THE SECOND DAY

SALVIATI. Yesterday took us into so many and such great digressions twisting away from the main thread of our principal argument that I do not know whether I shall be able to go ahead without your assistance in putting me back on the track.

SAGR. I am not surprised that you should find yourself in some confusion, for your mind is as much filled and encumbered with what remains to be said as with what has been said. But I am simply a listener and have in my mind only the things I have heard, so perhaps I can put your discourse back on its path by briefly outlining these for you.

As I recall it, yesterday's discourse may be summarized as a preliminary examination of the two following opinions as to which is the more probable and reasonable. The first holds the substance of the heavenly bodies to be ingenerable, incorruptible, inalterable, invariant, and in a word free from all mutations except those of situation, and accordingly to be a quintessence (note: Literally, a fifth essence, distinct from the four elements of earth, water, air, and fire which were to be found within the lunar sphere.) most different from our generable, corruptible, alterable bodies. The other opinion, removing this disparity from the world's parts, considers the earth to enjoy the same perfection as other integral bodies of the universe; in short, to be a movable and a moving body no less than the moon, Jupiter, Venus, or any other planet. Later many detailed parallels were drawn between the earth and the moon. More comparisons were made with the moon than with other planets, perhaps from our having more and better sensible evidence about the former by reason of its lesser distance. And having finally concluded this second opinion to have more likelihood than the other, it seems to me that our next step should be to examine whether the earth must be considered immovable, as most people have believed up to the present, or mobile, as many ancient philosophers believed and as others of more recent times consider it; and, if movable, what its motion may be.

SALV. Now I know and recognize the signposts along our road. But before starting in again and going ahead, I ought to tell you that I question this last thing you have said, about our having concluded in favor of the opinion that the earth is endowed with the same properties as the heavenly bodies. For I did not conclude this, just as I am not deciding upon any other controversial proposition. My intention was only to adduce those arguments and replies, as much on one side as on the other-those questions and solutions which others have thought of up to the present time (together with a few which have occurred to me after long thought) - and then to leave the decision to the judgment of others.

SAGR. I allowed myself to be carried away by my own sentiments, and believing that what I felt in my heart ought to be felt by others too, I made that conclusion universal which should have been kept particular. This really was an error on my part, especially as I do not know the views of Simplicio, here present.

SIMP. I confess that all last night I was meditating on yesterday's material, and truly I find it to contain many beautiful considerations which are novel and forceful. Still, I am much

more impressed by the authority of so many great authors, and in particular ... You shake your head, Sagredo, and smile, as if uttered some absurdity.

SAGR. I merely smile, but believe me, I am hardly able to keep from laughing, because I am reminded of a situation that I witnessed not many years ago together with some friends of mine, whom I could name to you for that matter.

SALV. Perhaps you had better tell us about it so that Simplicio will not go on thinking your mirth was directed at him.

SAGR. I'll be glad to. One day I was at the home of a very famous doctor in Venice, where many persons came on account of their studies, and others occasionally came out of curiosity to see some anatomical dissection performed by a man who was truly no less learned than he was a careful and expert anatomist. It happened on this day that he was investigating the source and origin of the nerves, about which there exists a notorious controversy between the Galenist and Peripatetic doctors. The anatomist showed that the great trunk of nerves, leaving the brain and passing through the nape, extended on down the spine and then branched out through the whole body, and that only a single strand as fine as a thread arrived at the heart. Turning to a gentleman whom he knew to be a Peripatetic philosopher, and on whose account he had been exhibiting and demonstrating everything with unusual care, he asked this man whether he was at last satisfied and convinced that the nerves originated in the brain and not in the heart. The philosopher, after considering for awhile, answered: "You have made me see this matter so plainly and palpably that if Aristotle's text were not contrary to it, stating clearly that the nerves originate in the heart, I should be forced to admit it to be true."

SIMP. Sir, I want you to know that this dispute as to the source of the nerves is by no means as settled and decided as perhaps some people like to think.

SAGR. Doubtless it never will be, in the minds of such opponents. But what you say does not in the least diminish the absurdity of this Peripatetic's reply; who, as a counter to sensible experience, adduced no experiment or argument of Aristotle's, but just the authority of his bare *ipse dixit*.

SIMP. Aristotle acquired his great authority only because of the strength of his proofs and the profundity of his arguments. Yet one must understand him; and not merely understand him, but have such thorough familiarity with his books that the most complete idea of them may be formed, in such a manner that every saying of his is always before the mind. He did not write for the common people, nor was he obliged to thread his syllogisms together by the trivial ordinary method; rather, making use of the permuted method, he has sometimes put the proof of a proposition among texts that seem to deal with other things. Therefore one must have a grasp of the whole grand scheme, and be able to combine this passage with that, collecting together one text here and another very distant from it. There is no doubt that whoever has this skill will be able to draw from his books demonstrations of all that can be known; for every single thing is in them.

SAGR. My dear Simplicio, since having things scattered all over the place does not disgust you, and since you believe by the collection and combination of the various pieces you can draw the juice out of them, then what you and the other brave philosophers will do with Aristotle's texts, I shall do with the verses of Virgil and Ovid, making centos of them and explaining by means of these all the affairs of men and the secrets of nature. But why do I

speak of Virgil, or any other poet" I have a little book, much briefer than Aristotle or Ovid, in which is contained the whole of science, and with very little study one may form from it the most complete ideas. It is the alphabet, and no doubt anyone who can properly Join and order this or that vowel and these or those consonants with one another can dig out of it the truest answers to every question, and draw from it instruction in all the arts and sciences. Just so does a painter, from the various simple colors placed separately upon his palette, by gathering a little of this with a bit of that and a trifle of the other, depict men, plants, buildings, birds, fishes, and in a word represent every visible object, without any eyes or feathers or scales or leaves or stones being on his palette. Indeed, it is necessary that none of the things imitated nor parts of them should actually be among the colors, if you want to be able to represent everything; if there were feathers, for instance, these would not do to depict anything but birds or feather dusters.

SALV. And certain gentlemen still living and active were present when a doctor lecturing in a famous Academy, upon bearing the telescope described but not yet having seen it, said that the invention was taken from Aristotle. Having a text fetched, he found a certain place where the reason i's given why stars in the sky can be seen during daytime from the bottom of a very deep well. At this point the doctor said: "Here you have the well, which represents the tube; here the gross vapors, from whence the invention of glass lenses is taken; and finally here is the strengthening of the sight by the rays passing through a diaphanous medium which is denser and darker."

SAGR. This manner of "containing" everything that can be known is similar to the sense in which a block of marble contains a beautiful statue, or rather thousands of them; but the whole point lies in being able to reveal them. Even better we might say that it is like the prophecies of Joachim or the answers of the heathen oracles, which are understood only after the events they forecast have occurred.

SALV. And why do you leave out the prophecies of the astrologers, which are so clearly seen in horoscopes (or should we say in the configurations of the heavens) after their fulfillment?

SAGR. It is in this way that the alchemists, led on by their madness, find that the greatest geniuses of the world never really wrote about anything except how to make gold; but in order to tell this without revealing it to the vulgar, this fellow in one manner and that one in another have whimsically concealed it under various disguises. And a very amusing thing it is to hear their comments upon the ancient poets, revealing the important mysteries hidden behind their stories--what the loves of the moon mean, and her descent to the earth for Endymion; her displeasure with Acteon; the significance of Jupiter's turning himself into a rain of gold, or into a fiery flame; what great secrets of the art there are in Mercury the interpreter, in Pluto's kidnapings, and in golden boughs.

SIMP. I believe, and to some extent f know, that the world does not lack certain giddy brains, but their folly should not redound to the discredit of Aristotle, of whom it seems to me you sometimes speak with too little respect. His antiquity alone, and the mighty name he has acquired among so many men of distinguished mind, should be enough to earn him respect among all the learned.

SALV. That is not quite how matters stand, Simplicio. Some of his followers are so excessively timid that they give us occasion (or more correctly would give us occasion if we credited their triflings) to think less of him. Tell me, are you so credulous as not to

understand that if Aristotle had been present and heard this doctor who wanted to make him inventor of the telescope, he would have been much angrier with him than with those who laughed at this doctor and his interpretations? Is it possible for you to doubt that if Anistotle should see the new discoveries in the sky he would change his opinions and correct his books and embrace the most sensible doctrines, casting away from himself those people so weak-minded as to be induced to go on abjectly maintaining everything he had ever said? Why, if Aristotle had been such a man as they imagine, he would have been a man of intractable mind, of obstinate spirit, and barbarous soul; a man of tyrannical will who, regarding all others as silly sheep, wished to have his decrees preferred over the senses, experience, and nature itself It is the followers of Aristotle who have crowned him with authority, not he who has usurped or appropriated it to himself And since it is handier to conceal oneself under the cloak of another than to show one's face in open court, they dare not in their timidity get a single step away from him, and rather than put any alterations into the heavens of Aristotle, they want to deny out of hand those that they see in nature's heaven.

SAGR. Such people remind me of that sculptor who, having transformed a huge block of marble into the image of a Hercules or a thundering Jove, I forget which, and having with consummate art made it so lifelike and fierce that it moved everyone with terror who beheld it, he himself began to be afraid, though all its vivacity and power were the work of his own hands; and his terror was such that he no longer dared affront it with his mallet and chisel.

SALV. I often wonder how it can be that these strict supporters of Aristotle's every word fail to perceive how great a hindrance to his credit and reputation they are, and how the more they desire to increase his authority, the more they actually detract from it, For when I see them being obstinate about sustaining propositions which I personally know to be obviously false, and wanting to persuade me that what they are doing is truly philosophical and would be done by Aristotle himself, it much weakens my opinion that he philosophized correctly about other matters more recondite to me. If I saw them give in and change their opinions about obvious truths, I should believe that they might have sound proofs for those in which they persisted and which I did not understand or had not heard.

SAGR. Or truly, if it seemed to them that they staked too much of their own reputation and of Aristotle's in confessing that they did not know this or that conclusion discovered by someone else, would it not be a lesser evil for them to seek it among his texts by the collection of various of these according to the practice recommended by Simplicio? For if all things that can be known are in these texts, then it must follow that they can be discovered there.

SALV. Sagredo, do not sneer at this prudent scheme, which it seems to me you propose sarcastically. For it is not long since a famous philosopher composed a book on the soul in which, discussing Aristotle's opinion as to its mortality or immortality, he adduced many texts beyond those already quoted by Alexander. As to those, he asserted that Aristotle was not even dealing with such matters there, let alone deciding anything about them, and he gave others which he himself had discovered in various remote places and which tended to the damaging side. Being advised that this would make trouble for him in getting a license to publish it, he wrote back to his friend that he would nevertheless get one quickly, since if no other obstacle came up he would have no difficulty altering the doctrine of Aristotle; for with other texts and other expositions he could maintain the contrary opinion, and it would still agree with the sense of Aristotle.

SAGR. Oh, what a doctor this is' I am his to command; for he will not let himself be imposed upon by Aristotle, but Will lead him by the nose and make him speak to his own purpose! See how important it is to know how to take time by the forelock! One ought not to get into the position of doing business with Hercules when he is under the Furies and enraged, but rather when he is telling stories among the Lydian maids.

Oh, the inexpressible baseness of abject minds! To make themselves slaves willingly; to accept decrees as inviolable; to place themselves under obligation and to call themselves persuaded and convinced by arguments that are so "powerful" and "clearly conclusive" that they themselves cannot tell the purpose for which they were written, or what conclusion they serve to prove' But let us call it a greater madness that among themselves they are even in doubt whether this very author held to the affirmative or the negative side. Now what is this but to make an oracle out of a log of wood, and run to it for answers; to fear it, revere it, and adore it?

SIMP. But if Aristotle is to be abandoned, whom shall we have for a guide in philosophy? Suppose you name some author.

SALV. We need guides in forests and in unknown lands, but on plains and in open places only the blind need guides. It is better for such people to stay at home, but anyone with eyes in his head and his wits about him could serve as a guide for them. In saying this, I do not mean that a person should not listen to Aristotle; indeed, I applaud the reading and careful study of his works, and I reproach only those who give themselves up as slaves to him in such a way as to subscribe blindly to everything he says and take it as an inviolable decree without looking for any other reasons. This abuse carries with it another profound disorder, that other people do not try harder to comprehend the strength of his demonstrations. And what is more revolting in a public dispute, when someone is dealing with demonstrable conclusions, than to hear him interrupted by a text (often written to some quite different purpose) thrown into his teeth by an opponent? If, indeed, you wish to continue in this method of studying, then put aside the name of philosophers and call yourselves historians, or memory experts; for it is not proper that those who never philosophize should usurp the honorable title of philosopher.

But we had better get back to shore, lest we enter into a boundless ocean and not get out of it all day. So put forward the arguments and demonstrations, Simplicio--either yours or Aristotle's--but not just texts and bare authorities, because our discourses must relate to the sensible world and not to one on paper. And since in yesterday's argument the earth was lifted up out of darkness and exposed to the open sky, and the attempt to number it among the bodies we call heavenly was shown to be not so hopeless and prostrate a proposition that it remained without a spark of life, we should follow this up by examining that other proposition which holds it to be probable that the earth is fixed and utterly immovable as to its entire globe, and see what chance there is of making it movable, and with what motion.

Now because I am undecided about this question, whereas Simplicio has his mind made up with Aristotle on the side of immovability, he shall give the reasons for his opinion step by step, and I the answers and the arguments of the other side, while Sagredo shall tell us the workings of his mind and the side toward which he feels it drawn.

SAGR. That suits me very well, provided that I retain the freedom to bring up whatever common sense may dictate to me from time to time.

SALV. Indeed, I particularly beg you to do so; for I believe that writers on the subject have left out few of the easier and, so to speak, more material considerations, so that only those are lacking and may be wished for which are subtler and more recondite. And to look into these, what ingenuity can be more fitting than that of Sagredo's acute and penetrating wit?

SAGR. Describe me as you like, Salviati, but please let us not get into another kind of digression--the ceremonial. For now I am a philosopher, and am at school and not at court *(al Broio)*.

SALV. Then let the beginning Of OUT reflections be the consideration that whatever motion comes to be attributed to the earth must necessarily remain imperceptible to us and as if nonexistent, so long as we look only at terrestrial objects; for as inhabitants of the earth, we consequently participate in the same motion. But on the other hand it is indeed just as necessary that it display itself very generally in all other visible bodies and objects which, being separated from the earth, do not take part in this movement. So the true method of investigating whether any motion can be attributed to the earth, and if so what it may be, is to observe and consider whether bodies separated from the earth exhibit some appearance of motion which belongs equally to all. For a motion which is perceived only, for example, in the moon, and which does not affect Venus or Jupiter or the other stars, cannot in any way be the earth's or anything but the moon's.

Now there is one motion which is most general and supreme over all, and it is that by which the sun, moon, and all other planets and fixed stars--in a word, the whole universe, the earth alone excepted--appear to be moved as a unit from east to west in the space of twenty-four hours. This, in so far as first appearances are concerned, may just as logically belong to the earth alone as to the rest of the universe, since the same appearances would prevail as much in the one situation as in the other. Thus it is that Aristotle and Ptolemy, who thoroughly understood this consideration, in their attempt to prove the earth immovable do not argue against any other motion than this diurnal one, though Aristotle does drop a hint against another motion ascribed to it by an ancient writer of which we shall speak in the proper place.

SAGR. I am quite convinced of the force of your argument, but it raises a question for me from which I do not know how to free myself, and it is this: Copernicus attributed to the earth another motion than the diurnal. By the rule just affirmed, this ought to remain imperceptible to all observations on the earth, but be visible in the rest of the universe. It seems to me that one may deduce as a necessary consequence either that he was grossly mistaken in assigning to the earth a motion corresponding to no appearance in the heavens generally, or that if the correspondent motion does exist, then Ptolemy was equally at fault in not explaining it away, as he explained away the other.

SALV. This is very reasonably questioned, and when we come to treat of the other movement you Will see how greatly Copernicus surpassed Ptolemy in acuteness and penetration of mind by seeing what the latter did not-I mean the wonderful correspondence with which such a movement is reflected in all the other heavenly bodies. But let us postpone this for the present and return to the first consideration, With respect to which I shall set forth, commencing with the most general things, those reasons which seem to favor the earth's motion, so that we may then hear their refutation from Simplicio.

First, let us consider only the immense bulk of the starry sphere in contrast With the smallness of the terrestrial globe, which is contained in the former so many millions of

times. Now if we think of the velocity of motion required to make a complete rotation in a single day and night, I cannot persuade myself that anyone could be found who would think it the more reasonable and credible thing that it was the celestial sphere which did the turning, and the terrestrial globe which remained fixed.

SAGR. If, throughout the whole variety of effects that could exist in nature as dependent upon these motions, all the same consequences followed indifferently to a hairsbreadth from both positions, still my first general impression of them would be this: I should think that anyone who considered it more reasonable for the whole universe to move in order to let the earth remain Fixed would be more irrational than one who should climb to the top of your cupola just to get a view of the city and its environs, and then demand that the whole countryside should revolve around him so that he would not have to take the trouble to turn his head. Doubtless there are many and great advantages to be drawn from the new theory and not from the previous one (which to my mind is comparable with or even surpasses the above in absurdity), making the former more credible than the latter. But perhaps Aristotle, Ptolemy, and Simplicio ought to marshal their advantages against us and set them forth, too, if such there are; otherwise it will be clear to me that there are none and cannot be any.

SALV. Despite much thinking about it, I have not been able to find any difference, so it seems to me I have found that there can be no difference; hence I think it vain to seek one further. For consider: Motion, in so far as It is and acts as motion, to that extent exists relatively to things that lack it; and among things which all share equally in any motion, it does not act, and is as if It did not exist. Thus the goods with which a ship is laden leaving Venice, pass by Corfu, by Crete, by Cyprus and go to Aleppo. Venice, Corfu, Crete, etc. stand still and do not move with the ship; but as to the sacks, boxes, and bundles with which the boat is laden and with respect to the ship itself, the motion from Verflice to Syria is as nothing, and in no way alters their relation among themselves. This is so because it is common to all of them and all share equally in it. If, from the cargo in the ship, a sack were shifted from a chest one single inch, this alone would be more of a movement for it than the two-thousand-mile journey made by all of them together.

SIMP. This is good, sound doctrine, and entirely Peripatetic.

SALV. I should have thought it somewhat older. And I question whether Aristotle entirely understood it when selecting it from some good school of thought, and whether he has not, by altering it in his Writings, made it a source of confusion among those who wish to maintain everything he said. When he wrote that everything which is moved is moved upon something immovable, I think he only made equivocal the saying that whatever moves, moves with respect to something motionless. This proposition suffers no difficulties at all, whereas the other has many.

SAGR. Please do not break the thread, but continue with the argument already begun.

SALV. It is obvious, then, that motion which is common to many moving things is idle and inconsequential to the relation of these movables among themselves, nothing being changed among them, and that it is operative only in the relation that they have with other bodies lacking that motion, among which their location is changed. Now, having divided the universe into two parts, one of which is necessarily movable and the other motionless, it is the same thing to make the earth alone move, and to move all the rest of the universe, so far as concerns any result which may depend upon such movement. For the action of such a movement is only in the relation between the celestial bodies and the earth, which relation

alone is changed. Now if precisely the same effect follows whether the earth is made to move and the rest of the universe stay still, or the earth alone remains fixed while the whole universe shares one motion, who is going to believe that nature (which by general agreement does not act by means of many things when it can do so by means of few) has chosen to make an immense number of extremely large bodies move with inconceivable velocities, to achieve what could have been done by a moderate movement of one single body around its own center?

SIMP. I do not quite understand how this very great motion is as nothing for the sun, the moon, the other planets, and the innumerable host of the fixed stars. Why do you say it is nothing for the sun to pass from one meridian to the other, rise above this horizon and sink beneath that, causing now the day and now the night; and for the moon, the other planets, and the fixed stars to vary similarly?

SALV. Every one of these variations which you recite to me is nothing except in relation to the earth. To see that this is true, remove the earth; nothing remains in the universe of rising and setting of the sun and moon, nor of horizons and meridians, nor day and night and in a word from this movement there will never originate any changes in the moon or sun or any stars you please, fixed or moving. All these changes are in relation to the earth, all of them meaning nothing except that the sun shows itself now over China, then to Persia, afterward to Egypt, to Greece, to France, to Spain, to America, etc. And the same holds for the moon and the rest of the heavenly bodies, this effect taking place in exactly the same way if, without embroiling the biggest part of the universe, the terrestrial globe is made to revolve upon itself

And let us redouble the difficulty with another very great one, which is this. If this great motion is attributed to the heavens, it has to be made in the opposite direction from the specific motion of all the planetary orbs, of which each one incontrovertibly has its own motion from west to east, this being very gentle and moderate, and must then be made to rush the other way; that is, from east to west, with this very rapid diurnal motion. Whereas by making the earth itself move, the contrariety of motions is removed, and the single motion from west to east accommodates all the observations and satisfies them all completely.

SIMP. As to the contrariety of motions, that would matter little, since Aristotle demonstrates that circular motions are not contrary to one another, and their opposition cannot be called true contrariety.

SALV. Does Aristotle demonstrate that, or does he just say it because it suits certain designs of his? If, as he himself declares, contraries are those things which mutually destroy each other, I cannot see how two movable bodies meeting each other along a circular line conflict any less than if they had met along a straight line.

SAGR. Please stop a moment. Tell me, Simplicto, when two knights meet tilting in an open field, or two whole squadrons, or two fleets at sea go to attack and smash and sink each other, would you call their encounters contrary to one another?

SIMP. I should say they were contrary.

SAGR. Then why are two circular motions not contrary? Being made upon the surface of the land or sea, which as you know is spherical, these motions become circular. Do you

know what circular motions are not contrary to each other, Simplicio? They are those of two circles which touch from the outside; one being turned, the other naturally moves the opposite way. But if one circle should be inside the other, it Is I . impossible that their motions should be made in opposite directions without their resisting each other.

SALV. "Contrary" or "not contrary," these are quibbles about words, but I know that with facts It is a much simpler and more natural thing to keep everything with a single motion than to introduce two, whether one wants to call them contrary or opposite. But I do not assume the introduction of two to be impossible, nor do I pretend to draw a necessary proof from this; merely a greater probability. The improbability I . s shown for a third time in the relative disruption of the order which we surely see existing among those heavenly bodies whose circulation is not doubtful, but most certain. This order is such that the greater orbits complete their revolutions in longer times, and the lesser in shorter; thus Saturn, describing a greater circle than the other planets, completes it in thirty years; Jupiter revolves in its smaller one in twelve years, Mars in two; the moon covers its much smaller circle in a single month. And we see no less sensibly that of the satellites of Jupiter (*stelle, Medicee*), (note: Galileo had named the moons he discovered the "Medicean stars" in honor of his patron, the Grand Duke of Tuscany, to whom this book was dedicated.) the closest one to that planet makes its revolution in a very short time, that is in about forty-two hours, the next, in three and a half days; the third in seven days and the most distant in sixteen. And this very harmonious trend will not be a bit altered if the earth is made to move on itself in twenty-four hours. But if the earth is desired to remain motionless, it is necessary, after passing from the brief period of the moon to the other consecutively larger ones, and ultimately to that of Mars in two years, and the greater one of Jupiter in twelve, and from this to the still larger one of Saturn, whose period is thirty years--it is necessary, I say, to pass on beyond to another incomparably larger sphere, and make this one finish an entire revolution in twenty-four hours. Now this is the minimum disorder that can be introduced, for if one wished to pass from Saturn's sphere to the stellar, and make the latter so much greater than Saturn's that it would proportionally be suited to a very slow motion of many thousands of years, a much greater leap would be required to pass beyond that to a still larger one and then make that revolve in twenty-four hours. But by giving mobility to the earth, order becomes very well observed among the periods; from the very slow sphere of Saturn one passes on to the entirely immovable fixed stars, and manages to escape a fourth difficulty necessitated by supposing the stellar sphere to be movable. This difficulty is the immense disparity between the motions of the stars, some of which would be moving very rapidly in vast circles, and others very slowly in little tiny circles, according as they are located farther from or closer to the poles. This is indeed a nuisance, for just as we see that all those bodies whose motion is undoubted move in large circles, so it would not seem to have been good judgment to arrange bodies in such a way that they must move circularly at immense distances from the center, and then make them move in little tiny circles.

Not only will the size of the circles and consequently the velocities of motion of these stars be very diverse from the orbits and motions of some others, but (and this shall be the fifth difficulty) the same stars will keep changing their circles and their velocities, since those which two thousand years ago were on the celestial equator, and which consequently described great circles with their motion, are found in our time to be many degrees distant, and must be made slower in motion and reduced to moving in smaller circles. Indeed, it is not impossible that a time will come when some of the stars which in the past have always been moving will be reduced, by reaching the pole, to holding fast, and then after that time will start moving once more; whereas all those stars which certainly do move describe, as I said, very large circles In their orbits and are unchangeably preserved in them.

For anyone who reasons soundly, the unlikelihood is increased--and this is the sixth difficulty--by the incomprehensibility of what is called the "solidity" of that very vast sphere in whose depths are firmly fixed so many stars which, without changing place in the least among themselves, come to be carried around so harmoniously with such a disparity of motions. If, however, the heavens are fluid (as may much more reasonably be believed) so that each star roves around in it by itself, what law will regulate their motion so that as seen from the earth they shall appear as if made into a single sphere" For this to happen, it seems to me that it is as much more effective and convenient to make them immovable than to have them roam around, as it is easier to count the myriad tiles set in a courtyard than to number the troop of children running around on them.

Finally, for the seventh objection, if we attribute the diurnal rotation to the highest heaven, then this has to be made of such strength and power as to carry with it the innumerable host of fixed stars, all of them vast bodies and much larger than the earth, as well as to carry along the planetary orbs despite the fact that the two move naturally in opposite ways. Besides this, one must grant that the element of fire and the greater part of the air are likewise hurried along, and that only the little body of the earth remains defiant and resistant to such power. This seems to me to be most difficult; I do not understand why the earth, a suspended body balanced on its center and indifferent to motion or to rest, placed in and surrounded by an enclosing fluid, should not give in to such force and be carried around too. We encounter no such objections if we give the motion to the earth, a small and trifling body in comparison with the universe, and hence unable to do it any violence.

SAGR. I am aware of some ideas whirling around in my own imagination which have been confusedly roused in me by these arguments. If I wish to keep my attention on the things about to be said, I shall have to try to get them in better order and to place the proper construction upon them, if possible. Perhaps it will help me to express myself more easily if I proceed by interrogation. Therefore I ask Simplicio, first, whether he believes that the same simple movable body can naturally partake of diverse movements, or whether only a single motion suits it, this being its own natural one.

SIMP. For a simple movable body there can be but a single motion, and no more, which suits it naturally; any others it can possess only incidentally and by participation. Thus when a man walks along the deck of a ship, his own motion is that of walking, while the motion which takes him to port is his by participation; for he could never arrive there by walking if the ship did not take him there by means of its motion.

SAGR. Second, tell me about this motion which is communicated to a movable body by participation, when it itself is moved by some other motion different from that in which it participates. Must this shared motion in turn reside in some subject, or can it indeed exist in nature without other support?

SIMP. Aristotle answers all these questions for you. He tells you that just as there is only one motion for one movable body, so there is but one movable body for that motion. Consequently no motion can either exist or even be imagined except as inhering In its subject.

SAGR. Now in the third place I should like you to tell me whether you believe that the moon and the other planets and celestial bodies have their own motions, and what these are.

SIMP. They have, and they are those motions in accordance with which they run through

the zodiac--the moon in a month, the sun in a year, Mars in two, the stellar sphere in so many thousands. These are their own natural motions.

SAGR. Now as to that motion with which the fixed stars, and with them all the planets, are seen rising and setting and returning to the east every twenty-four hours. How does that belong to them?

SIMP. They have that by participation.

SAGR. Then it does not reside in them; and neither residing in them, nor being able to exist without some subject to reside in, it must be made the proper and natural motion of some other sphere.

SIMP. As to this, astronomers and philosophers have discovered another very high sphere, devoid of stars, to which the diurnal rotation naturally belongs. To this they have given the name *primum mobile;* this speeds along with it all the inferior spheres, contributing to and sharing with them its motion.

SAGR. But when all things can proceed in most perfect harmony without Introducing other huge and unknown spheres; without other movements or imparted speedings; with every sphere having only its simple motion, unmixed with contrary movements, and with everything taking place in the same direction, as must be the case if all depend upon a single principle, why reject the means of doing this, and give assent to such outlandish things and such labored conditions?

SIMP. The point is to find a simple and ready means.

SAGR. This seems to me to be found, and quite elegantly. Make the earth the *primum mobile*; that is, make it revolve upon itself in twenty-four hours in the same way as all the other spheres. Then, without its imparting such a motion to any other planet or star, all of them will have their risings, settings, and in a word all their other appearances.

SIMP. The crucial thing is being able to move the earth without causing a thousand inconveniences.

SALV. All inconveniences will be removed as you propound them. Up to this point, only the first and most general reasons have been mentioned which render it not entirely improbable that the daily rotation belongs to the earth rather than to the rest of the universe. Nor do I set these forth to you as inviolable laws, but merely as plausible reasons. For I understand very well that one single experiment or conclusive proof to the contrary would suffice to overthrow both these and a great many other probable arguments. So there is no need to stop here; rather let us proceed ahead and bear what Simplicio answers, and what greater probabilities or firmer arguments be adduces on the other side.

SIMP. First I shall say some things in general about all these considerations taken together, and then get down to certain particulars.

It seems to me that you base your case throughout upon the greater ease and simplicity of producing the same effects. As to their causation, you consider the moving of the earth alone equal to the moving of all the rest of the universe except the earth, while from the standpoint of action, you consider the former much easier than the latter. To this I answer that it seems that way to me also when I consider my own powers, which are not finite

merely, but very feeble. But with respect to the power of the Mover, which is infinite, it is just as easy to move the universe as the earth, or for that matter a straw. And when the power is infinite, why should not a great part of it be exercised rather than a small? From this it appears to me that the general argument is ineffective.

SALV. If I had ever said that the universe does not move because of any lack of power in the Mover, I should have been mistaken, and your correction would be opportune; I grant you that it is as easy for an infinite force to move a hundred thousand things as to move one. But what I have been saying was with regard not to the Mover, but only the movables; and not with regard to their resistance alone, which is certainly less for the earth than for the universe, but with regard to other particulars considered just now.

Next, as to your saying that a great part of an infinite power may better be exercised than a small part, I reply to you that one part of the infinite is not greater than another, when both are-finite; nor can it be said of an infinite number that a hundred thousand is a greater part than two I . s, though the former is fifty thousand times as great as the latter. And if what is required in order to move the universe is a finite power, then even though this would be very large in comparison with what would be required to move the earth alone, nevertheless a greater part of the infinite power would not thereby be employed, nor would that which remained idle be less than infinite. Hence to apply a little more or less power for a particular effect is insignificant. Besides, the operations of such power do not have for their end and goal the diurnal movement alone, for there are many other motions of the universe that we know of, and there may be very many more unknown to us.

Giving our attention, then, to the movable bodies, and not questioning that it is a shorter and readier operation to move the earth than the universe, and paying attention to the many other simplifications and conveniences that follow from merely this one, it is much more probable that the diurnal motion belongs to the earth alone than to the rest of the universe excepting the earth. This is supported by a very true maxim of Aristotle's which teaches that *frustra fit per plura quod potest fieri per pauciora*.

SIMP. In referring to this axiom you have left out one little clause that means everything, especially for our present purposes. The detail left out is aeque bene; hence it is necessary to examine whether both assumptions can satisfy us *equally well* in every respect.

SALV. Finding out whether both positions satisfy us equally well will be included in the detailed examination of the appearances which they have to satisfy. For we have argued *ex hypothesi* up to now, and Will continue to argue so, assuming that both positions are equally adapted to the fulfillment of all the appearances. So I suspect that this detail which you declare to have been omitted by me was rather superfluously added by you. Saying "equally well" names a relation, which necessarily requires at I east two terms, one thing not being capable of being related to itself, one cannot say, for example, that quiet is equally good with quiet. Therefore to say: "It is pointless to use many to accomplish what may be done with fewer" implies that what is to be done must be the same thing, and not two different things. And because the same thing cannot be said to be equally well done With itself, the addition of the phrase "equally well" Is superfluous, and a relation with only one term,

SAGR. If we do not want to repeat what happened yesterday, please get back to the point; and you, Simplicio, begin producing those difficulties that seem to you to contradict this new arrangement of the universe.

SIMP. The arrangement is not new; rather, it is most ancient, as is shown by Aristotle refuting it, the following being his refutations :

"First, whether the earth is moved either in itself, being placed in the center, or in a circle, being removed from the center, it must be moved with such motion by force, for this is not its natural motion. Because if it were, it would belong also to all its particles. But every one of them is moved along a straight line toward the center. Being thus forced and preternatural, it cannot be everlasting. But the world order is eternal; therefore, etc.

"Second, it appears that all other bodies which move circularly lag behind, and are moved with more than one motion, except the *primum mohile*. Hence it would be necessary that the earth be moved also with two motions; and if that were so, there would have to be variations in the fixed stars. But such are not to be seen; rather, the same stars always rise and set in the same place without any vaniations.

"Third, the natural motion of the parts and of the whole is toward the center of the universe, and for that reason also it rests therein." He then discusses the question whether the motion of the parts is toward the center of the universe or merely toward that of the earth, concluding that their own tendency is to go toward the former, and that only accidentally do they go toward the latter, which question was argued at length yesterday.

Finally he strengthens this with a fourth argument taken from experiments with heavy bodies which, failing from a height, go perpendicularly to the surface of the earth. Similarly, projectiles thrown vertically upward come down again perpendicularly by the same line, even though they have been thrown to immense height. These arguments are necessary proofs that their motion is toward the center of the earth, which, without moving in the least, awaits and receives them.

He then hints at the end that astronomers adduce other reasons in confirmation of the same conclusions--that the earth is in the center of the universe and immovable. A single one of these is that all the appearances seen In the movements of the stars correspond with this central position of the earth, which correspondence they would not otherwise possess. The others, adduced by Ptolemy and other astronomers, I can give you now if you like; or after you have said as much as you want to In reply to these of Aristotle.

SALV. The arguments produced on this matter are of two kinds. Some pertain to terrestrial events without relation to the stars, and others are drawn from the appearances and observations of celestial things. Aristotle's arguments are drawn mostly from the things around us, and he leaves the others to the astronomers. Hence it will be good, if it seems so to you, to examine those taken from earthly experiments, and thereafter we shall see to the other sort. And since some such arguments are adduced by Ptolemy, Tycho, and other astronomers and philosophers, in addition to their accepting, confirming, and supporting those of Aristotle, these may all be taken together in order not to have to give the same or similar answers twice. Therefore. Simplicio, present them, if you will; or, if you want me to relieve you of that burden, I am at your service.

SIMP. It will be better for you to bring them up, for having given them greater study you will have them readier at hand, and in great number too....

SALV. But is it not your opinion, and that of the author and of Aristotle and Ptolemy and all their followers, that earth, water, and air are equally of such a nature as to be constituted

immovable about the center?

SIMP. That is taken as an irrefutable truth.

SALV. Then the argument for the different natures of these elements and elemental things is not taken from this common natural condition of rest with respect to the center, but must be learned by taking notice of other qualities which they do not have in common. Therefore whoever should take from the elements only this common state of rest, and leave them all their other actions, would not in the least obstruct the road which leads us to an awareness of their essences.

Now Copernicus takes from them nothing except this common rest, leaving to them weight or lightness; motion up or down, slow or fast; rarity and density; the qualities of beat, cold, dryness, moistness; and, in a word, everything else. Hence no such absurdity as this author imagines exists anywhere in the Copernican position. Agreement in an identical motion means neither more nor less than agreement in an identical state of rest, so far as any diversification or nondiversification of natures is concerned. Now tell me if he has other opposing arguments.

SIMP. There follows a fourth objection, taken once again from an observation of nature. It is that bodies of the same kind have motions which agree in kind, or else they agree in rest. But in Copernicus's theory, bodies agreeing in kind and quite similar to each other would have great discrepancies as to motion, or even be diametrically opposed. For stars, so very similar to one another, would nevertheless have such dissimilar motions that six planets would perpetually go around, while the sun and the fixed stars would remain forever unmoved.

SALV. The form of this argumentation appears to me valid, but I believe that its content or its application is at fault, and if the author were to persist in this assumption the consequences would run directly counter to his. The method of argument is this:

Among world bodies, there are six which perpetually move; these are the six planets. Of the others (that is, the earth, the sun, and the fixed stars) the question is which move and which stand still. If the earth stands still, the sun and the fixed stars necessarily move, and it may also be that the sun and the fixed stars are motionless if the earth is moving. This matter being in question, we inquire which ones may more suitably have motion attributed to them, and which ones rest.

Common sense says that motion ought to be deemed to belong to those which agree better in kind and in essence with the bodies which unquestionably do move, and rest to those which differ most from them. Eternal rest and perpetual motion being very different events, it is evident that the nature of an ever-moving body must be quite different from that of one which is always fixed. Let us therefore find out, when in doubt about motion and rest, whether by way of some other relevant condition we can investigate which--the earth, or the sun and the fixed stars--more resembles those bodies which are known to be movable,

Now behold how nature, favoring our needs and wishes, presents us with two striking conditions no less different than motion and rest; they are lightness and darkness--that is, being brilliant by nature or being obscure and totally lacking in light. Therefore bodies shining with internal and external splendor are very different in nature from bodies deprived of all light. Now the earth is deprived of light; most splendid in itself is the sun, and the

fixed stars are no less so. The six moving planets entirely lack light, like the earth; therefore their essence resembles the earth and differs from the sun and the fixed stars. Hence the earth moves, and the sun and the stellar sphere are motionless.

SIMP. But the author will not concede that the six planets are dark, and will stand firm upon that denial; or else he will argue the great conformity in nature between the six planets and the sun and fixed stars, as well as the contrast between the latter and the earth, with respect to conditions other than those of darkness and light. Indeed, I now see that here In the fifth objection, which follows, there is set forth the great disparity between the earth and the heavenly bodies. He writes that there would be great confusion and trouble in the system of the universe and among its parts, according to the Copernican hypothesis, because of its placing among the heavenly bodies (immutable and incorruptible according to Aristotle, Tycho, and others); among bodies of such nobility by the admission of everyone (including Copernicus himself, who declares them to be ordered and arranged in the best possible manner and who removes from them any inconstancy of power); because, I say, of its placing among bodies as pure as Venus and Mars this sink of all corruptible material; that is, the earth, with the water, the air, and all their mixtures!

How much superior a distribution, and how Much more suitable it is to nature--indeed, to God the Architect Himself--to separate the pure from the impure, the mortal from the immortal, as all other schools teach, showing us that impure and infirm materials are confined within the narrow arc of the moon's orbit, above which the celestial objects rise in an unbroken series!

SALV. It is true that the Copernican system creates disturbances in the Anistotelian universe, but we are dealing with our own real and actual universe.

If a disparity in essence between the earth and the heavenly bodies is inferred by this author from the incorruptibility of the latter and the corruptibility of the former in Aristotle's sense, from which disparity he goes on to conclude that motion must exist in the sun and fixed stars, With the earth immovable, then he is wandering about in a paralogism and assuming what is in question. For Aristotle wants to infer the incorruptibility of heavenly bodies from their motion, and it is being debated whether this is theirs or the earth's. Of the folly of this rhetorical deduction, enough has already been said. What is more vapid than to say that the earth and the elements are banished and sequestered from the celestial sphere and confined within the lunar orbit? Is not the lunar orbit one of the celestial spheres, and according to their consensus is it not right in the center of them all? This is indeed a new method of separating the impure and sick from the sound-giving to the infected a place in the heart of the city! I should have thought that the leper house would be removed from there as far as possible.

Copernicus admires the arrangement of the parts of the universe because of God's having placed the great luminary which must give off its mighty splendor to the whole temple right in the center of it, and not off to one side. As to the terrestrial globe being between Venus and Mars, let me say one word about that. You yourself, on behalf of this author, may attempt to remove it, but please let us not entangle these little flowers of rhetoric in the rigors of demonstration. Let us leave them rather to the orators, or better to the poets, who best know how to exalt by their graciousness the most vile and sometimes even pernicious things. Now if there is anything remaining for us to do, let us get on with it.

SIMP. Here is the sixth and last argument, in which he puts it down as an unlikely thing that

a corruptible and evanescent body could have a perpetual regular motion. This he supports by the example of the animals, which, though they move with their natural motion, nevertheless get tired and must rest to restore their energy. And what is such motion compared to the motion of the earth, which is immense in comparison with theirs? Yet the earth is made to move in three discordant and distractingly different ways I Who would ever be able to assert such a thing, except someone who was sworn to its defense?

Nor in this case is there any use in Copenicus saying that this motion, because it is natural to the earth and not constrained, works contrary effects to those of forced motions; and that things which are given impetus are destined to disintegrate and cannot long subsist, whereas those made by nature maintain themselves in their optimum arrangement. This reply, I say, is no good; it falls down before our answer. For the animal is a natural body too, not an artificial one; and its movement is natural, deriving from the soul; that is, from an intrinsic principle, while that motion is constrained whose principle is outside and to which the thing moved contributes nothing. Yet if the animal continues its motion long, it becomes exhausted and would even die if it obstinately tried to force itself on.

You see, therefore, how everywhere in nature traces are to be found which are contrary to the position of Copernicus, and never one in favor of it. And in order that I shall not have to resume the role of this opponent, hear what be has to say against Kepler (with whom he is in disagreement) in regard to what this Kepler has objected against those to whom it seemed an unsuitable or even an impossible thing to expand the stellar sphere as much as the Copernican position requires. Kepler objects to this by saying: "*Difficilius est accidens prueter modulum subiecti intendere, quam subiectum sine accidente augere: Copernicus igitur verisimiliusfacit, qui auget orbem stellarum fixarum absque motu, quam Ptolenweza, qui auget motumfixarum immensa velocilate*." ("It is harder to stretch the property beyond the model of the thing than to augment the thing without the property. Copernicus therefore has more probability on his side, increasing the orb of the stars as fixed without motion, than does Ptolemy who augments the motion of the fixed stars by an immense velocity.") The author resolves this objection, marveling that Kepler was so misled as to say that the Ptolemaic hypothesis increases the motion beyond the model of the subject, for it appears to him that this is increased only in proportion to the model, and that in accordance with this latter the velocity of motion is augmented. He proves this by imagining a millstone which makes one revolution in twenty-four hours, which motion will be called very slow. Next he supposes its radius to be prolonged all the way to the sun; the velocity of its extremity will equal that of the sun; prolonging it to the stellar sphere, it will equal the velocity of the fixed stars. Yet at the circumference of the millstone it will be very slow. Next, applying this reflection about the millstone to the stellar sphere, let us imagine a point on the radius of that sphere as close to its center as the radius of the millstone. Then the same motion which is very rapid in the stellar sphere will be very slow at this point. The size of the body is what makes it become very fast from being very slow, and thus the velocity does not grow beyond the model of the subject, but rather it increases according to that and to its size, very differently from what Kepler thinks.

SALV. I do not believe that this author entertained so poor and low an opinion of Kepler as to be able to persuade himself that Kepler did not understand that the farthest point on a line drawn from the center out to the starry orb moves faster than a point on the same line no more than two yards from the center. Therefore he must have seen and comprehended perfectly well that what Kepler meant was that it was less unsuitable to increase an immovable body to an enormous size than to attribute an excessive velocity to a body already vast, paying attention to the proportionality *(modulo)*--that is to say, to the standard

and example--of other natural bodies, in which it is seen that as the distance from the center increases, the velocity is decreased; that is, the period of rotation for them requires a longer time. But in a state of rest, which is incapable of being made greater or less, the size of the body makes no difference whatever. So that if the author's reply Is to have any bearing upon Kepler's argument, this author will have to believe that it is all the same to the motive principle whether a very tiny or an immense body is moved for the same time, the increase of velocity being a direct consequence of the increase in size. But this is contrary to the architectonic rule of nature as observed in the model of the smaller spheres, Just as we see in the planets (and most palpably in the satellites of Jupiter) that the smaller orbs revolve in the shorter times. For this reason Saturn's time of revolution is longer than the period of any lesser orb, being thirty years. Now to pass from this to a much larger sphere, and make that revolve in twenty-four hours, can truly be said to go beyond the rule of the model. So that if we consider the matter carefully, the author's answer does not go against the sense and idea of the argument, but against its expression and manner of speaking. And here also the author is wrong, nor can he deny having in a way perverted the sense of the words in order to charge Kepler with too crass an ignorance. But the imposture is so crude that with all his censure he has not been able to detract from the impression that Kepler has made upon the minds of the learned with his doctrine.

Then as to the objection against the perpetual motion of the earth, taken from the impossibility of its keeping on without becoming fatigued, since animals themselves that move naturally and from an internal principle get tired and have need of repose to relax their members ...

SAGR. It seems to me that I hear Kepler answering him that there are also animals which refresh themselves from weariness by rolling on the ground, and that hence there is no need to fear that the earth will tire; it may even be reasonably said that it enjoys a perpetual and tranquil repose by keeping itself in an eternal rolling about.

SALV. Sagredo, you are too caustic and sarcastic. Let us put all joking aside, for we are dealing with serious matters.

SAGR. Excuse me, Salviati, but to me what I have just said is not so far from relevant as perhaps you make it out to be. For a movement that serves for repose and removes the weariness from a body tired of traveling may much more easily serve to ward it off, just as preventive remedies are easier than curative ones. And I am sure that if the motion of animals took place as does this one which is attributed to the earth, they would not weary at all. For the fatigue of the animal body proceeds, to my thinking, from the employment of but one part in moving itself and the rest of the body. Thus, for instance, in walking, only the thighs and the legs are used to carry themselves and all the rest, but on the other hand you see the movement of the heart to be indefatigable, because it moves itself alone.

Besides, I don't know how true it is that the movement of animals is natural rather than constrained. Rather, I believe it can be truly said that the soul naturally moves the members of the animal with a preternatural motion. For if motion upward is preternatural to heavy bodies, the raising of such heavy bodies as the thigh and the leg to walk cannot be done without constraint, and therefore not without tiring the mover. Climbing up a ladder carries a heavy body upward against its natural tendency, from which follows weariness because of the natural repugnance of heaviness to such a motion. But if a movable body has a motion to which it has no repugnance whatever, what tiredness or diminution of force and of power need be feared on the part of the mover? And why should power be dissipated where it is

not employed at all?

SIMP. It is against the contrary motions by which the terrestrial globe is imagined to move that the author directs his objection.

SAGR. It has already been said that they are not contrary at all, and that in this the author is much deceived, so that the strength of his objection is turned against the objector himself when he will have it that the *primum mobile* carries all the lower spheres along, contrary to the motion which they are continually employing at the same time. Therefore it is the *primum mobile* which ought to get tired, since besides moving itself it has to take along many other spheres which moreover oppose it with a contrary motion. Hence the last conclusion that the author drew, saying that in going over the effects of nature, things favorable to the Aristotelian and Ptolemaic opinion are always found and never any that do not contradict Copernicus, stands in need of careful consideration. It is better to say that if one of these positions is true and the other necessarily false, it is impossible for any reason, experiment, or correct argument to be found to favor the false one, as none of these things can be repugnant to the true position. Therefore a great disparity must exist between the reasons and arguments that are adduced by the one side and by the other for and against these two opinions, the force of which I leave you to judge for yourself, Simplicio.

SALV. Carried away by the nimbleness of your wit, Sagredo, you have taken the words out of my mouth just when I meant to say something in reply to this last argument of the author's; and although you have replied more than adequately, I wish to add anyway what I had more or less in mind.

He puts it down as a very improbable thing that an evanescent and corruptible body such as the earth could move perpetually with a regular motion, especially since we see animals finally exhaust themselves and stand in need of rest. And to him this improbability is increased by this motion being immeasurably greater in companison with that of animals. Now I cannot understand why he should be disturbed at present about the speed of the earth, when that of the stellar sphere, which is so much greater, causes him no more considerable disturbance than does that which he ascribes to the velocity of a millstone performing only one revolution every twentv-four hours. If the velocity of rotation of the earth, by being in accord with the model of the millstone, implies no consequence of greater moment than that does, then the author can quit worrying about the exhaustion of the earth; for not even the most languid and sluggish animal--not even a chameleon, I say--would get exhausted from moving no more than five or six yards every twenty-four hours. But if he means to consider the velocity absolutely, and no longer on the model of this millstone, then inasmuch as the movable body must pass over a very great space in twenty-four hours, he should show himself so much the more reluctant to concede this to the starry sphere, which, with incomparably greater speed than that of the earth, must take along with it thousands of bodies, each much larger than the terrestrial globe.

It would now remain for us to see the proof by which this author concludes that the new stars of 1572 and 1604 were sublunar in position, and not celestial, as the astronomers of that time were commonly persuaded; truly a great undertaking. But since these writings are new to me, and long by reason of so many calculations, I thought that it would be more expeditious for me to look them over as well as I can between this evening and tomorrow morning; and then tomorrow, returning to our accustomed discussions, I shall tell you what I have got out of them. Then, if there is time enough, we shall discuss the annual movement attributed to the earth.

Meanwhile, if there is anything else you want to say--particularly you, Simplicio--about matters pertaining to this diurnal motion which has been so lengthily examined by me, there is yet a little while left to us in which this can be discussed.

SIMP. I have nothing else to say, except that the discussions held today certainly seem to me full of the most acute and ingenious ideas adduced on the Copernican side in support of the earth's motion. But I do not feel entirely persuaded to believe them; for after all, the things which have been said prove nothing except that the reasons for the fixedness of the earth are not necessary reasons. But no demonstration on the opposing side is thereby produced which necessarily convinces one and proves the earth's mobility.

SALV. I have never taken it upon myself, Simplicio, to alter your opinion; much less should I desire to pass a definite judgment on such important litigation. My only intention has been, and will still be in our next debate, to make it evident to you that those who have believed that the very rapid motion every twenty-four hours belongs to the earth alone, and not to the whole universe with only the earth excepted, were not blindly persuaded of the possibility and necessity of this. Rather, they had very well observed, heard, and examined the reasons for the contrary opinion, and did not airily wave them aside. With this same intention, if such is your wish and Sagredo's, we can go on to the consideration of that other movement attributed to the same terrestrial globe, first by Anistarchus of Samos and later by Nicholas Copernicus, which is, as I believe you well know, that it revolves under the zodiac in the space of a year around the sun, which is immovably placed in the center of the zodiac.

SIMP. The question is so great and noble that I shall listen to its discussion with deep interest, expecting to hear everything that can be said upon the subject. Following that, I shall go on by myself at my leisure In the deepest reflections upon what has been heard and what is to be heard. And if I gain nothing else, it will be no small thing to be able to reason upon more solid ground.

SAGR. Then in order not to weary Salviati further, let us put an end to today's discussions, and tomorrow we shall take up the discourse again according to our custom, hoping to hear great new things.

SIMP. I shall leave the book on the new stars, but I am taking back this booklet of theses in order to look over once more what is there written against the annual motion, which will be the subject of tomorrow's discussion.

End of the Second Day

LINK TO FIRST DAY
LINK TO THIRD DAY

Trial of Galileo Homepage