Box 15

Doubling the Square, The Cube, and Cubic Roots

In these investigations of doubling the square, doubling the cube, and other challenges LaRouche has laid out, we find we must make a lot of constructions. If the faithful reader has not chickened out, and has begun the process of fighting with these problems, he has run into two things. First, a certain amount of frustration, a "fire in the butt," that provokes those industrious souls to do more work. Second, a sense that the investigation isn't really about doubling the square or doubling the cube, after all.

Compared to doubling the square, the doubling of the cube is a conundrum, and an order of magnitude more difficult to discover. The cube is characteristic of the visible universe, as Plato describes in the *Timaeus:* It provides surfaces and lines to our mind's eye, as parts of itself. The seemingly more elementary line and plane do not have independent existences (except in Flatland). We see lines and planes only because visible space is "cubical," i.e., *spherical.* But, we never actually see the cube. Part of it is always hidden from sight. We need multiple views of the same object by which the mind constructs an idea of the object's complete appearance.

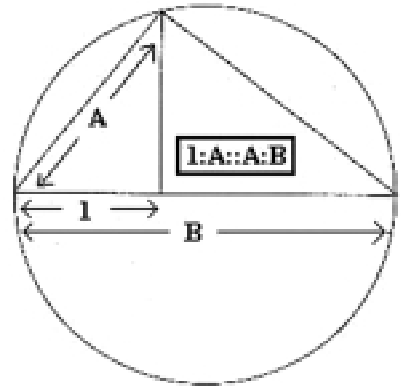
Questions regarding the universe in its entirety are found there, but they are just out of sight. When we try to pin them down, they seem to move just out of reach. What did Archytas see in the cube? He knew that it requires a concert of circular actions to produce, and he knew that those actions are ordered by powers outside the cube. D'Alembert and de Moivre, on the other hand, wanted to torture the cube; they wanted to force it to submit, to give up its depth, to make it become just one more surface. They wanted to force the life out of it so they could make it an equation and pin it in their entomological box, next to the *Lepidoptera.* They wanted to stop you from recognizing the power of discovery inside your own mind.

FIGURE 1

The circular action required to build the torus, is invisible to your senses. See Box 3.

Think back to when you discovered how to double the square. (Double the square right now, if you haven't already!) What images went through your mind? Perhaps opening your mail, or cutting a piece of toast, or folding your sheets. Often, something you don't ordinarily associate with geometry, becomes the inspiration by which you generate the discovery. But, each of these images is an experience your mind actually recognizes, as containing the crucial species of action that doubles the square. Was that discovery thus already somewhere in your mind, or was it a brand new creation?

FIGURE 2



One mean between two extremes, inside the circle.

Now, compare the doubling of the square with doubling the cube. We've seen that doubling the square and the cube both require circular actions (**Figure 1**).

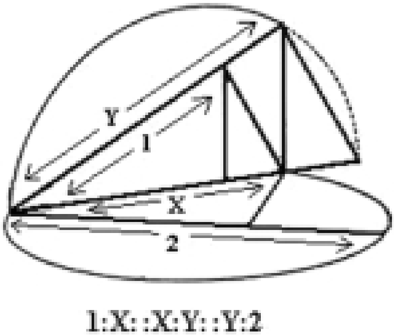
Finding one mean between two extremes, to generate all the square magnitudes, can be represented as instances inside one circular action (**Figure 2**).

Finding the construction for creating two means between two extremes, according to Archytas, demands an additional circular action, orthogonal to that action which has the power to generate square magnitudes (**Figure 3**).

So, we see that the square powers are really a shadow of that principle that generates cubic magnitudes. Recall that, when one sees a cube, one is really piecing together a set of images of squares and lines, which are projections from the cube, which you can't see.

Fast forward to the entrance of Carl

FIGURE 3



Two circular actions, orthogonal to each other, generate two means between two extremes.

Gauss into the fight. He defined the roots of all algebraic equations, as the intersection of two surfaces, generated by multiply-connected circular action, intersecting at a plane. Looking at this through Gauss's eyes, the algebraic equation is not the determining power, but is produced as an effect of the gross characteristics of the two surfaces. For example, the roots of a cubic equation are really the intersections of three surfaces, two of which shoot up to infinity three times in one rotation (**Figure 4**).

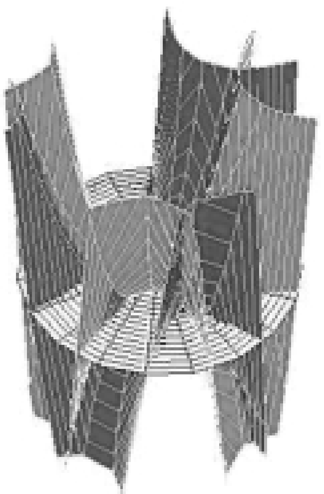
The roots are thus an integral aspect of the entire surface geometry, just as the two means are effects of the intersection of three different curved surfaces. Unlike Archytas' cubic construction, though, Gauss's surfaces can be constructed to generate any power.

What do these constructions say about visual space? When we see objects such as cubes, are we really seeing what we think we see? Or, are we seeing a metaphorical representation of something, lurking behind the senses, which ironically also generates what we now recognize as the Archytas construction, or Gauss's construction of algebraic roots? Only from this type of ironical study, can we begin to scientifically pin down the source of that eerie "behind the scenes" notion.

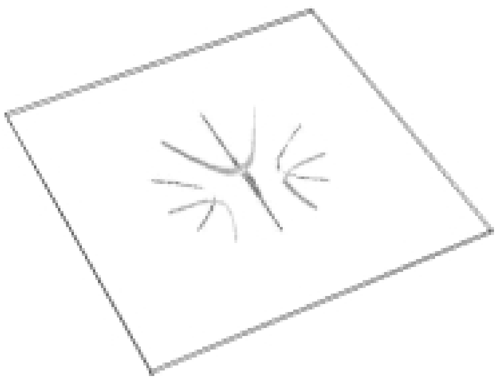
—Riana St. Classis
and Peter Martinson

FIGURE 4

(a)



(b)



The two surfaces for a cubic equation (a), and the curves formed by their intersection with the plane (b).