

*“Those who become Freemasons only for the sake of finding out the secret of the order, run a very great risk of growing old under the trowel without ever realizing their purpose. Yet there is a secret, but it is so inviolable that it has never been confided or whispered to anyone. Those who stop at the outward crust of things imagine that the secret consists in words, in signs, or that the main point of it is to be found only in reaching the highest degree. This is a mistaken view: the man who guesses the secret of Freemasonry, and to know it you must guess it, reaches that point only through long attendance in the lodges, through deep thinking, comparison, and deduction.*

*He would not trust that secret to his best friend in Freemasonry, because he is aware that if his friend has not found it out, he could not make any use of it after it had been whispered in his ear. No, he keeps his peace, and the secret remains a secret.”*

From the Memoirs of Giovanni Giacomo Casanova, Brockhaus-Plon, 1960

Over the past few years we have had the pleasure of enjoying many thought provoking papers presented to us inside these walls from a variety of the seven liberal arts and sciences. At each communication of this Lodge we continue to enjoy the musical education that Bro. Organist has been supplying for us. We have come close to my subject choice for today when R.W. Bro. Bowick spoke to us on Arithmetic with the magic of numbers. We have heard R.W. Bro. Quinn come close to my topic when he led us through the galaxy with his Astronomy lecture. We have had Grammar lessons from R.W. Bro. Switzer. Logic from our Grand Master. And an abundance of Rhetoric from W. Bros. Hampton and Peré. Today, Geometry takes its turn as I would like to initiate the discussion of one of the most important and perhaps the least understood of all the symbols of Masonry

#### The 47<sup>th</sup> Problem of Euclid

which has been adopted as a symbol in the Master's Degree and figure in the jewel of the Past Master. This symbol can often be seen in our Lodges on the Master's Tracing Board. The world is indebted to Pythagoras of Samos, for solving this problem, which has had a profound effect on our world in general and on Masonry in particular.

So why a paper on the 47<sup>th</sup> Problem of Euclid? This might, at first blush, seem to be obvious. After all, Masons are taught in the lecture of the Second Degree that Geometry is the first and noblest of sciences, the foundation upon which the superstructure of Freemasonry is erected. Jumping ahead a bit for some of us, in the Third Degree, we are also taught that the 47th Problem of Euclid teaches us to be great lovers of the arts and sciences. My apologies for any discussion of any parables used from advanced Degrees but that is the last time I will draw attention to it. I will in advance, beg the forgiveness of our two Fellowcraft Masons if I infringe on the experience of their Third Degree in any way – more likely I am hoping to increase their anticipation.

Unravelling the complex riddle of the 47<sup>th</sup> Problem and understanding why it is regarded as a central tenant of Freemasonry properly begins with the study of its history and mathematical applications. The ritual during which the 47<sup>th</sup> Problem is introduced briefly explores these issues however having fleetingly touched on the fundamentals, the ritual goes no further and it is left to the Candidate to undertake further exploration. The puzzling brevity with which the 47<sup>th</sup> Problem is discussed, given the accompanying importance placed upon its value to the Craft, seems almost to be an invitation for the intellectually curious to explore further. Most Candidates however, seem to assume that their acquaintance with the 47<sup>th</sup> Problem gained from their early years of formal education provides them with more than adequate knowledge of the 47<sup>th</sup> Problem of Euclid and that they have already satisfactorily mastered the concept. Few ever investigate further. So, for the benefit of our two Fellowcraft, I will proceed.

In *The Assayer*, written by Galileo Galilei in 1623, we read: "Philosophy is written in this grand book - the universe - which stands continuously open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering about in a dark labyrinth."

A further consequence is that if a man knows the maths, and is therefore able to read the "book", he shall know the Supreme Being's plan without any intermediary.

Who was Pythagoras? He was born on the Greek island of Samos in the Aegean Sea in approximately 570 B.C. He became a traveller, a philosopher and a mathematician seeking knowledge. He was an astronomer, a teacher and the founder of a school. He was also a man who many claim, performed miracles. He believed in the immortality of the soul and he was also a renowned athlete.

The world is indebted to this man for many other accomplishments as well, in the areas of medicine, music and astronomy. Pythagoras introduced weights and measures to Greece. The doctrine now known as the "Harmony of the Spheres," where the planets and stars moved according to mathematical equations, which corresponded to musical notes and thus produced a symphony, originated with him. There is evidence that no one considered the earth a sphere revolving in space before him. He was the first to discover the therapeutic value of music. He was the first to carry the study of arithmetic beyond the needs of commerce. The term "philosopher" was first used by Pythagoras. He founded the "Pythagorean Fraternity," the most influential school of its time for the purpose of pursuing the religious and ascetic practices. Most accounts agree that what was done and taught among the members was kept a profound secret. The esoteric teachings may have concerned the secret religious doctrines and usages, which were undoubtedly prominent in the Pythagorean system. Temperance of all kinds seems to have been strictly urged. The club was in practice at once "a philosophical school, a religious brotherhood, and a

political association." Pythagoras was the first to consider women the equal of men, and admitted both to his school on equal terms. He was probably the first to teach by parables and symbols. He became so wise and learned that his teachings were followed by such giants of the ancient world as Socrates, Plato and Aristotle. He did more for his century than any other man.

Like many great philosophers of the day, Pythagoras left no writings of his own. What he did, and what is known about him has been handed down through the writings of his followers. To some extent, Masonic Lodges of today are patterned after the society he formed. The philosophy he taught in the 5<sup>th</sup> century B.C. is much the same as the philosophy taught to Freemasons in this the 21<sup>st</sup> century A.D.

In Martin Clare's landmark publication of 1730, "Defense of Masonry," he declared Pythagoras to be "a Grecian philosopher and mathematician who had a big influence on Masonry around 530 B.C." He continues by saying that "Pythagoras, by travelling into Egypt, became instructed in the mysteries of the nation, and there he laid the foundation of all his symbolical learning." Professor Clare stated that "the Pythagoreans professed a great regard for the four Principles of Masonry – a Point, a Line, a Superficies and a Solid and particularly held that the Square was a very proper emblem of Divine Essence."

So it makes sense, on the surface, we would look to Euclidian mathematics as operative Masons. Let's first take a look at what the 47<sup>th</sup> Proposition states mathematically:

"In right angled triangles the square on the side subtending the right angle is equal to the squares on the sides containing the right angle." Or as the non-mathematicians know it more readily - "In every right-angled triangle the square on the hypotenuse is equal to the sum of the squares of the other two sides."

Geometry 101 – Lesson 1

The perfect right angled triangle has sides of 3, 4 and 5,

The square of 3 is 9.

The square of 4 is 16.

The sum of 9 and 16 is 25 with 25 representing the hypotenuse.

The square root of 25 is 5.

Therefore, the ratio is written: 3:4:5

When we write down the square of the first four numbers (1, 2, 3 and 4), we see that by subtracting each square from the next one, we get 3, 5 and 7.

Ok, let's try it.

The square of 1 is 1.

The square of 2 is 4.

The square of 3 is 9.

And the square of 4 is 16.

1, 4, 9 and 16

Subtracting each square from the next one...

$$4-1 = 3$$

$$9-4 = 5$$

$$16-9 = 7$$

3:5:7: These are the regular steps in Masonry. They are the steps in the Winding Stair which leads to the Middle Chamber and they are the number of brethren which form the number of Masons necessary to open a lodge of:

Master Mason: 3

Fellow Craft: 5

Entered Apprentice: 7

These are the sacred numbers of Masonry.

Legend has it, that when Pythagoras had successfully established this fact, he was so pleased that he sacrificed an ox to the Gods. When the renowned geometer Euclid of Alexandria wrote his textbook entitled "The Elements" some two and a half centuries later in the year 300 B.C., he included the Pythagorean theory as the 47<sup>th</sup> problem of his first book.

Solving this 47<sup>th</sup> problem facilitated the making of calculations and the drawing of plans for buildings, which is why it is also known as the 'Carpenter's Theorem.' According to the Greek historian Lucius Mestrius Plutarchos, it was also known as the 'Egyptian Triangle' as this triangle consisting of sides of

three, four and five parts was a symbol frequently employed by Egyptian priests. To the Egyptian's, it was considered a symbol of 'universal nature.' Plato's theory in Book VIII, Chapter III of "The Republic" was that the base, which was composed of four units, was made to represent Isis - the female principle. The perpendicular, composed of three units, represented Osiris - the male principle and the hypotenuse – that composed of five units – was seen as the product of the first two principles, Horus their son. The Egyptians also held that the number three was the first perfect odd number, that four was the square of two, which was the first even number, and that five was the result of three plus two. The Egyptians however, made a further more important use of this triangle – they used it as the standard for all their measures of extent and it is believed to be applied by them at the building of the great pyramids.

This most important discovery of the learned Pythagoras is the root of all geometry and the very foundation of mathematics. Using this theorem, it was made possible for the construction of railways, roads, bridges and tunnels to begin at both ends and meet perfectly in the middle. By this science, the Architect is enabled to construct his plans and execute his designs; the General to arrange his soldiers; the Engineer to mark out the ground for construction; the Geographer to give dimensions to the world and all things therein contained; to delineate the extent of the seas and specify the dimensions of empires, kingdoms and provinces. By it, the Astronomer is enabled to make his observations and to fix the durations of time, seasons, years and cycles. In fact, the Astronomer, the Pilot and the Navigator would be lost without the Pythagorean Theory.

Using this formula, we can prove a circle, a right angle, a square and much more, all of which are essential for the operative mason. This formula is essential in any construction effort, hence it's obvious importance to operative masons.

But, we are not operative masons, we are speculative Masons only. That being the case, why is the 47<sup>th</sup> Problem of Euclid important to us? Or is it?

The 47<sup>th</sup> Problem was incorporated into our ritual because it was extremely important to the operative masons from whom we originated. The square was used to square their work, and without it, they would have found it impossible to build their majestic castles and beautiful cathedrals that gave such grandeur to the European landscape during the Middle Ages. This right-angle triangle, which forms a perfect square, is the most important tool in Masonry. It is part of the furniture of our Lodge; is one of the moveable jewels; one of our working tools; and it is mentioned extensively in the Fellowcraft Degree. The Square is so highly esteemed among speculative Masons that it is the jewel set aside for the highest office in our Masonic Lodges – the Worshipful Master. The Square is also a guide to the whole Craft, as all Masons are expected to square their actions by the Square of virtue.

'This symbol is attached to the Past Masters jewel because just as this figure depends upon several lines, angles and triangles, which form the whole, so Masonry depends upon its several members and fundamental principles upon which the institution is founded.'

The 47<sup>th</sup> Problem of Euclid is also important to the whole of Masonry because the apron, the badge that distinguishes all Masons from the rest of the world, takes its shape and proportions from this symbol. In Masonry, the 47<sup>th</sup> Problem also symbolizes perseverance, a search for truth and the need for more knowledge.

According to Reverend James Anderson's "Constitutions" published in 1723:

*"The Great Pythagoras, provided the Author of the 47th Proposition of Euclid's first Book, which, if duly observed, is the Foundation of all Masonry, sacred, civil, and military.... This wise philosopher, Pythagoras, enriched his mind abundantly in a general knowledge of things, and more especially in Geometry, or Masonry. On this subject he drew out many problems and theorems, and, among the most distinguished, he erected this, when, in the joy of his heart, he exclaimed Eureka, in the Greek language signifying, "I have found it," and upon the discovery of which he is said to have sacrificed a hecatomb. It teaches Masons to be general lovers of the arts and sciences."*

Masonry, as a speculative science, concerns itself with morality, upright behaviour and the brotherhood of man. Since we are speculative Masons, there must be a more significant reason for the 47<sup>th</sup> Problem of Euclid, a meaning within a meaning. The thinking man must ask himself, what relationship does geometry have to morality that it would be an emblem of morality?

The answer is right before us, but as with all things Masonic, one must go back to the foundation. At the time the first Grand Lodge was founded, the 47<sup>th</sup> Problem of Euclid was more commonly known as the Pythagorean Theorem. So why did those early ritualists choose to use the 47<sup>th</sup> Problem of Euclid?

First, it was not Pythagoras who discovered the rule that is referenced by his name. The Egyptians used this principle, long before Pythagoras set it down, to measure their fields after the annual Nile floods washed away the boundary markers. Pythagoras is the man who proved that the process works.

History records that Pythagoras established a society with philosophical, religious and political aims. Shrouded in secrecy, they believed that only by truly understanding the universe could one achieve salvation of the soul, and since Divinity created all things, studying it over a period of several lifetimes, could bring one closer to Divinity itself. As such, it was believed that only through study and reason could one start to understand Divinity. Clearly, reason is based on measurable things (such as through numbers and objects), and is easier to understand if expressed in that matter by a larger number of people.

Hence this society devoted much of its time to the mathematics, including Geometry to try to explain and express matters using numbers. Being able to explain many unknowns using reason and numbers was incorporated in Freemasonry, which sets it opposite to the Church, which emphasizes faith over reason. Indeed, Pope Pius IX, in his encyclical, *Qui Pluribus*, dated November 9, 1846, attacked those who “put human reason above faith, and who believe in human progress.” Many people consider this to be a reference to Freemasonry.

This is interesting, because in the Book of Wisdom 11:20 we read:

“Even apart from these, men could fall at a single breath when pursued by justice and scattered by the breath of thy power. But thou hast arranged all things by measure and number and weight.”

So the very “measurement of things” the Church objects to, is mentioned in Scripture as being a universal “standard” that allows men to understand their world and their surroundings.

Geometry is about measuring and creating standards, understanding and reasoning. These things were opposed by the early church leaders, so it is understandable that Freemasonry, as a bastion of reasoning and moral philosophy would conceal its secrets within geometry.

This still leaves us with the question, ‘Why the 47<sup>th</sup> Problem of Euclid and not the 1<sup>st</sup> or the second?’

The reason it was chosen was to conceal the greater truth!

In the 18<sup>th</sup> century, there was another philosopher, a moral philosopher, who presented his moral philosophy in the same format that Euclid used to present his geometrical problems. More than that, he titled his book: “Ethics,” and based his ethics upon the format used by “Euclid” to present his mathematical formulas. This philosopher was Benedict Spinoza, and strangely enough, his 47<sup>th</sup> Problem was:

“PROPOSITION. XLVII. The human mind has an adequate knowledge of the eternal and infinite essence of God.”

When you consider that the early speculative Freemasons considered Freemasonry to be “a peculiar system of morality veiled in allegory and illustrated by symbols,” it seems logical to conclude that hidden somewhere within the Masonic system lay hidden a system of morality that was peculiar or unique.

Slightly before speculative Freemasonry appeared on the scene, this famous philosopher wrote a book of ethics or morality that was truly peculiar, it was so peculiar that he was labelled a heretic and copies of his book were burned. His book was peculiar in more ways than just his ideas; it was written in the same

format as Euclid's "Book of Elements," it was a moral philosophy based on the logical format of Geometry.

Freemasonry is about morality, and the 47<sup>th</sup> problem of Freemasonry is about morality. Masonic symbolism is the building of a moral edifice so perhaps the two Euclidian problems, having the same name, influenced the use of the symbol of geometry to represent both ... mathematics and morality.

Before I conclude my Brethren, I would like to leave you with a quote which has been credited to Pythagoras while addressing a group of politicians:

*"The true chief must not only possess the science and power of commanding well, but he must also love men; for it is absurd that a shepherd should hate his flock and feel hostile disposition towards those he is educating. We must first know that the good man is necessarily good; for the happy man is he who deserves praise and congratulations; the good man deserves only praise."*

When Pythagoras spoke these words of wisdom, he might well have been speaking to all Freemasons in the world, but more particularly, I would argue, those who are the leaders of our Craft.