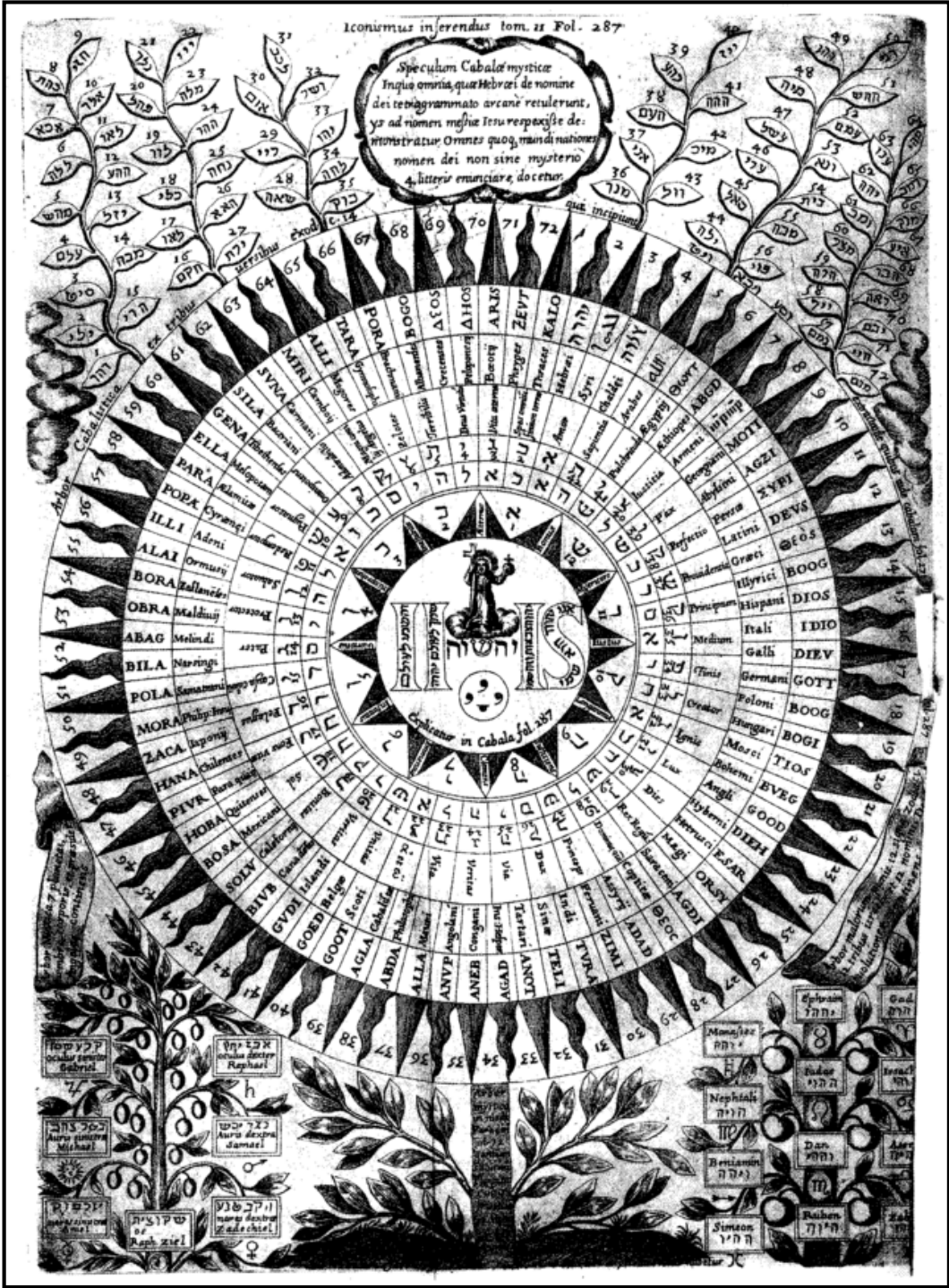# Mathematical Meanings of the Names of God

by

Stephen Phillips


A diagram of the names of God in Athanasius Kircher's *Oedipus Aegyptiacus* (1652-54)

Table of gematria number values of the ten Sephiroth

	SEPHIRAH	GODNAME	ARCHANGEL	ORDER OF ANGELS	MUNDANE CHAKRA
1	Kether (Crown) **620**	EHYEH (I am) **21**	Metatron (Angel of the Presence) **314**	Chaioth ha Qadesh (Holy Living Creatures) **833**	Rashith ha Gilgalim First Swirlings. (Primum Mobile) **636**
2	Chokmah (Wisdom) **73**	YAHVEH, YAH (The Lord) **26**, **15**	Raziel (Herald of the Deity) **248**	Auphanim (Wheels) **187**	Masloth (The Sphere of the Zodiac) **140**
3	Binah (Understanding) **67**	ELOHIM (God in multiplicity) **50**	Tzaphkiel (Contemplation of God) **311**	Aralim (Thrones) **282**	Shabathai Rest. (Saturn) **317**
	Daath (Knowledge) **474**				
4	Chesed (Mercy) **72**	EL (God) **31**	Tzadkiel (Benevolence of God) **62**	Chasmalim (Shining Ones) **428**	Tzadekh Righteousness. (Jupiter) **194**
5	Geburah (Severity) **216**	ELOHA (The Almighty) **36**	Samael (Severity of God) **131**	Seraphim (Fiery Serpents) **630**	Madim Vehement Strength. (Mars) **95**
6	Tiphareth (Beauty) **1081**	YAHVEH ELOHIM (God the Creator) **76**	Michael (Like unto God) **101**	Malachim (Kings) **140**	Shemesh The Solar Light. (Sun) **640**
7	Netzach (Victory) **148**	YAHVEH SABAOTH (Lord of Hosts) **129**	Haniel (Grace of God) **97**	Tarshishim or Elohim **1260**	Nogah Glittering Splendour. (Venus) **64**
8	Hod (Glory) **15**	ELOHIM SABAOTH (God of Hosts) **153**	Raphael (Divine Physician) **311**	Beni Elohim (Sons of God) **112**	Kokab The Stellar Light. (Mercury) **48**
9	Yesod (Foundation) **80**	SHADDAI EL CHAI (Almighty Living God) **49**, **363**	Gabriel (Strong Man of God) **246**	Cherubim (The Strong) **272**	Levanah The Lunar Flame. (Moon) **87**
10	Malkuth (Kingdom) **496**	ADONAI MELEKH (The Lord and King) **65**, **155**	Sandalphon (Manifest Messiah) **280**	Ashim (Souls of Fire) **351**	Cholem Yesodeth The Breaker of the Foundations. The Elements. (Earth) **168**

The Sephiroth exist in the four Worlds of Atziluth, Beriah, Yetzirah and Assiyah. Corresponding to them are the Godnames, Archangels, Order of Angels and Mundane Chakras (their physical manifestation). This table gives their number values obtained by the ancient practice of gematria, wherein a number is assigned to each letter of the alphabet, thereby giving a number value to a word that is the sum of the numbers associated with its letters.

All numbers from this table appearing in the text are written in **boldface**.
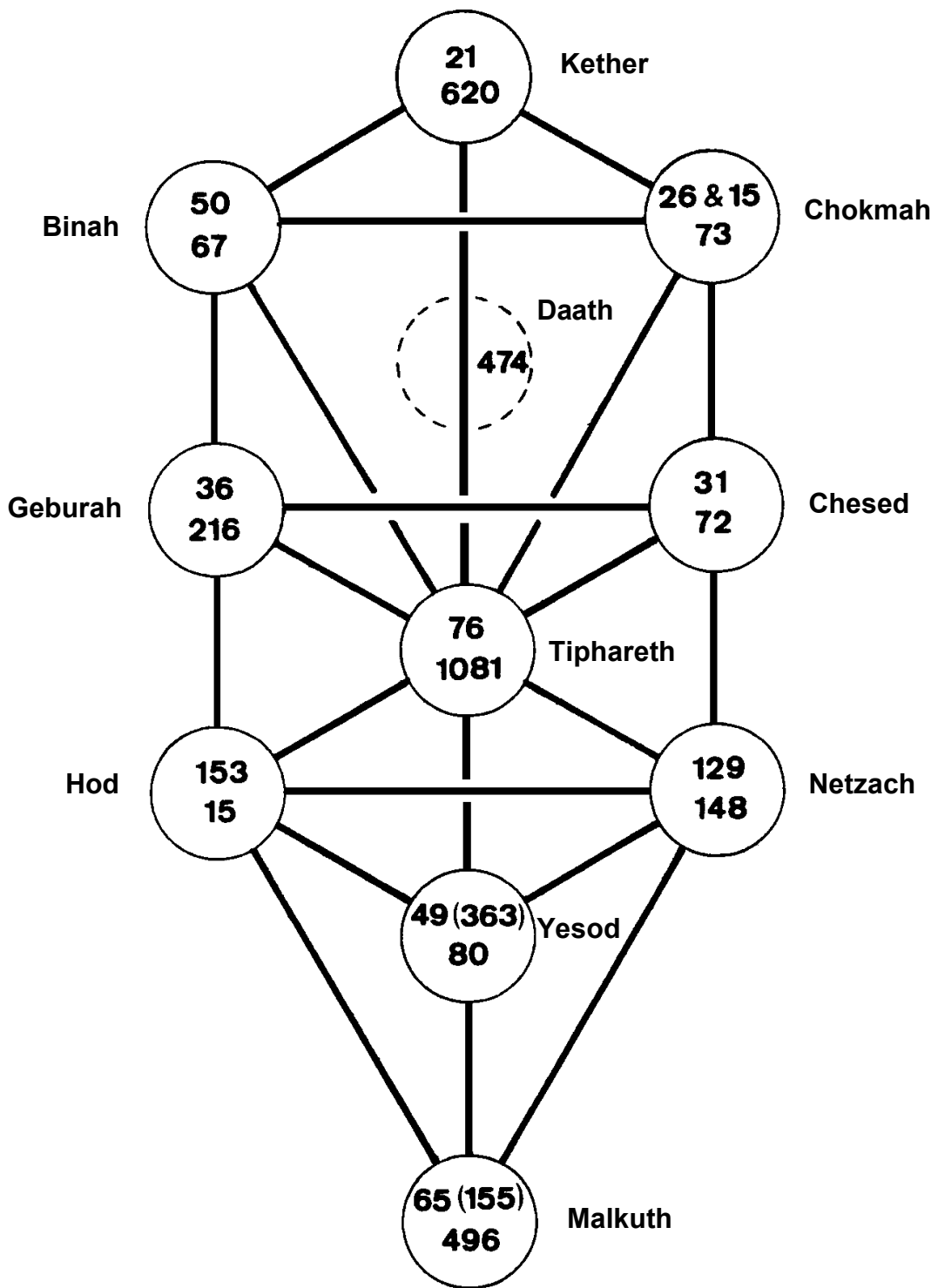
Upper numbers are values of Godnames.

Lower numbers are values of names of Sephiroth.

Figure 1. The Tree of Life.

MATHEMATICAL MEANINGS
OF THE NAMES OF GOD

Part 1

1. Godnames as mathematical formulae

We showed in Article 49 that the Godname numbers of several Sephiroth define patterns of integers expressing parameters of CTOL such as the numbers 550 and 91. It became apparent that Godname numbers determine the geometrical composition of CTOL too many times to be attributable plausibly to chance. These are specific examples of how Godname numbers quantify purely geometrical aspects of the Tree of Life and CTOL. Their mathematical meaning, however, is much wider because the Godnames of the ten Sephiroth in the Tree of Life embody *all* archetypal aspects of this 'Image of God' blueprint, not only those relating to its geometrical representation.

As an ever growing, eclectic body of arcane knowledge about the nature of existence, Kabbalah has been influenced by many diverse cultures. The Sephirothic Godnames are the most authentic and reliable part of Kabbalah because of their antiquity (several sacred names of God, e.g., YAHWEH and ELOHIM, appear in *Genesis*). They have long been understood by students of Kabbalah to express the quintessential meaning of the Divine Attributes originating in Atziluth, the highest World of Archetypes. What is little known, however, even by most Kabbalists is the fact that, as well as having a traditional religious significance for Judaism, the Godnames are powerful *mathematical* formulae determining how the Tree of Life is realized in the infinitesimal, sub-atomic world. This makes them far more than just ancient names of God sacred to a particular religious culture or ethnic group. It gives them a relevance to science.

At first sight, the Godname numbers (Fig. 1) of the Sephiroth appear to be just nondescript integers. But their letter values turn them into formulae or prescriptions which, when applied to certain classes of mathematical objects or geometrical figures composed of tetractyses, generate numbers characterizing the mathematical nature of the 'Image of God' blueprint *insofar as it is determined by the Sephirah in question*. The letter values do *not* simply make up the Godname number but are significant in themselves because they constitute the various terms of these formulae. More explicitly, the individual letters of a Godname are essential components of an abstract algorithm that encapsulates the metaphysical meaning of the Sephirah and — like a mathematical function — generates numbers or parameters characterising the Tree of Life or mathematical patterns embodying its archetypal properties in a way that matches this meaning. For example, the Godname number of the first Sephirah Kether has the most *rudimentary* scope, whereas the Godname number of the last Sephirah, Malkuth, has the most *concrete* application, in keeping with the meaning of the former as the source of creation and with the meaning of the latter as the outer material form of the Tree of Life, whatever its manifestation. The function of the Godname numbers of the intermediate Sephiroth fall between these two extremes. The lower the position of a Sephirah in the Tree of Life, the narrower is the scope of the prescription represented by its Godname and the more explicit or concrete is the mathematical formulation.

Figure 1 also shows the numbers of the Hebrew names of the Sephiroth. They, too, are significant, although they lack the mathematical generality of the Godname numbers. Instead of being prescriptive, each number characterizes the meaning of its Sephirah in various ways. For example, it may be a *coordinate* that locates the Sephirothic level in

CTOL most aptly representing the Sephirah. In the case of Malkuth, its number marks the commencement of a higher counterpart of the 'Malkuth' level of CTOL, where matter manifests as superstrings with nine spatial dimensions, as we shall discover later in this chapter. The letter values of the Sephirothic names also contain information, sometimes acting as subsidiary coordinates locating the generic SL in CTOL. This is evident in the case of Hod, which, because of its simplicity, may be said to offer the most convincing proof that some Sephirothic name number values are coordinates, with CTOL as the map to which they refer.

As well as explaining the meaning of the number values of the Godnames and names of the Sephiroth, we shall also discuss their mathematical properties as numbers. These two aspects, however, often cannot be separated. In the case of Godname numbers in particular, the latter may determine the former. We shall find that the Tree of Life incorporates the properties of integers in a way that is both remarkable and beautiful. *Number and the geometrical form of the Tree of Life are inseparable*. Two great insights lay at the heart of Pythagoras' teachings. Firstly, he recognized that 'number is the essence of the Gods,' by which was meant that the archetypes of the Divine Mind naturally manifest themselves in the very properties of numbers. Secondly, he discovered that the tetractys, the symbol of Wholeness and of Unity, is the fundamental paradigm of the mathematics of Creation, and — as such — is the symbolic form for representing these archetypes. The teaching of this great mathematician and sage that numbers have a sacred, spiritual dimension is one that the modern secular mind is easily inclined to dismiss as an aberration born of the superstitions prevalent in the ancient world. It is a shallow opinion that needs revision in view of the evidence presented in this website.

In a superficial sense, the metaphysical nature of the first ten integers arises from the fact that they number the order of appearance of the ten Divine Qualities, or Kabbalistic Emanations, so that the properties of each integer reflects the metaphysical meaning of its corresponding Sephirah. For example, the number 1, or Pythagorean Monad, symbolizes undivided unity or non-duality and is obviously associated with Kether — the source of dualistic Creation. The number 2, or Pythagorean Dyad, symbolizes the beginning of duality, but still only as an abstract potential, and thus corresponds to the latent potential for creation of diversity denoted by Chokmah. The number 3 establishes the notion of relationship and structure because it provides an independent perspective or dimension by means of which the mirror-image relation of subject and object is, so to speak, seen outside itself and thus made objective. It corresponds to the third Sephirah, Binah, in which the abstract possibility of form (expressed in Hod as ideas of the Divine Mind) first arises.

However, we shall demonstrate that certain integers have an intrinsic, metaphysical character that is more profound than formal correspondences of this kind. These numbers arise repeatedly in different contexts and at different levels of analysis of the mathematical properties of the Tree of Life. They fall into various classes defined by a particular Sephirothic quality that they quantify. Parameters belonging to the same class are found to be representable by the *same* type of regular polygon. This means that a unique number can be associated with a particular Sephirah because the polygon with this number of sides invariably represents parameters that express properties of the Tree of Life reflecting the metaphysical meaning of this Sephirah. For example, the number 6 is obviously linked to the Star of David and hexagon because the latter have, respectively, six points and corners. All parameters that express properties of CTOL as a whole are found to have a Star of David or a hexagonal representation (e.g., the

number 91 is the sum of the first *six* squares). This gives the number 6 a particular 'cosmic' character. It is not coincidence that one of the titles that the Pythagoreans assigned to the hexad is 'Kosmos.' It corresponds to the sixth Sephirah, Tiphareth, which, as a Divine Quality, manifests cosmically as the Spiritual Self of a human being.

Of all the integers, the number 4 or Tetrad was most important to the Pythagoreans. The superficial reason given for this by historians of mathematics is that it terminates the set of integers 1, 2, 3 & 4 needed to generate any number up to 10, the perfect Decad, any larger integer being likewise generated by them. The true reason is more profound. As we shall show, these integers constitute the natural basis for expressing Godname numbers. More important still, we shall demonstrate that they are the unique basis for describing the mathematical properties of the Tree of Life and thus its microcosmic manifestation: the superstring and its generalisation — the d-brane.

2. Kether
GODNAME: AHIH.
ENGLISH VERSION: EHYEH.
MEANING: "I am."
NUMBER: **21**.

$$\begin{array}{cccc} A & H & I & H \\ 1 & 5 & 10 & 5 \end{array} = \textbf{21}.$$

The Godname of the highest Sephirah first appears in the *Old Testament* in chapter 3 of *Exodus,* which describes God as appearing in a flame of fire to Moses out of the midst of a burning bush and appointing him leader of the children of Israel in order to deliver them out of Egypt from the oppressive rule of the Pharaoh. When Moses asks God what he should say to his people when they ask him what is the name of the God of their fathers who has sent him to them, God answers: "I AM THAT I AM," and He adds: "Thus shalt thou say unto the children of Israel: 'I AM has sent me unto you.'" (*Exodus* 3: 14). In keeping with the status of Kether as the seed source of Creation, its Godname EHYEH is, mathematically speaking, the most abstract prescription of all Godnames, embodying the most general mathematical archetype. Because of its abstruseness, its pivotal role in the mathematics of the Tree of Life can be overshadowed by the Godname numbers of Chokmah and Binah, which are often more conspicuous because their polarized functions as the heads of the Pillars of Mercy and Judgement make these numbers more readily recognizable. The Godname of the head of the central Pillar of Equilibrium is the minimal prescription or delineation of whatever conforms to the paradigm of the Image of God. Latent within this formula are the *unrealised* potential of Chokmah and the materialized actuality or entelechy of Binah.

The number of different groups of r objects that can be selected from n objects is the binomial coefficient

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

where n! = 1×2×3×4×… n. Seven objects have

$$\binom{7}{2} = \textbf{21}$$

different pairing. Using the identities

$$\binom{n+1}{r+1} = \binom{n}{r} + \binom{n}{r+1}$$

and

$$\binom{n}{r} = \binom{n}{n-r},$$

then

$$\binom{7}{2} = \binom{6}{1} + \binom{6}{2},$$

where

$$\binom{6}{1} = \binom{5}{0} + \binom{5}{1} = \binom{5}{5} + \binom{5}{4}$$

and

$$\binom{6}{2} = \binom{5}{2} + \binom{5}{1} = \binom{5}{3} + \binom{5}{5}.$$

Therefore,

$$21 = \binom{5}{5} + \binom{5}{4} = \binom{5}{3} + \binom{5}{1}$$

$$= 1 + 5 + 10 + 5,$$

which are the letter values of EHYEH. This confirms that the Godname number of Kether is, indeed, the binomial coefficient $\binom{7}{2}$ expressing the number of ways seven different objects can be paired.

The seven hexagonal yods of a tetractys forming the corners of a regular hexagon and its centre correspond to the seven Sephiroth of Construction. They can be paired in **21** different ways (shown in Figure 2 by lines), of which 6 (=1+5) pairings are represented by the sides of the hexagon and **15** (=10+5) pairings are represented by internal lines.
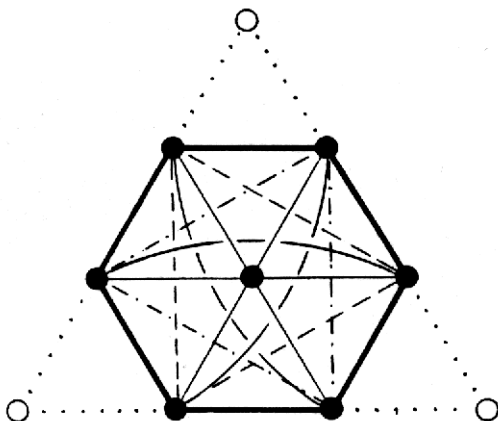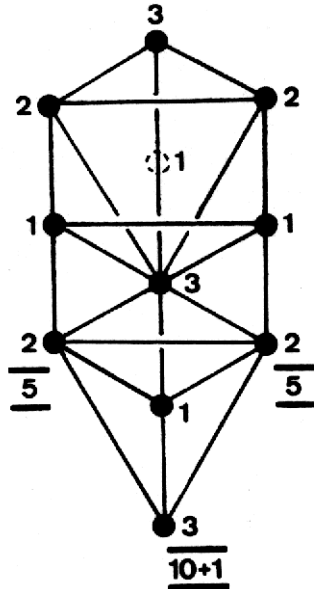

Figure 2. The seven hexagonal yods that symbolise the seven Sephiroth of Construction can be joined in **21** ways.

An SL in CTOL may belong to one, two or three adjoining, overlapping Trees of Life. If each Sephirah is weighted with the number of trees that it shares (Fig. 3), we find that the sum of these weights = (2+1+2) + (3+3+3+1) + 1 + (2+1+2) = 5 + 10 + 1 + 5 = **21**,

AHIH = 1 + 5 + 10 + 5 = 21

Figure 3. The numbers of adjacent trees sharing the 10 Sephiroth & Daath sum to **21**.

where the first term is for the left-hand Pillar of Judgement, the second and third terms are for the central Pillar of Equilibrium and the fourth term applies to the right-hand Pillar of Mercy. The Godname number of Kether defines how many times the SLs of any tree in CTOL other than the lowest and highest ones are shared. Notice that, although not a Sephirah, Daath becomes Yesod from the perspective of the next higher tree and thus belongs as an SL *only* to this tree; similarly for Yesod, Chesed and Geburah. The number **21** of EHYEH is the number of Sephirothic *functions* of a tree (except for the lowest and highest trees), (10+1) of these operating in adjoining trees ("1" denotes Daath). For example, Tiphareth has three functions, being simultaneously Kether of the next lower tree and Malkuth of the next higher tree.

21 is the *minimum* number of independent 'bits of information' needed to delineate the full geometrical potential of the Tree of Life. For example, the lowest tree in CTOL has 19 triangles and two tetrahedra, i.e., **21** triangles & tetrahedra formed by its SLs. The Godname number of Kether specifies the number of geometrical *shapes* making up this
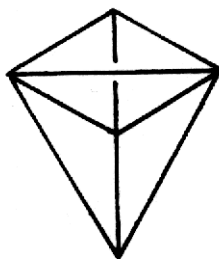
5 corners of 7 triangles

9 sides of 7 triangles

7 triangles

‾‾

21

Figure 4. The Upper & Lower Faces are each made up of **21** geometrical elements.

tree. As Figure 4 shows, **21** is also the number of triangles and their corners and sides comprising a Face of the tree. Once again, this illustrates the *minimal*, prescriptive character of EHYEH, for CTOL is constructed from the linking together of successive Faces of overlapping trees.

The number of SLs in n overlapping Trees of Life is given by:

$$Y(n) = 6n + 4.$$

Kether of the third Tree of Life is the (Y(3)=22)nd SL, so that **21** SLs emanate from it.

Each of the lowest ten trees of CTOL is the counterpart of a dimension of the 10-dimensional space-time predicted by superstring theory, the lowest three trees corresponding to the three dimensions of ordinary space. The Godname number of Kether is therefore the number of SLs emanating from a point needed to form three overlapping trees. In this sense, it prescribes the dimensionality of *ordinary* space.

In view of the significance of the square as a symbol of the number 4 so revered by the Pythagoreans, it is curious that **21** is the *smallest* number of distinct squares into which a square can be dissected (see *The Penguin Dictionary of Curious and Interesting Numbers*, David Wells, 1988, p. 98). This property illustrates again the minimal, prescriptive character of EHYEH, whose number is **21**.

Let us now examine how the Godname number of Kether defines symmetries of the structure of CTOL. The number of SLs on the central pillar of the n-tree is $C(n) = 2n + 3$. Therefore, for every seven trees,

$$C(n+7) - C(n) = 14 \text{ and } Y(n+7) - Y(n) = 42,$$

i.e., seven SLs on the central pillar of CTOL separate every **21** SLs. Tree levels are defined as the shared, vertical steps up the rungs of "Jacob's Ladder" represented by any set of overlapping Trees of Life (Fig. 5), excluding unshared Paths joining Chesed & Geburah of each tree. The number of tree levels in the n-tree is $L(n) = 3n + 4$. Therefore,
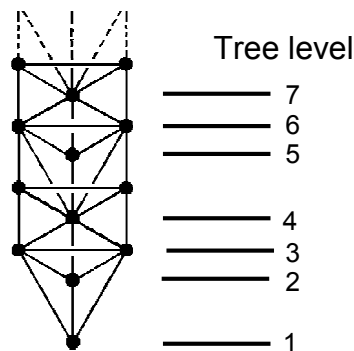
$$L(n+7) - L(n) = \mathbf{21},$$

i.e., **21** tree levels span every seven trees. Since the Theosophical solar planes and the cosmic superphysical planes are each mapped by seven overlapping trees, the Godname number of Kether specifies the number of tree levels in either type of plane. In other words, EHYEH prescribes the 7-fold division of the cosmic and solar planes. Using the formula for $Y(n)$ given above,

$$Y(n+\mathbf{21}) - Y(n) = 126,$$

Tree level

— 7
— 6
— 5

— 4
— 3
— 2

— 1

Figure 5

i.e., every **21** trees have 126 SLs. It is remarkable that the number 126 is the sum of the *four* types of combinations of the letters A, H and I in the Godname of Kether:

A = 1, H = 5, I = 10

1.	A + H + I		=	16
2.	AH + HI + AI + HH		=	42
3.	AHI + HIH + AHH		=	47
4.	AHIH		=	**21**
		TOTAL	=	126

Corresponding SLs of adjacent, overlapping trees are separated by six SLs. In particular, the first Sephirah below Kether to belong to the central Pillar of Equilibrium is Tiphareth, the sixth Sephirah. The first six Sephiroth are arranged at the corners of a hexagon or, equivalently, the points of a Star of David, which will be shown in the discussion of the Godname of Tiphareth to encode its number. Assigning the first six integers to these corners or points,

21 =

```
        1
   6  /\/\  2
    \/    \/
    /\    /\
   5  \/\/  3
        4
```
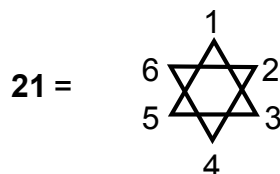
i.e., **21** is the *sixth*, triangular number. Also:

$$91 = 1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2,$$

where

$$1^2 = 1$$
$$2^2 = 1 + 3$$
$$3^2 = 1 + 3 + 5$$
$$4^2 = 1 + 3 + 5 + 7$$
$$5^2 = 1 + 3 + 5 + 7 + 9$$
$$6^2 = 1 + 3 + 5 + 7 + 9 + 11,$$

i.e., 91 is the sum of **21** odd integers. This is how EHYEH prescribes the 91-fold structure of CTOL. Notice that

$$21^2 = 1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3.$$

The sum of the Godname numbers of the first six Sephiroth is

$$\textbf{21} + \textbf{26} + \textbf{50} + \textbf{31} + \textbf{36} + \textbf{76} = 240$$

$$= \begin{matrix} 4! \\ 4!\ \ 4! \\ 4!\ \ 4!\ \ 4! \\ 4!\ \ 4!\ \ 4!\ \ 4!. \end{matrix}$$

The superstring gauge symmetry group E_8 has 240 non-zero roots. Here is the first indication of a connection between the group mathematics of superstring theory and a property of the Tree of Life, viz. the 'translational symmetry' that corresponding SLs of adjacent trees are separated by a constant number (6) of SLs. The number value of EHYEH prescribes the number 240 in the following remarkable way: the binomial coefficient $\begin{pmatrix} n \\ r \end{pmatrix}$ is the coefficient of X^r in the expansion of $(1+X)^n$ according to the binomial theorem:

$$(1+X)^n = \sum_{r=0}^{n} \begin{pmatrix} n \\ r \end{pmatrix} X^r.$$

Putting $X = 1$,

$$2^n = \sum_{r=0}^{n} \begin{pmatrix} n \\ r \end{pmatrix}.$$

A triangular array of binomial coefficients such as the one shown in Figure 6 is called *Pascal's Triangle*, named in honour of the French mathematician and philosopher Blaise Pascal (1632-1662), one of the inventors of probability theory. Coefficients in adjacent rows are related by the identity

$$\begin{pmatrix} n+1 \\ r \end{pmatrix} = \begin{pmatrix} n \\ r-1 \end{pmatrix} + \begin{pmatrix} n \\ r \end{pmatrix},$$

which means that each number within the triangle is obtained by adding the two numbers immediately above it to the right and left. $\begin{pmatrix} n \\ r \end{pmatrix}$ is the number of different combinations of r objects selected from n objects. The latter can be chosen from n different objects obviously only in one way, i.e., $\begin{pmatrix} n \\ n \end{pmatrix} = 1$. The sum of the first **21**

$2^0 =$ $\quad$ $\binom{0}{0} = 1$

$2^1 =$ $\quad$ $\binom{1}{0} = 1$ $\quad$ $\binom{1}{1} = 1$

$2^2 =$ $\quad$ $\binom{2}{0} = 1$ $\quad$ $\binom{2}{1} = 2$ $\quad$ $\binom{2}{2} = 1$

$2^3 =$ $\quad$ $\binom{3}{0} = 1$ $\quad$ $\binom{3}{1} = 3$ $\quad$ $\binom{3}{2} = 3$ $\quad$ $\binom{3}{3} = 1$

$2^4 =$ $\quad$ $\binom{4}{0} = 1$ $\quad$ $\binom{4}{1} = 4$ $\quad$ $\binom{4}{2} = 6$ $\quad$ $\binom{4}{3} = 4$ $\quad$ $\binom{4}{4} = 1$

$2^5 =$ $\quad$ $\binom{5}{0} = 1$ $\quad$ $\binom{5}{1} = 5$ $\quad$ $\binom{5}{2} = 10$ $\quad$ $\binom{5}{3} = 10$ $\quad$ $\binom{5}{4} = 5$ $\quad$ $\binom{5}{5} = 1$

$2^6 =$ $\quad$ $\binom{6}{0} = 1$ $\quad$ $\binom{6}{1} = 6$ $\quad$ $\binom{6}{2} = 15$ $\quad$ $\binom{6}{3} = 20$ $\quad$ $\binom{6}{4} = 15$ $\quad$ $\binom{6}{5} = 6$ $\quad$ $\binom{6}{6} = 1$

$2^7 =$ $\quad$ $\binom{7}{0} = 1$ $\quad$ $\binom{7}{1} = 7$ $\quad$ $\binom{7}{2} = 21$ $\quad$ $\binom{7}{3} = 35$ $\quad$ $\binom{7}{4} = 35$ $\quad$ $\binom{7}{5} = 21$ $\quad$ $\binom{7}{6} = 7$ $\quad$ $\binom{7}{7} = 1$
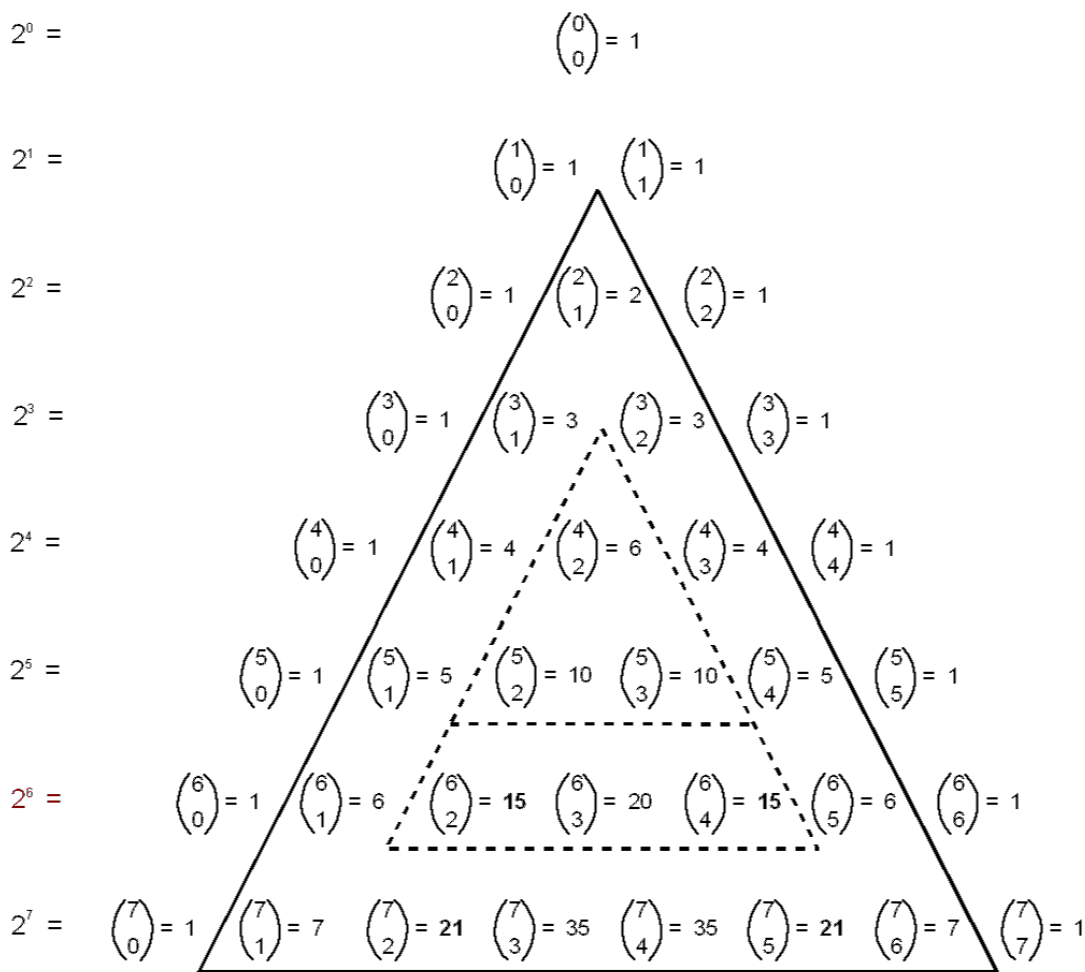
Figure 6. First **21** binomial coefficients in Pascal's Triangle other than 1 sum to 240.

coefficients $\begin{bmatrix} n \\ r \end{bmatrix}$ (2≤n≤7; r<n) in the six rows of the Pascal's Triangle in Figure 6 is 240.

This shows how the Godname number of Kether prescribes the number 240. The significance of this vis-à-vis the Tree of Life is as follows: suppose that in the descent of the Lightning Flash in CTOL each successive emanation of an SL alters every previous SL in some way that need not be specified here. An analogy would be how a birth of a child changes the lives not only of its parents but also their parents, grandparents, etc. Regard each SL as a state of consciousness that is altered slightly every time a new SL is emanated in CTOL. In a cycle of six successive emanations between the top (Kether, n = 1) of one tree and the top (Kether, n = 7) of the next lower tree,

$$1 + 2 + 3 + 4 + 5 + 6 = \mathbf{21}$$

changes take place in the six SLs preceding the new Kether. $\begin{bmatrix} n \\ r \end{bmatrix}$ is the number of combinations of the first n SLs taken r at a time. Therefore,

$$247 = \sum_{n=1}^{7} \sum_{r=1}^{n} \begin{bmatrix} n \\ r \end{bmatrix}$$

is the number of combinations of modified SLs that are generated in the cycle. They include

$$\sum_{n=1}^{7} \begin{bmatrix} n \\ n \end{bmatrix} = 7$$

combinations of one, two, ... seven SLs taken, respectively, one, two, ... seven at a time. Between successive Kethers, there are

$$247 - 7 = 240 = \sum_{n=2}^{7} \begin{bmatrix} n \\ r \end{bmatrix}$$

combinations of SLs other than the seven combinations shown below:

> n = 1: Kether
> n = 2: Kether-Chokmah
> n = 3: Kether-Chokmah-Binah
> n = 4: Kether-Chokmah-Binah-Daath/Yesod
> n = 5: Kether-Chokmah-Binah-Daath/Yesod-Chesed
> n = 6: Kether-Chokmah-Binah-Daath/Yesod-Chesed-Geburah
> n = 7: Kether-Chokmah-Binah-Daath/Yesod-Chesed-Geburah-Tiphareth

The cyclic emanation of each successive tree generates what may be called 240 'degrees of freedom.' Its complete emanation from Kether to Malkuth generates (240+240=480) degrees of freedom, of which 240 belong to its Upper Face (Kether–Tiphareth) and 240 belong to its Lower Face (Tiphareth–Malkuth). Compare this property with the fact that the 480 non-zero roots of the superstring group $E_8 \times E_8'$ consist of 240 roots of E_8 and 240 roots of the second group E_8'. Of these 240 combinations,

$$\sum_{r=1}^{6} \begin{bmatrix} 7 \\ r \end{bmatrix} = 126$$

(the sum of the six binomial coefficients along the base of the Pascal's Triangle shown in Figure 6) are combinations of the *final* SLs from Kether to Tiphareth, the remaining 114 combinations being those of *intermediate* SLs created during the cycle of emanation of each tree. We found earlier that 126 is the sum of all eleven combinations of the three different letters A, H and I composing the Godname of Kether. It has the Star of David representation:
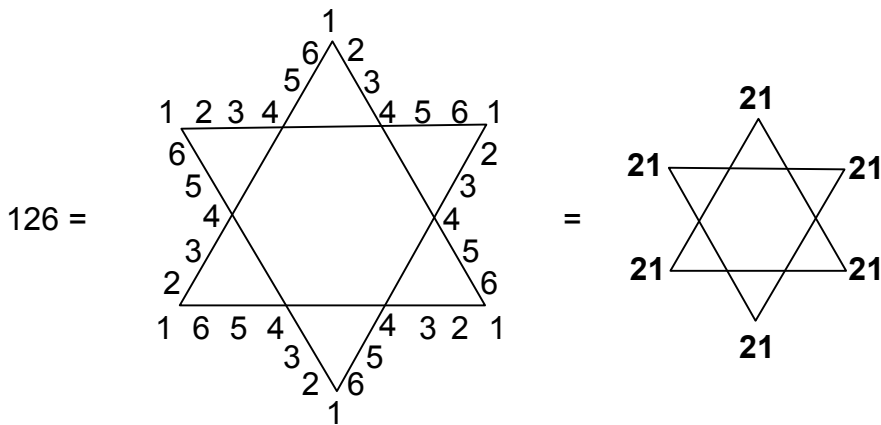
in which the integers 1-6 are assigned to the six yods per star point. Since 126 is the sum of the six binomial coefficients shown above, **1260** is the sum of sixty coefficients. We note from Table 1 that **1260** is the number value of the *Tarshishim*, the Angelic Order associated with the *seventh* Sephirah, Netzach. An arithmetic connection is thus

established between the order of emanation of a Sephirah and the number value of the Hebrew name of its Angelic Order. Adding the coefficient $\begin{bmatrix} 7 \\ 7 \end{bmatrix}$ (= 1), the number 1261 is the sum of 61 binomial coefficients, where 61 is the number value of AIN (the Absolute). The latter number is represented by the 61 yods of a decagon divided into tetractyses, this being equivalent to ten overlapping trees up to its highest Sephiroth of Construction, the 61st SL. The representation has one central yod (■), 10 corner yods (○) and **50** (•) yods arranged at corners and at centres of hexagons. These numbers are the letter values of AIN:

$$1261 =$$

■ = 1

○ = • = **21**
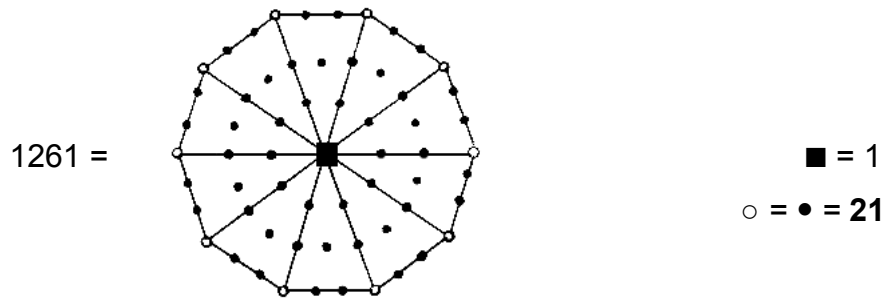
AIN = 1 + 10 + **50** = 61.

The word AIN is thus *equivalent* to a picture generated by tetractyses — a property that we will find is also shared by Godname numbers. Assigning the number 1 to the central yod and **21** to the 60 surrounding yods generates the number 1261, as does assigning the binomial coefficient $\begin{bmatrix} 7 \\ 7 \end{bmatrix}$ to the central yod and the six coefficients $\begin{bmatrix} 7 \\ 1 \end{bmatrix}, \begin{bmatrix} 7 \\ 2 \end{bmatrix}, \dots \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ to the six yods per tetractys. The number 1261 can be expressed in terms of the first *four* odd integers as

$$1261 = \frac{1^5 + 3^5 + 5^5 + 7^5}{1 + 3 + 5 + 7},$$

which relates the Pythagorean Tetrad, Decad and tetractys to the number of EHYEH. Notice that **21** is the arithmetic mean of the *squares* of 1, 3, 5 & 7:

$$\mathbf{21} = \frac{1^2 + 3^2 + 5^2 + 7^2}{4}.$$

A remarkable property of the Pascal's Triangle in Figure 6 is that the triangular array of six coefficients shown outlined by dashes has **76** as their sum, whilst its inner triangle has the sum of **26**, the three coefficients forming the base of the larger triangle having the sum **50**. The two inner triangles thus express the Godname number of the sixth Sephirah, Tiphareth: YAHWEH ELOHIM = **26** + **50**. The sum of the **15** coefficients forming the boundary of Pascal's Triangle is

$$164 =$$
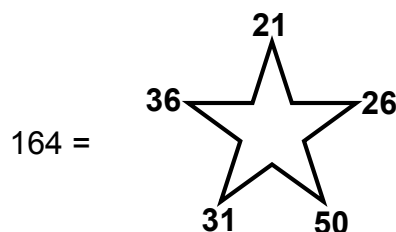
i.e., it is the sum of the Godname numbers of the first *five* Sephiroth. **15** is the number of YAH, the earlier version of YAHWEH. the Godname of Chokmah, and it is the *fifth* triangular number. The edge of the Pascal's Triangle has **36** binomial coefficients,

where **36** is the Godname number of Geburah. This is an excellent example of how Godnames (six in this case) collaborate to define mathematical patterns representing properties of the Tree of Life, in this case, the 240 non-zero roots of the superstring symmetry group E_8.

Let us now consider all possible sums of the Pythagorean integers 1, 2, 3 & 4 raised to the powers 1, 2, 3 & 4:

SUMS OF SAME POWERS

$$1^1 + 2^1 + 3^1 + 4^1 = 10$$
$$1^2 + 2^2 + 3^2 + 4^2 = 30$$
$$1^3 + 2^3 + 3^3 + 4^3 = 100$$
$$1^4 + 2^4 + 3^4 + 4^4 = 354$$

$$\text{SUBTOTAL} = 494$$

SUMS OF DIFFERENT POWERS

$$1^1 + 2^2 + 3^3 + 4^4 = 288$$
$$1^1 + 2^2 + 3^4 + 4^3 = 150$$
$$1^1 + 2^3 + 3^2 + 4^4 = 274$$
$$1^1 + 2^3 + 3^4 + 4^2 = 106$$
$$1^1 + 2^4 + 3^2 + 4^3 = 90$$
$$1^1 + 2^4 + 3^3 + 4^2 = 60$$
$$1^2 + 2^1 + 3^3 + 4^4 = 286$$
$$1^2 + 2^1 + 3^4 + 4^3 = \mathbf{148}$$
$$1^2 + 2^3 + 3^1 + 4^4 = 268$$
$$1^2 + 2^3 + 3^4 + 4^1 = 94$$
$$1^2 + 2^4 + 3^1 + 4^3 = 84$$
$$1^2 + 2^4 + 3^3 + 4^1 = \mathbf{48}$$
$$1^3 + 2^2 + 3^1 + 4^4 = 264$$
$$1^3 + 2^2 + 3^4 + 4^1 = 90$$
$$1^3 + 2^4 + 3^2 + 4^1 = 30$$
$$1^3 + 2^4 + 3^1 + 4^2 = \mathbf{36}$$
$$1^3 + 2^1 + 3^2 + 4^4 = 268$$
$$1^3 + 2^1 + 3^4 + 4^2 = 100$$
$$1^4 + 2^2 + 3^3 + 4^1 = \mathbf{36}$$
$$1^4 + 2^2 + 3^1 + 4^3 = \mathbf{72}$$
$$1^4 + 2^3 + 3^2 + 4^1 = 22$$
$$1^4 + 2^3 + 3^1 + 4^2 = 28$$
$$1^4 + 2^1 + 3^2 + 4^3 = \mathbf{76}$$
$$1^4 + 2^1 + 3^3 + 4^2 = 46$$

$$\text{SUBTOTAL} = 2964$$
$$\text{TOTAL} = 3458$$

Of the 28 different combinations of powers, 24 (=1×2×3×4) contain *different* powers of 1, 2, 3 & 4. Of the latter, **21** combinations have different sums. Remarkably, the Godname number of Kether defines how many combinations of different powers of 1, 2, 3 & 4 have different sums! Two of these combinations sum to Godname numbers:

$$\mathbf{36} = 1^3 + 2^4 + 3^1 + 4^2$$

and

$$\mathbf{76} = 1^4 + 2^1 + 3^2 + 4^3.$$

The total number of powers present in all 28 combinations is

$$4×4 + 4×4! = \mathbf{112} = \mathbf{36} + \mathbf{76}.$$

The sum of the **21** different sums of different powers of 1, 2, 3 & 4 is

$$
2570 = \begin{array}{c}
257 \\
257\ 257 \\
257\ 257\ 257 \\
257\ 257\ 257\ 257,
\end{array}
$$

where 257 is the 55th prime number and

$$
55 = \begin{array}{c}
1 \\
2\quad 3 \\
4\quad 5\quad 6 \\
7\quad 8\quad 9\quad 10
\end{array}
$$

is the *tenth* triangular number. The number 257 (= 4^4 + 1) is known to mathematicians as the *fourth* Fermat number (notice its very Pythagorean character). In 1640, the great mathematician Fermat conjectured that every number of the form

$$F_n = 2^{2^n} + 1$$

(so-called 'Fermat numbers') is a prime number. The first four numbers are prime:

$$F_0 = 2^1 + 1 = 3;\ F_1 = 2^2 + 1 = 5;\ F_2 = 2^4 + 1 = 17;\ F_3 = 2^8 + 1 = 257.$$

But his conjecture turned out to be wrong, the great Swiss mathematician Euler proving in 1732 that F_5 is composite[*]. In fact, Fermat numbers are now known to be composite for all n from 5 to 19 inclusive, as well as for many larger values of n. It is remarkable that the Godname number of Kether defines via the Pythagorean Tetrad and tetractys not merely a Fermat number but the *fourth* one! It suggests that a profound connection exists between the Godname numbers of the Sephiroth and the Pythagorean doctrine that a four-fold pattern permeates the mathematics of the cosmos. One might be inclined to dismiss the above result as another coincidence were this option not made highly implausible by many other examples of this "Tetrad Principle" at work. The principle was formulated in Article 1.

All numbers that are prescribed by Godname numbers are found to have remarkable representations in terms of the integers 1, 2, 3 & 4 and the tetractys. The number 2570 is one such example:

$$
2570 = \begin{array}{c}
4^4 \\
4^4\ 4^4 \\
4^4\ 4^4\ 4^4 \\
4^4\ 4^4\ 4^4\ 4^4
\end{array}
$$

(with corners labelled 1, 2, 3, 4)

COMPLETE GOD-NAME: AHIH AShR AHIH.
ENGLISH VERSION: EHYEH ASHER EHYEH.

---

[*] An integer is composite if it is exactly divisible by at least one integer other than itself.

MEANING: "I am that I am."
NUMBER: **543**.

$$\begin{array}{ccccc} \text{AHIH} & \text{A} & \text{Sh} & \text{R} & \text{AHIH} \\ \mathbf{21} & 1 & 300 & 200 & \mathbf{21} \end{array} = 21 + 501 + 21 = \mathbf{543}.$$

The **501**st SL from the apex of CTOL is the **50**th SL from its nadir, viz. Daath of the eighth tree. The next lower SL, Chesed of the eighth tree, is the 42nd from Daath of the first tree, which is therefore the **543**rd SL from the highest Kether of CTOL. Between Chesed of the eighth tree and Daath of the first tree are 14 SLs (14) on the left-hand Pillar of Judgement, 14 SLs (14') on the right-hand Pillar of Mercy, seven Kethers (7) and seven Daaths (7'), a total of 42 SLs, which can be written:

$$42 = (7 + 14) + (7' + 14')$$

$$= 21 + 21'.$$

The **543** SLs between the highest Kether of CTOL and its lowest Daath is the sum of

(Calligraphy, Joseph Russel Collection, New York).

**EHYEH
ASHER
EHYEH**

Figure 7

the 501 SLs between the former and Daath of the eighth tree and the 42 SLs between the Daaths of the eighth and first trees:

$$\mathbf{543} = \mathbf{501} + 42$$

$$= 21 + \mathbf{501} + 21',$$

which reproduces the number values of the three words making up the complete Godname of Kether. The 7-tree representing the Theosophical physical plane emanates from Daath of the eighth tree, which is not only the **50**th SL but also the **26**th tree level, showing how the Godname numbers of Chokmah and Binah define the Kabbalistic source of the physical universe.

Kether is the pure, unchanging Being of God. EHYEH ASHER EHYEH expresses God's supreme realization of His nature through *knowledge* and *understanding* of His incarnation in matter, this self-knowledge being quantified by the **543** SLs that emanate from the highest point of Creation — Kether of the 91st tree — to Daath (signifying experiential knowledge) of the *lowest*, most physical level of CTOL

The number of EHYEH ASHER EHYEH (Fig. 7) can be expressed in terms of the

Godname numbers of the seven Sephiroth of Construction:

$$543 =$$
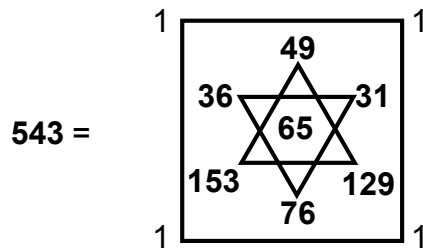
The latter sum to 539, which is the number of SLs in CTOL above Kether of its lowest tree. The four corners with the integer 1 assigned to them thus represent Kether, Chokmah, Binah and Daath of the lowest tree.

The opposite of this representation of **543** is

$$543 =$$

$$\bullet = 15 =$$
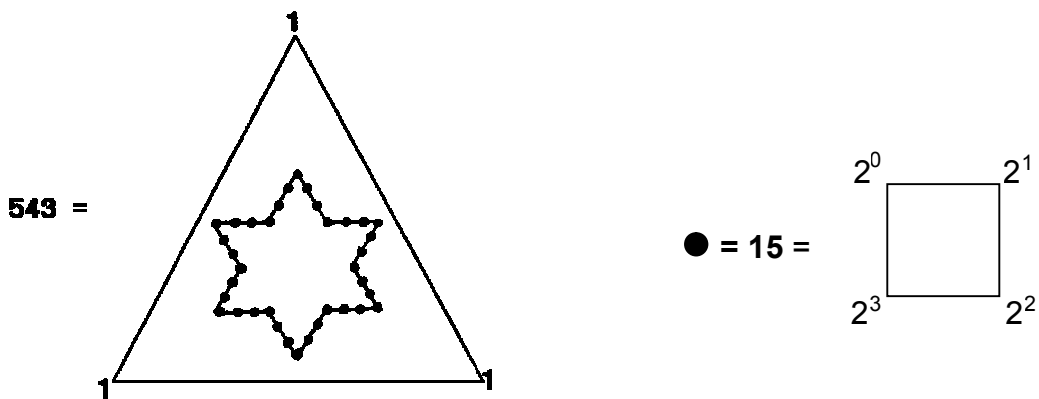
The triangle of unit integers symbolizes the *highest* Kether, Chokmah and Binah of CTOL — the supreme cosmic manifestation of the Holy Trinity — and the value of the **36** yods, each weighted with the number **15** of YAH, a Godname of Chokmah, is 540. This is the number of SLs from Daath of the lowest tree up to (but not including) the highest Supernal Triad. Noting that **36**, the Godname number of Geburah, is the sum:

$$36 =$$
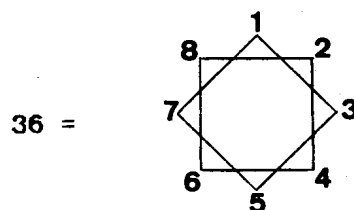
of the first *four* even integers and the first *four* odd integers and that **15** is the sum of the first *four* powers of 2, one can see the role played by the Tetrad of the ancient Pythagoreans in determining the number of EHYEH ASHER EHYEH.

HEBREW NAME: KThR.
ENGLISH VERSION: KETHER.
MEANING: "Crown."
NUMBER: **620**.

$$K \quad Th \quad R$$

$$20 \quad 400 \quad 200 = \textbf{620}.$$

Kether is the seed from which the nine other Sephiroth of the Tree of Life grow. An n-sided regular polygon with its sectors turned into tetractyses is a representation of n

overlapping Trees of Life up to the first Sephirah of Construction of the nth tree. We saw earlier that dividing a decagon into ten tetractyses generates 61 yods, this being the number of AIN, the Absolute. The interpretation of this is that ten Sephiroth emanate
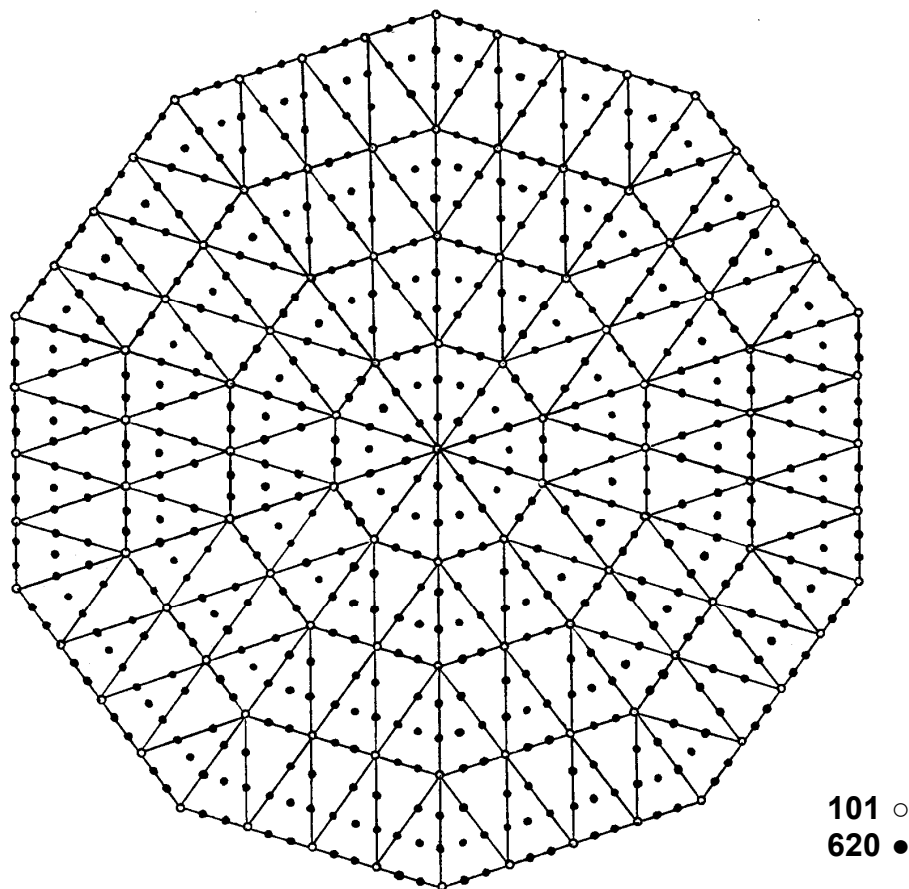

101 ○
620 ●

Fig **8**. Division of a decagon into 2nd-order tetractyses generates the number **620** of Kether.

from the Unmanifest of AIN, each with its own Tree of Life structure corresponding to one of the ten tetractys sectors of the decagon. Each yod denotes a Sephirothic level of the tree representing one of the Sephiroth, which in turn has its own Tree of Life/tetractys representation (Fig. 8). A decagon with 2nd-order tetractyses as sectors has 721 yods, of which **101** are corners of tetractyses and **620** are in hexagons ("hexagonal yods"). The three corner yods of a tetractys symbolize Kether, Chokmah and Binah, which embody the most fundamental archetypes expressing the nature of God, and the seven hexagonal yods symbolize the seven Sephiroth of Construction, which implement the Divine blueprint in Creation. Just as an acorn can be said to contain a potential oak tree, Kether 'contains' the other Sephiroth. Kether has the number **620** because the ten-fold differentiation of each of the ten Sephiroth generates **620** hexagonal yods signifying Sephiroth of Construction. This number thus signifies the potential number of 'degrees of freedom' required to express the ten-fold Divine paradigm.

An example of how these degrees of freedom manifest geometrically in CTOL is the remarkable fact that **21** overlapping Trees of Life have a 3-dimensional structure built out of **620** triangles, sides of triangles & tetrahedra. This number can be represented in

terms of 1, 2, 3 & 4 by a **21**-sided regular polygon:

620 =

(**21**-sided regular polygon)
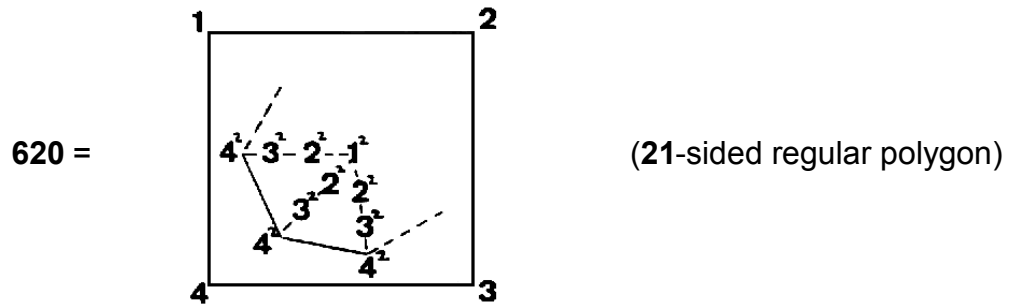
67 integers surround the centre of the representation, where **67** is the number of Binah. Note that if the polygon were divided into tetractyses, the number of yods (including those at the corners of the enclosing square) would be the number of SLs in the **21**-tree.
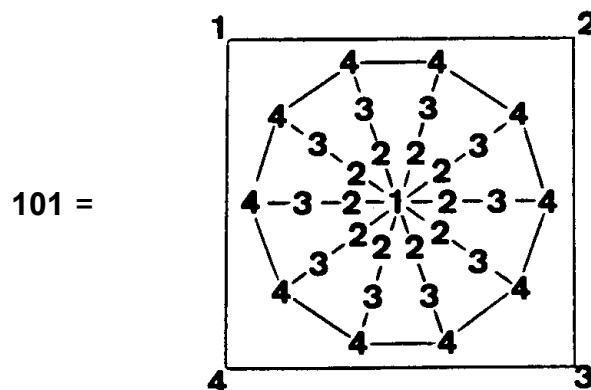
Returning to the decagonal representation of **620**, there are

720 =
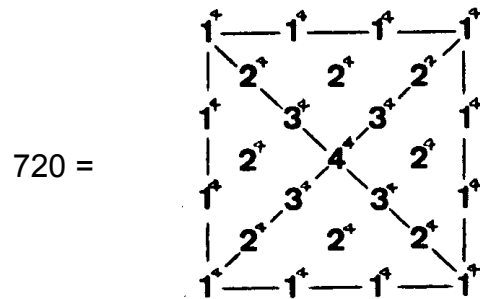
yods surrounding its centre, of which

100 =

$=$

$$1^3 \quad\quad 2^3$$
$$4^3 \quad\quad 3^3$$
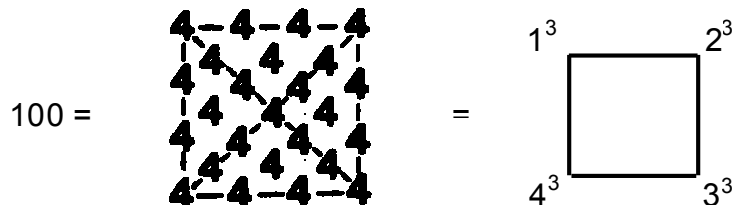
are yods at corners of tetractyses. The total number of corner yods is represented by a decagonal array of the integers 1, 2, 3 & 4:

101 =

where **101** is the number of *Michael*, the Archangel of Tiphareth.

Another representation of **620** in terms of 1, 2, 3 & 4 can be derived from the identity:

$$6201 = 1^2 + 2^2 + 3^2 + \ldots + \mathbf{26}^2,$$

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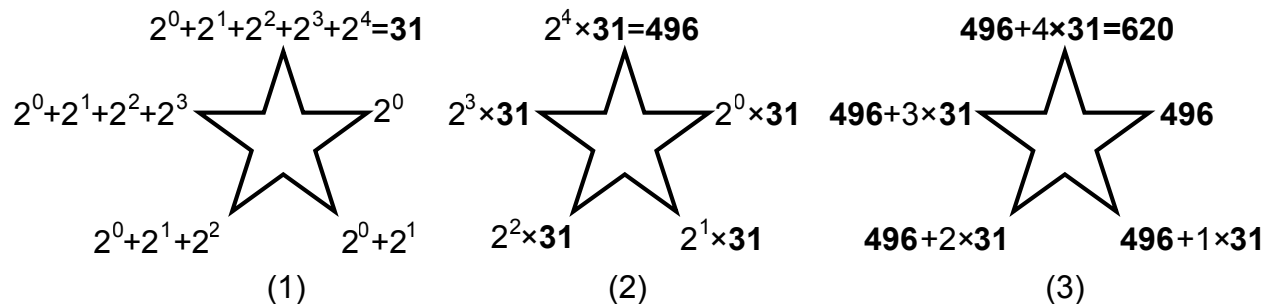where **26** is the Godname number of Chokmah. This gives:

$$620 = \frac{2^2 + 3^2 + 4^2 + \ldots + \mathbf{26}^2}{1 + 2 + 3 + 4},$$

where

$$26 = \frac{2^2 + 3^2 + 4^2 + \ldots + (1 \times 2 \times 3 \times 4 = 24)^2}{1^3 + 2^3 + 3^3 + 4^3}.$$

620 is mathematically generated from unity in three cycles, each of five stages symbolized by the points of a pentagram:

(1)   (2)   (3)

The integers 1, 2, 3 & 4 define:

(1) As powers of 2, the Godname number **31** of Chesed, the first Sephirah of Construction;

(2) As **31** times successive powers of 2, the number **496** of Malkuth, the last Sephirah of Construction;

(3) As multiples of **31**, the number **620** of Kether, the first Sephirah.

Since

$$\mathbf{31} = 2^0 + 2^1 + 2^2 + 2^3 + 2^4$$

$$= 1 + 2 + 4 + 8 + 16,$$

then

$$\mathbf{620} = 20 \times \mathbf{31} = 20(1 + 2 + 4 + 8 + 16)$$

$$= 20 \times 1 + 20(2 + 8) + 20(4 + 16)$$

$$= 20 \times 1 + 20 \times 10 + 20 \times 20$$

$$= 20 + 200 + 400,$$

which reproduces the values of the three Hebrew letters of Kether. Also,

$$\mathbf{496} = 16 \times \mathbf{31} = 2^4(2^0 + 2^1 + 2^2 + 2^3 + 2^4)$$

$$= 2^4 + 2^5 + 2^6 + 2^7 + 2^8,$$

and

$$\mathbf{620} = \mathbf{496} + 4 \times \mathbf{31}$$

$$= 2^4 + 2^5 + 2^6 + 2^7 + 2^8 + 2^2(2^0 + 2^1 + 2^2 + 2^3 + 2^4)$$

$$= 2^2 + 2^3 + 2^5 + 2^6 + 2^9.$$

620 is the sum of five powers of 2, starting with the Pythagorean tetrad: $2^2 = 4$. Since

$$
\begin{array}{c}
\mathbf{62} \\
\mathbf{62\ \ 62} \\
\mathbf{620} = \quad \mathbf{62\ \ 62\ \ 62} \\
\mathbf{62\ \ 62\ \ 62\ \ 62},
\end{array}
$$

where **62** is the number of *Tzadkiel*, Archangel of Chesed, and

$$62 = 2 \times \mathbf{31} = 2(2^0 + 2^1 + 2^2 + 2^3 + 2^4)$$

$$= 2^1 + 2^2 + 2^3 + 2^4 + 2^5$$

is the sum of five powers of 2, we see that **620** is the sum of 5×10 = **50** powers of 2, where **50** is the number of ELOHIM. A decagon divided into tetractyses has **50** hexagonal yods. These powers can therefore be assigned to the yods symbolizing Sephiroth of Construction. The sums 20, 400 and 200 of the inner, middle and outer configurations of powers of 2 are the values of the three letters of Kether: K = 20, Th = 400 and R = 200. This remarkable representation illustrates the fundamental connection between the Pythagorean tetractys and the number values of the names of the Sephiroth.

3. Chokmah
GODNAME: (1) JHVH or YHVH; (2) JH or YH.
ENGLISH NAME: (1) YAHVEH, YAHWEH or JEHOVAH; (2) JAH or YAH.
MEANING: Its root means 'to become.'
NUMBER: (1) **26**;   (2) **15**.

$$
\begin{array}{cccc}
Y & H & V & H = \mathbf{26} \\
10 & 5 & 6 & 5
\end{array}
\qquad
\begin{array}{cc}
Y & H = \mathbf{15} \\
10 & 5
\end{array}
$$

The best known of the sacred Names of God, YAHWEH, appears eight times in the original Ten Commandments (*Exodus* 20:1-17). It is, however, only the English biblical translation, for neither YAHWEH nor JEHOVAH is the authentic pronunciation of the Godname, which has only four consonants and no vowels. Its correct pronounciation has been known only to a few Kabbalists throughout the ages. Hence, they call the four-letter word YHVH 'TETRAGRAMMATON.' When the scrolls of the Torah are read aloud on the Sabbath, ADONAI, or 'Lord,' is said instead of the written name of God. In ancient times, when its correct pronunciation was known, YHVH was uttered only once a year by the high priest on the Day of Atonement. Kabbalists believe that this 'Word of Power' can be used, if pronounced properly, to invoke the power of God. Its potency is revealed in the traditional belief that it was with its aid that Moses caused the Red Sea to part, having been entrusted by God His 'explicit name': "Thou shalt say unto the children of Israel: 'YHVH, the God of your fathers, the God of Abraham, the God of Isaac and the God of Jacob hath sent me to you. This is my name for ever, and this is my memorial unto all generations'" (*Exodus* 3:15).

TETRAGRAMMATON expresses the unbridled power of Creation. It is the Word that said: "Let there be light." The creative, generative principle in nature is embodied in the archetypes of the Godnames of the Sephiroth belonging to the Pillar of Mercy headed by Chokmah, whose Godname YAHWEH is the demiurge. This Sephirah expresses not God's vision of Creation (or what can be — this is found in Chesed) but the power behind His vision, the dynamic impulse behind manifestation. TETRAGRAMMATON is a kind of formula that abstractly expresses the potential of the Tree of Life. Insight into its powerful, generative quality can be gained by considering ten different objects A, B, C, D, E, F, G, H, I, J arranged in tetractys formation. Since

$$2^n = \sum_{r=1}^{n} \begin{bmatrix} n \\ r \end{bmatrix} = 1 + \sum_{r=0}^{n} \begin{bmatrix} n \\ r \end{bmatrix},$$

the sum of the number of combinations of n objects taken one at a time, two at a time, ... n at a time is

$$\sum_{r=1}^{n} \begin{bmatrix} n \\ r \end{bmatrix} = 2^n - 1.$$

Shown below are the various combinations of labelled objects in the four rows of the tetractys:

n		Combinations	Number of combinations = $2^n - 1$
1	A	A	1
2	B C	B, C, BC	3
3	D E F	D, E, F, DE, DF, EF	7
4	G H I J	G, H, I, J, GH, GI, GJ, HI, HJ, IJ, GHI, GHJ, GIJ, HIJ, GHIJ	**15**
			TOTAL = **26**

The number **15** of YAH is the number of combinations of *four* objects:

$$15 = \sum_{r=1}^{4} \begin{bmatrix} 4 \\ n \end{bmatrix} = 2^4 - 1.$$

and the number **26** of YAHWEH is the number of combinations of the ten objects in the four rows, taken separately:

$$26 = \sum_{n=1}^{4} \sum_{r=1}^{n} \begin{bmatrix} n \\ r \end{bmatrix} = \sum_{n=1}^{4} (2^n - 1).$$

Both Godname numbers are defined by the Pythagorean Tetrad. In terms of binomial coefficients:

$$15 = \sum_{r=1}^{4} \begin{bmatrix} 4 \\ n \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \end{bmatrix} + \begin{bmatrix} 4 \\ 2 \end{bmatrix} + \begin{bmatrix} 4 \\ 3 \end{bmatrix} + \begin{bmatrix} 4 \\ 4 \end{bmatrix}$$

$$= (4 + 6) + (4 + 1)$$

$$= 10 + 5,$$

which reproduces the letter values of YAH (alternatively, **15** = 4 + (6+4) + 1 = 10 + 5). The value of Y in the Godname YH is the number of combinations of 4 objects taken either 1 or 2 at a time or 2 or 3 at a time, whilst the value of H is the number of combinations of 4 objects taken, respectively, either 3 or 4 at a time or 1 or 4 at a time.

The sum of the tetractys array of consecutive integers:

$$n-4$$
$$n-2 \quad n-3$$
$$n+1 \quad n \quad n-1$$
$$n+5 \quad n+4 \quad n+3 \quad n+2$$

is 10n + 5. For n = 1, the sum

$$-3$$
$$-1 \quad -2$$
$$2 \quad 1 \quad 0$$
$$6 \quad 5 \quad 4 \quad 3$$

is 10 + 5 = **15**. The number of YAH: **15** = 10 + 5, is thus generated by a tetractys of monotonically increasing integers with the number 1 at its centre. This relates the Pythagorean Monad, which is symbolised by the point — the symbol of Kether — to the number of YAH.

Both **15** and **26** are the sums of tetractys arrays of binomial coefficients in Pascal's Triangle:
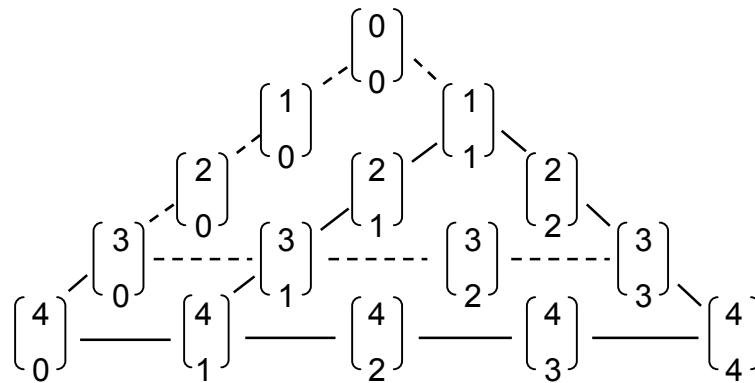
the upper tetractys outlined by dashed lines representing **15** and the lower one representing **26**. The latter can also be represented as a tetractys of powers of 2:

$$26 = \begin{matrix} 2^0 \\ 2^0 \ 2^1 \\ 2^0 \ 2^1 \ 2^2 \\ 2^0 \ 2^1 \ 2^2 \ 2^3 \end{matrix},$$

the sum of the first four powers of 2 forming the base of the tetractys being **15**, a fact which provides a clue to the generative character of YAH, as now explained.

Mathematicians call the n-dimensional generalization of the cube a 'Boolean n-cube.' It has 2^n corners. For example, the 0-cube is a point with ($2^0 = 1$) corner, the 1-cube is a finite, straight line with ($2^1 = 2$) corners (its two ends), the 2-cube is a square with ($2^2 = 4$) corners and the 3-cube is the ordinary cube with ($2^3 = 8$) corners. The first *four* n-cubes: the point, straight line, square and cube have

$$2^0 + 2^1 + 2^2 + 2^3 = \mathbf{15}$$

corners. The fourth n-cube, the 3-cube, has 8 corners (0-cubes), 12 edges (1-cubes) and 6 square faces (2-cubes), a total of **26** 0-, 1- & 2-cubes. The number of YAH defines therefore the number of points, or 0-cubes, in the *four* stages of the generation of the 3-dimensional cube from a mathematical point, whilst the number of YAHWEH is the number of 0-, 1- & 2-cubes needed to construct a 3-cube. In other words, it

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quantifies *all* the geometrical information contained in a cube. These examples illustrate the 'generative potential' quality of the mathematical archetype embodied in the two Godnames of Chokmah. TETRAGRAMMATON has no single specific meaning vis-à-vis the Tree of Life because Godnames express the archetypal qualities of the Sephiroth as abstract formulae with a wide domain of application, although each prescription always accords precisely with the metaphysical meaning of its Sephirah.

The tetractys array of binomial coefficients summing to the number of YAHWEH is more than just an ad hoc mathematical representation. It has an interpretation in terms of the geometry of the Tree of Life, as now explained. For the Pythagoreans, the integers 1, 2, 3 & 4 symbolized by the four rows of points in the tetractys defined, respectively, the dimensionless *point*, the 1-dimensional *line* with its two end-points, the 2-dimensional triangle with three corners (hence, in general, *surface*) and the 3-dimensional tetrahedron with four corners — the simplest polyhedron (hence, in general, *volume*). This series of geometrical objects of increasing dimensionality constitutes what may be called the 'trunk' of the 3-dimensional Tree of Life:

trunk
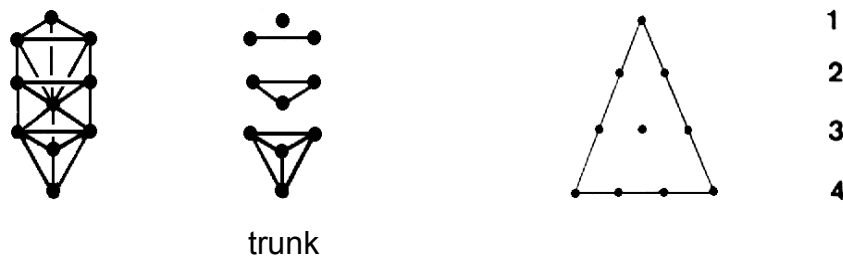
Mathematicians would describe it as a disconnected graph whose components are the first *four* complete graphs. In less technical language it represents the four stages in the generation from a mathematical point (Kether) of the simplest polyhedron — the tetrahedron, whose corners coincide with the positions in space of Netzach, Hod, Yesod and Malkuth and whose edges are their connecting Paths. As we have just stated, the four rows of yods of the tetractys also symbolize these stages. A geometrical correspondence between the Tree of Life and the tetractys is thus revealed. From the perspective of Kabbalah, this four-fold structure reflects the division of the Tree of Life into the four Worlds of Atziluth, Beriah, Yetzirah and Assiyah.

Identifying the positions in space of the ten Sephiroth with the ten objects earlier labelled A, B, C, etc, we see that pairs of letters denote the straight lines joining pairs of points, combinations of three letters represent the triangles formed by these points and the single combination of four letters represents the tetrahedron formed by the four lowest Sephirothic points of the Tree of Life. A binomial coefficient $\binom{n}{r}$ in the tetractys representation of **26**:

	points	lines	triangles	tetrahedra	Total
$\binom{1}{1} = 1$	1	0	0	0	1
$\binom{2}{1} = 2 \quad \binom{2}{2} = 1$	2	1	0	0	3
$\binom{3}{1} = 3 \quad \binom{3}{2} = 3 \quad \binom{3}{3} = 1$	3	3	1	0	7
$\binom{4}{1} = 4 \quad \binom{4}{2} = 6 \quad \binom{4}{3} = 1 \quad \binom{4}{4} = 1$	4	6	4	1	**15**
				TOTAL =	**26**

26 =

is simply the number of (r-1)-dimensional geometrical figures present in the (n-1)-dimensional figure in the trunk of the Tree of Life corresponding to the nth row of the tetractys. For example, the 3-d tetrahedron consists of [$\binom{4}{1}$ = 4] corners, [$\binom{4}{2}$ = 6] edges, [$\binom{4}{3}$ = 4] triangular faces and, of course, [$\binom{4}{4}$ = 1] tetrahedron.

The tetractys of powers of 2 discussed earlier representing the number of YAHWEH has two different orientations:

(1)

$$2^0 \qquad = 2^1 - 1 = 1$$
$$2^0 \ \ 2^1 \qquad = 2^2 - 1 = 3$$
$$2^0 \ \ 2^1 \ \ 2^2 \qquad = 2^3 - 1 = 7$$
$$2^0 \ \ 2^1 \ \ 2^2 \ \ 2^3 \qquad = 2^4 - 1 = \mathbf{15}$$

(2)

$$2^3 \qquad = 1{\times}2^3 = 8 \ \Big\} \, 16$$
$$2^2 \ \ 2^2 \qquad = 2{\times}2^2 = 8$$
$$2^1 \ \ 2^1 \ \ 2^1 \qquad = 3{\times}2^1 = 6 \ \Big\} \, 10$$
$$2^0 \ \ 2^0 \ \ 2^0 \ \ 2^0 \qquad = 4{\times}2^0 = 4$$

As we have just seen, the sum of the powers of 2 in a row of tetractys (1) is the number of geometrical elements defining the corresponding level of the trunk of the Tree of Life. What is the meaning of the sums 4, 6, 8 and 8 of the four rows of powers of 2 in orientation (2) of this tetractys? According to superstring theory, there are four macroscopic dimensions of space-time and six dimensions of a microscopic space; according to bosonic string theory, there are **26** dimensions of space-time, of which 16 are compactified, leaving 10-dimensional superstring space-time. The sums of the powers of 2 in the four rows:

$$\mathbf{26} = 4{\times}2^0 + 3{\times}2^1 + 2{\times}2^3 + 1{\times}2^3$$
$$= 4 \ + 6 + (8 + 8 = 16) = 10 + 16,$$

are remarkably the *dimensionalities of the subspaces resulting from the two-stage compactification of 26-dimensional space-time*, viz. firstly, a 16-dimensional space and 10-dimensional space-time and, secondly, a 6-dimensional space and 4-dimensional space-time. Furthermore, the branching: **26** = 10 + 16 is reproduced numerically in the powers-of-2 representation of **26** in another way:

$$\mathbf{26} = \begin{matrix} 2^3 \\ 2^2 \ \ 2^2 \\ 2^1 \ \ 2^1 \ \ 2^1 \\ 2^0 \ \ 2^0 \ \ 2^0 \ \ 2^0 \end{matrix} = \ \triangle \ + \ \begin{matrix} 2^2 \ 2^2 \\ 2^1 \ 2^1 \ 2^1 \\ 2^0 \ 2^0 \end{matrix}$$

$$= \qquad 10 \qquad + \qquad 16.$$

i.e., 10 is the sum of the powers of 2 at the corners of the tetractys corresponding to the Supernal Triad and 16 is the sum of the seven powers whose positions correspond to the yods symbolizing the seven Sephiroth of Construction. We conclude:

1. The number of YAHWEH defines the *dimensionality of the space-time of bosonic strings*;
2. The trunk of the Tree of Life encodes this number as the number of its geometrical building blocks;
3. The tetractys representation of **26** in terms of the first four powers of 2 encodes the dimensionalities of macroscopic space-time, superstring space-time and the compactified spaces of superstrings and bosonic strings.

The letter values of YAHWEH also reproduce this division:

$$YHVH = 10 + (5+6+5) = 10 + 16.$$

Our discussion of the Godname of Malkuth will explain how other Godnames prescribe the dimensionality of space-time.

For the Pythagoreans the number 2 or Dyad, being the smallest even integer, expressed the principle of *Apeiron*, the Unlimited or Indefinite. The principles of *Peras* and *Apeiron* are incorporated in the Tree of Life through the Pillars of Judgement and Mercy, which are headed by Binah and Chokmah. Numbers defining the 3-dimensional form of superstrings are expressed in odd integers, so that the principle of *Peras*, which these integers express, operates through the Pillar of Judgement, whose Sephiroth embody the 'feminine' principle determining form. On the other hand, the numbers of YAHWEH, which define sequences of geometrical objects terminating in 3-dimensional polyhedra like the tetrahedron and cube, are expressed in powers of 2, so that the principle of *Apeiron* operates through the Pillar of Mercy, whose Sephiroth embody the 'masculine' generative principle. The powers-of-2 representations of the two Godname numbers of Chokmah illustrate the principle of the Unlimited in operation. Another example is the Godname of the generative Sephirah Chesed, whose number **31** is the sum of the first five powers of 2 and which lies below Chokmah on the Pillar of Mercy. Sephiroth belonging to this pillar have Godname archetypes that do not specify form but which, instead, prescribe the sequence of mathematical objects that lead to form, e.g., the number of YAHWEH is the number of space-time dimensions of bosonic strings.

The numbers of Godnames are related mathematically to one another. For example, the **15**th odd integer after 1 is **31**. The number **26** of YAHVEH and the number **50** of ELOHIM are connected by the identity:

$$51^2 = 2601 = 1 + 3 + 5 + 7 + ... + \mathbf{101},$$

that is,

$$2600 = 3 + 5 + 7 + ... + \mathbf{101}$$

$$= \sum_{n=1}^{50} (2n + 1),$$

i.e., 2600 is the sum of the **50** odd integers after 1. Writing

$$2600 = (3+5) + (7+9) = (11+13) + ... + (99+\mathbf{101})$$

$$= 8 + 16 + 24 + ... + 200$$

$$= 4(2 + 4 + 6 + ... + \mathbf{50})$$

$$= 4\sum_{n=1}^{25} 2n,$$

therefore,

$$\mathbf{26} = \frac{\sum_{n=1}^{25} 2n}{25},$$

i.e., **26** is the arithmetic mean of the even integers from 2 to **50**. This is an illustration of the Pythagorean principle of *Apeiron*, or Unlimited, because **26** is defined by *even* integers and Chokmah signifies the unrestricted, creative power of God before its limitation by Binah, which embody the opposite principle of *Peras*, or Limit.

26 is also related to **50** by: