FROM A POINT
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Contemplation of the 47th Problem of Euclid is calculated to induce a study of Geometry and the other liberal arts and sciences.

The designation "Seven Liberal Arts" did not arise until in the mid 400's of the common era. The name was probably coined by Martianus Capella[1]. The distinction between Arts and Sciences divides them into two classes, the first three are called the Trivium; the latter four, called the Quadrivium. Over the years their character has changed. We run into them in Barbara Tuchman's A Distant Mirror, the Calamitous 14th Century, where Music is preceded by Astronomy rather than the way we play them out in our lecture. As they aged into the age of Descartes and Newton, modern science stripped them of their magic. Finally, when the dust settled, all that was left is a vague notion that they are somehow associated with our modern Colleges of Liberal Arts and their BA and BS degrees.

As Science they have long held a mystical nature. The coldness of scientific thought did not become the way of the world until the 19th century. Until then Science had been a murky blend of religion and mysticism, tied together by speculation, when there was inadequate instrumentation for proper experimentation. Even the greatest scientist of all time, Sir Isaac Newton, was an alchemist. It took generations to realize that chemicals have properties distinct to themselves, and it is those properties, not spiritual forces that make them work.

Why, then, does Masonry make so much of these Magnificent Seven? The answers are

[1]History of Mathematics, by D.E. Smith, Dover Books

shrouded in numerology, Kabala and mysticism, which would be fine if one lived in the middle ages. I for one, am a skeptic; no, a cynic. My life is built on Ockham's Razor[2], which in plain parlance means keep it simple. The fact is that the authors of our ritual, in building upon the building of Solomon's Temple, focused on the winding stairway and needed references to associate with the three, five and seven steps. We can see how artificial a devise they used, inasmuch as they were able to find two references each in conjuring up metaphors for the three and five steps, but only one to associate with the seven. They evidently did not want to associate the Seven with the days of the week. That might have led them into pagan reference to the Roman Gods for whom the days are named.

The artificiality of the Fellowcraft lecture is further demonstrated by the allusion to the story of Jeptha, which has nothing to do with Solomon's Temple. The period of Judges predates the Monarchy. In fact, the reference to "Jeptha, Judge of Israel" is somewhat misleading, as we might think it refers to the post Solomonic period when the monarchy bifurcated into the factional kingdoms of Judah and Israel.

One reference to the Seven Liberal Arts and Sciences does contain a significant association with Masonry. In the Convent of Santa Maria Novella in Florence, a Fresco by Taddeo Gaddi, a 14th century painter depicts the Seven Liberal Arts and Sciences.

> .... [P]ainted in 1322, the central figure of which is St. Thomas Aquinas, Grammar appears with either Donatus (who lived about A.D. 250) or Priscian (about A.D. 530), the two most prominent teachers of grammar, in the act of instructing a boy; Rhetoric accompanied by Cicero; Dialectic by Zeno of Elea, whom the ancients

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[2]William of Ockham was a 14th century friar, known as a logician who developed the theory that the simplest explanation is the most probable. It is also noteworthy that logic is a college course found in Department of Philosophy. After all, philosophy is but the extrapolation of logical thought.

> considered as founder of the art; Arithmetic by Abraham, as the representative of the philosophy of numbers, and versed in the knowledge of the stars; Geometry by Euclid (about 300 B.C.), whose "Elements" was the text-book *par excellence*; Astronomy by Ptolemy[3], whose "Almagest" was considered to be the canon of star-lore; Music by Tubal Cain using the hammer, probably in allusion to the harmoniously tuned hammers which are said to have suggested to Pythagoras his theory of intervals[4].

Note that here too, Music is the 7th rather than 6th of the Arts and Sciences.

Additionally, there is an illustration dating to 1492 by Franchinus Gafurius which depicts Pythagoras experimenting with the sounds of various devices, including hammers, stings etc[5]. One of the panels in the illustration is of Tubal, who aside from having been an artificer in the known metals, is also the father of the harp. Evidently, this association between Tubal and Pythagoras had a long play in early years of what would become the Renaissance.

In a work for AMD titled “Confusion Amongst The Workmen” I made several associations between Tubal and our Operative Grand Master along with two other artisans of the Exodus, to demonstrate how the authors of our ritual were not bashful about borrowing from here and there and in cutting and pasting our own Masonic mythology. The idea of Tubal making music with a hammer on an anvil is not so far fetched. In 1720 Handel composed a piece for harpsichord known as “The Harmonious Blacksmith”. About 150 years later, Verdi wrote the Anvil Chorus to “Il Travatore”. It is, nevertheless something of a stretch to expect that our Masonic authors were aware of these pieces of art. Likelier than not, the reference to geometry in the Seven was all they needed to associate the Seven Liberal Arts and Sciences with the lecture.

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[3]The painting was done prior to Copernicus, so Ptolemy’s geocentric or earth centered universe was still the accepted truth. Ptolemy lived from 85 to about 165; so he is much later than any or the other Greek philosophers we will deal with in this paper.

[4]The Catholic Encyclopedia “The Seven Liberal Arts”

[5]The Golden Ratio by Mario Livio, Broadway Books, 2003

That being said, the name of this paper is “From a Point” and as the title suggests, it presents a view of Masonic ritual beginning with the most basic. Earlier, I mentioned that the Seven Liberal Arts are broken into two categories, the Trivium and the Quadrivium. As a lawyer I spend my working day on the Trivium; Grammar, Rhetoric and Logic. In my spare time, I enjoy delving into the sciences, so this paper will focus on the Quadrivium, recognizing, of course that it will require Grammar, Rhetoric and Logic to get my point across.

Note that the three branches of the Trivium are building blocks for the four of the Quadrivium. One cannot proceed into Arithmetic without first being able to express arithmetic problems in words, in a logical sequence. As my kids are finding out, it is one thing to be presented with an abstract set of numbers separated by an equal sign and asked to solve the problem; as opposed to being handed a set of words and told to translate them into a formula to solve for a numbered answer. In turn, as we will see, Arithmetic and Geometry are themselves building blocks for Music and Astronomy.

The Quadrivium begins with Arithmetic. While the focus of this paper is on all four sciences of the Quadrivium, they will be viewed through a very special lens, my camera obscura, as we will express them through three very important numbers: 3.14159, 1.41421 and 1.61803.

But as we are taught in the Fellowcraft lecture, we must start with the Trivium. So, let us begin by examining the words in the lecture in order to understand the sciences. For anyone who has gone through the chairs, one of the ways that Masonry makes good men better, is by instilling in them a pride of accomplishment, of which there is that accomplishment of memorizing all those words. The Senior Deacon, given his first major piece of ritual, approaches it as an exercise in “I can do that!”, but do we ever ask ourselves what the words mean? Do we ever listen to them? When it is our turn to perform a piece of ritual do we convey it so that it has meaning to the candidate, or are we so caught up in the marathon of getting through the lecture without being prompted, that the words are of themselves a meaningless form in an archaic recitation?

The paragraph on Arithmetic makes reference to the "properties of numbers". What properties? In the movie "Clan of the Cave Bear" there is a scene where the Shaman carefully places some pebbles on a rock. He then vocalizes a different grunt to represent each of them. These pebbles are sacred, because the Shaman claims they have magical properties. The Shaman can group them into 2's 3's even 5's, and each of the groupings gets its own grunt, just as did the pebbles. The onlookers are awed. The Shaman knows this power guarantees his status in the clan. So began the properties of numbers.

But there is more to Arithmetic than just its properties. We are taught that through an understanding of Arithmetic we will be "... led to a comprehensive knowledge of our great Creator and the works of creation." That thought will be addressed when we get a closer look at our three "mysterious" numbers.

When we reach Geometry, we begin to realize that science has application; or to put it more simply, science is useful. It is needed by the General, the Engineer and the Astronomer. Notice that unlike Arithmetic whose application reveals creation, Geometry is more down to earth; or to put it another way, it is less metaphysical or abstract than numbers. When one draws a line in the sand, then intersects it with another and another to make a triangle, it becomes tangible. Descartes was the inventor of analytic geometry. He took geometric shapes and reduced them to formulae. Would you rather deal with $\mathbf{a^2 + b^2 = c^2}$ or a circle? If you were not aware, $\mathbf{a^2 + b^2 = c^2}$ is the formula for a circle. If it also vaguely reminds you of another geometric form, then you are ahead of me in this paper.

In one important element Geometry does possess an abstract, metaphysical nature. That is the “point”. It is an indivisible part of space, infinitesimal, yet the fundamental abstraction of geometry. It is that place into which we insert the pin of the compasses. By itself it is nothing, but in its non existence it is the building block of everything. For the lecture instructs us that we proceed from a point to a line, and once we have a line, we have geometry.

In one of the episodes of MASH Radar managed to get a date with a musically educated nurse. Of course he had no idea what to say to her. So Hawkeye, his mentor, gave him this advice: ‘Just keep saying “Ah, Bach!”’. Talk about elevating the passions by sound! Certainly, no one who has ever listened to Bach could avoid saying that his expressions were intelligible to the heart. Bach was a master architect. His fugues have been plotted using marching tin soldiers to illustrate how the music builds, grows, turns and weaves from a single line to an ordered edifice of sound. Beethoven was no less Bach’s peer, his Fifth Symphony, proclaimed by its “Destiny” theme, g,g,g,e flat, just two notes, crashes around us and rouses us from complacency into the higher reaches of the universe. As Shakespear described the nature of man; Michelangelo showed us the nature of Heaven; but Beethoven, deaf as he was, harmonized the sounds of man pounding on the gates of Heaven, demanding admission. Such is the power of music.

Music has another power. At the end of the day, after beating back the barbarians at the gate, bringing home a stag from the hunt, chopping the wood, and stoking the hearth, a man finally sits back with a tankard of ale and calls for a song. It is as that point in his quest to survive another day, that he has risen above the baseness of life, and it is at that moment, that he becomes a humanist. Music is but one of the humanities; the written word, the painted canvas are others. But music is the most abstract, it is the most mathematical.

Unfortunately, the lecture missed the point as to why Music in included in the Seven Liberal Arts and Sciences. Again I refer to an earlier AMD paper, this one titled “That which is Great Judicious and Distinct”. The music of the Seven Liberal Arts, is not, per se, about sound. It is about ratios; the ratios known as the Harmony of the Spheres. The idea was the brain child of our old pal Pythagoras. As referenced above, he spent a great deal of his time contemplating music. It was he who discovered, the musical interval. Just as musical notes lay in ratios one to the other within an octave, so The Harmony of the Spheres theorized that the Great Creator had placed the planets in an ordered sequence, where the distances between planets lay along a progression of ratios. That is probably why, in its mediaeval form, Music was the last of the Seven Liberal Arts, for it took astronomy a step higher, by claiming, that Deity had decreed order in the cosmos.

Well, it turns out that there is no Harmony of the Spheres. Once a database of observations had been complied[6], those ratios were not there. Johannes Kepler had set out to finally prove the Order of the universe (at that time there were no telescopes and no conception of galaxies). He built a model of our solar system based on Pythagoras’ ratios, but soon realized the astronomical observations were incompatible with the model. Worse than that, the orbits of objects flying through the cosmos are not built on spheres, but as Kepler discovered, on ellipses.

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[6]Tycho Brahe, a Danish Astronomer compiled years of observations, all prior to the invention of the telescope.

So, we cannot even say that a planet's path is a fixed distance from the object it orbits. Kepler, whom this writer considers one of the most courageous scientists of all time, having set out to prove the Harmony of the Spheres, turned against this 2000 year old truth (just as a century earlier, Copernicus had bucked Ptolemy's truism that the sun and planets revolved around the earth, and four centuries later, Einstein would dissipate the notion of an ether). Kepler rethought the layout of the cosmos, and went on to lift astronomy to Newton's level. For Newton took Kepler's three laws, and under the influence of Galileo, reinvented the universe. For purposes of our lecture, which places astronomy the last of the sciences, it is a culmination of all that precedes it. With the possible exception of Rhetoric, which is the private domain of lawyers and politicians, all the other arts are needed to comprehend Astronomy. Despite my frequent professional reliance upon Rhetoric, I see it somehow out of place, for science needs no Rhetoric to prove a theory's validity. As we have just seen, after Kepler, Music, i.e. the Harmony theory, had been discredited, and Music the seventh of the liberal arts and sciences, was reduced to the sixth level while astronomy ascended to the seventh.

At last, we are ready to take a look at our three numbers. I can offer no Shaman's magic to describe them, yet they inspire no less awe.

In Kings I, we find the legendary origins of Masonry, the building of King Solomon's Temple. Aside from the Architectural marvel of it, there is the splendor of its furnishings, amongst which was a sea. This was one of the works attributed to our Operative Grand Master. Yet I Kings 7 contains an arithmetical impossibility. Verse 23 reads:

> And he made a molten sea, ten cubits from the one brim to the other; it was round all about, and his height was five cubits; and a line of thirty cubits did compass it

round about.

What is wrong with this picture? The answer is *pi*. A diameter of 10 cubits would have had a circumference of 31.4, not 30. Nevertheless, pi was not so unknown even then. In Egypt there exists the Ahmes Papyrus, written at about 1550 BCE, some 300 years before the Exodus, some 580 years before the building of Solomon's Temple. Its formula yields 3.1605 for pi, our mysterious number 3.14159. However, Archimedes who lived from 287 BCE until 212 BCE, some 700 plus years after the building of Solomon's Temple, was able to calculate *pi* to between 3 1/7 and 3 10/71[7]. Although one may think that the Greek letter for pi (π)[8] was applied to this number at the time of Archimedes, it actually was introduced in 1706 by Welsh mathematician, William Jones.

So, what is pi? It is no more than the number of times the diameter of a circle will fit around its circumference. It is fairly obvious that pi is going to show up in anything round, yet, mysteriously, it appears outside the context of circles and spheres. We are all familiar with the notion of a "bell curve", a probability distribution. Well, pi shows up there as well. Though of some controversy in the mathematical community, it has been suggested that pi can be found in the design of the Great Pyramid at Giza, which is anything but circular. One theory to explain this is that the size and placement of the stone blocks was a function of the circumference of the rollers used to move them.

While our second number, 1.41421 is not mentioned directly in the MM lecture, it is very much a part of it. In order to appreciate it, we need to go back a few years; to around 600 B.C.

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[7]History of Mathematics by D.E. Smith, Dover Publications 1953

[8]Lawyers use the Greek letters pi π and delta Δ to signify Plaintiff and Defendant.

(B.C.E. if you will). That is when number theory probably got off the ground with Thales of Miletus (624BC-547BC). In fact philosophy a la Grec probably began in Miletus, and Thales was one of the original Greek Philosophers. This period is a good two hundred years before the likes of Socrates, Plato and Aristotle. Thales' contribution to number theory is that he brought together the ideas of Egypt and Mesopotamia. However, one of his pupils took mathematics to a higher level. Pythagoras (569 BC - 475 BC) was born in Samos, not far from Miletus. By the time of his birth, the Egyptians had known that a 3-4-5 triangle had a right angle, but they did not know why. Pythagoras became more than a man; he became a movement; he became a school. Distinguishing his identity from that of his school has become a problem, for historians are uncertain whether all that is attributed to him was in fact the result of his efforts or those of his followers. In modern times, Thomas Edison was the most prolific of inventors. Yet much of what is attributed to his genius was the work of his staff. He used to say that genius is 10% inspiration and 90% perspiration. Well once he established himself, he just dealt with the 10% part.

Earlier I mentioned that $\mathbf{a^2 + b^2 = c^2}$, the formula for a circle, has another purpose. It is also the solution to the 47th Problem of Euclid. How did the same formula resolve two different problems? Actually, they are one in the same. According to Euclid in Book III Proposition 21, if I connect any point on the circumference of a circle to the two points where the diameter meets the circumference, I will create a right triangle. $\mathbf{a^2 + b^2 = c^2}$ are coordinate points, where **a** is the **x** axis, **b** the **y** and **c** the hypotenuse, or in this case, the diameter. If I plot this once, I get a very nice looking right triangle. If I plot it over and over again, for an infinite number of **a** and **b** values, both positive and negative[9], I get a circle.

But we are not done. Recall the mysterious number 1.41421. It is the square root of 2. It is the cement that binds the side of a square to the diagonal through it, and since a right triangle with two equal sides, is half a square, that diagonal is the hypotenuse of the 47th Problem. The relationship between a square with sides **a** and hypotenuse **c** is that of $\mathbf{a}\sqrt{2} = \mathbf{c}$. As we shall see in a square, it is an uneasy relationship. By the way, Pythagoras did not exclaim Eureka. How the lecture got it wrong, is addressed in “That which is Great Judicious and Distinct”.

The MM lecture tells us nothing about the 47th Problem, nor what Euclid had to do with it. Euclid of Alexandria lived between 325BC-265BC or BCE, born 150 years after Pythagoras’ death. Euclid distinguished himself in geometry not only for his own propositions, but as a compiler. He saw geometry as a system, not just a disjointed set of rules.

Euclid’s Thirteen Books of the Elements are the work of the master architect of geometry. Book I begins simply enough with definitions. Here are a few, which I raise to compare them to the lessons of the Fellowcraft lecture. Keep in mind that this is from a translation, and translators sometimes take greater latitude than we might expect.

Book I.

A point is that which has no part.
A line is breathless length.
A surface is that which has length and breadth only.

He does not define a solid until Book XI

A solid is that which has length, breadth and depth.

Nowhere in my edition of Euclid did the word superficies appear. It is called a surface.

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[9] Since a negative number squared equals a positive number, in a circle we will always have positive and negative values of **a** and **b** and yet always have a positive value of **c**.

From his definitions, he proceeds to axioms and postulates. These are principles which are beyond proof. They are those self evident ideas that our gut tells us are true. Then follow his propositions, or as the lecture would call them, his problems. He first deals with triangles, the simplest of the surfaces. As he lays down a proof, we find him referring to earlier proofs as he builds upon them to develop more complex ideas. From triangles, he proceeds to parallelograms, four sided surfaces. With every proof, one senses that he is laying the foundation for something more profound. Finally, he culminates Book I with the 47th problem. But there are twelve more books, in which he describes circles, geometric proportions, ratios, prisms, pyramids, cones and cubes. Anyone familiar with computer macros, will instantly appreciate Euclid. He constructs proofs, one on top of the other, just as a programmer 2500 years later, would build macros.

Euclid's method of proof takes on three basic formats. In his early proofs, he relies on the notion of reductio ad absurdum. In this he makes an assumption, such as a triangle can have three ninety degree angles. Then working with that assumption, he proves it false, thereby disproving his assumption and thus proving its opposite. His second method is called exhaustion. It is a variation on the Sherlock Holmes, "Once you have excluded everything else, what remains is it, no matter how improbable." His third method, is as discussed above, nothing short of architecture, each idea building on the one that precedes it.

One of the interesting aspects of the 47th problem is that there are more than 60 proofs for it. The diagram on the officer's jewel is Pythagoras' own proof. The classic right angle triangle is the 3-4-5 triangle, where. Three squared plus four squared equals five squared. However, where the sides are equal, an isosceles right triangle, the square root of 2 gets in the way, and there is no smooth fit. In all, if we have taken away anything from high school math, it is the

Pythagorean theorem, probably the most famous theorem in the world, along side with $E=mc^2$.

Now we are ready for our third number, 1.61803. This is the “Golden Section”, also known as the extreme and mean ratio. Today it is called the “Golden Ratio”. The number is represented by the Greek letter phe (Φ). Mathematically it is **$(\sqrt{5} + 1)/2$**. So far we have seen Pi show up in Kings I (and I might add in 2 Chronicles 4:5). Certainly, the circle is relevant to Masonry, as illustrated in the Entered Apprentice Lecture. Next we watched the square root of two literally drop out of the 47th Problem of Euclid. Now we shall see that our last number is derived from the Blazing Star in the center of the Mosaic pavement. The Blazing Star is probably the most ignored of the Masonic emblems. All we know about it is that it is an hieroglyphic representation of Divine Providence. We see it depicted as a five pointed star, a pentagram. As anyone who has ever doodled knows, a pentagram is what one gets connecting the angles in a pentagon. It was in this form of play that Pythagoras ran into the Golden Ratio.

The problem was simple enough. Start with line **A**. Find the point, such that if I cut **A** into **B** and **C**, the ratio of **B/A** will equal the ratio of **C/B**. Euclid defined the problem in Book IV Definition 3. “A straight line is said to have been cut in extreme and mean ratio when, as the whole line is to the greater segment, so is the greater to the less.” Pythagoras found this relationship while tinkering with a pentagram. It just so happens that the ratio of a side of a pentagon (all its sides being equal) to one of the diagonals of a pentagram inscribed within it, equals the Golden Ratio. But there is more. Mario Livio wrote a book entitled The Golden Ratio, the Story of Phi. The World’s Most Astonishing Number. The introduction to the book was written by Dan Brown, author of the DaVinci Code, as the DaVinci Code makes use of Phi in the clues to the story. What makes Phi special is that it keeps popping up nearly everywhere. It has been considered the most esthetic ratio in all of creation. In the Fellowcraft lecture we are taught that architecture is based on a "due proportion". Theories abound that the Golden ratio was used by the ancient Greeks and Romans to develop that proportion. Phi is found in nature; from the alignment of leaves about a stem, to the spiral of galaxies. It has been found in the meter of poetry, the rhythms of music, and in art, as is the theory expressed in DaVinci Code.

It took two notes for Beethoven to create the 5th Symphony, but it is as if G-d created the universe with a single number. In a very real sense, it is Divine Providence. It so overwhelmed Pythagoras that he took it for the ratio in which the Creator had laid out the planets. The Golden Ratio was to him the Harmony of the Spheres; the Music of the Seven Liberal Arts and Sciences.

In the late 12th and early 13th centuries, a traveling salesman named Leonardo of Pisa, later known as Fibonacci, came upon mathematics while in north Africa to alleviate the boredom of his travels. He not only contributed to mathematics but also to commerce, when he introduced (or at least promoted) Hindu-Arabic numerals into commercial dealings. In his travels he also came across the Golden Ratio. The Fibonacci Sequence is his main contribution to mathematics. It is a progression of numbers where each number is the sum of the 2 numbers preceding it. As it turns out, this series of numbers lie in Golden Ratio, one to the other. "This Fibonacci sequence has been found everywhere in nature, from the divisions of a nautilus shell to the cross-hatchings on a sunflower head."[10]

We are nearly at the end of our discussion of these three numbers. We have one last topic. It is called irrationality.

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[10] The Nothing that Is, A Natural History of Zero by Robert Kaplan, Oxford University Press, 1999,

In expressing these numbers, I arbitrarily designated them to 5 digits to the right of the decimal place: 1.41421, 1.61803, and 3.14159. The reality is that each of these numbers has an indefinite, and therefore infinite number of digits that can be calculated to the right of the decimal point. Unlike dividing 3 into 1, the sequences of these numbers never repeats itself. The significance of these characteristics is that none of these three numbers can be expressed as a fraction. I can divide 1 by 4, 1 by 3 or 2 by 5. But because these numbers are irrational, there is no fit of a numerator to a denominator, simply because we cannot figure out what the numerator or the denominator is. That is what I meant when I mentioned that there was an uneasy relationship between the sides of a square and the hypotenuse. Because the base and height in a square are equal, instead of $\mathbf{a^2 + b^2 = c^2}$ we end up with $\mathbf{2a^2= c^2}$**.** When we take the square root of $\mathbf{2a^2}$ we wind up with $\sqrt{2}\,\mathbf{a}$. In the 3-4-5 right triangle, where the base and height of the triangle are not the same, there is no square root of two to muck up the calculations.

The discovery of irrational numbers also dates back to the Pythagorean school. It was received with such horror, that it was believed to have been a cosmic error and the knowledge of such phenomena was suppressed.

So where does all this take us. The title of this paper is “From a Point”so it would be fitting if I had a point to make. If we were to calculate any of our three numbers, pi, $\sqrt{2}$, or phi to its ultimate conclusion, we would proceed through infinity back to a last digit (if such were possible), and we would arrive at a point. We already know from the Fellowcraft lecture, which undoubtedly borrowed from Euclid, that a point is nonexistent What we have before us are three numbers that govern our lives, but which cannot fully exist until we reach infinity. The lesson is that our very existence is a contradiction. Infinity is everywhere, and it is nowhere. We exist in what we think of as the finite. We have a calculable height, width, depth, mass, and life span. Yet we exist in a universe of infinite dimension and infinite time. The Pythagoreans suppressed irrational numbers because they were prisoners of the finite, prisoners of an ordered universe where everything had a place and even the planets lined up in order. We, in our post Einstein world have come to embrace chaos, the irrational and the realization that we are limited in our understanding of the limitless.

And G-d decreed unto the Council of Infinite Wisdom: "I will create a physical Universe and give it to Mankind that he may enjoy dominion over it. But lest he grow so mighty and full of himself, that he forget who is G-d and who is man, I give it strictly in charge that he never comprehend the full measure of my creation."

To end, I will relate an anecdote about how Euclid's reach throughout the millennia nearly destroyed Einstein. For many years there had been a problem with the orbit of Mercury. The astronomical observations did not fit the predictions. Theories abounded, including the presence of another planet that perturbed Mercury's orbit. It was named Vulcan. By 1914 Einstein was ready to release his General Theory which said otherwise. It predicted that the mass of the sun was bending the light the astronomers were seeing through their telescopes, and that Mercury, the planet closest to the sun, was right where it should be. Part of the problem was that Mercury lies so close to the sun, that it is very difficult to observe.

In August of 1914 a German expedition set out to study a solar eclipse, in which Mercury would be visible. But August, 1914 saw the start of World War I and the expedition was recalled before the eclipse took place. Einstein would have to wait another four years for the next eclipse to prove his General Theory. In 1915, he came across a mathematics he had not previously known. It was called Rheimann geometry. It went a step beyond Euclid's plane geometry, the geometry of the flat. Rheimann's geometry is the geometry of the curved. Since the General Theory postulated a curved universe, Einstein got on board with Rheimann and recalculated the constant which predicted the pull of the sun's mass on the gravity of Mercury. He found that he was off by a factor of two. Had the expedition completed its work, Einstein would have been laughed out of existence. In 1919 after the war, a British expedition set out to chart that next solar eclipse. The rest is history. By the way, about half a mile from Trenton Lodge is the US Courthouse. On the first floor there is a display of photos and documents describing the more memorable events that took place there over the years. Included is a photograph of Einstein being naturalized there in 1940.

The Fellowcraft lecture tells us that numbers have properties and that they will lead us to a knowledge of our Great Creator and a contemplation of the works of creation. In this brief presentation, we have explored the simplest elements of geometry; the circle, right triangle, square and pentagon, building blocks of all that we see and touch around us. But we have come to realize that their simplicity is misleading, and that embedded within them are keys to the infinite realm of the Great Creator. At last, the Seven Liberal Arts and Sciences have enabled us to unravel some of the secrets to His works of creation. The Ahmes Papyrus, written more than 3500 years ago begins with these evocative words: "The Entrance Into the Knowledge of All Existing Things and All Obscure Secrets". Even then they knew.