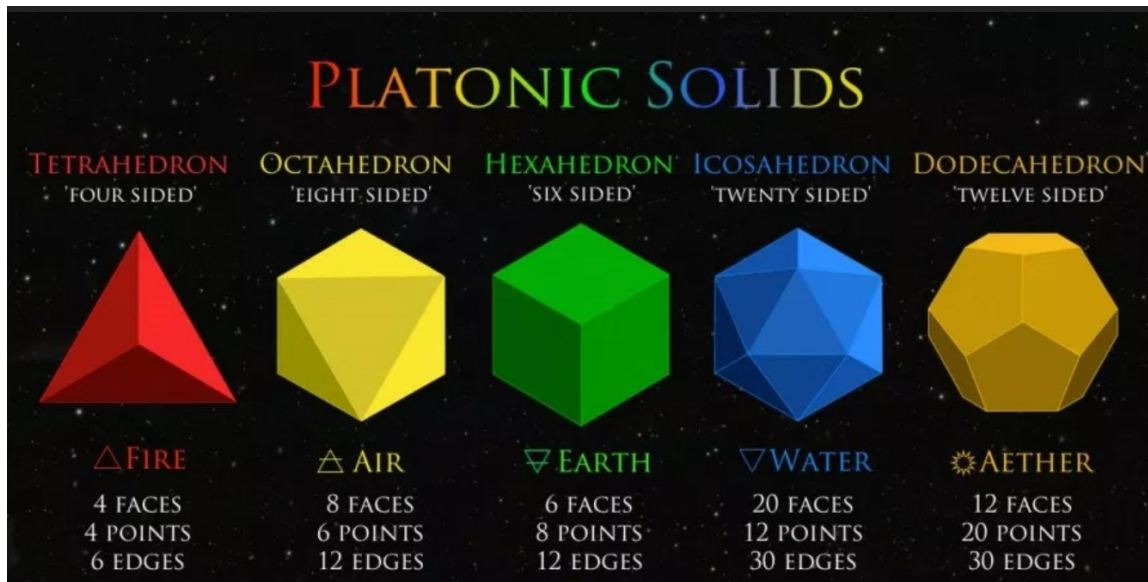




Reviewed 04/04/20

THE PLATONIC SOLIDS – A DESCRIPTION

*Grateful thanks to Geoffrey Cuthill, PPrGSwdB and the late Ken Cox, PPrTGP
Both members of Liverpool Epworth Chapter No 5381 who wrote this document in 2010.*



The Platonic solids are carried into the chapter

Section one

Q– Companion, what have you there?

Ans – A set of the five Platonic solids

Q- What are they?

Ans – In **geometry** they are convex polyhedra

Q - What are polyhedra?

Ans – They are multi sided figures

Q - Why are they so described?

Ans - Because their faces form regular congruent polygons meeting at each vertex.

Q - Who is believed to have discovered them?

Ans – The **mathematician** Pythagoras who lived 500 years before Christ.

Q – Who was Pythagoras?

Ans - Pythagoras of Samos is often described as the first pure mathematician. Unlike many later Greek mathematicians, we have nothing of Pythagoras's writings. We do however have his name attached to the famous theorem which everybody meets in their mathematics lessons at school. Pythagoras's father was a merchant from Tyre who ensured that Pythagoras was well travelled and well educated, learning to play the lyre, learning poetry and to recite Homer. He went to Egypt and by all accounts visited many of the temples and took part in many discussions with the priests. It is not difficult to relate many of Pythagoras's beliefs, ones he would later impose on the society that he set up in Italy, to the customs that he came across in Egypt.

Q – What event in his later life is of interest to the **companions**?

Ans.-This ancient philosopher was taken prisoner by the Persians and taken to Babylon. He remained there for **12** years and is said to have had frequent interviews with Ezekiel, and to have derived from the instructions of the prophet much of that esoteric system of philosophy into which he afterwards indoctrinated his disciples. He would also, some **historians** state, have met Cyrus who as we all know from our ritual was the reason that the sojourners left Babylon and travelled to Jerusalem to rebuild the temple. Pythagoras then returned to Samos and, outside the city, he made a cave the private site of his own philosophical teaching, spending most of the night and daytime there and doing research into the uses of mathematics.

Section Two

Q – Where were these five Platonic solids found?

Ans – At the mouth of the cave in which he worked and died.

Q – Who is credited in disclosing them to the world?

Ans – Plato

Q - How did he disclose them?

Ans – In the dialogue with Timmaneus, in his book ‘The Republic’ written in 360 BC

Q – **Companion**, who was Plato

Ans – A Greek Philosopher and teacher

Q - When and where was he born?

Ans - In the year 428 or 427 BC in Athens

Q – What was his background?

Ans - He came from one of the wealthiest and most politically active families in **Athens**. He was the student of Socrates and the teacher of Aristotle. Though influenced primarily by Socrates, he was familiar with the work and teachings of Pythagoras through contact with the Pythagoreans as the followers of the deceased mathematician were called. When his mentor Socrates died, Plato left Athens and travelled to several places of learning perhaps even Egypt. Plato believed that he could describe the **universe** using five simple shapes. These shapes, called the Platonic solids, did not originate with Plato. In fact, they go back **1,000s** of years before Plato; you can find stone models (perhaps dice?) of each of the Platonic solids in the Ashmolean Museum at Oxford dating to around **2,000 BC**. But Plato made these solids central to a vision of the physical world that links ideal to real, and microcosm to macrocosm in an original, and truly remarkable, style. In any event, Plato returned to Athens and founded a school.

Q – What was this school called?

Ans – It was known as the Academia which is where we get our word, '**academic**'. The Academia got its name from its location, a grove of trees, surrounded by high trees and adorned by spacious covered walks sacred to the hero Academus, a mile or so outside Athens that can still be visited today.

Q - What teaching method did Socrates use?

Ans - A series of interactive questions and answers known as dialogues

Q - How did Plato teach?

Ans - By conversing with his students whilst walking.

Q - To whom was Plato a mentor?

Ans – The **philosopher**, Aristotle who was in turn tutor to Alexander the Great.

Section Three

Q - Who was Socrates?

Ans.-Socrates was born in **470 BC** in Athens and is widely recognized as the father of western philosophy. Although Socrates himself wrote **nothing**, he is portrayed in other men's works as a man of great insight, integrity, self-**mastery and** argumentative skill. He was committed to living simply and to interrogating the everyday views and popular opinions of those in his home city of Athens. At the age of 70, he was put to death at the hands of his fellow citizens on charges of impiety and corruption of the youth. Socrates and his contemporaries lived in a polytheistic society, a society in which the gods did not create the world but were themselves created. Socrates would have been brought up with the stories of the gods recounted in Homer, in which the gods were not omniscient, omnibenevolent, or eternal, but rather power-hungry super-creatures that regularly intervened in the affairs of human beings. Socrates instead seemed to have a conception of the divine as always benevolent, truthful, authoritative, and wise. For him, divinity always operated in accordance with the standards of rationality. This conception of divinity, however, dispenses with the traditional conception of prayer and sacrifice as motivated by hopes for material payoff. Socrates' theory of the divine seemed to make the most important rituals and sacrifices in the city entirely useless, for if the gods are all good, they will benefit human beings regardless of whether or not human beings make offerings to them. Jurors at his trial might have thought that, without the expectation of material reward or protection from the **Gods**, Socrates was disconnecting religion from its practical roots and its connection with the civic identity of the city. One of Socrates' most famous statements **is**: "The only thing I know **is**; I know nothing". As we have heard Plato was his most famous student and his words and actions in the search and defence of truth changed the world and his example still inspires people today.

Q - Where is the **geometric** construction of the five Platonic solids to be found?

Ans – In the 13th Chapter of 'Elements', by the Alexandrian **geometrician** Euclid who also laid down their sequence which we follow tonight.

Q. - Who was Euclid?

Ans. Euclid was a Greek **mathematician** who was born around **365 BC** and is considered to be the **father** of **geometry**. He lived in Alexandria and was mostly active during the reign of the Pharaoh Ptolemy I. Although Euclid was a famous mathematician, very little is known about his life but it is believed that he was a student of Plato. Euclid is best known for having compiled geometry text books that gathered together all that was known at the time about geometry and proofs. The 13 books, dealing with geometry, called The Elements, were so brilliantly written that it replaced all the mathematics that preceded it, and all the earlier

work was subsequently lost. As a consequence, there is no way to be certain about what Euclid himself contributed. The first of the 13 books that make up Euclid's **'Elements'** is devoted to a proof of theorem 47, which is the theorem of Pythagoras and has resonance in our Craft masonry. The **'Elements'** remained the definitive textbook on geometry and mathematics for well over two millennia, surviving the eclipse in classical learning in Europe during the Dark Ages through Arabic translations. It set, for all time, the model for mathematical argument, following logical deductions from initial **assumptions**, (which Euclid called **'axioms'** and **'postulates'**), in order to establish proven theorems.

Section Four – The Tetrahedron

A companion picks up the tetrahedron

Q – Companion, what have you there?

Ans - The **tetrahedron**

Q - What is a tetrahedron?

Ans – A solid figure of 4 planes, also known as a triangular pyramid. It is a polyhedron composed of four triangular faces, six straight edges, and four vertex corners. The tetrahedron is the simplest of all the ordinary convex polyhedra and the only one that has fewer than 5 faces.

Q - Describe the shape of those planes

Ans – They are four equilateral triangles.

Q – What solid figure do they produce?

Ans - A pyramid

Q - What reference has it to Royal Arch Masonry?

Ans - The four equilateral faces are equal to eight right angles which make up the Triple Tau

Q - What does the pyramid represent?

Ans - The world axis, with its body representing man's ascent through the hierarchy of enlightenment and its apex spiritual attainment.

Q – To which of the classical elements did Plato attach the **tetrahedron**?

Ans - Fire

Q - On what ground did he make that attachment?

Ans – Because the heat of fire feels sharp and stabbing like the tetrahedron. Fire is considered the smallest, and most acute, of the elements and is also known as the original element. It can combine with the others and is represented by the colour red. It is also linked to the **solar plexus**, which is the centre for personal power, **acceptance and** a natural balance between the physical and the spiritual. Each side of the **tetrahedron** sits flat, no matter how it is turned, making it the perfect symbol for balance. Since each of its corner points is equally distant from each of the others, there is no strain or tension in a **tetrahedron**, but rather a condition of rest in equilibrium.

Section Five – The Octahedron

A companion picks up the octahedron

Q - What do you hold?

Ans- The **octahedron**

Q - Describe its shape

Ans - An eight-sided figure composed of eight equal and equilateral triangular faces.

Q - Is it related to any other solid?

Ans - Yes. The octahedron is equivalent to two tetrahedrons

Q - What relevance does it have to Royal Arch **Masonry**?

Ans - Having eight faces totalling 16 right **angles**, it equates to two **Triple Taus**

Q – To what element did the ancients connect the octahedron?

Ans - Air

Q - How did they come to do so?

Ans - They believed that air was made up of octahedral.

Q - Why did they come to such a conclusion?

Ans - They considered that the components of air are so smooth that a person can barely feel it

Q - What is the symbolic meaning of air?

Ans – The spiritual life and freedom, equating with the soul. Plato decided that the octahedron would represent the atom air. He reasoned that since fire, **air and** water react the most with each other, their atoms must be similar in shape. Tetrahedrons, **octahedrons**, and **icosahedrons** are all composed of equilateral triangles. Knowing this, Plato decided that air must be represented by the octahedron because it was the second lightest of the three atoms and the octahedron has the second least number of sides.

Section Six - The Cube

A Companion picks up the cube

Q – What solid do you present?

Ans - The **hexahedron**

Q - By what name is it commonly called?

Ans - The cube

Q - Describe the cube

Ans - It is a solid figure of six equal square faces

Q - What relevance does it have to Freemasonry in general and the Royal Arch in particular?

Ans - In its form the **cube** is the most substantial of the Platonic bodies

Q - What other property does it have?

Ans - It is the firmest and most immovable on its base so that our ancient companions used it to make substantial buildings. It represents the final stage of a cycle of immobility. It can be seen as the truth, because it looks the same from any perspective, it is commonly thought of as the counterpart of the sphere. The cube is, in essence, the squaring of a circle.

Scientifically, the cube usually represents salt. Spiritually, the cube symbolizes a solid foundation and stability suggesting a need of patience and consistency, allowing things to develop in their own perfect time. The cube is a three-dimensional square in our physical space, therefore, scientifically, it is a symbol of stability and permanence. It is geometric perfection. The cube can be seen as the truth in symbolic artistry because it looks the same from any perspective.

Q – What purpose did they believe it served?

Ans - They thought it made a pattern in the space known to us and for which the rules of Euclid apply

Q - How is the cube known in Freemasonry?

Ans- By the name rough and perfect ashlar

Q - What do they signify?

Ans - The rough ashlar represents the mind of man in its infant or primitive state

Q - What does the perfect ashlar represent?

Ans - The mind of man in the decline of years after a life well spent in acts of piety

Q - What relation therefore does the cube have to the Holy Royal Arch?

Ans - The six-sided square faces have 24 right angles or three **Triple Taus**

Q - To what **element** does the cube traditionally apply?

Ans - Earth

Q - Why is it so linked?

Ans - Since it can sit flat on the ground, a cube is associated with the earth. Giving stability on firm ground it is the emblem of the earth itself. The **hexahedron** was assigned to represent the atom **earth**. Plato reasoned that because a cube is very stable it would best represent **earth**, for earth was also seen as being very stable.

Section Seven - The Icosahedron

A companion picks up the icosahedron

Q - Name the object you hold.

Ans - The **icosahedron**.

Q - How do you define it?

Ans - A solid body bounded by **20** faces. The name comes from Greek (*eíkosi*), meaning '20', and (*hédra*), meaning 'seat'. The plural can be either '**icosahedrons**' or '**icosahedra**'.

Q - Of what shape are those faces?

Ans - They are each equal and equilateral triangles which are equivalent to two right angles

Q - How many right angles are contained in that solid?

Ans - 40, which in a Royal Arch **chapter** is equivalent to five **Triple Taus**

Q - How was this body used by Plato?

Ans - He used it to express the element water

Q - On what grounds did he do so?

Ans - The icosahedron is considered to be the heaviest of the solids contained by triangles and is next in weight and substance to the cube

Q - Ascribe another reason given by the **ancients**?

Ans - They thought that since water flows out of the hand when picked up, it was as if it were made of tiny balls which this solid resembles. Water is all about movement, **flow and** change. Water moves easily from a gas to a liquid to a solid. It can be visible one minute and invisible the next.

Q - How else did they regard the element water?

Ans - As the universal symbol of purity, fertility and of life itself. It has been suggested that the regular icosahedron is the first example of a geometrical object that was the free creation of human thought, not the result of observations in nature. Regardless of the truth of this, it is interesting to try to track down the origin of the icosahedron. A side note in one of Euclid's '**Elements**' speaks of: "**The** five so-called Platonic figures which, however, do not belong to Plato, three of the five being due to the Pythagoreans, namely the cube, the **pyramid and** the dodecahedron, while the octahedron and the icosahedron are due to **Theaetetus**". More recently it has been claimed that a regular icosahedron appears among a collection of stone balls in the Ashmolean Museum - balls that were unearthed in Scotland and may date back to **2,000 BC**. Spiritually, the icosahedron is associated with the term "GO WITH THE FLOW".

Section Eight – The Dodecahedron

Companion picks up the solid

Q - What solid do you present?

Ans - The **dodecahedron**

Q - What is a **dodecahedron**?

Ans - A solid body made up of 12 equal and equilateral pentagons which form the beginning of a sphere akin to a soccer ball.

Q - What is a **pentagon?**

Ans - A five-sided figure

Q - How many degrees does it possess?

Ans - 540, the equivalent of six right angles

Q - What then is the total number of right angles contained in a dodecahedron?

Ans - 72 or in Royal Arch **Masonry, nine **Triple Taus****

Q - How was that solid used by the Platonists?

Ans - It was used to express the **spirit of the **universe****

Q - Why did they do so?

Ans - Because this solid approach nearer to a sphere than any other

Q - What comment did Plato make upon it?

Ans - 'The **God used the dodecahedron for arranging the constellations on the whole heaven'**

Q - How did other philosophers regard the spirit of the universe?

Ans - They called it ether or the quintessential spirit. Like a crystal or gem, its facets and symmetries compel our eyes and hearts to observe life more deeply. The ancient Greeks honoured the **12 signs of the Zodiac in the sacred host of the **dodecathlon**, the **12** Gods whose temples were placed in the **12** equally divided sections which radiated out from the centre of the City of Athens. Their popular worship shrouded the secret correspondences of sets of **12**, observed in a multitude of natural and cultural phenomena. There were **12** hours of the day and night, **12** months in a year. **12** units in various measurements and weights, **12** labours and the **12** days between the winter solstice and the first day of the new year, which marked the return to chaos and the subsequent rebirth of order.**

Section Nine - The Solids in Freemasonry

Q. How did the solids come into Freemasonry?

Ans. They are referred to in a lecture on the Second Degree by William Preston considered to be the father of Masonic history.

Q. - Who was William Preston?

Ans - William Preston was born in Edinburgh in 1742 and entered the Royal High School, Edinburgh at six, where he shone in Latin, and would also have studied Greek. He continued his classical studies at college, before moving to London, where he took employment as an editor with the King's Printer. He joined a group of Edinburgh Freemasons living in the English capital that formed a **lodge** and then changed allegiance to the Moderns and became Caledonian Lodge No 325 which was also a major component in the first Grand Chapter of Royal Arch Masonry. Preston soon began an extensive program of Masonic research in Britain and overseas and he built a vast storehouse of Masonic knowledge, which he applied initially to explaining and organising the lectures attached to the three degrees of Freemasonry. The publication of his *Illustrations of Masonry*, which ran to **12** English editions in the author's lifetime, as well as being translated into other languages, cemented his place in Masonic history.

Q. - How do we remember him today?

Ans. - On his death in 1818, Preston bequeathed to Grand Lodge the sum of £300 for the perpetuation of his system of instruction. Lectures in accordance with this system were delivered until 1862, when the Lectureship was permitted to lapse but in 1924 the Prestonian Lectureship was revived with the lecturer now submitting a Masonic subject of his own selection, and with the exception of the war years, regular appointments have been made annually to the present day.

Q. - What is the earliest reference to the solids in Freemasonry?

Ans. - In the year 1810, when they are included in the 'Iowa' version of Preston's lecture.

Section Ten

Q. - How did the solids come to be associated with the Royal Arch?

Ans.- Some Masonic historians speculate that they were included in a revision of the ritual in 1834 where a short reference is made to them in the symbolic lecture.

Q. - To what does that short reference allude?

Ans.- To the breast jewel worn by the companions which by its intersections forms a number of angles taken in five several combinations which when reduced to their amount in right angles are found to be equal to the five regular Platonic bodies. At first sight, there does not seem to be any connection between the Royal Arch **jewel** and the Platonic **bodies**. A tortuous explanation of the connections between the five Platonic **bodies** and the Royal Arch Chapter **jewel** used to be recounted at the time of exaltations. Summarised, the Triple Tau, (at one time suspended from the circle of the jewel) is composed of eight right angles, and, among other things, was the '**key**' to the Platonic **bodies**. The dodecahedron with **12** pentagons, each of which has internal angles totalling six right angles, equates to nine Triple Taus. On a cursory examination, we would not notice the five Platonic shapes present within the Seal of Solomon, but when we count the number of right-angles, their presence becomes apparent. We note that the number of right-angles in the Triple Tau and a multiple of it are equal to combinations of the triangles in the Seal of Solomon. Hence the Triple Tau, or key, '**unlocks**' the Seal of Solomon to reveal the five Platonic shapes.

***NOTE From; On a cursory examination, to end of paragraph clear formatting and reset text to Arial Rounded MT Bold**

Q. - Who was responsible for revising the **ritual?**

Ans.- A committee set up by The Supreme Grand Chapter in 1834 of which the Rev George Adam Browne was a member.

Q. - Why is he significant?

Ans.- Because in 1827 he gave lectures on the Royal Arch jewel which contained references to the Platonic solids.

Q. - Who was the Rev Browne?

Ans.- A Past Grand Chaplain, Grand Superintendent of Suffolk and Cambridge and formerly personal Chaplain to the Duke of Sussex, Grand Master.

Q. - Why did he associate the solids with the breast jewel?

Ans.- Geometrically both have similar explanations.

Section Eleven – Dialogue on the Elements

Q. - Why are the solids displayed in a Royal Arch **chapter**?

Ans – So that the **companions** can contemplate their collective and individual meaning.

Q. - What is their collective meaning?

Ans – The form and shape of the **universe**.

Q. - Why is that so?

Ans – The **ancients** believed that the four material regular solids are the component parts of the cosmos and are bound together by the fifth which is **spirit**.

Q. - What other form does that contemplation take?

Ans – A reflection on the elements attached to each solid.

Q. - Will you please explain those **elements** beginning with Fire which the **tetrahedron** represents?

Ans – Fire is considered to symbolize that energy which inflames our right moral intentions and consumes our inclinations toward wrong. It is associated with sight and the colour red.

Q. - The next being Air which the **octahedron** represents, how may it be defined?

Ans – Since Air is the force which sustains life and gives animation to the body it is representative of the moral teachings of Freemasonry which bring life and purpose to our fraternity. It is associated with birds, sound and the colour yellow,

Q. - What does Earth represented by the **hexahedron** signify?

Ans – The Scriptures state that **mankind** was created from the dust of the earth and to dust it shall return, therefore **companions** must order their lives according to the principles and tenets of Freemasonry so they may be prepared for that ultimate fate. It is associated with mammals, smell and the colour green.

Q. - The fourth **element** is Water, represented by the **icosahedron**, what is its significance?

Ans – Symbolically **Water** is regarded as the agent of cleansing and refreshment which are the rewards of those who labour to the glory of God in Freemasonry. It reminds companions that they are to be renewed for his service. It is associated with reptiles, taste and the colour blue.

Section Twelve

Q. - What is the last and mysterious **element** upon which the companions **contemplate** and is represented by the **dodecahedron**

Ans - That is Spirit, which is regarded as the essence of all that exists and is the symbol of the **universe** being associated with ether, touch and the colour **violet**.

Q. - What is the nature of Spirit?

Ans - The invisible power of the Divine Being whose entire nature is Spirit and is be worshipped in spirit and in truth.

Q. - Will you name the attributes given by the **Spirit** to the human personality?

Ans – Love, joy, peace, patience, kindness, goodness, faithfulness, gentleness and **faith**, all of which are inculcated by Freemasonry.

Conclusion

So, **companions**, the Platonic solids form the raw materials of all that exists and in this sublime degree combine the essence of the physical with the spiritual. To each **companion**, when displayed in open **conclave**, they are the ultimate expression of that Supreme Being who with humility we acknowledge as the true and living God Most High.