

Appendix I: Some Essential Proportions

In the study of Greek gematria, it has been found that the mathematical proportions of geometrical figures can be particularly useful to making associations between word values in texts. The conceptual application of these proportions requires further study and delineation. In order to make these proportions more readily available to the student, the following figures are appended. An effort has also been made to explain the ideas traditionally appended to each figure. It will be noticed that the following essays accompanying the figures become less objective and more philosophical as they progress. The primary reason for this is that the complexity of ideas behind the geometrical figures increases with the increasing number of sides.

The Point

Of the mathematical point, very little can be said. It is a rather mysterious and irrational thing for the entirety of geometry to be based on. One can not say that the point has any dimension, so saying that a point “exists” is highly problematic, yet the figures of all higher dimensions are described as composed of points. A line segment, regardless of its length, contains an infinite number of points. Obviously, the point is a convenient mathematical abstraction; it is completely unreal. The infinitely contracted point is a figure of Hadit in the Thelemic pantheon. It is often used as a figure of the Sephirah Kether on the Tree of Life. It is deity considered on the scale of the infinitely small, as omnipresent, the seed and source of all existence. It is infinite potential unsullied by expression. The point is also referred to as the “monad” in early Greek geometry.

The Line

The line signifies the division of the monad by self-reflection. It is the transition from pure potential taken in its most abstract sense to energy with a particular magnitude and direction. The line is not a particularly useful figure in itself, but it forms all other geometrical figures. In the sense that the line signifies division of the monad and of area, it is a corruptive or destroying force. Yet, the line is also the beginning of form, as it is essential for imposing structure on the primal chaos. In nearly all creation stories of world mythology, the first act of creation is a division: land from water, light from darkness, silence from speech, and so on.

The Circle

The circle is a figure connoting continuity and wholeness. It is often used to describe the underlying unity of existence, the undifferentiated ground of being. It is sometimes used as a figure of Nuit in the Thelemic pantheon. It is deity considered on the scale of the infinitely large, the expanse and expansion of creation. All regular polygons approximate the circle, with the approximation increasing in accuracy as the number of sides increases. It is, by this definition, a polygon with an infinite number of sides. The regular polygons can be defined by the relationship between their inscribed and circumscribed circles; these proportions will be detailed below for each of the polygons. They form some of the most important geometrical proportions in the canon of sacred geometry. Most people are at least marginally acquainted with the proportions of the circle, but for completeness, they are listed below. D is the diameter of the circle, r its radius, C its circumference, and A its area.

$$C = D\pi$$

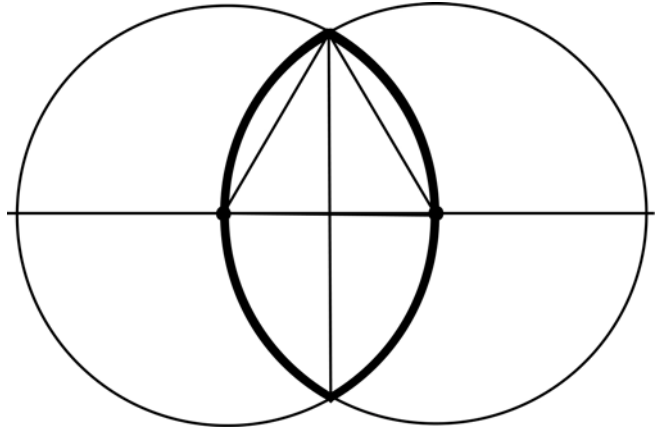
$$C = 2\pi r$$

$$A = \pi r^2$$

The *Vesica Piscis*

The *vesica piscis* is a figure formed by two interpenetrating circles of equal radii. The name of this figure means “fish bladder,” presumably due to its shape; it is also called a *mandorla* (from an Italian word meaning “almond”) when used in connection with works of art. In Christian art, the vesica is often used to frame images

of Christ, God, or the Virgin Mary. It is a figure connoting the fusion or reconciliation of opposites, but also the penetration or eruption of one sphere of reality into another. Another name for the vesica is “the eye of God,” again probably due to its shape. It is often used to symbolize birth, due to its resemblance to the female generative organs. Many ancient temples in Greece and the rest of Europe are built on the proportions of the vesica, perhaps indicating that the temple is a place where the divine penetrates the mundane world. The vesica is also used as the basis for the lamen of the OTO. Due to its geometric proportions, the vesica is intimately related to the circle, the equilateral triangle and the hexagon. It’s proportions follow.



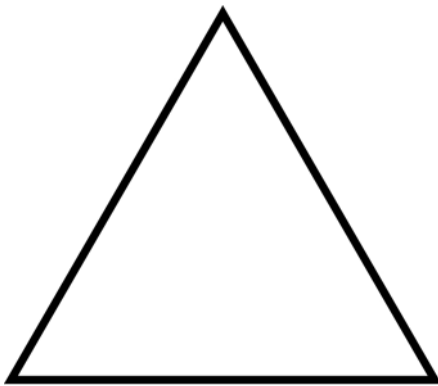
The proportion of the minor axis to the major axis is $1 : \sqrt{3}$

$$C = \frac{4}{3}\pi r$$

$$A = r^2 \left(\frac{2\pi}{3} - \frac{\sqrt{3}}{2} \right)$$

The Triangle

The equilateral triangle is one of the most important lineal figures in the practice of Western ritual magick. Having three sides, it refers to the principle of the trinity, however it may appear: Mother – Father – Child, I – A – O, Sulphur – Mercury – Salt, Sattvas – Rajas – Tamas, Kether – Chokmah – Binah, thesis – antithesis – synthesis, etc. Ideas iconically represented by the triangle include generativity (including childbirth as well as artistic creativity), and dynamic change as opposed to stasis and hierarchy. The core idea is that of



unity dividing into duality while retaining its character as the ground within which opposites are reconciled, or of opposing forces harmonizing to create a new synthesis without losing their individual characters. Three was considered to be the first number by the Pythagoreans, one and two being but principles that are the basis of number.

The triangle is associated with the sephirah Binah on the Tree of Life, which means “understanding.” The triangle represents understanding in the sense that meaning depends on relating individual ideas to one another. Sensory experiences only acquire meaning when they are related to past experiences; our understanding of how the world works depends on relating causes to effects in our daily lives. The three points of the triangle can be said to represent two events and the connection that exists

between them considered as a third entity. The number three represents the mean between two extremes, and thus the “mean-ing” of direct experience.

The triangle is used in goetia and other forms of evocation as a means of providing a space in which the spirit can manifest and be directed or contained. The triangle is also associated with the elements of spirit and of fire, due to the attributions of the Hebrew letter *Shin* with its triple apices. The triangular relation in

astrology (i.e., the trine aspect) is considered a harmonious and beneficial one. The salient proportions of the triangle follow.

$$\text{Height} = \text{side} \times \frac{\sqrt{3}}{2}$$

$$A = \text{side}^2 \times \frac{\sqrt{3}}{4}$$

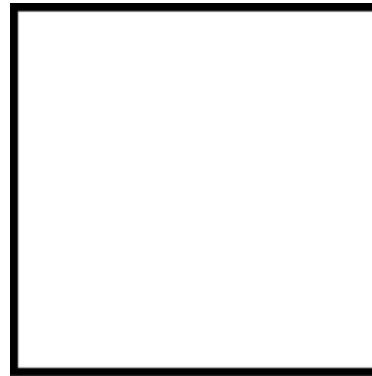
$$\text{Radius of inscribed circle} = .28868 \times \text{side}$$

$$\text{Radius of circumscribed circle} = .57735 \times \text{side}$$

The Square

The square represents the principle of the quaternity – the four elements, the four cardinal directions, the four watchtowers of the universe, the four letters of Tetragrammaton, and so on. It is an idea of solidity and manifestation in definite material form. The square is often used as a symbol for the alchemical element salt, which is the crystallization of the alchemical process in the Philosopher's Stone; the primary crystalline form of salt (NaCl) molecules is a cube. A figure of three dimensions can be defined by a minimum of four points in space; for the Pythagoreans, the number four represented the three-dimensional world with which we are familiar in daily life.

In contrast to the triangle, the square represents fixed order and static, hierarchical form. It is the lawful aspect of the observable universe. Without this principle, energy could not find permanent expression or material effect (It is perhaps possible to draw an analogy with Einstein's theory of general relativity, in that energy divided by – or distributed into – mass is equal to the *squared* speed of light). The square is also found in the graphical representation of the root chakra, representing the basis of the material body, within which is contained the serpent power of kundalini. It might be proposed that all squares represent a potency bound in form, and that this potency may be discovered by geometrical analysis.



The square, as the basis of the equal-armed cross, is often described as a figure representing the intersection of the plane of matter by spirit. The author feels that this is true only in a limited sense. In this symbolic arrangement, spirit and matter intersect at only a single point. This may represent spirit giving birth to the plane of matter or being fixed in matter (that is, light in extension), but not really consciously indwelling matter, for which the pentagon is a more appropriate symbol.

$$\text{Area} = \text{side}^2$$

$$\text{Radius of inscribed circle} = .5 \times \text{side}$$

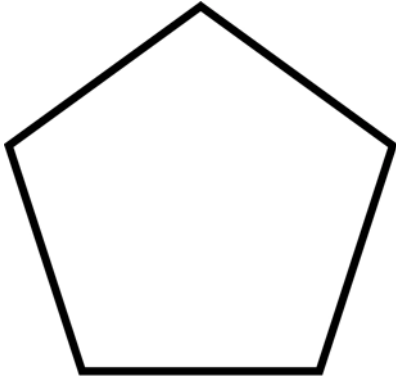
$$\text{Radius of circumscribed circle} = \text{side} \times \frac{\sqrt{2}}{2}$$

The Pentagon

The pentagon is often said to represent the presidency of the element of Spirit over the four material elements. It also represents the unbalancing of the static harmony of the square through the introduction of a fifth point, for five is the number of Mars, and the fives in the Tarot usually represent strife or discord. This unbalancing force is necessary to upset the stultifying potential that the square represents. The pentagram is the basis for what is known as the *golden proportion*, which is usually represented by the greek letter ϕ (= 1.61803...).

Through mathematical modeling of the growth of plants and other life processes, this proportion has been found to be almost universal in nature. The reason for its ubiquity is complex, but has to do with its ability to resolve a variety of what are known as “packing problems.” In short, it seems to govern growth processes in such a way as to avoid problems like crowding and inefficiency. In esoteric terms, therefore, the number five and the pentagon symbolizes the life force that animates matter, the “intelligence” that governs the

development of form in time. This necessarily includes death and decay as well as growth.



The pentagon is the first lineal figure whose points can be connected to form a regular polygram, in this case the pentagram. Being a figure of five points, the pentagram has much the same meaning as the pentagon. The pentagram is often considered to be a figure of the microcosm. It also represents man because its five points correspond to the arms, legs, and head. The inverted pentagram has often foolishly been seen to represent evil. A case can be made for this correspondence, as for any correspondence one wishes to draw, but in consideration of the total symbolism of the pentagon, it is more accurately seen as spirit becoming aware of itself as bound in matter. This action redeems matter of its brute character by giving it consciousness of itself, although it is also, in a sense, a fall. As the

senses of man number five, this act of spirit entering into relation with matter is also the basis of sense consciousness, a principle to be found in many systems of world philosophy.

$$\text{Area} = 1.70248 \times \text{side}^2$$

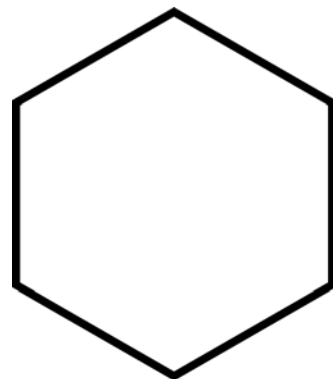
$$\text{Radius of inscribed circle} = .68819 \times \text{side}$$

$$\text{Radius of circumscribed circle} = .85065 \times \text{side}$$

The Hexagon

The hexagon and its associated hexagrams are often considered to represent God or the principle of deity. It is also a symbol of the macrocosm. Considered as a progression from the pentagon, the hexagon represents an additional degree of freedom. That is, it is not only consciousness, but freedom of movement of that awareness between above and below. In the lesser banishing ritual, the six rayed star shines in the column that stands in the center of the four watchtowers of the universe. Whereas the pentagram can be interpreted as symbolizing knowledge of one’s nature, the hexagon represents the ability of that nature to express itself in doing or creating. In the Judeo-Christian cosmology, the world was created in six days. It therefore represents omnipotence over the four of matter. The hexagon can contain two vesicas without intersection, as shown below. Since the vesica is the “eye of God,” the hexagon implies the omniscience of God.

The hexagram is a figure composed of two interlaced triangles, one pointing upward and the other downward. This represents the freedom to move between above and below, but it is also a figure of union or of balance between two extremes. It is the *act* of union rather than unity itself. The hexagram is a figure of Tiphareth, or the sun, and the energy of the sun is produced by the fusion of atoms. The harmonies between the vesica, the equilateral triangle, and the hexagram should be studied carefully. All three represent generativity or creativity after different manners, and all three share the same basic proportions. In light of this study, the author has come to the conclusion that the hexagram does not represent God *per se* (for which the point or the circle are more appropriate), but the action of deity in the midst of the universe, which has the nature of creating.



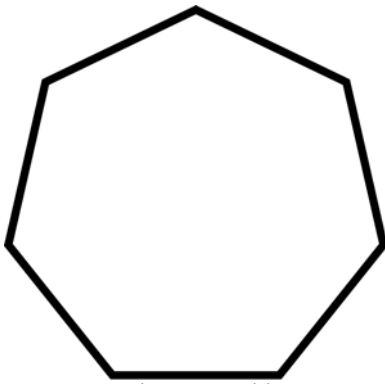
$$\text{Area} = 2.59808 \times \text{side}^2$$

$$\text{Radius of inscribed circle} = .86603 \times \text{side}$$

$$\text{Radius of circumscribed circle} = \text{side}$$

The Septagon

The septagon, or figure of seven sides, is the first figure in this series that can not be constructed using only a straightedge and compass. Like the squaring of the circle and the trisection of the angle, it therefore represents impenetrable mystery. The number seven corresponds to the seven planets of classical astrology, the seven major chakras, the seven stages of the alchemical process, the seven letters of ARARITA, VI TRIOL and BABALON, the seven operations of Pythagorean mathematics, and the seven stars of the Great Bear (Ursa Major). Seven has been considered a magical number since antiquity, but the reason is not immediately apparent. It is usually described as the number of perfection, probably because the seventh day represents the sabbath and the completion of God's act of creating the world in the Judeo-Christian cosmology. Both the Egyptians and the Greeks distinguished between "imperishable stars," which were



circumpolar and therefore never set in the northern hemisphere, and "unwearying stars" which rise and set¹. The primary example of imperishable stars is the constellation of the Bear, which is composed of seven stars. The number seven can also therefore be seen as an expression of eternity, or of eternal life.

The number seven is also attributed to Venus, or the sephirah of Netzach. This sephirah represents the binding or attractive force of desire. In fact, in later Greek polytheism, one of the attendants of Aphrodite is Himeros, or desire. Since desire for something implies a lack of that thing, it seems odd that the number of perfection and eternity should also signify this state of incompleteness. If we stop to consider our experience of perfection and completeness in day to day life, however, this attribution

becomes more clear. In Ovid's *Metamorphoses*, desire – especially sexual desire – is explained as a yearning to be completed and made whole. In our daily life, we experience this sensation of desire a thousand times – desire for food, for greater comfort, for mastery, for sexual satisfaction, for sleep. Desire aims at achieving the state of being without desire, yet never accomplishes it but fleetingly. Perfection, being beyond time, nevertheless pulls all things through time; she is the lover that beckons irresistibly, yet can never be finally embraced. She is the pole star around whom all other stars move in their courses.

$$\text{Area} = 3.63391 \times \text{side}^2$$

$$\text{Radius of inscribed circle} = 1.03826 \times \text{side}$$

$$\text{Radius of circumscribed circle} = 1.15238 \times \text{side}$$

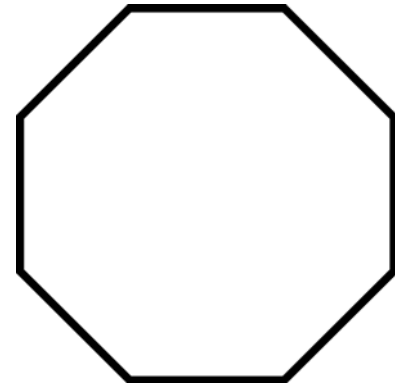
The Octagon

The Octagon is referred to Hod, the sephirah of Mercury, and therefore to reason and analysis. It is a multiplication of the four of matter by the dyad. Whereas seven is a number representing the attractive or binding force, eight aims at dispersion or division, creating distinctions and boundaries between things. In Greek mythology, Hermes was the god of boundaries or borders, both because it was through his power that they were defined, and because he was responsible for crossing them. Hermes was the mediator between Olympus and Earth as messenger of the gods, but also between Earth and Hades as psychopomp or guide of departed souls through the underworld. The number eight has a paradoxical nature because it denotes both expansion and limitation. It is the nature of the intellect to draw distinctions between things, to discriminate, and therefore to multiply entities. At the same time, it imposes structure on chaos through the limitation of

¹ This is actually untrue; there seem to be seven to the naked eye, but two of them are double star systems.

reductionism. This may be one explanation for why Hermes is often depicted as a bisexual or hermaphroditic god. As with the square, the octagon represents a danger of restriction through control. As modern quantum mechanics has demonstrated, beyond a certain point, further restriction in one dimension only produces greater uncertainty in another.

Eight is the number of the ogdoad, the 8th sphere of the heavens in which the fixed stars are placed, and within which the World Soul, Sophia, dwells according to some gnostic speculations. The eighth sphere forms the boundary between the limited, temporal universe and the *pleroma*, or fullness of God. This limit might be compared with what is known as the Hubble radius in modern cosmology. The Hubble radius defines the area of the expanding universe that we are theoretically capable of observing; even if the universe is bigger than the Hubble radius, we are incapable of ever observing anything outside it. Again, we meet with paradox, because Sophia is also seen as a divine spark trapped *within* the dross of matter. As we analyze matter into smaller and smaller units, we again arrive at an absolute boundary to observation known as the Planck size. Anything smaller than the Planck size can not be detected or observed; indeed, at this scale, the laws of physics cease to have meaning. The World Soul lies locked behind both gateways of material existence, and reason can not unlock them; but Hermes is also the crosser of boundaries, a trickster god, and the patron of travelers and thieves. By elaborating upon the four of material existence, the eight ends up exposing its ultimate basis in unreason, just as a koan, exhausting the intellect, reveals its solution to be entirely irrational. The number eight is also associated with the eight-lettered name of BAPHOMET, and some writers have proposed that the name Baphomet is a cipher for Sophia.



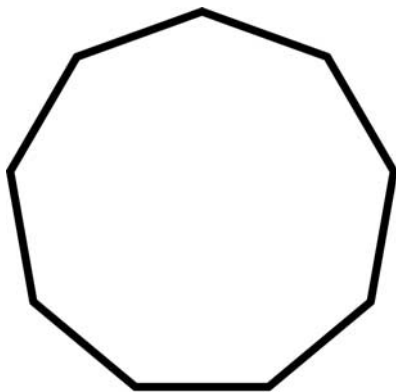
$$\text{Area} = 4.82843 \times \text{side}^2$$

$$\text{Area of inscribed circle} = 1.20711 \times \text{side}$$

$$\text{Area of circumscribed circle} = 1.30656 \times \text{side}$$

The Enneagon

The figure of nine sides is called the enneagon. Like the septagon, the enneagon can not be drawn with a simple straightedge and compass, so again we have an intimation of a certain inscrutability or mystery. Some gnostic texts mention an ennead or 9th sphere beyond the ogdoad, so the number nine may indicate the pleroma or fullness of divinity. Since nine is three squared, we can place the enneagon in the same figural series as the triangle, the hexagon, and the vesica pisces. It must therefore represent some facet of the process of generation or creativity. Since it is a squared value, it also relates to crystallization or manifest structure. These principles suggest the idea of the potency of creation bound in formal, lawful operation.



Practically speaking, this potency bound in form constitutes the operation of replication, reproduction and permutation. It is an associative process that does not create new entities but discovers new arrangements or novel combinations within the boundaries of natural law. This process in the psychological arena is central to creative thinking and imagination. The logic of dreams is associationistic, building connections and meanings based on what the waking mind might consider trivial or absurd relationships. Psychologists theorize that dreaming is vital to the process of encoding memories, and mathematical models of memory are usually based on the properties of association networks. Associationistic thinking also characterizes many psychotic states. At the same time, some modern philosophers of science see permutation as a unifying principle behind the phenomena of nature.

The enneagon is attributed to the sephirah Yesod, and to the Moon. This sphere is considered to represent the reproductive organs and to rule imagination and dreams. The Moon in astrology is often said to rule memory, or to be a “reflecting ether” or storehouse of thought-forms. On the Tree, Yesod is responsible for receiving the emanations of the higher sephiroth and reflecting them into the manifest world of Malkuth, so the enneagon can be seen as a gateway between potentiality and actuality.

The lunar nature is sometimes criticized as being sterile or leading to stagnation. It is true that without an influx of inspiration or genius, replication and permutation can be stultifying. Without this process, however, genius and inspiration are incapable of finding full expression. The Vedas are filled with descriptions of flying machines, but the invention of the airplane could not take place before the wheel, the lightweight engine, an efficient airfoil, and a myriad of other materials were available for permutation into the Wright Flyer.

$$\text{Area} = 6.18182 \times \text{side}^2$$

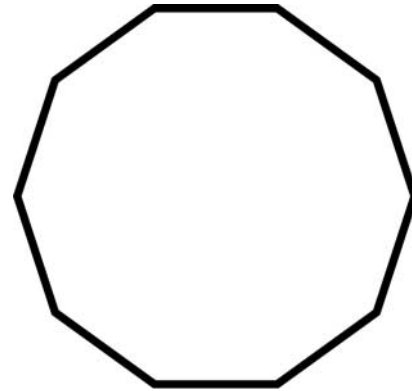
$$\text{Radius of inscribed circle} = 1.37374 \times \text{side}$$

$$\text{Radius of circumscribed circle} = 1.46190 \times \text{side}$$

The Decagon

The figure of ten sides, the decagon, is a figure for the universe *in toto*. To minds well acquainted with Arabic numerals and decimal math, there is a certain intuitive grasp of this idea, but we must remember that the ancients did not use this system of signifying numbers. For the Pythagoreans, the number ten was taken as a figure of the Universe because it is the sum of the numbers 1 through 4. As stated above in the essay on the square, it takes at least four points to define a three-dimensional object. The sum of 1 through 4 therefore signifies the stages of creation that result in the three-dimensional spatial world we live in. The Greek letter iota, which signifies the number ten, has a gematria value of 1111, which reduces to 4 by addition of its digits. The decagon is therefore a figure representing the unfolding of the phenomenal world from the monad. It can also represent a return to the monad from phenomenal existence, or a vision of the monad within phenomenal existence, as it does with the figure of the Black Sun of the path of *Cheth* on the Tree of Life.

Even more apparent than in the pentagon, we find the golden ratio represented in the decagon. In the decagon, the distance from the center of the figure to a vertex is proportional to a side as phi. The decagon therefore represents many of the same themes as in the pentagon, but the decagon is a more balanced figure overall. Whereas the pentagram represents a constructive unbalancing of the four of matter by the introduction of consciousness, the decagon declares that consciousness and matter are but two aspects of the same radiant reality. The decagon can be seen as the superimposition of the upright and inverted pentagrams into a single truth. The nature of this truth has been expressed in a variety of ways in different systems of metaphysics, from the “tat tvam asi” of the Hindu to the “Malkuth is in Kether and Kether in Malkuth” of the Kabbalist. The decagon is a return to unity on a new arc in the spiral of unfolding reality.



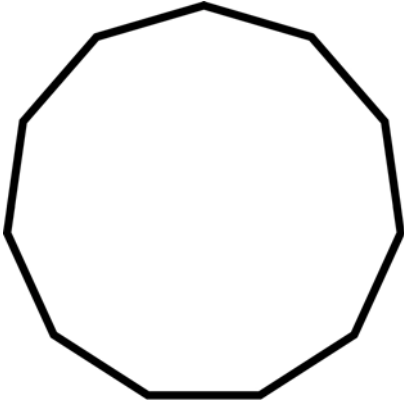
$$\text{Area} = 7.69421 \times \text{side}^2$$

$$\text{Radius of inscribed circle} = 1.53884 \times \text{side}$$

$$\text{Radius of circumscribed circle} = 1.61803 \times \text{side}$$

The Endecagon

The number eleven has been interpreted by some as an “evil” number. In the Golden Dawn system, the number eleven is representative of the qliphoth, the broken “shells” that could not contain the divine emanation at the creation of the world. As such, this system depicted eleven as representative of madness, disorder and confusion. It is as though, after having formulated the entire process of creation in the numbers one through ten, the suggestion that there are numbers beyond this set is useless, offensive and blasphemous. The *Sepher Yetzirah* declares that the universe was created by God from the numbers one through ten, so from one perspective, the use of the number eleven implies the use of energies that are against God or outside the domain of God’s activity. This perspective can not be wholly discounted, but there are other perspectives to consider in a full appreciation of the number.



Since the number ten is essentially a reassertion of the Monad, a progression beyond ten is a breaking of symmetry in the same sense that the number two breaks the symmetry of one. Using this analogue, we can interpret eleven as a release of energy out of potential, which is one reason to see eleven as the number of magick. Eleven, however, is a breaking of symmetry on the level of the universe as an already unfolded monad, and so can be seen as the first step in climbing back up the Tree from Malkuth toward Kether. This is surely an act of

hubris not unlike that of the great heroes of Greek mythology who sought to climb Mt. Olympus and dwell with the gods. However, it is also the act of the mystic who claims union with God as his birthright.

The number eleven represents chaos and confusion in the sense that it goes beyond the order imposed by interpreting the whole cosmos in terms of the numbers one through ten. It is a realization that whatever limited symbol set we try to use to represent the universe in its wholeness is incomplete, for the number scale is infinite. For the Pythagoreans, finding the ideal order and harmony that expressed itself fleetingly in the manifest universe was a way of coming closer to God. For them, it would have been absurd and blasphemous to suggest that uncertainty and disorder could be an essential attribute of the cosmos. Their worldview was, at its core, dualistic. What was not capable of expression in terms of whole numbers was not real; anything irrational was ultimately illusory. This explains their ascetic way of life and their withdrawal from sensory experience. They suppressed their knowledge of the irrationality of the square root of two because it did not accord with the idealism of their world view. Einstein, despite his massive intellect, could not be persuaded of the truth of quantum mechanics because it included an element of mathematically irreducible uncertainty. With this cautionary note, we bring our essay on pure number to an end.

$$\text{Area} = 9.36564 \times \text{side}^2$$

$$\text{Area of inscribed circle} = 1.70284 \times \text{side}$$

$$\text{Area of circumscribed circle} = 1.77473 \times \text{side}$$