

Just a very quick recap from last time to remind you how we got here. We're looking back to the philosophy of the 17th and 18th centuries. And in these first two and a half lectures, I'm basically explaining why that is such an interesting and pivotal period for the development of philosophy, and also why the problems that arose then remain very pressing today.

So we saw that, in the medieval world, the view of the universe was basically dominated by Aristotle and the Bible. Aristotle had a physical theory which essentially explained the workings of things in the world on the model of human or animal behavior. The idea was roughly that the reason why stones fall is that they're striving to reach the center of the universe. They have something like a desire.

Now, this came under a lot of pressure from two particular directions. One of them was to do with Aristotle's theory of the heavens. Stones fall because they strive to reach the center of the universe. What about planets? What about the Sun? What about the moon? Well, we see those moving in circles. They must be striving to move in circles. And the Aristotelian explanation was based on the idea that they must be made of a completely different stuff, whose nature is completely different from that of stones on earth. Stones strive to reach the center of the universe. Therefore, the center of the earth things, planets, stars, the moon must be made of different stuff. Ether, which instead strives to imitate the perfection of God by moving in circles.

That came under great pressure when Galileo turned his telescope towards the sky and saw various phenomena which simply contradicted it. The heavens proved not to be as perfect and unchanging as people had thought. There were craters and mountains on the moon. Not everything circled around the earth. Jupiter had moons going around it. And in particular, observations of Venus and the phases of Venus simply contradicted the ancient theory of how these things worked.

Coupled with that was a realization that the Aristotelian theory of science was seriously defective. If you say that such and such acts in a particular way because it strives or desires to act in that way, it's clear if you think about it that's completely unexplained. That kind of theory could be used to explain anything at all. No matter how something behaves, you can say, "Oh well, it does it that way because it wants to." Unless you've got some way of discriminating between the sorts of things, the sorts of ways in which things can be expected to behave, then simply appealing to intentions becomes completely empty.

And a far better theory came along in the 17th century. Again, Galileo played a major part in getting it started, and Descartes was absolutely crucial in getting it established. The theory of mechanism. The idea that things, physical things behave as they do not because they have anything analogous to desires, but rather because they bump into each other, push each other either by pressure or impact.

So we get a mechanical theory of the world, which seems much more genuinely explanatory. And this theory was applied in various contexts with success. The remaining problem about how to explain the circulation, for example, of the moon around the earth, how do you explain that if everything is moving simply in accordance with impact from other things? And if bodies act, as Galileo and Descartes thought, under inertia, that is, they just keep going in the same direction at the same speed unless they're acted upon by a force, how do we explain why heavenly bodies orbit around other heavenly bodies? That remains a problem.

Descartes, as we saw, got a really neat explanation of that. His neat explanation was that the essence of matter is extension. Everything fundamentally about matter can be understood by considering it as geometrically extended stuff. So wherever you have extension, you have matter. That means the earth is completely full. There is no space, no empty space. And it follows that all motion everywhere in the heavens and down here as well must take the form of circuits or vortices. If there cannot be empty space, then that's the only way things can move, by something else taking its place and pushing whatever is in the place where it moves to, round in the vortex.

So the explanation of the orbiting of the planets, the orbiting of the moon, and so on is in terms of these vortices. All seems very neat.