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Descartes and Dialectics

One consequence of Descartes' attempt to extend the mathematical method everywhere is a rejection of the use of dialectic in the speculative sciences. Descartes' well-known position is that "we should busy ourselves with no object about which we cannot attain a certitude equal to that of the demonstrations of Arithmetic and Geometry."¹ But, the certitude of arithmetic and geometry is such that no dialectic is required to prepare the mind of the student for their reception. Hence, if we proceed in all the sciences as in arithmetic and geometry, there will be no need for dialectic. Descartes indicates this in his *Third Rule for the Direction of the Mind* :

In the subjects we propose to investigate, our inquiries should be directed, not to what others have thought, nor to what we ourselves conjecture, but to what we can clearly and perspicuously behold and with certainty deduce ; for knowledge is not won in any other way.²

Here Descartes implies that the acquisition of science is not helped by referring to the opinions of others or to our own probable conjectures. But dialectic proceeds from probable opinions. Hence, Descartes is rejecting dialectic itself.

The opinion of another famous thinker, Aristotle, is quite the opposite. In his *Topics*, he carefully investigates the art of dialectic, and in most of his other works, he makes extensive use of dialectical arguments. In the *Topics*, Aristotle distinguishes the dialectical syllogism which proceeds from probable opinions (i.e., the opinions of all or most men, or of all or most wise men or the most famous of them) from the other species of syllogism such as demonstration. He sees many uses for dialectic.³ The first use of dialectic is for the *exercise* of the reason. Most people are aware that the body needs exercise and also the internal sense powers like the memory and imagination. But it is not so easy to recognize that the human intellect or reason, as such, is in need of exercise. Yet, we see that men are easily deceived, especially in the beginning of the speculative life, and this is a sign of the weakness of man's reason. The human reason is like the human body in a weakened condition, a body that is easily susceptible to any disease that comes along. We can call

1. *Rules for the Direction of the Mind*, Rule II, Vol. I, p.5. — All volume and page numbers for Descartes in this articles are from the Dover edition of *The Philosophical Works of Descartes* in two volumes.

2. Vol.I, p.5.

3. *Topics*, I, c.2.

error, by a certain proportion, a disease of the reason. Hence, as bodily exercise makes the body more capable of withstanding harmful things and of doing its proper operation well, so dialectic strengthens the reason so that it is less easily deceived and is more capable of achieving its end. Even the errors of those who have gone before us are useful to exercise the reason. Hence, *a fortiori*, the consideration of probable opinions, and the arguments drawn from them, will exercise the reason.

The second use of dialectic is for *intellectual encounters with others* in which we can argue against them from their own opinions. This is the most effective way of removing that impediment to seeing truth which a man has who assents to a false opinion. Such a man thinks himself to know when really he is ignorant. It is by leading a man into a contradiction that we can make him realize his ignorance. This is precisely what Socrates was fond of doing. We might also compare this to what takes place in the body. Just as the doctor cannot induce health into his patient without first curing him of his disease, so the teacher cannot bring truth into a student's mind without first curing him of any errors he may have.

The third use of dialectic is in reference to the sciences, especially the philosophical ones. Dialectic enables us to construct probable arguments on both sides of a question. Arguments arise on both sides of a question precisely because there is some truth hidden there, some truth difficult to see. The opposed arguments point out to the mind where the difficulty lies, and hence the mind knows where to give its attention to find the solution. The solution is the discovery of some truth.

Dialectic has, according to Aristotle, a special use in helping us to come to know the first principles of some sciences. The principles of a science cannot be approached by that science because there is nothing prior to them in that science. Thus, in natural science, we arrive at the principles of its subject through a long dialectical process as can be seen in Book One of Aristotle's *Physics*.

We think this difference of opinion between Aristotle and Descartes is important enough to merit a careful consideration. For it is a difference about something that affects all or most of the sciences. In what follows, we shall first proceed dialectically. Perhaps this seems unfair to Descartes who rejects dialectic, but it is not if we present *his arguments* against dialectic and if we argue against his position from *his own opinions*. No man can truly object or complain when we start from the opinions and arguments that he himself accepts.

Many arguments against the necessity of dialectic can be drawn from, or are suggested by, the text of Descartes. We can divide these arguments into two groups: the first includes general objections against dialectic, and the second, particular objections against each

of the four uses of dialectic assigned by Aristotle in his *Topics*. The general objections will be given first.

The speculative intellect, whose end is truth, seeks to know conclusions with certitude. This is why it must reject dialectic which can never give one certitude :

For a long time I had remarked that it is sometimes requisite in common life to follow opinions which one knows to be most uncertain . . . But because . . . I wished to give myself entirely to the search after Truth, I thought that it was necessary for me to take an apparently opposite course, and to reject as absolutely false everything as to which I could imagine the least ground of doubt, in order to see if afterwards there remained anything in my belief that was entirely certain.¹

Since dialectic proceeds from probable propositions, it can be of no more use for knowing conclusions with certitude than are false propositions :

. . . for the purpose of investigating the truths that are metaphysically certain, we should pay no more credence to doubtful matters than to what is plainly false.²

Since a dialectical or probable proposition (about which there can always be some doubt) might be false, we can make no use of it in the investigation of the true. Although a true conclusion can sometimes be drawn from false propositions, we can never know, or be certain that a conclusion is true when it has been concluded from propositions that are, or might be, false. This, then, is the first general argument against dialectic.

The second objection is even more serious because it maintains that dialectic can lead us into error :

He is no more learned who has doubts on many matters than the man who has never thought of them ; nay he appears to be less learned if he has formed wrong opinions on any particulars. Hence, it were better not to study at all than to occupy one's self with objects of such difficulty, that owing to our inability to distinguish true from false, we are forced to regard the doubtful as certain ; for in these matters any hope of augmenting our knowledge is exceeded by the risk of diminishing it. Thus, . . . we reject all such merely probable knowledge and make it a rule to trust only what is completely known and incapable of being doubted.³

The reason why we are in danger of falling into error through dialectical reasoning is that the latter proceeds from propositions which

1. *Discourse on Method*, Part IV, Vol.I, pp.100-101.

2. *Reply to Objections VII against the Meditations*, Vol.II, p.266.

3. *Rules for the Direction of the Mind*, Rule II, Vol.I, p.3.

may be false and, from false propositions, you are likely to get false conclusions. In fact, some dialectical propositions must be false since they are opposed even contradictorily to each other :

... considering how many conflicting opinions there may be regarding the self-same matter, all supported by learned people, while there can never be more than one which is true, I esteemed as well-nigh false all that only went as far as being probable.¹

A third general objection is suggested by the following words of Descartes :

I could not, however, put my finger on a single person whose opinions seemed preferable to those of others, and I found that I was, so to speak, constrained myself to undertake the direction of my procedure.²

The necessity of making a choice among probable opinions is seen from the fact that they are opposed. But, even if we make a choice between two contradictory propositions, nothing prevents us from contradicting ourselves through other probable opinions we have accepted. For probable opinions can be both true and false, and from true and false propositions, we are likely to get eventually a contradiction. But contradiction is a sign of inconsistency which is a result of bad reasoning. Hence, dialectic is defective. Indeed, it is the nature of dialectic (and rhetoric) to lead us to opposite conclusions, to lead us to contradict ourselves, and to be inconsistent. Hence, dialectical reasoning is poor reasoning and should be rejected. Let us turn now to particular objections against the four uses of dialectic given in the *Topics* of Aristotle.

The first use or purpose of dialectic is to exercise the mind. But that exercise is bad because it produces bad habits such as scepticism, contentiousness and even self-deception. Sceptics are produced by the custom of hearing proofs given for every side of every question. Thus the arguing to opposite conclusions (which is the work of dialectic) leads the listener to think that truth is not attainable by man. And this despair has the disastrous effect of turning men away from the investigation of truth :

if we wish in earnest to establish for ourselves those rules which shall aid us in scaling the heights of human knowledge, we must admit assuredly among the primary members of our catalogue that maxim which forbids us to abuse our leisure as many do, who neglect all easy quests and take up their time only with difficult matters ; for they, though certainly making all sorts of subtle conjectures and elaborating most plausible arguments with great ingenuity, frequently find too late that after all their labours,

1. *Discourse on Method*, Part I, Vol.I, p.86.

2. *Discourse on Method*, Part II, Vol.I, p.91.

they have only increased the multitude of their doubts, without acquiring any knowledge whatsoever.¹

This multitude of doubts is the mother of scepticism and despair as Descartes observed in the account of his life as a student. The second reason why dialectic is bad exercise is that it disposes us to attack even the truth and, hence, it hinders us from perceiving that truth :

For from the very fact that anyone girds himself up for an attack upon the truth, he makes himself less capable of perceiving the truth itself, since he withdraws his mind from the consideration of those reasons that tend to convince him of it, in order to discover others that have the opposite effect.²

The third reason why the practice of dialectic is bad exercise is that it may lead us by custom or repetition to think that we have really attained certitude. This, according to Descartes, is what happened in ancient Greece in regard to

Plato and Aristotle, between whom the only difference that exists is that the former . . . confessed that he had never yet been able to discover anything for certain, and was content to set down the things that seemed to him to be probable . . . Aristotle, on the other hand, had less candour, and although he had been Plato's disciple for twenty years, and possessed no other principles than his master's, he entirely changed the method of stating them, and proposed them as true and certain.³

The second use of dialectic is in encounters with others for, when we can proceed from their opinions, we can meet them on their own grounds. But, there is no need of a special logic for arguing with other people because the same argument that convinces us should also convince others if it is a good argument :

. . . I shall first of all set forth in these Meditations the very considerations by which I persuade myself that I have reached a certain and evident knowledge of the truth, in order to see if, by the same reasons which persuaded me, I can also persuade others.⁴

The geometer uses in class, before the students, the same argument that convinced him the night before. A good argument should be objective ; i.e., the same for all. For example, in experimental science, the experiment (which is the basis of the reasoning) should be objective : that is, able to be performed by others in the same way and with the same results.

1. *Rules for the Direction of the Mind*, Rule II, Vol.I, p.4.

2. *Reply to Objections II against the Meditations*, Vol.II, p.50.

3. Descartes's Letter to the translator of his *Principles of Philosophy* into French, Vol.I, p.206.

4. Preface to the reader of the *Meditations*, Vol.I, p.139.

The third use of dialectic is in relation to the sciences, for it is said that a consideration of both sides of a question will enable us to see the truth more clearly. But dialectic cannot really be of use for science as is clear from the following argument : in science where one gets necessary knowledge (as in geometry), a proposition is either obvious (as are the principles), or is shown through ones that are obvious (as are the conclusions). But in neither of these two cases is there a need for making something clearer by arguing to opposites. What is obvious needs no manifestation, and why argue to its opposite which is manifestly false? The conclusions are made known by being necessarily deduced from the principles, not by arguing to opposites. Hence, we find no arguing to opposites in Euclid when he draws his conclusions necessarily. Thus, dialectic is useless for making the truth appear better in a science. This argument is collected from the many texts of Descartes where he says that there are only two ways to certain knowledge for man : "self-evident intuition" and "necessary deduction," as in the following text :

... we shall here take note of all those mental operations by which we are able, wholly without fear of illusion, to arrive at the knowledge of things. Now I admit only two ; *viz.* intuition and deduction. By intuition I understand, not the fluctuating testimony of the senses, nor the misleading judgment that proceeds from the blundering constructions of the imagination, but the conception which an unclouded and attentive mind gives us so readily and distinctly that we are wholly freed from doubt about that which we understand . . . besides intuition there is deduction, by which we understand all necessary inference from other facts that are known with certainty. This, however, we could not avoid, because many things are known with certainty, though not by themselves evident, but only deduced from true and known principles . . . These two methods are the most certain routes to knowledge, and the mind should admit no others. All the rest should be rejected as suspect of error and dangerous.¹

The fourth use of dialectic (which can also be considered a particular one under the third use) is to be a way to the principles of a science. The latter cannot be discussed scientifically since there is nothing prior to them in the science. But, it is ridiculous to try to arrive at the principles of a science by dialectic. If dialectic were used to arrive at the principles of a science, you would come to know the principles from opinions. But, opinions are not certain. Hence, the principles would not be either, and this is opposed to the notion of principle of a science. Hence, dialectic is useless for knowing the principles of a science. This is what Descartes observes :

... none of the conclusions deduced from a principle which is not evident can be evident even though they are deduced from them in a manner

1. *Rules for the Direction of the Mind*, Rule III, Vol.I, pp.7-8.

which is evident and valid, and from this it follows that none of the reasonings which they rested on principles such as these probable opinions could give them any certain knowledge of anything, nor in consequence cause them to advance one step in the search after wisdom.¹

This text is also useful for the first general objection against dialectic : dialectic can contribute nothing to the certitude which the speculative intellect seeks. Next, let us draw up some dialectical arguments against Descartes' position on dialectic.

Descartes should not reject dialectic in general because it can give us no certitude while the speculative intellect seeks certitude. For, although dialectic cannot by itself give us certitude, it may be the occasion for our perceiving something certain which is similar to what Descartes himself experienced : "... in destroying all those opinions which I considered to be ill-founded, I made various observations and acquired many experience, which have since been of use to me in establishing those which are more certain."² Besides, Descartes himself was sometimes satisfied with less than certain knowledge, as in the latter or experimental part of natural science.

Again, one should not reject dialectic in general because its conclusions can involve an element of falsehood while the speculative intellect seeks truth. For even a dialectical argument that leads to a false conclusion can be of use in clarifying the truth. This is what happened to Descartes himself when answering the objections made to his *Meditations on First Philosophy* :

... there may perhaps have remained many obscurities which, however, will, I hope, be entirely removed by the Replies which I have made to the Objections which have been set before me.³

Presumably, Descartes thought that the conclusions of the objections were false.

Moreover, would not dialectic be useful to Descartes even if it leads us to contradict ourselves and, hence, to be inconsistent? For Descartes is pre-eminent among all thinkers in insisting that we have clear and distinct ideas ; yet he recognizes that it is not always easy to know when we have clear and distinct ideas :

... the things which we conceive very clearly and distinctly are all true ... however ... there is some difficulty in ascertaining which are those that we distinctly conceive.⁴

1. Descartes' Letter to the translator of his *Principles of Philosophy*, into French, Vol.I, p.207.

2. *Discourse on Method*, Part III, Vol.I, p.99.

3. *Synopsis of the Meditations*, Vol.I, p.141.

4. *Discourse on Method*, Part IV, Vol.I, p.102.

But, what is it, according to Descartes, that manifests to us when our ideas are not clear and distinct? It would seem to be precisely that for which dialectic is useful: "...contradictoriness in our concepts arises merely from their obscurity and confusion; there can be none in the case of clear and distinct ideas."¹

Let us look, now, at some other arguments which lead one to believe that Descartes should have paid more attention to the uses for dialectic. The first and third reasons drawn from Descartes against dialectic as an exercise (it produces scepticism and the deception that we have more than probability) seem to attack more the excess than the reality of dialectic. Descartes, however, recommends the study of the ancients even though there is a similar danger:

To study the writings of the ancients is right, because it is a great boon for us to be able to make use of the labours of so many men; and we should do so, both in order to discover what they have correctly made out in previous ages, and also that we may inform ourselves as to what in the various sciences is still left for investigation. But yet there is a great danger lest in too absorbed study of these works, we should become infected with their errors.²

An argument against the second objection of Descartes against dialectic as an exercise (we can see truth less after attacking it) has already been considered above.

The second use of dialectic is in encounters with others where we attempt to proceed from their opinions. But Descartes should have seen the utility of this procedure for removing the impediments which others have to seeing the truth by reason of their habitual opinions. Descartes himself experienced that it is hard for one to root out customary opinions even in the face of truth: "ancient and commonly held opinions still revert frequently to my mind, long and familiar custom having given them the right to occupy my mind against my inclination and rendered them almost masters of my belief."³ And in excusing his preoccupation with eliminating errors from the minds of others, Descartes wrote:

... you would prefer me ... to carry out my resolve only in a perfunctory manner. This is forsooth to assume that it is very easy for all to free themselves from the errors in which, since infancy, they have been steeped, and that too much care may be employed in carrying this out, a contention which no one maintains.⁴

1. *Reply to Objections II against the Meditations*, Vol. II, p.46.

2. *Rules for the Direction of the Mind*, Rule III, Vol.I, pp.5-6.

3. *Meditation I on First Philosophy*, Vol.I, p.148.

4. *Reply to Objections V against the Meditations*, Vol.II, p.205.

But if it is false that "too much care may be employed in carrying this out," then we should not overlook that most efficacious way of leading a man out of his errors by showing him that his opinions do not agree. This, however, is precisely what dialectic intends in its second use.

The third use of dialectic is in regard to the sciences, for it is said that we can perceive the truth better when we have heard both sides. Descartes, however, observed when answering objections that "the reader, seeing objections and reply at the same time, will more easily judge of the truth."¹ Besides, no one maintains that the *bene dubitare* of dialectic is in itself a securing of the truth, but only a preparation for it. And, Descartes himself admits this when defending his method of doubting :

... mere doubt alone does not suffice to establish any truth ; but that does not prevent it from being useful in preparing the mind for the subsequent establishment of the truth. This is the sole purpose for which I have employed it.²

And, in another place, Descartes writes that it was necessary for him to employ doubt so "that I might prepare my readers' minds for the study of intellectual matters and for distinguishing them from matters corporeal, a purpose for which such arguments seem wholly necessary."³ The arguments that we brought against Descartes general critique of dialectic can also be applied here.

The fourth use of dialectic is in regard to the principles of a science. Now, no one thinks that dialectic is a way to those principles which are obvious to all, and in this even Aristotle would agree with Descartes. Yet, not all principles are known to everyone, as Descartes himself admits :

... only those things which we conceive clearly and distinctly ... have the power of persuading me entirely. And although amongst the matters which I conceive of in this way, some indeed are manifestly obvious to all, while others only manifest themselves to those who consider them closely and examine them attentively ; still, after they have once been discovered, the latter are not esteemed as any less certain than the former.⁴

But, of what type are those principles which are not obvious to all? Let us again take our cue from Descartes :

Truly we shall learn how to employ our mental intuition from comparing it with the way in which we employ our eyes. For he who attempts to view a multitude of objects with one and the same glance, sees none of

1. *Discourse on Method*, Part IV, Vol.I, p.128.

2. Letter from Descartes to Clerselier, Jan. 12, 1646, Vol.II, p.127.

3. *Reply to Objections III against the Meditations*, Vol. II, p.60.

4. *Meditation V on First Philosophy*, Vol.I, p.183.

them distinctly ; and similarly the man who is wont to attend to many things at the same time by means of a single act of thought is confused in mind.¹

In order to employ the general principle laid down at the beginning of the quote, we can observe that some objects are too bright for our eyes ; others, too dim or dark ; and some are well proportioned. Is there anything similar in the case of the intellect's objects ? Descartes' words seem to imply so :

... the primary notions that are the presuppositions of geometrical proofs harmonize with the use of our senses, and are readily granted by all. Hence, no difficulty is involved in this case, except in the proper deduction of the consequences... On the contrary, nothing in metaphysics causes more trouble than the making of its primary notions clear and distinct. For, though in their own nature they are as intelligible as, or even more intelligible than those the geometricians study, yet being contradicted by the many perceptions of our senses to which we have since earliest years been accustomed, they cannot be perfectly apprehended except by those who give strenuous attention and study to them, and withdraw their minds as far as possible from matters corporeal. Hence, if they alone were brought forward, it would be easy for anyone with a zeal for contradiction to deny them.²

But, using again the likeness of our intellect to our eyes, does not dialectic perform the same role for the intellect that a hand does for the eyes when it points out to them something difficult to see ? When I attempt to point out some object that you do not see in the distance, I make use of objects around it which are easy for you to see, and by these I lead your eyes to come upon the previously unnoticed object. Similarly, when probable opinions clash, there is something difficult for the intellect to see or understand. We can be led to notice the thing which is difficult to see through the opposed opinions and arguments which surround it. Moreover, the opposed opinions and the arguments from them do not prove the thing difficult to understand any more than, in the case of the eyes, the objects around a thing just noticed make it to be seen. They could disappear now and our eyes could still contemplate the object discovered.

It might be useful here to consider also the uses for dialectic given at the beginning of Book Three of the *Metaphysics* of Aristotle. The first of these is that the solution of doubts or difficulties generated by dialectic is the discovery of truth. But, Descartes should have employed dialectic for this since he also found truth by solving difficulties :

... if I have succeeded in discovering certain truths in the Sciences... I may say that they are resultant from, and dependent on, five or six principal difficulties which I have surmounted.³

1. *Rules for the Direction of the Mind*, Rule IX, Vol.I, p.28.

2. *Reply to Objections II against the Meditations*, Vol.II, pp.49-50.

3. *Discourse on Method*, Part VI, Vol.I, p.123.

Dialectic concentrates our mind upon where the difficulty of a question lies since men dispute about difficult points. And this is what Descartes wants us to do :

When we have once adequately grasped the meaning of a "question," we ought to try and see exactly wherein the difficulty consists in order that, by separating it out from all complicating circumstances, we may solve it the more easily.¹

The second use of dialectic given in the *Metaphysics* is that it enables us to know where we are going ; and the third use, when we have arrived. Descartes criticizes those who do not know these two things :

For frequently people are in such a hurry in their investigations that they bring only a blank understanding to their solution, without having settled what the marks are by which they are to recognize the fact of which they are in search, if it chance to occur. This is a proceeding as foolish as that of a boy, who, sent on an errand by his master, should be so eager to obey as to run off without having received his orders or knowing where to go.²

After dialectic, we know when we have arrived ; *scil.*, when we can solve all the difficulties as well as know why people had difficulties. We also know where we are going insofar as dialectic points out something difficult to see, and this latter is the end of every investigation.

The fourth use of dialectic given in the *Metaphysics* is close enough to the third one in the *Topics* as to require no separate consideration. These dialectical arguments against Descartes' position make one wonder whether his objections against dialectic could not be resolved. With that end in mind, let us look more carefully at the art of dialectic.

A natural starting-point would be to consider the elements from which we construct dialectical propositions and dialectical problems. These are four in number : accident, genus, property and definition. Why these are the elements can be seen from the following consideration : Since the dialectical syllogism proceeds from probable opinions and not from the principles or causes of the thing, it cannot manifest why the predicate of its conclusion belongs to the subject of its conclusion. Hence, it can only argue that the predicate belongs, or does not belong, to the subject in some way. But the predicate, which belongs to a subject, is either convertible with that subject or not. And in either case, it either pertains to its nature or it does not. If it is not convertible with the subject and does not pertain to its nature, we have the predicate *accident*. If it is not convertible with the subject and does pertain to its nature, we have the predicate *genus*. If it is

1. *Rules for the Direction of the Mind*, Rule XIII, Vol.I, pp.53-54.

2. *Rules for the Direction of the Mind*, Rule XIII, Vol.I, p.52.

convertible, but outside the nature, we have the predicate *property*. Last, if it is convertible and pertains to the nature, we have the predicate *definition*. Dialectical propositions and problems are constructed from these, although they differ in the way in which they ask about them. The dialectical problem proposes one of the predicates in regard to some subject as a question to be investigated, as whether habit is the genus of virtue or not? In this case, we are asking about the connection of the predicate with the subject which we intend to investigate. A dialectical proposition, however, asks the answerer to agree or disagree to the probability of a predicate belonging to a subject in one of the four ways as, "does it seem that habit is the genus of virtue or not?" The dialectical argument does not investigate this question, but it proceeds from the answer given to conclude something else.

We should not overlook how the problems of *accident*, *genus*, and *property* can be ordered to the problem of *definition*. What belongs as a *definition* must be convertible as a *property* and pertaining to the nature of the subject as *genus*. Likewise, it has to belong to the subject as does *accident*. Hence, if we show that a predicate does not belong to, or that it is not essential to, or not convertible with the subject, we shall also be showing that it is not said of that subject as a *definition*.

We have already said that dialectic does not show why the predicate belongs to the subject. The demonstrator shows why a property belongs to a subject, but the dialectician only concludes that a predicate belongs to a subject as a property of it. Yet he does not show this absolutely any more than he shows that a predicate belongs to its subject absolutely. The dialectician only shows that the conclusion follows from what has been accepted, or admitted, as probable. This is why the dialectician can show that a conclusion is probable, but never that it is true.

Next in line are the definitions of dialectical proposition and of dialectical problem. A dialectical proposition is an asking about the probable or a questioning of the probable. This seems to be a strange way of defining it since a question, as such, cannot be the premiss of a syllogism. And, again, it seems that the dialectician does not have his proposition, or cannot argue, until someone has conceded that something is probable. The concession, however, is not a questioning, but an answer. But consider the following text of Saint Thomas :

... cum propositio accipiat alteram partem enunciationis, dialectica indifferenter accipit quamcunque earum. Habet enim viam ad utramque partem contradictionis, eo quod ex probabilibus procedit. Unde etiam et in proponendo accipit utramlibet partem contradictionis et quaerendo proponit. Demonstrativa autem propositio accipit alteram partem determinate, quia nunquam habet demonstrator viam, nisi ad verum demonstrandum. Unde

etiam semper proponendo accipit veram partem contradictionis. Propter hoc etiam non interrogat, sed sumit, qui demonstrat, quasi notum.¹

Saint Thomas does not say *proponit responsum*, but *quaerendo proponit* for the dialectician. The demonstrator, however, proposes *determinate* the true part of a contradiction. Thus a dialectical proposition seems to be inbetween the indetermination of the mind with respect to both parts of a contradiction in a question, and the determination of the mind to one half in the premiss of a demonstration.

Yet the dialectical proposition is closer to a question than to a demonstrative premiss :

Dialecticus enim non procedit ex aliquibus principiis demonstrativis, neque assumit alteram partem contradictionis tantum, sed se habet ad utramque (contingit enim utramque quandoque vel probabilem esse, vel ex probabilibus ostendi, quae accipit dialecticus.) Et propter hoc interrogat. Demonstrator autem non interrogat, quia non se habet ad opposita.²

A dialectical proposition is not, *simpliciter loquendo*, accepted by the intellect. The judgment of the answer in dialectic does not bear upon the truth or falsity of the proposition, but merely upon its probability. The dialectician does not judge whether it *is* so, but whether it *seems* so to all men, or most men, or to all or most, or the most famous of wise men. If the dialectician accepted the proposition simply, he would be able to assume only one part of a contradiction. We cannot understand the nature of a dialectical proposition without understanding the question that gives rise to it ; just as we cannot understand our own *intelligere* without understanding the *quoddam pati* that gives rise to it.

A dialectical problem is a consideration striving either towards choice or avoidance, or towards truth and knowledge, either in themselves or as an aid to them. A dialectical problem always concerns something doubtful in regard to either human action (choice or avoidance), or the nature of things (truth and knowledge), or the tool of science — logic (an aid to the others). There is a *striving towards* rather than a resolution, because dialectic proceeds from probable opinions which conflict with each other and which cannot resolve a question. Resolution pertains to demonstration just as judgment does.

Next we should list the four instruments or tools of dialectic by which we may abound in dialectical syllogisms. The first tool of dialectic is to know how to take probable propositions. The various ways of doing this are given by Aristotle in Chapter Fourteen of Book One of the *Topics*. These probable propositions should be listed

1. *In I Post. Anal.*, lect.5, n.47.

2. ST. THOMAS AQUINAS, *In I Post. Anal.*, lect.20, n.6.

according to different subjects and arranged from the more universal to the less universal. This facilitates their memory and use. The second tool of dialectic is to be able to divide a word or distinguish how many senses it has. Various ways of doing this are given in Chapter Fifteen of Book One of the *Topics*. The third tool of dialectic is to discover or find the differences between things in the same genus or in genera not far apart. As the things whose differences we are trying to discover are closer, so our mind is *exercised* more in using this tool. The fourth tool of dialectic is to consider the likeness of things in different genera, which likeness is between proportions (as X is to Y, so A is to B) ; or even the likeness of things in the same genus. As the things whose likeness we are considering are further apart, so our mind is *exercised* more in using this tool.

Next, we should consider the uses of the three last tools (the use of the first tool is quite clear). The tool of distinguishing the senses of a word is useful for clearness in a discussion and so the questioner and answerer will have in mind the same thing and not just the same word. Thirdly, it is useful to avoid sophisms, many of which are based on the equivocation of words. The tool of finding differences is useful for syllogisms about what is the same or other (these are subordinated to the problem of definition), and for knowing what each thing is since the ultimate part of a definition is a difference. The tool of considering or finding likenesses is useful for inductions (which dialectic makes as well as syllogisms), for hypothetical syllogisms, and for definitions. One cannot progress towards the universal from singulars whose likeness one has not seen. Since there is the same judgment about things that are alike (insofar as they are alike), we can get the major premiss of a hypothetical syllogism through seeing a likeness of proportions. For example, if what is more desired by us is less desirable in itself, then what is more known by us is less knowable in itself. This tool is also useful for the genus, or what is like a genus, in a definition, because every genus is something in which many species are alike. However, even a likeness of proportions is useful for getting the first part of a definition, as when we see a likeness of proportions between the soul in relation to a natural body equipped with tools and the power of sight in relation to the eye. Just then as the power of sight is the first act of the eye (while seeing is its second act), so the soul is the first act of a natural body equipped with tools.

The last thing to be considered before answering Descartes' objections is the notion of a dialectical place. The Greek word for *places* has been given as the name of Aristotle's work on dialectic ; and, in fact, the six middle books of the eight books of the *Topics* give one the places in which the four just described tools are useful to construct dialectical syllogisms in regard to the four main problems (accident, genus, property, definition) and the other problems subordinated to them. Since the word *place* is carried over to dialectic

(and rhetoric) from corporeal things, we must first discover the likeness which is at the basis of this transfer.

We say that bodies are in place and by place we understand, after a long discourse in Book Four of the *Physics*,¹ the immovable surface first surrounding a body. We say *surrounding* to distinguish place from the surface of the body contained in the place. Place is the surface of the container. *First* designates the proper place, which is no greater than the body contained, rather than a common place which also contains other bodies. *Immovable* should be taken formally in reference to the entire universe, rather than materially; i.e., according to the body which is the subject of the surface. For example, a boat anchored in a river remains in the same place because the surface surrounding it is always situated in the same way with respect to the shore, even though that surface is always different in subject according to the different water flowing by.

The word *place* is carried over into dialectic and rhetoric and applied to a certain kind of proposition which is to the subject about which it helps us to conclude something, as is the place in nature to the body it contains. How are these two proportions alike?

First, just as the place in nature is outside the body it contains: so a dialectical place or rhetorical place is a proposition which is outside any particular subject it might help us to conclude something about. To take Aristotle's example in the *Rhetoric*,² the following proposition is a place: if a predicate is said of the subject it is less apt to belong to, then it is also said of the subject it is more apt to belong to. This proposition pertains no more to the subject of one science than another. We could use it just as well in regard to the subject of natural science as to that of moral science or any other science. If a man thought it probable that the souls of brute animals were immortal, he would also admit this about the human soul for this latter is more thought to be immortal. Or, in moral science, if he thought that fornication was a sin, he would also agree that adultery was a sin since adultery is thought to be worse than fornication. Notice that the place is insufficient, by itself, for concluding something about any subject — one must take with it something else which is peculiar or proper to that subject. The four tools supply the propositions which are peculiar to a given subject. As in our examples, one might ask whether it did not seem to all or most men that adultery was worse than fornication, or whether most men did not think that man is more likely to have an immortal part in him than are the other animals.

There is a second likeness to the place in nature that we can observe in the logical place. Just as bodies have a certain order or

1. C.1-4.

2. Bk.I, c.2.

position among themselves according to the places they occupy ; so the things in our intellect have a certain order among themselves according to the relations which the intellect attributes to them in their state of being understood. Thus we carry over words that first apply to the position or order of bodies in place to the order or position of things understood in the mind. For example, in the *Categories*, we speak of *higher* and *lower* genera, and in regard to the syllogism, we speak of *before* and *after*. This order in the intellect is based on the relations which the intellect attributes to things understood in their state of being understood, such as genus, species, etc. And the dialectical places are based upon these common intentions. For example, there is the following place based on the intentions of genus and species : if a genus is said of a subject, then one of the species of that genus must also be said of that subject. Or, the former example we gave of a place was based on the intentions of predicate and subject. This also agrees with what was said in regard to the first likeness since these intentions are extrinsic to the subjects considered :

Dialecticus autem procedit . . . ex intentionibus rationis, quae sunt extranea a natura rerum. Et ideo dicitur, quod dialecticus est tentativa, quia tentare proprium est ex principiis extraneis procedere.¹

It might be good to investigate this more fully in the light of the purpose of logic. The purpose of logic is to help us to come to a knowledge of what is unknown to us. But there are two ways of coming to a knowledge of what is unknown to us : one is to discover it by ourselves and the other is to acquire or learn it from a teacher. The second way, although more common, presupposes the first and, in fact, imitates it. Let us start with the second which is more known to us. Since it is not by chance that the students learn something that was unknown to them from the teacher, there must be some determinate means whereby the teacher succeeds in bringing the students to a knowledge of what was unknown to them. What is common to every teacher is that he uses *words* to teach the student. Words seem to be a necessary tool which the teacher uses to communicate new knowledge. But how can words communicate knowledge of what is unknown to us? If we know the meanings of the words spoken to us, we already know anything the teacher can say. If the meanings of the words are unknown to us, the teacher again communicates nothing ; just as if he were speaking in a foreign language not known to us.

If we take the first half of this dilemma which is more reasonable (for no one thinks that a teacher communicates anything if his words

1. ST. THOMAS, *In IV Metaph.*, lect.4, n.574.

do not signify anything to the students), it follows that the teacher makes use only of what is known already to his students. Thus it must be that the teacher leads them to a knowledge of what is unknown to them through what is known to them. But, if the student comes to a knowledge of what is unknown to him through what he knows already, why does he need a teacher at all? What does the teacher add to the things the student knows?

The words of the teacher not only signify things the student knows already, but also an *order* the student can put into his own knowledge. If the student could put that order into the things he knows without having someone else point it out to him, he would have no need of the teacher. This is, in fact, what that man does who discovers, by himself, something unknown to him. This is also why we said that learning imitates the process a man would go through in coming to know something by himself.

But, there is something more fundamental than the order which is put into the things we know so that we can come to a knowledge of the unknown. Man could not derive the unknown from the known unless they had some order or relation to each other. If there were no order or relation of the known to the unknown, it would be impossible to proceed by art (i.e., through determinate means) from one to the other. And, in fact, the order of things known to each other is for the sake of the order of things known to things unknown; just as the order of the parts of a chair to each other is for the sake of the order of the whole chair to sitting.

But, there are two kinds of order or relation that things known can have to things unknown. One is the order or relation that belongs to the thing known, or the thing unknown, considered in themselves, apart from any knowledge we may have of them. For example, smoke has a certain relation to fire apart from any knowledge we may have of them. Or, quantities equal to a third quantity have a certain relation to each other, and this relation belongs to them apart from any knowledge we may have of them. Or, every effect has a certain relation to its cause, and this is so apart from any knowledge we may have of them.

There is a second kind of relation or order that things known can have to things unknown and vice-versa. This is an order or relation that belongs to them in the state of being understood. And, since a thing is singular when sensed in nature and universal when understood, those relations which presuppose universality are relations that belong to things in their state of being understood. For example, the order or relation of habit to virtue and vice, or of these latter to habit, is one that belongs to them in the state of being understood. We name these relations genus and species, respectively. Or, to be a major or minor or middle term in a syllogism is to have a relation in the state of being understood.

Since logic directs us from a knowledge of the known to a knowledge of the unknown, it must be concerned with directing us on the basis of both of these kinds of relation that the known can have to the unknown. For it is possible to proceed by art from the known to the unknown on the basis of either of these kinds or relation or order.

This, however, seems to be contrary to the common opinion among those learned in logic ; to wit, that the subject of logic is only the second kind of relation or order. It is said that the subject of logic is second intentions and, by second intentions, is meant those relations that belong to things understood in the very state of being understood.

We answer that the subject of logic is, indeed, second intentions. But, this does not prohibit logic from directing us from the known to the unknown on the basis of an order or relation which these things have to each other in reality. This does not mean, however, that logic has that relation as its subject. Rather the subject of logic would be some relation that the thing known can have to the thing unknown in the state of being understood, which relation, however, presupposes a relation in reality itself. For example, because an effect has a relation to its proper cause in reality, we can use the effect (if it is known) as a middle term for concluding the existence of the cause (if this is unknown). To be a middle term, or that through which something else is made known, is a relation that belongs to the effect in the state of being understood. And to be a conclusion is something that belongs to the existence of the cause in the state of being understood. Now the effect could not be a middle term for manifesting the existence of its cause unless it had a real relation to its cause in reality. Hence, in showing us that an effect can be a middle term for manifesting the existence of its cause (or that a cause, made explicit in the definition of a subject, can be a middle term for manifesting why a property belongs to that subject in the conclusion), logic is showing us how to proceed by our reason from the known to the unknown on the basis of a real relation or order which they have to each other in reality, apart from any consideration we make of them.

All parts of logic, however, do not do this. This can be seen, for our purposes, in the part of logic concerning the complex unknown. In this part, we find both demonstration and dialectic. In demonstration, we proceed from the known to the unknown on the basis of a certain order or relation which they have to each other in reality, or in their proper natures, apart from their being understood. Thus, in geometry, we demonstrate that the triangle has its interior angles equal to two right angles (which was unknown to us before the demonstration) and we do so on the basis of the known relation of the exterior angle to the two interior and opposite

angles which is one of equality (a relation based on the natures of the things ; that is, upon their quantity) and also upon the known relation of quantities which are the results of adding equal quantities to the same quantity, which relation is also one of equality (if equals are added to equals, the results are equal : these relations of equality follow upon the very nature of quantity in itself and not upon its being understood). Or, in natural science, we demonstrate the existence of an unmoved mover (which is unknown) through the dependence in reality of motion (which is known) upon a mover and, ultimately, upon such a mover. Or, we demonstrate the nature of the soul (which is unknown) through those (known) operations which have in reality (even apart from our knowing it) a certain relation to, or order to, or dependence upon, the nature of the soul. Thus, in demonstration, we proceed from the known to the unknown on the basis of a certain order or relation which they have to each other in themselves ; and the relations which belong to them in the state of being understood are something secondary, although such relations are the subject of the demonstrative part of logic. This is why there is no *demonstrativa utens*. The use of the demonstrative part of logic does not consist in proceeding from the second intentions studied there to demonstrate something about what is found in reality ; rather it consists in proceeding from the causes or effects known in a particular science to demonstrate something about the effect or property or cause as the case may be.

The part of logic called dialectic also has as its subject relations that belong to things understood in the state of being understood. But, unlike the demonstrative part, it directs us in proceeding from the known to the unknown on the basis of the order or relation which they have to each other in the state of being understood. For example : every virtue is either moral or intellectual. But, human faith is neither a moral virtue nor is it an intellectual virtue. Therefore it is not a virtue. The unknown (human faith is not a virtue) has a certain order or relation to what is known (every virtue is either moral or intellectual, and human faith is not a moral virtue and human faith is not an intellectual virtue) which order is based on the relations of genus to species and of species to genus. Because of the relation of genus to species, we must attribute some species under a genus to whatever we wish to place under that genus. The relations of genus to species and vice-versa are relations that belong to the known and the unknown in the state of being understood. This is why there is a *dialectica utens*. One can proceed from the second intentions studied in the *Topics* to conclude something probable in the sciences.

From these things, we can see why the dialectical syllogism is said to be based on *places*. When we arrange things in place, there is a certain order or relation of them to each other. But this order

or relation is not based necessarily upon anything intrinsic to them. Similarly, in dialectic, the order or relation is something extrinsic to the known and the unknown since the order which belongs to things in the state of being understood by us is extrinsic to them. However this order may in some way touch upon an order which they have in themselves ; just as the ancients thought that bodies were arranged in place according to something intrinsic to them.

A third likeness can also be observed. Just as our eyes look in various places for a body that is hidden to them ; so our intellect considers various dialectical places to find what is unknown to it. If for example, it were unknown to the intellect whether government was good for society, it might look at the opposite, anarchy, and see if it was bad for society. One knows where to look in this case through this dialectical place : if one member of a pair of contraries belongs to one member of another pair, then the remainder belongs to the remainder. This fits in with the fact that dialectic is in the *pars inventiva* of logic. Here again we can see that the place is not sufficient by itself without the tools — unless one had the proposition that “anarchy is bad for society,” one could not find anything in the place.

This notion of dialectical place corresponds to the nature of a dialectical proposition or problem. A dialectical proposition is in the form of “Is X *said of* Y as an accident (or genus or property or definition)?” while a dialectical problem proposes to investigate “Whether X is *said of* Y as an accident (or genus or property or definition)?” Now outside the intellect, one thing is not *said of*, or predicated of, another. When we say that two is half of four, we make a statement about the way things are in themselves. But, when we say that half of four is *said of* two as a property, we are first saying something about two as it is in our intellect. For something is *said of*, or predicated of, two only in the intellect. Hence dialectic can proceed from second intentions which are relations that belong to things in their state of being understood. Thus the dialectician can argue that, if a man admits that virtue is *said of* courage as a genus, he must also admit that the genera above virtue are also *said of* courage as *remote genera*. This follows from the very order of things in our mind as genera.

From these things, we can see how far dialectical argument are from demonstrations in their principles and conclusions. The effect of demonstration is *scire* which Saint Thomas speaks about thus :

... *scire* aliquid est perfecte cognoscere ipsum, hoc autem est perfecte apprehendere veritatem ipsius : eadem enim sunt principia esse rei et veritatis ipsius, ut patet ex *II Metaphysicae*. Oportet igitur *scientem*, si est perfecte cognoscens, quod cognoscit causam rei scitae.¹

1. *In I Post. Anal.*, lect.4, n.32.

However, we must also avoid the opposite error of thinking that dialectic has nothing to do with the way things are. Something will not seem to be so to all men or most men, or to all or most learned men, or to the most famous of them unless it has some element or appearance of the truth. And, the intentions, upon which the places are based, result from a way of truly understanding something outside the intellect. They are, thus, not arbitrary or fictitious. This is also why there can be a science about them although we cannot have science by arguing from them in other sciences. Moreover, when a man is led by dialectical arguments to contradict himself, this shows that he has *not* attained things as they are.

After this glimpse at the nature of the art of dialectic, let us try to answer Descartes' objections to it. We shall first answer the particular objections against the uses of dialectic since from this will become clear the answer to the general objections.

The first argument against the use of dialectic to exercise the mind is that such exercise must be bad, for it produces a bad habit — scepticism. The construction of arguments leading to opposite conclusions on every subject makes the mind think that truth is unattainable by us.

We answer that dialectical arguments must be regulated by art and every art aims at the mean. A moderate use of dialectical arguments does not produce scepticism, but make the intellect more able to distinguish, compare, and avoid error. The mean in dialectical arguments, both as to their number and their difficulty, must be considered, not only in relation to a subject, but especially in regard to the student. They should be neither too many nor too difficult for the student at his stage of development. Dialectical arguments should not be separated from an eventual solution of the doubt generated by them, and they should not be multiplied so much that the student despairs of reaching the truth. Scepticism is a kind of despair and despair, like its opposite, hope, concerns a *bonum arduum*. But the doubts or difficulties generated by dialectical arguments are a *bonum arduum*. When those difficulties are excessively multiplied and no solutions are given, the student loses hope of achieving the difficult good — truth — and despairs. This despair is the substance of scepticism. Descartes probably experienced an unregulated use of dialectical arguments which easily produces the despair of scepticism.

The second argument against the use of dialectic as an exercise for the intellect is that dialectical arguments against the truth leave our mind disposed against the truth. This disposition is bad and, hence, the exercise that produces it is bad.

We answer that it is proper to dialectic to argue on both sides of a question and, thus, the mind is not left with a strong disposition against the truth. Besides, dialectical arguments are not capable of generating a habit ; i.e., a quality difficult to change, unless they are

thought to be demonstrative. But this latter is due to an ignorance of the art of dialectic. Moreover, any disposition left in the mind by dialectical arguments against the truth (unless they are excessive) is a *per accidens* help in coming to a fuller knowledge of truth. For the mind attempts with much greater intensity to know the truth when trying to overcome that disposition, or solve those dialectical arguments, than it would have if it simply tended towards the truth without facing any impediments.

The third argument against the use of dialectic as an exercise is that dialectical arguments may lead us by custom or repetition to think that we have really attained certitude.

To this we can give again the first two answers that we gave above to the second argument. The art of dialectic constructs arguments on both sides so that we are not convinced merely because we have heard only one side. Again, if we have the art of dialectic, we will recognize dialectical arguments for what they are. Moreover, the person who has not exercised his mind on both sides of a difficult question is much more apt to be deceived into thinking that some probable or sophistical argument is a demonstration; for, he sees nothing in opposition to his probable or sophistical argument which would lead him to examine that argument more carefully.

The following argument was raised against the second use of dialectic in regard to meeting an opponent with his own opinions: a good argument should be convincing to all. Thus, we use the same scientific reason with others that we used to convince ourselves. The geometer, for example, uses the same demonstration with his class that before convinced him. Hence, there can be no valid logic to construct arguments that are not convincing for all.

We answer that every good argument proceeds from the more known, but one cannot say that the more known is in every way the same for all men. That which approaches more closely to what men know naturally is more known to them. But *natural* here can mean two things. If we are referring to the *nature of man* which is common to all men, then the same things are more known to all men; e.g., the things they can sense are more known to men than the non-sensible or immaterial things. But, if we are referring to what is sometimes called *second nature* — the habits, customs and traditions a man acquires or is part of — then, it is clear that the same things are not more known or accepted by all men. All men have not had the same teachers, or been in the same schools, or heard the same opinions repeated throughout their lives. Hence, since men tend to proceed from the more known in the second sense as much as, if not more than, they do from the more known in the first sense (the reason for this is that habit is a more proximate and determinate principle), it is often necessary to start with them where they are, even though this is different from your starting-point.

But to start with the other person's opinions is to proceed dialectically. Through his true opinions (he has them since nature in the first sense is never entirely corrupted by bad habits), we can lead a man to contradict his false opinions, and thus we shall lead him back to what is more known according to the nature which is common to all men.

Again, people make errors. But the person who is in error thinks himself to know. Hence, he is in a different position with regard to the truth than is a man who is merely ignorant. The latter merely *lacks* the truth while the former has a positive or real disposition against, or contrary to, the truth. But, the second use of dialectic does not communicate science or truth ; rather, it eliminates a disposition contrary to the truth. Hence, it is not strange that its arguments are different from those of science which is the same for all. Truth is one, but there are an infinity of errors against it. Although truth is the same for all, the errors which men make against truth are not always the same. Hence, the dialectical arguments, which help to remove their errors, are not the same.

The argument against the third use of dialectic was as follows : in science where one gets necessary knowledge (as in geometry), a proposition is either obvious (as the principles) or shown through ones that are obvious (as the conclusions). But in neither of these two cases is there a need for making something clearer by arguing to opposites. What is obvious needs no manifestation, and why argue to its opposite which is manifestly false? The conclusions are made known by being deduced necessarily from the principles, not by arguing to opposites. Hence, we find no arguing to opposites in Euclid when he draws his conclusions necessarily. Hence, dialectic is useless for making the truth appear better in a science.

We answer that dialectic is useful to those wanting to investigate the truth more than to those who already have the truth. We will see that this is so concerning the principles in the answer to the next objection. But, even after one has the principles, it does not follow that one sees everything to which the power of those principles extends. Otherwise, as soon as a man had acquired the principles of a science, he would possess the whole science. But this is not so as we can see in the case of a student who has just acquired the proper principles of geometry. He still needs to be instructed about the various conclusions that can be deduced from those principles. But, in geometry (or arithmetic), once a man has deduced conclusions from the principles, he can demonstrate those same conclusions to another man without using dialectic. Why cannot this be done without dialectic in the other sciences, like natural science or metaphysics?

When we examine the subjects of these other sciences (natural science and metaphysics), we see that they are difficult for our intellect to understand for reasons that do not apply to the subject of geometry.

But the subjects of natural science and metaphysics are difficult to know for different reasons. The things studied in natural science (like matter, motion, time, etc.) are difficult to know on account of their lack of being and, hence, lack of knowability, while the things studied in metaphysics (like the separated substances) are difficult to know on account of the weakness of our intellect — even though they are in themselves the most knowable. But the things studied in geometry (like triangles and squares) do not lack being, as mobile things, nor are they above the capacity of our intellect. We find something similar to this in the case of our eyes. My eyes have no difficulty in seeing the printed page before me now with the light there is. But it is difficult for my eyes to look at the sun, or to see something in the dark. The reason for the difficulty in seeing is not the same in each case. The sun is difficult to look at, not because it lacks visibility, but because our eye is too weak, the sun being too bright for it. The difficulty in the other case is due to the object which lacks visibility ; i.e., lacks light whence things are visible. Sciences like natural science have a difficulty analogous to the eye's difficulty in seeing things in the dark. Things like motion and time are difficult to know because they barely exist. When Shakespeare compares time to the waves, he is giving time an existence it does not have. Our minutes, unlike the waves, do not exist together. Sciences like metaphysics or theology have a difficulty analogous to the eye's difficulty in looking at an object that is too bright for it. But the subject of geometry is analogous to something that is not difficult for the eyes to see.

Thus, the proper principles of the mathematical sciences are easy to grasp while those of the non-mathematical sciences are grasped with difficulty and imperfectly. Then, since one must grasp a principle in itself before seeing it as a principle or before seeing what its power extends to, it follows that there is in the non-mathematical sciences a special difficulty of seeing what the power of their principles extends to. As we grasp their principles only imperfectly, we cannot immediately see what follows them even when the order of them to certain conclusions is proposed by the teacher. But, this is not so in geometry. There we see immediately that the principles involve a certain conclusion once the order of the former to the latter has been proposed by the teacher. This is why we have no need of dialectic in geometry. But, how does dialectic help us to see what follows from the proper principles of the other sciences?

Dialectic constructs probable arguments about the conclusions of a science. These probable arguments generate a doubt or problem about the conclusion. The intellect is forced to resolve that doubt. The resolution of this doubt about the conclusion is made only by extending the power of the principles to that conclusion. We see by experience in these non-mathematical sciences that the student

cannot well see how the power of the principles extends to new conclusions until he has tried to resolve the doubts about those conclusions.

We can also consider this difficulty about extending the power of the principles in the non-mathematical sciences in regard to what they are extended to. We often deduce properties, or something like a property, in the sciences. But, the properties of mathematical things are not difficult to know as far as their *quid nominis* is concerned ; e.g., although many demonstrations are required before the intellect sees that the triangle must have its interior angles equal to two right angles, there is no difficulty in seeing what it is to have interior angles equal to two right angles. But this is not so in the non-mathematical sciences. It is not easy to see what those things are which follow upon mobile being, the subject of natural science. Motion, place, and time are obscure. Similarly in theology, it is not easy to go from one attribute of God to another, but there are difficulties even in regard to what the attributes are ; e.g., eternity is not only difficult to prove of God, but it is also difficult to know what eternity is. Hence, there is also a need for dialectic because our intellect sees what the property is in an imperfect way. From these things, one can begin to see that the deductions in the non-mathematical sciences have a need for dialectic because of our necessarily imperfect and difficultly acquired knowledge of both the principles and the properties to be deduced from them. The problem is not just one of formal logic.

The next objection is against the particular use of dialectic with respect to the principles of the non-mathematical sciences : if dialectic is used to arrive at the principles of a science, you would come to know the principles from opinions. But, opinions are not certain. Hence, the principles would not be certain either, and this is contrary to the notion of principle of a science. Hence, dialectic is useless for knowing the principles of a science.

We answer that the principles do *not* depend upon the dialectical arguments in *being* understood, but in *coming-to-be* understood. These two things are not the same at all. Something can depend upon something else in order to come into existence and still not depend upon that other thing once it exists. A house depends upon the man building it in order to come into existence. But, once it exists, the house does not require the man who built it. He can die and the house will continue to exist.

Now, we do not have need of dialectic even to come to understand the principles of geometry since these latter have no special difficulty for our intellect. But in the non-mathematical sciences, as we have seen, there are special difficulties not met with in the case of the mathematical sciences. Their principles are hidden to us because, unlike quantity as quantity, they are not *per se* represented in our phantasms or images which are to our intellect as exterior colors are

to our eyes. But, they can be pointed out with the help of dialectic. This process of pointing them out does not make the principles depend upon the dialectical arguments in order to be understood in themselves once we have come upon them. This is similar to what happens in the case of the eyes when something in the distance is pointed out to them. We direct a person's eyes to something in the distance that he did not notice through other things that his eyes cannot miss. But, once his eyes come upon the object unnoticed before, he can see it by itself without any dependence on the objects which led him to it. Now the conflict of opinions on difficult questions is something the human intellect does not easily miss. When these are developed into dialectical arguments, there is pointed out to the intellect where there is something difficult to see or understand. The intellect concentrates itself there and may eventually unravel the difficulty, hitting upon the principle difficult to see or understand.

Let us take an example of this process. The first thing to be considered in the science of logic is the universal ; yet most men do not know distinctly what a universal is, since it transcends our sense and imagination whence our intellectual knowledge is derived. This, then, is an example of a principle which the human intellect does not easily grasp. How, then, could it be pointed out to those who founded the science of logic? Let us look at the following example of dialectical discussion taken from the *Parmenides* of Plato. Parmenides is questioning Socrates :

“ But I should like to know whether you mean that there are certain ideas of which all other things partake, and from which they derive their names ; that similars, for example, become similar, because they partake of similarity, and great things become great because they partake of greatness ; and that just and beautiful things become just and beautiful, because they partake of justice and beauty ? ”

“ Yes, certainly,” said Socrates, “ that is my meaning.”

“ Then each individual partakes either of the whole of the idea or else of a part of the idea ? Can there be any other mode of participation ? ”

“ There cannot be,” he said.

“ Then do you think that the whole idea is one, and yet, being one, is in each one of the many ? ”

“ Why not, Parmenides ? ” said Socrates.

“ Because one and the same thing will exist as a whole at the same time in many separate individuals, and will therefore be in a state of separation from itself.”

“ Nay, but the idea may be like the day which is one and the same in many places at once, and yet continuous with itself, in this way each idea may be one and the same in all at the same time.

“ If like your way, Socrates, of making one in many places at once. You mean to say, that if I were to spread out a sail and cover a number of men, there would be one whole including many — is not that your meaning ?

“ I think so.”

"And would you say that the whole sail includes each man, or a part of it only, and different parts different men?"

"The latter."

"Then, Socrates, the ideas themselves will be divisible, and things which participate in them will have a part of them only and not the whole idea existing in each of them?"

"That seems to follow."¹

Socrates' dilemma is due to his ignorance of something difficult to see or understand : the universal whole. Such a whole does not fall directly under our senses and imagination like the sensible integral whole. Hence, while the latter is easy to understand, the former is not. In speaking about the universal whole, which is said to be a whole according to a later sense of the word, Socrates, quite naturally, falls back upon the primary meaning of whole which is the integral one coming under his senses and imagination. Hence, he falls into doubt, and this doubt is a sign of there being something difficult to see in the matter. When our intellect concentrates on this difficulty, it sees the necessity of extending the word *whole*, with a new imposition, to the universal. When this has been done, a principle of logic has been discovered. But that principle would never have gotten out of the phantasms or images (where only the prime analogue of whole is represented) unless one had gone through this dialectical process or one similar to it. Once, however, the mind has understood the universal distinctly, it has no dependence on the dialectical process that led up to it.

Difficulties similar to this are also found in metaphysics and theology where we must also transcend our imagination. There seems to be a very close connection between the logical doctrine of analogy and the use of dialectic to bring the principles into our intellect from the phantasms or images which are to our intellect something like exterior colors are to our eyes. We can also see this close connection in natural science where the difficulty is due to the dimness of the object we are trying to know. In Book One of the *Physics*, we find the difficulties of Anaxagoras who came the closest to understanding prime matter. Anaxagoras cannot quite reach an understanding of the way things are *in* prime matter. Like Socrates above, he falls back upon a prior sense of the word. He thinks of things as being in prime matter as they are in a box or as parts are in a whole. Hence, like Socrates, he falls into all kinds of difficulties as Aristotle shows there. Our senses and imagination in some way attain directly to these first meanings of *in*, but only the intellect can extend the word *in*, with a new imposition, to being in the potentiality of matter. The intellect would never do this, however, except in the face of difficulties like those confronting Anaxagoras' position. We

1. *Dialogues of Plato*, Jowett Trans., Random House, N. Y., Vol.II, pp.91-92, n.131.

do not have these difficulties, however, in the case of the principles of geometry since these latter fall directly under the imagination whence our intellectual knowledge begins. The facts that we do not make use of analogous words in mathematics and that their principles can be arrived at without dialectic are connected just as the opposite facts are connected in the other sciences.

After these things, it is not difficult to answer the general objections against dialectic. The first general objections was that dialectic can give us no certitude since it proceeds from probable opinions. Hence, it can be of no use for the speculative intellect which desires certitude.

We answer that, although dialectic cannot give us certitude, it can be most useful in preparing the way for a certain knowledge both of the principles and of the conclusions of the non-mathematical sciences. Moreover, it is not possible for the speculative intellect to have certitude everywhere and a probable knowledge is better than complete ignorance.

The second general objection against dialectic was as follows : the opinions of men disagree. Hence, falsehood is found in them. But, from false premisses, you will probably eventually get false conclusions. And, in fact, some conclusions must be false since they are opposed (in fact, to lead to opposite conclusions is proper to dialectic and rhetoric). But, we desire to attain truth and avoid error in our reasoning. Therefore, dialectic is useless.

We answer that dialectic does not proceed from just any opinions, but from the probable. The probable has some element of truth in it, and that element of truth is what we want, not the element of falsehood. No man gets the whole truth by himself, but each one seizes some part of it. Dialectic enables us to collect these parts. Thus, dialectic is similar to listening to the advice of many men before making up our mind. We do not, however, swallow the advice of every man or everything a man may say. Moreover, if we proceed according to the art of dialectic, there is no error in concluding something which is false. The error would consist in assenting to that false conclusion as if it were true in itself. But, the dialectician, as we have seen above, does not assent absolutely to his conclusion. He merely shows that it follows from what is admitted as probable.

The third general objection against dialectic was this : since you argue to opposite conclusions with dialectic, you will contradict yourself. This contradiction of inconsistency is a sign of poor reasoning. Hence, dialectic is useless.

We answer that there is no contradiction in the person who says, for example, that it is probable that happiness is sense pleasure and that happiness is not sense pleasure. The affirmation is probable because it seems so to most men. The negation is probable because it seems so to wise men like Aristotle. But, if a person himself were

made to assent to both of these through different arguments starting from opinions he admitted as being true, such a man would be inconsistent. But to discover this inconsistency is not bad for it reveals an error which can then be eliminated.

It is difficult to judge without a complete consideration of these matters but, from what has been said, it seems that the position of Descartes on dialectic is untenable.

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