Euclid Problematic

By

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The Forty-Seventh Problem of Euclid was an invention of our ancient friend and brother, the great Pythagoras, who in his travels through Asia, Africa, and Europe, was initiated into several orders of priesthood and raised to the sublime degree of Master Mason. This wise philosopher enriched his mind with a knowledge of many arts and sciences, more especially Geometry and Masonry. He devised many geometrical problems and theorems, among the most celebrated of which was this, which in the joy of his heart, he called Eureka, signifying, I have found it, and upon the discovery of which, he is said to have sacrificed to Jehovah. It teaches Masons to be general lovers of the arts and sciences.[1]

The above, taken directly from the January 2000 edition of the *Tennessee Craftsman* (the published ritual of the Grand Lodge of Tennessee F. & A. M.), is certainly familiar to men who have passed through the solemn ceremonies of our order. It has however, long been a puzzle to the serious Masonic student by virtue of its numer-

ous errors, questionable statements, and general lack of substance by way of any real explanation of the problem at hand.
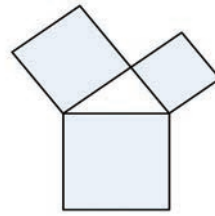

Figure 1.

To begin with, The Forty-Seventh Problem of Euclid states that, "In right-angled triangles, the square on the side opposite the right angle equals the sum of the squares on the sides containing the right angle." Or to put it in simple mathematical terms:

$$A^2 + B^2 = C^2$$

This well-known geometrical proof is depicted here graphically, and in form similar to that presented to the Brother during the appropriate portion of his lecture. This is, of course, familiar to anyone who studied even basic geometry in school and is commonly known as the Pythagorean Theorem. This simple fact leads to the first significant question which the reflective Mason must ask. Why, if the world regards this as the

Pythagorean Theorem, do we insist on giving it a different name? With curiosity thus aroused, other questions begin to form. Was Pythagoras in fact a Brother Master Mason as asserted? Did he actually cry out "Eureka" and make a great sacrifice? Isn't there some application of this great geometric truth more substantial than to "teach Masons to be general lovers of the arts and sciences?"

A fair amount is known about Pythagoras. The Greek mathematician and philosopher was born about 582 B.C. on the island of Samos. It is generally claimed that he spent a significant amount of time traveling throughout Egypt, Chaldea, and Asia Minor, during which he was initiated into various mystery schools. He eventually settled in Crotona in southern Italy, where he founded a school of instruction. When his school was attacked, he fled Crotona, and died circa 500 B.C.[2]

It is widely understood that the famous theorem attributed to Pythagoras was well known long before his time. Commonly referred to as "the Egyptian string trick," the practical application was to square large structures. Simply, any given length of string can be divided into twelve equal parts which are marked along the length of the string. By placing three sticks in the ground and adjusting them so that they form a triangle with sides equal to three, four, and five marks, a right angle is formed. Thus, a perfect square angle can be created from a length of string and some measuring device such as a twenty-four inch gauge. This application makes use of the simplest form of the right triangle, the 3-4-5 triangle, which is the form commonly depicted in Masonic circles. Pythagoras didn't invent it, but he did pro-

vide the mathematical proof, which one can presume gives him naming rights.

While Pythagoras did form a school of instruction which advanced members by degrees, to claim that he received the degree of Master Mason is a claim too ludicrous to be taken seriously. According to Mackey, the first verifiably authentic mention of Pythagoras with respect to Freemasonry comes in a speech delivered by Sir Francis Drake to the Grand Lodge of York in 1726 in which Pythagoras, Euclid, and Archimedes are mentioned by name only as being great geometricians. Writings connecting Pythagoras to Freemasonry are, according to that author, notably absent until the middle of the 18th Century, when the new breed of speculative Masons of the 1717 revival began to connect him with the Fraternity.[3]

Nowhere in any biography of Pythagoras is the term "Eureka" used except as published in Masonic ritual. That term is associated with Archimedes, who allegedly worked out his principle of liquid buoyancy while sitting in his bathtub, and leaping from the tub, ran naked through the streets shouting, "Eureka!" No mention is made of ritual sacrifice on the part of Archimedes, and the practice was expressly forbidden to the initiates of the Pythagorean school.[4]

So is there a deeper Masonic lesson to be learned from the right-angle triangle? One fairly obvious application is in the position of the lesser lights around the altar of Freemasonry in some jurisdictions. In my jurisdiction the very last page of the *Tennessee Craftsman* illustrates the proper form of a Lodge room and clearly shows that the lesser lights are to be arranged as if they were the vertices of a Pythagorean 3-4-5 triangle.

This application however, is not universal, as many other jurisdictions provide no such illustration. In fact, many jurisdictions state that the lights are to be placed merely in a triangular position. Often they are arrayed in the form of an equilateral triangle beside the altar, not around it.

Somewhat more obscurely, it has been pointed out that in conducting the candidate through the circumambulations during each degree, the Pythagorean triangle is formed. Indeed, during the Entered Apprentice degree, the candidate "squares" the northeast corner of the lodge three times in a clockwise fashion before changing direction. During the same portion of the ritual in the Fellowcraft degree, that corner is squared four times and five times in the Master Mason degree.[5] While this is a bit more subtle and serves to illustrate some significance of the 3-4-5 triangle, it does not directly provide any deeper interpretation.

With nothing of any great substance to address these "other questions" previously stated, my attention was returned to the original question concerning the naming of this proposition. What is so special about Euclid that Freemasons feel the need to refer to the Pythagorean Theorem using his name? In attempting to address this question, I decided to consult Euclid directly. Almost instantly, I found myself inundated with meaning upon deeper meaning and a whole new perspective on the nature of the Craft.

Euclid, often referred to as the Father of Geometry, collected the sum of geometrical knowledge and understanding into thirteen volumes collectively known as *The Elements*. The first volume of *The Elements* concerns itself with planar geometry and contains forty-eight problems or proofs. The Pythagorean Theorem is the forty-seventh, and the forty-eighth is essentially the converse of its predecessor. For all substantive purposes, the Pythagorean Theorem is the last significant proposition of Euclid's first book of *The Elements*. It is the Omega of that volume. So what is the Alpha?

Having found Pythagoras at the end of *The Elements*, I naturally turned to the beginning. To my delight, I found that the First Problem of Euclid virtually drips with Masonic application and esoteric symbolism. It essentially states that, given any finite straight line, an equilateral triangle may be constructed. Using only a straight edge (i.e. a twenty-four inch gauge) and a compasses.
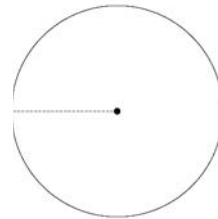

Figure 2.

To begin, use a compasses to draw a circle with any given radius (Fig. 2). We have essentially created the "point within the circle" which represents each Brother. Now reverse the compasses in such a way that the other end of the radius becomes the center point and describe a second circle overlapping the first (Fig. 3).

The resulting overlapping area is shaded in the accompanying figure. Deviating slightly from Euclid, we find in this area one of the fundamental components of sacred geometry, the
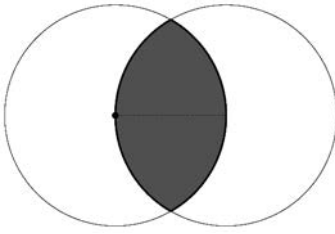
Figure 3.

Vesica Piscis. This shape holds many different significations, depending upon the school of thought which views it. In pagan rites, it is held to symbolize the generative union of the male and the female. To the early Christians, it was named the Ichthys and was displayed horizontally. The most common modern application of this can be seen displayed on rear windows and bumpers, typically with a tail attached to solidify the impression of a fish. Mathematically, the ratio of the length of the Vesica Piscis to its width is 265:153. Perhaps one clue as to why this symbol came to be adopted by the early Christians can be found in John 21:11, where it clearly states that the number of fish which Jesus caused to be caught was 153.

Returning to Euclid, we learn that by connecting the two ends of the shared radius to either the top or bottom apex of the overlapping area, we achieve the goal of the first problem by creating a perfect equilateral triangle. This is illustrated in Fig. 4. But the resultant form yields much more than is directly given in *The Elements*, particularly when viewed through the lenses of sacred geometry and Freemasonry. Indeed, the equilateral triangle is almost universally accepted as a symbol of the Deity, with each side representing the principle attributes: directive, supportive, and creative, the Masonic appellations of which are Wisdom, Strength, and Beauty.

Moreover, the upper half of the Vesica Piscis, displayed in Fig. 4 as the shaded area around the equilateral triangle, forms the exact mathematical proportions of the gothic arch. This form of arch, while different from that which is symbolically incorporated into a number of Masonic degrees, shows that the medieval operative stonemasons had a firm grasp of this application of Euclidean geometry, as this form was commonly used in churches and cathedrals of the time throughout Europe. It can still be seen to be incorporated into churches and Masonic lodges today.
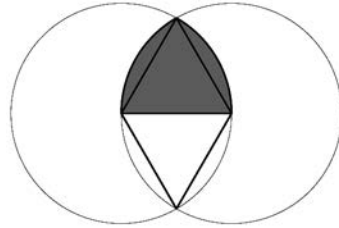

Figure 4.

The upward-pointing triangle also alludes to the male generative principle, and when combined with the correspondingly created downward-pointing equilateral triangle, a symbol of the female generative principle, the pagan interpretation is more clearly understood. The left side of Fig. 5 clearly shows these two triangles overlapped, forming a union of these two generative principles. Removing the horizontals of each (or simply not using them in the first place) yields an approximation of a most familiar symbol to Freemasons the world over.

Returning to Fig. 2 and its association to the "point within the circle," we are specifically told that the original point
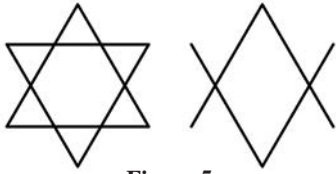
Figure 5.

represents the individual Brother. In moving to Fig. 3, we are basically taking that original point, and making a single circuit around another point, returning to the place from whence we came. In doing so, we create another radius (actually two, but we can only move in one direction at a time) around which we can make another circuit. In the course of our journey through the three degrees, we make one purposeful circumambulation in the first degree, two in the second, and three in the third for a total of six circuits. Interestingly enough, precisely six circuits around the original center point of the first circle in Fig. 2 can be made. The resultant shape can be seen in Fig. 6, and yields a cornucopia of sacred and Masonic symbolism.

The original circle is visible in the center of this drawing, and I've kept the original radius to assist in identifying it. By adding these six overlapping circles to the original, we have created twelve small equilateral triangles. Six of them are within the original circle and are not shown in the figure. Six are outside the circle and when highlighted as above, clearly array themselves into the form of the six-pointed star. Within the original circle, we see that by connecting the points where each circle intersects, we create a hexagon surrounding a central shape which brings to mind the petals of a flower. These petal shapes are almost identical to the proportions of the petals of the water lily of the Nile, and the hexagon represents the individual cell of
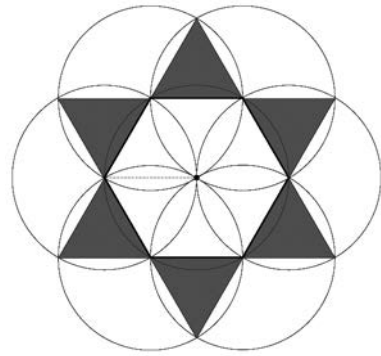

Figure 6.

the honeycomb, the internal (i.e. hidden, esoteric) form of the beehive.

The Masonic application of what I have come to call "The First Problem of Euclid" does not end there. At least one other form of significance is created by making the six circuits around the original point. To illustrate this more clearly, Fig. 7 highlights the intersection points. The resultant form is another equilateral triangle, composed not of lines, but of points. Specifically, a triangle composed of four rows of points with one, two, three, and four points in each of the rows. This shape is more commonly referred to as the tetractys, which has so many sacred and Masonic references as to warrant an entire volume on its own.
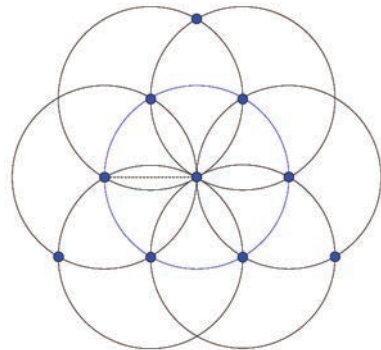

Figure 7.

First, it is comprised of the first four numbers which when added together produce the sum of ten, often referred to as the "perfect number." For this reason alone, the tetractys was considered to be significant and even holy by a number of the mystery schools. In the Pythagorean school, the tetractys is composed not of points but of ten Hebrew "Yods." In the Hebrew tradition, it is formed with four letters, ו ה י ה arranged as shown in Fig. 8. From this, it is easy to see how the sacred Hebrew name of Deity corresponds to that version of the tetractys. Combined with the fact that geometrically, the tetractys is made up of nine (or three times three) small equilateral triangles, the significance of "three times three" to the Royal Arch degree becomes readily apparent. Pike points out in his dissertation on the Master Mason degree that both Pythagoras and the Hebrew priests alike borrowed the tetractys from the ancient Egyptians. He goes on to say that it "ought to be replaced among the symbols of the Master's Degree, where it rightly belongs."[6]

The Hebrews, in all probability, learned this sacred form from Moses, who has been repeatedly identified as an initiate of the Egyptian schools and who plays a significant part in the symbolism of the Royal Arch degree. Py-

thagoras most likely learned it from the Egyptians in his reported travels there. The tetractys was arguably the greatest symbol of those who studied under him at Crotona. In fact, initiates into the Pythagorean school took their obligations "by Him who gave our soul the tetractys, which hath the fountain and root of ever-springing nature."[7] Furthermore, Pythagoras used the numerical properties of the tetractys to explain mathematically the nature of musical scales and harmonic ratios and also the seven principle colors of the visible spectrum emanating from the three-pointed triad of the Godhead.

So, as with many of the journeys typified in the various ceremonies of Masonic initiation, I found that I had come full circle. I began at Pythagoras, and in attempting to discover the reason behind several mistakes and odd phraseology, I found myself going through Euclid only to return to Pythagoras on a much deeper level. Perhaps this is the exact point of all the confusing details given in the explanation to the newly made Master Mason. It exists as it is presented in order to lead us to explore and discover the deeper, hidden meanings for ourselves.

One cannot examine this very deeply without inevitably arriving at the Pythagorean mystery school at Crotona, which has much in common with our current system of Masonic instruction. It is not, however, my intention to assert that Freemasonry is descendant from this school. To do so would be just as hollow as the myriad "proofs" that our order is the direct descendant of medieval stonemasons' guilds or the Knights Templar. While both these and other similar explanations offer interesting, and even some potentially accurate in-

Figure 8.

sight concerning the tangible, exoteric, or operative origin of our institution, it is the more esoteric, or speculative origin in which I am interested. In other words, it is far less important to prove which political organization from which we institutionally sprang than to understand the schools of thought from which we are philosophically descendant.

It is my assertion that Freemasonry contains within it one of the last remaining vestiges of the ancient system of symbolic instruction from a myriad of mystery schools. In essence, the ancient hidden mysteries of Freemasonry are the mysteries of the Pythagoreans, the Egyptians, the Kabbalists, the Zoroastrians, the Mithras, and a score of others.

Our system of symbolic, allegorical instruction carries hidden within it the essence of mystic principles spanning the entire history of human existence, preserving those teachings through a modern age where such thought flies in the face of empirical and scientific reason.

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Notes

1 *Tennessee Craftsman*, 24th Edition (Nashville:Grand Lodge of the State of Tennessee, 2000) 99.

2 Albert G. Mackey, *Encyclopedia of Freemasonry*, Vol. 2 (Chicago:The Masonic History Company, 1909) 823.

3 Albert G. Mackey, *The History of Freemasonry* (New York:Gramercy Books, 1996) 368.

4 Manly P. Hall, *The Secret Teachings of All Ages*, Readers Edition (New York:Tarcher/Penguin, 2003) 201.

5 Reid McInvale, "Circumambulation and Euclid's 47th Proposition," [Internet – WWW, URL], http://www.io.com/~janebm/summa.html, January, 1997.

6 Albert Pike, *Morals and Dogma of the Ancient and Accepted Scottish Rite of Freemasonry* (Charleston:Supreme Council of the Thirty-Third Degree, 1871) 88.

7 Hall, 202.

The only difference between a tax man and a taxidermist is that the taxidermist leaves the skin.   -- Mark Twain