

The Science of Logic
**A Course in the Formal and Material Principles
of Right Reason**

Prologue: What is Philosophy?

The Nature of Philosophy

According to Common Opinion

What is Philosophy? Is it a science? Is it a kind of poetry? Is it just a lower form of Theology? Surveying the various opinions about the nature of Philosophy reveals a term so widely abused that one is tempted to think that there is no such thing as Philosophy; that it is a myth as culturally specific as the boogeyman, occasionally popping out of dusty old closets to scare scientists and college freshmen. The special sciences today have so far rolled back the fog of the knowable universe that anyone who wants to breath the clear air of knowledge is told to take up instruments and measure something, while Philosophy is respectfully escorted to the deepest, darkest corners of your local cafe-bookstore—to be stumbled upon whenever political commentators go thumbing for useless rhetoric. When we think of philosophers we think of tussled hair, tweed jackets, and pipe smoke. But this is an image which, though eerily autobiographical, I must insist is a stereotype. Philosophy is not only scientific, it is the perfection of all sciences. And the philosopher is not only a crazy old windbag, he's the craziest of old windbags. But ridiculously well worth listening to.

According to Many Laymen

Most people outside the academic community use the term 'philosophy' to mean any sort of clever maxim, usually suggesting a rule for making decisions. Thus, someone will say, "well, *my* philosophy is seize the day." Which really just means, "I've decided that whenever I doubt the prudence of an action I will take the course which is more pleasurable and worry about the consequences later." Is this sort of axiomatic nonsense all that we mean by Philosophy? Go to any corporate website and you'll see something similar—it's usually on a page titled 'Our Philosophy'. But again all we really find on the 'Our Philosophy' page is a list of nice sounding words; words that potential customers would really like honestly to use if they ever had to describe their experience of this company to someone else: 'loyal', 'friendly', 'excellence', 'focus', 'commitment', 'innovation'. Potential customers then feel good about these words and decide to do business. Philosophy for the layman has become a catchall word for nonsensical drivel. But at least they respect it.

According to Many Scientists

Scientists, on the other hand, generally have a much lower opinion of Philosophy. Devoted to observation and experiment, most scientists view philosophy as dealing with the diametrical opposite of what they perceive to be true knowledge. They think Philosophy concerns things that cannot be observed, cannot be controlled, cannot be measured and tested. In other words, Philosophy has absolutely nothing to do with science. Even if it is considered to be a legitimate area of study, it most certainly is not science. We'll learn presently that the reason Philosophy is

thought to be totally separated from modern science is because the whole of Philosophy has come to be identified with what is in reality only a part: namely, Metaphysics.

According to Many Philosophers

Philosophers are perhaps the worst people to ask if you ever want to know what Philosophy is. They cannot seem to distinguish between Philosophy and History. Philosophers today seem so utterly unsure that there is any true opinion that when you take a Philosophy course at most universities, you will be learning in fact the history of Philosophy. You will learn what Kant thought, or what Hegel thought, or what Plato thought, etc. etc. The one thing that you will not learn is whether or not any of these philosophers was right. You will be asked on every exam, “What did Kierkegaard think about such-and-such?”, and you will be expected to quote book and chapter to prove that this is indeed what Kierkegaard thought. But you will not be asked (neither may you ask) “was it true?”

Unfortunately, most so-called Thomistic Philosophy programs are no exception. They do not teach Thomism, they teach the biography of St. Thomas. And the ultimate test for whether or not something is ‘true’ is whether or not you can find a quote somewhere in St. Thomas’s works that *says* it is true.

So in academia, you’ve got the science department which thinks that Philosophy is too abstract and aloof to be scientific, and you’ve got the Philosophy department which thinks that Philosophy is too subjective to be certain; we can’t really know for sure, so we must just be tolerant.

For my part, when I use the word ‘Philosophy’ I have a very strict meaning. And it is the traditional meaning used by the Greeks and accepted by the Scholastics. It is neither a mystical thesaurus of questionable maxims, nor the transcendental antithesis to scientific inquiry, nor history. But enough of what it isn’t, let’s take a look at what it is.

According to the Scholastics

Whenever we undertake to study something, we really ought to know at least in general way what that thing was; no one would ever set out to study the parts of a cleome unless he knew, at least in the vaguest fashion, what on earth a cleome was—if you can’t point to a cleome, I don’t know how you expect to study it. Hence, it makes sense that before we go on to study Logic, which is a part of Philosophy, we outline at least in a general way what Philosophy itself is. And to know what a thing is, is to know its nature or essence, even if only in its most general characteristics—even if I only know that a cleome is that plant out in my garden with pink and lavender petals and long, spindly arms, I at least know something about its nature, albeit imperfectly.

Now, one of the things we’ll learn in Logic is ‘definition’. And one of the things that we’ll learn about definition is that there are two types: nominal definition and real definition. Nominal definition does nothing more than single something out for us: a cleome, for example, may be

defined as that plant out in my garden with such-and-such features. Again, a nominal definition of a square might be ‘the shape of that building’s face over there’. A real definition, as we’ll learn, gives us some insight into the real nature of the thing; so a real definition of a square would be a quantity terminating in four sides of equal length, or something of the sort. So a real definition, properly done, gives us the nature of a thing by separating that thing from all others. Therefore, to give you insight into the nature of philosophy we’ll look at its definition; first, its nominal definition, then its real definition.

Some writers don’t believe that we should treat of the definition of philosophy at the beginning of philosophical studies. They hold, instead, that the definition of philosophy comes at the very end of our studies; as kind of a corollary to *Metaphysics*. They would argue that, for example, a real definition of ‘man’ cannot be given until you’ve studied man and his properties and can conclude to his real nature (his nature being, as I said, enshrined in the real definition). There is some truth to this, but we need to make a distinction. In the order of human discovery, yes, naturally the understanding of what man is and, in our present case, what philosophy is won’t properly be a proven conclusion until all of its parts are distinguished and examined; but for the purposes of pedagogy, i.e., for the purposes of teaching new students, once we have the real definition it is better to share it with them at the outset to give them an idea of where their knowledge of the subject will be taking them—it’s an aid and a courtesy to the students. The rest of their studies, then, will be a continuing proof of this definition. Besides, it seems a little ridiculous to have students talking about philosophy for years before anyone ever tells them what philosophy is.

The Nominal Definition

So let’s start with the nominal definition and try to point out (from its name and etymologically) what the Scholastics hold philosophy to be.

The name ‘philosophy’, as is often pointed out, comes from the Greek, and it means ‘love of wisdom’, or ‘philos’ (love) ‘sophia’ (wisdom). According to Cicero, it was supposedly Pythagoras (the well known philosopher of mathematics) who first coined the term in response to his being called a ‘wiseman’. Pythagoras pointed out (so Diogenes tells us) that only God is truly wise, whereas a person such as was he could only ever hope to be called a ‘lover of wisdom’. Well, the name stuck. And philosophy came to mean the search for wisdom itself, but only insofar as this wisdom is accessible to rational human nature. That is, knowledge of reality insofar as man can attain by long, laborious, processes of observation, induction, and deduction; philosophy is imperfect wisdom always in pursuit of perfect wisdom. Or in other words, philosophy came to mean knowledge tending toward a comprehensive grasp of all reality. “For while the ancients who pursued the study of wisdom were called sophists, i.e., wise men, Pythagoras, when asked what he professed himself to be, refused to call himself a wise man as his predecessors had done, because he thought this was presumptuous, but called himself a philosopher, i.e., a lover of wisdom. And from that time the name “wise man” was changed to “philosopher,” and “wisdom” to “philosophy.” This name also contributes something to the point under discussion, for that man seems to be a lover of wisdom who seeks wisdom, not for some

other reason, but for itself alone. For he who seeks one thing on account of something else, has greater love for that on whose account he seeks than for that which he seeks.”¹ So it was that philosophy used to mean *the entirety of human intellectual pursuits, always tending to a unifying vision of reality which is called ‘wisdom’*.

Already, here with this first nominal definition we can see a huge divergence between what philosophy use to mean (i.e., all human knowledge as tending toward a complete understanding of reality) and the very miniscule role that philosophy is given today (i.e., empty maxims which cannot be verified by observation or experiment).

The Real Definition

How, then, are we really to define philosophy according to this older view? The most common way to define it is by saying that philosophy is the knowledge of all things through their first or highest causes. A noted philosopher by the name of Jacques Maritain has this to say in his celebrated ‘An Introduction to Philosophy’: “Philosophy is the science which by the natural light of reason studies the first causes or highest principles of all things—is, in other words, the science of things in their first causes, insofar as these belong to the natural order.” And more often than not, this definition is given by most modern philosophers who claim to subscribe to the traditional view.

However, there is a huge problem with this definition: it identifies ALL of philosophy with what is but a single BRANCH of philosophy, namely, Metaphysics. Maritain knew that he was doing this, and he was explicit about it: “we shall take philosophy to mean philosophy *par excellence*, the first philosophy or Metaphysics.” But how does he know that Metaphysics is philosophy *par excellence* until he can give a basic definition of philosophy in general? So he shirked the whole responsibility of giving an adequate definition of philosophy in general, and as a consequence an entire generation of Thomistic philosophers identified philosophy with Metaphysics.

Furthermore, this definition entirely contradicts the nominal definition that had been accepted by everyone since the time of the ancient Greeks. To possess Metaphysics, you see, *is* to be a wise man because it orders everything in light of their first and ultimate causes, as we’ll learn at the end of this course. But the older understanding encompassed not only the actual possession of human wisdom, but also all those other fields of study which are directed toward that wisdom as their final goal. The common understanding today would entirely separate modern ‘sciences’ from philosophical investigation except insofar as the conclusions of Metaphysics could be applied to them.

Finally, this definition would go further than just identifying all the branches of philosophy with Metaphysics, but it would also reduce all the branches of Metaphysics to the study of Natural Theology; because Natural Theology studies the First and Highest Cause of all beings. Because of this view, Thomistic Philosophy has today been completely divorced from any science which does not make explicit reference to God. Thus, the Thomistic philosopher Etienne Gilson held

¹ In I Meta., lect. 3, n. 56.

that all Philosophy is necessarily subordinate to Supernatural Theology, and all philosophic investigations must be studied in light of revealed principles. Well, since there's precious little way that modern science can be directly studied in relation to revealed principles, Philosophy for modern Thomists has very little to do—if not nothing—with empiriological sciences (i.e., sciences of experimentation).

So what then is the real definition of Philosophy? Well, according to the older view (and this is the sense in which 'Philosophy' will be used in this book) Philosophy refers to all possible reasoned knowledge put in order and directed to a complete, comprehensive grasp of reality. Hence, the real definition of such knowledge would be along the lines of this: Philosophy is the *synthesis, or complex, of all sciences which deal with beings knowable by human reason.*

Let's look at each part of this definition to help you understand it.

Philosophy is a *synthesis, or complex, of sciences.* Sciences are processes of reasoning which lead to true and certain conclusions from true and certain principles. Now, philosophy is not one particular science, but it is a whole which has particular sciences as its part. There are other complexes of science which are similar to this: math, for example, is not a single science, but it is a term for a collection of sciences contains underneath itself, namely, arithmetic (along with its kindred studies) and geometry (along with its kindred studies)². Natural science, to give another example, is a single name which refers to all the sciences dealing with the natural order, and these sciences are its parts. So what 'math' is to the various mathematical sciences, Philosophy is to *every science possible to the unaided human mind.* It is a synthesis or complex or structure or system or totality or network of all the particular sciences as properly ordered amongst themselves. And so to be a philosopher as compared with being, say, a molecular biologist, is like being the captain of the ship as opposed to being, say, the guy down in the boiler-room. It is the captain who knows where everyone on the ship should be (and why), and it is the captain who knows where the ship is going. It is the philosopher who knows how all the sciences should fit together and to what end they are ordered. Now, knowing how one science is related to another is properly the work of the logician, as we shall see. Hence, philosophers must first, foremost, and forever be logicians. That is why Logic is of the utmost importance.

So Philosophy is not formally distinct from science. In fact, philosophy is the sum of all the sciences insofar as these sciences are properly ordered and subordinated amongst themselves. So when we speak of Philosophy, we are speaking of science. But note that Philosophy is not itself a science. In other words, the particular sciences, such as physics, math, metaphysics, ethics, etc. are not simply parts of a larger science which is called 'philosophy'. No, each one is a distinct science; Philosophy is the ordering of these sciences one to the other in a great logical structure, conglomeration, or synthesis. But we'll get deeper into this later.

Philosophy *deals with all beings.* Now, a being is anything which does exist or can exist; and existence is either outside the mind, or inside the mind only (so, for example, a horse with a long

² That real mathematics is divided ONLY into arithmetic and geometry is something we will learn towards the end of this course in Logic.

spiral horn on its head could possibly exist outside the mind, while, say, ‘-3’ can only ever exist in the mind). So philosophy is concerned with every actual and possible being, whether it is a ‘real being’ or simply a ‘being of the reason.’ And it deals with these beings not only in their highest or ultimate causes (as the other definition insists) but also in their lower and proximate causes. Hence, the other definition (i.e., the science of things in their first causes) is formally included in what we understand to be Philosophy.

Philosophy *deals with all beings knowable by reason*. That’s not to say ‘all beings that can be reasonably or rationally investigated’, but rather all beings that can be discovered and examined by unaided reason. In this way, Philosophy is distinguished from Supernatural Theology which takes its principles from truths which are inaccessible to human reason. So for example, that God exists is something knowable by unaided reason, as you’ll discover when you advance in your courses. But the inner life of God (that God is Triune, for example) is not a truth that can be discovered by reason acting alone. Nevertheless, once Divine truth is revealed, we can certainly reason about that subject.

Perhaps now would be a good time to explore further the relationship between Philosophy and Sacred Theology, which is—as a conclusion to all we’ve said up to this point—really the distinction between rational human science and Sacred Theology. Perhaps no one so well summarized the distinction between the two as did the eminent Cardinal Mercier, a greatly esteemed Thomistic scientist (though often wrongheaded and certainly not infallible)³ of the late 1800’s. I quote him liberally:

“In the eyes of theologians philosophy is regarded as ‘natural’, in this sense that it deals with an order of knowledge to which man can attain by the light of unaided reason and is opposed to that order of knowledge which, because it surpasses the power and needs of created nature, is called ‘supernatural’. The latter order of knowledge deals with the truths proposed to our faith by divine revelation and the profound study of this concerns not the philosopher but the Christian theologian. Yet that there is a certain connexion between human sciences and revealed truths we may see from the fact that both these natural and supernatural truths spheres of knowledge meet in the mind of the Christian scientist or philosopher.

“It is important to determine the relations between them.

“1) Philosophy, and hence science, is a study formally independent of all authority. Indeed, for the constitution of a science two things are essential: that it have certain principles and the means of drawing such conclusions from these principles as are contained by them in germ. All sciences have their own principles and distinctive methods. They deduce their principles from the analysis of a given subject-matter, which so analyzed discloses the existence of various relations; the simplest and most general of these furnish the formative principles of our

³ Though I will, indeed, often be citing His Excellency in this work because of his profound attempts to reunify philosophy and science, I would like it to be understood that I do not endorse his work in its entirety. In fact, quite often he missed the mark so widely that it’s laughable to read him. For example, he believed that Logic, which teaches the method of procedure in the sciences, should actually be studied AFTER Metaphysics, which is the culmination of all scientific investigation.

knowledge. The mind recognizes these relations with certitude because they furnish their own evidence. When the combination of these simple relations leads the mind to more complex conclusions, it is precisely the evidence of the connexion between the latter set and the former that is the sole motive which induces the reason to assent to the results obtained by demonstration. Hence, the essential elements of science—principles, conclusions and the certainty of the evidence between them—are independent of all Church authority.

“This general argument is confirmed by the fact that science and philosophy existed before the foundation of the Church, and the Author of Christianity came not to destroy the natural endowment of man but to enrich it with better gifts. Moreover, when in the first half of the last century De Bonald and La Mennais sought to oblige the human reason to receive its first principles and its primary motives of certitude from revealed teaching, Gregory XVI, far from accepting this dutiful subjection offered to the Church, publicly reprovved and condemned the mistaken loyalty of its authors.

“2) Are we to conclude that the Christian scientist and philosopher may show a complete disregard of the teachings of revelation? Certainly not, for the Church has received from God the deposit of revealed truths and it is her mission to it intact. Thus when in the name of science or philosophy the imprudent or the rash advance theories which contradict the teachings of revelation, the Church cautions those who trust to her for guidance, and denounces the error the acceptance of which would run counter to the belief in divine revelation. Her guardianship is thus negative and she herself does not *positively* teach either science or philosophy. She leaves entire liberty to those who study them, and history and individual experience testify to her zeal in encouraging them. She uses no voice of authority in such matters; men are left to their own reflection and research; her only authoritative mission is teach the dogmas of revelation. But such being her mission she cannot allow, still less approve, anything that may be detrimental to the divine teaching. As long as scientists and philosophers do not put themselves in opposition to what she knows to be revealed by God, and in consequence most certainly true, she respects the freedom of human learning; but when any one puts forward as science what is only mistaken conjecture, she calls for a revision of such hasty conclusions, and thus shows herself the helpmate of the human reason by her assistance in disclosing to it its errors.

“In short philosophy and the sciences are autonomous in this sense that in their case the supreme motive of certitude is the intrinsic evidence of the object they study, whereas in matters of faith the ultimate motive of belief is the authority of God, the author of supernatural revelation. Revelation is not a motive of assent, a direct source of knowledge for the scientist and the philosopher, but rather a safeguard and a *negative* standard. The Christian philosopher from the moment that he undertakes his investigations has full liberty of interrogating nature or his own consciousness and of following the direction of his reason. But if it should happen that he finds his conclusions at variance with revealed truth as proposed to his belief by legitimate authority, he is bound alike in the interest of faith and of scientific truth to trace back his inquiries until his difficulties find a solution in accord with the teachings with which at first sight they seemed to conflict. Divine truth cannot be erroneous; whatever is a certain contradiction of a dogma certainly revealed cannot but be error and to repudiate error is surely an act of reason.

“3) But, it may be asked, if the case should arise of an evident contradiction between faith and reason, must we abdicate the rights of reason? We who are believers do not admit the possibility of such a contradiction. To answer the unbeliever, we must make an appeal to experience. Can he bring a proof, even a single proof, of a manifest contradiction between an evident truth of reason and a dogma of the Church? We confidently assert that there never has been found a manifest conflict between a dogma and a certain conclusion of science. Where discrepancies have arisen and doubts have been introduced they have always been the outcome of hasty observation, premature induction or ill-considered hypothesis, or, on the other side, of inaccurate definition of belief or the personal opinion of isolated theologians. When it is not immediately apparent wherein lies the explanation of a seeming disagreement between what is put forward as of faith and what is put forward as a scientific conclusion, the prudent and wise Catholic scientist will for the time suspend his judgment and await with confidence for the real truth to be brought to light.

“The Vatican Council sums up Catholic teaching concerning the relations of rational conclusions and revealed dogmas in these words: ‘Although faith is above reason there can never be a true discord between faith and reason; for the God Who reveals mysteries and bestows the gift of faith is He Who has also illuminated the human mind with the light of reason; but we cannot find contradiction in God and neither can truth be opposed to truth. If the vain appearance of such contradiction should arise, this is either because the dogmas of the faith have not been understood and expounded according to the mind of the Church or because arbitrary opinion has been mistaken for judgment founded on reason.’”⁴

So in the light of what has been said we can come to a number of conclusions. First, Philosophy (and therefore each and every human science) is formally distinguished from Sacred Theology because Theology proceeds under the light of revealed principles. Philosophy, on the other hand, proceeds from natural principles; i.e., from principles gathered from experience and known by reason.

Second, Philosophy is distinguished from faith and opinion. “Faith implies assent of the intellect to that which is believed. Now the intellect assents to a thing in two ways. First, through being moved to assent by its very object...Secondly the intellect assents to something, not through being sufficiently moved to this assent by its proper object, but through an act of choice, whereby it turns voluntarily to one side rather than to the other: and if this be accompanied by doubt or fear of the opposite side, there will be opinion, while, if there be certainty and no fear of the other side, there will be faith.

Now those things are said to be seen which, of themselves, move the intellect or the senses to knowledge of them. Wherefore it is evident that neither faith nor opinion can be of things seen either by the senses or by the intellect.”⁵

⁴ A Manual of Modern Scholastic Philosophy, Volume 1.

⁵ II-II, q. 1, a. 4, c.

In other words, sciences, as we'll explain towards the end of this course, ultimately force the mind to assent to their conclusions because the intrinsic evidence is so obvious that the mind has no choice but to assent, under pain of contradiction. It excludes any relation to the will. Faith and opinion, on the other hand, always include a reference to the will in some way or another. The evidence given by the object of faith and opinion may sway the mind to believe it or doubt it, but ultimately it is the will which chooses to believe one side of an argument or another.

So to sum up, "Philosophy, in its widest meaning, comprises every single science; for it is called a kind of 'love' 'or 'friendship of knowledge' for which reason human wisdom is called Philosophy by St. Thomas in his introduction to his commentary on the Ethics. And thus Philosophy is a generic knowledge comprising under itself every science which can be naturally acquired, especially the speculative sciences [i.e., sciences which study things that man does not create; we'll examine these later], the love of which is properly called the 'love of knowledge' because they are loved for the sake of knowing alone."⁶ This is what Scholastics mean when we use the term 'Philosophy'. Every science that man can study falls under it.

Now, when a thing by nature grows and develops, we understand it better by examining its natural tendencies. From its natural tendencies, we can reason to where it is trying to go. By studying the growth of a plant, say, for example, our old acquaintance the cleome, we can form an idea of what a perfect cleome should look like once all its growing is finished. Now, sciences develop in the intellect just as plants develop and grow in the soil. So to better understand Philosophy—and, most especially, to understand what perfect Philosophic Science should look like—let's examine how it is formed within the human mind and see if we can discover what it should look like when it is fully developed.

All animals have senses. However, some animals only have a few senses, while other animals have all the senses. An oyster, for example, has the sense of touch, which is a fundamental sense and is found in all animals; but it does not have memory. In fact, it doesn't need memory because it doesn't need to seek things out for its survival and nourishment. Other animals, though, do need to seek things out and make provisions for the future, as a squirrel needs to store its food for the winter. These animals are endowed with memory. And because they have memory they can acquire a certain habit of association which resembles learning. Thus, an animal who has been shocked a number of times by an electrical fence will associate a certain visual object (namely, the fence) with an unpleasant sensation; and since natural desires compel the animal to flee what is unpleasant and seek out what is pleasant, it will avoid what resembles its past unpleasant experience.

Man, however, can go far beyond this association. From a number of catalogued experiences in his memory and imagination, man can abstract universal notions. While the animal sees the fence and feels the pain, man can abstract the notion of 'fence', of 'pain', of 'electricity' of 'causality' (e.g., the electricity in the fence CAUSED my pain). Man can understand universal

⁶ John of St. Thomas, *Cursus Philosophicus Thomisticus*, Vol. 2

notions, while animals understand only the particular things of sense. This understanding of universal notions is the distinctive feature of the intellect.

But even beyond merely understanding these universal ideas (e.g., the ideas of ‘electricity’ and ‘pain’), man can induce propositions from his many experiences (e.g., ‘electricity can cause pain’). And then from these propositions, man can arrive at new knowledge which is potentially contained in the old (e.g., ‘What has electricity running through it can cause pain; but this fence has electricity running through it; therefore, this fence can cause pain’). This is the process of reasoning which is distinctive to man.

Now when an object is presented to man, he cannot grasp everything about it at in a single glance. Instead, he examines various noticeable features of the thing one by one. When the mind sees a certain rock, for example, it doesn’t know everything about that rock but must content itself with examining its attributes singly. It looks at its color, its hardness, its weight, perhaps even its ability to conduct electricity. Each of these attributes goes to making up man’s idea of this particular kind of rock; these various intelligible objects we are going to call ‘notes’ throughout this course. Each of these notes is abstracted from the rock which is sensed, and each note is separated from all the others so that the mind can examine them. But if they were kept separated one from the other, then the mind wouldn’t have knowledge of reality; after all, these notes don’t exist separately (they are combined in the rock), they are only considered separately by the mind. So the mind, in order to know reality, must unite all these various notes which it has grasp into a single concept: namely, the concept of the rock. So the mind first distinguishes, then unites. All the notes that make up the concept of the rock (that is, all of the notes taken together) constitute what we will call our comprehension of the rock (from ‘cum-prehendere’ or ‘to grasp together’). We will discuss this thoroughly later on. The point to understand here is that by the simplest notions, we come to understand the most complex objects. And from these simple notions, we gradually build up our knowledge of real things.

Sciences come about when our will, by its power to control the other faculties of our body, turns our mind to one particular object and concentrates our thought on it. So, for example, concentrating our mind on the various notes of rocks and minerals, and gradually perfecting our comprehension of them, will give us geology. Concentrating on cataloguing the various properties of the cleome and other plants will give us botany. But no science of this sort can ever go beyond that proper object which it studies; the botanist will never become the geologist as long as his mind is directed to plants. The botanist, as a botanist, has only the most limited kind of knowledge of reality. But the mind does not rest in this. Everything, you see, is naturally inclined to its proper operation—heat is naturally inclined to diffuse itself, plants are naturally inclined to grow—and it will pursue that operation even when inhibited—e.g., you can’t stop a plant from *trying* to grow except by killing it. Now, the proper operations of the intellect is to understand reality. And as we said, understanding for the intellect is not simply knowing something in its various intelligible parts, but it is comprehending all those parts in a unified whole; its putting back together all the parts that is has separated. Even if the mind possessed a vast knowledge of all the various particular sciences, it wouldn’t rest until it put all those particular sciences into a unified and systematic whole; this is the mind’s natural tendency to find

a unified, comprehensive, systematized vision of all reality. This systematization is called Philosophy, and its tool is called Logic.

Now, science is not *simply* a cataloguing of the various attributes of objects and reality. That would only be preparatory to science. Science seeks the principles, causes, and reasons of what it observes. Since the mind necessarily grasps the notion of causality (as we'll learn later), it necessarily asks of everything, 'why?' And it asks this because in knowing that there must be a cause, while at the same time not knowing what that cause is, it knows that it doesn't have a unified vision; and as I said, the mind naturally seeks this unity. In other words, the mind naturally flees ignorance; but when it doesn't know a cause while knowing that there *is* indeed a cause, the mind knows itself to be ignorant.

We express causes very frequently. Every time we say 'because' we are leading the mind to a cause. Why is grass green? Because it contains chlorophyll. This doesn't seem very significant, but that's because we've yet to examine the power of what is called the 'syllogism' (one of the primary focuses of this course). This explanation of why grass is green actually contains an abbreviated syllogism. If we blow it up and make explicit the syllogism which is now only implicit, we get:

Everything which contains chlorophyll is green.
But grass is something containing chlorophyll.
Therefore, grass is green.

Hence, the notion of containing chlorophyll is the 'middle term', or the unifying idea by which 'greenness' is united to 'grass'. Chlorophyll is the principle of greenness in the grass; it is the cause of greenness in the grass, and it is the reason why the grass is green. The purpose of each science is to seek out these unifying terms in their own particular subject areas. That is, every science seeks out the principles, reasons, and causes of the subject it is studying.

Now, principles, reasons, and causes do not mean the same thing. 'Principle' is a very broad term that means only a beginning or rather that from which a thing proceeds in any way at all; so the kitchen is a principle of my motion into the living room because I started in the kitchen. Nevertheless, 'being in the kitchen' is not a *cause* of my being in the living room. A cause is something upon which another depends for its continuing existence or for its coming into existence. Thus, the movement of my legs is a cause of my moving into the living room. While it is true that every cause is at the same time a principle, it is not true that every principle is at the same time a cause. If a cause is removed, the effect is removed. If my legs don't move, neither do I. But the same is not necessarily true of a principle. Even if the kitchen were turned into, say, the dining room, my motion would remain what it is. Science must distinguish between what is truly a *cause* of a thing, from what is merely a *principle* or, in other words, from a phenomenon which just happens to occur first.

Now, when a cause is considered in relation to the mind, we call it a reason. The reason why the grass is green is the fact that it contains chlorophyll. The reason why a triangle has three interior angles equal to two right angles is because of the very nature of a three-sided plane figure, etc.

We won't be discussing causes again until we treat of reasoning processes much later on in this course. But I'd like to introduce you to the four chief kinds of causes right now so that we might forestall any future difficulties.

A cause, as I said, is a principle in virtue of which a being exists or comes into existence. A cause is the reason why a thing is what it is.

1) *The Formal Cause*: Think of a statue. Let's say a statue of Aristotle. Then ask yourself, what makes this statue to be a statue of Aristotle and not a statue of, say, Plato. You might answer that the statue of Aristotle is smarter (and I'd probably agree!), but that's beside the point. What makes this slab of clay to be Aristotle is that it has been shaped into the form of Aristotle and not the form of Plato, or Socrates, or anyone else. This principle by which the shapeless clay is made to be this or that thing and distinct from everything else we call the *formal cause*. Whenever this formal cause is altered, it becomes something different—e.g., it ceases to be Aristotle and becomes someone else. But notice that the clay itself has its own form independent of any other form superadded to it; e.g., independent of the form of Aristotle or Plato. In fact, the clay would be what it is (i.e., clay) even if it was never shaped into a statue. The form of statue is not necessary for clay to be what it is. Hence, we say that the form which is imposed on the clay is accidental to the nature of the clay: it is an *accidental form*. The clay itself is, however, not an accident of something else, but is a specific kind of thing which exists as a thing independently of another subject into which it is received; in other words, the clay is a substance. And the formal cause of the clay itself (i.e., its 'clayness', if you will) is what we call a *substantial form*. So the clay is a substance, and the form given to the clay is an accident. And for any given substance, there can be almost endless varieties of accidents; the clay can be Aristotle or Plato or Apollo or it can be white or red or hard or soft, etc. etc.

2) *The Material Cause*: The form of Aristotle does not exist by itself. It's not floating around somewhere and waiting for someone to shove it in the clay. It only exists when it is brought out of the clay by gradually molding the clay into the desired form. The clay itself is that *out of which* the statue of Aristotle is made, whereas the form of Aristotle is that *by which* the statue is this particular statue of the Philosopher. There is a real dependence of the form of Aristotle on the matter of the clay. If the clay starts to disintegrate, the form would disappear. Moreover, the matter (e.g., the clay) can receive many, many different forms, though not at the same time: it can be a statue of Aristotle at one moment, and then it is molded down and becomes a statue of Plato. So we have discovered *matter* which is that cause from which a thing is made since it exists in it. And have *form* which is the cause which determines and specifies the material cause.

Is that it? Nope. The clay can't give to itself the form. If it could, that would mean that the clay already has it (because you can't give something that you don't have) and hence the clay would both have the form and not have the form at the same time. So we need another cause.

3) *The Efficient Cause*. This would be the sculptor in our example. The efficient cause is the principle from which the motion that united the form to the matter (e.g., the form of Aristotle to the clay) first proceeded. Matter and form are never united except under the influence of an efficient cause (because the matter cannot give itself the form, as I said, and the form doesn't exist before it's united to the matter, as I said).

4) *The Final Cause*. The sculptor never acts without a reason. Maybe it was to make money, maybe it was for the sheer pleasure of sculpting, maybe it was just to do something rather than to do nothing! The reason that the sculptor sculpted is what we call the final cause. But we need to make a distinction here between the final cause of the worker and the final cause of the work. Let's take another example: scissors. The guy who makes scissors at the scissor factory has perhaps one goal in mind: to make a living. That is the final cause of his scissor making. But the scissors themselves also have a final cause: namely, to cut. Likewise, the statue of Aristotle has its own final cause: to be a good representation of Aristotle. Everything has a final cause, as you'll learn much later. What is the final cause of a cleome? To do all those things that a cleome is supposed naturally to do. For now, it's just important that you understand a final cause to be that for the sake of which a thing is or comes to be.

The material and formal causes are called *intrinsic* causes because as long as the statue exists, it will have matter arranged in some form. If the form disappears, it's no longer a statue, just a chunk of clay. And if the clay dissolves, the form of Aristotle goes with it. The efficient cause and the final cause, on the other hand, are called *extrinsic* causes. It's not always necessary that these two exist. Even if the cleome hasn't yet grown up to its full stature (part of its final cause), the cleome still exists. And even if the sculptor is long dead, the statue still remains.

To study all of these causes is the business of the sciences; each one focusing on the causes of its particular subject-matter. But sometimes, one scientific subject-matter will depend on another. For example, molecular biology will depend upon certain conclusions laid down by chemistry and general biology; in other words, the causes which the molecular biologist seeks are actually the subject matter of a higher area of study. Hence, molecular biology is an area of study which is necessarily placed under more general areas of study. And when the whole conglomerate of these sciences, the whole ordering of scientific subject matter, is placed and approached and studied in the proper order, we have Philosophy. For the Scholastic, there is no distinction between knowing philosophically and knowing scientifically. Philosophy is just a general name that refers to the general rational, orderly, scientific inquiry into the causes of reality. For the Scholastic, every scientist is a philosopher; it's just that most of them today happen to be bad philosophers.

The Historical Origin of Philosophy

So, how is it that Philosophy today has come to mean anything but a systematic scientific inquiry into reality? Well, we've already dealt with one of the underlying causes, although only in

passing: namely, the identification of Philosophy with only one branch of philosophical science, Metaphysics.

Now, we ought to bear in mind that a study of the history of Philosophy does not pertain to the philosopher properly speaking; rather, it pertains to the historian. In the same way, no one would fault a medical doctor for not knowing the old practice leeching. In fact, most of us might be grateful that he had never been trained in such things. Besides, history, as we'll learn in the course is a science only in the loosest sense of the term.

Nevertheless, seeing how Philosophy came to be regarded as a useless abstract will help us to avoid those opinions which lead to unhappy conclusion. So I'll present to you here a brief outline of the history of philosophic science with a special emphasis on why modern philosophy is, lamentably, modern philosophy.

Philosophy for the Greeks (six centuries before and six centuries after Christ)

The earliest Greek philosophers are also recognized as being the first scientists; this makes sense, of course, in the light of everything we've spoken of up until now. For them to be what we call today a scientist was to philosophize. Their chief concern was to investigate the causes of change in the external world and to discover what was the common element underlining the constant flux of reality. It was in this time period that the modern theory of atomic composition was first found in germ; pretty advanced stuff for lofty, head-in-the-cloud philosophers, indeed. There was no question that what they were studying was the reality that presented itself to our sensation, even if some of them ended up trying to deny that what they sensed was actually as things are. But little by little they started to inquire about things which were not so immediately evident to the senses; they began to wonder about celestial composition, phases of the moon, and in the end the entire arrangement of the universe as an ordered whole.

Generally this period of science is arranged in four periods: the Pre-Socratic (i.e., before Socrates), the Socratic (including Plato and Aristotle), the Post-Socratic until the rise of Neo-Platonism, and the Neo-Platonic.

The first question of the Ancient Greeks, as I said, was about the ultimate element from which the world is made; the 'material cause', to use the language to which you have now been introduced. Thales, who is recognized as the first scientist-philosopher, believed that the ultimate element was water; Anaximenes and Diogenes thought that it was air; Heraclitus thought that it was fire; Empedocles thought that it was fire, air, earth, and water (the infamous 'four elements' which were a precursor to modern elemental chemistry); Anaximander thought it was infinite matter; and Anaxagoras thought that a conglomeration of infinitesimally small particles made up of all different substances on Earth comprised all things, and were arranged in various patterns by an immaterial intelligence.

The question of the ultimate material cause (to use our own language) led to the question of change, or rather the constant succession of formal causes (again, to use our terms). Where did the statue in the clay come from? It couldn't have come from the statue, because then it would

have already been there and, hence, there would have been no change; but also it couldn't have come from nothing, because nothing comes from nothing. To solve this, Heraclitus taught that all things are in constant motion and there is no stable formal cause in the clay, or in anything else, for that matter. The Eleatic school, on the other hand, led by Zeno, Xenophanes, and Parmenides (to name a few), held that all change must be an illusion. And they went to very great lengths to show that all suppositions that things change leads to contradiction.

Now, while the first scientists were heavily debating the external world, a group of skeptical thinkers pointed out that the thinking subject, the person, was being ignored in their investigations. They were known as the Sophists, and they attempted to show that all inquiry into the physical world led to the destruction of knowledge; hence, we ought not even try to know truth from falsity, right from wrong. Chief among them were Protagoras and Gorgias.

In response to the scientific devastation wrought by the sophists, Socrates taught that proper grounding in concepts and scientific definitions was paramount. He returned to the scientific community determinate objects of investigation and he restored the dignity of the intellect. We have no works written by Socrates himself; instead, his teaching is relayed to us through his disciple, Plato.

Plato once again took up the question of change and stability in the observable world. But to solve it, he posited the existence of two different realities: one of sensible things which are in constant motion, and another a world of ideas which are stable and universal. All the things of sense are but mere participations in the eternal ideas. The human soul, Plato taught, existed before it was joined to the human body, and in this pre-corporeal state it contemplated the eternal ideas. All knowledge, then, of the sense world is but a remembering of what the soul saw in a previous type of existence.

The greatest disciple of Plato—and perhaps the most influential figure in all philosophic history—was Aristotle. He was a scientist beyond compare and he did more than any before him to synthesize all the scattered truths contained in the earlier philosophers. He devised the four causes (to which I have already introduced you), he formulated the notions of act and potency (about which you will read a great deal), and most importantly for our course in Logic, he was the first to systematize the acts of the intellect and deduce the rules for proper thinking and reasoning.

After the death of Aristotle, scientists directed much of their attention away from the external world and concentrated on moral philosophy. Leaving speculative science aside and focusing almost entirely on deriving rules of behavior, the four most recognizable schools of this time—the Peripatetic School, the Stoic School, the Epicurean School, and the platonic New Academy—eventually devolved into a new type of skepticism.

Next came the Neo-Platonic period which was to nearly bankrupt Greek science and profoundly influence the early Fathers of the Catholic Church. Focusing on religion and the spirituality of man, the Neo-Platonists admitted a kind of immediate communication between the human soul and the unfathomable, unknowable inner life of God. This interchange is brought about by

means of mystical intuitions and poetical ecstasies which defy the use of logic. There is an easily recognizable similarity between the neo-platonic movement and the modern existentialist revolt. Plotinus and Porphyry were two of the leading figures of this time.

Philosophy for the Church Fathers (from the time of Christ to the seventh century)

When the Fathers spoke on philosophic and scientific matters, it wasn't for the sake of science itself, but for the purpose of defending the dogmas of Faith and reconciling the apparent inconsistencies between pagan wisdom and revealed truth. Hence, most of their works in philosophy took over the prevailing neo-platonic doctrines in defense of Catholicism.

During the time of the Anti-Nicene Fathers we encounter the great apologists Justin Martyr, Irenaeus, Tertullian, Clement of Alexandria, and Origin. Among the Greek Fathers we find Athanasius, Basil, Gregory of Nyssa, John Chrysostom, and Cyril of Alexandria.

Saint Augustine was by far the most learned and prolific of all these Fathers. But he never approached systematic and scientific inquiries into reality. It is impossible to compare his works to those of the philosophic scientists before him or after him: theirs were systems, his was not. Augustine never left the domain of faith and utilized whatever philosophy was available to him for the purpose of apologetics.

Philosophy for the Medievals (from the seventh century to the fifteenth century)

Anyone who wishes to understand Medieval philosophy must understand several important distinctions. First, Medieval philosophy and Scholastic Philosophy are not the same things. While it is true that Scholastic Philosophy had its strongest impetus during the Medieval period, there were numerous other philosophical systems in both the East and West, all vying for the spotlight. Hence, a proper analysis of Medieval scientific systems must be divided into a study of Scholastic systems and a study of the opposing non-Scholastic systems.

Also, we must make a very clear distinction between Scholastic Philosophy and Scholastic Theology. It is one of the greatest historical injustices ever perpetrated that a philosophy proper to Medieval Scholasticism has been denied by modern scholars. The confusion stems from a misunderstanding about the subordinate role that philosophy takes in explaining the dogmas of Faith. But on this distinction between science and philosophy, I've already written at length above.

Scholastic Philosophy

There's little need to discuss Scholastic Philosophy much here, since all that you will be learning in this course is Scholastic Philosophy! But let me at least point out some of the causes which made this period especially fruitful in the domain of science. First, the works of the Greek philosophers—most importantly, those of Aristotle—were finally translated into Latin and diffused among scholars of the Western world. This was accompanied by the commentaries on Aristotle by the great Arabian scientists of the East. Among the most prominent were Alfarabi, Avicenna, and Averroes. The neo-platonic commentaries of Averroes would lead to one of the

most controverted (and condemned) philosophic positions of the era: Latin Averroism. The most dangerous theory put forward by the Latin Averroists (and a theory which was introduced by the Islamic Averroes himself) was that of the ‘two-fold truth’. According to this theory, what is true in Philosophy can be false in Theology, and what is true in Theology can be false in Philosophy. In other words, there can be a valid contradiction between Faith and science. Such an opinion was necessary for Averroes given the multifarious absurdities in the Islamic faith, but it was unacceptable for Christianity which held that it was the same God who created the universe as gave Divine Revelation; and there can be no contradiction in God. But this isn’t to say that the ‘two-fold truth’ was the only danger of this system. Latin Averroism also denied personal immortality, the creative act of God, the individuality of the human intellect, etc.

Besides the introduction of the Greek works and the Arabic commentaries, the development of the great European universities was perhaps the most important factor in Medieval philosophic development; many of these universities, such as the University of Paris, still exist today. Finally, the foundation and growth of the Mendicant Orders must be marked also among the great causes of Scholastic growth; first and foremost among these Orders is to be placed the Dominican Order with its heavy emphasis on knowledge and truth. Thomas Aquinas was a product of the Dominican Order.

Non-Scholastic Philosophy

Non-Scholastic philosophy was more prevalent than was pleasant in the Middle Ages. From the pantheist neo-Platonism of John Scotus Eriugena, Bernard of Tours, and David of Dinant to the Jewish, Persian, and Syrian philosophy of the East, to the Latin Averroism of Siger of Brabant, to the rationalism of Raymond Lully and many, many others, Scholasticism and its ideal of science was far from triumphant during this period. In fact, the proliferation of non-Scholastic and profoundly irrational systems of philosophy—systems which were manifestly false in light of the new experimental techniques being developed—were one of the greatest causes of the Enlightenment’s rejection of the old doctrines.

Philosophy During the Renaissance

The collapse of the Byzantine Empire, the revolt of the Protestants against the Catholic Church and the ideological rejection of her schools (including Scholasticism), and the resurrection of unadulterated Greek thought in all its rhetorical form was fatal for Scholastic science; Scholastic science which was, by its own fault, becoming corrupted and tedious. The Scholastics of this period were locked in endless dialectical debate about the most insignificant subjects, ever driving themselves from contact with new innovations. The universities became lazy and couldn’t compete with the rise of new schools. And the humanists perverted the Scholastic synthesis into a degraded and eclectic Platonic-Aristotelianism. That’s not to say that there weren’t bright spots. Indeed, proper Scholasticism was still growing, though at an impeded rate, in France, Portugal, and Italy. In fact, some of the greatest Scholastic Thomists were to be found during this period: Ferrariensis, Cardinal Cajetan, Francis of Vittoria, Melchior Cano, Banez, and the inimitable John of St. Thomas.

Philosophy for the Early Moderns

As decadent Scholasticism and neo-Platonic humanism took center stage, declaring themselves to be ‘Philosophy’, it’s no wonder that in the time of Descartes and Francis Bacon we begin to see the first real wedge being driven between science and philosophy. Philosophy was being identified with the abstract and unattainable, the rhetorical and poetical, the lofty and intangible; while science, utilizing new techniques in induction and controlled experimentation, was holding itself to the ideal that we can only be certain of things which can be directly observed by the senses. Playing into the trap, philosophers came to equate all of their speculations with Metaphysics, such that by the time of Christian Wolff, philosophers were regarding all philosophy as a contraction or I should say and application of Metaphysics to some particular subject-matter.

But it wasn’t until Kant came along that the divorce of Philosophy from science was inevitable. In his Critique of Pure Reason, Kant played on popular sentiment and explicitly identified non-experimental science with Metaphysics; and Metaphysics was being taken as the whole of philosophy. He then tried to show, in far too many words, that the subject of Metaphysics was entirely unknowable by the human mind. Unfortunately, many believed him. From that point on, Philosophers were effectively barred from the laboratory. Philosophy would no longer play any significant role in the scientific community. Philosophy and science were two separate disciplines.

Philosophy for the Contemporary Moderns

The split of Philosophy and science haunts us to this day. And the problem is ever worsening. In fact, with the rise in subjectivist systems, Philosophy itself is no longer being considered a discipline at all; even among so-called philosophers! Instead, Philosophy is being treated as though it were history. And the study of Philosophy is but the biographical overview of all those thinkers whom the scientific community refuses to accept as their own. We are not allowed to say that a certain philosopher was right or wrong, we are allowed only to explain what they taught and search for new interpretations of their texts. Even in Thomistic circles, Philosophy has nothing to do with science; it is merely, as I said before, the biography of St. Thomas. Thomists have become textual exegetes, busying themselves with new translations of his texts, and worrying about what it is that Thomas ‘really meant’, instead of asking themselves, ‘is it true?’! Philosophic Science is, for all intents and purposes, dying.

The Neo-Scholastic Revival

An attempt to restore Scholastic Thomism and reconcile Philosophy with the partial sciences began in 1879 under the auspice of Pope Leo XIII after the publication of his encyclical Aeterni Patris. This movement was known as the Neo-Scholastic Revival. In the Encyclical, the saintly Pontiff wrote:

“Among the Scholastic Doctors, the chief and master of all towers Thomas Aquinas, who, as Cajetan observes, because "he most venerated the ancient doctors of the Church, in a certain way seems to have inherited the intellect of all."(34) The doctrines of those illustrious men, like the scattered members of a

body, Thomas collected together and cemented, distributed in wonderful order, and so increased with important additions that he is rightly and deservedly esteemed the special bulwark and glory of the Catholic faith. With his spirit at once humble and swift, his memory ready and tenacious, his life spotless throughout, a lover of truth for its own sake, richly endowed with human and divine science, like the sun he heated the world with the warmth of his virtues and filled it with the splendor of his teaching. Philosophy has no part which he did not touch finely at once and thoroughly; on the laws of reasoning, on God and incorporeal substances, on man and other sensible things, on human actions and their principles, he reasoned in such a manner that in him there is wanting neither a full array of questions, nor an apt disposal of the various parts, nor the best method of proceeding, nor soundness of principles or strength of argument, nor clearness and elegance of style, nor a facility for explaining what is abstruse.

“Moreover, the Angelic Doctor pushed his philosophic inquiry into the reasons and principles of things, which because they are most comprehensive and contain in their bosom, so to say, the seeds of almost infinite truths, were to be unfolded in good time by later masters and with a goodly yield. And as he also used this philosophic method in the refutation of error, he won this title to distinction for himself: that, single-handed, he victoriously combated the errors of former times, and supplied invincible arms to put those to rout which might in after-times spring up. Again, clearly distinguishing, as is fitting, reason from faith, while happily associating the one with the other, he both preserved the rights and had regard for the dignity of each; so much so, indeed, that reason, borne on the wings of Thomas to its human height, can scarcely rise higher, while faith could scarcely expect more or stronger aids from reason than those which she has already obtained through Thomas.

“While, therefore, We hold that every word of wisdom, every useful thing by whomsoever discovered or planned, ought to be received with a willing and grateful mind, We exhort you, venerable brethren, in all earnestness to restore the golden wisdom of St. Thomas, and to spread it far and wide for the defense and beauty of the Catholic faith, for the good of society, and for the advantage of all the sciences. The wisdom of St. Thomas, We say; for if anything is taken up with too great subtlety by the Scholastic doctors, or too carelessly stated-if there be anything that ill agrees with the discoveries of a later age, or, in a word, improbable in whatever way-it does not enter Our mind to propose that for imitation to Our age. Let carefully selected teachers endeavor to implant the doctrine of Thomas Aquinas in the minds of students, and set forth clearly his solidity and excellence over others. Let the universities already founded or to be founded by you illustrate and defend this doctrine, and use it for the refutation of prevailing errors. But, lest the false for the true or the corrupt for the pure be drunk in, be ye watchful that the doctrine of Thomas be drawn from his own fountains, or at least from those rivulets which, derived from the very fount, have thus far flowed, according to the established agreement of learned men, pure and clear; be careful to guard the minds of youth from those which are said to flow thence, but in reality are gathered from strange and unwholesome streams.”

His call to intellectual arms was well heeded in some countries, and Scholasticism began once more to flourish in the universities. Among the ranks of the Neo-Scholastics we count Gredt, Hugon, Zigliara, Taparelli, Sanseverino, Pesch, Lorenzelli, Mercier, Cornoldi, Liberatore, Urraburu, Kleutgen, Matussi, and many, many others. Unfortunately, the great strongholds of Neo-Scholasticism were left barren by two world wars, and the last authority of this movement was wiped out by Modernist professors and clergy who had infiltrated the Catholic Church. Whatever hope there was to reconcile Philosophy with the sciences, has been severely weakened by the obliteration of the Neo-Scholastic movement.

The Division of Philosophy (i.e., the division of the sciences)

So, now that we've given the general definition of Philosophy, and now that we've seen, historically, why this definition is no longer the standard one in use, we are going to move on to enumerating the parts of Philosophy. And since the parts of Philosophy are, as we talked about above, the sciences themselves, the division of Philosophy is really the division of the human sciences. Now, it's impossible in this introductory session to give a complete division of all the sciences; that will have to wait until later. Besides, dividing the sciences in their entirety will be one of the last conclusions of Logic, as we'll see.

Sciences can be divided according to the objects with which they deal—and this would be to divide them in virtue of themselves, or formally—or they can be divided according to the order in which we should learn them—that is, in relation to ourselves. So let's look first at how the sciences are divided according to themselves, then according to how our mind should acquire them; keeping in mind that all of this will be dealt with in much greater detail at the end of our course.

In Itself

We can divide sciences according to their purpose, or rather their final causes (that for the sake of which they are acquired), and we can divide them according to their subject-matter, or rather their material cause.

By Reason of Purpose

Properly speaking, the end or final cause of all scientific knowledge is the contemplation of truth. And the intellect rests in this knowledge. This is called *Speculative Science*. It has as its end simply the contemplation of the truth attained. However, the intellect can also extend its knowledge in order to direct that something be done or made. When what is considered is not the nature of a thing in itself and absolutely, but how a thing is to be brought about, we have *Practical Science*. So, for example, when I study the nature of a healthy man, I'm studying a thing that already exists in reality without a view to creating it myself; this is a speculative science called Anthropology. If, however, I'm trying to determine what course of action I should take here and now in order to make this man healthy, I'm studying something that doesn't actually exist (i.e., this man is not actually healthy) but which I want to cause in reality (i.e., I want to *make* him healthy); this is a practical science called medicine. Both speculative and practical sciences study causes; however in the former we're studying the causes which are actually present, while in the latter we're studying the causes which *should* be present in order that some goal be achieved (e.g., the causes which need to be present in order for this man to become healthy).

To put it another way, speculative science remains in the mind contemplating, while practical science extends to the direction of other parts of the body. And it can do this in two ways. First,

the intellect can extend this knowledge in order to create something distinct from ourselves—and this we call Art—or it can extend its knowledge in order to direct the will to act morally—this we call Prudence. So the first division of Philosophy is into Speculative Philosophy and Practical Philosophy. Practical Philosophy is again divided into the Arts and Prudence.

Now, Speculative Philosophy considers everything that man can observe in reality. So how are the various speculative sciences to be divided? To give a full explanation at this point in our study would be very difficult—we'll cover this in depth only at the end of the course—but for now let me put it this way: sciences differ one from another because of a difference in objects. An object is that which is first and fundamentally impressed on a knowing faculty. For example, 'color' is the object of sight because it is what is first visible to us, and it is by means of color that we see everything else such as size and shape; if a thing had no color (i.e., if it didn't reflect light), we wouldn't see it. Again, the object of hearing is sound; if a thing didn't resonate, we wouldn't have any auditory knowledge of it. Now, every new and different kind of object determines or specifies a different kind of knowing. That is, formally different kinds of objects distinguish formally different kinds of knowledge. So because 'color' is formally different from 'sound' we can distinguish two different sensitive faculties; namely, sight and hearing. And it is *only* because we can observe different objects that we are aware of different powers. Thus, a man born without a sense of smell would never think to ask about smells until he realized that other people have something that he does not. So acts of knowing are formally distinguished according to the object that immediately confronts the knowing faculties.

Note well, though, that the 'object' is not the same as the 'thing'. One 'thing' can provide us with many different objects. The dog in front of me provides me with color when I look at him, with auditory vibrations when he barks, with a sensation of softness when I pet him, etc. One thing, many objects. Sometimes, though, we refer to both the thing and the object as 'objects', but we make a big distinction when we do this. The thing itself we call the 'material object' while the particular point of view we call the 'formal object'. So the material object might be the dog, but the formal object of sight is color and the formal object of hearing is sound; just as one material cause can receive several different formal causes, so one material object can present us with a number of different formal objects.

The intellect likewise is confronted with numerous types of objects which it pulls out, or abstracts, from the things we encounter. And just as sense knowledge differs according to a diversity in sensible objects which it encounters in the thing, so intellectual knowledge differs according to a diversity of intelligible objects which it abstracts from the thing. And as many specifically different objects of intellectual knowledge can be abstracted from the things we encounter, so many will be the objects that we can scientifically (that is, intellectually and rationally) investigate.

So how many scientifically intelligible objects can the intellect pull out? Well, first, you should notice that scientific knowledge must be certain and necessary knowledge; that is, scientific knowledge cannot be knowledge which might be false. Scientific knowledge must be true and certain. Otherwise, it's only opinion. $1+1=2$. This is certain and necessary knowledge because

it can't be in any other way; it isn't possible for 1+1 to equal anything else. But the things we encounter in reality don't provide us with that necessity. I can't say for certain that this dog will bark at the stroke of noon. This dog *might* bark at the stroke of noon. Then again it *might* be dead by 11:30. You see, the dog (and every other particular thing that we encounter with the senses) is always in motion, and a thing in motion is constantly changing; it is constantly other than it was. I don't just mean *local* motion—moving from place to place. But motion in a wide sense meaning any kind of change. Learning is a kind of motion, nourishing one's body is a kind of motion, receiving visual impressions on the eye is a kind of motion, etc. All the things of the sensible world are in a constant state of motion and, therefore, do not provide us with the necessity and certitude that science demands. So, if knowledge is to be scientific then the object of scientific inquiry must be abstracted from this state of constant change: it must be immobilized. And there are as many different kinds of scientific objects as there are ways of conceiving things by immobilizing them. This process of intellectually immobilizing them is called abstraction.

As we'll learn in this course, there are three ways that the thing can be immobilized; that is, there are three kinds, or degrees, of abstraction.

Natural Science

Notice that the things we sense in reality all have their own matter (i.e., material cause) with its own peculiar, individual characteristics; and because of this particular matter, the things in reality are constantly changing. That statue of Aristotle which is the subject of so much discussion has its own particular matter; namely, that singular chunk of clay that the sculptor used to make it. And that singular chunk of clay has its own characteristics. Maybe it's a little discolored, maybe the density isn't what it should be, etc. etc. This particular matter that goes to make up the singular thing we encounter in the real world is what we call individual sensible matter. It has unique qualities possessed by it and by no other. It is singular, one of a kind, and constantly changing.

But this individual is of no real interest to the scientist. Remember the scientist wants universal, necessary, and certain knowledge. He's not interested in saying 'this clay has such-and-such particular qualities at this particular moment', rather he wants to be able to say 'ALL clay has such-and-such properties at every moment, of this we are certain, and here's the reason why'. Hence, the scientist will intellectual leave behind the individual sensible matter and rise to what we call the first degree of abstraction. In this first kind of abstraction, the scientist leaves behind the individual sensible matter of the things we sense in reality but keeps what we call universal sensible matter. He leaves behind 'this chunk of clay' or 'that chunk of clay' and he keeps only the universal notion of 'clay'. So, once again, the statue in reality has a *form* (e.g., of Aristotle) which is individualized by some particular sensible *matter* (e.g., this chunk of clay sitting in front of me). But the first level of abstraction will abstract from the *particular* or *singular* sensible matter and retain only the *common* or *universal* concept of that matter (e.g., clay in general).

Suddenly the scientist is no longer considering this unique statue over here in the corner of the room (i.e., this form in this matter), but rather all statues universally (i.e., form in matter). All scientific investigation into physical reality must make this first kind of abstraction. No scientist stops at ‘this flesh’ or ‘these bones’ in particular, because he’s wants to know about ‘flesh’ and ‘bones’ universally. He leaves aside all the unique characteristics about ‘this flesh’ and ‘these bones’ in order to get at what is always and everywhere true about ‘flesh’ and ‘bones’ in general.

This first level of abstraction gives us the Physical Sciences. Physical science, as we’ll learn, has many, many subdivisions, and all modern scientific investigation will find a place somewhere in these subdivisions.

Now, the physical scientist abstracts from individual sensible matter but he necessarily retains the notions of universal sensible matter. If the scientist is studying the properties which always and everywhere pertain to apple pie, he must abstract from the various apple pies on the table and rise to a universal understanding of apple pie in general. Although this universal notion does not contain any real, singular apples in it (nor individual scoops of sugar and flour), nevertheless, it must still contain the concept of ‘apple’ considered generally (as well as the common concepts of ‘sugar’ and ‘flour’). If it didn’t, then the scientist wouldn’t be thinking about an apple pie: an apple pie must be conceived as containing apples (and flour, sugar, etc.). That is, to consider the physical world, we must always conceive of it as containing sensible matter; otherwise we would not be thinking about the natural, physical world.

Mathematics

However, there is another level of abstraction which not only leaves behind the particular sensible matter (‘this apple’ and ‘that bag of sugar’), but also gives up the common/universal sensible matter (‘apple’ and ‘sugar’). This new level of abstraction rises above all sensible matter and considers purely intelligible matter, or rather ‘quantity’ itself, independently of any material cause. This is the level of Mathematics and the Mathematical Sciences.

The object of Mathematics requires no material cause in order for it to be conceived. While ‘apple pie’ must necessarily be conceived as having ‘apples’ as its material cause, ‘triangle’ does not need to be conceived as ‘wooden’ or ‘plastic’ or ‘clay’ or anything else. The number 2 doesn’t need to be considered as 2 apple pies or 2 dogs; but simply as a quantity. The mathematician has abstracted from all sensible matter and has pulled out of physical things an object which is specifically different from the object of physical science. Now, it’s quite true that in order for the mathematical object to exist independently of the mind, matter will be required; in order that ‘triangle’ exist outside our minds it must be ‘a wooden triangle’ or ‘a plastic triangle’ etc.—you’ll never see ‘triangle’ floating down the street, but you might see a brass triangle lying in the road. But to be conceived, to be understood, we must leave beside all considerations of sensible matter. Indeed, if we don’t do this, we won’t properly understand what a triangle is. A triangle existing in the wood (i.e., a wooden triangle) is not really a triangle. If you put it under a microscope, you’ll see all kinds of ragged edges and imperfections. To understand the nature of ‘triangle’ as having three and only three sides, we necessarily have to

abstract from all these physical imperfections. So while the physicist considers an object which requires both matter and form in order to be understood (e.g., the form of pie made up of apples, sugar, flour, etc.) as well as requiring matter and form in order for that object to exist, the mathematician considers form alone (e.g., the form of triangle); but a form which would need to have matter if ever it were to exist outside the mind. And both these intelligible *objects*—i.e., quantity, which is the object of Math, and sensible physical natures, which is the object of Physics—are abstracted from the same singular *things* existing in reality. That is, in Math and Physics, we have the same *thing* but looked at from two different points of view, just as sight and hearing both regard the same sensible *thing* but have two different *objects* or points of view. Or in other words, both Math and Physics have the same *material* object (e.g., apple pie), but they each have a different *formal* object (e.g., Physics considers the pie as being a real thing made up of real ingredients, while Math considers it as having height, width, volume, etc.)

Metaphysics

So, math considers beings which do not require matter in order to be conceived and understood but which *do* require matter in order to exist. Now, Physics is going to prove to us that there is another kind of reality; namely, immaterial reality. Once we prove that there *must* exist an immaterial Prime Mover, we will have learned that there are some things which not only *do not* require matter in order to be *conceived and understood* (such as mathematical objects), but which also *do not* require matter in order to exist: we will have discovered that there is a purely immaterial reality. Because of this, there is a level of abstraction which will leave behind not only singular sensible matter, and not only common sensible matter, and not only intelligible quantified matter, but *all reference to any matter whatsoever*. We will no longer be considering what is common to *physical or material being* nor will we be simply considering *immaterial being* but rather we'll be studying what is common to *all being* in general; or as it most often called, *being as being*. This is Metaphysics.

Now, properly speaking, acquiring the object of metaphysics is not really an abstraction, because we're not simply separating an intelligible object from the physical thing; we don't pull out of the physical thing a notion of 'being as being' in the same way we pull out the notes of 'colored' 'soft' and 'smelly'. Rather, it's a kind of separation because we are considering a wholly different sort of reality than the physical things we encounter with the senses. But this is way ahead of our brief introduction. For now just keep in mind that the object of Metaphysics is an object completely separated from reference to matter. Whereas Physics studies objects which require matter both in order to exist and in order to be understood (apple pie can neither be conceived nor can exist without 'apples'), and whereas Math studies objects which can be conceived without matter but cannot exist without matter ('triangle' which must be, for example, a 'wooden triangle' to exist), Metaphysics studies things which do not require matter either to be conceived or to exist (e.g., God, causality, relation, and in general being as being).

So the three most significant divisions of Philosophy based upon the objects which are studied is a division into 1) Physical Sciences, 2) Mathematical Sciences, 3) Metaphysical Sciences.

To sum up:

PHILOSOPHY

1. Speculative Philosophy
 - a. Physical Sciences
 - b. Mathematical Sciences
 - c. Metaphysical Sciences
2. Practical Philosophy
 - a. Art
 - b. Prudence

In Relation to the Order of Learning

So we have seen how sciences are diversified according to three different kinds of abstraction that the mind can make from the particular things that we encounter in sensible reality. However, none of this means that, psychologically speaking, the sciences are best studied in this order; just because there are sciences of the First Degree of Abstraction, sciences of the Second Degree, and sciences of the Third Degree doesn't mean that we should study the Physical Sciences, then the Mathematical Sciences, and then the Metaphysical Sciences. Quite to the contrary, the learning process of the mind doesn't proceed according to abstractive levels, but rather from what is better known to us, more general, and more vague, to what is less known to us, more specific, and more clarified. For this reason, if a man were properly educated from his youth he would learn Math before he learns the Physical Sciences, because the concept of the arithmetical 'unit' comes before the concepts used in the Physical Sciences. He would learn Moral Science (which is a specific type of Physical Science) after he learned Psychology (which is another specific type of Physical Science) because how man should act is less clear than what man is. And he should learn Metaphysics only much, much later because it is the most difficult science and it pertains to things which are the least known to us; i.e., immaterial realities. But there is one exception to the rule which demands we go from the easiest sciences to the most difficult: Logic. Logic teaches the method of procedure in *all* sciences and must therefore precede all other studies. Yet, it is an exceedingly difficult undertaking because it is a science objectively located on the Third Level of Abstraction; Logic, as we'll learn, deals with an immaterial reality, namely the *relationships* between our various concepts.

So the proper order of study for a young mind should be the following: Logic, Mathematics, Natural Science (including Psychology), Ethics, and then finally Metaphysics.

COROLLARY: Two Divisions to be Avoided

The Wolffian Division

Christian Wolff (1679-1754) was a German rationalist philosopher of the so-called Enlightenment period who sought a new division of the sciences based upon a very corrupted form of Scholasticism. According to Wolff, Metaphysics is not the last science to be studied. It was not for him the least known and most abstract of sciences. Rather, Metaphysics is the very first science known to man, and all other sciences are a contraction of Metaphysical notions. In

other words, every speculative science is just an application of Metaphysics and Metaphysical notions (such as the principle of non-contradiction, Wolff thought) to some object that we encounter; and nearly all the facts of reality can be deduced from these fundamental concepts.

His division of speculative science is this:

METAPHYSICS

1. General Metaphysics (Ontology)
2. Special Metaphysics
 - a. Metaphysics of Bodies
 - b. Metaphysics of Spirits
 - i. Of Created Spirits (e.g., the human soul)
 - ii. Of Uncreated Spirits (i.e., God)

Wolff confused the logical and ontological order, and in doing so he inverted the natural progression of the human mind. Instead of beginning with sense knowledge and gradually building up scientific inquiries into reality, Wolff thought that we begin with an analysis of our fundamental notions and then deduce everything else that can be known about reality from these. But while it is true that primary principles such as non-contradiction are *defended* and *explained* by Metaphysics, we *use* these principles without giving them a second thought long before anyone ever questions them or brings them into doubt. So Metaphysics need not logically come first, even if ontologically speaking it treats of principles which apply to all reality, material or immaterial.

Unfortunately, the Wolffian division of the sciences became very popular in European universities. Many, many scholastic thinkers accepted this division without question and tried to present Thomism along its lines. For them, since Metaphysics treats of all beings in general, the other sciences must just be specific divisions of Metaphysics treating of specific kinds of being. However, as I've already mentioned, and as we'll spend much more time on later, Metaphysics deals with a completely different formal object than does Physics or Metaphysics. Metaphysics isn't related to the other sciences as whole to part (for example, as sense is related to sight, touch, taste, etc.) but as part to part (as sight is related to hearing).

The Wolffian division contributed to the problem I've mentioned a number of times; i.e., identifying Philosophy only with Metaphysics, and leading to its divorce from empirical, observable, measurable investigation. We'll be returning to this division much later on, but for now I warn you to be on your guard when reading certain Scholastic material (especially Jesuit books) written after the time of Wolff. This division is just one example of the many perversions of sound thought which have twisted the old doctrine. The human mind naturally and slowly proceeds from imperfect knowledge to perfect knowledge, from sense knowledge to intellectual conception, from conception to the vast scientific synthesis. The Wolffian division would have us start with perfect knowledge and then work our way down to the things of sense!

The Existential Division

Much akin to the Wolffian division of the sciences (though not intentionally) is the modern existential approach to philosophy proposed by a large number of Thomists who follow the school of Etienne Gilson (1884-1978). Authoritarians claiming to have discovered new meanings in the texts of St. Thomas which somehow eluded each and every philosopher for nearly 800 years, the proponents of Existential Thomism (as it is often labeled) make the primary study of all philosophy a study of what they call 'esse'. Esse is a Latin word properly meaning existence or the act of existing. However, for the Existentialists, 'esse' is grasped intuitively and is a quasi-mystical concept. For many of them (following Gilson), modern science has made the traditional Scholastic sciences totally obsolete, and so Metaphysics is the only science for the Philosopher. Furthermore, all of his philosophic investigations are a gradual evolving of this primordial concept of 'esse' within which he will discover all things. So as Wolff thought we begin with a knowledge of all beings, so Existential Thomists think we begin with a knowledge of all beings as contained in the intuited concept of 'esse'. The truth is quite the opposite, we start with knowledge of material things (though under their most basic notions) and gradually build up to an analogical concept which will include both material and immaterial reality—we don't intuit it from the start; if we did, then we would have no real need to examine reality, but we would need only to examine our own consciousness. Metaphysics, then, is logically the only science for the Existential Thomist. Everything else is just a more specific clarification of our fundamental intuition. That is, there is no formal object in Metaphysics which is in any way different from the formal objects of Math and the Physical Sciences. Even if they refuse to admit it, Existential Thomists implicitly adhere to the Wolffian division and sever Philosophy from modern science.

The Properties of Philosophy

The properties of Philosophy are certain attributes or characteristics of Philosophy which follow from its nature. These are conclusions to what we've examined up until now.

To be the Most Universal Scientific Synthesis

This follows from the fact that Philosophy deals with all beings, whereas each individual science deals with one particular object. Of course, we have to remember that Philosophy deals with only those beings knowable by reason and is, therefore, specifically distinct from Sacred Theology.

To be a Perfect Scientific Synthesis

This follows from the fact that it gives true and certain knowledge of all of reality, whereas experiment and observation (with which most modern science is concerned) is only preparatory to a perfect knowledge of causes and gives us only probable conclusions. We'll discuss the defects of the modern experimental approach later on in the course.

To be a Perfective Synthesis for Man

This follows from the fact that Philosophy is divided into Speculative and Practical. As such man perfects not only his intellect with philosophic knowledge, but he uses this knowledge to create order in the acts of his will.

To be Necessary for Man

This follows from the previous property. Philosophy is necessary for man by teaching him the end of his rational human nature and how he is to pursue it. Furthermore, it teaches him the end of human society, both familial and civil, and the rights that must exist between men in order for the end of the family and state to be attained. Finally, it teaches him the natural obligations which exist insofar as he is a *created* being.

To be the Most Dignified Synthesis for Man

This follows from the fact this Philosophy treats of all beings, including the Divine. Any lower scientific synthesis treats only of created things.

To be Independent of Supernatural Theology

This follows from the fact that Philosophy proceeds under the light of unaided human reason. All sciences have principles, conclusions, and a connection between the two. In Philosophical Science, all of these are proven to the human mind on their own intrinsic merit independently of anyone asking that they be believed. On the other hand, the principles of Theological Science ultimately depend upon the fact that God has revealed them; that is, they cannot be proven unless we *choose* to accept what has been revealed by God.

To be a Necessary Tool of Supernatural Theology

Though neither Theology nor Philosophy is subordinated to the other, at the very least, Logic will be necessary for the development of Sacred Theology because it is the tool of all sciences. Logic, as we'll see, teaches the universal method by which reason is perfected, allowing man to proceed with ease, order, and without error in any process of reasoning. Theological reasoning is no exception. Furthermore, Theology often borrows principles which are learned from the Philosophical Sciences (e.g., the nature of man) in order to better explain its object. For this reason, Philosophy is often called the handmaid of Theology.

The Causes of Philosophy

Given everything that we've said about Philosophy up to this point, and recalling our discussion of the four causes, we can now lay out in general what the causes of philosophy are.

1. The Intrinsic Causes of Philosophy
 - a. *The Material Cause*: The material cause, as we said, was that out of which a thing is made and remains in it. So what makes up Philosophy? What is the matter out

of which the Philosophic Sciences are constructed? All beings. The material cause of Philosophy is every being about which we can have human knowledge.

- b. *The Formal Cause*: And what is added to all beings to transform them from what they are into a synthesized and intelligible whole? Human Reason. So when human reason is applied to an understanding of all beings in their entirety we get Philosophy; just as when the form of Aristotle is applied to the clay, we get a statue.

2. The Extrinsic Causes of Philosophy

- a. *The Efficient Cause*: And what is the cause which unites the form and matter; the cause which applies human reason to examining all beings? The human intellect which perceives itself to be in ignorance of a complete and comprehensive grasp of reality. It naturally flees this ignorance and begins to put things together.
- b. *The Final Cause*: And what is the goal in creating Philosophy? Why does the intellect seek to perfect itself? Well, immediately, the goal of the intellect is to rid itself of its ignorance. So we say that proximate final cause is knowledge, or rather perfection of the intellect. And since this knowledge can be used to direct the acts of the will, moral activity (i.e., the perfection of the will) is another final cause. But the intellect and will are only parts of man, and, properly speaking, it isn't the intellect or will which is acting, but rather it is man who is acting *by the use* of his intellect and will. And since the part is always for the sake of the whole, the remote final cause of Philosophy isn't merely the good of the intellect or the will, but the good of man as a whole.

So to summarize all that we have said about the nature of Philosophy, the human intellect in a state of ignorance applies its power of reasoning to all knowable beings, creating sciences and synthesizing them into a comprehensive view of reality, for its own perfection and ultimately for the perfection of man as a whole. Every science finds its place in Philosophy, as every part finds its place in the whole.