, a. 4, note 28.

In general, metaphysics uses the inferior sciences and in this sense depends on them. But this dependence is purely materiaL As the supreme science in the natural order, metaphysics is independent in its own sphere and does not exist for the sake of the other sciences. It is supremely free. See St. Thomas, *In I Meta,* lect 3, n. 58; J. Maritain. *An Introduction to Philosophy,* p. 118.47

47. A demonstration *quia* is one which proves the existence of something from its effect without revealing the very nature *of* that thing or giving the reason why it is. Only a demonstration *propter* quid does that Thus the demonstrations of the existence of God based on the sensible world are demonstrations quia, not *propter quid.* "Demonstrations can be made in two ways: One is through the cause, and is called *propter quid,* and this is to argue from what is prior absolutely. The other is through the effect, and this is called a demonstration *quia;* this is to argue from what is prior relatively only to us." Summa *TheoL* I. 2, 2. See *Contra Gentiles Ï, 12; In I Post. AndL* lect. 21 See also G. Smith, *Natural Theolopy,* pp. 55-59.

sdence contributes something to divine science and nevertheless it is divine science which explains its principles. That is why Boethius[48] places divine science last, because it is the last relatively to us.

Reply to obj. 10. Although we should learn natural science after mathematics because the extensive data it is grounded upon require experience and time, still, since natural things fall under the senses, they are naturally better known than the mathematical entities abstracted from sensible matter.

ARTICLE TWO

Does Natural Philosophy Treat of What Exists in Motion' and Matter?

We proceed thus to the second article: It seems that natural science does not treat of what exists in motion and matter.

Objection I. For matter is the principle of individuation. Now, according to Plato's doctrine, which is found in Porphyry,[2] no science treats of individual things but only of universals. Therefore, natural science does not treat of what is in matter.

Objection 2. Again, science pertains to the intellect. But the intellect knows by abstracting from matter and from the conditions of matter. Therefore, no science can treat of what is not abstracted from matter.

Objection 3. Again, as is clear in the *Physics*,[3] the First Mover is considered in natural science. But the First Mover

48. Boethius, De *Trinitate* 2 (PL 64, 1250A).

L Motion *(motus),* as used throughout the article, means not only change of place, but change in general, including qualitative, quantitative and substantial change. For St Thomas doctrine of change, see I* *III Phys.* lect. 1-5; Eng. trans, pp. 7, 28-49.

1 Pru-τΛντν *Isaagae (Commentaria in AristotL Graeca TV/I, p.* 6. IL S — 1 6 3 - *Philebus* 1SC-D, 1TO; *Laches* 198D.

3. Aristotle. *Physics* VOL 5, S6a4-257a33.

is free from all matter. Therefore, natural science does not treat only of what is in matter.

Objection 4. Again, every science has to do with what is necessary. But whatever is moved, as such is contingent, as is proved in the *Metaphysics*[4] Therefore, no science can treat of what is subject to motion; and so neither can natural science.

Objection 5. Again, no universal is subject to motion; for as is said in the beginning of the *Metaphysics*,[5] it is not man in general who is healed, but *this* man. But every science concerns that which is universal. Therefore natural science does not treat of what is in motion.

Objection 6. Again, some of the things with which natural science deals are not subject to motion; for instance, the soul, as is shown in the *De Anima*,[6] and the earth, as is proved in the *De Caelo et Mundo*.[7] What is more, all natural forms neither come into being nor perish, and for the same reason they are not subject to motion except accidentally. This is shown in the *Metaphysics*[8] Therefore not everything that physics considers is in motion.

Objection 7. Again, every creature is mutable, for, as Augustine says,[9] immutability naturally belongs to God alone. So if it is the task of natural science to consider what is in motion, it will be its business to consider all creatures; which clearly appears to be false.

On the contrary, it is the work of natural science to reach conclusions about natural things. Now, natural things are those in which there is a principle of motion; and, as the

4. Aristotle. *Metaphysics* IX. 8. 1050b11-15.

5. Aristotle. *Metaphysics I.* 1, 981a18-20.

6. Aristotle. *De Anima* I, 3, 4O5b31-407b12.

7. Aristotle. De *Caelo et Mundo* II, 14, 256a24-297a8. For the immobility *of* the earth, see below, note 25.

8. Aristotle. *Metaphysics VTl,* 8. 1033b5.

9. St. Augustine. De Civitate Det XI, 10 (CSEL 40, L 525).

Metaphysics says,[10] wherever there is motion there must be matter. So natural science treats of what is in motion and matter.

Moreover, there must be some speculative science dealing with what is in matter and motion, for otherwise the teaching of philosophy, which is knowledge of being, would be incomplete. Now no other speculative science treats of these things, for neither mathematics nor metaphysics does so. Therefore, natural science treats of them.

Moreover, the fact is clear from the statements of the Philosopher in the *Metaphysics"* and the *Physics*[12]

Reply: It was the difficulty involved in this problem that drove Plato to posit ideas. For, as the Philosopher says,[13] he believed all sensible things to be always in flux, following the opinion of Cratylus and Heraclitus, and so he thought that there can be no science concerning them. As a consequence, he asserted the existence of substances separated from the sensible world, which might serve as the objects of science and of definitions. Now he made this mistake because he failed to distinguish what is essential from what is accidental. Thus it happens that accidentally even the wise frequently fall into error, as is said in the *Sophistic Refutations.*[14]

Now, as is shown in the *Metaphysics,*[15] we find in a sensible substance both the whole or the composite itself, and also the nature *(ratio),* that is, its form;[16] and it is the

10. Aristotle, *Metaphysics* IX, 8, 1050b22; see VII. 8, 1033bl8.

IL Aristotle, *Metaphysics* VI,. 1, 1025b26-28.

12. Aristotle, *Physics* II, 2, 193b22-134al2.

11 Aristotle, *Metaphysics* I, 6, 987a32-34.

14. Aristotle, *Sophistic Refutations* I» 6. 164b6.

15. Aristotle, *Metaphysics* VII, 8, 1033bl7ff.

16. Form, as used here by St Thomas, means the whole nature or of a thing. It is the *ratio* of a thing, or that which its definition signifies. For example, humanity is the essence of Peter; consequently it is his form or *ratio.* Notice that form in this context does not mean substantial form, for instance in man. his soul. The difference between these two meanings of the word "form" is expre^sed by the terms *forma zotius* (form of the whole) and *forma*

composite which is essentially generated and corrupted and not the nature or form except accidentally. As the *Metaphysics* says,[17] "It is not *house* that comes into existence, but *this house.*" Now anything can be considered apart from whatever is not essentially related to it. Consequently, the forms and natures of things, though they be forms and natures of things existing in motion, are without motion according as they are considered in themselves. Therefore, as the Philosopher says," they can be the objects of sciences and definitions. As he proves,[18] the sciences of sensible things are not grounded on a knowledge of certain substances separated from the sensible world.

Now, when we consider without motion natures *(rationes)* of this kind, which are the objects of the sciences of things, we must consider them without the characteristics according to which motion belongs to mobile things. But since every motion is measured by time, and the first motion is local motion, without which there is no other motion present, it must be that a thing is subject to motion according as it exists here and now; and this belongs to a mobile thing itself according as it is individuated by matter existing under determined dimensions.[20] Therefore, natures of this sort, by

pnrtij (form of the part). The former is the whole essence, including both form and matter in a material substance. The latter is a part of the essence and excludes matter. See St. Thomas. De Ente et Essentia 3. pp. 31-32. Eng. trans, p. 28 and note 7, pp. 37-38: *In VII Metn.* lect. 9, nn. 1467-1469. See also A. Maurer, "Form and Essence in the Philosophy erf St Thomas." in *Mediaeval Studies,* 1951, pp. 16-17«.

17. Aristotle, *Metaphysics* VII, 15, 1039b25.

18. Aristotle, *Metaphysics* VII, 15, 1039b27-1040a2. Aristotle shows here that there is neither scientific definition nor demonstration about sensible individual substances because they are contingent and can either be or not be. Science deals primarily only with the necessary, that is. with the natures of things as defined in universal concepts. See St. Thomas, *In VII Meta.* lect. 15. For the way in which the individual is known in natural science, see below, Q. 5, a. 2, Reply to obj. 4, p. 22.

19. Aristotle. *Metaphysics* VU 14. 1039a21ff.

20. For St. Thomas' doctrine of individuation of form by matter, see Roland-Gosselin, Le "De *Ente et Essentia"* pp. 10£ff. By determinate matter *(materia signata)* is meant particular matter, for instance

reason of which there can be sciences of mobile things, must be considered without determined matter and everything consequent upon such matter, but not without undetermined matter, because the notion of the form which determines matter to itself depends on this notion of undetermined matter. That is why the nature of man, which his definition signifies, and which is the object of science, is considered without *this* flesh and *these* bones, but not absolutely without flesh and bones. And since, as the *Metaphysics says,*[21] individual things include determined matter in their nature while universals include common matter, we do not call this simply an abstraction of form from matter, but of the universal from the particular.

Natures of this sort, abstracted in the above manner, can be considered in two different ways: In one way in themselves, and then they are considered without motion and determined matter, and such a consideration befalls them only because of the existence they have in the intellect. In another way they can be considered in relation to the things of which they are the natures, which things indeed exist in matter and motion. In this way they are principles whereby we know those things, since everything is known through its form. Thus in natural science we have knowledge of mutable and material things existing outside the soul through natures of this sort, which are immobile and considered without particular matter.

Reply to obj. 1. Matter is the principle of individuation only in so far as it exists with determined dimensions; and in this sense natural science indeed abstracts from matter.

Reply to obj. 2. The intelligible form is a thing s quiddity, for, as the *De Anima* says,[22] the object of the intellect is the

this flesh or *these* bones. By indeterminate matter is meant common matter, for instance flesh and bones. The natures studied by natural sciences abstract from the former, but not brom the latter kind of matter. See *Summa Theol.* I, 85. 1. Reply to obj. 2.

a. Aristotle, *Metaphysics* VTL 10, W35027-31.

22. Aristotle *De Anima* HL < 429619. See St Thomas, *In III De Anima,* led 8. nn. 705-717; Eng. trans, pp. 414-419.

u'bat of a thing. Now, as is said in the *Metaphysics,*[23] the quiddity of a universal composite, like *man* or *animal,* includes within itself common, but not particular, matter. So the intellect regularly abstracts from determined matter and its conditions; but in natural science it does not abstract from common matter, although matter itself is considered in natural science only in relation to form. For this reason the natural scientist is more concerned with form itself than he is with matter.

Reply to obj. 3. Natural science does not treat of the First Mover as of its subject or as part of its subject, but as the end to which natural science leads. Now the end does not belong to the nature of the thing of which it is the end, but it has a relation to it; as the end of a line is not the line but is related to it. So also the First Mover is of a different nature from natural things, but it is related to them because it moves them. So it falls under the consideration of natural science, not in itself, but in so *far as* it is a mover.

Reply to obj. 4. Science treats of something in two ways: In one way, primarily and principally; and in this sense science is concerned with universal natures, which are its very foundation. In another way it treats of something secondarily, as by a sort of reflection; and in this sense it is concerned with the things whose natures they are, inasmuch as, using the lower powers, it relates those natures to the particular things possessing them. For a knower uses a universal nature both as a thing known and as a means of knowing. For through the universal nature of man we can judge of this or that particular man. Now, all universal natures of things are not subject to motion and so, in this respect, all science is concerned with what is necessary. But some of the things possessing those natures are necessary and immobile, and others are contingent and subject to movement; and in this respect sciences are said to be concerned with the contingent and mobile.-[24]

23 Aristotle. Metapliyaica VII, 10, 1035b28-30.

24. Individual things are thus indirectly and secondarily the object of

Reply to obj. 5. Although a universal is not moved, it is levertheless the nature of a mobile thing.

Reply to obj. 6. Although the soul and other natural forms are not themselves subject to motion, they are moved accidentally, and they are moreover the perfections of mobile things; and for this reason they come within the domain of natural science. But even though the earth as a whole is not moved (for it happens to be in its natural place, where a thing is at rest in virtue of the same nature through which it is moved to a place), nevertheless, when its parts are outside their proper place, they are moved to a place.[25] Thus the earth falls within the domain of natural science both by reason of the immobility of the whole earth and by reason of the movement of its parts.

Reply to obj. 7. The mutability characteristic of all creatures is not with respect to any natural motion, but with respect to their dependence on God, separation from whom entails destruction of their very being. And that dependence falls under the consideration of metaphysics rather than natural philosophy. Spiritual creatures, moreover, are mutable only with regard to choice; and this sort of motion is not the concern of the natural philosopher but rather of the metaphysician.

science. See above. *Reply,* p. 20; also Summa *Theol.* I, 86, 1; 86, 3.

25. According to mediaeval physics, each of the four elements, earth, water, air and fire,has its naturalplacein the universe, with earth at the center. Byvirtue of its nature, each of the elements rests in its proper place in the order in which they are listed above, or if removed from that place tends to move back to it That is why a stone, in which the element of earth predominates, tends to fall, and fire tends to rise. See St Thomas, Γη I De *Caelo et Mundo,* lect. 17-18. See also J. de Tonquédec, *Questions de cosmologie et de physique chez Aristotle et saint Thomas,* pp. 8-16.

For the immobility of the earth in the center of the universe, see st Thomas, In II De *Caelo et Mundo,* lect 21.

ARTICLE THREE

Does Mathematics Treat Without Motion and Matter of What Exists in Matter?

We proceed thus to the third article: It seems that mathematics does not treat of what exists in matter without matter.

Objection 1. For since truth consists in the adequation of thing to intellect, there must be falsehood whenever we think of something otherwise than it is. If then in mathematics we consider what is in matter without matter, we will consider it falsely; and so mathematics will not be a science, for every science is concerned with what is true.

Objection 2. Again, as the Philosopher states,[1] every science has the task of considering a subject and the parts of that subject. Now in actual existence matter is a part of all material things. So it is impossible *for* a science to treat of what is in matter without treating of matter.

Objection 3. Again, all straight lines are specifically the same. But the mathematician treats of straight lines by numbering them; otherwise he would not treat of the triangle and the square. It follows that he considers lines as specifically the same and numerically different. But it is clear from the above that matter is the principle differentiating things specifically the same. So the mathematician treats of matter.

Objection 4. Again, no science completely abstracting from matter demonstrates through a material cause. But in mathematics some demonstrations are made which can only be reduced to *a* material cause, as when we demonstrate something about a whole by its parts. For, as the *Physics says?* parts are the matter of the whole. Thus in the *Posterior Analytics*[2] the demonstration that the angle in a semicircle is a right angle from the fact that each of its two parts is half of a right angle,

1. Aristotle, Posterior *Analytics* I. 28. 87a38ff.
2. Aristotle. *Physics* II. 3. 195a20.

1 Aristotle. *Posterior Analytics* II, IL 94a28-34.

is reduced to a material cause. Therefore, mathematics does not entirely abstract from matter.

Objection 5. Again, motion cannot exist without matter. But the mathematician ought to consider motion, because, since motion is measured relative to space, to consider the quantity of space, which pertains to the mathematician, and the quantity of motion, has the same nature and belongs to the same science. Therefore, the mathematician does not entirely leave matter out of consideration.

Objection 6. Again, astronomy is a part of mathematics and so too is the science of the moved sphere, the science of weights, and music;[4] all of which treat of motion and mobile things. So mathematics does not entirely abstract from matter and motion.

Objection 7. Again, natural science is entirely concerned with matter and motion. But some conclusions are demonstrated alike by the mathematician and the natural scientist; for instance, whether the earth is round and whether it is in the middle of the universe. Therefore, it is impossible that mathematics entirely abstract from matter.

If it be said that mathematics abstracts only from sensible matter, the contrary seems true, for sensible matter seems to be particular matter, because what the senses perceive are particular things, and all the sciences abstract from this kind of matter. So mathematical investigation should not be called more abstract than that of the other sciences.

Objection 8. Again, the Philosopher says[5] that there are three branches of study: the first of what is mutable and corruptible, the second of what is mutable and incorruptible, and the third of what is immutable and incorruptible. As

4. See St Thomao' reply to the objection for the sense in which these sciences are *=»*4 to be parts of mathematics. By the science of the moved sphere *(sphaera mota)* is meant the general study of the movement of soherical bodies. See St Thomas. *In VI Phys.* lect 12. a. 3; see also ttv» references to "moved sphere" in the Index to St. Thomas' Commentary on the *De Caelo et Mundo* in the Leonine edition, p. 443.

5. Aristotle, *Physics* II, *1,* 138a28-3L

Ptolemy explains,[6] the first is natural science, the third divine science, and the second mathematics. Therefore, mathematics concerns what is mutable.

On the contrary there is what the Philosopher says in the *Metaphysics.*[7]

Moreover, some things, although existing in matter, do not contain matter in their definition; for instance, the curved, which differs in this respect from the snub. Now philosophy should treat of all beings. Hence some part of philosophy must consider beings of this sort; and this is mathematics, for this does not belong to any other part.

Moreover, what is prior from the point of view of the intellect can be considered without what is posterior. Now mathematicals are prior to natural things existing in matter and motion, for the latter are so related to mathematicals that they add something to them, as is said in the *De Caelo et Mundo*[8] Therefore, mathematical investigation can be without matter and motion.

Reply: In order to throw light on this question we must understand how the intellect in its operation is able to abstract.[9]

We must realize that, as the Philosopher says,[10] the intellect has two operations, one called the "understanding of indivisibles," by which it knows *what* a thing is; and another by which it composes and divides, that is to say, by forming affirmative and negative enunciations. Now' these two operations correspond to two principles in things. The first operation has regard to the nature itself of a thing, in virtue of w'hich the known thing holds a certain rank among beings, whether it

6. Claudius Ptolemaeus, Syntaxes *Mathematica* I, 1, *(Opera Omnia I* 5, B-6, 5).

7. Aristotle. *Metaphysics* VI, 1, 1026a7-10, 14.

8. Aristotle. *De Caelo et Mundo* iII. 1, 299alfiff.

9 For the meaning of abstraction and the modes *of* abstraction, see above. Introduction. pp. xvi-xxvii.

10. Aristotle. De Aaima III, 6, 430a26; b26ff.

be a complete thing, as some whole, or an incomplete thing, as a part or an accident. The second operation has regard to a thing's act of existing *(esse),* which results from the union of the principles of a thing in composite substances, or, as in the case of simple substances, accompanies the thing's simple nature.

Now, since the truth of the intellect results from its conformity with the thing, clearly in this second operation the intellect cannot truthfully abstract what is united in reality, because the abstraction would signify a separation with regard to the very existence of the thing. For example, if I abstract man from whiteness by saying, "Man is not white," I signify that there is a separation in reality. So if in reality nun and whiteness are not separated, the intellect will be false. Through this operation, then, the intellect can truthfully abstract only those things which are separated in reality, as when we say, "Man is not an ass."

Through the first operation, however, we can abstract things which are not separated in reality; not all, it is true, but some. For since everything is intelligible in so far as it is in act, as the *Metaphysics* says,11 we must understand the nature itself or the quiddity of a thing either inasmuch as it is a certain act (as happens in the case of forms themselves and simple substances); or by reason of that which is its act (as we know composite substances through their forms); or by reason of that which takes the place of act in it (as we know prime matter through its relationship to form, and vacuum through the absence of a body in place). And it is from this that each nature is given its definition.

Now, when that through which the intelligibility *(ratio)*12 of a nature is constituted and through which the nature itself

IL Aristotle, *Metaphysics* IX, 9. 1051a29-32.

12. The *ratio* of a thing is its definition, or, in other words, the concept which expresses what a thing is. By extension, the term also signifies the intelligible nature of a thing corresponding to its definition. *More"generally. ratio* is simply what the intellect grasps of the meaning of any name. See St Thomas. Iit I *Sent.* 2. 1, 3; 33, 1. L Reply to obj. 3.

is understood, has a relation to, and a dependence on, something else, clearly we cannot know the nature without that other thing. This *is true* whether they are connected as a part is united to a whole (as we cannot know *foot* without knowing *animal,* because that whereby *foot* has the nature of *foot* depends on that whereby *animal* is *animal),'* or whether they are connected as form is united to matter, as one part to another part, or as accident to subject (as we cannot know the *snub* without *nose);* or even whether they are separated in reality (as we cannot know *father* without knowing *son,* although these relationships are found in different things). But if one thing does not depend on another with regard to what constitutes the intelligibility of the nature, then the intellect can abstract it from that other thing so as to know it without that other. This is true not only if they are separated in reality, as *man* and *stone,* but also *if they* are united in reality, whether they are joined as part and whole (as *letter* can be understood without syllable, but not vice versa, and *animal* without *foot* but not conversely); or even if they are joined as form is united to matter and accident to subject (as *whiteness* can be understood without *man* and vice versa).

Accordingly, in its various operations the intellect distinguishes one thing from another in different ways. In the operation by which it composes and divides, it distinguishes one thing from another by understanding that the one does not exist in the ocher. In the operation, however, by which it understands what a thing is, it distinguishes one from the other by knowing what one is without knowing anything of the other, either that it is united to it or separated from it. So this distinction is not properly called separation, but only the first. It is correctly called abstraction, but only when the things, one of which is known without the other, are one in reality. For if we consider animal without considering stone, we do not say that we abstract animal from scone.

It follows that since, properly speaking, we can only abstract things united in reality, there are two sorts of abstraction corresponding to the two modes of union mentioned above.

namely, -fbe union of part and whole, and the union of form and matter. The first is that in which we abstract form from matter, and the second is that in which we abstract a whole *from* its parts.

Now that form can be abstracted from some matter, the intelligibility of whose essence does not depend on matter of that sort; but the intellect cannot abstract form from the sort of marær on which the intelligibility of the essence depends. Consequently, since all accidents are related to substance as form to matter, and since the nature of every accident is to depend on substance, any accidental form cannot possibly be separated from substance. Accidents, however, befall substance in a definite order. Quantity' comes first, then quality, then passions and motion. So quantity can be considered in substance before the sensible qualities, in virtue of which matter is called sensible, are understood in it. Quantity, then, does not depend on sensible matter with regard to the nature of its substance, but only on intelligible matter.'[13] For, after accidents have been excluded, substance remains intelligible only to the intellect, because the sense powers do not reach a comprehension of substance. And it is mathematics, which considers quantities and the properties of quantities, such as figures and the like, which treats of abstract entities of this sort.

Furthermore, we cannot abstract a whole from just any parts whatsoever. For there are some parts on which the nature of the whole depends, that is, when to be such a whole

13. The matter which is the subject of mathematics is called "intelligible because it is not perceived by the external senses, like "sensible matter", but by the imagination, which was sometimes called "intellect" by the mediaevals. See St. Thomas, *In VII Meta.* lect. 13. nn 1494-1496: *In IB De Anima,* lect. 10. n. 745; Eng. trans, p. 432. ~ Intelligible matter is defined as "substance as subject to quantity. See *Summa Theol.* 1, 85, 1, Reply to obj. 2; *In II Phys.* lect 3. *n.* 5. However St. Thomas sometimes speaks of the subject of mathematics as simply quantities and their properties, such as figures, surface the like «See *In VII Meta.* lect 11. n. 1508). It should be noticed that according to St Thomas mathematics does in a sense *n,<nlities* understood as formal determinations and relations *See In* V *Meta.* lect. 16. nn. 989-992. *In VIII Meta,* lect ' n* 1761: J. Maritain. *Les Degrés du savoir.* p. 72. note L

is to be composed of such parts. It is in this way that a syllable is related to letters and a mixed body to the elements. Parts of this sort, which are necessary for understanding the whole because they enter into its definition, are called parts of the species and of the form. There are some parts, however, which are accidental to the whole as such. The semicircle, for instance, is related to the circle in this way, for it is accidental to a circle that by division two of its parts or more are considered equal or unequal. But it is not accidental to a triangle that three lines are designated in it, for because of this a triangle is a triangle. Similarly it is an essential characteristic of man that there be found in him a rational soul and a body composed of the four elements. So man cannot be understood without these parts and they must be included in his definition; so they are parts of his species and form. But finger, foot, and hand, and other parts of this kind are outside the notion of man; and thus the essential nature of man does not depend on them and man can be understood without them. For whether or not he has feet, as long as he be granted as made up of a rational soul and a body composed of the elements in the proper mixture required by this sort of form, he will be a man. And these parts are called parts of matter, which are not included in the definition of the whole, but rather the converse is true. This is how all determined *(signatae)* parts are related to man; for instance, *this* soul, *this* body, *this* nail, *this* bone, etc. These indeed are parts of Socrates' and Plato's essence, but not of man precisely as man. And for this reason the intellect can abstract man from these parts. And this son of abstraction is the abstraction of the universal from the particular.

So there are two abstractions of the intellect: One which corresponds to the union of form and matter or accident and subject. This is the abstraction of form from sensible marrer The other corresponds to the union of whole and part; and to this corresponds the abstraction of the universal from the particular. This is the abstraction of a whole, in which we consider a nature according to its essential character, in

independence of all parts which do not belong to the species but are accidental parts. But we do not find abstractions opposed to these, in which a part is abstracted from a whole or matter from form, because a part either cauuot be abstracted from a whole by the intellect if it is one of the parts of matter in whose definition the whole is included; or it can indeed exist without the whole if it is one of the parts of the species; for instance, a line without a triangle, a letter without a syllable, or an element without a mixed body.

However, in the case of those things which can exist separately, separation rather than abstraction obtains. Similarly when we say form is abstracted from matter, we do not mean substantial form, because substantial form and the matter correlative to it are interdependent, so that one is not intelligible without the other, because the appropriate act is in its appropriate matter. Rather, we mean the accidental forms of quantity and figure, from which indeed sensible matter cannot be abstracted by the intellect since sensible qualities cannot be understood unless quantity is previously known, as is clear in the case of surface and color. And neither can we understand something to be the subject of motion unless we understand it to possess quantity. Substance, however, which is the matter of intelligible quantity, can exist without quantity. Consequently, the consideration of substance without quantity belongs to the order of separation rather than to that of abstraction.

We conclude that in the operation of the intellect there is present a threefold distinction; One with respect to the operation of the intellect composing and dividing, which is properly called separation; and this belongs to divine science or metaphysics. There is another with respect to the operation by which the quiddities of things are formed, which is the abstraction of form from sensible matter; and this belongs to mathematics. And there is a third with respect to the same operation which is the abstraction of the universal from the partio* lar; and this indeed belongs to physics and to all the sciences in general, because in every science we disregard the

accidental and consider what is essential. And because certain persons, like the Pythagoreans and the Platonists, did not understand the difference between the last two and the first they fell into error, asserting that mathematical and universals are separate from sensible things.[14]

Reply to obj. 1. When the mathematician abstracts he does not consider a thing otherwise than it is. For he does not understand the line to exist without sensible matter, but he treats of the line and its properties without considering sensible matter. So there is no discordance between intellect and thing, because even in the thing what belongs to the nature of line does not depend on that which renders matter sensible, but rather contrariwise. Thus, as the *Physics* says,[15] it is clear that there is no falsity in the one who abstracts.

Reply to obj. 2. By "material" we mean not only that of which matter is a part, but also what exists in matter; and in this way a sensible line can be called something material. So this does not prevent a line being understood without matter. For sensible matter is not related to a line as a part, but rather as the subject in which it exists; and the same is true of surface and body. For the mathematician does not consider the body which is found in the category of substance, according as its parts are matter and form, but he rather considers body[16] according as it is in the category of quantity constituted by three dimensions; and body in this sense is related to body in the category of substance, of which physical matter is a part, as an accident to its subject.

Rep/y *to obj. 3.* Matter is the principle of numerical diversity only inasmuch as, being divided into many parts, and receiving in each part a form of the same nature, it constitutes many individuals of the same species. Now matter can be divided only if we presuppose quantity in it; if that

14. See St Thomas, *Summa* Theol. I, 85. 1, Reply to obj. 1 and 1
15. Aristotle. *Physica* II. 2. 193b35.
16. For the meaning of the two senses of the term '-body·', see St Thomas. De *Ente et Ewntia,* 2; Eng. trans, pp. 33-34.

is taken away, every substance remains indivisible. So the primary reason for the diversification of things of one species lies in quantity. And indeed this belongs to quantity inasmuch as its very nature implies position as a sort of constitutive difference, which is nothing else than the arrangement of parts. So even when the intellect has abstracted quantity from sensible matter, it is still possible to imagine numerically diverse things of the same species, for example, several equilateral triangles and several equal straight lines.

Reply to obj. 4. Mathematics does not abstract from every kind of matter but only from sensible matter. Now the parts of quantity which seem to be in a way the basis for a demonstration by means of a material cause are not sensible matter; rather, they pertain to intelligible matter, which indeed, as is clear in the *Metaphysics*[17] is found in mathematics.

Reply to obj. 5. By its very nature motion is not in the category of quantity, but it partakes somewhat of the nature of quantity from another source, namely, according as the division of motion derives from either the division of space or the division of the thing subject to motion. So it does not belong to the mathematician to treat of motion, although mathematical principles can be applied to motion, and therefore, inasmuch as the principles of quantity are applied to motion, the natural scientist treats of the division and continuity of motion, as is clear in the *Physics*.[19] And the measurements of motions are studied in sciences intermediary between mathematics and natural science:[20] for instance, in

17. Aristotle, *Metaphysics* XI, 10, 1036a11.
Aristotle, *Physics* VI, 4. 234b21-235b5.

18. For the meaning of intermediate science *(scientia media),* see below. Reply to obj. 6. p. 34; also *In II Phys.* lect 3, n. 8; *Summa Theol* II-II, 9, 2, Reply to obj. 3. See also J. Maritain, *Les Degrés du savoir.* pp. 84-85; 120-125. 270; Réflexion» *sur l'intelligence,* pp. 136-187; *Philosophy of Nature,* pp. 36-44. *Science and Wisdom,* pp. 40-46.
Both in the present work and in the *Summa Theologiae* the intermediate sciences are said to have a greater affinity to mathematics than to physical science, since they are *formally* mathematical (that is, their method of demonstration is mathematical) and only *materiallu* physical (that is, the subject matter considered is sensible nature). In his Commentary on the *Physics,* however, he says that

the science of the moved sphere[20] and in astronomy.[21][22]

Reply to obj. 6. Simple bodies and their properties remain in composite bodies although in a different way, as the proper qualities of the elements and their proper movements are found in a mixed body. What is proper to composite bodies, however, is not found in simple bodies. And so it is that the more abstract and simple the objects of a science are, the more applicable its principles are to the other sciences. Thus the principles of mathematics are applicable to natural things, but not vice versa, because physics presupposes mathematics; but the converse is not true, as is clear in the *De Caelo et Mundor*

So there are three orders of sciences concerning natural and mathematical entities. Some are purely natural and treat of the properties of natural things as such, like physics, agriculture

these sciences are more physical than mathematical because their *end* is sensible nature (that is, they purpose to study the physica; universe although by means of mathematics). Aristotle himself considered them parts of mathematics, although *the more phudcal parts.* (See Aristotle, *Physics* II, 2. 194a7-8). The mediaeval Latin version of the *Physics* mistranslates the text of Aristotle to read that these sciences are *more physical than mathematical.* This, however, is not Aristotle's view. (See the Latin version of Aristotle's *Physic»* in St. Thomas, Opera *Omnia,* ed. Leonine II. p. 61). For Aristotle's doctrine of these sciences, see Sir Thomas Heath, *Mathematics* in *Aristotle,* pp. 11-16.

20. *For* the meaning of "science of the moved sphere", see above, note 4.

21. *Astrologia. St.* Thomas uses this term as synonymous with *astronomia.* one of the liberal arts. (See A *Lexicon of St. Thomas Aquinas,* Fas. I. p. 93). It has been translated *astronomy* throughout this work. St. Thomas defines it as "one of the mathematical sciences, whose subject is the heavens and celestial bodies." *(In III Meta,* lect 7, n. 411). However, he did not distinguish it from astrology, some of whose basic views he shared. For him, as for the medieval-; in general, the stars have an important influence on the sublunar world, and from a study of them at least some future events ran be foreknown. But he excludes from their number all purely contingent and accidental events, both in human affairs and in natural happenings. See *Summa Theol.* II-II, 95. 5: *De Judiciis Astrorum; De Occultis Operibus Naturae.* See also P. Choisnard, Sami *Thomas d'Aquin et l'influence des astres;* L. Thorndike. *A History of Magic and Experimental Science* II. pp. 608-615: Pierre Duhem. Le *système du monde* III, pp. 348-357; J. de Tonquédec, *Questions de colnnologie et de physique chez Aristote et saint Thomas,* pp. 16-68; J. McAllister The *Letter of St. Thomas Aquinas De Occultis Operibus Nat..* ρρ. 150-155, 15S-1K.

22. Aristotle. *De* Caelo et Mundo HL L, 299al£ff.

and the like. Others are purely mathematical and treat of quantities absolutely, as geometry treats of magnitude and arithmetic number. Still others are intermediate,[23] and these apply mathematical principles to natural things; for instance, music, astronomy and the like. These sciences have, however, a closer affinity to mathematics, because in their procedure what is physical functions as something material, while what is mathematical functions as something formal. For example, music considers sounds, not inasmuch as they are sounds, but inasmuch as they are proportionable according to numbers; and the same holds in other sciences. Thus they demonstrate their conclusions concerning natural things, but by means of mathematics. Therefore nothing prevents their being concerned with sensible matter in so far as they have something in common with natural science, for in so far as they have something in common with mathematics they are abstract.

Reply to obj. 7. Because the intermediate sciences mentioned above have something in common with natural science as regards what is material in their procedure, but differ from it as regards what is formal in it, nothing prevents these sciences from occasionally having the same conclusions as natural science. Nevertheless, they do not use the same means of demonstration, unless the sciences are mixed and one occasionally uses what belongs to another, as the natural scientist proves that the earth is round from the movement of heavy bodies, while the astronomer proves it by considering eclipses of the moon.[24]

Reply to obj. 8. As the Commentator says,[25] the Philosopher there did not intend to distinguish between the speculative sciences, because the natural scientist treats of everything subject to motion, whether it be corruptible or incorruptible, while the mathematician as such does not treat of anything

23.

24. St Thomas makes the same point in his Sun.nm *Theologiae* I. 1. L

25. *In U Phy**. 2. **t** c. Π. fol. 74D-E.

subject to motion. But he intended to distinguish between the things studied by the speculative sciences, which must be treated separately and in order, although these three sorts of things can be apportioned to the three sciences. For incorruptible and immutable beings pertain precisely to the metaphysician. However, beings which are mutable and incorruptible, owing to their uniformity and regularity, can be studied in their movements by mathematical principles; which cannot be said of beings which are mutable and corruptible. Therefore, as Ptolemy says,[26] the second kind of beings pertain to mathematics by reason of astronomy, while the third kind remain proper to natural science alone.

ARTICLE FOUR

Does Divine Science Treat of What Exists Without Matter and Motion?

We proceed thus to the fourth article: It seems that divine science does not treat of things separate from motion and matter.

Objection 1. For divine science seems to be especially concerned with God. Now we can come to know God only by "way of His visible effects, which are created in matter and motion, as it is said in the *Epistle to the Romans:*[1] "The invisible things of Him, from the creation of the world, are clearly seen, being understood by the things that are made." Therefore, divine science does not abstract from matter and motion.

Ohiection 2. Again, that to which motion in some way belongs is not entirely separate from motion and matter. But motion in some way belongs to God. Thus it is said in *Wisdom*[2] that the Spirit of Wisdom is "mobile" and "more

26. See above, note 6.

1. St Paul. Eptjrtie to che *Romans* I, 20.

2. *The Book of Wisdom* VII. 22. 24. "Mobile" here has the meaning of

mobile than ali mobile things." And Augustine says[3] that God moves Himself without time and place. And Plato also asserted[4] that the First Mover moves itself. Therefore divine science, which treats of God, is not entirely separate from motion.

Objection 3. Again, divine science must treat not only of God but also of angels. But angels are moved both with regard to choice, because they became bad after having been good, and also with regard to place, as is evident in the case of those who are sent as messengers. So the objects of divine science are not entirely separated from motion.

Objection 4. Again, as the Commentator seems to say in the beginning of the *Physics;'* every being is either pure matter or pure form or a composite of matter and form. But an angel is not a pure form, because then he would be pure act, which is true of God alone. Neither is he only pure matter. So he is a composite of matter and form. Therefore divine science does not abstract from matter.

Objection 5. Again, divine science, the third part of speculative philosophy, is the same as metaphysics, whose subject is being, and especially substantial being. This is clear in the *Metaphysics** But being and substance do not abstract from matter; otherwise no being would be found which is material. So divine science does not abstract from matter.

Objection 6. Again, according to the Philosopher,' it is the business of a science to consider not only a subject but also the divisions and attributes of that subject. Now, as we have

"active.** The Douay translation runs: "For in her (Le. Wisdom) is the spirit of understanding . . . active . . . For Wisdom is more active than all active things.**

3. St Augustine, De Genesi *ad Litteram.* VUL n. 20 <CSEL 28, 259).

4. See Aristotle. *Metaphysics* XII, 6. 1072al; Plato. *Phaedrus* 245C. *Timaeus* 30A, 34B.

5. Averroes. *In I Phys.* 1, t c 1, *foL* SE.

t Aristotle. *Metaphysics* IV, L 1003aZl; *2,* 1003bl7.

7 Aristotle, *Posterior Analytics* I. 28, 87a38; see 10, 76bll-16.

said, being is the subject of divine science. Therefore it is the business of this science to treat of ali beings. But matter and motion are beings. Therefore they come under the consideration of metaphysics, and so divine science does not abstract from them.

Objection 7. Again, as the Commentator says,[8] divine science demonstrates by means of three causes: efficient, formal and final. But an efficient cause cannot be considered without considering motion, and in like manner neither can a final cause, as the *Metaphysics* says.[9][10] This is why no demonstration is given by means of such causes in the case of mathematicals, because they are immobile. Therefore divine science does not abstract from motion.

Objection 8. Again, in theology we treat of the creation of the heavens and the earth, of acts of men, and many similar things which involve matter and motion. So theology does not seem to abstract from matter and motion.

On the contrary, the Philosopher says in the *Metaphysics* [11] that first philosophy deals with things which can exist separately, that is, from matter, and with immobile things. Now first philosophy is divine science, as he says in the same place. Therefore divine science is abstractf^from matter and motion.

Moreover, the most excellent science deals with the most excellent beings. But the most excellent science is divine science. Therefore, since immaterial and immobile beings are the most excellent, divine science will treat of them.

Moreover, the Philosopher says in the beginning of the *Metaphysics*[11] that divine science concerns first principles and causes. Now these are immaterial and immobile. Therefore things of this sort are the objects of divine science.

8. Averroes, In I *Phys,* 1, t. c. 1, foL 6BC.
9. Aristotle, *Metaphysics* ΓΠ. 2, 996a22-27.
10. Aristotle, Metaphysics VI. 1, 1026al6
11. Aristotle, *Metaphysics* L. 1.981b28.

Reply: In order to throw light on this question we must understand what science should be called "divine science." We must realize indeed that if a science considers a subject-genus,[12] it must consider the principles of that genus, since science is perfected oaly through knowledge of principles, as the Philosopher explains in the beginning of the *Physics*[13] Now there are two kinds of principles. Some are complete natures in themselves and nevertheless are principles of other things; as the heavenly bodies are principles of lower bodies and simple bodies are principles of mixed bodies. In the sciences, therefore, we study them not only in so far as they are principles, but also in so far as they are certain things in themselves. And for this reason they are treated of not only in the science of the beings of which they are the principles, but also in an independent and separate science. Thus there is a branch of natural science treating of heavenly bodies distinct from that treating of lower bodies, and there is one treating of the elements distinct from that treating of mixed bodies. There are some principles, however, which are not complete natures in themselves, but only principles of natures; as unity is the principle of number, point the principle of line, and form and matter principles of natural body. Principles of this sort, then, are treated of only in the science dealing with the things *of* which they are principles.

Now just as there are certain common principles of any particular genus extending to all the principles of that genus, so too all beings, inasmuch as they share in being, have certain principles which are the principles of all beings. And as Avicenna says,[14] "these principles can be called common in two senses: first, by predication, as when I say that form is common to all forms because it is predicated of each; second, by causality, as we say that the sun, which is numerically one, is the principle of all things subject to generation. Now there are principles common to all beings not only in the first way

12. For the meaning of subject of science, see above, Introduction pp. xv, xvL
13. Aristotle. *Physice* I. 1. 184al0-12-
14^ Avicenna. *Sufficientia* L 2. foL 14*

(in this sense the *Philosopher* says[15] that ali beings have analogically the same principles), but also in the second way, so that there are certain beings, numerically one, which are the principles of all things; namely, inasmuch as the principles of accidents are reduced to the principles of substance, and the principles of perishable substances are reduced to imperishable substances, and so in a certain hierarchical order all beings are reduced to certain principles. And since the principle of being for all things must be supremely being, as the *Metaphysics* says,[1]' such principles must be most perfect and therefore supremely in act, so that they have no potency whatsoever or the least possible, because actuality is prior to, and more excellent than, potentiality, as the *Metaphysics* says.[17] And for this reason they must be without maner, which is in potentiality, and without motion, which is the actuality of the potential. And of this sort are divine beings, because if the divine exists anywhere it exists especially in such an immaterial and immobile nature, as is said in the *Metaphysics.*[1*]

Therefore, because divine things of this sort are the principles of all beings and nevertheless are complete natures in themselves, we can study them in two ways: first, in so far as they are the common principles of all things, and second in so far as they are beings in their own right. But even though such first principles are most knowable in themselves, our intellect stands to them as the eye of an owl to the light of the sun, as the *Metaphysics* says;'[9] and so we can cotfte to them by the light of natural reason only in so far as we are led to

15. Aristotle, *Metaphysics* XII, 4, 1070a3L

15. Aristotle. *Metaphysics* Π. L, 993b24-31. See St. Thomas. *Summa TheoL* I, 2. 1

17. Aristotle, *Metaphysics* ΓX. 8. 1M9B5; 9. 105Ia4

18. Aristotle, *Metaphysics* VI. 1. 1036e20. By "divine beings" St. Thomas means not only God but also angels. For a discussion *at* metaphysics as the science erf immaterial subtances. see J. Collins. *The Thomistic Philosophy of the Angela,* pp 1-15.19

19. Aristotle. *Metaphysics* Π. 1, 993b9-U.

them by their effects. And this is the way the philosophers arrived at them, as is clear from the *Epistle to the Romans:*[20] The invisible things of God . . . are clearly seen, being understood by the things that are made." So, too, the philosophers study divine beings of this sort only in so far as they are the principles of all things; and therefore they are dealt with in that science which studies what is common to all beings, which has as its subject being as being. And the philosophers call this science divine science.

There is, however, another way of knowing beings of this sort, not as their effects reveal them but as they reveal themselves. The Apostle mentions this way in his *First Epistle to the Corinthians:*[21] "So the things also that are of God no man knoweth, but the Spirit of God. Now we have received not the spirit of this world, but the Spirit that is of God, that we may understand." And again:[22] "But to us God hath revealed them by His Spirit." In this way we know divine things as they subsist in themselves and not only in so far as they are principles of things.

Thus theology or divine science is of two kinds. There is one theology in which we treat of divine things, not as the subject of the science but as the principles of the subject, and this is the sort of theology pursued by the philosophers and which is also called metaphysics. There is another theology, however, which studies divine things for their own sakes as the subject of the science; and this is the theology taught in Sacred Scripture.[23] Both theologies are concerned with what is separate in existence from matter and motion, but in different ways, according as something can exist separate from

20 St Paul. Epistle to *the Romans* I, 20.

ZL St Paul, First *Epistle to »he Corinthians* II. 11-12.

22. *Loe. cit.* 10.

23 For St Thomas' doctrine of theology as the science of Sacred Scripture see *In I Sent. prologos,* I; *In* Lib. *Boetii de Trinitate* II, 1-4 *Contra Gentiles* I. 3-4; *Summa Theol.* I. 1. See also M. D. Chenu. *La'thèologie comme science* «u xüi* *siècle;* 5L Grabmann. Die *theol. Erkenntni^nntlEMe^^^^ hL^mas von Aqntn ouf*

matter and motion in two *different* ways: First, in the sense that it is of the nature of the thing called separate to be able in no way to exist in matter and motion, as God and the angels are said to be separate from matter and motion. Secondly, in the sense that it is not of the nature of that which is separate to exist in matter and motion, but it can exist without them although we sometimes find it in them. In this sense, being, substance, potency and act are separate from matter and motion because they do not depend on them with respect to existence, unlike mathematical, which can only exist in matter although they can be understood without sensible matter. Thus philosophical theology treats of beings separate in the second sense as its subjects and of beings separate in the first sense as the principles of its subject.[24] But the theology of Sacred Scripture treats of beings separate in the first sense as its subjects, although it deals with some things in matter and motion in so far as this is needed to elucidate divine things.

Reply to obj. 1 When something is incorporated into a science only to throw light on something else, it does not belong to the science essentially, but, in a way, incidentally, as some mathematicals are incorporated into the natural sciences. And in this way nothing prevents some things in matter and motion being in divine science.

Reply to obj. 2. We do not attribute motion to God properly, but by a kind of metaphor, and this in two ways: First, according as the operation of the intellect or will is improperly called motion; and in this way a person is said to move himself when he knows or loves himself. In this sense, as the Commentator says,[25] the statement of Plato is true, that the First Mover moves Himself because He knows and loves Himself. Secondly, according as the flowing forth of effects from their causes can be called a procession or motion of cause to effect in so far as the likeness of the cause is left in the effect itself; and so the cause, which previously existed in

24. See St Thomas, *In Meta.* Prooemium, trans, below, pp. 80-83.

25. Averroes. *In VIII Phys.* 4. t c. 40, fol. 380D-F. See Plato, *Phaedrus* 245D, Laws X. 895B.

itself, afterwards comes to be in the effect through its likeness. And in this way God, who has communicated His likeness to all creatures, in a certain respect is said to be moved by them or to go forward to all things. Dionysius frequently uses this manner of speaking.[26] And this also seems to be the meaning of the statement in *Wisdom*,[27] that "Wisdom is more mobile than all mobile things," and that "She reacheth from end to end mightily." However, this is not motion in the proper sense of the term, and so the argument does not follow.

Reply to obj. 3. Divine science received through divine inspiration does not treat of the angels as its subject, but only as something incorporated into the science to throw light on its subject. For Sacred Scripture treats of the angels just as it does other creatures. In the divine science taught by the philosophers, however, the angels, which they call intelligences, are considered from the same point of view as the First Cause or God, in so far as they are also secondary principles of things, at least through the movement of the spheres,[28] although they themselves are subject to no physical motion. Moreover, motion with respect to choice is reducible to the way in which the act of the intellect or will is called motion, which is an improper sense of the term, wherein motion is understood as operation. Further, when angels are said to move in place, local motion is not in reference to enclosure in place but in reference to the activity they exercise in this or that place, or in reference to some other relations they have to place, although that relation is absolutely equivocal to that which a localized body has to place. So it is clear that they do not move in the sense in which we say natural things move.[29]

26. Pseudo-Dionysius, *De Divinis Nominibus* 9, η. 9 (PG X 916C).

27. *The Book of Wisdom* VII. 24; VIII. 1.

23 According to St. Thomas, the heavenly bodies through their movements are the causes *of* the generation and corruption *of* terrestiai bodies, and the movement of the heavenly bodies is caused by angels. *Contra Gentiles* . 70; III. 23, 24; De *Spiritualibus Creaturis 6,* Eng trans, PP 73-82; *Summa Theolopiae* I. 70, X See also J. de Tonquédec. *Questions de cosmologie et de phycique chez Aristote et saint Thomas,* pp. 4«ff.

29 per St- Thomas' view on the movement of angels in place, see *Summa*

Reply to obj. 4. Act and potency are more common than matter and form. Therefore, even though we do not find a composition of form and matter in the angels we can still find potency and act in them. For matter and form are parts of a thing composed of matter and form; and so we find a composition of matter and form only in those things with parts, one of which is related to the other as potency to act. Now what can be, can also not be; and so one part can be found with or without the other; and therefore, as the Commentator says,[30] we find a composition of matter and form only in those things which are by nature corruptible. Nor does this prevent an accident being eternally conserved in a subject, like shape in the heavens. For a heavenly body cannot exist without such a shape, since shape and all accidents in general accompany substance as their cause. So a subject is related to its accidents not only as passive potency, but also in a way as an active potency: and for this reason some accidents are naturally always conserved in their subjects. But matter is not the cause of form in this way, and therefore all matter subject to form can also not be subject to it, unless perhaps an extrinsic cause preserves it, as we maintain that even some bodies composed of contraries, like the bodies of those arisen from the dead, by the divine power are incorruptible.

Now, since an angel's essence is by its nature incorruptible, it has no composition of form and matter. But an angel does not exist of himself, and so he is potential to the existence he receives from God. Consequently, the existence received from God is related to his simple essence as act to potency. And this is what is meant by saying chey are composed of *wbat they are (quod est)* and *that by which they are (quo est),* their act of existing being understood as *that by which they are* and the angelic nature itself being understood as *wbat they are.*[31]

Theologiae L 53, 1-1

30. Averroes, *In I de Caelo,* t c. 20, foL 15C; *In VIII Meta.* 2. t c. 4 fol 211F; 6. t c. 12. fol. 23DF.

31. See St Thomas, De *Ente et Eaeenüa* 4. Eng. trans, pp. C-48. Contra

However, even if angels were composed of matter and form, they would not be composed of sensible matter, from which both the objects of mathematics must be abstracted and those of metaphysics must be separated.

Reply to obj. 5. We say that being and substance are separate from matter and motion not because it is of their nature to be without them, as it is of the nature of ass to be without reason. Rather we say they are separate because it is not of their nature to be in matter and motion, although sometimes they are in matter and motion, as animal abstracts from reason, although some animals are rational.

Reply to obj. 6. The metaphysician deals with individual beings too, not with regard to their special natures in virtue of which they are special kinds of being, but in so far as they share the common character of being. And in this way matter and motion also fall under his consideration.

Reply to obj. 7. Action and passion do not belong to things as they exist in thought but as they exist in reality. Now since the mathematician deals with things abstract only in thought, in so far as they come under his consideration they cannot be a principle or an end of motion. So the mathematician does not demonstrate by means of efficient and final causes. But the things the metaphysician deals with exist separately in reality, and such things can be the principle and end of motion. So nothing prevents his demonstrating by means of efficient and final causes.

Reply to obj. 8. Just as Faith, which is in a way the habit *of* the principles of theology, has for its object the First Truth itself, and yet the articles of Faith contain certain other things relating to creatures in so far as they have some connection with the First Truth, in the same way theology is primarily concerned with God as its subject, but it includes many things about creatures as His effects, or as being in some way related to Him.

Π 50-51; D* *Spiritualibus Creaturis* I, Eng. trans, pp. 15-29;

QUESTION SIX

The Methods of Speculative Science

The next question concerns the methods ascribed by Boethius to the speculative sciences.[1] There are four points of inquiry in this connection:

1. Must we proceed according to the mode of reason in natural science, according to the mode of learning in mathematics, and according to the mode of intellect in divine science?[2]
2. Must we entirely abandon the imagination in divine science?
3. Can our intellect behold the Divine Form itself?
4. Can our intellect behold the Divine Form by means of some speculative science?

ARTICLE ONE

Must We Proceed According to the Mode of Reason in Natural Science, According to the Mode of Learning in Mathematics, and According to the Mode of Intellect in Divine Science?

(a)

On the first point we proceed thus: It seems that we must not proceed according to the mode of reason in natural science.

Objection 1. For rational philosophy is contradistinguished to natural philosophy.[3] But it seems to belong properly to

1. See Boethius, Dè *Trinitate 2* (PL 64, 1250B).
2. In the Latin text the three speculative sciences are said to proceed respectively *rationabiliter, disciplinabiliter* and intelfectualiter. The terms are taken from Boethius, ioc. cit. See M. D. Chenu. "Notes de lexicographie philosophique médiévale: *Disciplina",* p, 687.
3. Throughout the Question the term "natural philosophy" i« used synonymously with -physics" and "natural science." See above Introduction, pp. viii, *»ii

rational philosophy to proceed according to the mode of reason. So this method is not appropriately ascribed to natural philosophy.

Objection 2. Again, in the *Physics'* the Philosopher frequently distinguishes between the methods of arriving at rational conclusions and physical conclusions. Therefore it is not the special characteristic of natural science to proceed rationally.

Objection 3. Again, what is common to all the sciences should not be reserved to one. But every science proceeds by reasoning, advancing from effects to causes or from causes to effects or from certain signs. So this method should not be reserved to natural science.

Objection 4. Again, in the *Ethics'* the Philosopher contradistinguishes the reasoning part of the soul from the scientific part. But natural philosophy belongs to the scientific part. Therefore it is not appropriately said to proceed according to the mode of reason.

On the contrary, the *De Spiritu et Anima'* says that reason is concerned with the forms of bodies. Now it belongs most especially to natural philosophy to consider bodies. Therefore the rational method is appropriately attributed to it.

Moreover, Boethius says:[7] "When reason contemplates some universal nature, using neither imagination nor sense, it nevertheless comprehends imaginable and sensible things." Now it belongs to the natural philosopher alone to comprehend

4. Aristotle, *Physics* HI, 5, 204b4, 10. Aristotle here distinguishes between a dialectical argument based on general notions and principles. which leads to a probable conclusion, and a truly scientific argument based on principles proper to physics, which leads to truth. See St. Thomas, *In III Phys.* lect. 8, n. 1 and 5.

5. Aristotle. *Nicomachean Ethics* VI, 1, 1139al2. Aristotle here distinguishes between the calculating or deliberative part of the soul and the scientific. The former is concerned with knowledge of things that are variable and contingent, *e.g.*. individual human acts, the latter with what is necessary and invariable.

6. *Liber de Spiritu et Anima* 11 <PL 40. 787).

7. Bœthius, *De Consolatione Philosophiae* V, prosa 4 (CSEL 67, 118 10-12).

what is imaginable and sensible. Therefore the rational method is suitably attributed to natural philosophy.

(b)

In the second place, it seems inappropriate to say that mathematics proceeds according to the mode of learning.

Objection 1. For learning seems to be nothing else than the receiving of science.[8] But we receive scientific knowledge in every part of philosophy, because all the sciences proceed by means of demonstration. So it is common to all parts of philosophy to proceed according to the mode of learning; and so this procedure should not be made exclusive to mathematics.

Objection 2. Again, the more certain something is, the easier it seems to learn it. But natural things seem to be more certain than mathematicals because they are apprehended by the sense, from which all our knowledge takes its origin. Therefore this method belongs to the natural philosopher rather than to the mathematician.

Objection 3. Again, as the *Metaphysics* says,[9] we begin in the sciences from the point from which we learn more easily. But learning begins with logic, which must be mastered before mathematics and all the other sciences. Therefore it belongs to logic rather than to the other sciences to proceed according to the mode of learning.

Objection 4. Again, the methods of natural and divine science are taken from powers of the soul, namely from reason and intellect. Therefore in the same way the method of mathematics ought to be taken from some power of the soul. So it is not appropriate to say that its method is to proceed according to the mode of learning.

On the contrary, to proceed according to the mode of learning is to proceed by demonstration and with certitude. But

8. Disciplina, from which the English "discipline" is derived mmec from the Latin *discere,* which means to learn. For an historical study of the terra in connection with the sciences, see M. D. Chenu art. rit.

9. Aristotle, *Metaphysics V, L* 1013a2-5.

as Ptolemy says,[10] "Mathematics alone, if one applies himself diligently to it, will give the inquirer after knowledge firm and unshaken certitude by demonstrations carried out with unquestionable methods." Therefore it is most characteristic of mathematics to proceed according to the mode of learning.

Moreover, this is evident from the Philosopher who, in several places in his works, calls the mathematical sciences disciplines.[11]

(c)

In the third place, it seems that it is not appropriate to divine science to proceed according to the mode of intellect.

Objection 1. For, according to the Philosopher,[12] intellect *(intellectus)*[13] is of principles, while science is of conclusions. But principles alone are not considered in divine science; some conclusions are also considered. Therefore to proceed according to the mode of intellect is not appropriate to divine science.

Objection 2. Again, we cannot proceed intellectually with regard to those things that transcend every intellect. But divine things transcend every intellect, as Dionysius[14] and the Philosopher[15] say. Therefore they cannot be dealt with intellectually.

10. Claudius Ptolemaeus, *Syntaxis Mathematica* I, 1 *(Opera Omnia* I, 6. 17-20).

11. Aristotle, *Topics* VII, 3, 153a9-11. The English word "mathematics" is derived from the Greek *mathema,* which means knowledge in Eneral and in particular mathematical knowledge. The corresponding itin word is disciplina. Hence the close association of disciplina with mathematics. See M. D. Chenu, *art. cit.*

12. Aristotle, *Posterior Analytics* I. 2, 71b17-18: 20-22; II. 19. 100b10; *Nicomachean Ethics* VI, 6. 1141a7; 12, 1143a36.

13. *intellect»* is the intellectual virtue of the understanding of first principles- See St. Thomas. *Summa Theol.* I-II. 57, 2.

14. Pseudo-Dionysius, De *Divinis Nominibus* I, n. 5 <PG X 593A).

15. Liber *de Causis* 5, ed. Bardenhewer. p. 168. As was customary at the rime St Thomas here attributes this work to Aristotle. Later, when writing his commentary on it, he recognized that it is a translation an* Arabian work, drawn largely from Proclus *Elements of Th* -logy St Thomas seems to have been the first to recognize this, c * CtThomas, JExpoeUio *super Librum de Causis,* L ed. Mandonnet P- Is··

Objection 3. Again, Dionysius says[16] that angels have intellectual power inasmuch as they do not gather their divine knowledge from what is sensible and divided; but, as he adds,[17] this is beyond the power of the soul. Therefore, since the divine science which is now under discussion is a science belonging to the human soul, it appears that its proper method is not to proceed intellectually.

Objection 4. Again, theology seems particularly concerned with the things of Faith. But understanding *(intelligere)* is the end of the things of Faith. Thus it is said in *Isaias,* according to another translation,[18] "Unless you believe, you will not understand." So we should not say that proceeding intellectually about divine things is the method of theology but the end.

On the contrary, the *De Spiritu et Anima* says[19] that intellect *(intellectus)* has for its object created spirits, while understanding *(intelligentia)* has for its object God Himself. Now divine science is principally concerned with them. Therefore it seems proper to it to proceed intellectually.

Moreover, the method of a science must correspond to its subject matter. But divine things are intelligible in virtue of themselves. Therefore the method appropriate to divine science is to proceed intellectually.

Reply: To the first question *(a)* I reply that a method of proceeding in the sciences is called rational in three ways:

In one way, on the part of the principles from which we begin; for instance, when we proceed to prove something beginning with constructs of reason, like genus, species, opposite, and intentions of this sort, which the logicians study. In this sense a method will be called rational when in a science

16. Pseudo-Dionysius, De Dirinis *Nominibus* 7, n. 2 (PG 3, 868B).

17. Pseudo-Dionysius. ibid.

18. *Isaias* 7, 9. This is the reading of the Septuagint. used by St Augustine, for example, in his De *Doctrina Christiana* TT, 12 (PL 34. 43).

19. Liber *de Spiritu et Anima* 11 (PL 40. 787).

we use the propositions taught in logic, riamely inasmuch as we use logic as having a teaching function in the other f sciences.20 But this method of proceeding cannot belong properly to any particular science, which will fall into error unless it proceeds from its own proper principles. However, logic and metaphysics properly and suitably use this method, because both are universal sciences and in a .sense treat of the same subject.21

In another way a method is called rational from the end, when we stop in the very process of attaining it. For the ultimate end which the investigation of reason ought to reach is the understanding of principles, in which we resolve our judgments. And when this takes place, it is not called a rational procedure or proof but a demonstration. Sometimes, however, the investigation of reason cannot arrive at the ultimate end, but stops in the investigation itself, that is to say, when two possible solutions still remain open to the investigator. And

20. *Logica docens.* Distinguished from logica utens. As here presented. these are two types of applied logic. Logica *docens* teaches the other sciences the meaning of logical terms, which they can use in their demonstrations. For example, the metaphysician can use the logical notions of genus and species to prove the distinction between essence and existence. (See below, p. 70, note 22). However, when the philosopher uses this method he proceeds dialectically, and his conclusions are only probable. (See In *IV Meta.* lect. 4. n. 574; y* \osi· Anal. lect. 20, n. 5. See also J. Isaac, "La notion de dialectique chez saint Thomas," Rerue *des sciences* phil. et *théol.,* 1S50. pp. 497-503).

Logica *utene.* on the other hand, is the use other sciences make of the rules of probable reasoning, described for example in Aristotle's *Topics.*

Sometimes, however, logica *docens* means the demonstrative science of logic, or pure logic; *logica utens* is applied logic. See In I *Post. Anal.* lect. 20. n. 5; In IV *Meta.* lect. 4, nn. 576-577; John of St. Thomas. Arj *Logica* II. Q. 1, a. 4, pp. 277-284; J. Maritain, A *Prefset. to Metaphysics,* pp. 41-42.

2L The logician, like the metaphysician, studies all beings, so that their subject matter is co-extensive. However. he studies.all beings in a different way than the metaphysician. Wha* he properly studies is second intentions, which are beings {TroAuced by the- intellect and as such exist onlv in it. But these logical beings are co-extensive with the beings of nature, because all the latter enn fall under the consideration of the intellect. See St. Thomas, ,η *IV Metu.* lect. 4. nn 573-574; In I *Post. Anai.* lect X, n- 5; J. Maritam. A *Preface to Metaj^ystcs.* pp. 38-40. For the meaning of second intentions, see below, note 33.

this happens when we proceed by means of probable arguments,[22] which are suited to produce opinion or belief, but not science. In this sense, *rational* method is contradistinguished to *demonstrative* method. And we can proceed rationally in all the sciences in this way, preparing the way for necessary proofs by probable arguments. And this is another use of logic in the demonstrative sciences; not indeed as having a teaching function, but as being useful.[23] In these two ways, then, a method is called rational from rational science; for, as the Commentator says,[24] in both of them logic, which is another name for rational science, is used in the demonstrative sciences.

In a third way, a method is called rational from the rational power, that is, inasmuch as in our procedure we follow the manner proper to the rational soul in knowing; and in this sense a rational method is proper to natural science. For in its procedures natural science keeps the characteristic method of the rational soul in two ways. First, in this respect, that just as the rational soul receives from sensible things, which are more known relatively to us, knowledge of intelligible things, which are more known in their nature, so natural science proceeds from what is more known relatively to us and less known in its own nature. This is evident in the *Physics*.[25] Moreover, demonstration by means of a sign or an effect is used especially in natural science. Secondly, natural science uses a rational method in this respect, that it is characteristic of reason to move from one thing to another; and this method is observed particularly in natural science, where we go from the knowledge of one thing to the knowledge of another, for example from the knowledge of an effect to the knowledge of

22. For St Tnomas' doctrine of probability, see Th. Deman, "Notes de lexicographie philosophique médiévale: Probabilis," Revue des sciences ρλιl. et tfcéoi., 1933, pp. 260-290; P. Gardeil. "Le 'certitude probable',- Keuue des sciences *phil. et théol.,* 1911, pp. 237-266; 441-485..

23. *Lagictk 'ttena.* See aboce, note 20.

24. Averroee, *In'l Phys.* C. 2, t t 35, fol. 23C.

25. Aristotle, Physics I, L 194al9-2L

its cause. Nevertheless the procedure in natural science is not to go simply from one thing to that which is other according to reason and not other in reality, as when we go from the concept *animal* to the concept *man*. For in the mathematical sciences we proceed only by means of what is of the essence of a thing, since they demonstrate only through a formal cause. In these sciences, therefore, we do not demonstrate something about one *thing* through another *thing,* but through the proper definition of that thing. For although some demonstrations about the circle are made by means of the triangle and vice versa, this is only inasmuch as the triangle is potentially in the circle and vice versa.2β But in the case of natural science, in which demonstration takes place through extrinsic causes, something is proved of one thing through another thing entirely external to it. So the method of reason is particularly observed in natural science; and on this account natural science among all the others is most in conformity with the human intellect. Consequently we say that natural science proceeds rationally, not because this is true of it alone, but because it is especially characteristic of it.

Reply to obj. 1. That argument is based on the method called rational in the first way. In this sense a rational method is proper to rational and divine science, but not to natural science.

Reply to obj. 2. That argument is based on the method called rational in the second way.

Reply to obj. 3. The method of reason is maintained in all the sciences in so far as they proceed from one concept to that which is other according to reason, but not in the sense that they go from one *thing* to another *thing*. As has been said, that is proper to natural science.

26. One mathematical figure or number is said to be potentially contained in another analogously to the way in which something actual is contained in something potential; for example, as the carved statue is contained potentially in the wood from which it is carved. However, this use of the term "potential" in mathematics is purely metaohorica!. See St Thomas. *Summa Theologiae* I-II. 72. 4. Reply to obj. 2; In *V Meta.* lect 14. n. 974; *In IX Meta,* lect 1. η. 1Π4.

Reply to obj. 4. In that place[27] the Philosopher considers identical the reasoning and deliberative part of the soul; so it is clear that it pertains to the second meaning of rational mentioned above. In the same place,[28] moreover, by reason of their contingency, he assigns human actions, which are the objects of moral science, to the reasoning or deliberative part of the souL

From what has been said, then, we can gather that the first mode of rationality is most characteristic of rational science, the second of moral science, and the third of natural science.

To the second question (b) I reply that mathematical science is said to proceed according"^to the mode of learning, not because it alone does so, but because this is especially characteristic of it. For since learning is nothing else than receiving science from another, jwe are then said to proceed according to the mode of learning when our method leads to certain knowledge, which is called science. Now this occurs particularly in the mathematical sciences. For since mathematics is intermediate between natural and divine science, it is more certain than either.[29] It is more certain than natural science because its investigation is not bound up with motion and matter, while the investigation of natural science centers upon matter and motion. Now from the very fact that natural science deals with maner, its knowledge depends upon many things, namely upon the consideration of matter itself and form and the material dispositions and properties accompanying form in matter. And wherever there are many factors to be considered in order to know something, knowledge is more difficult. Thus the *Posterior Analytics* says[30] that a science is

27. Aristotle, *Nicomachean Ethics* VI, 1, H39al2.

28. Aristotle, loc. cit., 1139al2-14.

29. See St. Thomas, *In II Meta.* lect. 5, n. 336.

30. Aristotle, *Posterior Analytics* I, 27, 87a31, 34-35. Here Aristotle explains: "What I mean by 'additional elements' is this: a unity is substance without position, while a point is^substance with position: the- latter contains an additional element" Notice that from this point of view metaphysics is the most certain of the sciences, for it

less certain which is constituted by additional elements, as geometry is less certain than arithmetic. Now since natural science deals with things that are mobile and which lack regularity, its knowledge is less certain; for its demonstrations frequently hold good only in the majority of cases because things sometimes happen differently. And so too the more a science draws close to particular things, as do practical sciences like medicine, alchemy and ethics, the less certain they can be because of the multitude of factors to be taken into account in sciences of this sort, the omission of any one of which leads to error, and because of their variability.

The method of mathematics is also more certain than the method of divine science, because the objects considered by divine science are further removed from sensible things, from which our knowledge takes its origin. This is true both with regard to the separate substances, of which we have an inadequate knowledge from what we know from the sensible world, and also with regard to those things that are common to all beings, which are most universal and thus furthest removed from the particular things falling under the senses. But mathematicals themselves come under the senses and are objects of our imagination, such as figures, lines, numbers and the like. So the human intellect, which receives its knowledge from images, knows these things with greater ease and certitude than it does a separate intelligence or even the nature of substance, or act and potency and the like.

It is clear, then, that mathematics is easier and more certain than natural science and theology, and much more so than the other sciences which are practical; and for this reason we say that it especially proceeds according to the mode of learning. And this is what Ptolemy asserts in the beginning of the *Almagest:*[3L] "Let us call the other two kinds of theoretical

rnnsidprs *being,* which is most universal and simple, while natural philosophy considers *mobile being* and mathematics *quantified being.* See St Thomas, *In I Meta,* lect 2. n. 47.

3L Claudius Ptolemaeus, *Syntaxis Mathematica* I, c. 1 *(Opera Omnia, 1,* 6, 11-20).

knowledge opinion rather than science: theology indeed on account of its obscurity and incomprehensibility, physics on the other hand because of the instability and obscurity of matter. Mathematics alone will give the inquirer firm and unshaken certitude, namely demonstrations carried out with unquestionable methods."

Reply to obj. 1. Although we acquire knowledge in all the sciences, nevertheless in mathematics, as we have said, we do so with greater ease and certitude.

Reply to obj. 2. Although natural things fall under the senses, still,[32] because of their changeableness, when they come into being outside the senses they do not have the great certitude of mathematicaIs, which are without motion, and yet exist in sensible matter and thus can fall under sense and imagination.

Reply to obj. 3. In learning we begin with what is easier, unless necessity dictates otherwise. For sometimes in learning we must begin, not with what is easier, but with that upon whose knowledge the knowledge of what comes after depends. That is why in acquiring knowledge we must begin with logic; not because it is easier than the other sciences, for it involves the greatest difficulty, concerned as it is with second intentions,[33] but because the other sciences depend on it inasmuch as it teaches the method of procedure in all the sciences. And, as the *Metaphysics* says,[34] we must know the method of science before science itself.

Reply to obj. 4. The method of the sciences is taken from

32. I have omitted the et, following the reading of manuscripts Vatican Ottab. 198. fol. 16**; Paris. St Geneviève 238, fol. 158*.*; Cambridge Corpus Christi College 35, foL 239**.

33. These are the beings of the mind (for example, genus, species, difference) which are the subject matter of logic. First intentions are produced by the mind to represent directly real things, (for example, man, tree); second intentions are produced by the intellect when it reflects upon its first intentions and their relations to each other. Hence they form part of the logioel structure of knowing and cannot exist outside the intellect. See St Thomas, De *Potentia,* 7. 9.34

34. Aristotle. *Metaphysics* II, 3, 995al2-14.

the powers of the soul because of the way in which these powers operate. So the methods of the sciences do not correspond to the soul's powers, but rather to the ways in which these powers can operate, which are themselves diversified not only according to the powers alone, but also according to their objects. So it is not necessary that the method of every science be named after a power of the soul. However, we can say that just as the method of physics is taken from reason because physics gets its data from the senses, and the method of divine science is taken from the intellect because it treats of something in God, so also the method of mathematics can be taken from reason inasmuch as it gets its data from the imagination.

To the third question (c) I reply that just as we attribute a rational method to natural philosophy because it adheres most closely to the method of reason, so we attribute an intellectual method to divine science because it adheres most closely to the method of intellect. Now reason differs from intellect as multitude from unity.[35] Thus Boethius says[36] that reason is related to intellect as time to eternity and as a circle to its center. For it is distinctive of reason to disperse itself in the consideration of many things, and then to gather one simple truth from them. Thus Dionysius says:[37] "Souls have the power of reasoning in that they approach the truth of things from various angles, and in this respect they are inferior to the angels; but inasmuch as they gather a multiplicity into

35. Reason and intellect are not distinct powers of the soul; they are distinct acts of the same power. The act of intellect is "to apprehend intelligible truth simply*; the act erf reason is "to advance from one thing understood to another, so as to know an intelligible truth. . . . Reasoning, therefore, is compared to understanding *(intelligere)* as movement is to rest, or acquisition to possession." St. Thomas. *Summa Theologiae* L 79. 8. Hence the act of intellect or understanding is a simple intuition *(intuitus)* or grasping of an intelligible object present to the intellect. See St. Thomas, *In I Sent.* d. 3. q. 4. a. 5. See also J. Péghaire, *Intellectus et Ratio selon. S. Thomas d'Aquin.*

36. Boethius. De *Consolatione Philosophiae* IV, prosa 6 (CSEL 67. 98. 4-7).

37. Pseudo-Dionysius. De Divinis *Nominibus* 7. η. 2 (PG 3. 868BC).

unity they are in a way equal to the angels." Conversely, intellect first contemplates a truth one and undivided and in that truth comprehends a whole multitude, as God, by knowing His essence, knows all things. Thus Dionysius says:[38] "Angelic minds have the power of intellect in that they understand divine truths in a unified way."

It is clear, then, that rational consideration ends in intellectual consideration by way of analysis *(secundum viam resolutionis),* inasmuch as reason gathers one simple truth from many things. And again, intellectual consideration is the beginning of rational consideration by way of synthesis *(secundum viam compositionis vel inventionis),* inasmuch as the intellect comprehends multitude in unity.[39] So that consideration which terminates all human reasoning is supremely intellectual.

Now in its process of analysis the whole consideration of reason in all the sciences terminates in the consideration of divine science. For, as we have said, reason sometimes advances from one thing to that which is other in reality, as when the demonstration is through external causes or effects; by synthesis indeed when we go from causes to effects (for causes are simpler than effects and exist more unchangeably and uniformly), by analysis when we proceed conversely. Consequently, the ultimate end of analysis in this life is when we arrive at the highest and most simple causes, which are the

38. Pseudo-Dionyrius, ibid.

39. Reasoning begins with understanding and ends in it. For we begin to reason from principles which we understand, and at the end of the reasoning we understand the conclusions arrived at from the principles. The movement of reason from principles to conclusions is called "the way of composition or discovery" *(via compositionis vel inventionis);* the movement of reason from conclurions to principles in which it resolves or verifies its conclusions, is called "the way of resolution" *(via resolutionis). The former is* a movement of synthesis, in which the reason goes from cause to effect, from the universal to the particular, from the simple to the multiple. The latter is a movemait of analysis, in which the reason proceeds in the opposite direction. See St. Thomas, *Summa Theologiae* I, 79, 8; *De Veritate* 10, 8, Reply to obj. 10: 15, *1; In II Meta.* lect. 1, n. 278. See also L. M. Régis. "Analyse et synthèse dans S. Thomas," *Studia Mediaevalia,* 1948. pp. 303-330.

separate substances.[40] Sometimes, however,, reason advances from one concept to that which is other according to reason, as when we proceed according to intrinsic causes; by synthesis indeed when we go from most universal forms to more particular ones, by analysis when we proceed conversely, because what is more universal is simpler. Now what is most universal is common to all beings; and so the ultimate end of analysis in this life is the consideration of being and the properties of being as being. And, as we said above, these are what divine science considers, namely the separate substances and what is common to all beings. It is clear, therefore, that its consideration is supremely intellectual.

It also follows from this that divine science gives all the other sciences their principles, inasmuch as intellectual consideration is the starting-point of rational consideration; and for this reason it is called *first philosophy.* Nevertheless it is learned after physics and the other sciences inasmuch as intellectual consideration is the end of rational consideration. And for this reason it is called *metaphysics,* as being beyond physics, for in the order of analysis it comes after physics.[41]

Reply to obj. 1. We say that divine science proceeds intellectually not as though it makes no use of reason, moving forward from principles to conclusions, but because its reasoning most closely approaches intellectual consideration and its conclusions are closest to its principles.

Reply to obj. 2. God is beyond the comprehension of every created intellect, but He is not beyond the uncreated intellect, since in knowing Himself He comprehends Himself. However, He is above the intellect of everyone here on earth as regards knowing *what He is,* but not as regards knowing *that He is.*[42] The blessed in Heaven, however, also know' *uhat He is,* because they see His essence. Nevertheless divine science is not only about God. It is concerned with other things as well,

40. That is. God and the angels, substances separated from matter.
41. See above, Q. 5, a. 1, note 20.
42. See below. Q. 6. a. 3, pp. 67-72.

which are not beyond the human intellect even in its present state as regards knowing about them *what* they are.

Reply to obj. 3. As we said above, human consideration at its terminus in a way approaches angelic knowledge; not that it equals it, but bears a resemblance to it. So Dionysius says:[43] "Souls, by reducing multitude to unity, are rightly considered the equal of the angelic intelligences,'as far as this is proper and possible to souls."

Reply to obj. 4. The knowledge of Faith also belongs in a special way to understanding *(intellectus).* For we do not possess the things of Faith through the investigation of reason, but we hold them by simply receiving understanding. But we are said not to understand them because the intellect does not have a full knowledge of them. That indeed is promised to us as our reward.

ARTICLE TWO

Must We Entirely Abandon the Imagination in Divine Science?

We proceed thus to the second article'. It seems that in divine science we must go to[L] images.

Objection 1. For divine science was never more appropriately taught than in Sacred Scripture. But treating of the divine in Sacred Scripture we resort to images when divine things are described for us under sensible figures. Therefore in divine science we must go to images.

43. Pseudo-Dionysius, *De Divinis Nominibus* 7, η. 2 <PG 3, 868BC).

L *Deduci ad.* The expression, which plays a central role in this article and which defies exact translation, comes from Boethius. De *Trinitate* 2 iPL 64, 1250B). It has the technical meaning of the intellects being brought ar led to something in which its judgment is verified. The intellect is said "to be led to" the senses, imagination or the intellect itself, in the sense that it terminates its knowledge there, finding in the data grasped by the faculty in question the evidence on which it bases the truth of its judgment. The intellect is "led to" or "goes to" something as the final court of appeal for its judgment. See below, fie-piy. on. 62ff. See also J. Maritain, *Les Degrés du savoir* pp, 107-113; *The Philosophy of Nature,* p. 25.

Objection 2. Again, we grasp divine things only by the intellect; and that is also the reason why, as we have said,[2] we must proceed intellectually when treating of them. But, as the Philosopher says,[3] it is impossible to understand without the imagination. Therefore in divine science we must go to images.

Objection 3. Again, we know the divine especially through divine illumination. But as Dionysius says:[4] "It is impossible for the divine light to illumine us from above unless it be hidden within the covering of many sacred veils." And he calls these sacred veils "images of sensible things."[5][6] So in divine science we must go to images.

Objection 4. Again, when dealing with what is sensible we must make use of the imagination. But we know divine things from sensible effects, according to the statement of the *Epistle to the Romans:** "The invisible things of God . . . are clearly seen, being understood by the things that are made." Therefore in divine science we must resort to images.

Objection 3. Again, in the domain of the knowable we are ruled especially by the starting point of knowledge; for instance in the domain of nature we are ruled by sense, from which our knowledge begins. Now in us intellectual knowledge begins in the imagination, since images are related to our intellect as colors to sight, as the *De Anima* says.[7] Therefore in divine science we must go to the imagination.

Objection 6. Again, since the intellect does not use a bodily organ, an injury to such an organ hinders the action of the intellect only in so far as it turns to the imagination. Now the intellect is hindered in its consideration of divine things through an injury of a bodily organ, namely the brain. There-

2. See above, Q. 6. a. 1, p. 57.
3. Aristotle, *De Anima I,* L 403a8: III, 7, 431al6.
4. Pseudo-Dionysius, *De Caelesti Hierarchia* L n. 2. (PG 3, 121B).
5. Pseudo-Dionysius, op. *cit.* L n. 3 (PG 3, L24A).
6. St. Paul, *Epistle to the Romans* L 20.
7. Aristotle, *De Anima* HI, 7, 431114

fore in considering divine things the intellect resorts to the imagination.

On the contrary, Dionysius says in his *Mystical Theology'* speaking to Timothy: "O beloved Timothy, in mystic contemplation abandon the senses." But the imagination has to do only with the sensible, for it is a movement produced by the sense in act, as the *De Anima* says.[9] Therefore, since the considerations of divine things are eminently mystical, we should not have recourse to images in them.

Moreover, in the procedure of any science we should avoid what leads to error in it. But, as Augustine says,[10] the principal error regarding divine things is the mistake of those who try to transfer to them what they know of the corporeal world. Therefore, since the imagination has to do only with the corporeal, it seems that in divine science we should not go to images.

Moreover, as is clear from Boethius,[11] a lower power does not extend to that which is proper to a higher power. But it belongs to an intellect and to an intelligence to know the divine and the spiritual, as is said in the *De Spiritu et Anima.'*[12] Therefore, since, as is said in the same work,[13] imagination is below intelligence and intellect, it seems that in the domain of the divine and the spiritual we should not go to the imagination.

Reply: In all knowledge two points must be taken into account: the beginning and the end. The beginning belongs to apprehension, the end however to judgment, for it is there that knowledge is completed.[14]

Pseudo-Dionysius. De Mystiea *Theologia* 1, n. 1 <PG 3. 997B».

9. Aristotle, *De Anima* HI. 3, 429a1.
10. St Augustine. De *Trinitate* I, 1 (PL 42, 819).
    Boethius, De *Consolatione Philosophiae V,* prosa 4 (CSEL 67 n; 29-118, 1).
12. Liber *de Spiritu et Anima* 11 <PL 40. 787).
13. Op. cit. (PL 40, 786).
14.

Now the beginning of all our knowledge is in the sense; for from the apprehension of sense springs the apprehension *of the* imagination, which, as the Philosopher says,15 is a movement resulting from sense; and from it in turn springs our intellectual apprehension, because, as is clear in the *De Anima,*16 images are as objects of the intellectual soul.

Knowledge, however, does not always terminate in the same way. Sometimes it terminates in the sense, sometimes in the imagination, and sometimes in the intellect alone. For sometimes the properties and accidents of a thing revealed by the sense adequately manifest its nature,17 and then the intellect's judgment of the thing's nature must conform to what the sense reveals about it. All natural things, limited to sensible matter, are of this sort. So the terminus of knowledge in natural science must be in the sense, so that we judge of natural things as the sense reveals them, as is clear in the *De Caelo et Mundo*,18 And the person who neglects the senses in regard to natural things falls into error. Furthermore, I call natural things those which are concreted with sensible matter and motion both with respect to their existence and our consideration of them.

There are some things, however, the judgment of which does not depend on what the sense perceives, because even though they exist in sensible matter, yet they abstract from it in the concept which is their definition; and we judge of anything chiefly according to the concept which is its definition. But because in this concept they do not abstract from every kind of matter, but only from that which is sensible, and because when sensible characteristics are removed there

15. Aristotle, *De Anima HI.* 3. 429al.

16. Aristotle, De Anima HI, 7, 431al4.

17. On the other hand, St Thomas says that sometimes the essential differences of things are unknown to us. In these cases we must use accidental characteristics and empiriological signs in place *of* essential properties in order to know things. See St Thomas. De *Veritate* 4, 1 ad 8" 10. 1 and ad β": *Contra Gentiles* I, 3; *In VII Meta.* lect 12. n. 1552. See also J. Maritaln, *Les Degrés du savoir,* pp. 347-349; 495-407; 410.

IX Aristotle, *De Caelo et Mundo* HI, 7, 306al6.

remains something which is apprehensible by the imagination, we must judge about such things according to what the imagination reveals. Now mathematicals are of this sort; and therefore knowledge through judgment in mathematics must terminate in the imagination and not in the sense, because mathematical judgment exceeds the apprehension of sense. Thus a judgment about a mathematical line is sometimes not the same as one about a sensible line; for example, that a straight line touches a sphere at only one point, which is true of an abstract straight line, but not of a straight line in maner, as is said in the *De Anima*.[19]

On the other hand, there are some things which transcend both what falls under the sense and what falls under the imagination, as those that are entirely independent of maner both with respect to their existence and our consideration of them. So when we know things of this sort through judgment, our knowledge must terminate neither in the imagination nor in the sense. Nevertheless we come to know them from what is apprehended by the sense and imagination. This we do either by way of causality, as from an effect we come to know a cause which is not commensurate with the effect but surpasses it; or by transcendence or by negation, as when we separate from such beings whatever the sense or imagination apprehends. These are the ways of knowing divine things from the sensible world laid down by Dionysius in his *Divine Names*.[20]

It follows that with regard to divine things we can use the sense and the imagination as the beginnings of our knowledge but not as the ends of our knowledge, namely, so that we judge divine things to be such as what the sense or imagination apprehends. Now to go to something is to terminate in it.'[21] Therefore in divine science we should go neither to the imagination nor to the sense. In mathematics, however, we

IS. Aristotle, *De Anima* I, L 4û3al3-16.

20. Pseudo-Dionysius, De Divini» Nominibus 7, n. 3 (PG 3, 869C-872A).

21. See above, note 1-

must go to the imagination and not to the sense; while in the natural sciences we must rather go to the sense. For this reason they are in error who try to proceed in the same way in these three parts of speculative science.

Reply to obj. 1. Sacred Scripture does not present divine things to us under sensible images in order that our intellect might halt there, but that it might rise from them to things invisible. So too, as Dionysius says,[22] it even teaches the divine by means of images of base things to offer less occasion of halting at such things.

Reply to obj. 2. As regards the beginning of our knowledge, the operation of our intellect in its present state is never without an image. But our knowledge need not always terminate at images, so that, in other words, what we understand we judge to be such as what is apprehended by the imagination.

Reply to obj. 3. That text of Dionysius refers to the beginning of knowledge, not to its end which is reached when we know divine things from sensible effects in the three ways described above. The text does not mean to say that we must judge the divine according to the manner of being of these sensible effects.

Reply to obj. 4. That argument is valid when the beginning of knowledge adequately leads to what we seek to know. In this way the sense is the beginning in the natural sciences, but not, as we have said, in divine science.

Reply to obj. 3. The image is the principle of our knowledge, as that from which the operation of the intellect begins, not as something fleeting, but enduring as a sort of foundation of intellectual activity, just as principles of demonstration must remain in every procedure of science; for images are related to the intellect as objects in which it sees whatever it sees either through a perfect representation or through a negation. So when knowledge of images is impeded, the intellect's knowledge must be completely obstructed even in divine

22. Pseudo-Dionysius, De *Caelesti Hierarchia* 2, n. 2 (PG 3, 1-WA).

science. For clearly we cannot know that God causes bodies, or transcends all bodies, or is not a body, *if* we do not *form* an image of bodies; but our *judgment of* what is divine is not made according to the imagination. Consequently, even though in our present state of *life the* imagination is necessary in all our knowledge of divine things, with regard to such things we must never terminate in it.[23]

ARTICLE THREE

Can Our Intellect Behold the Divine Form Itself?

We proceed thus to the third article: It seems that we are unable to behold the Divine Form itself, at least in this life.

Objection 1. For as Dionysius says,[1] "If anyone seeing God understood what he saw, he did not see God Himself but one of His creations." Now the Divine Form is God Himself. Therefore we are not able to behold the Divine Form itself.

Objection 2. Again, the Divine Form is the Divine Essence itself. Now no one in the present life can see God through His essence. Therefore neither can he behold the Divine Form.

Objection 3. Again, if we see the form of something, we have some knowledge of that thing. But according to Dionysius,[2] our intellect is most united to God when it knows absolutely nothing of Him. Therefore we are unable to behold the Divine Form.

Objection 4. Again, as was said above,[3] all our knowledge takes its beginning from the sense. But what the sense perceives is inadequate to reveal the Divine Form or even the other separate substances. Therefore we are unable to behold the Divine Form itself.

Objection 3. Again, according to the Philosopher,[4] our

23. The reply to obj. 6 is contained in the reply to obj. 5.
1. Pseudo-Dionysius, *Epistola I* (PG 3, 1065A).
2. Pseudo-Dionysius. De *Mystica Theologia* 1, η. 3 'PG 3, lOOlA).
3. See above, Q. 6, a. 2, p. 63.
4. Aristotle, *Metaphysics* Π, 1, 993b9-lL

intellect is related to what is most evident as the eye of an owl to the sun. But the eye of an owl cannot see the sun at all Therefore neither can our intellect see the Divine Form itself or other separate forms, which are the most evident of all things.

On the contrary, the Apostle says in the *Epistle to the Romans:*[4] "The invisible things of God are clearly seen by a creature of the world," (that is, by man), . His eternal power also and divinity." Now the Divine Form is simply the Divinity itself. Therefore in some way we can know the Divine Form with our intellect.

Moreover, commenting on the text of *Genesis** "I have seen God face to face," the gloss of Gregory says:[7] "Unless a person somehow beheld it, namely, divine truth, he would not feel himself incapable of beholding it." But we feel that we cannot perfectly see the Divine Essence. Therefore in some way we do behold it.

Moreover, Dionysius says[8] that the human mind gradually becomes accustomed to rise from the world of sense to heights beyond this world, which are nothing else than the separate forms.[9] Therefore we can somehow know the separate forms.

Reply: We know a thing in two ways: in one way when we know *that it is,* and in another way when we know *what it is.*[10] Now in order to know *what* anything is, our intellect must

5. St. Paul, Epistle to *the Romans* L 20. Here St. Thomas interprets *a creatura mundi* as meaning "by a creature of the world," namely man. He al gives the more common interpretation of the expression ("from the creation of the world") in his Commentary on the *Epistle to the Romans,* 1, lect. 6.

6. *Genesis,* 32. 30.

7. Paterius, Liber *de Expositione V. ac N. Testamenti,* compiled from various works of St Gregory the Great pars L lib. 1. c. 48 (PL 79. 7170; see St Gregory. *Moralia XXIV,* 6 <PL 76, 2920.

8. Pseudo-Dionysius, *De Caelesti Hierarchia* 2, n. 5 (PG 3, 145B).

9. That is, God and the angels, spiritual beings separate from matter.

10. This is the distinction between knowing the answer to the question "whether a thing is" (an est) and the answer to the question "what a thing is" (quid *est).* See Aristotle, *Posterior Analytics* H, 7,

penetrate its quiddity or essence either directly or by means of other things which adequately reveal its quiddity. But in this life our intellect cannot directly penetrate the essence of God or other separate essences,[11] because it directly extends to images, to which it bears the same relation as sight does to color, as the *De Anima* says.[12] So the intellect can directly conceive the quiddity of a sensible reality but not of an intelligible reality. Thus Dionysius says:[13] "According to our way of knowing, we cannot immediately attain to the contemplation of the invisible." There are some invisible things, however, whose quiddity or nature is perfectly revealed by the known quiddities of sensible things; and we can also know what these intelligible objects are, although indirectly. For instance, from the fact that we know what man and animal are, we come to know adequately the relation of one to the other, and from this we know what a genus and a species are.[14] But the sensible natures known to us do not adequately

92b11). In the precise sense of the term, to know of anything quid est we must grasp its essence in itself, so as to be able to define it by its essential properties and to give the reason for those properties and for the very existence of the thing. It is in this sense of the term that St. Thomas denies that we can know the quid *est of* God in this life. He says, "With regard to God, quid *est* remains wholly unknown". The Blessed in Heaven, however, see the essence of God in itself, without the intermediary of any created likeness or representation. Here on earth we can know the essence of God only as it is represented by creatures, and therefore we cannot know of it quid *est.* However, as St. Thomas says immediately below (p. 70), we can know of something quid *est* in an indistinct way. without penetrating its very essence and knowing it in itself. In this second sense we can know of God quid est, in the manner described below by St. Thomas. See below, note 27. Also St. Thomas. *Contra Gentiles* I, 30; III. 49; *In Boetium de Trinitate,* Q. 1, a. 2; *In II Post. AnaL* lect. 1, n. 8. For discussions of this doctrine, see J. Maritain. *Les Degrés du savoir,* pp. 827-843; E. Gilson, *Le Thomisme,* pp. 155-159; J. Anderson, *The Bond of Being,* p. 266 and note 13.

11. That is, angels.

12. Aristotle, De *Anima* III, 7, 431a14.

13. Pseudo-Dionysius, De *Caelesti Hiérarchie* 2, n. 2 (PG 3, 140A).

14. Both genus and species designate relations: genus the relation of an essence to many things different in species (for example, animal to rational and irrational animal); species the relation of an essence to many things different in number (for example, man to Peter,

reveal the Divine Essence or even other separate essences, since naturally considered they do not belong to one genus;[15] and *quiddity* and all such terms are predicated almost equivocally[16] of sensible things and of these substances. That is why Dionysius calls[17][18] the likenesses of sensible things, transferred to immaterial substances, "unlike likenesses, which intellectual beings participate in one way and sensible beings in another." Consequently, we cannot have adequate knowledge of the former from the latter by way of likeness or even by way of causality, because the effects of those substances found in lower beings do not measure up to their powers so that we can come to know the essence of their cause in this way.

Accordingly, in the present life it is absolutely impossible to know *what* these immaterial substances are, not only by natural knowledge but also by Revelation; for, as Dionysius says,[19] the light of divine Revelation comes to us adapted to our condition. Thus even though Revelation elevates us to know something of which we should otherwise be ignorant, it does not elevate us to know in any other way than through

Paul. etc.). For St. Thomas' doctrine of genus and species and their relation to the essences of things, see his De Ente et Essentia 2, Eng. trans, pp. 33-38; 3. Eng. trans, pp. 39-42.

15. From the point of view of the logician, material and immaterial things can be brought under the same logical 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, however, 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 genius 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. For this distinction between logical and natural genus, see St. Thomas, *In I Sent.* d. 19, q. 5, a. 2. Reply to obj. 1; *In X Meta.* lect. 12. n. 2142-2144; *Summa Theologiae,* I. 66, 2, Reply to obj. 2: 88. 2, Reply to obj. 4.

16. 'Almost equivocally", or in other words, analogically. For St. Thomas' doctrine of analogy, see G. B. Phelan. *St. Thomas and Analogy;* J. Anderson. *The Bond of Being* For the analogical character of essence, see J. Maritain. "Sur la doctrine de l'aséité divine", *Mediaeval Studies,* 1943, pp. 39-50.

17. Pseudo-Dionysius. *De Caelesti Hierarehia* 2, n. 4 (PG 3, 1410.

18. Pseudo-Dionysius. *op. cit.* L n. 2 (PG 3, 121B).

sensible things. Thus Dionysius says:19 "It is impossible for the divine light to illumine us from above unless it be hidden within the covering of many sacred veils." Now knowledge by way of the sensible is inadequate to enable us to know the essences of immaterial substances. So we conclude that we do not know *what* immaterial forms are, but only *that* they are, whether by natural reason based upon created effects or even by Revelation by means of likenesses taken from sensible things.

It should be noticed, however, that we cannot know *that* a thing is without knowing in some way *what* it is, either perfectly or at least confusedly, as the Philosopher says20 we know things defined before we know the parts of their definition. For if a person knows that man exists and wants to find out what man is by definition, he must know the meaning of the term "man." And this is possible only if he somehow forms a concept of what he knows to exist, even though he does not know its definition. That is to say, he forms a concept of man by knowing some proximate or remote genus and some accidental characteristics which reveal him externally. For our knowledge of definitions, like that of demonstrations, must begin with some previous knowledge.21 Similarly, therefore, we cannot know *that* God and other immaterial substances exist unless we know somehow, in some confused way, *what* they are. Now we cannot do this by knowing a proximate or remote genus, for God is in no genus, since His essence is not distinct from His existence: a condition required in all genera, as Avicenna says.22 Created immaterial substances, however,

19. Pseudo-Dionysius, ibid.

20. Aristotle, *Physics* I, 1, 184a24-bl2: "Now what is to us plain and obvious at first is rather confused masses, the elements and principles of which become known to us later by analysis Thus we must advance from generalities to particulars - - - - a child begins by calling all men ^father', and all women 'mother', but later on distinguishes each of them."

2L For the necessity of precognition in our knowledge of definitions and demonstrations, see *In I Post. Anal,* lect 1-3; De Veritate 1, L

22. Avicenna, *Metaphysics* VHI, 4, fol. 99rh; 5, fol. 99'". See St Thomas- "(God) is not in a genus, for the quiddity of anything in a genus must be other than its act of existing, since thé different bein^

are indeed in a genus; but even though considered logically they are in the same remote genus as these sensible substances, namely the genus of substance, considered naturally they do not belong to the same genus, just as also heavenly and terrestial bodies are not in the same genus. For, as the *Metaphysics* says,[23] the corruptible and incorruptible are not of one genus. It should be noticed that the logician considers concepts in themselves; and from this viewpoint nothing prevents the immaterial and the material, the incorruptible and the corruptible, from having something in common. But the natural philosopher and the metaphysician treat of essences as existing in reality; and therefore they say that there are diverse genera wherever they find diverse modes of potency and act and consequently diverse modes of existing. Similarly, neither has God any accidental characteristics, as we will prove later.[24] And *if* other immaterial substances have such characteristics we do not know them, and therefore we cannot say we know these substances with confused knowledge by knowing their genus and observable accidents. Instead of knowing their genus we know them by negations, as when we know' that they are immaterial and incorporeal, without shapes, etc. And the more negations we know of them, the less confusedly do we know them, for subsequent negations limit and determine a previous negation as differences specify and determine a remote genus.[25] Our knowledge of the heavenly bodies is also for the most part by negations, in so far as they are in a different genus than lower bodies. We know, for instance, that they are neither light nor heavy, hot nor cold.[26] And instead of acci-

within a genus or species have the same generic or specific quiddity or nature, whereas their act of existing is diverse." *De Ente et Essentia. 5;* Eng. trans, p. 50.

23. Aristotle, *Metaphysics* X, 10, 1058628. See above, note 15.

24. St Thomas did not treat this question in the present work, which he left incomplete. On this point see his *Contra Gentiles* I, 23; *Summa Theologiae* L X 6.

25. See St. Thomas, *Contra Gentiles* I, 14; E. Gilson. *Le Thomisme, pp.* 141-150.

26. According to mediaeval astronomy, the heavenly bodies were not

dental characteristics in these substances we have their connections with sensible ones, either with regard to the relationship of cause to effect or the relationship of transcendence.

We conclude, then, that with regard to immaterial forms we know that they exist, and instead of knowing what they are we have knowledge of them by way of negation, by way of causality and by way of transcendence.[27] These are the ways of knowing immaterial beings proposed also by Dionysius?[28] And this is the way Boethius thinks[29] we must behold the Divine Form, namely through the exclusion of all images and not so as to know what it is.

The solution of the objections is clear from what has been said, for the first arguments are based on perfect knowledge of what a thing is, the others on imperfect knowledge of the sort described.

composed of the four elements of fire, air, water, earth, but of a fifth type of matter or "fifth essence" (quinta essentia"). Hence they do not have the properties of being hot or cold, light or heavy, which belong to the four elements. On this point, see St. Thomas, In I De Caelo et Mundo, lect. 5, nn. 5-7; lect. 6. See also J. de Tonquédec. Questions de cosmologie et de Physique chez Aristote et Saint Thomas, pp. 17-21.

27. "There is something with regard to God which is entirely unknown to man in this life, namely, what God is (quid est Deus) . . . And this is so because man's knowledge begins with those things which are connatural to him, namely, sensible creatures, which are not adequate to represent the divine essence. Nevertheless man can know God from creatures of this sort in three ways, as Dionysius says in the Divine Names: First through causality. For since such creatures are imperfect and changeable, they must be reduced to some unchangeable and perfect principle. And from this we know that God exists (de Deo an est). Secondly, by way of excellence (per viam excellentiae). For all things are reduced to a first principle, not as to a proper and univocal cause, as man begets man, but as to a universal and transcendent cause. And from this we know that He is above all things. Thirdly, by way of negation, because if He is a transcendent cause, nothing which is in creatures can belong to Him . . ." In Epistolam, ad Romanos L lect. 6. See Contra Gentiles I, 29.

28. Pseudo-Dionysius, De Divinis Nominibus, 7, η. 3 (PG 3, 869D-872A).

29. Boethius, De Trinitate 2 (PL 64. 1250B).

ARTICLE FOUR

Can Our Intellect Behold the Divine Form by Means of Some Speculative Science?

We proceed thus to the fourth article: It seems that we can come to behold the Divine Form through the speculative sciences.

Objection 1. For, as Boethius says here,[1] theology is a part of speculative science. But, as he says,[2] it belongs to theology to behold the Divine Form. Therefore we can arrive at a knowledge of that Form through the speculative sciences.

Objection 2. Again, there is a speculative science treating of immaterial substances, namely divine science. Now any science treating of a substance beholds the *form of* that substance, because all knowledge is by means of form, and according to the Philosopher[3] all demonstration begins with essence. Therefore we can behold separate forms through the speculative sciences.

Objection 3. Again, according to the philosophers[4] the ultimate happiness of man is to understand the separate substances. For, since happiness is the most perfect operation, it must have to do with the most excellent things falling under the intellect, as we can learn from the Philosopher in the *Ethics? Now the* happiness described by the philosophers is an operation springing from wisdom, since wisdom is the most perfect virtue of the most perfect power—the intellect; and, as the *Ethics* says,[5] this operation is happiness. Through

1. Boethius, De *Trinitate* 2 (PL 64. 1250A).
2. *Ibid.* (1250B).
3. Aristotle, *Posterior Analytics* II, 90b24; *Metaphysics* VII, 9, 1034a31.
4. See Aristotle, *Nicomachean Ethics* X. 7, 1177al9-21: Avicenna. *Liber VI Naturalium* V, 6. fol. 26™; Averroes, *In III De Anima* t c. 36, foL 174'-187. On this point see St Thomas, *Contra Gentiles* III, 41-45; *Summa Theologiae* L, 88, 1-2.
5. Aristotle, *Nicomachean Ethics* X, 7, HT7al9-2L
6. Aristotle, *ibid.*

wisdom, therefore, we understand the separate substances. Now wisdom is a speculative science, as is clear in the *Metaphysics'* and *Ethics** So we can understand the separate substances through the speculative sciences.

Objection 4. Agnin, if something is unable to reach the end for which it exists *it is to* no purpose. But the inquiry in all the speculative sciences is directed as to its end to a knowledge of the separate substances, because what is most perfect in any genus is the end. Therefore if substances of this sort cannot be understood through the speculative sciences, all of them would be to no purpose, which is absurd.

Objection Again, everything directed by nature to an end has been previously endowed with principles by which it is able to arrive at that end and by which it also tends towards that end; for the principles of natural motions are within a thing. Now the end of man to which he is directed naturally is to know the immaterial substances, as both the saints and the philosophers teach. So man is naturally endowed with principles of that knowledge. But everything we can arrive at from naturally known principles is included in one of the speculative sciences. Therefore the knowledge of immaterial substances pertains to some speculative sciences.

On the contrary, the Commentator says[9] that if this is true it follows that either the speculative sciences are not yet completed, since we have not yet discovered those sciences by which we can know the separate substances, and this because we do not yet understand these substances owing to our ignorance of some principles; or if it happens because of some defect in our nature that we cannot discover the speculative sciences by which the aforementioned substances may be known to us, it follows that if some persons are capable of discovering sciences of this sort, we and they are men only in an equivocal sense. The first of these theses is improbable;

7. Aristotle. Metaphysics I, 1, 982a2; 2, 982al5 ff.
8. Aristotle, *Nicomachean Ethier* VI, 7, U41al6-19. b3.
9. Averroes, In III De Anima, t. c. 36, fol. 182E-133B.

the second is impossible. So we cannot understand these substances through some speculative sciences.

Moreover, in the speculative sciences we search after definitions, by which we understand the essences of things through the division of a genus into differences and through the examination of a thing's causes and accidents, which contribute a great deal to our knowledge of the essence. But we cannot know these things in the case of immaterial substances because, as we have already said,10*considered naturally they have no genus in common with the sensible substances known to us. And they either do not have a cause, like God, or their cause is deeply hidden from us, like that of the angels. Their accidents are also unknown to us. So there can be no speculative science through which we might come to understand immaterial substances.

Moreover, in the speculative sciences we know the essences of things through definitions. Now a definition is a term made up of a genus and differences. But the essences of these substances are simple and there is no composition in their quiddities, as is clear from the Philosopher and the Commentator.11 So we cannot understand these substances through the speculative sciences.

Replyz In the speculative sciences we always proceed from something previously known, both in demonstrating propositions and also in finding definitions. For just as a person comes to know a conclusion by means of propositions previously known, so also from the concept of a genus and difference and the causes of a thing he comes to know its species. Here, however, it is impossible to go on to infinity, because then all science would cease, both as regards demonstrations and definitions, since the infinite cannot be traversed. So inquiry in all the speculative sciences works back to something first given which a person does not have to learn or

10. See above, Q. 6, a. 3, p. 7L

IL Aristotle, *Metaphysics* IX, 10, 1051b27; Averroes. In *IX Meta.* t. c. 22. fob 248D.

discover (otherwise he would go on infinitely), but which he knows naturally. Of this sort are the indemonstrable principles of demonstration, for example, "Every whole is greater than its part", and the like, to which all demonstrations in sciences are reduced; and of this sort too are the first conceptions of the intellect, like being, one, and conceptions of this kind, to which all the definitions of the sciences must be reduced.

From this it is clear that, in the speculative sciences, by means of demonstration and definition we can know only those things to which our natural knowledge extends. Now such naturally known truths are revealed to man by the light of the agent intellect, which is natural to man; and nothing indeed is made known to us by this light except in so far as it renders images actually intelligible; for in this consists the operation of the agent intellect, as the *De Anima* says.[12] But since we receive images from the sense, our knowledge of the above-mentioned principles begins in the sense and memory, as is clear from the Philosopher.[13] Consequently, such principles do not carry us beyond what we can know from the objects of sense.[14]

Now we cannot know the quiddity of separate substances from what we receive from the sense, as is clear from what we said before, although by means of sensible things we can come to know of the existence of these substances and some of their conditions. So we cannot know *what* a separate substance is through any speculative science, although through them we can know of their existence and some of their conditions; for instance, that they are intellectual, incorruptible and the like. This is also the teaching of the Commentator,[15] although Avempace said the contrary,[16] thinking that quid-

12. Aristotle. De *Anima* HI, 5, 430al5. See St. Thomas, *Summa Theologiae* I, 79, 3; 85, L

13. Aristotle, *Posterior Analytics* Π, 19. 100a3~9.

14. See St. Thomas, *Summa Theologiae* I-Π, 3, 6.

15. Averroes. *In III De Anima,* t. c. 36, fol. 182BD.

16. St. Thomas knew Avempace s doctrine through Averroes, who refers to it in his Commentary on the *De Anima, loc. cit,* fol. 182DE

dities of sensible things adequately reveal immaterial quiddities. But as the Commentator says,[17] this is clearly false, since quiddity in a way is predicated of both in an equivocal sense.

Reply to obj. 1. Boethius does not intend to say that through the science of theology we can contemplate the essence of the Divine Form itself, but only that it transcends all images.

Reply to obj. 2. Some things are knowable to us through themselves; and in bringing such things to light the speculative sciences use their definitions to demonstrate their properties, as happens in the sciences which demonstrate *propter quid.*™ There are other things which are not knowable to us through themselves but through their effects. And if indeed the effect is adequate to the cause, we take the quiddity itself of the effect as our starting point to prove that the cause exists and to investigate its quiddity, from which in turn its properties are made evident. But if the effect is not adequate to the cause, then we take the effect only as the starting point to prove the existence of the cause and some of its conditions, although the quiddity of the cause is always unknown. And this is what happens in the case of the separate substances.

Reply to obj. 3. Man's happiness is twofold: One is the imperfect happiness found in this life, of which the Philosopher speaks, and this consists in contemplating the separate substances through the habit of wisdom. But this contemplation is imperfect and such as is possible in our present life, not so as to know the quiddity of the separate substances. The other is the perfect happiness of Heaven where we will see God Himself through His essence as well as the ocher separate substances. But this happiness does not come through any speculative science, but through the light of glory.

Reply to obj. 4. As we have said, the speculative sciences are directed to an imperfect knowledge of separate substances.

Reply to obj. 3. We are endowed with principles which

17. Averroes, *ibid.* Essence or quiddity is predicated quasi *aequivoce of* God and creatures, that is, analogically See above, Q. 6, a. 3, p. 69, and note 16.

18. See above. Q. 5, a. 1, note 47.

enable us to prepare for that perfect knowledge of separate substances but not with principles with which to reach it. For even though by his nature man is *inclined to his ultimate end, still he cannot* reach *it by nature* but *only by* grace, and this owing *to the loftiness of* that end.[19]

19. See *Summa Theologiae, i.n, 5, 5, Reply to* obj. 1; *De Veritate 22,* 7.

APPENDIX I

The Division of the Sciences in St. Thomas' Commentary on the Ethics.[1]

As the Philosopher says in the beginning of the *Metaphysics,*[2] it belongs to the wise man to order. This is because wisdom is the highest perfection of reason, whose business it is to know order. For although the sensitive powers know some things absolutely, it belongs to the intellect or reason alone to know the order of one thing to another.

Now there is a twofold order in things. One is the order of the parts of some whole or some multitude to each other, as for example the parts of a house are ordered among them* selves. The other is the order of things to an end. And this order is more primary than the first; for, as the Philosopher says in the *Metaphysics*[2] the order of the parts of an army among themselves exists by virtue of the order of the whole army to its leader.

Furthermore, order is related to reason in a fourfold way. For there is a certain order which reason does not make but simply contemplates, as for example the order of things in nature. There is another order which reason by its consideration produces in its own act; for instance when it orders its concepts to one another and the signs of its concepts, for they are meaningful sounds. Thirdly, there is the order which reason by its consideration produces in the operations of the will And fourthly, there is the order which reason by its consideration produces in external things which it causes, as in the case of a box or a house.

Now because reason's act of consideration is perfected through habit, there are diverse sciences corresponding to the

L *In I Eth.* lect 1, ed. Pirotta. nn. 1-2.

2. Aristotle, *Metaphysics* I, 2, 982al8.

3. Aristotle, *op. eit.* XII, 10, 1075al4-16.

diverse orders which it is the task *of* reason to consider. The *philosophy of nature* is concerned with the order of things which human reason beholds but does not make, so that <thus understood> we include even metaphysics under the philosophy of nature. The order which reason by its act of consideration produces in its own act pertains to *rational philosophy, which is concerned with the order of the* parts of discourse to each other and the order of principles among themselves and to conclusions. The order of voluntary actions belongs to the consideration of *moral philosophy.* And the order which reason by its act of consideration produces in external things, made through human reason, pertains to the *mechanical arts.*

APPENDIX II

Metaphysics as a Science: St. Thomas' Introduction to bis Commentary on the Metaphysics.[1]

As the Philosopher teaches in his *Politics,- when any multitude of things is ordained to one* end, one of them must be director or ruler and the rest *directed or ruled. This is evident in the* union of soul and body, for the soul naturally commands and the body obeys. The same is also true among the powers of the soul, for according to the natural *order the irascible and concupiscible powers* are ruled by reason.

Now all the sciences and arts are ordained *to one end,* namely to the perfection of man, which is his happiness. *So it follows that one of them must be the ruler of* all the rest; *and this science rightly claims the* name of *wisdom, for it belongs to the wise man to order others.*

Furthermore, if we *carefully examine how someone is suited to rule, we can know which science this is and the sort of objects it studies. For just as men of strong intellect are naturally* rulers and masters of others while those *robust in*

1. *In Meta.* Prooemium, *ed. Cathala-Spiazzi,* pp. 1-2.
2. Aristotle, *Politics* 1, 5, *1254130.*

body and weak in intellect are naturally subjects, as the Philosopher remarks in the abovementioned work,[3] so the science which is most intellectual should be naturally the ruler of the others; and this is the science which investigates the most intelligible things.

Now we can understand "the most intelligible things" in three ways. First, from the order of understanding; for that seems to be more intelligible from which the intellect derives its certitude. Whence, since the intellect acquires certitude of science from causes, the knowledge of causes seems to be most intellectual. It also follows that the science which considers first causes seems to be the supreme director of the others.

Secondly, "the most intelligible things" can be understood from a comparison of intellect to sense. For since the sense knows the particular, the intellect seems to differ from it in that *it* comprehends the universal. Whence it also follows that that science is most intellectual which concerns the most universal principles. Now these are being and the consequent attributes of being, such as *one* and *many, potency* and *act.* Principles of this sort should not remain entirely unknown, since without them it is impossible to have a complete knowledge of what is proper to any genus or species. Furthermore, they should not be studied in some one particular science, for since they are required for a knowledge of every genus of things, with equal reason they would be investigated in every particular science. We conclude that principles of this sort are studied in one universal science which, since it is most intellectual, is director of the others.

Thirdly, "the most intelligible things" can be understood from the knowledge itself of the intellect. For since anything has the power of intellect because it is free from matter, those things must be most intelligible which are most separated from matter. For the intelligible and the intellect must be proportionate and belong to one genus, since the intellect and the intelligible are one in act. Now those things are most

3. *Loc. cit.,* 1254bl5ff.

separated from matter which abstract not only from signate matter, such as natural forms understood universally, which are the objects of natural science, but entirely from sensible matter, and not only in thought, like mathematicals, but also in existence, such as God and the separated intelligences. Consequently, the science inquiring into these things seems to be most intellectual and the director or mistress of the rest.

Now this threefold consideration is not to be attributed to different sciences but to one. For the abovementioned separated substances are the universal and primary causes of being. What is more, it belongs to the same science to investigate the proper causes of any genus and the genus itself, as for example natural philosophy investigates the principles of natural body. So it must belong to the same science to investigate the separated substances and being-in-general *(ens commune),* which is the genus[4] of which the abovementioned substances are the common and universal causes.

Furthermore, it is evident from what has been said that although this science is concerned with the three objects mentioned, nevertheless it does not concern each of them as its subject, but only being-in-general. For the subject in a science is that whose causes and attributes we investigate, but not the causes themselves of any genus under inquiry. For the knowledge of the causes of any genus is the end attained by the inquiry of the science. However, even though the subject of this science is being-in-general, the whole science is said to concern what is separate from matter both in existence and in thought. For not only are those things called separate in existence and thought which can never exist in matter, like God and the intellectual substances, but also those which can be without matter, such as being-in-general. This, however, would not be possible if they depended on matter for their existence.

4. Being is not a genus in the strict sense of the term. (See *In III Meta.* lect. 8. n. 433). It is here called a genus because it is the subject of metaphysics and hence analogous to the subject-genera of the other sciences. For the subject-genus of a science, see *In I Post Anal* lect. 15, nn. 3-4.

This science, then, is given three names corresponding to the above three considerations which reveal its perfection. It is called *divine science* or *theology* inasmuch as it investigates the abovementioned substances. It is called *metaphysics* as inquiring into being and the consequent attributes of being, for by way of analysis these are come upon after physics, as the more universal after the less universal. It is also called *first philosophy* inasmuch as it inquires into the first causes of things.

We have now clarified the subject of this science, its relation to the other sciences, and its name.

APPENDIX III

The Order of Learning the Sciences

1. As the Philosopher says in the *Ethics'* the highest felicity of man consists in the best activity of man belonging to his highest power (that is, the intellect), in relation to the most intelligible object. Further, since an effect is known through its cause, it is clear that a cause is in its nature more intelligible than an effect, although *to us* effects are at times more known than causes, because our knowledge of universal and intelligible causes has been gathered by us from the particular things which fall under the sense. Absolutely speaking, therefore, the first causes of things must be in themselves the highest and most intelligible objects, since they are the highest beings and the highest truths, being for other things the cause of their essence and truth, as the Philosopher makes clear in the *Metaphysics.'* It remains, however, that such primary causes are less well known and subsequently known as far as we are concerned. For our intellect stands to them as the eye of an owl to the light of the sun, which, owing to its excessive clarity, cannot be perfectly perceived.

It is proper, therefore, that the highest felicity that man

L Aristotle, *Nicomachean Ethics* X, 7, 1177al9-22.
2. Aristotle, *Metaphysics* II, 1, 993E23-26.

ran obtain in this life should consist in the contemplation of the first causes; for the little that can be known about them is more lovable and noble than everything that can be known about lesser things, as is clear from the Philosopher in the *De Partibus Animalium?* And it is through the completion of this knowledge[4] in us after the present life that man is made perfectly happy, according to the words of the Gospel: *This is eternal life, that they may know thee, the only true God?*

So it is that the philosophers aimed principally at this, that through whatever they considered in things they might arrive at the knowledge of the first causes. That is why they placed the science concerned with first causes last, and allotted the last part of their lives to its consideration. For they began first of all with logic, which teaches the method of the sciences. Secondly, they went on to mathematics, which even boys are capable of learning. Thirdly, they took up the philosophy of nature, which, because of <the needed> experience, requires time. Fourthly, they turned to moral philosophy, of which a young person cannot be a suitable student. And finally they applied themselves to divine science, whose object is the first causes of things.

St. Thomas, *In Librum de Causis,* lect. 1, ed. Mandonnet, *Opuscula Omnia* I, p. 195.

2. Aristotle raises the question why a boy can become a mathematician but cannot become wise, or in other words a metaphysician or physicist (that is, a philosopher of nature). His reply to this is that mathematics are known through abstraction from sensible things, which are the objects of experience, and as a result a great length of time is not required to know mathematics. But natural principles, which are not abstracted from sensible things, are known through experience, for which a long length of time is required.

3. Aristotle, De Partibus Animalium. I, 5. &44b31-35.

4. Following the reading of manuscripts, Paris, Bibl Nat. Lat 16102 fol. !«■"> and 16,103, fob 174«.

5. St. John 17, 3.

As far as wisdom is concerned, he adds that young persons do not believe (that is, do not understand with their mind) the objects of wisdom (that is, metaphysics), although they may speak them with their lips. But with regard to mathematicals, their essences are not hidden from them, because the definitions of mathematicals concern things which are imaginable, whereas the objects of metaphysics are purely intelligible. Now young persons can easily grasp what falls under the imagination. But they cannot understand with their mind what transcends sense and imagination, because their intellects are not trained to such considerations owing both to the shortness of their life and the many changes of their nature.

Consequently, the fitting order of learning will be the following: First, boys should be instructed in logic, because logic teaches the method of the whole of philosophy. Secondly, they are to be instructed in mathematics, which do not require experience and do not transcend the imagination. Thirdly, they should learn the natural sciences, which, although not transcending sense and imagination, nevertheless require experience. Fourthly, they are to be instructed in the moral sciences, which require experience and a soul free from passions, as is said in the first book? Fifthly, they are to learn metaphysics and divine science, which transcend the imagination and demand a robust intellect.

St. Thomas, *In VI Etb.* lect. 7, ed. Pirotta, nn. 1209-1211.

1 Aristotle, *Nicomachean Ethics* I. 3, 1095a2-lL