seasons is not the cycles of the moon, but a different set of relations, which we think has to do with where we are in relation to an orbit that the Earth takes around the sun. There is a battle raging on right now as we speak, over whether it is our Earth going around the sun, as Aristarchus and the Pythagoreans think, or as Aristotle says, the sun is going around our Earth.

BOY: Why do they not all agree?

HERDSMAN: It is not so easy. It requires a proof of somewhat higher causes, and may take many generations to prove. Here is why: Take your finger and orbit it around your eye, with your other eye closed.

BOY: It looks like my finger is circling my eye.

HERDSMAN: Now, orbit your eye around your finger.

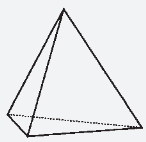
BOY: It looks the same, my finger still appears to be orbiting my eye.

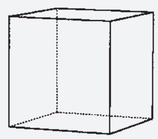
HERDSMAN: From the point of view of the observer, there is no difference in the perceived motion from a relatively stationary body observing a body in motion, or the inverse, from a moving body observing a relatively stationary one.

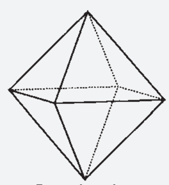
BOY: If it is so difficult to figure out what is actually going on, how then can it be of such fundamental importance?

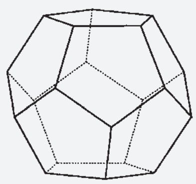
HERDSMAN: Perhaps you have heard the story of how Thales was able to achieve a fundamental peace treaty between warring states, simply by outflanking the heads of state with his ability to forecast an eclipse based upon his knowledge of the true motions. But even more fundamental, is how these ideas have been used by sea travellers.

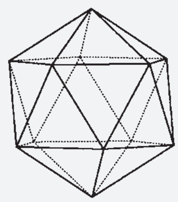
The Platonic Solids


Tetrahedron


Cube


Octahedron


Dodecahedron


Icosahedron

Among the many startling discoveries of the application of universal physical principles to the organization of the visible world found in the scientific investigations of Plato and his associates, was the recognition of the unique constructability of the five regular (Platonic) solids. The most important aspect of this discovery did not lie in the visible world, however, but in the necessary implications for the existence of what Carl Gauss would call the "complex domain" two millennia later.

The proof that no other regular solids but these—the pyramid, cube, octahedron, dodecahedron, and icosahedron—could be constructed in visible space, was tantamount to the assertion that, contrary to textbook Euclideanism or the dead world of Isaac Newton, physical space was not "empty," but instead shaped by unseen boundary conditions inherent in the possibilities of physical action. What appear to be the axioms, definitions, and postulates of mathematics, must yield to the causal relations of physics; in fact, the very proof of the uniqueness of the Platonic solids—one of the greatest achievements of Greek geometry, which required the development of a theory of proportions able to deal with incommensurable species of magnitudes (*powers*)—represented, paradoxically, a complete overturning of the method of deductive (logical) proof upon which it was based.

Although Plato presents these issues directly in his *Timaeus,* they are also embedded at the heart of the *Republic,* in the twinned metaphors of The Cave and Divided Line. Here, we see that what we know truly, we know metaphorically—but only by reference to an unseen *Power* which animates and unifies the more immediate aspects of our experience.

—*Ken Kronberg*

BOY: How is that?

HERDSMAN: Before man conceived of a ship, we had no way to explore the planet and discover what else there was, including the discovery and colonization of our Greek islands by ancient seafaring cultures. With ships, the pilot's art was given birth—the essence of which lies in more than just how to steer a ship.

BOY: But isn't that the essence of the pilot's art? How to steer a ship, insofar as is best?

HERDSMAN: And by "best," would you mean any way that would get you somewhere, or the most direct way to get where you intended to go?

BOY: The latter, of course.

HERDSMAN: Then, as one final exercise, I would like you to imagine yourself in the middle of the ocean. What do you see when you look around?

BOY: I see water, in every direction I look.

HERDSMAN: So, if you want to go to some island directly east of you, which way do you steer?

BOY: Well, I know where the North Star is, so I just keep going in the direction to my right when I face the North Star.

HERDSMAN: And, if you were going slightly northeast or slightly southeast, how would you know?

BOY: Well, I don't know.

HERDSMAN: Or, if you were going a lot northeast, or a lot southeast, then probably you would miss the island you were aiming for?

BOY: I suppose, then, that you are going to tell me that there is something more to the astronomy of the pilot's art, than simply knowing where to find the North Star?

HERDSMAN: First off, there are problems with trying to map out the activity of a sphere, onto a flat plane of papyrus. These mappings explode at the edges of the map, where they start to lose all accuracy the closer you get to the edge. But, Platon rediscovered the lost method of mapping the sphere onto the plane, with his now-famous regular divisions of the sphere.

BOY: I would like to know more about that.

HERDSMAN: Then you should try to figure them out for yourself, on your own, and maybe they will accept you into the Academy at Athens.

BOY: Regular solids, huh? But, that still doesn't explain how pilots can go east or west without missing their targets.

HERDSMAN: If the pilot goes too far north or too far south, what do you think happens to the North Star's position in the sky? If you watch it from here every night, it will appear to always be in the same position, wobbling a little here or there, but always in the same position, with the rest of the stars circling around it. However, if we travelled south to Alexandria, it would drop a bit in the sky.

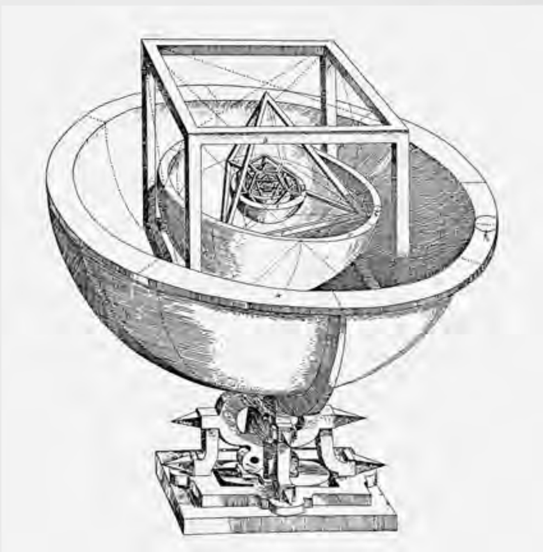
BOY: How can that be?

HERDSMAN: Well, imagine that the Earth is a sphere, and that the North Star was very, very far away. What would happen as you moved along the surface of the sphere toward the top?

BOY: What do you mean by "top"? I thought you said a sphere.

HERDSMAN: A rotating sphere always spinning.

BOY: Then, by "top," I guess you mean one of those two



Johannes Kepler discovered that the ordering of the visible planets corresponded to the ordering achieved by inscribing and circumscribing spheres around the five Platonic solids, in the order depicted in this illustration from his "Mysterium Cosmographicum."