

Aquinas's Commentary on the De caelo, Lectures 16-21

Lecture 16: Two arguments for one universe, taken from lower bodies

Aristotle's Text	Aquinas's Commentary
<p>We must now proceed to explain why there cannot be more than one heaven-the further question mentioned above. For it may be thought that we have not proved universally of bodies that none whatever can exist outside our universe, and that our argument applied only to those of indeterminate extent.</p>	<p>154. After showing that the universe is not infinite in magnitude, the Philosopher here shows that there are not numerically many worlds, much less an infinitude of them.</p> <p>First he mentions his intention;</p> <p>Secondly, he pursues his proposition, at 155.</p> <p>He says therefore first [105] that because it has been proved that the body of the whole universe is not infinite, there remains for us to say that it is not possible that there be many heavens, i.e., many worlds: for we had already mentioned above that this was to be discussed.</p> <p>It should be noted that above the Philosopher mentioned that outside the heavens there is no body either finite or infinite; from which it follows that there is not another world besides it, for that would put a body outside the heavens. Consequently, if it were sufficiently proved above that outside the heavens there exists no body either finite or infinite, nothing would remain to be proved. But if someone does not consider that it was proved for bodies universally, namely, that it is impossible for any of them to be outside the world, but considers that the argument given above refers only to bodies assumed infinite, then, according to this, it still remains to be seen whether it is possible that there be many heavens, i.e., many worlds.</p>
	<p>155. Then at [106] he proves his proposition:</p> <p>First he shows that there is but one world;</p> <p>Secondly, he inquires whether it is possible that there be many worlds (L. 19).</p> <p>As to the first he does two things:</p> <p>First he shows that there is only one world and takes his argument from the lower bodies, of which everyone supposed the world to consist, at 156;</p> <p>Secondly, he shows the same with a general argument based on both the lower and the celestial bodies (L. 18).</p>

Aristotle's Text	Aquinas's Commentary
	<p>About the first he does two things:</p> <p>First he adduces arguments to prove his proposition;</p> <p>Secondly, he proves something he had presupposed (L. 17).</p> <p>With regard to the first he gives three arguments:</p> <p>The second one begins at 159;</p> <p>The third one in Lecture 17.</p>
<p>Now all things rest and move naturally and by constraint. A thing moves naturally to a place in which it rests without constraint, and rests naturally in a place to which it moves without constraint. On the other hand, a thing moves by constraint to a place in which it rests by constraint, and rests by constraint in a place to which it moves by constraint. Further, if a given movement is due to constraint, its contrary is natural.</p>	<p>156. Regarding the first he does two things [106]:</p> <p>First he presents three suppositions. The first is that all bodies rest and are moved both according to nature and according to compulsion. This of course is true in lower bodies which, since they can be generated and corrupted, can not only be transmuted from their species by the power of a stronger agent, but can be removed from their place by a violent motion or by violent rest. But in celestial bodies, since they are incorruptible, nothing can be violent and outside their nature.</p> <p>The second supposition is that in whatever place certain bodies remain according to nature and not through compulsion, they are moved thither by nature, and into whatever place things are carried by nature they naturally rest there. And the same is to be said about violence: in whatever place things rest through violence, they are carried to that place by violence; conversely, if they are carried to a place through violence, they are at rest there through violence. The reason for this supposition is that since rest in a place is the end of local motion, the motion must be proportionate to the rest, just as the end is proportionate to the means.</p> <p>The third supposition is that if any change of place is accomplished by violence to a body, the contrary change is according to nature for that body, as is plain from what was said above.</p>
<p>If, then, it is by constraint that earth moves from a certain place to the centre here, its movement from here to there will be natural...</p>	<p>157. Secondly, at [107] from these suppositions he argues to his proposition. First on the part of motion. For if there are two worlds, there must be earth in both. Therefore the earth in that other world will be moved to the middle of this world either by nature or by compulsion. If by the latter, we shall have to say, according to the third supposition, that the contrary change of place, i.e., from this world to the middle of that world is natural to it. And this is plainly false, since earth is never naturally moved from the middle of this world. Therefore, the first is also false, namely, that there is more than one world.</p>

Aristotle's Text	Aquinas's Commentary
<p>and if earth from there rests here without constraint, its movement hither will be natural. And the natural movement in each case is one.</p>	<p>158. Secondly, at [108] he argues to the same on the part of rest. For just as it is plain that the nature of earth does not allow being moved naturally from the middle of this world, so, too, the nature of earth has this quality, that it be naturally at rest in the middle of this world. If then earth brought here from that world remains here not by violence but by nature, it follows, according to the second supposition, that it will be brought from that middle to here according to nature. And this is so because there is but one motion, or one change of place, that is according to nature for earth; hence both motions cannot be natural to earth, namely, from that middle to this or from this to that.</p>
	<p>Then at [109] he presents a second argument which excludes a certain defect which someone can claim in the first argument: for someone could answer to the first that the earth in that world is different in nature from that in this world.</p> <p>First, then, Aristotle dismisses this at 160;</p> <p>Secondly, from this he argues to his proposition, at 162;</p> <p>Thirdly, he excludes an objection, at 163.</p> <p>He shows that the earth in the other world is of the same nature as that of this world:</p> <p>First with an argument taken on the part of the world, at 162.</p> <p>Secondly, with one based on motion, at 161.</p>
<p>Further, these worlds, being similar in nature to ours, must all be composed of the same bodies as it. Moreover each of the bodies, fire, I mean, and earth and their intermediates, must have the same power as in our world. For if these names are used equivocally, if the identity of name does not rest upon an identity of form in these elements and ours, then the whole to which they belong can only be</p>	<p>160. He says therefore first [109] that if the several worlds posited are of a like nature, they must be composed of the same bodies; further, each of those bodies must have the same virtue as the body of this world. Consequently, fire and earth must have the same virtue in each of those worlds, and the same goes for the intermediate bodies, air and water. For if the bodies that are there in another world are spoken of equivocally in relation to the bodies that exist among us in this world and are not according to the same "idea," i.e., not of the same species, the consequence will be that the entire world consisting of such bodies will be only equivocally called a world. For wholes that are composed of parts diverse in species are themselves diverse. But this does not seem to be the intention of those who posit many worlds; rather they use the word "world" univocally. Hence it follows according to their intention that the bodies in these different worlds possess the same virtue. And thus it is manifest that even in those worlds, just as in this, some one of the bodies constituting the world is apt to be</p>

Aristotle's Text	Aquinas's Commentary
called a world by equivocation.	moved from the middle, which belongs to fire, and some other to the middle, which belongs to earth, if it is true that all fire is akin in species to all other fire in whatever world it exists, just as the various parts of fire in this world are of one species. And the same holds for the other bodies.
Clearly, then, one of the bodies will move naturally away from the centre and another towards the centre, since fire must be identical with fire, earth with earth, and so on, as the fragments of each are identical in this world. That this must be the case is evident from the principles laid down in our discussion of the movements, for these are limited in number, and the distinction of the elements depends upon the distinction of the movements.	<p>161. Then at [110] he shows the same thing with an argument taken from motion. And he says that it is manifestly necessary that things be as we have said concerning the uniformity of the bodies which are in the various worlds; and this from the suppositions which are assumed with respect to motions. And he calls "suppositions" the statements which he uses to show the proposition, because here they are being assumed as principles, although some of them have been previously proved. Now one of the suppositions is that motions are finite, i.e., determinate with respect to species; for there are not infinite species of simple notions, but three only, as was proved above [cf. Lect. III, n. 9; also L. IV, n. 4]. A second supposition is that each of the elements is described in terms of having a natural tendency toward some one of the motions; as earth is described as heavy on account of its tendency to downward motion, and fire light on account of its aptitude for upward motion.</p> <p>Hence, since the species of motion are determinate, the same specific motions must exist in every world. And because each of the elements is described with respect to some motion, it is further necessary that the elements are specifically the same everywhere, i.e., in each world.</p>
Therefore, since the movements are the same, the elements must also be the same everywhere. The particles of earth, then, in another world move naturally also to our centre and its fire to our circumference. This, however, is impossible, since, if it were true, earth must, in its own world, move upwards, and fire to the centre; in the same way the earth of our world must move naturally away from the centre when it moves towards the centre of another universe. This follows from the supposed juxtaposition of the worlds. For either we must refuse to admit the identical nature of the simple bodies in the various universes, or, admitting this, we	<p>162. Then at [111] from these premises he argues to the proposition. For if the bodies in every world are of the same species, and we see that all the parts of earth in this world are carried to the middle of this world, and all parts of fire to its boundary, then the consequence will be that also all the parts of earth in any other world are moved to the middle of this world, and all the parts of fire in any other world to the boundary of this world. But this is impossible. For if this should happen, the earth in another world would have to be carried upward in its own world and fire in that world would have to be carried to its middle. Similarly, the earth in this world would be naturally carried from the center of this world to the center of that world.</p> <p>And this must follow on account of the disposition of the worlds which have such a position that the middle of one world is at a distance from the middle of another; consequently, earth cannot be moved to the middle of another world without leaving the middle of its own world and moving to the boundary, which is to be moved upward. Likewise, because the boundaries of various worlds have different positions, then if fire is to be carried to the boundary of another world, it must leave the boundary of its own world, which is to be moved downward in its own world. But all these things are untenable - for either we must posit that the natures of the simple bodies are not the same in the several worlds (which was disproved above), or, if we say that they are of the same nature and wish to avoid the aforesaid inconsistencies which follow upon a diversity of middles and boundaries, we must admit but one middle to which all heavy bodies, wherever they are, are moved, and one boundary to which are moved all light things wherever they be. On this assumption, it is impossible that there be many worlds, because one middle and one boundary imply one circle or sphere.</p>

Aristotle's Text	Aquinas's Commentary
<p>must make the centre and the extremity one as suggested. This being so, it follows that there cannot be more worlds than one.</p>	
<p>To postulate a difference of nature in the simple bodies according as they are more or less distant from their proper places is unreasonable. For what difference can it make whether we say that a thing is this distance away or that? One would have to suppose a difference proportionate to the distance and increasing with it, but the form is in fact the same.</p>	<p>163. Then at [112] he excludes an objection, since someone could say that the bodies in another world are not moved to the center and boundaries of this world on account of the distance.</p> <p>But he rejects this and says that it is unreasonable to accept the postulate that the natures of simple bodies vary on the ground of their being more or less distant from their places, so as to be moved to their places when they are near but not when they are far away. For it does not seem to make any difference to the nature of the body whether it is this far or that far from its place, because mathematical differences do not vary the nature. For it is according to reason that the closer a body gets to its place the more swiftly is it moved, but yet the species of its motion and of the mobile are not varied. For a difference in velocity is according to quantity, not according to species, just as is a difference in length.</p>

Lecture 17: A third argument from lower bodies. Natural bodies have determinate places

Aristotle's Text	Aquinas's Commentary
	<p>164. Having given two arguments showing that the world is one, Aristotle here gives a third argument for the same. And this argument adds something which seemed to be lacking in the first argument. For someone could say that it is not inherent in bodies to be naturally moved to certain definite places, or, if they are moved to definite places, those that are one in species and diverse in number are moved to numerically diverse places, which agree in species. But they are not moved to the same numerical place as the first argument supposed.</p> <p>Therefore, in order to make these things sure, Aristotle adduces this third argument. With respect to this he does three things:</p> <p>First he gives the argument, at 165;</p> <p>Secondly, he excludes an objection, at 166;</p> <p>Thirdly, he infers the main conclusion, at 169.</p>
<p>Moreover, the bodies must have some movement, since the fact that they move is quite evident. Are we to say then that all their movements, even those which are mutually contrary, are due to constraint? No, for a body which has no natural movement at all cannot be moved by constraint. If then the bodies have a natural movement, the movement of the particular instances of each form must necessarily have for goal a place numerically one, i.e. a particular centre or a particular extremity.</p>	<p>165. He says therefore first [113] that the above-mentioned bodies must have some motion. For it is manifest that they are moved - this, indeed, is evident to sense and to reason, because such are natural bodies, i.e., bodies which it befits to be moved. Therefore there can remain the doubt whether it is to be said that natural bodies are moved violently with all the motions with which they are moved, even if they are contrary motions - for example, that fire is moved both upward and downward by compulsion. But this is impossible, because what is not apt to be moved at all, i.e., what of its nature has no motion cannot be moved by compulsion. For we say that a thing suffers compulsion if it is removed from its proper inclination by the force of a stronger agent. If, therefore, there is not a natural inclination to certain motions in bodies, compulsion has no place in them - any more than blindness would be attributed to an animal if it had no capacity to see. Consequently, we must admit that those bodies which are parts of the world have a motion according to nature, and among the bodies having a nature, the motion is one. Now motion is called "one" inasmuch as it is to one terminus, as is plain in <i>Physics</i> V. Therefore the motion of each thing belonging to the same species must be to one numerical place: namely, if they are heavy, it is to the middle, which is of this world; if they are light, it is to the boundary which is of this world. And upon this it follows that there is one world.</p>
<p>If it be suggested that the goal in each case is one in form but numerically more than one, on the analogy of particulars which are</p>	<p>166. Then at [114] he excludes an objection. For someone could say that all bodies having the same natural motion are moved to places that are the same in species, but several numerically - since even the singulars, i.e., the individual parts of one natural body, e.g., earth or water, are numerically many but do not differ in species. But oneness of nature in the mobiles that are of the same species does not seem to require any more than that</p>

Aristotle's Text	Aquinas's Commentary
<p>many though each undifferentiated in form, we reply that the variety of goal cannot be limited to this portion or that but must extend to all alike. For all are equally undifferentiated in form, but any one is different numerically from any other.</p>	<p>their motion be one in species; in keeping with this, it would seem to be enough if the places at which the motion is terminated were alike in species.</p>
<p>What I mean is this: if the portions in this world behave similarly both to one another and to those in another world, then the portion which is taken hence will not behave differently either from the portions in another world or from those in the same world, but similarly to them, since in form no portion differs from another.</p>	<p>167. But in order to exclude this he says that such an accident, namely, being moved to the same specific places, does not seem to be congruent to one set of parts and not to another (i.e., such that some parts alike in species would be moved to the same numerical place and others to the same specific place); rather it should be congruent to all alike (i.e., either all the parts alike in species be moved to the same numerical place, or all such parts be moved to one place specifically similar but numerically different) - for all such parts are alike in not differing specifically, but each differs from the other numerically. The reason he says this is that the parts of any body, for example, earth, which are in this world are similarly related both to the parts of earth in this world and to the parts in another world, since earth here and earth there are specifically the same. If, then, a part, e.g., of earth, be taken hence, i.e., from this world, it makes no difference whether it is compared to parts in some other world or to parts in this world; rather the relationships are the same in both cases. For the parts of earth in this world and those in some other world do not differ in species. And the same holds for other bodies. But we see that all parts of earth in this world are moved to one numerical place; similarly for other bodies. Therefore all the parts of earth in whatever world they exist are naturally moved to this middle of this world.</p> <p>168. Therefore the very natural inclination of all heavy bodies to one numerical middle, and of all light bodies to numerically one boundary, manifests the unity of the world. For it cannot be said that in the many worlds, bodies would be arranged according to diverse middles and boundaries, as happens in the case of men in whom the centers and boundaries are numerically diverse but specifically the same. For the nature of man's members or those of any other animal is not determined with respect to their relationship to some place but rather with respect to their relationship to some act; indeed, the position occupied by the parts of animals is in keeping with a suitable operation of the members. But the nature of heavy and of light things is determined to definite places, such that all having the same nature also have numerically one natural inclination to numerically one place.</p>
<p>The result is that we must either abandon our present assumption or assert that the centre and the extremity are each numerically one. But this being so, the heaven, by the same evidence and the same necessary inferences, must be one</p>	<p>169. Then at [115] he infers the principal conclusion. For when a conclusion according to due form is inferred from premises, either the conclusion must be concluded or the premises denied. He concludes, therefore, that either it is necessary to deny these suppositions, i.e., the principles from which he concluded the proposition, or to concede the conclusion, namely, that there is one middle to which all heavy things are moved, and one boundary to which all light things are carried. If this is true, then it is necessary as a consequence that there be one heaven, i.e., one world and not several, and this on account of the above-given "arguments," i.e., signs and "necessities," i.e., necessary arguments.</p>

Aristotle's Text	Aquinas's Commentary
only and no more.	
<p>A consideration of the other kinds of movement also makes it plain that there is some point to which earth and fire move naturally.</p>	<p>170. Then at [116] he proves something he had assumed, namely, that natural bodies have definite places to which they are naturally borne.</p> <p>First he proves the proposition;</p> <p>Secondly, he rejects a contrary opinion (L. 18).</p> <p>About the first he does two things:</p> <p>First he shows the proposition by a natural argument;</p> <p>Secondly, by a sign, at 173.</p> <p>As to the first he does three things:</p> <p>First he proposes what he intends, and says it is clear from other arguments than the foregoing - or even from other motions - that there is a definite place whither earth is naturally borne. And the same is to be said of water and of any of the other bodies.</p>
<p>For in general that which is moved changes from something into something, the starting-point and the goal being different in form, and always it is a finite change. For instance, to recover health is to change from disease to health, to increase is to change from smallness to greatness. Locomotion must be similar: for it also has its goal and starting-point—and therefore the starting-point and the goal of the natural movement must differ in form—just as the movement of coming to health does not take any direction which chance or the wishes of the mover may select. Thus, too, fire and earth move not</p>	<p>Secondly, at [117] he gives his argument, saying that entirely, i.e., universally, this is true, that whatever is moved is changed from something determinate to something determinate: for it is said in <i>Physics</i> I that something white comes to be, not from any non-white at random, but from black. Now these two factors, namely, that from which a motion proceeds, and that into which it is terminated, differ in species - for they are contrary, as is plain in <i>Physics</i> V; but contrariety is a difference respecting form, as is said in <i>Metaphysics</i> X. He proves what he has said by the fact that every change is finite, as was proved in <i>Physics</i> VI, and also by the facts cited above, namely, that nothing is moved to what it cannot attain; but nothing can attain to the infinite; hence every change must be finite. But if there were not something definite toward which a motion tends and something specifically different from that, at which it begins, the motion would have to be infinite; for there would be no reason why the motion should end here rather than elsewhere, but, for the same reason that it began to be moved thence, it would also begin to be moved hence.</p> <p>He also explains what was said, by an example. For what is healed is moved from sickness to health; what is increased is moved from small to large. Hence, too, what is carried, i.e., moved according to place, is moved from something definite to something definite, and these are the place at which a motion begins, and the place to which it tends. Consequently, there must be a specific difference between the place from which something is locally moved and the place into which it is naturally borne, just as what is healed does not tend to just anything at random, as though by chance, or solely according to the will of the mover, but to something definite, to which</p>

Aristotle's Text	Aquinas's Commentary
<p>to infinity but to opposite points; and since the opposition in place is between above and below, these will be the limits of their movement.</p>	<p>it is inclined by nature. In the same way, therefore, fire and earth and other natural bodies are not borne ad infinitum, i.e., to something indefinite, as Democritus held; rather they are borne to places opposite to those in which they previously found themselves. But "up" is contrary to "down" in the realm of place. It follows, therefore, that "up" and "down" are the termini of the natural motions of simple bodies.</p>
<p>(Even in circular movement there is a sort of opposition between the ends of the diameter, though the movement as a whole has no contrary: so that here too the movement has in a sense an opposed and finite goal.) There must therefore be some end to locomotion: it cannot continue to infinity.</p>	<p>172. Then at [118] he excludes an objection by which someone could object that circular motion does not seem to be from opposite to opposite, but more from the same to the same.</p> <p>But he says that even circular motion somehow involves opposition of termini. He says "somehow" for two reasons. First, because opposition in circular motion is not found with respect to points designated on the circle insofar as they are points of the circle, but only insofar as they are the extremities of the diameter - on the basis of which a maximum distance is reckoned in a circle, as was said above. Hence he adds: "What are according to the diameter," i.e., the extremities of the diameter, "are opposite." Secondly, because just as the whole spherical body does not change place as to subject but only in conception, although the parts change their place even as to subject, so also, if the entire circular motion is taken, there is no opposition in termini, except conceptually, namely, in the sense that the same [point], from which and to which circular motion is, is taken now as the beginning and now as the end. But if we take the parts of circular motion, we find opposition with respect to a straight line, as has been said. And therefore he adds that there is nothing contrary to a whole revolution. Consequently, it is plain that even in things circularly moved, the change is in a certain way toward things opposite and determinate.</p> <p>Thus he concludes universally to what he intended, namely, that there is necessarily an end involved in local motion and that a natural body is not moved in infinitum [i.e., to nothing definite], as Democritus posited about the motion of atoms.</p>
<p>This conclusion that local movement is not continued to infinity is corroborated by the fact that earth moves more quickly the nearer it is to the centre, and fire the nearer it is to the upper place. But if movement were infinite speed would be infinite also; and if speed then weight and lightness. For as superior speed in downward movement implies superior weight, so infinite increase of weight</p>	<p>173. Then at [119] he proves the same thing through a sign. This proof he calls an "argument" in the sense that it is, so to speak, conjectural. And he says that the argument for claiming that a natural body is not moved to infinity but to something certain is that earth, the closer it approaches the middle, the more swiftly it is moved (which can be perceived from its greater impetus, namely, as something is more strongly impelled by the heavy in its fall as it nears the terminus of its motion); and the same holds for fire whose motion is swifter, the closer it approaches an upward place. If, therefore, earth or fire were moved to infinity, their speed could increase indefinitely.</p> <p>And from this he concludes that the heaviness or lightness of a natural body could be increased infinitely. For just as the speed of a heavy body is greater according as the heavy body descends farther (and a heavy body is swift on account of its heaviness), so, too, an indefinite addition could be made to the speed if an infinite addition were made to heaviness or lightness. But it was shown above that there cannot be an infinite heaviness</p>

Aristotle's Text	Aquinas's Commentary
<p>necessitates infinite increase of speed.</p>	<p>or lightness, and that nothing can be moved toward what it cannot attain. Consequently, addition of heaviness ad infinitum cannot occur, and, as a result, neither can addition of speed. Hence neither can the motion of natural bodies be tending toward what is infinite.</p> <p>174. It should be noted that the cause of this accident that earth is moved more swiftly the more it descends was explained by Hipparchus in terms of an agent causing motion by compulsion. The farther the motion is from such an agent the less remains of that agent's power, so that the motion becomes slower. Hence in the beginning, a compulsory motion is intense but in the end it is weakened, until finally the heavy body can no longer be borne upward, but begins to be moved downward due to the small amount of the agent's virtue that remains, which, the less it becomes, so much the swifter becomes the contrary motion.</p> <p>But this explanation is applicable only to things that are moved naturally after a compulsory motion; it does not apply to things that are moved naturally on account of being generated outside their proper places.</p> <p>Others explained this phenomenon in terms of the amount of the medium through which the motion takes place (for example, the amount of air): in such a motion, if it is natural, the farther a thing has been moved, the less is the amount remaining - and, therefore, the less is it able to impede a natural motion. But this explanation also, applies no less to compulsory motions than to natural motions, in which, nevertheless, the contrary happens, as will be said below.</p> <p>Therefore, it must be said with Aristotle that the cause of this phenomenon is that, to the extent that a heavy body descends more, to that extent is its heaviness the more strengthened on account of its proximity to its proper place. And therefore he argues that if the speed increased infinitely, the heaviness, too, would increase indefinitely. And the same holds for lightness.</p>

Lecture 18: Exclusion of the opinion that natural bodies are not moved naturally to determined places. Unity of the world from higher bodies.

Aristotle's Text	Aquinas's Commentary
<p>Further, it is not the action of another body that makes one of these bodies move up and the other down; nor is it constraint, like the 'extrusion' of some writers.</p>	<p>175. After showing that natural bodies are by nature moved to definite places, the Philosopher here excludes a contrary opinion.</p> <p>First he proposes what he intends;</p> <p>Secondly, he proves his proposition, at 176.</p> <p>Now, since truth is established by excluding falsehood, the Philosopher here induces the exclusion of an error as a certain demonstration of the truth. He says, therefore, that what has been said is manifested by the fact that natural bodies are not borne upward and downward as though moved by some external agent.</p> <p>By this is to be understood that he rejects an external mover which would move these bodies per se after they obtained their specific form. For light things are indeed moved upward, and heavy bodies downward, by the generator inasmuch as it gives them the form upon which such motion follows, but they are moved per accidens, and not per se, by whatever removes an obstacle to their motion. However, some have claimed that after bodies of this kind have received their form, they need to be moved per se by something extrinsic. It is this claim that the Philosopher rejects here.</p> <p>Neither should it be said that these bodies are moved by compulsion, which is the opinion of those who said that they are moved by a certain "extrusion," in the sense that one body is displaced by another, stronger, one. For they assumed that there was one motion natural to all bodies, but since some are given momentum by others, it comes to pass that a certain number are moved upward and a certain number downward.</p>
<p>For in that case the larger the mass of fire or earth the slower would be the upward or downward movement; but the fact is the reverse: the greater the mass of fire or earth the quicker always is its movement towards its own place.</p>	<p>176. Then at [121] he proves his proposition with three arguments. The first of these is adduced mainly to show that bodies of this kind in their natural motions are not moved by external movers. For it is clear that a motion is slower to the extent that the mover overcomes the mobile less. But a given virtue of the mover overcomes a larger mobile less than a smaller.</p> <p>If, then, these bodies were moved by an external mover, a greater amount of fire would be moved upward more slowly and a larger amount of earth downward more slowly. But just the opposite happens, for a greater quantity of fire and a greater quantity of earth are moved more swiftly to their places. This gives us to understand that these bodies have the principles of their motion within themselves, and their motive powers are greater according as the bodies are greater, and that is why they are moved more swiftly. Consequently, it is plain that</p>

Aristotle's Text	Aquinas's Commentary
	such bodies in their natural motions are not moved by an exterior power but by an intrinsic one, which they have received from their generator.
Again, the speed of the movement would not increase towards the end if it were due to constraint or extrusion; for a constrained movement always diminishes in speed as the source of constraint becomes more distant,	177. At [122] he gives a second argument which is adduced mainly to show that motion of these bodies is not through compulsion. For we see that all things moved by compulsion are moved more slowly according as their distance from the mover increases, as is plain in projectiles, whose motion slackens near the end and finally fails. If, then, heavy and light bodies were moved by compulsion as though mutually pushing one another, it would follow that their motion toward their proper places would not be faster but slower in the end. But the contrary of this is plain to our senses.
and a body moves without constraint to the place whence it was moved by constraint. A consideration of these points, then, gives adequate assurance of the truth of our contentions.	178. He gives at [123] the third argument which can regard both. For we see that no body is moved by violence to a place whence it can be removed by violence. For it is because a body is apt to be in a certain place that it can be moved thence by violence; hence it was originally brought there naturally and not by violence. If, therefore, it is assumed that some motions of heavy and light bodies are violent by which they are moved from certain places, it cannot be said that the contrary motions which brought them there are violent. Thus it is not true that all the motions of these bodies are caused by another and by violence. He concludes from the foregoing, in summary, that speculation on these points will testify to the truth of what has been said.
The same could also be shown with the aid of the discussions which fall under First Philosophy, as well as from the nature of the circular movement, which must be eternal both here and in the other worlds.	179. Then at [124] he shows through the higher bodies which are moved circularly that the world is one: First in a special way by the higher bodies; Secondly, in a general way by the higher and the lower, at 181. He says therefore first [124] that there is still another way of proving that there is but one world, by arguments taken from first philosophy, i.e., by using what has been determined in the <i>Metaphysics</i> , and from what has been shown in <i>Physics</i> VIII, namely, that circular motion is eternal, which, both in this and in other worlds, has a natural necessity. For the Philosopher concluded to the eternity of celestial motion in <i>Physics</i> VIII by considering the order between mobiles and movers, which must be similar in any world, if "world" is taken univocally. Now if celestial motion is eternal, it must be moved by an infinite power, such as cannot exist in a magnitude, as was proved in <i>Physics</i> VIII. Such a power is non-material and consequently numerically one, since it is a form and species only, whereas it is through matter that individuals are multiplied in the same species. Consequently, the power that moves the heavens must be numerically one. Hence the heavens too must be numerically one, and, consequently, the whole world. 180. But someone can say that this argument does not conclude with necessity. For the first mover moves the heaven as that which is desired, as is said in <i>Metaphysics</i> XII. But there is nothing to prevent the same thing

Aristotle's Text	Aquinas's Commentary
	<p>from being accidentally many. So it seems that we cannot from the unity of the first mover conclude necessarily to the unity of the heavens.</p> <p>But it must be said that many can desire one thing, but not indeed in an identical way, since an absolute multitude is not joined immediately to one thing that is first; but many things can desire one thing according to a certain order, some being closer and some more remote, the coordination of which to one ultimate objective makes the unity of the world.</p>
<p>It is plain, too, from the following considerations that the universe must be one. The bodily elements are three, and therefore the places of the elements will be three also; the place, first, of the body which sinks to the bottom, namely the region about the centre; the place, secondly, of the revolving body, namely the outermost place, ...</p>	<p>Then at [125] he proves his proposition with an argument taken generally from higher and lower bodies. And he says that even the following consideration will show that it is necessary for the heaven, i.e., the world, to be one. To prove this he assumes that, just as there are three bodily elements, namely, heaven and earth and an intermediate, so there are three places corresponding to them: one is the place about the middle, that of the subsisting body, i.e., the place of the heaviest body which supports all, namely, earth; another is the place which is the highest in altitude, that of the circularly moved body; the third place is intermediate and corresponds to the intermediate body.</p> <p>With regard to these words it should be noted that Aristotle here reckons the heaven among the elements, although an element is something out of which things are composed, as is said in <i>Metaphysics V</i>.</p> <p>However the heaven, even though it does not enter into the composition of a mixed body enters into the composition of the whole universe, as being a part of it. Or he is using the word "element" in a wide sense to designate any of the simple bodies which he calls "bodily elements" to distinguish them from prime matter, which, though an element, is not a bodily element, for considered in itself it is without any form.</p> <p>Secondly, we should consider his statement that there are three places. Now since place is the boundary of a containing body, as is said in <i>Physics IV</i>, it can be clear what the place of the intermediate element is - for it is the surface of the supreme, body containing it. How the first body is in place has been explained in <i>Physics IV</i>. But how the middle [i.e., the center], which seems to be not a container but a contained, is the place of the heavy body seems to offer difficulty. [Appears here to be a circularity... the simple bodies are defined in terms of natural place, but place is determined by the bodies that are there]</p> <p>But it should be said that, as has been said in <i>Physics IV</i>, the surface of the containing body does not have the notion of place because it is the surface of such a body but with respect to the position it has in relation to the first container accordingly, namely, as it is nearer or farther from it [<i>But nature is unaffected by distance!</i>]. Now the heavy body in its nature is at a maximum distance from the celestial body on account of its materiality;</p>

Aristotle's Text	Aquinas's Commentary
	<p>therefore there is due it a place farthest from the first container and nearest to the middle. Consequently the surface containing the heavy body is called its place according to its nearness to the center. Hence he said advisedly that the place located around the middle is the place of the subsisting body.</p>
<p>... and thirdly, the intermediate place, belonging to the intermediate body. Here in this third place will be the body which rises to the surface; since, if not here, it will be elsewhere, and it cannot be elsewhere: for we have two bodies, one weightless, one endowed with weight, and below is place of the body endowed with weight, since the region about the centre has been given to the heavy body. And its position cannot be unnatural to it, for it would have to be natural to something else, and there is nothing else. It must then occupy the intermediate place. What distinctions there are within the intermediate itself we will explain later on.</p>	<p>182. From what has been set forth he goes on to prove his proposition from a light body, just as above he had proceeded from a heavy body. For it is necessary that a light body which is borne upwards be in this intermediate place: because, since every body is in some place, if the light body were not in this intermediate place, it would be outside it. But that is impossible, because outside this intermediate place there is, on the one side, celestial body which has no heaviness or lightness, and on the other side, terrestrial body which has heaviness. Now it cannot be said that there is a place more downward than the place of the body having heaviness, because the place about the middle is proper to it. But from this it is plainly impossible for another world to exist, because some light body would have to be there and thus, if that world were above this world, a light body would exist above the place of the heavens; if that world were below this world, a light body would be below the place of the heavy body - which is impossible.</p> <p>183. But to this argument someone could object that the light body would be outside this intermediate place not according to nature but outside its nature. To exclude this he adds that not even outside its nature can a light body be outside this intermediate place. Because every place that is outside nature for some body is according to nature for some other body. For neither God nor nature has made any place in vain, i.e., a place in which no body is apt to be. Now, no other body is found in nature except the three mentioned and to which the aforesaid places are deputed, as is plain from what has been said. Hence neither according to nature nor beside nature can a light body exist outside this intermediate place. Consequently, it is impossible that there be many worlds. Since he had spoken of an intermediate element as if it were one certain body, he adds that later, i.e., in the third and fourth books, he will speak about; the differences in that intermediate. For it is divided into fire, air and water, which is also light in relation to earth.</p>
<p>We have now said enough to make plain the character and number of the bodily elements, the place of each, and further, in general, how many in number the various places are.</p>	<p>Finally in summary he concludes that from the foregoing it is manifest about the bodily elements, which and how many they are, and what is the place of each of them and, in general, how many bodily places exist.</p>

Lecture 19: Solution of the argument seeming to justify several worlds.

Aristotle's Text	Aquinas's Commentary
	<p>184. After showing that there is but one world, the Philosopher here shows that it is impossible for there to be many. And it was necessary to prove this, because nothing prevents the possibility of something's being false [now] which can yet be true [later]. Concerning this he does three things:</p> <p>First he presents an objection which seems to show that it is possible that many worlds exist;</p> <p>Secondly, he answers it, at 194;</p> <p>Thirdly, he proves something he had presupposed in his answer (L. 20).</p> <p>About the first he does two things:</p> <p>First he states his intention and his plan of treatment;</p> <p>Secondly, he begins to prove his proposition, at 186.</p>
<p>We must show not only that the heaven is one, but also that more than one heaven is and, further, that, as exempt from decay and generation, the heaven is eternal.</p>	<p>185. He says therefore first [127] that after the foregoing, we must still prove that not only is there one world but that it is impossible for there to be more, and further that the world is eternal, so as to be imperishable, i.e. never ceasing to be, and unborn, i.e., never beginning to be, according to his opinion. He states this because the first consideration seems somehow to depend on the second. For if the world were generable and perishable by union and separation, according to friendship and strife, as Empedocles said, many worlds would be possible in the sense that when one had perished another would be generated later, as Empedocles believed. And because the truth is truly known when the difficulties which seem to be contrary to it are solved, therefore the first thing to do is bring forth the difficulties concerning this, i.e., which seem to indicate that there are or can be many worlds - for the solution to this difficulty will confirm the truth.</p>
	<p>186. Then at [128] he presents the argument that could lead one to question whether it is not possible for more than one world to exist. Hence he prefaces the remark that, for those who hold this point of view, i.e., the one coinciding with the argument to follow, it will appear impossible that it, namely, the world, be one and unique, i.e., that there be necessarily just one world. For the following argument does not prove that it is necessary that there be several worlds, which is equivalent to its being impossible that there be but one; rather it proves that it is possible that there be more than one world, which is equivalent to its not being necessary that there be but one. Now in order to show this he induces an argument containing two syllogisms:</p> <p>The first of these is at 187;</p>

Aristotle's Text	Aquinas's Commentary
	<p>The second at 190.</p> <p>The first syllogism is this: In all sensible things that come to be by art or by nature, the consideration of the form considered in itself is one thing and the consideration of the form insofar as it is in matter is another. But the heaven is a sensible thing having a form in matter. Therefore, the absolute consideration of its form, i.e., as considered universally, is one thing, and the consideration of its form in matter, i.e., as considered in particular is another.</p> <p>First, therefore, he presents the major, at 187;</p> <p>Secondly, the minor, at 188;</p> <p>Thirdly, he draws the conclusion, at 189.</p>
<p>We may begin by raising a difficulty. From one point of view it might seem impossible that the heaven should be one and unique, since in all formations and products whether of nature or of art we can distinguish the shape in itself and the shape in combination with matter. For instance the form of the sphere is one thing and the gold or bronze sphere another; the shape of the circle again is one thing, the bronze or wooden circle another. For when we state the essential nature of the sphere or circle we do not include in the formula gold or bronze, because they do not belong to the essence, but if we are speaking of the copper or gold sphere we do include them. We still make the distinction even if we cannot conceive or apprehend any other example beside the particular</p>	<p>187. He says therefore first [128] that in all things that exist and were generated, i.e., made, either by nature or by art, the form considered according to itself is one thing according to our consideration, and the form mixed with matter, i.e., the form taken as joined with matter, is another.</p> <p>He first explains this by an example in mathematical objects in which it is more evident, because sensible matter does not enter therein. For the species of a sphere is according to our consideration other than the form of the sphere in sensible matter, which is denoted when a sphere is called "golden" or "bronze"; similarly, the form of a circle is one thing, and what is meant by a golden or bronze circle is another. And this is evident, because when we give the <i>quod quid erat esse</i>, i.e., the defining notion, of a circle or a sphere, we make no mention therein of gold or bronze. This implies that to be "golden" or "bronze" does not pertain to their substance [essence], which the definition signifies.</p> <p>But there seems to be a difficulty in natural things, whose forms cannot exist or be understood without sensible matter, as "snub" cannot exist and be understood without "nose." Natural forms, however, although they cannot be understood without sensible matter in common, can be understood without signed sensible matter, which is the principle of individuation and of singularity. Thus, "foot" cannot be understood without flesh and bones, but it can be understood without this flesh and these bones. And therefore he adds that if we cannot understand and accept in our consideration anything outside the singular, i.e., outside the matter which is included in the notion of the individual, namely, as it is signate [<i>is signate a Thomistic notion deriving from the essence-esse distinction?</i>] - because sometimes there is nothing to prevent this from happening (namely, that a form be able to be understood without sensible matter) in the same way that we understood a circle without sensible matter; nevertheless, in natural things, in which forms are not understood without matter, the notions of the thing taken in common and taken in the singular are not the same, any more than the notion of "man" and of "this man" are</p>

Aristotle's Text	Aquinas's Commentary
<p>thing. This may, of course, sometimes be the case: it might be, for instance, that only one circle could be found; yet none the less the difference will remain between the being of circle and of this particular circle, the one being form, the other form in matter, i.e. a particular thing.</p>	<p>the same. Thus the essence of "circle" and "this circle," i.e., of the notions defining a circle, and this circle, are different. For the notion of a thing in common is the species, i.e., the notion of the species, but the notion of a particular thing signifies the notion of the species as found in determinate matter, and pertains to the singular.</p>
<p>Now since the universe is perceptible it must be regarded as a particular; for everything that is perceptible subsists, as we know, in matter.</p>	<p>188. Then at [129] he presents the minor of his syllogism. And he says that since the heaven, i.e., the world, is something sensible, it must be among the singulars, for every sensible thing exists in matter. For a form not in matter is not sensible but intelligible only - for sensible qualities are characteristics of matter.</p>
<p>But if it is a particular, there will be a distinction between the being of 'this universe' and of 'universe' unqualified. There is a difference, then, between 'this universe' and simple 'universe'; the second is form and shape, the first form in combination with matter;</p>	<p>189. Then at [130] he presents the conclusion and says that if the heaven, i.e., the world, belongs among the singulars, as has been shown, its notion as a singular will differ from its notion absolutely, i.e., taken universally the two notions will differ. Consequently, it follows that "this heaven" taken singularly will be different in consideration from "heaven" taken universally, i.e., this latter heaven taken universally will be as a species and form, while the other, namely, that taken singularly, will be as form joined to matter. However, this is not to be taken as implying that in the definition of a natural thing taken universally no matter is mentioned at all, but rather that individual matter is not mentioned.</p>
<p>and any shape or form has, or may have, more than one particular instance.</p>	<p>190. Then at [131] he presents the second syllogism, as follows: Whatever things have their forms in matter, are, or are able to be, several individuals of one species. But "this heaven" signifies a form in matter, as was said. Therefore, there either are, or can be, many heavens.</p> <p>Now in regard to this he first presents the major;</p> <p>Secondly, he explains it, at 191;</p> <p>Thirdly, [having taken the minor from the previous syllogism], he draws the conclusion at 192.</p> <p>He says therefore first [131] that all things of which there is a form and species, i.e., which are not themselves forms and species, but have forms and species, are either many individuals of one species or many can exist. But things that are themselves forms and subsistent species, as are separated substances, cannot have several members of one species.</p>

Aristotle's Text	Aquinas's Commentary
<p>On the supposition of Forms such as some assert, this must be the case, and equally on the view that no such entity has a separate existence. For in every case in which the essence is in matter it is a fact of observation that the particulars of like form are several or infinite in number.</p>	<p>91. Then at [132] he explains the foregoing both according to Plato's opinion and according to his own. And he says that whether there are "species," i.e., separated ideas, as the Platonists assume, then this must happen, i.e., there must be several individuals of one species - because the separated species is posited as the exemplar of a sensible thing and it is possible to make many copies according to one exemplar; or whether no such species exist separately, there can still be several individuals of one species. For we see this happen in all things whose substance (i.e., whose essence, which is signified by the definition) exists in signate matter, namely, that there are several individuals, or even an infinitude of individuals, of one species. The reason for this is that, since signate matter does not enter the notion of the species, the notion of the species can be indifferently verified in this individual matter and in that; consequently, there can be many individuals of one species.</p>
<p>Hence there either are, or may be, more heavens than one. On these grounds, then, it might be inferred either that there are or that there might be several heavens.</p>	<p>192. Then at [133] he draws the intended conclusion, namely, that either there are many worlds or many worlds can be made.</p> <p>Finally he says in summary that from the foregoing someone can conjecture that either there are, or can be, many worlds.</p> <p>193. But there seems to be a conflict here between Aristotle and Plato. For Plato in the Timaeus proved the oneness of the world from the oneness of the exemplar; but here Aristotle from the oneness of the separated species concludes to the possibility of several worlds.</p> <p>But two answers can be given to this. First on the part of the exemplar, which, if it is one in such a way that oneness is its essence, then the copy must imitate the exemplar in this oneness. But the first separated exemplar is such. Hence also the world, which is the first copy thereof, must be one. This was the way Plato proceeded in his proof. But if oneness is not of the essence of the exemplar but is outside its essence, then the copy could be like the exemplar in respect to what belongs to its species - for example, in the notion of man or horse - but not in respect to oneness. And it is in this way that Aristotle's reasoning proceeds.</p> <p>Or it can be answered from the viewpoint of the copy, which is more perfect to the extent that it is more faithful to the exemplar. Therefore, some copies are like one exemplar in respect to oneness of species, but not in respect to numerical oneness. But the heaven, which is a perfect copy, is like its exemplar with respect to numerical oneness.</p>
<p>We must, however, return and ask how much of this argument is correct and how much not. Now it is quite right to say that the formula of the shape apart from the matter must be different from that</p>	<p>194. Then at [134] he solves this objection:</p> <p>First he gives the solution;</p> <p>Secondly, he explains it, at 195.</p>

Aristotle's Text	Aquinas's Commentary
<p>of the shape in the matter, and we may allow this to be true. We are not, however, therefore compelled to assert a plurality of worlds. Such a plurality is in fact impossible if this world contains the entirety of matter, as in fact it does.</p>	<p>He says therefore first that in order to settle the above doubt we must once more consider what was said well and what not well. For if all the premises are true, the conclusion is necessarily true. He says, therefore, that it was correct to say that the notion of form differs, namely, in the case of that which is without matter and in the case of that which is with matter.</p> <p>This is to be granted as true. Consequently, the first conclusion which is the minor of the second syllogism is conceded. But from this it does not follow of necessity either that there are several worlds, or that there can be several, if it is true that this world consists of all its matter, as is true and as will be proved below. For the major proposition of the second syllogism, namely, that things which have a form in matter can be numerically many in one species, is not true except in things that do not consist of their entire matter.</p>
<p>But perhaps our contention can be made clearer in this way. Suppose 'aquilinity' to be curvature in the nose or flesh, and flesh to be the matter of aquilinity. Suppose further, that all flesh came together into a single whole of flesh endowed with this aquiline quality. Then neither would there be, nor could there arise, any other thing that was aquiline. Similarly, suppose flesh and bones to be the matter of man, and suppose a man to be created of all flesh and all bones in indissoluble union. The possibility of another man would be removed. Whatever case you took it would be the same. The general rule is this: a thing whose essence resides in a substratum of matter can never come into being in the absence of all matter.</p>	<p>95. Then at [135] he explains what he had said with an example.</p> <p>First he gives the examples;</p> <p>Secondly, he adapts them to his proposition, at 196.</p> <p>He says therefore first [135] that what has been said will become clearer from what will be said. For snub-nosedness is curvature in a nose or in flesh; thus flesh is the matter of snub-nosedness. If then from all flesh one flesh were to be made, namely, the flesh of one nose, and snub-nosedness existed in it, nothing else would be snub-nosed nor could be. And the same holds for man, since flesh and bones are the matter of man: if one man were formed from all the flesh and all the bones, so that he could now not be destroyed, there could be no more than one man - but if he could be destroyed, it would be possible, after his corruption, for another man to exist, just as when a box is destroyed, another can be made from the same wood. And the same is true for other things. And the reason for this he assigns, namely, that none of the things whose form is in matter can come into being if the proper matter is not at hand, any more than a house could be made if there were not stones and wood. Consequently, if there were no bones and flesh other than those of which the one man is composed, no other man could come into being but him.</p>
<p>Now the universe is certainly a particular and a material thing: if however, it is composed not of a part but of the whole of matter, then though the being of 'universe' and</p>	<p>196. Then at [136] he adapts this to his proposition. And he says it is true that the heaven is a singular thing and one constituted of matter. But it is not constituted out of part of its matter, but out of all of it. And therefore, although there is a difference between the notions of "heaven" and "this heaven," there neither is, nor can be, another heaven, due to the fact that all the matter of heaven is comprehended under this heaven.</p>

Aristotle's Text	Aquinas's Commentary
<p>of 'this universe' are still distinct, yet there is no other universe, and no possibility of others being made, because all the matter is already included in this.</p>	<p>197. However, it should be realized that some prove the possibility of many worlds in other ways. In one way, as follows: The world was made by God; but the power of God, since it is infinite, is not limited to this world alone. Therefore it is not reasonable to say that He cannot make yet other worlds.</p> <p>To this it must be said that if God were to make other worlds, He would make them either like or unlike this world. If entirely alike, they would be in vain - and that conflicts with His wisdom. If unlike, none of them would comprehend in itself every nature of sensible body; consequently no one of them would be perfect, but <i>one perfect world would result from all of them.</i></p> <p>In another way, as follows: To the extent that something is more noble, to that extent is its species more powerful. But the world is nobler than any natural thing existing here. Therefore, since the species of a natural thing existing here, for example, of a horse or cow, could perfect many individuals, much more so can the species of the whole world perfect many individuals.</p> <p>But to this it must be answered that it takes more power to make one perfect than to make several imperfect. Now the single individuals of natural things which exist here are imperfect, because no one of them comprehends within itself the total of what, pertains to its species. But it is in this way that the world is perfect; hence, from that very fact its species is shown to be more powerful.</p> <p>Thirdly, one objects thus: It is better for the best to be multiplied than for things not so good. But the world is the best. Therefore, it is better to have many worlds than many animals or many plants.</p> <p>To this it must be said that here it pertains to the goodness of the world to be one, because oneness possesses the aspect of goodness. For we see that through being divided some things lose their proper goodness.</p>

Lecture 20: The universe shown to consist of every natural and sensible body as its matter

Aristotle's Text	Aquinas's Commentary
<p>It remains, then, only to prove that it is composed of all natural perceptible body. First, however, we must explain what we mean by 'heaven' and in how many senses we use the word, in order to make clearer the object of our inquiry.</p>	<p>198. Having presented the solution brought forward, the Philosopher here proves what he had presupposed, namely, that the world consists of all its matter.</p> <p>First he tells his intention and order of procedure [137] and says that in order to complete the preceding solution, we must show that the world consists of every natural and sensible body, which is its matter. But before showing this, it is necessary to explain what is meant by this word "heaven," and in how many senses it is used, so that our question can be answered more clearly.</p>
<p>(a) In one sense, then, we call 'heaven' the substance of the extreme circumference of the whole, or that natural body whose place is at the extreme circumference. We recognize habitually a special right to the name 'heaven' in the extremity or upper region, which we take to be the seat of all that is divine. (b) In another sense, we use this name for the body continuous with the extreme circumference which contains the moon, the sun, and some of the stars; these we say are 'in the heaven'. (c) In yet another sense we give the name to all body included within extreme circumference, since we habitually call the whole or totality 'the heaven'.</p>	<p>199. Secondly he proves his proposition:</p> <p>First he shows the various senses of the word "heaven";</p> <p>Secondly, he proves the main proposition, at 200.</p> <p>With regard to the first [138] he gives three senses of heaven. In one way the heaven is called "the substance of the extreme circulation of the whole," i.e., that which is at the boundary of the whole universe and is moved circularly. And because he had explained the meaning of the word in terms of "substance," whose notion transcends natural philosophy, since it pertains to <i>Metaphysics</i>, he adds another explanation having the same meaning, saying that the heaven is "the natural body whose place is at the extreme circumference of the world," which explanation is more befitting to natural science.</p> <p>He proves this meaning from the way people speak - since words are to be used in the sense most people use them, as is said in <i>Topics</i> II. For men are more likely to call "heaven" that which is the extreme of the entire world and which is most up, not, indeed, as "up" is taken in natural science, i.e., as being the terminus of the motion of light things (for in this sense nothing is farther "up" than the place to which fire is borne) but as taken according to common parlance, where "up" designates that which is farther from the middle. "Up" also refers to the place of all divine beings (where "divine" signifies not celestial bodies - not all of which are in the outermost sphere - but non-material and incorporeal substances), for it has been said above that all men attribute to God a place that is up.</p> <p>In a second way "heaven" means not only the outermost sphere but "the whole body continuous with the extreme circumference of the whole universe," i.e., all the spheres of celestial bodies, in which exist the moon and sun and certain of the stars, namely, the other five planets (for the fixed stars are in the supreme sphere according to the opinion of Aristotle, who did not posit another sphere above that of the fixed stars).</p>

Aristotle's Text	Aquinas's Commentary
	<p>And he proves this meaning also on the basis of common parlance: for we say that the sun and moon and other planets exist in the heaven. Now these bodies are said to be continuous with the extreme sphere, because they are alike in nature, i.e., they are imperishable and movable circularly, and not because one continuous body is formed from all of them - for then they could not have several and different motions, a continuum being something whose motion is one, as is said in <i>Metaphysics</i> V.</p> <p>In a third way "heaven" means "the whole body contained within the extreme circumference," i.e., by the extreme sphere. This, too, he proves from the common use of the word - since we are wont to call the whole world and the totality, i.e., the universe, the "heaven."</p> <p>It should be noted that "heaven" is here used in these three ways not equivocally but analogically, i.e., in relation to one first. For it is the supreme sphere that is first and principally called "heaven"; secondly, the other celestial spheres from the continuity they have with the supreme sphere; thirdly, the universe of bodies insofar as they are contained by the extreme sphere.</p>
<p>The word, then, is used in three senses. Now the whole included within the extreme circumference must be composed of all physical and sensible body, because there neither is, nor can come into being, any body outside the heaven.</p>	<p>200. Then at [139] he proves the proposition.</p> <p>First he shows that there is no sensible body outside the heaven taken in the third sense, i.e., outside this world;</p> <p>Secondly, he shows that there is not outside it any of the things that are normally consequent upon natural bodies (L. 21).</p> <p>As to the first he does three things:</p> <p>First he proposes what he intends;</p> <p>Secondly, he proves his proposition, at 201;</p> <p>Thirdly, he concludes to his main proposition, at 206.</p> <p>He says therefore first [139] that whereas "heaven" is said in three ways, we shall be discussing it now in its third sense, where heaven is taken as "the whole contained by the extreme circumference." Concerning this heaven it is necessary that it consist of every sensible and natural body - which is its matter, and thus it consists of all its matter - due to the fact that outside this heaven no body exists, nor can exist.</p>
<p>For if there is a natural body outside the extreme circumference it must be either a simple or a composite</p>	<p>201. Then at [140] he proves the proposition.</p> <p>First he shows that there is no body outside the heaven;</p>

Aristotle's Text	Aquinas's Commentary
<p>body, and its position must be either natural or unnatural.</p>	<p>Secondly, that none can be there, at 205.</p> <p>About the first he does two things:</p> <p>First he presents a division through which he manifests the proposition;</p> <p>Secondly, he excludes each member of the division, at 202.</p> <p>He says therefore first [140] that if there is a <i>Physical</i>, i.e., natural, body outside the extreme periphery , i.e., circumference, it has to be either of the number of simple bodies, or of the number of composite bodies. Moreover, it must exist there according to nature, or outside its nature.</p>
<p>But it cannot be any of the simple bodies. For, first, it has been shown that that which moves in a circle cannot change its place. And, secondly, it cannot be that which moves from the centre or that which lies lowest. Naturally they could not be there, since their proper places are elsewhere;</p>	<p>202. Then at [141] he eliminates each member of this division.</p> <p>First he shows that outside the extreme sphere no simple body exists according to nature. For simple bodies are such that one is moved circularly, one from the middle, and one is moved to the middle and in the middle supports all the others, as was had above. But none of these bodies can exist outside the extreme circumference. For it has been shown above in <i>Physics</i> VI that the circularly moved body does not as to its whole being change its place except in conception. Consequently, it is not possible for that body which is moved circularly to be transferred to a place outside of that in which it exists. But this would follow, if there were a circularly moved body existing outside the extreme circumference as in its natural place. Since the reason that it would be natural to that circularly moved body would also make it natural to the body circularly moved in this world, and every body is naturally borne to its natural place, it would follow, therefore, that that latter circularly moved body would be transferred outside its proper place to another place - which is impossible.</p> <p>Similarly it is not possible for a light body which is moved from the center to be outside the extreme circumference or for a heavy body which supports the other bodies in the center. For if it is maintained that they exist naturally outside the extreme circumference, such a thing cannot be, since they have other natural places, namely, within the extreme circumference of the whole. For it was shown above that there is one numerical place for all heavy bodies and one for all light bodies. Hence it is not possible that those bodies be naturally outside the extreme circumference of the whole.</p> <p>And it should be noted that this argument, both as to the body circularly moved, and as to the body moved with straight motion, possesses necessity on account of what was proved above, namely, that there is but one extreme and one middle.</p>
<p>and if these are there unnaturally,</p>	<p>203. Secondly, at [142] he shows that no simple body is outside the heaven outside its nature. For if it were there</p>

Aristotle's Text	Aquinas's Commentary
<p>the exterior place will be natural to some other body, since a place which is unnatural to one body must be natural to another: but we saw that there is no other body besides these. Then it is not possible that any simple body should be outside the heaven.</p>	<p>in that manner that place would be natural to some other body; for a place outside nature for one body must be according to nature for some other - if a proper body were lacking to a place, that place would exist in vain. But it cannot be said that that place is natural to any body: for it is not natural to a circularly moved body, nor to a light or heavy body. But it has been shown above that there are no other bodies besides these. Consequently, it is plain that no simple body exists outside the heaven, either according to nature or outside nature.</p>
<p>But, if no simple body, neither can any mixed body be there: for the presence of the simple body is involved in the presence of the mixture.</p>	<p>204. Thirdly, at [143] he proves that there is no mixed body there. For if none of the simple bodies exists there, it follows that no mixed body is. Wherever there is a mixed body, simple bodies must be there, due to the fact that simple bodies are present in the mixed; and a mixed body gets its natural place according to the simple body predominant in it.</p>
<p>Further neither can any body come into that place: for it will do so either naturally or unnaturally, and will be either simple or composite; so that the same argument will apply, since it makes no difference whether the question is 'does A exist?' or 'could A come to exist?'</p>	<p>205. Then at [144] he shows that outside the heaven there cannot be any body. Hence he says that it is not possible for a body to come to be outside the heaven. For it would be there either according to nature or outside nature; again, it would be either simple or mixed. But no matter which of these is given, the same situation as above would prevail. For according to the above-stated reasons, it makes no difference whether the question concerns the existence of a body outside the heaven, or the possibility of its coming to be there, since the foregoing arguments conclude both, and since in sempiternal things to be and to be able to be do not differ, as is said in <i>Physics</i> III.</p>
<p>From our arguments then it is evident not only that there is not, but also that there could never come to be, any bodily mass whatever outside the circumference. The world as a whole, therefore, includes all its appropriate matter, which is, as we saw, natural perceptible body. So that neither are there now, nor have there ever been, nor can there ever be formed more heavens than one, but this heaven of ours is one and unique and complete.</p>	<p>206. Then at [145] he draws the conclusion mainly intended. And he says it is manifest from what has been said that outside the heaven no mass of any sort of body exists, nor can exist, since the whole world consists of its entire proper matter and the matter of the world is the sensible natural body.</p> <p>However, it should be not understood that he wishes to prove that no sensible body exists outside the heaven on the ground that it consists of the totality of its matter; but rather the converse. Nevertheless, he uses that manner of speaking because the two are mutually convertible.</p> <p>He concludes, therefore, that there are not many worlds at present, nor were there many in the past, nor will there ever be able to be in the future. Rather the heaven is one and unique and perfect in the sense of consisting of all its parts or of its total matter.</p>

Lecture 21: Outside the heaven there is no place, time etc., consequent upon sensible bodies.

Aristotle's Text	Aquinas's Commentary
It is therefore evident that there is also no place or void or time outside the heaven.	<p>[207] After showing that there neither is, nor can be, any sensible body outside the heaven, the Philosopher here shows that outside the heaven there is none of the things that follow upon sensible bodies.</p> <p>First he proves the proposition;</p> <p>Secondly, he describes the things that do exist outside the heaven, at 213.</p> <p>About the first he does three things:</p> <p>First he proposes what he intends;</p> <p>Secondly, he proves the proposition, at 208;</p> <p>Thirdly, he draws the intended conclusion, at 212.</p> <p>He says therefore first [146] that with the proof that outside the heaven there is no sensible body, it is also manifest that outside the heaven there is neither place nor void nor time - for these three things were discussed as being concomitants of natural bodies in <i>Physics</i> IV.</p>
For in every place body can be present;	<p>208. Then at [147] he proves the proposition.</p> <p>First, as to place: In every place it is possible for a body to exist, otherwise it would be in vain. But outside the heaven it is not possible for any body to exist, as was proved. Therefore, outside the heaven there is no place.</p>
and void is said to be that in which the presence of body, though not actual, is possible;	<p>Secondly, at [148] he proves that outside the heaven there is not a void: Those who posit a void define it to be a place in which a body is not existing but can exist. But outside the heaven it is not possible for a body to exist, as has been shown. Therefore, outside the heaven there is not a void.</p> <p>209. But it should be noted that the Stoics posited an infinite void, in one part of which the world exists. Consequently, according to them, there is a void outside the heaven. They wanted to prove this with the following fantasy [thought-experiment]: If someone were on the extreme circumference of the heaven, he could either extend his hand beyond or not. If not, then it is being impeded by something existing beyond. The same question will return regarding that thing existing beyond, if anyone could, while on the extremity, reach out his hand beyond. Consequently we must go on infinitely, or come to an extreme body beyond which a man existing</p>

Aristotle's Text	Aquinas's Commentary
	<p>there could reach out his hand. In that case it follows that beyond that a body could exist and does not. Hence there will be a void beyond.</p> <p>To this Alexander responds that the position is impossible. For since the body of the heaven cannot undergo anything, it cannot receive anything extraneous. Hence, if from this impossible assumption, something against the thesis follows, one should pay it no heed.</p> <p>But this answer does not seem to be sufficient - since the impossibility of this position is not on the part of something outside the heaven but on the part of the heaven itself. But now we are dealing with what is outside the heaven. Hence it is the same argument if the whole universe were the earth, on whose boundary a man could exist. Consequently, we must state otherwise, just as he says, that a man situated on the extreme circumference could not extend his hand beyond, not because of something outside impeding it, but because it is of the very nature of all natural bodies that they be contained within the extreme circumference of the heaven - otherwise the heaven would not be the universe. Hence if there were a body not depending on the body of the heaven as on a container, there would be nothing to prevent it from existing outside the heaven, as in the case of the spiritual substances, as will be said below.</p> <p>210. But that there is no void outside the heaven Alexander proves on the ground that such a void is either finite or infinite: If finite, then it is terminated somewhere and the same question will return: Could a person extend his hand beyond that? If it is infinite, it will be capable of receiving an infinite body: then either that power of the void will be in vain or it will be necessary to posit an infinite body capable of being received into the void of the infinite.</p> <p>Likewise, if there is a void outside the world, the world will be related to each part of the void in exactly the same way, because in a void there are no differences. Consequently, this part of the void in which the world exists is not its proper place. Therefore there is no cause why it should remain in this part of the void. But if the world is in motion, it will not be moved to one part rather than to another, because in the void there are no differences. Therefore, it will be moved in every direction; and thus the world will be torn asunder.</p>
<p>and time is the number of movement. But in the absence of natural body there is no movement, and outside the heaven, as we have shown, body neither exists nor can come to exist.</p>	<p>211. Thirdly, at [149] he proves that outside the heaven there is no time. For time is the number of motion, as is plain in <i>Physics</i> IV. But motion cannot exist without a natural body, and a natural body neither exists nor can exist outside the heaven, as has been proved. Therefore, outside the heaven there neither is, nor can be, time.</p>
<p>It is clear then that there is neither place, nor void, nor time, outside the heaven.</p>	<p>212. Then at [150] he draws the conclusion intended, and concludes that it is manifest from the foregoing that outside the whole heaven there is neither place nor void nor time.</p>
<p>Hence whatever is there, is of such a nature as not to occupy any place, nor</p>	<p>213. Then at [151] he describes what type of things are outside the heaven. About this he does two things:</p>

Aristotle's Text	Aquinas's Commentary
<p>does time age it; nor is there any change in any of the things which lie beyond the outermost motion;</p>	<p>First he concludes their condition from the foregoing;</p> <p>Secondly, he shows the same from common opinion, at 217.</p> <p>About the first he does two things:</p> <p>First he removes from them the condition of things that exist here; Secondly, he describes their proper condition, at 214.</p> <p>He says therefore first [151] that because there is no place outside the heaven, it follows that things by nature apt to be there do not exist in place. And Alexander says that this can be understood about the heaven itself, which is not in place as a whole but with respect to its parts, as is proved in <i>Physics IV</i>.</p> <p>Again, because time does not exist beyond the heaven, it follows that they do not exist in time; consequently, time does not make them grow old. And this, too, according to Alexander, can belong to the heaven, which, indeed, is not in time in the sense that to be in time consists in being measured by some part of time, as is said in <i>Physics IV</i>. Not only do such beings not grow old in time, but no change affects those things which lie "beyond the outermost motion [lotionem]," i.e., beyond the local motion of light bodies - for he is accustomed to call rectilinear motion <i>latio</i>.</p> <p>But it does not seem to be true that no change affects heavenly bodies, since they are moved locally, unless perhaps we limit "change" to one affecting the substance. But this seems to be a forced explanation, since the Philosopher excludes all change universally. Likewise, it cannot be properly said that the heaven is there, i.e., outside the heaven. Consequently, it is better to understand his words as applying to God and separated substances which plainly are not contained by time, nor place, since they are separated from all magnitude and motion. Such substances are said to be "there," i.e., outside the heaven, not as in a place, but as not contained nor included under the containment of bodily things, and as exceeding all of corporeal nature. It is such beings that the expression befits, namely, that they undergo no change; because they lie beyond the extreme motion, namely, that of the farthest sphere, which is ordered as extrinsic to and containing all change.</p>
<p>they continue through their entire duration unalterable and unmodified, living the best and most self-sufficient of lives.</p>	<p>214. Then at [152] he explains the qualities of these beings.</p> <p>First he describes their condition;</p> <p>Secondly, he explains a word he used, at 215;</p> <p>Thirdly, he shows the influence of these beings on others, at 216.</p>

Aristotle's Text	Aquinas's Commentary
	<p>He says therefore first [152] that those beings which are outside the heaven are unalterable and wholly impassible. They lead the best of lives, inasmuch as their life is not mingled with matter as is the life of corporeal beings. They also have a life that is most self-sufficient, inasmuch as they do not need anything in order to conserve their life or to perform the works of life, They have a life, too, which is not temporal but in total eternity.</p> <p>Now, among the qualities here listed some can be attributed to heavenly bodies - for example, that they are impassible and unalterable. But the other two cannot belong to them, even if they are alive. For they do not have the best life, since their life would be one resulting from the union of a soul to a celestial body; neither do they have a most self-sufficient life, since they attain their good through motion, as will be said in Book II.</p>
<p>As a matter of fact, this word 'duration' possessed a divine significance for the ancients, for the fulfillment which includes the period of life of any creature, outside of which no natural development can fall, has been called its duration. On the same principle the fulfillment of the whole heaven, the fulfillment which includes all time and infinity, is 'duration' - a name based upon the fact that it is always-duration immortal and divine.</p>	<p>215. Then at [153] he explains the word "eternal" which he had used. And he says that the ancients pronounced this word as divine, i.e., as befitting divine things. Now this word has two meanings.</p> <p>In one way it is used in a qualified sense as meaning the eternity or age [<i>saeculum</i>] of a thing: for in Greek the same word signifies both. He says, therefore, that the eternity or age of a thing is called an end, i.e., a certain terminal measure which contains the time of any thing's life, in such a way that no time of the life belonging to the thing according to nature exists outside that end or measure. It is like saying that the span of 100 years is the "age" or "eternity" of a man.</p> <p>In another way "eternity" is used in an absolute sense as comprehending and containing all duration. And this is what he says, namely, that according to the same notion, eternity is called the end of the entire heaven, i.e., it is the span containing the entire duration of the heaven, i.e., the span of all of time. In this sense, eternity refers to a certain perfection which contains all time and the entire infinitude of duration - not as though this eternity is stretched out according to the succession of past and future, as in the case of any span of time, because such succession follows upon motion, whereas the things he described as having life in eternity are completely immobile, but this eternity is a whole existing all at once and comprehending all time and all infinitude. (The Greek word [in English "aeon"] is derived from the words for "always existing".) Such an end, which is called "eternal" is immortal, because that life is not ended by death, and "divine," because it is beyond all matter, quantity, and motion.</p>
<p>From it derive the being and life which other things, some more or less articulately but others feebly, enjoy.</p>	<p>216. Then at [154] he shows the influence of these things on others. Now it is manifest that from what is most perfect there is a flowing to others that are less perfect, just as heat flows from fire to other things that are less hot, as is said in <i>Metaphysics</i> II. Hence, since those beings possess the best and most self-sufficient life and eternal existence, it is from them that existence and life are communicated to other things. But not equally to all; rather, to some "more luminously," i.e., more evidently and more perfectly, namely, to those that have individual eternal existence and to those that have rational life; to others "more darkly," i.e., in a lesser and more imperfect</p>

Aristotle's Text	Aquinas's Commentary
	<p>way, namely, to those things that are eternal, not in the same individuals, but according to sameness of species, and which have sense or nutritive life.</p>
<p>So, too, in its discussions concerning the divine, popular philosophy often propounds the view that whatever is divine, whatever is primary and supreme, is necessarily unchangeable. This fact confirms what we have said.</p>	<p>217. Then at [155] he manifests what he had said about the condition of the aforesaid beings that exist outside the heaven.</p> <p>First he proposes what he intends;</p> <p>Secondly, he presents reasons, at 218.</p> <p>With respect to the first [155] it should be known that among the philosophers there were two kinds of teachings. For there were some which from the very beginning were proposed according to the order of doctrine to the multitude and these were called "encyclia"; others were more subtle, and were proposed to the more advanced hearers and were called "syntagmatica," i.e., co-ordinal, or "acromatic," i.e., hearable, teachings. The dogmas of the philosophers are called "philosophemata."</p> <p>He says, therefore, that in the "encyclia" [or popular] philosophic discussions concerning divine things the philosophers very often in their arguments showed that everything divine must be "untransmutable," as not subject to motion, and "first," as not subject to time, and "highest," as not contained by place. And they called every separated substance "divine." And this confirms what has been said about such beings.</p>
<p>For there is nothing else stronger than it to move it-since that would mean more divine-</p>	<p>218. Then at [156] he gives reasons to manifest what he had said, namely, that the first and highest is untransmutable.</p> <p>First he manifests the proposition;</p> <p>Secondly, he draws a conclusion, at 220.</p> <p>In regard to the first he gives two arguments, the first of which is as follows: What is always causing motion and acting is better than what is moved and acted upon. But there is nothing better than the first and highest divinity, so as to be able to move it, because such a mover would be more divine. Therefore, the first divine being is not moved, since whatever is moved must be moved by another, as is proved in <i>Physics</i> VII and VIII.</p>
<p>and it has no defect and lacks none of its proper excellences.</p>	<p>219. The second argument is at [157]: Whatever is moved is moved either to avoid an evil or acquire a good. But what is first has no evil to avoid and lacks no good that it could acquire, because it is most perfect. Therefore, the first is not moved.</p> <p>The argument could also be presented in the following way: Whatever is moved is moved either to better or to worse. But neither of these can belong to God according to what is said here. Therefore, God, is in no way</p>

Aristotle's Text	Aquinas's Commentary
	<p>moved. And one should note that this second argument may be introduced to show that He is not moved by Himself.</p>
<p>Its unceasing movement, then, is also reasonable, since everything ceases to move when it comes to its proper place, but the body whose path is the circle has one and the same place for starting-point and goal.</p>	<p>220. Then at [158] from the foregoing he draws a conclusion. And he says it "reasonably," i.e., probably, follows that that first mover of the first mobile acts with unceasing motion. For whatever things, after having been moved, rest, these do so when they reach their appropriate place, as is clear in heavy and light bodies. But this cannot be said of the first mobile which is moved circularly, because where its motion starts is the same as where it ends. Therefore, the first mobile is moved by the first mover with an unceasing motion.</p> <p>And it should be noted that this argument does not conclude of necessity. For it can be said that the motion of the heaven does not cease, not on account of the nature of the place, but on account of the will of the mover.</p> <p>Therefore, he does not present this as a necessary, but as a probable, conclusion.</p>