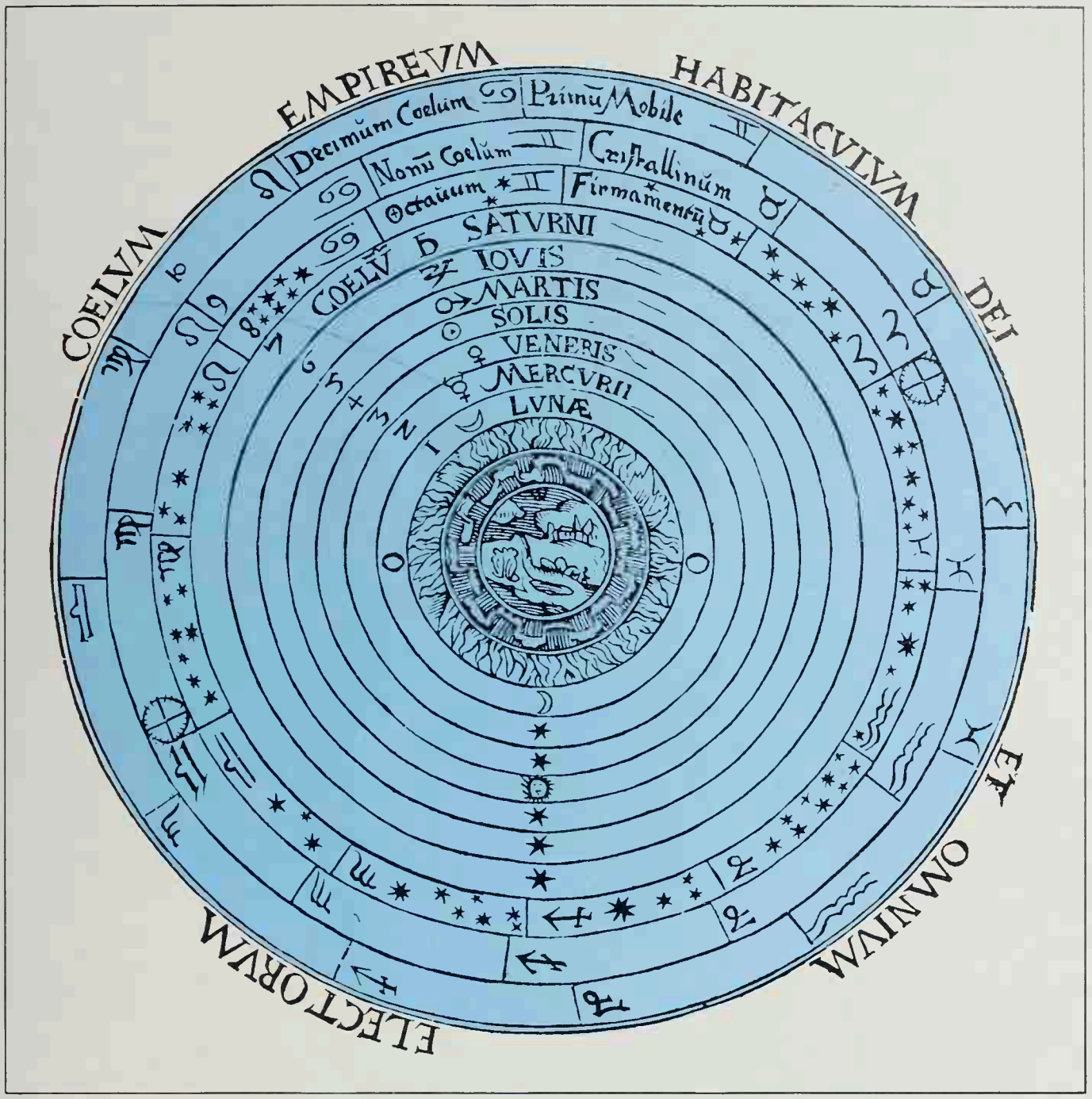

A plan of the sphere of the heavens. The stars lie on the outermost sphere, beyond which lies Heaven. In the centre is the Earth with the 'elements' earth, water, air and fire. Between are the transparent spheres which were supposed to exist and on which the Moon and the planets were thought to be attached.
From Peter Apian, Cosmographia, *published in Antwerp in 1539.*

was a vast stride forward that also brought in its train the realization that the Sun and Moon were ordinary physical bodies, not special celestial entities as had once been believed.

It was during this exciting period of research that the telescope was invented and first used in astronomy. The telescope does two things: firstly, it grasps more light than the unaided eye can do, and so reveals visible objects too dim to see without it; secondly, it magnifies distant objects so that their images are spread out and more detail can be detected – in other words it increases ANGULAR RESOLUTION. Its effect, as Galileo was forthright in pointing out, was that man began to realize that the universe was far more astonishing than he had previously imagined. First of all it was discovered that the planets were visible because they reflected sunlight; only the stars emitted light on their own account. There were, then, at least two classes of bodies in the universe. Moreover, some planets had satellites orbiting round them, in essence similar to the way the Moon orbits the Earth. Again, the Moon was seen to possess mountains and craters, valleys and plains, and questions arose about the nature of the other planets – had they surface features too, and were they perhaps inhabited?

But undoubtedly the most significant advance brought about by the telescope was its ability to show a whole range of new objects in the universe. Not only were there planets and stars, but the number of stars was far greater than anyone had supposed. Subsequent research has shown that the universe is vast indeed, and populated with other material besides just stars and planets. Out in space, among the stars, are vast gas clouds or **nebulae**, often extending for as much as 30 pc across space. Some of these glow brightly because of hot stars embedded in them; others are dark and can be noticed only because they blot out the stars behind them, looking like great holes in space. These are the cause of the dark patches observed in the Milky Way. The use of radio telescopes has made it evident that not only is there material in between the stars, but also there are other clouds of dark gas, never detected before.

The stars and nebulae have also been found to be organized in a grand scheme. The stars themselves are either separate or in associations and clusters, although these groups have nothing whatever to do