

## ARTICLE 55

# The Platonic solids embody the five exceptional Lie groups and the structure of the subquark state of the $E_8 \times E_8$ heterotic superstring

by

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### Abstract

*Construction of the faces of the tetrahedron, octahedron, cube & icosahedron requires 248 points & straight lines. Believed by the ancient Greeks to be the shapes of the particles of the four Elements Earth, Water, Air & Fire, these Platonic solids therefore embody  $E_8$ , the rank-8, exceptional Lie group with dimension 248 at the heart of superstring theory that describes the symmetry of the unified force between superstrings — the basic particles of matter. It is implausible that this is coincidence, because the number of points & lines in various subsets of the set of 248 points & lines are the numbers of roots in the four exceptional subgroups of  $E_8$ . 2480 geometrical elements surround the axes of the five Platonic solids when their faces and interiors are constructed from triangles. This is the number of space-time components of the 248 10-dimensional vector gauge fields that transmit superstring forces. This cannot, plausibly, be due to chance because numbers that quantify the geometrical compositions of various subsets of elements are (apart from the Pythagorean factor of 10) equal to the numbers of roots of the exceptional subgroups of  $E_8$ . On average, 496 geometrical elements other than vertices surround the axes of the five Platonic solids, 248 elements making up each half. This is the regular polyhedral counterpart of  $E_8 \times E_8$ , the symmetry group with dimension 496 associated with one of the two types of heterotic superstrings. 1680 geometrical elements (including their vertices) surround the axes of the first four Platonic solids. This number is the number of circular turns in each of the ten helices making up the basic constituents of matter, as described over a century ago by C.W. Leadbeater with the aid of a yogic siddhi. Many earlier articles have identified these particles as the subquark state of the  $E_8 \times E_8$  heterotic superstring. That this is not coincidental is indicated by how the gematria number values of the Hebrew words making up the Kabbalistic name of the Mundane Chakra of Malkuth naturally appear as the numbers of their sides and their corners & triangles. It is confirmed by the fact that the same numbers manifest in other sacred geometries, such as the outer & inner Trees of Life and the disdyakis triacontahedron. This is because, as sacred geometry, the Platonic solids embody the same mathematical archetypes as those found in these geometries. It is also confirmed by the fact that 168 yods on average in the faces and axes of the five Platonic solids surround their centres when they are constructed from tetractyses.*

Table 1. Gematria number values of the ten Sephiroth in the four Worlds.

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

(All numbers in this table that are referred to in the article are written in **boldface**).

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, traditionally symbolised by celestial bodies). 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 to a word a number value that is the sum of the numbers of its letters.

# 1. The faces of the first four Platonic solids embody the dimension 248 of E8

The five Platonic solids are known to mathematicians as the five regular, convex 3-dimensional polyhedra. They are named after Plato, who propounded in his *Timaeus* the Pythagorean doctrine that particles of the four Elements Earth, Water, Air & Fire had the shapes of the cube, icosahedron, octahedron & tetrahedron.

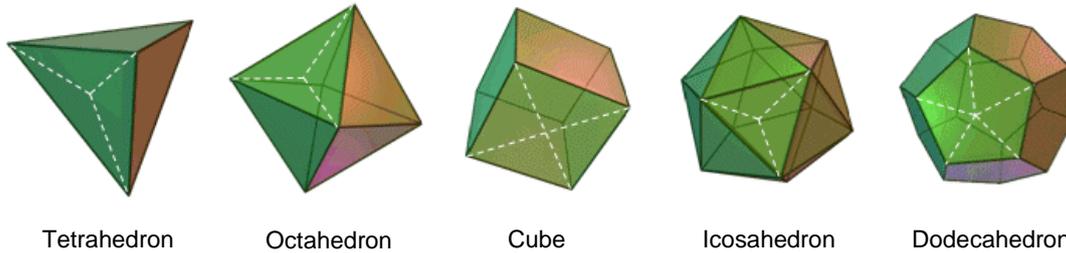


Figure 1. The five Platonic solids have **50** faces with 180 sectors.

The Pythagoreans associated the fifth regular polyhedron, the dodecahedron, with the celestial sphere. It came, later, to be identified with Aether, the fifth Element. The faces of the five Platonic solids are either equilateral triangles (tetrahedron, octahedron & icosahedron), squares (cube) or pentagons (dodecahedron). They have **50** vertices, **50** faces & 90 edges (Fig. 1). The number **50** is the number value of ELOHIM, the Godname of Binah, showing how this Godname prescribes their shapes. On average, the five solids have 10 vertices, 10 faces & 18 edges, i.e., 28 vertices & edges, where

$$28 = 1 + 2 + 4 + 7 + 14.$$

1, 2, 4, 7 & 14 are the factors of 28, so that it is the second perfect number\* Later, we shall reveal how

Table 2. Geometrical composition of the faces of the Platonic solids.

Polyhedron	V	E	F	m	C	e	T	Total = C + e + T
Tetrahedron	4	6	4	3	8	18	12	38
Octahedron	6	12	8	3	14	<b>36</b>	24	74
Cube	8	12	6	4	14	<b>36</b>	24	74
Icosahedron	12	30	20	3	32	90	60	182
<b>Subtotal</b>	<b>30</b>	<b>60</b>	<b>38</b>	<b>-</b>	<b>68</b>	<b>180</b>	<b>120</b>	<b>368</b>
Dodecahedron	20	30	12	5	32	90	60	182
<b>Total =</b>	<b>50</b>	<b>90</b>	<b>50</b>	<b>-</b>	<b>100</b>	<b>270</b>	<b>180</b>	<b>550</b>

(V = number of vertices, E = number of edges, F = number of faces, m = number of sectors in a face, C = V + F = number of corners of sectors, e = E + mF = number of sides, T = mF = number of triangles in F faces).

the five Platonic solids embody the third perfect number **496**.

Division of their faces into their sectors generates 180 triangles with (**50+50=100**) corners and (**90+180=270**) sides. Table 2 lists the number of corners, sides and triangles in the faces of each solid. The faces of the five Platonic solids are composed of 550 points, lines & triangles, where

$$550 = \begin{matrix} & & & & 55 \\ & & & & 55 & 55 \\ & & & 55 & 55 & 55 \\ & & 55 & 55 & 55 & 55 \\ & 55 & 55 & 55 & 55 & \end{matrix}$$

and

$$55 = \begin{matrix} & & & & & & 1 \\ & & & & & & 2 & 3 \\ & & & & & & 4 & 5 & 6 \\ & & & & & & 7 & 8 & 9 & 10 \end{matrix}$$

As 55 is the *tenth* triangular number, the Pythagorean Decad (10) determines their geometrical composition.

\* Perfect numbers are numbers that are the sum of their factors.

This beautiful property reveals the archetypal character of the polyhedral sacred geometry of the five Platonic solids. ELOHIM with number value **50** prescribes them because their **50** faces have 500 (=50x10) geometrical elements other than their **50** vertices.

Table 3 shows the numbers of polyhedral vertices (C) and non-polyhedral (V) corners, edges (E) and internal sides (e) of the triangular sectors of the faces of the first four Platonic solids:

Table 3. Geometrical composition of the faces of the first four Platonic solids.

Polyhedron	C	V	E	e	Total
Tetrahedron	4	4	6	12	<b>26</b>
Octahedron	6	8	12	24	<b>50</b>
Cube	8	6	12	24	<b>50</b>
Icosahedron	12	20	30	60	122
<b>Total =</b>	<b>30</b>	<b>38</b>	<b>60</b>	<b>120</b>	<b>248</b>

Notice how the Godname YAHWEH with number value **26** prescribes the tetrahedron (the simplest Platonic solid) with **26** corners & sides of the 12 triangles in its four faces. Notice also that the octahedron and cube each has **26** corners & polyhedral edges and **50** corners & sides, where **50** is the number value of ELOHIM, the Godname of Binah. The 24 triangles in the faces of each of these two polyhedra have **36** sides, where **36** is the number value of ELOHA, the Godname of Geburah, which is the Sephirah next below Binah on the Pillar of Judgement. The 120 triangular sectors of the 38 faces of the first four Platonic solids have 68 corners and 180 sides, i.e., **248** corners & sides. This shows how they embody the dimension **248** of E<sub>8</sub>, the rank-8, exceptional Lie group. The ancient Greeks believed that the tetrahedron, octahedron, cube & icosahedron were the shapes of the particles of, respectively, the elements Fire, Air, Earth & Water. We now see that these Platonic solids, indeed, *do* represent the properties of physical matter, because their geometrical composition is quantified by the very number that, according to E<sub>8</sub>xE<sub>8</sub> heterotic superstring theory, is the number of particles transmitting the unified force between superstrings of ordinary matter.

The dimension of a Lie group is the number of its so-called "roots," the definition of which need not detain us here. This set contains a subset of "simple roots" (the number of which defines the rank of the group). E<sub>8</sub> has eight simple roots and 240 roots. The four vertices and the four face-centres in the tetrahedron constitute

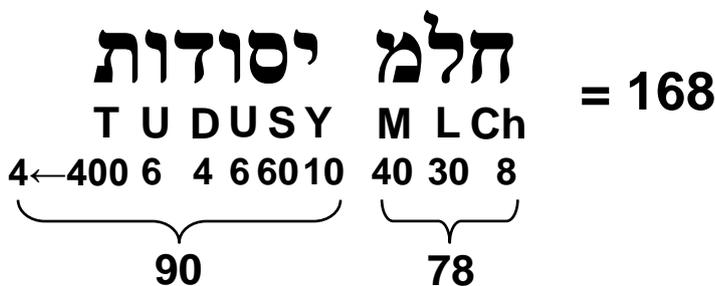


Figure 2. The gematria number value of *Cholem Yesodoth*, the Mundane Chakra of Malkuth, is **168**.

eight points, so it seems more natural to associate them with the eight simple roots of E<sub>8</sub>, rather than the eight centres of the faces of the octahedron or the eight vertices of the cube. It also seems more appropriate, for the tetrahedron is the simplest Platonic solid. The remaining 240 points and straight lines making up the first four Platonic solids correspond to its 240 roots. The **248** corners & sides comprise 128 corners & edges and 120 internal sides of sectors.

There are (6+12=18) lines in the tetrahedron and (6+8+8+6+12+20=60) points in the octahedron, cube & icosahedron (see Table 3). Hence, they form a set of 78 points & lines. 90 lines are in the faces of the icosahedron. There are (78+90=168) points & lines other than the (12+24+12+24=72) lines in the octahedron & cube. **168** is the number value of *Cholem Yesodoth*, the Mundane Chakra of Malkuth, 78 being the number of *Cholem* and 90 being the number of *Yesodoth* (Fig. 2).

The number **72** could be the sum of other combinations of numbers in the table. However, it is readily verified that the simplest and most natural combination is the pair of numbers **36**. Article 53 proves that sacred geometries embody the number 240 and that it displays the factorization 10x24. This means that we should expect the number **72** appearing in the geometrical composition of the faces of the first four Platonic solids to display the factorization 3x24 if it refers to the correct combinations. This, indeed, is the case for the **72** lines in the octahedron and cube, which have 24 edges, each polyhedron having 24 more sides of its 24 sectors. Notice also that, as the tetrahedron has 8 points in its faces, the number **80** (=8+72) arises naturally in the set of the first four Platonic solids. The division:

$$248 = 80 + 168$$

is characteristic of holistic systems. An example is the set of **248** yods up to Chesed of the fifth Tree (the **31st** SL) when the triangles in the lowest five Trees are tetractyses, the lowest Tree having **80** yods.

The fact that the first *four* Platonic solids embody the holistic parameter **248** in their geometry illustrates the Tetrad Principle formulated in Article 1. It states that the first *four* members of a class of mathematical object or, alternatively, the fourth member of that class, always express parameters of holistic systems.

## 2. Counterparts of exceptional subgroups of $E_8$

The sceptic would find it difficult to defend his suggestion that the number **248** arises in the first four Platonic solids simply by chance if it were pointed out that the numbers of roots in the four exceptional subgroups of  $E_8$ :

	$G_2$	$F_4$	$E_6$	$E_7$
Number of roots:	12	<b>48</b>	<b>72</b>	126

also manifest in the points & lines making up the faces of the first four Platonic solids, as is now shown. Ignoring the eight points in the tetrahedron that correspond to the eight simple roots, Table 4 indicates that

Table 4. The 126:114 division of the 240 points & lines in the first four Platonic solids.

Polyhedron	C	V	E	e	Total
Tetrahedron	–	–	6	12	18
Octahedron	6	8	12	24	50
Cube	8	6	12	24	50
Icosahedron	12	20	30	60	122
<b>Total =</b>	<b>26</b>	34	60	120	240

the octahedron, cube & icosahedron have (**26+34=60**) points and 54 edges, whilst the tetrahedron has 12 internal lines. They are indicated by the numbers in the yellow cells, which sum to 126. They correspond to the 126 roots of  $E_7$ , the largest exceptional subgroup of  $E_8$ . The numbers in the remaining orange cells add

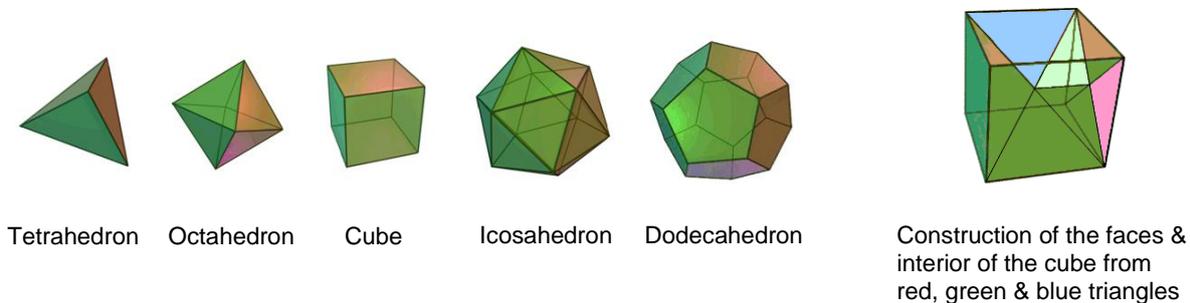


Figure 3. Constructed from Type A triangles, the five Platonic solids embody the superstring structural parameter 1680 and the dimensions of the five exceptional Lie groups.

up to 114. As  $G_2 \leq F_4 \leq E_6 \leq E_7 \leq E_8$ , the geometrical counterpart of the roots of an exceptional group must contain all the geometrical elements corresponding to a smaller, exceptional subgroup. The choice of numbers adding to 240 is consistent with this requirement because:

$E_7$ : the 240 points & lines contain a subset of 126 points & lines:

$$126 = 26 + 34 + 12 + 12 + 30 + 12;$$

$E_6$ : the subset of 126 points & lines contains a subset of **72** points & lines:

$$72 = 26 + 34 + 12;$$

$F_4$ : the subset of **72** points & lines contains a subset of **48** points & lines:

$$48 = 6 + 8 + 8 + 6 + 20$$

or

$$48 = 8 + 12 + 8 + 20;$$

$G_2$ : the subset of **48** points & lines contains a subset of 12 points & lines:

$$12 = 6 + 6$$

or, alternatively, the 12 vertices of the icosahedron. The ambiguity of choice is, of course, irrelevant to the point demonstrated here, namely, that the original selection of 240 points & lines contain subsets that correspond to the roots of the exceptional subgroups of  $E_8$ .

Suppose that the **50** faces of the five Platonic solids are divided into their sectors and that their **50** vertices and **50** face-centres are joined to their centres (Fig. 3). Sides of sectors are sides of triangles inside the polyhedra with vertices and their centres at their corners. For consistency with the division of all F polygonal faces of a Platonic solid with C vertices and E edges into their nF sectors (n = 3, 4 or 5), these internal triangles must be divided likewise, i.e., regarded as Type A triangles. Tabulated below are the numbers of non-vertex corners, sides & triangles in their faces and interiors that surround their axes, each containing two vertices and two sides of internal triangles:

Table 5. Formulae for non-vertex corners, sides & triangles in a Platonic solid.

	Corners	Sides	Triangles	Total
Faces:	F	E + nF	nF	E + F + 2nF
Interior:	E + nF	C - 2 + F + 3E + 3nF = 4E + 3nF	3E + 3nF	8E + 7nF
Total:	E + F + nF	5E + 4nF	3E + 4nF	9E + F + 9nF

(Euler's formula for a polyhedron: C - E + F = 2 has been used to simplify expressions). Tabulated below are the numbers of:

- non-vertex corners (V), sides (S) & red triangles (T) in the faces of the five Platonic solids that surround their axes, where V = F, S = E + nF and T = nF;
- corners (c), sides (s) & triangular sectors (t) in blue interior triangles formed by their edges that surround their axes, where c = E, s = C - 2 + F + 3E and t = 3E;
- corners (c'), sides (s') & triangular sectors (t') in green interior triangles formed by sides of sectors that surround their axes, where c' = nF, s' = 3nF and t' = 3nF.

Table 6. Geometrical composition of the faces & interiors of the five Platonic solids.

Platonic solid	Faces				Interior								Total
	V	S	T	Subtotal	c	s	t	Subtotal	c'	s'	t'	Subtotal	
Tetrahedron (n = 3)	4	18	12	34	6	24	18	48	12	36	36	84	166
Octahedron (n = 3)	8	36	24	68	12	48	36	96	24	72	72	168	332
Cube (n = 4)	6	36	24	66	12	48	36	96	24	72	72	168	330
Icosahedron (n = 3)	20	90	60	170	30	120	90	240	60	180	180	420	830
Subtotal =	38	180	120	338	60	240	180	480	120	360	360	840	1658
Dodecahedron (n = 5)	12	90	60	162	30	120	90	240	60	180	180	420	822
<b>Total =</b>	<b>50</b>	<b>270</b>	<b>180</b>	<b>500</b>	<b>90</b>	<b>360</b>	<b>270</b>	<b>720</b>	<b>180</b>	<b>540</b>	<b>540</b>	<b>1260</b>	<b>2480</b>

We find that 2480 points, lines & triangles are needed to construct the five Platonic solids around their axes, given their **50** vertices. This is the number of geometrical elements that surround their axes, each of which contains three points and two lines. Amazingly, as the unified superstring force with  $E_8$  symmetry is transmitted by **248** vector gauge fields, each with 10 space-time components, these fields have 2480 vector components. To every such component, there is a corresponding geometrical element in the five Platonic solids. **248** is the number value of *Raziel*, the Archangel of Chokmah. YAHWEH, the Godname of this Sephirah, prescribes the dimension of  $E_8$  because it is the mean of the squares of all the integers after 1 up to **26**, which is the number value of YAHWEH:

$$248 = (2^2 + 3^2 + 4^2 + \dots + 26^2)/25.$$

The following evidence indicates that this result is not due to coincidence. The five exceptional groups are  $G_2$  (dimension = 12+2),  $F_4$  (dimension = 48+4),  $E_6$  (dimension = 72+6),  $E_7$  (dimension = 126+7) &  $E_8$  (dimension = 240+8), where "+n" means that the group has n simple roots. As  $G_2 \leq F_4 \leq E_6 \leq E_7 \leq E_8$ , the geometrical counterpart of an exceptional group must contain all the geometrical elements corresponding to a smaller, exceptional subgroup. The table shows that inside the five Platonic solids and surrounding their axes are **1260** geometrical elements other than vertices that belong to triangles with sides of face sectors. **1260** is the

number value of *Tarshishim*, the Order of Angels assigned to Netzach. They include (180+540=720) points & lines. Of these, the table indicates that (120+360=480) belong to the first four Platonic solids, which contain 120 points. Compare the correspondence between the roots of the five exceptional groups (in the case of  $E_8$ , its eight simple roots are included) and these sets of elements:

- G<sub>2</sub>: 12 roots ↔ 120 internal points in first four Platonic solids;
- F<sub>4</sub>: **48** roots ↔ 480 internal points & lines in first four Platonic solids;
- E<sub>6</sub>: **72** roots ↔ 720 internal points & lines in five Platonic solids;
- E<sub>7</sub>: 126 roots ↔ 1260 internal points, lines & triangles in five Platonic solids;
- E<sub>8</sub>: **248** roots ↔ 2480 points, lines & triangles in five Platonic solids.

We see that not only do the five Platonic solids have 2480 geometrical elements other than vertices surrounding their axes but they also are composed of sets of elements that are ten times the numbers of roots in the four exceptional subgroups of  $E_8$ . This cannot be as well the result of chance! Rather, the more sensible conclusion to be drawn is that an isomorphism exists between the geometrical composition of the five Platonic solids and the root composition of  $E_8$  and its exceptional subgroups. Given that these famous polyhedra have been shown in previous articles to constitute a holistic system with features analogous to other sacred geometries, it should not seem surprising that the number 2480 manifests in their geometrical composition. This remarkable analogy demonstrates that superstring theory is part of the holistic pattern embodied in these geometries.

The icosahedron is the fourth Platonic solid. According to Table 2, it has (20+60=**80**) points & triangles in its faces. They also have **80** points in its faces and in internal triangles formed by sides of their sectors. Intuitively speaking, the latter seems the more likely counterpart of the eight simple roots of  $E_8$  because they are all points, whereas the former mixes points with triangles. It is readily verified by combining the various numbers in the table that no other Platonic solid has a combination of **80** geometrical elements of the same kind. The 60 corners of the internal triangles of the icosahedron formed by the sides of the sectors in its faces are the counterparts of the six simple roots of  $E_6$ , whilst the centres of its 20 faces are the counterparts of the two extra simple roots of  $E_8$ . The remaining 2400 geometrical elements consist of the following:

Faces				Interior				Interior				
Corners	Sides	Triangles	Subtotal	Corners	Sides	Triangles	Subtotal	Corners	Sides	Triangles	Subtotal	Total
30	270	180	480	90	360	270	720	120	540	540	1200	2400

As pointed out above, the 720 geometrical elements in the blue interior triangles generated by the edges correspond to the **72** roots of  $E_6$ . The (480+1200=1680) geometrical elements in the faces and in the interior green triangles generated by the sides of sectors of faces correspond to the remaining **168** roots of  $E_8$ . Previous articles have given many examples of the **72:168** division of the parameter 240 embodied in sacred geometries. It re-appears naturally in the geometrical composition of the five Platonic solids as the 720 internal geometrical elements generated by edges that surround the axes of the five Platonic solids and as the remaining 1680 elements other than the **80** corners in either the faces of the icosahedron or the internal triangles formed by sides of their sectors.

Surrounding the axis of a Platonic solid are, on average, (2480/5 = **496**) geometrical elements other than vertices. **248** geometrical elements other than vertices, on average, surround its axis in each half. This is the regular polyhedral basis of the  $E_8 \times E_8$  heterotic superstring, the counterpart of the direct product being the fact that each geometrical element in one-half of the “average” Platonic solid has a corresponding mirror-image element in its other half.

### 3. First four Platonic solids embody superstring structural parameter 1680

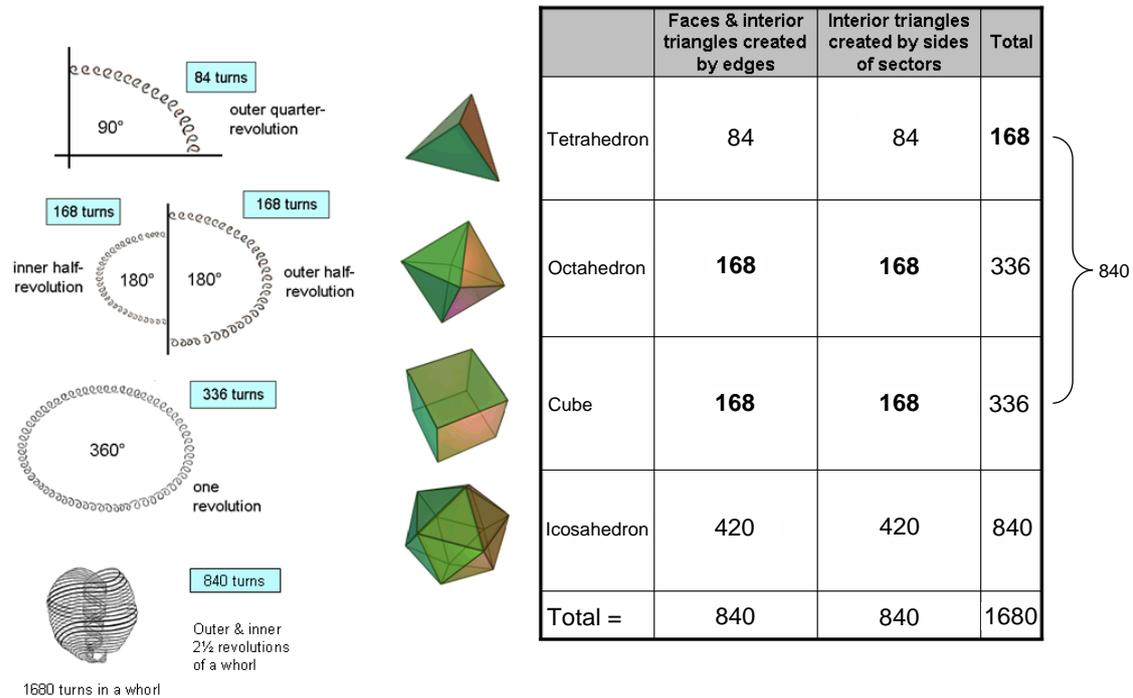
Including their 30 vertices, there are (30-8=22) vertices surrounding the axes of the first four Platonic solids. The table above shows that 1658 other geometrical elements surround their axes. The total number of such elements = 1658 + 22 = 1680 = **168**×10. This is another fundamental parameter of superstring physics that string theorists yet have still to discover, being the number of circular turns that C.W. Leadbeater counted in each helical whorl of the UPA/subquark superstring (Fig. 4). Confirmation that this number does not appear by chance in the context of the first four Platonic solids is provided by their composition when their vertices are included:

Corners	Sides	Triangles	Total
22 + 38 + 60 + 120 = 240	180 + 240 + 360 = 780	120 + 180 + 360 = 660	1680

780 (=78×10) sides and (240+660=900 =90×10) corners & triangles surround their axes. The number **168** is

the gematria number value of *Cholem Yesodoth*, the Mundane Chakra of Malkuth (see Table 1). As indicated in Fig. 2, the number value of *Cholem* is 78 and the number value of *Yesodoth* is 90.

We find that the first four Platonic solids, thought by the ancient Greeks to be the shapes of the particles of the Elements Earth, Water, Air & Fire, not only embody the superstring structural parameter 1680 but also reproduce in their geometrical make-up the number values of the two Hebrew words in the Kabbalistic name



The numbers of geometrical elements surrounding the axes of the first four Platonic solids are the number of turns in a ¼, ½, 1 & 2½ outer or inner revolutions of a whorl of the UPA/subquark superstring remote-viewed by Annie Besant & C.W. Leadbeater over 100 years ago.

Figure 4. The first four Platonic solids embody superstring structural parameters.

of the Mundane Chakra of Malkuth! It is improbable in the extreme that both numbers, as well as their sum, should appear by chance in the geometry of these Platonic solids in such a natural way. Instead, we are witnessing the manifestation of the mathematical archetypes embodied in the Kabbalistic system of Godnames, Archangelic Names, Orders of Angels and Mundane Chakras (see Table 1). They determine the properties of *all* sacred geometries because the latter are isomorphic, so that they possess properties that are quantified by the same numbers — namely, the gematria number values of the Godnames, etc.

As further indication that this amazing property of the first four Platonic solids does not arise by chance, consider the geometrical composition of each Platonic solid when its vertices are included:

Table 7. Geometrical composition (including vertices) of the first four Platonic solids.

Platonic solid	Faces	Interior	Interior	Total
Tetrahedron	<b>36</b>	<b>48</b>	<b>84</b>	<b>168</b>
Octahedron	<b>72</b>	96	<b>168</b>	336
Cube	<b>72</b>	96	<b>168</b>	336
Icosahedron	180	240	420	840
Total =	360	480	840	1680

We find that surrounding its axis:

- the tetrahedron has **168** geometrical elements ((**36+48=84**) in faces & interior generated by edges, 84 internal generated by sides of sectors);
- the octahedron has 336 geometrical elements ((**72+96=168**) in faces & interior generated by edges, **168** internal generated by sides of sectors);

- the cube has 336 geometrical elements (**168** in faces & interior generated by edges, **168** internal generated by sides of sectors);
- the icosahedron has 840 geometrical elements (420 in faces & interior generated by edges, 420 internal generated by sides of sectors);
- all four Platonic solids have 1680 geometrical elements (840 in faces & interior generated by edges, 840 in interior generated by sides of sectors).

The superstring structural parameter **168** appears explicitly in the tetrahedron, octahedron & cube, whilst its structural parameter 840 appears explicitly in the icosahedron. Such repeated appearances of the number value of *Cholem Yesodoth* cannot be due to chance! Rather, it demonstrates the truly profound fact that the

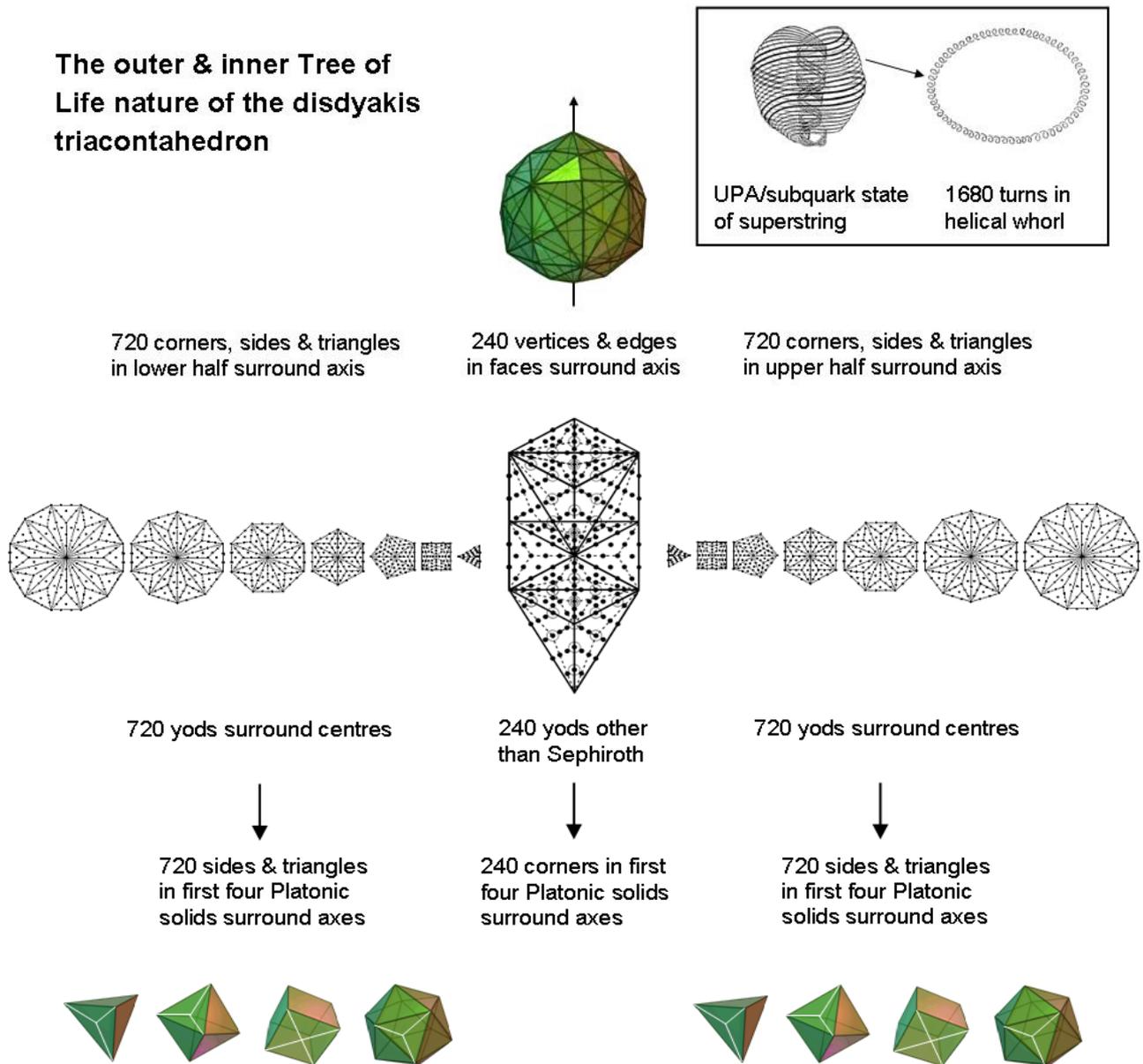


Figure 5. Correspondence between the geometrical composition of the first four Platonic solids, the disdyakis triacontahedron and the outer & inner Trees of Life.

sacred geometry of the first four Platonic solids — both individually and collectively — embed a number (in fact, several numbers) characterizing the structure of superstrings paranormally obtained over 100 years ago by remote viewing atoms. *This is because both superstrings and these Platonic solids are holistic systems that conform to the archetypal pattern described in **The holistic pattern** at the author's website.*

When the 180 internal triangles formed by joining adjacent vertices of the disdyakis triacontahedron to its centre are divided into their sectors, there are 1680 corners, sides & triangles surrounding any axis that passes through two diametrically opposite vertices (Fig. 5). They consist of 240 corners, 780 sides & 660 triangles. This is remarkable, for the table above indicates that the *same* numbers of corners, sides & triangles surround the axes of the first four Platonic solids. The reason for this is simple: both holistic systems are isomorphic representations of the same archetypal pattern.

The 1680 geometrical elements surrounding the axes of the first four Platonic solids consist (referring to the last table) of 240 points,  $(180+240+120+180=720)$  sides & triangles either in the faces or in their interior formed by edges and  $(360+360=720)$  internal sides & triangles formed by sides of sectors. This 240:720:720 division has its parallel in the 1-tree whose triangles are Type A, which has 240 yods other than Sephiroth, and the two sets of seven separate Type B polygons making up the inner Tree of Life, each set containing 720 yods that surround their centres (Fig. 5).

#### 4. Yod composition of Platonic solids

According to Table 5, a regular polyhedron with F faces, E edges & n sectors in each face has F corners other than vertices,  $(E+nF)$  sides & nF triangles in its faces that surround its axis passing through two opposite vertices. If each triangle becomes a tetractys, the number of yods other than vertices in its faces that surround its axis =  $F + 2(E+nF) + nF = F + 2E + 3nF$ . Including the  $(C-2)$  vertices surrounding its axis, the total number of yods =  $C + F - 2 + 2E + 3nF = 3E + 3nF$ , where Euler's formula for a polyhedron:

$$C - E + F = 2$$

has been used to replace C by E and F. The number of yods surrounding the axes of the five Platonic solids =  $3 \sum (E+nF) = 3(90+180) = 810$ . Their axes each consist of three yods on either side of its centre. Therefore,  $(810 + 5 \times 6 = 840)$  yods in their faces and axes surround the centres of the five Platonic solids, where

$$840 = 29^2 - 1 = 3 + 5 + 7 + \dots + 57$$

is the sum of the first 28 odd integers after 1. This demonstrates how the second perfect number 28, which we found in Section 1 to be the average number of vertices & edges in the five Platonic solids, determines how many yods surround their centres. The number 840 is a superstring structural parameter, being the number of circular turns in an outer or inner half of a whorl of the UPA/subquark superstring (see Fig. 4). It is expressed by the Tetrad Principle as

$$840 = 10 \times 84 = (1+2+3+4)(1^2 + 3^2 + 5^2 + 7^2).$$

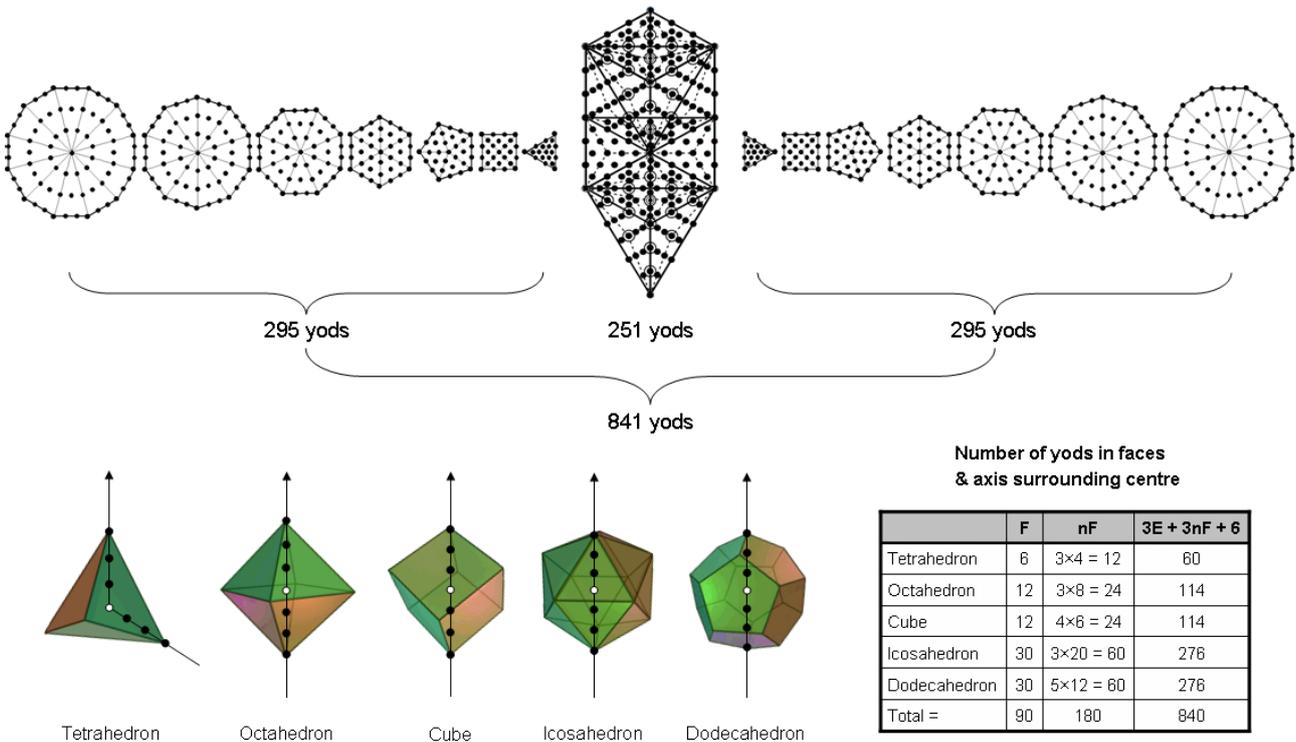


Figure 6. When nested, the five Platonic solids have 841 yods in their faces & axes. This is the number of yods in the 1-tree and the two sets of seven separate polygons of the inner Tree of Life.

The centre of a Platonic solid on average is surrounded by  $(840/5 = 168)$  yods in its faces & axes. This demonstrates how the superstring structural parameter **168** is embodied in the five Platonic solids.

Suppose that the five Platonic solids are nested in one another, occupying the same centre but with their axes pointing in different directions, each axis having three yods on either side of its centre, and with no vertices coinciding. The number of yods that surround the centre of a Platonic solid in its faces and on its axis =  $3E + 3nF + 6$ . The five nested Platonic solids contain 841 yods (Fig. 6). The 1-tree with Type A triangles contains 251 yods and the seven separate Type A polygons contain 295 yods, so that the number of yods in the 1-tree and both sets of seven separate Type A polygons =  $251 + 295 + 295 = 841$ . This demonstrates the Tree of Life nature of the Platonic solids. As two hexagonal yods lie on each edge, there are  $(90 \times 2 + 50 = 230)$  yods on the 90 edges of the five Platonic solids. There are  $(5 \times 4 + 1 = 21)$  yods other than vertices on their axes when they are nested. Therefore,  $(230 + 21 = 251)$  yods line their axes and edges, which leave 590 yods in their faces, 295 such yods being in their upper halves and 295 yods being in their lower halves. This is the *precise* counterpart of the 251 yods in the 1-tree and the 295 yods in each set of seven separate polygons. It is convincing evidence that it is not by chance that the five nested Platonic solids contain the same number of yods as the 1-tree and the two sets of seven separate polygons! The inner form of the 1-tree manifests in the five nested Platonic solids as their faces, whilst its outer form manifests as their edges and axes — those geometrical components that determine *their* forms.

Surrounding their axes are 40 vertices, **50** centres of faces, 90 edges lined by 180 hexagonal yods and 180 hexagonal yods at centres of the 180 tetractyses in their faces, i.e.,  $(40 + 50 + 180 + 180 = 450)$  yods. There are also 360 hexagonal yods lining the 180 sides of these tetractyses that meet at face-centres, whilst lining the axes are 30 yods surrounding centres of Platonic solids. The 840 yods surrounding the latter are made up of  $(30 + 360 = 390)$  yods lining either axes or interior sides and 450 yods either lining edges or at centres of tetractyses. On average,  $(390/5 = 78)$  yods are of the former type and  $(450/5 = 90)$  yods are of the latter type. As Figure 2 indicates, the average yod population of the axes and faces of the five Platonic solids reproduce



**The dodecagon determines the average yod population of the five Platonic solids surrounding their axes**

Figure 7. The five Platonic solids embody the number value **73** of Chokmah (“Wisdom”).

the number value **78** of *Cholem* and the number **90** of *Yesodoth*. Once again, this is evidence that the number **168** does not appear by chance in this context.

Referring again to Table 5, surrounding the axis of a regular polyhedron are  $(E + F + nF)$  corners other than vertices,  $(5E + 4nF)$  sides &  $(3E + 4nF)$  triangles. Therefore, the total number of yods other than vertices surrounding the axis =  $E + F + nF + 2(5E + 4nF) + 3E + 4nF = 14E + F + 13nF$ . For the five Platonic solids, the number =  $14 \times 90 + 50 + 13 \times 180 = 3650 = 365 \times 10$ . On average, a Platonic solid has  $(3650/5 = 730 = 73 \times 10)$  yods other than vertices surrounding its axis (Fig. 7). **73** is the gematria number value of Chokmah (“Wisdom”). According to Table 5, the interior of a Platonic solid has  $(E + nF)$  corners,  $(4E + 3nF)$  sides &  $(3E + 3nF)$  triangles surrounding its axis. The number of internal yods surrounding its axis =  $E + nF + 2(4E + 3nF) + 3E + 3nF = 12E + 10nF$ . The number of internal yods in the five Platonic solids =  $12 \times 90 + 10 \times 180 = 2880 = (1 + 2 + 3 + 4)(1^1 + 2^2 + 3^3 + 4^4)$ . On average, the axis of a Platonic solid is surrounded by  $(2880/5 = 576)$  internal yods. This, too, is expressed by the integers 1, 2, 3 & 4 because  $576 = 24^2 = 1^2 \times 2^2 \times 3^2 \times 4^2$ . It is a beautiful illustration of how these integers express properties of sacred geometries.

**5. Conclusion**

The five Platonic solids are an example of sacred geometry not because a famous philosopher wrote about them over 2000 years ago or because their symmetries and shapes are ubiquitous in nature — as though regularly used by a designing God — but because they are the regular polyhedral realisation of the divine mathematical archetypes, embodying the *same* patterns as those found in the sacred geometries of various

religions. Their geometrical and yod compositions are quantified by the dimensions of  $E_8$ ,  $E_8 \times E_8$  and the structural parameters **168**, 840 & 1680 of the UPA described by C.W. Leadbeater over a century ago. This is exemplified by:

- their faces consisting of **248** points & lines, where **248** is the dimension of the rank-8 exceptional Lie group  $E_8$  at the heart of superstring theory;
- by their having 2480 geometrical elements other than vertices surrounding their axes. On average, **496** geometrical elements other than vertices surround the axis of a Platonic solid, each half of it having **248** elements;
- 1680 geometrical elements surrounding the axes of the first four Platonic solids, so that they embody the superstring structural parameter recorded by C.W. Leadbeater — a number that many articles have shown is present in other sacred geometries.
- 840 yods in the faces & axes of the five Platonic solids surround their centres. On average, **168** such yods surround the centre of a Platonic solid.

### **Suggested reading**

*The mathematical connection between religion and science*, by Stephen M. Phillips, Antony Rowe Publishing, England, 2009.