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GEOMETRY and the GREAT PYRAMID.

The usages and customs among Freemasons have ever borne a near affinity to those of ancient Egypt. Their philosophers, unwilling to expose their mysteries to vulgar eyes, concealed their particular tenets and principles of policy and philosophy under hieroglyphical figures. They expressed their notions of government by signs and symbols, which were communicated to their Priests and Magi alone, who were bound by oath never to reveal them. Pythagoras (B.C.500) seems to have established his system on a similar plan, and many others of a more recent date have copied his example. In his day the Triangle was considered to be the most sacred of all emblems and when any obligation of more than usual importance was about to be administered, it was always given on the triangle, and when so taken to one was ever known to violate it.

The Egyptians called it the sacred number or number of perfection; and so highly was it prized by the ancients that it became among them an object of Divine worship. Under the principles of animating nature they gave it the sacred name of God, affirming that it represented the animal, vegetable and mineral kingdoms. They also called it Abroeth, or the soul of nature.

It is interesting to note that the Platonic theory (B.C.385) was that the Universe itself, as well as its subordinate parts, both animate and inanimate, were created by the Deity from the four elements - Fire, Air, Water and Earth. They assigned to each of the four elements the form of a solid, bounded by plane surfaces constituted of triangles.

It is apparent therefore that the triangle is a very ancient symbol permeating many of the ancient mysteries and religions and naturally leading to thoughts of the Triad or Trinity.

A review of the previous paper on Geometry should convince the earnest Mason that in all three Craft Degrees the symbolism of the triangle plays a significant part, whilst those brethren who have progressed to the Royal Arch will appreciate the supreme

importance attached to this geometric figure in that ceremony.

Any serious contemplation of the persistence of this symbol from ancient times to modern Freemasonry, is almost certain to bring to mind that mysterious structure, one of the seven wonders of the World, known as the Great Pyramid. Ancient Egyptian literature states that it enshrines a divine revelation as indeed its very name implies; this is derived from a composite Phrygian and Phoenician form "Purim-middoh" of the Chaldee "Urim-middin", from Urim = "The Lights", and Middin = "Measures", - compare the Hebrew "Urim and Thummim" the means of communication with Jehovah in the Holy of Holies of the Temple. The name by which the Pyramid was known to the Egyptians was Khuti, meaning The Lights. Coupling this information with the traditions of ancient Egyptian literature, it has been assumed that the Great Pyramid is the Metrolological or Geometrical Expression of Divine Revelation. It is the largest building ever constructed, its base covering 13 acres, with a circuit of nearly two thirds of a mile, and its mass comprising 90 million cubic feet. The side slopes, each about 5½ acres in area, were polished to reflect the sun's rays like a mirror.

The Origin of these structures is lost in the mists of time, but legends persist that the Tower of Babel was the first human effort at building and was of this type.

The word Babel was formerly believed to derive from the Assyrian word Babel = "confusion", in allusion to the confusion of tongues, but modern scholars incline to the derivation Bab-ili = "the Gate of God". They identify the structure with the extensive ruins at Ur in Chaldee known as the Zikkurat.

In South America there are also the pyramid type temples of the ancient Maya Race in the district of Yucatan, whilst in Egypt there are about 70 actual pyramids of various types, of which sixteen have been identified as tombs of Egyptian notabilities. It has, however, been established that the Great Pyramid, built in the reign of Kufu or Cheops (4th Dynasty B.C. 2641 or thereabouts), was not a tomb. The others which were tombs were rapidly plundered by

bands of robbers of later generations, but no entry was obtained to the Cheops Pyramid until A.D.800. About this time a marauder by the name of Al Hassoun forced a way through the outer casing, but discovered nothing but a passage leading to the drainage sump. No further attempts were made until after the translation of the papyri of the Egyptian Book of the Dead (now in the British Museum). Therein are defined the geometrical dimensions and the unit of measure of a standard pyramid that constitutes the geometrical expression of the ancient Law of Relativity. Subsequent investigation of the structure disclosed the existence of an ascending passage. This was, however, effectively blocked by a huge granite plug and access to the passage was only obtained by tunnelling round it. The chambers above were found empty, thus establishing that the Great Pyramid was never used as a tomb and the presence of the granite plug suggests it was never intended to be. Further confirmation was found in the presence of ventilation shafts which would not be put in a tomb. In 1859 John Tyler stated that the proportion of the Pyramid's height to its base circuit was that of the diameter of a circle to its circumference, and that its unit of measure was the Polar Diameter inch. -

1 Pyramid inch	-	1.0011 British inches
25 " "	inches	- 1 ten millionth part of the Earth's polar radius, and are also equal to the ancient Hebrew Sacred Cubit.

This was confirmed by the survey of Professor Piazzi Smyth (Astronomer Royal for Scotland) in 1864/5 who also stated that the base circuit was a representation of the solar year. A further survey undertaken by Sir Wm. Flinders Petrie in 1880 confirmed this also, and definitely identified the Great Pyramid with the standard pyramid referred to in the "Book of the Dead."

Subsequent investigations were collated in 1926 by D. Davidson M.I.S.E. and H. Aldersmith M.B., F.R.S.E. from which they have made the following deductions. The Pyramid's base plan gives an accurate representation of the earth and its orbit. This representation gives the mean sun distance, the number of days of

the solar year, the law of the Precession of the Equinoxes, and all the principal values and variations in connection with the year and the Earth's orbit, as well as a true geometrical definition of the law of Precession. The square circuit of the Pyramid's base

The Egyptians recorded their first observations on astronomy 3900 years before the Christian era, and subsequently developed their calendar by studying noon-lengths of the Pyramid shadows each spring and autumn.

passage geometry concerning the variations in the movement known as the Precession of the Equinoxes and the variations in other similar astronomical movements of long period is identical in every detail with that given by the latest works dealing with gravitational astronomy.

Thus Mr. Davidson states that the Great Pyramid is a geometrical representation of the mathematical basis of the science of a former generation, and in a footnote to the preface of his book appears the following "The origin of Freemasonry is said to date back to the dim ages, and I am led to suspect that the elements of the Order were formulated at a time when all knowledge of that Truth, subsequently to be enshrined in the structure of the Great Pyramid, had not yet been lost".

At the end of the book is a reference to the original seal of the United States of America adopted by Congress in 1782 and re-adopted in 1789. The design on the reverse side is that of the Great Pyramid with the Masonic Sacred Symbol enclosed in the triangular apex stone suspended above it.

A definite though somewhat obscure association of the Pyramid with Freemasonry exists in the Centenary Jewel dated 1872 of The Lodge of Industry and Perseverance No. 109, which is preserved in the Grand Lodge Museum. This has a design of the Pyramid and the rising sun above a tessellated pavement and is

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executed in colours in enamel. Unfortunately no records exist in the Library to show why this particular design was chosen.

It is, however, remarkable that for many centuries the Pyramid remained a complete mystery, and it may perhaps be significant that the gradual awakening of scientists and other eminent men to the hidden purpose of its construction has coincided with the formation of United Grand Lodge in 1813 and the subsequent growth in the numbers and influence of the Craft.

A great deal of time and thought has been devoted by eminent authors in endeavouring to solve the structural allegory believed to be hidden in the Great Pyramid, and in the ancient writings relating thereto, and a variety of speculations and conjectures have resulted in a number of books being published on the subject. Most of these, however, are essentially controversial and the writer is not competent to express any opinion on them.

Sufficient data has, however, been adduced to support Mr. Davidson's suggestion that in the study of this subject may be found valuable information of the early origin of Freemasonry, and it may even be possible that new facts may be discovered affecting its future.

The following books have been freely drawn upon to prepare this paper:-

"The House of the Master"	by Harsham Adams, from the Book of the Dead
"Pyramids and Temples of Gizeh"	by Sir Em. Flinders Petrie
"Our Inheritance in the Great Pyramid"	by C. Piazzi Smyth
"My Life and Work"	by C. Piazzi Smyth
"The Great Pyramid"	by Basil Stewart
-do-	by A.H. Spencer Palmer
-do-	by J.H. Lancaster
-do-	by D. Davidson & Dr. Aldersmith
"Great Pyramid Passages"	by Edgar

Notes on the Sequence of Pyramid Construction  
from "Ancient Egypt from the Records"

(M.E. Monckton Jones)

THIRD DYNASTY (2960 B.C.)

Zoser the son of Khasehem VI. and En Meat Nap was a great builder who built two tombs; the first a mastaba of brick and the second built of stone was the first of the Pyramids.

This tomb was built at a place now called Saqqara on the west of the Nile just below Memphis. At first it was simply a mastaba 227 feet wide and only 33 feet high. It was then widened and a second mastaba erected on top of the original leaving a terrace round it. This process was repeated until six steps existed; the five terraces have given the pyramid the name of the Step Pyramid of Saqqara, the final height of which was 195 feet.



FOURTH DYNASTY (2900 B.C.)

With this Dynasty begin the reigns of the great pyramid builders of whom the first is Snefru, who built the "Pyramid of Medum" and the "False Pyramid".

He was followed by Khufu (Gr. Cheops) who built the "Great Pyramid".

Next comes Khafre who was the builder of the "Second Pyramid" which was constructed partly of red granite and natural rock.

Menkure who succeeded Khafre built two more pyramids of no particular merit but is credited with causing much work to be done in connection with the "Book of the Dead" (circa. BC 2700).

FIFTH DYNASTY.

After this came the three sun god kings, Userkaf, Sahure and Kakaa. They built such smaller pyramids with blunted tops on which was a stone pillar or obelisk.

The last king of the Fifth Dynasty, Unis, built a pyramid differing from all others in its beautiful decorations. The walls inside are covered with texts from the religious creeds of all the preceding periods of Egyptian history.

The kings of the Sixth Dynasty did not build pyramids and

the Seventh Dynasty only produced one, that of Mentuhotep III. at Der-el-Bahri on the West Bank of the Nile near Thebes.

It was built by a sculptor named Mertisen who thus recounts his prowess on the inscription "I know the mystery of the divine word, an artist skilled in his art, I know what belongs to it ....."

TWELFTH DYNASTY (2000 B.C.)

Sesostris II. built a peculiar pyramid out of a great outcrop of rock at Il-lahun. By cutting away parts, the solid rock was fitted to make part of the walls, and to this granite and brickwork were added to complete the structure.

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OSIRIS, THE GREAT PYRAMID, AND THE  
EGYPTIAN BOOK OF THE DEAD.

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In the chapter on Religion, W.H. Boulton in his book "Egypt" states that in the early days every city, town and village possessed its own god, and every god had a female counterpart and a son. As the country became more organised, and a centralised form of government was set up, there was a tendency to reduce the number of these gods, and to see in them manifestations of a comparative few. There are even indications of something not far removed from a monotheistic conception of the Godhead. This is to be seen more particularly in some of the moral precepts in which references to God, in a singular form, are not infrequent.

The principal gods are described as follows:- Tum (the Sun God), who had his origin in the ocean, from himself begat four children - Shu, Tefnut, Geb and Nut. The first two representing the atmosphere and the last two the earth and the heavens respectively. Then Geb and Nut produced four more gods - Osiris, Isis, Set and Nephthys - here were a group of nine gods, a trio of trios, which constituted the "Great Company" or the "innate" of the gods.

In a country such as Egypt the beneficence of the sun in all the affairs of men is obvious, and it causes no surprise to find that the supremacy of the Sun God remained unchallenged for centuries. The name varied from time to time, however, which has rendered the task of students extremely difficult.

The rising sun was variously described as Osiris, Ra and Amon - Ra, whilst Tum or Itum was the god of the setting sun.

Besides Nut, other sky gods were Hathor, the Moon goddess, also known as Isis, Khons, the moon god, and Horus, the son of Osiris and Isis.

Among the earth gods, in addition to Geb may be mentioned Anquet and Sati, goddesses of the First Cataract, and Hapi, the Nile God.

Through most of the times of Egyptian History of which



records have been recovered, the most popular god was Osiris, and a number of those whose names are included in the list of chief gods are there because they are connected with the legend in relation to him. This relates that Osiris was originally a king who reigned in the Delta, and that Isis was his wife. Set was his brother, who in a fit of jealousy drowned him in the Nile, afterwards cutting the body into fourteen pieces and scattering them in different parts of the country. Isis and her son, Horus, recovered the pieces, and at each place where they were found erected a shrine. By means of magic ceremonies Osiris was then raised from the dead and endowed with renewed life forever. He was variously described as "king of kings, lord of Isis, prince of princes, the governor of the World, whose existence is everlasting".

The legend is but a thinly veiled allusion to the rising of the sun, its journey through the heavens to the setting in the West, where it appeared to sink into the Nile. It was then followed by the Moon (Isis) after which it re-appeared next day.

The Egyptians being very skilled in astronomy, it is important to remember that their story of the heavens, and particular of the sun, was written as a story of men, and that the people, almost universally, accepted it as such. The tombs of their gods were called as if the gods had actually existed. Dupuis in his "Origine de tous les Cultes" says "such was the tomb of Osiris (the Sun God) covered under one of those enormous masses known as Pyramids. This (the Cheops Pyramid) had its four fronts facing the four cardinal points of the world. Each of these fronts is 110 fathoms wide at its base, and the four form as many equilateral triangles. The perpendicular height is 77 fathoms, according to the measurements given by Chazelles of the Academy of Science. It results from these dimensions, and the latitude under which this Pyramid is erected, that 14 days before the spring equinox the sun would cease to cast a shade on the Pyramid at mid-day; and would not again cast it until 14 days after the autumnal equinox. The sun would then be found in the parallel or circle of southern declension, which answers to five degrees fifteen minutes. This

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would happen twice a year, once before the spring equinox, and once after the autumnal equinox. The sun would then appear exactly at mid-day upon the summit of the Pyramid, as though resting on an immense pedestal; while his worshippers, on their knees at its base, extending their view along the inclined plane of the northern side, would contemplate the great Osiris, at one period rising triumphant, and at the other descending into the lower regions. A similar spectacle would be presented of the full moon of the equinoxes (Isis) when taking place in this parallel.

The Egyptians, always grand in their conceptions, had executed a project, the boldest that was ever imagined, of giving a pedestal to the sun and the moon (Orion and Isis) when they arrived in that part of the heavens near to which passes the line which separates the northern from the southern hemispheres. They wished that the shade should disappear from the fronts of the Pyramid at mid-day, during the whole time that the sun sojourned in the southern hemisphere, and that the northern front should be covered with shade when the sun began to decline at the autumn equinox. This tomb of Osiris was covered with shade nearly six months, after which light surrounded it entirely at mid-day, as soon as Osiris, returning from the lower regions, regained his empire in passing into the southern hemisphere. The whole cult of Osiris was concerned with the worship of the heavenly bodies, including the final phase of his cenotaph. The design of the Great Pyramid (or tomb of Osiris) was taken from the Zodiacal Light, which is a triangular tract of light seen in the sky in some parts of the tropics when the sun is about to rise or has just set. Hence the Egyptian name for the Pyramid was Khuti - glory of light. They gave the triangle the sacred name of God and it became among them an object of divine worship.

In the opinion of the writer of these notes, this conception (the blaze of light reflected from the polished sides of the Pyramid, together with the name Khuti meaning glory) is the origin of the Masonic Symbol, the irradiated triangle enclosing the letter G.

The downfall of the XVIIIth Dynasty and of the Egyptian Empire was brought about by the introduction of Aten worship by Akh-en-Aten. The change which gave such offense to the priests of the hitherto state religion, was that, to Akh-en-Aten and his followers, Aten was the one god. It was the nearest approach to pure monotheism in Egypt, but in addition to being exclusive it was carried out with a good deal of intolerance.

It is impossible to read the hymns which have been discovered without feeling that in Atenism, religion in Egypt had made a tremendous advance on what had been. It went even further than may appear on the surface, for it was recognized that the god was not really the sun's disc, but was the power behind it - the disc was but the symbol for the unseen.

The intrigues of the priests of the former regime, added to the political changes of this time, led to another revolution resulting in the expulsion of the Hyksos, the restoration of Amen-Ha, and with him all the traditional gods of Egypt.

Egypt was no more ready for Monotheism than were any of the other nations of the time. Even Israel was not ready for it; but lately slaves in the house of bondage, they started with a purely monotheistic doctrine, yet their record is one of constant apostasy into idolatry.

The "Book of the Dead" is the great religious work of Egypt. It was the repository of all the priestly lore which it was necessary for the deceased to know to attain the <sup>great</sup> ~~best~~ aim of his life, a place in the kingdom of Osiris. The complete work contains one hundred and ninety <sup>chapters</sup> ~~chapters~~. Its object was simple, for it was intended to make known to the dead man or woman exactly what it was necessary to do and to say at each stage of the journey to the underworld, and during the judgment ceremony. Although there was an insistence on righteousness, there was so much magic, especially of words, that the real value of the teaching was lost. So far as can be seen the deceased's own words mattered but little, everything was set down as <sup>part</sup> ~~part~~ of a formula and a slip in the

use of the proper word at a particular time was evidently to be dreaded more than anything else. When the deceased entered the Hall of Osiris he had to repeat a hymn in which he expressed his own integrity and his good deeds towards others. In the Hall were the forty-two gods of the names of Egypt, and having repeated the magical names of each of the gates of the Hall, it was necessary for him to address each of the gods by his proper name. Next he had to address Osiris himself, again using fixed words. He was then invited to enter the Hall of Maati, the goddess of wisdom and truth, but entrance was denied until he had repeated certain magical names. Again certain questions were asked, and these being properly responded to, he was <sup>again</sup> taken to Osiris himself. In the presence of Osiris his heart had to be weighed against a feather, the symbol of truth and righteousness. The fate which the Egyptian religion held out for the evil was to have their heads cut off by the headdress of Osiris, their bodies were then dismembered and destroyed in part of fire; complete annihilation was their lot.

As some writers maintain that the ceremonies and symbols of Freemasonry are derived from the Mysteries of Osiris, it would appear that the selection of the design of the Pyramid and the rising sun on the jewel of the Lodge of Industry and Perseverance has reference to the cenotaph of Osiris, whilst the beehive in the foreground is the Masonic symbol for industry. A further illustration of this symbolism is shown in Gould's "History of Freemasonry" wherein a page of illustrations of seals of American Lodges is given one of which bears the design of a pyramid surmounted by the sun with the figure of the Sphinx in the foreground. The allegorical figure of the Sphinx has caused much speculation as to its origin, the most convincing theory being that given in "The Identity of the Druidical and Hebrew Religions". The author states that the Sphinx is a representation of the signs of the Zodiac, Leo and Virgo, joined together in commemoration of the inundation of the Nile. This occurs when the sun is in those signs and the great utility of this



1. Reverse of Great Seal of United States of America (1782).
2. Centenary Jewel of Lodge of Industry and Perseverance No. 109 (1872).
3. Seal of an American Lodge from Gould's History of Freemasonry.

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## THE ORIGIN OF MYSTIC NUMBERS

In Mackey's "Asiatic Researches" we read that, from Pekin to Elephantine, the men of learning observed that by the procession of the equinoxes, while one sign was sinking below the horizon, another was ascending into heaven, that is rising up towards the Pole. As the inhabitants of the earth were insensible of its motion, they thought the pole of heaven revolved round that of the earth, describing a figure like a serpent coiled round a mountain. According to the latitude the number of volves varied, and these numbers became venerated as mystical and sacred.

In latitude 40 at Pekin there is the Porcelain Tower, consisting of ten stories, for the North Pole in that situation is so far elevated above the horizon as to admit of ten volves of the serpent.

Nine was sacred in the northern parts of Asia from South China to the extreme west, because the people there lived under the same elevation of the pole. They all saw the great dial of the Deity (the sun) from the sixth stage of the world and they saw the pole as a cone or pyramid with nine stages.

According to Herodotus, the Tower of Babel, which was in latitude 35, had a roadway up the outside which went eight times round in its ascent, thus giving to the whole structure the appearance of eight towers one above another.

Eight was also a sacred number among the Budhists, and seven was esteemed by the Hindus.

In Egypt a statue of Pluto was found with a serpent coiled six times round his body, and at Saqqara, the first Pyramid constructed in Egypt, has five terraces making six steps, hence it became known as the Step Pyramid.

Fellows in his "Origin of Freemasonry" maintains that the symbols of the Craft are derived from Saboism. He explains the use of numbers as follows :- Three refers to the Sun in the signs of Cancer, Leo and Virgo. Five to the four elements of matter, and the sphere of the Universe. Seven to the seven planets.

Twelve to the signs of the Zodiac.

It would appear, therefore, that the cause which induced the ancients to venerate the various numbers was astro-geological. The science of numbers was the chief doctrine of the school of Pythagoras founded in the 6th Century B.C., which taught that everything that is intelligible can be expressed numerically, and that without number all is chaos. Pythagoras claimed that the relation of the scales in music can be so expressed, as he believed that the arrangement of the heavenly bodies depended on intervals regulated by musical harmony, and that in their motion they produced music - the famous "harmony of the spheres" - . In astronomy he recognised the circular focus of the earth; and his followers realised that the earth and the planets revolved round a central point, which they called a fire. This was in fact no new discovery since the Egyptians, centuries before, had recorded their symbol of the point within the circle to illustrate the primordial source of all things and worshipped the sun, "the centre of our solar system", as the symbol of the Supreme Being.

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