

GEOMETRIC-NUMERICAL PATTERN AT THE PYRAMIDS OF GIZA

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35th I C A N A S

(International Congress of Asian and North African Studies)

Budapest, Hungary, 7-12 July 1997

Organized by

The Korosi Csoma Society & The Eotvos Lorand University

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ABSTRACT

On a certain level, every object in architecture reflects the world view of a culture: the chosen position in nature, the distances to other objects, the outline of the design, the material, the method of access, the polar orientation or whatever. In archaeology the third dimension is often missing or obliterated. The western approach in analysis is based mainly on material construction points, mirroring the prevalent view of 'modern' science. The old Egyptians however, had a profoundly different belief system based on cyclic time and reincarnation cycles. For them, life and solid objects had an essence that cannot be found in material manifestations. Using some rules known to have been followed by Hindu architects for temple construction, it is possible to find a layout for the pyramids and the sphinx of Giza which offers a wide range of numerical and geometrical interrelations, mirroring on a deep level the religious system and the cosmology of the old Egyptians.

INTRODUCTION

"If archaeology cannot by its nature deal effectively with the specifically, or might we say essentially, human aspect of its subject then we take it that this does not mean that 'archaeology' wishes the 'human' to be neglected - rather that it cannot in its own terms deal adequately with it. We also take it that the essentially human aspect of such an important matter as our 'origins', or rather the origins of the making of 'permanent' structures, is too significant to be neglected. Therefore we offer our findings as complementary to archaeology, and have approached the subject from an architectural discipline with a philosophical perspective based to the best of our understanding on traditional values.

KEITH RITCHLOW; 1979; *Time Stands Still. New light on Megalithic Science*
 Gordon Fraser, London, Preface p.6;

concerning the way they have been constructed by involving symbolism and suppose they are somehow encoded in the proportions and the angles of the

A question is then raised as to how meaning can be coded in numbers. unconscious level. The following are some examples resulting from this

If '12' is experienced as a number representing completion of a cycle, coming in, '13' becomes a 'bad' number. In general, societies based on

because the legalized robbery that underlies the foundation of such societies¹ might be exposed to change.

A regular triangle is the most basic triangular shape. Six regular triangles cover a complete circle of 360°. This provides an archetypal connection between '6' and the concept of 'moving' in cycles. If one takes the center as an axis for the turns there are 7 points altogether. For that reason the number '7' is very often associated with parts of a cycle. When the heights of the regular triangle are also included one can easily construct a 12-polygon, a regularly occurring symbol for cycles which has the property that it can be divided by 1, 2, 3, 4 and 6. In this way the solstice points and the equinoxes can be fixed for a yearly cycle.

If politicians force hierarchical order onto a culture, round shapes are dismissed, because the circumference has equal distance to the center for each point, and equal rights for all is just what the controlling influences do not want. Square and rectangular shapes are preferred, smooth surfaces without decor, because they are easier to control. Thus the number 4 shows up more often. Relations like Pi (π), which symbolizes a circle and equal

involving the natural number which stands for natural growth, because that in modern cities, millions of square forms can be observed, hardly ever a symbols representing the least freedom for humanity.

significant points together. If one wishes to find the meaning of a proportion it $\sqrt{5}$, $1/\pi$, since this could be a statistical coincidence. But if the same number shows up 5 times in 10 measurements, then things change drastically. It becomes even more interesting, when the use of the numbers in relation to the context makes sense. In this case one can conclude that it would be a sign of "approved stupidity" if the deliberately chosen size built-into the construction is not recognized.

The following plan to govern an analysis of architectural content shows that a small number of tools can be used to arrive at a theoretical construct, where the position of the pyramids inside this formal-space makes deep sense in many levels. The reader does not have to follow all the steps of the construction. These are however, presented to document the correct

¹ GIOVANNINI, ROBERTO; 1994; *Terremoto nelle Borse. Tasse più basse solo ai ricchi*; l'Unità, Italia, 3.3.1994;

MÜLLER-KLEINSORGE, HELMUT; 1988; *Die Welser in Venezuela. Auf Beutezug in der Neuen Welt*; Verlag Damals, Gießen, Juli 1988;

PERINA, UDO; 1992; *Bankiers am Pranger. Hoffnung für Millionen Kleinsparer: Politiker wollen bei den Geldinstituten höhere Zinsen durchsetzen*. Zeit, 36/1992;

SOLIDUS; 1993; *Wie moderne Raubritter Banken und Sparkassen schröpfen ihre Kunden mit immer neuen Gebühren*. Zeit, 15/1993;

WERNICKE, CHRISTIAN; 1992; *Die Schuld der Gläubiger. Die armen Länder der Südhalbkugel werden von ihren Auslandsschulden erdrückt*; Zeit 23/1992;

MÜLLER, MARIO; 1993; *Gewinne versteckt. Deutsche Banken stärken ihre Reserven - Die Krise der Industrie ist dafür ein willkommener Anlaß*. Zeit 15/1993;

procedure in a way that can be appreciated by anyone. In the section dealing with discussion of the plan, the main correlations are shown followed by a proof. This geometrical technique seems to have been an universal knowledge of prehistoric people, because the procedure can also be followed on other plans.

AN OVERVIEW FOR ANALYSING ARCHEOLOGICAL GEOMETRY

People build their houses, temples and monuments according to their belief systems, and contrary to what one might first assume the outcome depends very little to the assumed actual need. Religions with a major concentration on death construct temples that look more like grave tombs. Christian temples constitute examples of this outlook. The concentration on death is also mirrored by a vast display of sado-masochistic pictures of lower ranking gods and the highest god is mostly represented as being tortured.

Religions that are more life-oriented build open temples with a strong connection to nature or they do not use a stone building at all because for them all of nature is holy instead an aggregation of stones.

Societies based on coercion and violence (particularly patriarchal societies) also display this hierarchical order (where men are in control of nature, cattle, women and machines) in the architecture. Such societies avoid round shapes where the access is equal from all sides and symbolizes cooperation. They prefer rectangles, long halls or long tables to create a head seat for one person only. The delusion of control over everything eliminates decorations. A good example is found in modern banks, insurances and military buildings where all such details are found together. These include: state organized coerce, violence and mass murder, square buildings with square windows, the least amount of variation and the maximum amount of uniformity. The outcry for stability is prevalent.

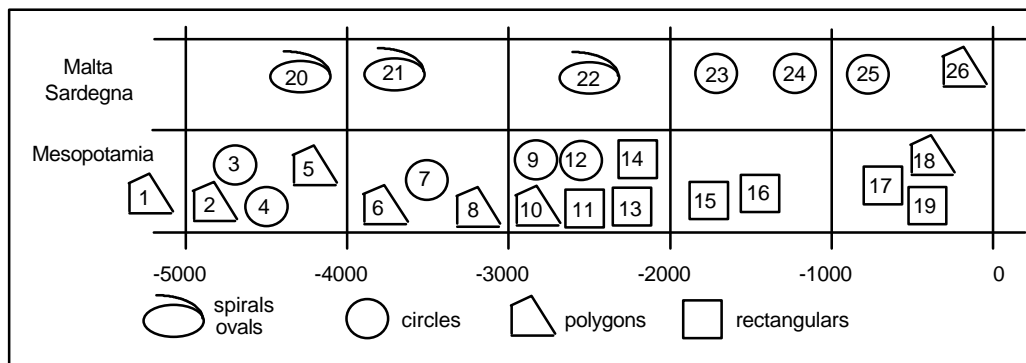


Figure 1: change of construction outlines through millennia. Obviously there is a tendency towards more uniform shapes and disappearance of round ones.

Near East:

- 1 Samarra
- 2 Ubaid I
- 3 Arpachiyah
- 4 Tell al'Ubaid
- 5 Ubaid III
- 6 Ubaid IV
- 7 Tepe Gawra
- 8 Warka

9 Oval Terrace

- 10 Sin Temple
- 11 Nippur
- 12 Khafaje
- 13 Shara, Tell Asmar
- 14 Ur
- 15 Mari
- 16 Ashur-Nirari I
- 17 Nimrud

18 Babylon

- Malta:**
- 20, 21 Hal Saflieri
- Hal Tarxien, Hagar Qin
- Mnajdra
- Sardinien:**
- 22 Pre-Nuraghe
- 23, 24, 25 Nuraghe
- 26 Phoenicier

Societies based on cooperation and peace on the other hand, have a preference for round forms like ovals, circles, spirals and egg shape. One of the best examples for this in the Mediterranean area are the temples at Malta: Xemxija, Mgarr Ta Hagra, Kordin III, Mnajdra, Ggantija, Tarxien, Kordin III and Hagar Qim, or the Pre-Nuraghe sites in Sardegna, have all exclusively oval walls with lots of variations. This let an investigating scientist to make a remark which is typical for modern western science: *"The constructors of the temples avoided to build rooms with corners and rectangles, but why?"*² The right question should be, why do modern cultures avoid round shapes? There is no place in nature where one can find similar forms like the houses in the suburbs of modern cities which are "punched out" as though the result of serial production. Rectangular corners have the **highest** disadvantage in construction statics, the least strength and the highest possibility of failure and collapse. Therefore there must be psychological reasons that the worst form in housing statics is used in constructing the largest number of houses.

Because men see the capacity for cooperation as a female quality and winning as a male attribute, these societies avoid building round objects. In his personal wars, Pope Bonifaz VIII destroyed all round temples of the Christian goddess Maria.

The symbolic nature of the circle is exhibited today in relation to power in political language. If the goal is cooperation then the participants have to sit on a round table³. This would not happen if there was not a mutual agreed belief system which says that distinct geometries have certain values imposed upon them.

In societies oriented in a materialistic direction, especially in capitalist ones, the new priests (called "scientists") hold that the universe came into existence by "pure chance". The modern scientist thinks of himself as the highest form of intelligence in nature and therefore considers any idea of a higher intelligence than himself as ridiculous.

Scientists as a group therefore preach a blind senseless nature with no self-consciousness at all and in this way the cities and houses are built as blind to the necessary requirements for human living, senselessness overwhelms the individual confined to the modern ferro-concrete-stone-age. Consciousness thus experiences an intolerable burden and becomes depressed. In such societies, marketing experts proclaim and sell certain objects as "art", but these are forms that future archaeologists will categorize as objects stemming from primitive societies or they will perhaps consider them as debris. The violence-based orientation of western society becomes obvious in the kind of art appreciated who works as a mirror. Pictures from a painter like VAN GOGH who turned violence against himself, attain the highest prices in auctions (of course, after he died), or, a scientist in archaeology describes the "Stela of Naram-Sin" from Susa with the following words: *"Wearing a horned headdress to signify his own divinity and carrying a bow,*

² ZAMMIT, THEMISTOCLES; 1995; *Die prähistorischen Tempel von Malta und Gozo*, Union, Malta

³ See also: WELTI, ALFRED; 1981; *Der Stuhl ist nicht allein zum Sitzen da. Einst war er als Thron den Göttern und Herrschern vorbehalten*; ART, 2/1981, (S.46-51);

*he tramples the enemy beneath his feat. Aesthetically, this is a magnificent design*⁴.

More spiritually-orientated cultures believe in an empowering force behind nature and the universe. They teach that mass and material context has no existence in itself but is a manifestation of a 'higher' force. That life-force manifests itself from the unseen dimension into matter. If that force moves away, the material counterpart disappears from its apparition. In the case of Buddhist and Hindu teaching or with the ancient Celts the idea of a higher-force can be found. Most of the tribes all around the world teach this truth and of course the same idea can also be found mirrored in the buildings.

In Hindu buildings there are construction points where material objects are not permitted, these points are called "marmas". An example: if a regular pentagon stands for the symbol for life, the center of the pentagon as a symbol for the center of life must stay free of matter, because matter has no existence in itself, instead its existence is due to emotional desire and mental activity before it can appear.

A SHORT INTRODUCTION FOR THE USE OF NUMBERS IN SCIENCE

Time and Space

In mathematics numbers are constructed according to a well known algorithm with the 5 axioms of PEANO. Space dimensions in physics are also constructed out of algorithms. Some references indicate that physical time is the forth dimension. That is obviously wrong because times produces higher dimensions but it is not identical with a dimension as such as EINSTEINS formula $\mathbf{t} \times \mathbf{c} \times \mathbf{i} = \mathbf{x}_4$ shows. The unit $\sqrt{-1} = \mathbf{i}$ has no dimension, \mathbf{c} represents speed measured in 'meters per second' and the parameter \mathbf{t} is given in seconds. What is left over is an index of length ('meter'), but not 'time'.

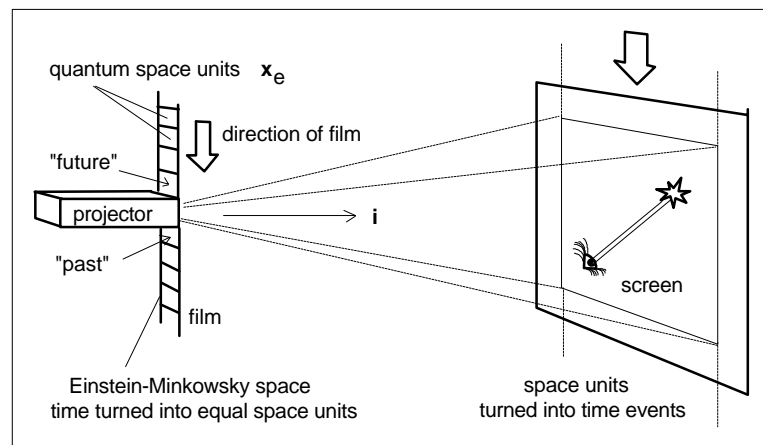


Figure 2: model for EINSTEIN-MINKOWSKI space

To obtain a realistic picture of the formula, imagine a movie production. Filming a scene results in the projection of events (\mathbf{x}_e), with lenses, in time with constant units (\mathbf{k}), onto a film. In this case \mathbf{i} produces an independent dimension and refers to the 90° angle in between the light beam cast by the

⁴ LLOYD, SETON; 1985; *The Archaeology of Mesopotamia*; Thames and Hudson, London;

events and the film as an object of time units is turned into space. Here time-like events are turned into quantified space, which is motionless, like the four dimensional universe of EINSTEIN-MINKOWSKI.

In the movie theater the opposite happens. Here two dimensional quantum space (x_e) moves perpendicular (*i*) to the projection in time (*t*) and the spectators are induced to imagine changing events. *"In this way the film has present pictures, past and future pictures, but on the screen there is only present."*⁵

L. WITTGENSTEIN, in another note, writes *" Maybe the difficulty is transferring the physical concept of time into the directly happening events. We do not talk about present, past and future imaginations."*⁶

That means time may be taken to be a more basic unit than space, because space is a derivative of time. Time is also discrete but this question will not be investigated at this juncture. Some citations to uphold this interpretation are:

"Usually we think about space and time as continual or at least dense," says BERTRAND RUSSEL and he continues *"But that is mainly a prejudice. Quantum physics shows the fact - independent if it is right or wrong - that physics never can come up with a proof for continuity. The opposite might be possible. Our human senses are not fine enough to distinguish between a continuous move and a fast discrete sequence of events."*⁷

In a further development of A. EINSTEIN's ideas it may be found connected with quantum-geo-metro-dynamics (QGMD) where scientists try to figure out the behavior of dynamically changing quantified space.

*"These considerations show, that the terms 'space-time' and 'time' are not primary but secondary ideas in constructing physical theories. These terms are valid for the classical approach. But they do not have importance nor use under the conditions where QGMD effects are at work."*⁸

Using the results of QGMD as a basis, it makes sense to use quantum changes of objects as a basis for the following working definition of "time".

"time"
shall be the gap in between the appearance of an object
and the exchange by another

From this definition space dimensions can be deducted. The models used are taken mainly from projective geometry. EUCLID's space is too specific to be used for a general procedure.

As a consequence of the general theory of relativity there are no stiff objects in gravitational fields. Moving through space any object experiences

⁵ WITTGENSTEIN, LUDWIG; 1993; *Philosophische Bemerkungen*; Suhrkamp, Frankfurt, V, 83, p 15.

⁶ ob.cit. V,81, page 14.

⁷ RUSSELL BERTRAND; 1967; *Einführung in die mathematische Philosophie*; Emil Vollmer Verlag, Wiesbaden, Seite 157.

⁸ WHEELER, JOHN, ARCHIBALD; 1968; *Einsteins Vision. Wie steht es heute mit Einsteins Vision alles als Geometrie aufzufassen*; Springer, berlin, N.Y., page 26.

form- change. To describe the changes one uses the model of a non-rigid object. **Figure 3** shows the different presentation of the same object in an EUCLIDIAN-space and a GAUSSIAN-space and the distance to a point P.

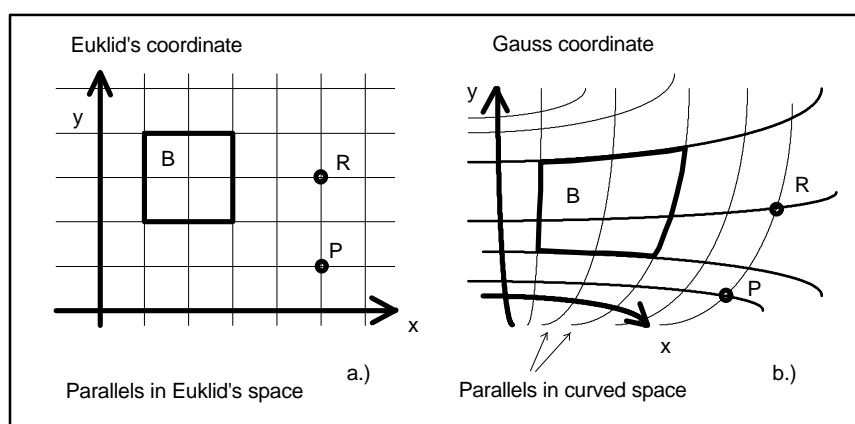


Figure 3 : Space models of EUCLID and GAUSS

Taking the knots of the lines as measures for the scaling, both graphics show the same event. As an example one may take an eraser and draw a rectangular grid on it, on all sides. When this is twisted, the above shapes will be revealed.

"Zero"

The initial object is an 'unconfigured' energy field. Here we find a language problem since western culture does not supply a term for this concept. One can talk about it as 'the primeval world'. Tibetan philosophy knows this basic foundation of the universe as the "zero-level" and it includes three types of time:

- 1.) abstract cosmic time / space;
- 2.) moments in infinite time / places in infinite space
- 3.) duration, continuance of time and space

On the zero-level, the concept of the universe developed itself in the world egg with permanent eddies of the milk ocean⁹. Modern science uses a similar concept if one takes the proposal of J.A.WHEELER as an example. Here, an unconfigured energy field requires a certain intensity of energy waves, in phase, to allow the 'condensation' of material objects. In the case of a phase shift, the object disappears. In an elsewhere equally distributed quantum field, the point of energy concentration marks an asymmetry, which is symbolized by the Tibetians, the Egyptians and about 80 more cultures¹⁰ as an egg. The Papyrus of NU says on sheet 5: *'Hail, thou Sycamore tree of the goddess Nut. Give me of the [water and of the] air which is in thee. I embrace that throne which is in Unu, and I keep guard over the Egg of Nekek-ur.'*¹¹ and on sheet 12: *"I am the Egg which is in Kenken-ur [the Great*

⁹ P. CYRILL VON KORVIN-KRASINSKI ; 1953; *Tibetische Medizinphilosophie* ; Origo, Zürich;

¹⁰ see: BAUMANN, HERMANN; 1986; *Das doppelte Geschlecht: Studien zur Bisexualität in Ritus und Mythos*; Dietrich Reimer, Berlin (1955);

¹¹ The Sycamore-tree is a symbol for the goddess Nut. The roots represent the development on a material level, the stem and the branches symbolize a development to non-material goals. Nut is the 'mother' of Osiris (Other symbols for her are the "night sky" and the

Cackler] *and I watch and guard that mighty thing which hath come into being*" . The Papyrus of NEBSENI writes: "[Horus] *spread air over the Divine Soul in its Egg in its day*"¹².

The egg-shape as a symbol for the primeval energy form of the 'universe' makes logic on a mathematical level too. 1.) A theoretical 'perfect' equal distribution would **never** have allowed any change and development at all. 2.) Energy in quantas must have an unequal distribution by inner laws¹³. WERNER HEISENBERG formulates the problem like this:

*"In this area of physics you cannot make a clear distinction between matter and force or between force and substance because every particle not only produces forces and is influenced by forces, but represents itself as a field of forces. As a result of the quantum theoretical dualism between waves and particles, the same reality appears as matter and as force."*¹⁴

"One"

To constitute the first dimension of a point, energy waves have to be in phase. Here we do not talk about the mathematical 'point', but a point according to the preceding time-definition, the smallest quantum of discrete energy, the HEISENBERG quantum $h/2\pi$. **Every** object is build up by a multitude of such units. The fact that every object in the universe consists of discrete energy units is of particular importance for analyzing archeological geometry on a higher level. Only in this way is it possible to obtain access to compare coded knowledge in proportions and angles with the results of modern science. Thus "one" appears in science also as a completed 360° rotation or as wave lengths.

An example from daily life, involves the production of points on a TV screen. The screen consists of single discrete pixels. To produce one single point on the screen, a certain amount of energy must be activated after a specific time-unit elapses. This activation has to be in phase with each adjacent point in order that a specific area can come into existence, thus space is discrete by this model. RICHARD FEYNMAN commented on the basis for this interpretation as follows:

*"On the other hand, I believe that the theory that space is continuous is wrong, because we get these infinities and other difficulties, and we are left with questions on what determines the size of all the particle. I rather suspect that the simple ideas of geometry, extended down into infinitely small space, are wrong."*¹⁵.

"north wind"). She stands for the universe as a unit enlosing **all** manifestations, the material, mental, spiritual ones and even the gods. The Turin Papyrus Bl. XXX says: *"Homage to you O ye gods who dwell in Amentet! Homage to you, O ye gods who dwell within Nut"*. The place 'Amentet' is also named 'Tenait' which means 'Circle of light'.

¹² An example for egg-shape in ritual buildings is given in the appendix: Nuraghe S.Maria, Muravera, Sardegna.

¹³ see: Nicolis, G. / Prigogine I.; 1983; *Self-Organization in Non-Equilibrium Systems*; Wiley, New York; Glansdorff, P. / Prigogine I.; 1971; *Thermodynamics of Structure, Stability and Fluctuations*; Wiley, London,

¹⁴ HEISENBERG, WERNER; 1990; *Physik und Philosophie*; Ullstein, Frankfurt, page 129-130;

¹⁵ FEYNMAN, RICHARD; 1965; *The character of physical law*; Cox&Wyman, London; page 166-167.

"Two"

To produce a line x , the procedure for establishing one point must be repeated with an additional "phase" dimension. This second phase is independent from the first one. In this case time t will be multiplied with a constant k to produce equal units and with a factor $\sqrt{(-1)} = i$, providing a guarantee of independence. In Geometry one uses 90° angles to represent independence.

$$x = t \times k \times i$$

Exchanging the constant k with c produces the formula of EINSTEIN-MINKOWSKI for the construction of higher dimensions: $t \times c \times i$. One can understand the relation of 'point', 'point-existence' and 'line' by recourse to a simple experiment. To do this, take a paper and draw lines on it in any form. Take a second piece of paper and cut a small slit in the middle. Then cover the drawing with the second piece of paper and move the slit over the lines. What may be seen as the result of this procedure are points moving from right to left and vice versa. The dimension supporting the lines has been exchanged by a space where points move in time. A space-like context available to introspection on a higher dimension, to yield the same content, requires the addition of time on a lower dimension time. A line is defined by 2 points and 1 connection.

"Three"

Repeating the above algorithm with a line produces a plane. At least two points are required to define a line. A plane requires 3 points for definition. Using a general approach with GAUSSIAN space, 3 points are the minimum and the maximum required to define a plane if there is to be independence among the connections between points and this results in representation of a regular triangle. Such an object has 3 corners, 3 sides and 1 area. Science holds that the minimum number of interacting forces between particles is 3 like $\pi^- \rightarrow n+p \rightarrow \pi^-$, then: "asymmetry needs a minimum of three symbols to be coded"¹⁶ and considerations arising from social anthropology show that nearly all cultures and tribes of the world connect their goddesses and gods with the number 3 or a triangle. Sometimes the '3' is connected with other numbers and symbols as in '1000' which stands for 10^3 , or it is hidden like in $1^1 2^2 3^3 = 1 \times 4 \times 27 = 108$ ¹⁷. In general, the power numbers are a symbol representing the level of the gods and the base level represents the human area. In the context of myths Mercury is often considered as the "mailman" of the gods carrying messages to others. The associated astronomical path as seen from the earth looks like two triangles wrapped together¹⁸. .

¹⁶ GRÉGOIRE, NICOLIS / PRIGOGINE, ILYA; 1987; *Die Erforschung des Komplexen*; Piper, München, page.255.

¹⁷ Another interesting note: $1^3+2^3+3^3 = (1+2+3)^2$

¹⁸ CRITCHLOW, KEITH; 1979; *Time stands still. New Light on Megalithic Science*; Gordon Fraser, London, page 160.

"Four"

As a next step the algorithm produces out of the two dimensional area (2-D) an object called 'space', to be more explicit 3-D-space. As before, the minimum and maximum number of independent points required is 4. An object called a 'tetrahedron' is obtained with 4 corners, 6 connecting lines, 4 areas and 1 space element. If the ascertained coefficients are written together the form of development follows the pattern that may be derived according to the formula of PASCAL. This pattern follows the binomial expansion and is often called 'PASCAL's Triangle'. The procedure for the development of the values is well known, the sum of two adjacent numbers give the value of the one below and the sides are all 1's.

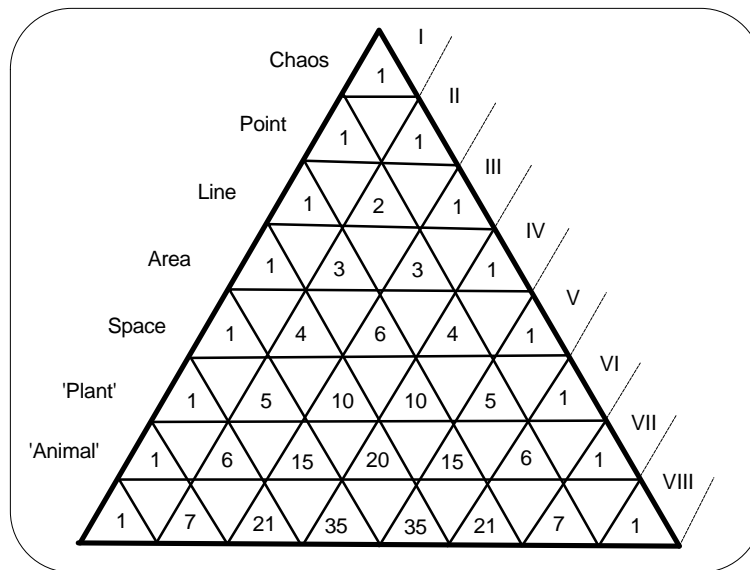


Figure 4: The triangle of PASCAL

The diagonals numbered with roman letters indicate the number of elements in a row. Roman I refers to the number of objects (always 1), II gives the number of corner points, III the connection lines, IV the areas, V the spaces and subspaces. Four points define a tetrahedron. Space and appearances in space have been connected with the number 4 in nearly all cultures. Spheres in an orientation following the form of a tetrahedron have, from prehistoric times (1500 BC) been found cut into stone in Scotland and examples can be seen at the City Museum of Dundee. Examples from Egypt are located in the British Museum among the Egyptian antiquities .

The '4' is used not only for representing 'space' but also for the material appearance of humans in space. Many myths tell about the development of man in 4 steps with increasing density and (decreasing happiness).

In chemistry row 4 of the periodic table contains Iron. Astronomy knows that this element acts as a kind of 'attractor' in the chemical development of stars. Elements lower than iron release energy in atomic fusion, those above consume energy. In effect, all elements have iron as a kind of chemical attractor for the processes involving atomic fusion. Mixtures of iron with other elements from group 4 result in very hard and flexible alloys (titanium, vanadium, chrome).

In short we are arrived at 5 time dimensions:

1. time dimension:	general change (see time definition).
2. time dimension:	changes of 1.) are in phase: a point comes into existence.
3. time dimension:	changes of 2.) are in phase: point produces a line
4. time dimension:	changes of 3.) are in phase: line produces an area.
5. time dimension:	changes of 4.) are in phase: area produces space.

Tabelle XXX: time dimensions

In this way 'space' may be viewed as a three dimensional subgroup of a five dimensional time system.

"Five"

Up to this point, the rule governing construction of a higher dimension involved the multiplication with **i** as a guaranty of independence and the factor **k** to produce equal units. This can be continued from four points, symbolizing space. The next derivative of space by time is usually named "speed". In biology where the changes are modest the term "growth" is used. Speed is defined by the relation of the difference in space (Δx) divided by the difference in time (Δt). The speed of an object is independent of space and time so requires a new dimension.

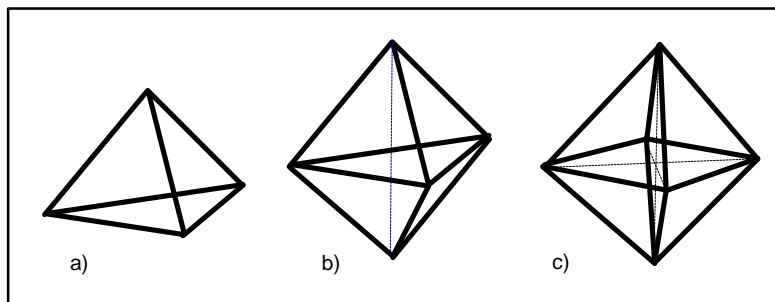


figure 5: tetrahedron pentahedron and hexahedron.

In general GAUSSIAN space it was shown that the minimum number of independent points to define 3-D-space was 4. This rule requires that five points be aligned with one more dimension to fit the pattern. A 3-D-pentahedron has a diagonal which is longer than the sides (Figure 5b). The requirement for equal length is only possible within a 4th space dimension which lies in an imaginary direction, as seen from 3-D-space.

As an example, a flower seed may be taken as a 4-D-space object. The observed aspect appears as a "still" picture or a single frame from a video-clip. To observe all of the time-space aspects of the seed it must be monitored over time! The related numbers in PASCAL's triangle are 1, 5, 10, 10, 5, 1, which means 1 object, 5 corners, 10 connections, 10 areas, 5 inner spaces. The new feature which is revealed is called "speed" or "growth". For this reason the figure five is used as a symbol for 'life'. The planet Venus viewed from the Earth shows in an 8 year cycle with the retrograde loops a five-folded pattern¹⁹. This too is a reason why the planet carries the name 'Venus' since it is a life-bearing symbol. Living objects have a distinct feature

¹⁹ The connection of the 8 with Venus you'll find with the Sumers too where a star with 8 beams was the symbol of Ishtar with the home planet Venus.(SITCHIN, ZECHARIA; 1989; *Der zwölfte Planet*; Knauer, München, page 259)

which sets them apart from non-living systems. Living systems are capable of self-reproduction. For this reason, if the life is used as a symbol for life, the root of five is sometimes added to symbolize this quality ($\sqrt{5} \times \sqrt{5} = 5^{20}$). The process of self-replication leads to growth which itself is captured by the natural number **e**.

In the case of growth by a corn kernel or a seed, the root of a number reproducing itself gives models the process that self-replication goes through in cycles, for which we have π as a symbol. The form of natural growth is captured by the natural number **e**.

If 'five' shows up in archaeology it must not necessarily be connected with the explained symbolism. But artists usually take great pride in taking care for every detail of their work. Viewing as an example the basalt stela of HAMMURABI (1795 BC), now to be seen in the Louvre, you will realize that the crown of the god of justice is a serpent with five coils, he has a skirt with five layers and sits on a stone with five inlets.

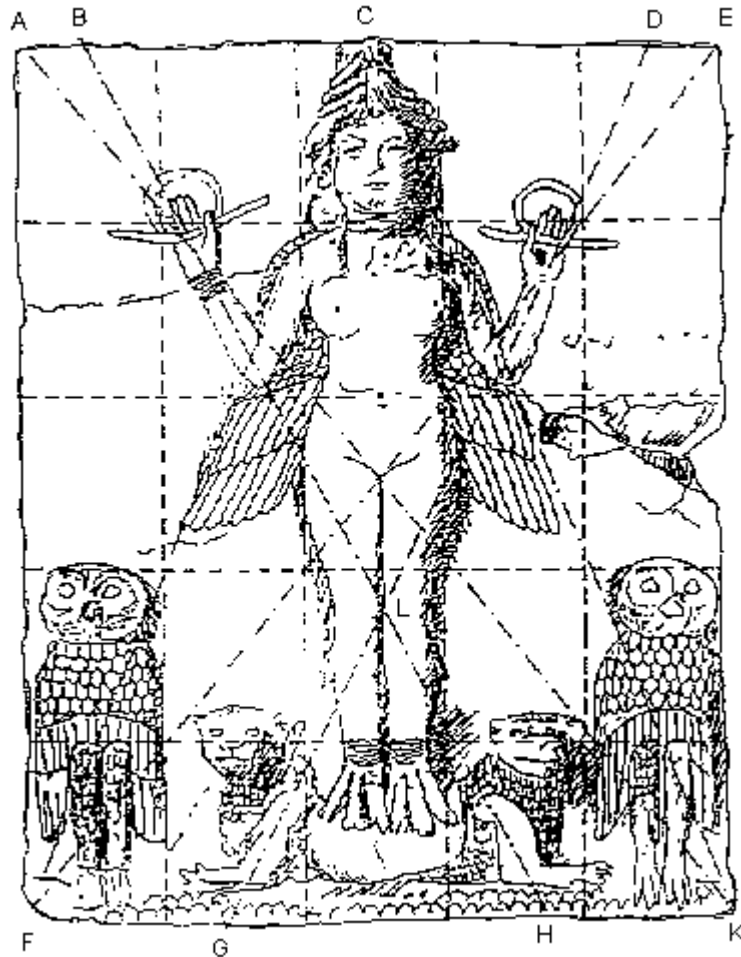


Figure 6: Goddess Lilith

An interesting way to code the number five into form is demonstrated by a Sumerian artist from Shaduppum (today Tell Harmal) ca 1900 BC. The terra-cotta relief of the goddess Lilith with her owls shows a five fold structure

²⁰ A note: $(1+2+3+4+5)^2 = 1^3+2^3+3^3+4^3+5^3$

horizontally and vertically (figure 6) and her crown has five coils. In her hands she holds the symbols of justice bearing a striking similarity with the Egyptian eternity-symbol.

She is thought of as the "Bringer of Death", associated with the owls, but death inside a reincarnation cycles means another birth in another time-space, thus the center of the terra-cotta art-form, the intersection of the diagonals A-K and E-F is the vagina of Lilith. The proportion of the sides of the terra-cotta piece is 3:4, that makes a diagonal with the value of five according to the law of PYTHAGORAS. The lines B-H and D-G of the lay out follow the forearms of Lilith crossing the point L in between her knees and defining the forelegs of the animal she is standing on. In old teachings at the point between the knees you will find the so-called "chakra of fate". In this case it divides the height of the terra-cotta art by the natural number e (2,71). The base G-H of the triangle G-H-L has to the sides L-H and L-G the relation of $0.86 = e/\pi$.

The connection of '5' with 'life' becomes very explicit in Chinese

language: 五 × 吾 The first symbol means 'five', the second one is an ancient form of 'five'; if you turn it 45° it becomes the sign for '10' and means also 'complete'. The third one, a combination of 'five' with 'opening' or 'talk' becomes the sign for 'I', as in 'I am'. The constant use of 'five' in connection with 'life' is demonstrated in the following list. For all of these items in the Chinese language the 'five'-symbol is used.

<ol style="list-style-type: none"> 1. May Day 2. 5 relationships 3. 5 flavors 4. 5 elements (earth, wood, fire, metal, water) 5. 5 sacred mountains (seat for holy spirits and gods) 6. 5 emperors (T'ai Hao, Yen Ti, Huang Ti, Shao Hao, Chuan Hsü) 7. 5 planetary gods 8. 5 constant virtues (benevolence, righteousness, propriety, knowledge, sincerity) 9. 5 races united in the Chinese Republic 10. the dragon-boat festival the 5th of the 5th lunar month 	<ol style="list-style-type: none"> 11. 5 principles of administrative authority 12. 5 poisonous creatures (snakes, toads, lizards, scorpions, centipedes) 13. 5 atmospheric influences 14. 5 clawed dragon 15. 5 blessings 16. the city of the 5 rams (from the story of 5 immortals who rode into the city on 5 rams, which were turned into stone) 17. 5 viscera (heart - fire, lungs - metal, liver - wood, kidneys - water, stomach - earth) 18. 5 thieves (joy, anger, pleasure, grief, lust) 19. 5 gods of wealth 20. 5 attributes of a human being (perception, consciousness, action, form, knowledge)
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The use of 'five' as a life symbol can be demonstrated in Sardegna too. The Nuraghe Asoru (S. Priamo) has on the eastern side two openings. The north eastern one is located in a way that the northern-most moon rise at summer solstice becomes observable from the inside.



Figure 7b: openings from the inside

The other one (h_6) has a shape of a five-pointed star. It fits the equinox line and the summer solstice for the sun, with the sun as a life support symbol. The heights of both openings are adjusted to fit the mountain range on the horizon.

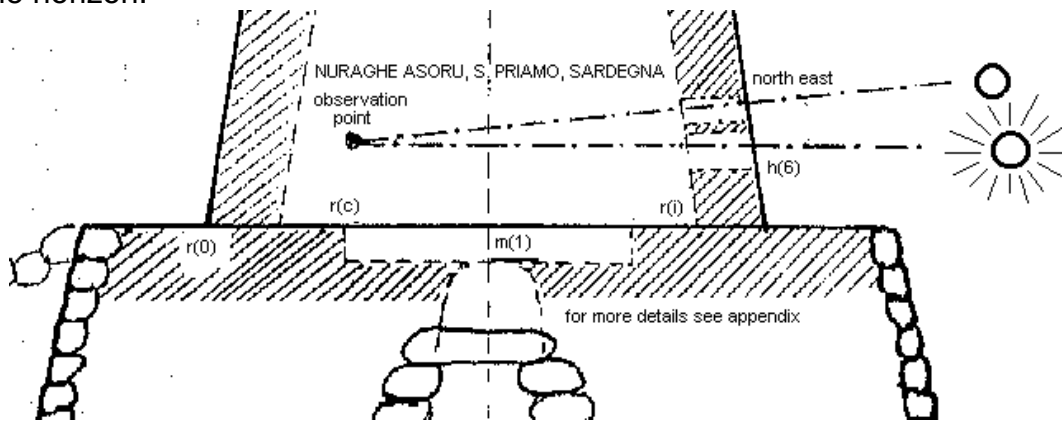


Figure 7a: Nuraghe Asoru, cross-section (see appendix for the whole plan)

Some specific numbers

Everything in the universe is composed by energy quanta. Thus, if natural processes are to be modeled it is necessary to use discrete mathematics and not analog processes. Discrete mathematics leads to theories of chaos. In this way it can be shown, that basic processes of building up mass particles lead to tetrahedron forms in fractal patterns. One can expect that a culture coding this knowledge of nature into an architecture, would use some of the special numbers of a tetrahedron:

- $\sqrt{3} \times a^2 = 1.732 \times a^2 =$ surface tetrahedron
- $0.118 \times a^3 = \text{rad } 6.76^\circ \times a^3 =$ tetrahedron volume
- $0.204 \times a =$ radius inner sphere of a tetrahedron
- $0.612 \times a =$ radius outer sphere of a tetrahedron.

A tetrahedron has 4 regular triangles. There is another regular shape with triangles: an icosahedron having 20 regular triangles. An icosahedron has $3 \times 20 = 60$ angles of 60° . Thus, there is a connection between the icosahedron and the number '60'. Some special relationships involving the icosahedron are:

- $0.756 \times a = \text{rad } 43.32^\circ \times a =$ radius inner sphere of an icosahedron
- $0.951 \times a = \text{rad } 54.49^\circ \times a =$ radius outer sphere of an icosahedron.

Another important regular shape is the dodecahedron with 12 regular heptagons. This form has $12 \times 5 = 60$ angles of 108° .

There is also another interesting connection in that $1^1 \times 2^2 \times 3^3 = 108$. The first 3 numbers powered by themselves and multiplied together give 108. For this reason in India 108 is very often associated with "GOD", because GOD is associated with 3 and a triangle. This was also done in old Egypt, where a sign for god was a triangle with an eye in it. The dodecahedron as a symbol also connects the 12 synodal moon cycles of a year with the '5'. Some special numbers of the dodecahedron are

- $1.113 \times a = \text{rad } 63.77^\circ \times a =$ radius inner sphere of a dodecahedron
- $1.401 \times a = \text{rad } 80.72^\circ \times a =$ radius outer sphere of a dodecahedron

RULES GOVERNING ARCHITECTURAL ANALYSIS

Separation paradigm

In those societies oriented in a materialistic and patriarchal direction where greed for material goods are positively promoted and where the control of objects by male persons is a dominant aspect of social life, there is a high probability that a preference for buildings with 90 degree angles and straight walls will be manifest. Dominant males hold on to the paradigm of separation (the subject / object discussion) and isolation. A typical feature of such cultures are "winning games" in sports, politics, relationships, religions and economies. In catering to the greed of construction companies, short gain becomes more important than quality of human life or durability of the buildings.

In China the public dominance of male persons reflected itself in the development of the writing system which became more and more rectangular. So as an inner logic even the symbol for 'round' became square:



The first symbol means 'opening' , 'mouth' or 'talk'; the second means 'an official' . Together they become the symbol for 'round' and 'circular'. " () *the function of the writing system as a mean to control and educating the people in moral was not domination from the beginning. Rather it is the result of a slow growing bureaucratism and a consequence of the influence of Confucianism during the time of Han. Because in the beginning the writing system was mainly used for sacral and magical functions and was used to communicate with ancestors and spirits;*"²¹

The paradigm of separation has no basis in nature. Therefore it is not intrinsically convincing and so must be violently forced onto people. Historically violence was substituted with fraud, as it is the well known practice by politicians and economists. Less well known are similar practices by secret societies where male persons hold power as with the mafia, camorra, opus dei, banks, masonry, 007, n'dranghetta, etc. The separation paradigm is always connected with male violence, thus there is a strong correlation between building complexes with square and rectangular walls and war like societies.

The separation paradigm concerns also theories about "time". The results from quantum physics and their different interpretations are totally ignored by archaeology and many other sciences. If a person does not accept the theories of multiple worlds, then a much bigger dilemma emerges namely that the universe must have 6 times more dimensions than there are single atomic particles²²! One of the most challenging situations results from the experiments of A. ASPECT and his team which proved backwards causation for material objects²³ . *The implications for archeology, astronomy,*

²¹ SCHMIDT-GLINTZER, HELWIG; 1990; *Geschichte der chinesischen Literatur*, Scherz, München, page 22;

²² to get an idea for the numbers showing up: the energy density of an atom is 10^{14} g/cm³. The energy density of **vaccum** is 10^{95} g/zm³ ! (see: WHEELER, JOHN. ARCHIBALD; 1986; *Einsteins Vision*; Springer, Berlin, Page 47;)

²³ ASPECT, ALAIN / DALIBARD, JEAN / ROGER, GERARD; 1982; *Experimental Test of Bell's*

*paleontology etc. are not even slightly touched. "In this delayed-choice experiment where something we do now has an irretrievable influence on what we can say about the past. History, for one photon at least, depends upon how we choose to make a measurement ... Wheeler goes on to consider the whole universe as a participatory, self-excited circuit () after thousands of millions of years it produces a state of being capable of observing the universe, and 'acts of observer-participancy - via the mechanism of the delayed-choice experiment - in turn this gives tangible 'reality' to the universe not only now but back to the beginning'."*²⁴

In cultures with an orientation towards spiritual development and cooperation it is likely that a belief-system will be found where a higher being created itself in many forms. Thus every part of the universe down to every atom is part of ALL-THERE-IS. In such a society more round shapes will occur, along with more variation of a theme, less uniformity, and considerable inter-correlation between different parts of the construction.

Discrete units & (a-) symmetry

One may suppose that if a building is supposed to represent the development of the universe as a whole, then a start will be made with one single element, usually with a circle, an oval or an egg. A slightly asymmetrical form like an egg is preferred because it is a better symbol for the capacity of creation.

Total symmetry in an absolute sense would never permit anything to happen. It can be readily shown that in a universe with discrete energy elements total symmetry is impossible and would in any case be a contradiction to discreteness²⁵. Where an object appears symmetrical it is usually due a question of scaling. Close inspection will reveal deviations.

If a building is supposed to represent the development of the universe as a whole, then you will start with one single element, usually with a circle, an oval or an egg. A slightly asymmetrical form like an egg is preferred because it is a better symbol for the capacity of creation.

There are some mathematical, physical and philosophical reasons that this unity has to have three parts. For example: a distance between two points is a unit. Such an entity has three parts, the start, the end and the connection. Every further element used in the construction must be drawn from this initial unit (i.e. circle as a unit with the parts: the center, the arc and the distance in between them).

Inequalities using Time-Varying Analysers. Physical Review Letters, Vol.49, Nr. 25, 20.Dec. 1982

²⁴ GRIBBIN, JOHN; 1984; *In Search of Schrödinger's Cat. Quantum Physics and Reality*; Bantam N.Y., page 210/212;

²⁵ In mathematics the illusion is still prevalent that numbers form a so called "continuum". But for several reasons this is basically wrong. All numbers are discrete being produced by the axioms of GIUSEPPE PEANO. BERTRAND RUSSELL'S statement about this fact is clear: "Every number is what it is, completely determined and inflexible, not becoming slowly another one. As a strict unit the distance to any other number is limited, although it can be made smaller than any given unit". (RUSSELL, BERTRAND; 1967; *Einführung in die mathematische Philosophie*; Emil Vollmer Verlag, Wiesbaden, page 119)

The fundamental rule of parsimony does not allow the introduction of any new length or outside measure which is not a prior part of the plan. To that end every single element in the building or site can be followed back as a part derived from a recent step.

In the case the whole construction is intended to serve as a message for others, particularly for future cultures, then one must exclude the possibility that the chosen (observed) distances, angles and relations could be considered to have been so placed as the result of coincidence. To avoid this, a further constraint is imposed on the analysis whereby every feature has to show up at least two times.

Probability space

A further step in rational analysis can be obtained through the use of simple non-parametric statistical probabilities. Given two points one can draw an infinite amount of circles going through the points, but all of the centers are lined up (Figure 8a)

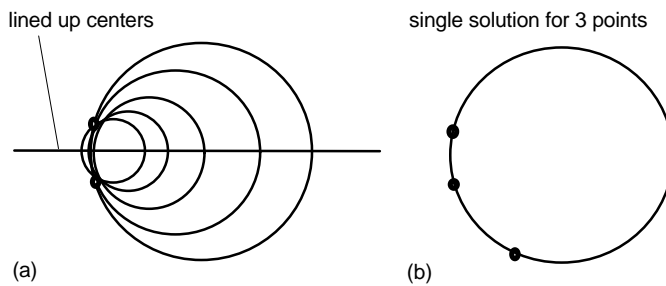
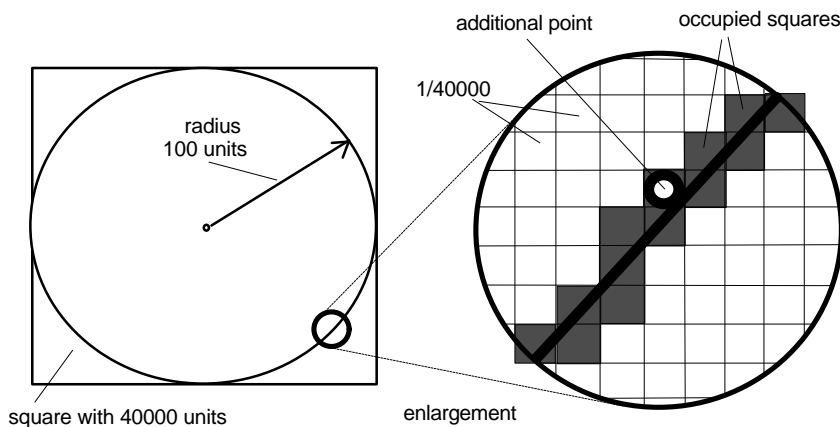


Figure 8: points defining circles

Where 3 points only are involved it can be shown that only one circle can be drawn through all of them (8b). In an architectural context this can be found quite readily. With 4 points the same intention can be concluded with a circle fitting through all only on very rare occasions.



Consider that allowable points must fall within a range of 1 percent of the radius length within a square with a side of twice the radius r . Then the square can be thought of as being divided by $200 \times 200 = 40\,000$ small units. The circumference of the circle is $2r \pi = 200 \pi = 628.318$, meaning that it occupies roughly about 630 units. If this factor is deducted from 40 000 then only 39 370 free fields will remain in relation to about 630 occupied fields. So

the chance that an additional point might be found on the circle is $630/39370 = 0.016$ or 1.6 percent.

By proceeding in this manner an interrelated construction can be derived where every detail is plotted from a previous position. Thus the possibility of exclusion on the basis of the calculated probability diminishes rapidly to almost zero for the case of coincidence because the probabilities involved are independent and are hence multiplied together. The resultant figure will force the conclusion that a deliberate choice has been made in developing the construction under consideration.

Close values from different operations

Attention should be drawn to specific features of mathematics and geometry such that particular relationships while very close to each other in terms of the values they may take nonetheless arrive at that state as the result of very different operations. Where such relationships are valued symbolically, the context has also to be signaled by other means to give the values some meaning.

Some examples:

a relationship is measured with the value 0.710 ± 0.005 . Thus it could be 0.707 which is 1 divided by the root of 2, or it could be 0.712 which is the root of 5 divided by π .

a relationship is measured with the value 0.820 ± 0.005 . In this case it could be 0.823 which is the root of 5 divided by the natural number e and equals the number of radians for an angle of 47.13° , or it could be the constant for the calculation for the height of a tetrahedron which equals $\text{rad } 46.78^\circ$.

an angular measurement may be obtained with the value of $29.5^\circ \pm 0.5^\circ$. 29.1° is the angle the earth moves around the sun in 1 synodal moon cycle of 12.368/year. The number of radians for an angle of 29.61° equals π divided by e times $\sqrt{5}$.

in another case, the angle of 26.9° represents the movement of the earth around the sun in 1 sidereal moon cycle of 13.370/year. The number of radians in 27° is 0.471, which is the constant required for the calculation of the volume of an octahedron.

Equinox orientations

Orientations to natural cycles are not always easy to detect. Equinoxes and solstices are in many cases part of the construction line, but in cases where the temple or the building is or was dedicated to a certain patron it may appear as though no orientation to the sunrise was involved. In Europe, with its hundreds of wars, many churches were destroyed and the new ones that were built on the same site were often changed. The geography in the form of surrounding mountains together with the elevation of the site also effect strongly the apparent direction of sun rise or sun set.

Dogma of "linear time"

A serious mental defect may be found in the western scientific dogma which posits the uni-linear development of cultures. This dogma is found wanting in many cases involving direct experience. The first problem emerges when definitions are proclaimed in advance of the axioms which are supposed to support them. That is of course a severe violation of basic

scientific rules. In this case the only observations that can be allowed are those which support a certain dogma and thus fit into the theory. All others are dismissed. The following example may be taken as representative of many: RUDOLPH H. KÄSE and WALTER ZENK both ocean scientists have been astonished to find that Mediterranean salt water eddies travel in the Atlantic for up to two years and that the evidence to support these findings has been ignored for a considerable period of time although the modern measuring technics have long been far advanced. *"one should suspect that earlier observers thought of errors in the measurements when they found very high deviations in salt concentrations at about 100 m depth in the north east Atlantic and that they omitted these high values from the record-sheets before they were mailed to the computer centers."* ²⁶.

A similar situation is known from archaeology where dogma holds that there is a causal relationship holding that 'later' → 'more technics' or 'later' → 'more culture' while at the same time not defining the axioms for 'culture' and 'technics'. It is illogical to use a definition for determining an axiom.

The dogma of 'uni-linearity' has a severe inherent contradiction. The only way to determine and to measure uni-linear time is by a machine which produces regular cycles. The more exact the cycles the 'better' the machine is supposed to be. But of course it becomes nonsensical to deny the existence of cyclical time when it is needed on the firsthand to determine the extent of linear time.

THE SPECIFIC ACCESS TO THE PLAN OF GIZA

The a-priori work

As in all sciences the way a work is presented is not the way the results are found. Here I excluded all the many ways I failed in finding a solution. I excluded all my own mind blocks I had to remove these to be open for new correlations. Reading some books of archaeoastronomy I was curious if the proposed technics work on some Nuraghe sites in Sardegna too. Having success there I tried it out with Malta, the Sumer and Assyrs and then I had to try Giza. Arriving here with the experience of analyzing several dozens of plans I had already a rough concept what to expect and what to exclude. Finding the center of the construction was easier now because I had already a plan to follow. Then looking for a pentagon the north direction seemed 'natural' to me and because all things just 'fell into place' I continued this way. The big circles are due to the mathematical pentagon construction and are 'unavoidable'. When I checked the bends of the causeways I just prolonged them to find out what intersection would result. Then I counter-checked to determine if the intersection made sense according to the inherent symbolism of the elements involved. Most of the symbolism I obtained from the *'Book of the Deaths of Egypt'*, known also as the *'Papyrus of Ani'*. I constructed a database for the *'Papyrus of Ani'* to figure out all of the inherent symbolism and intercorrelations.

²⁶ KÄSE, RUDOLPH, H. / ZENK, WALTER; 1993; *Meddies - Wirbel aus Mittelmeerwasser im Ostatlantik*; Spektrum d. Wissenschaft, 11/1993, page 29-34;

Sources

The first point for a critic is the source for the plan. In the beginning I used a satellite picture taken from a great height which has the advantage of inducing less distortions for distances and the disadvantage of providing difficulties in finding sharp corners. From close ups I have deduced probable edges. To support the data I checked out other sources but nearly all of them provide only measurements for the pyramids themselves and none for interrelating distances.

Graphics

The next problem is the graphic itself. In drawing an original to be used in obtaining subsequent measurements, one must face the problem of the size and of the width of the lines used. Should I take the measure from the edges which are sharp and defined or from the center of the line? I used a plan with the size of 30cm x 40 cm and a hard pointed pencil, but this cannot be copied or published.

Relatively good estimates of angles in between long lines or extensive distance can be obtained. For short distances like angles of P_1-S_{17} and P_2-S_{24} towards the east-west direction it becomes more difficult. For scaling reasons it is really hard to say if the lines are parallel to C or or to M_1M_3 . The plan for the Khufu pyramid shows a length difference of 1 +/- 0,5% towards M_1M_3 but 0 +/- 0,5% towards C. This case I consider the lower limit of measurements for the given situation.

Taking copies of the original drawing I found out that there is a possible distortion up to 0.2% depending on the weather conditions. With high humidity it's even more.

Center M_2 position

How high is the probability for M_2 as the center for the construction? In archaeological sites of importance and with an age older than 1500 BC cases can be found where deliberate movement of material objects out of the center of the construction has been undertaken. Usually there is a sign of how this moving is done and how the measures are taken. As an example let us look at the site at S. Vittoria di Serri, Sardegna ($9^{\circ}10'$ east, $39^{\circ}45'$ north). **Figure 9** shows a part of the site. Dominating are two pairs of pentagons (in the appendix a big regular triangle can be seen in the whole plan).

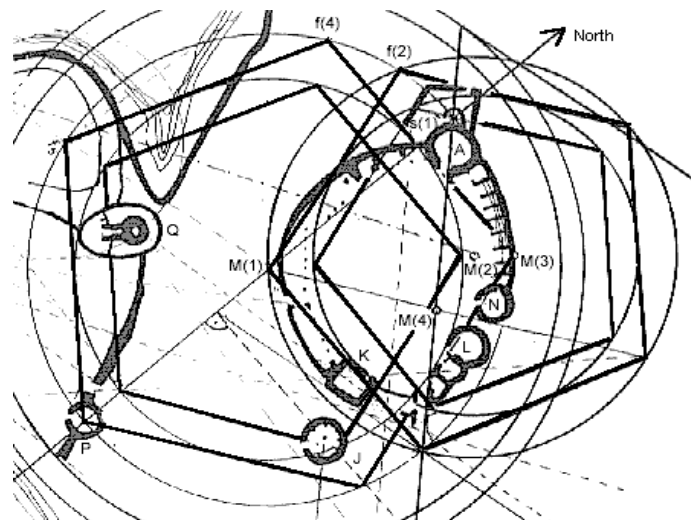


Figure 9: S. Vittorio di Serri, Sardegna

The plan starts with a circle around M_1 . If you take the natural number e as a symbol for growth, '5' for life and ' $\sqrt{\quad}$ ' for 'the root of', then $e/\sqrt{5}$ stands for 'natural growth of the root of live'. Growth happens in cycles, so we combine it with a year cycle of 365.24 days²⁷. As a base we take the megalithic yard (MY) of 0.8235 meter, multiplying $1MY \times e/\sqrt{5} = 1.0014$ Meter. That makes for a whole year

$$365.24 \times 1.0014 = 365.75 \text{ meter or a diameter of } 58.21 \text{ meter.}$$

That is what you will find at S. Vittorio for a circle around M_1 with the radius R_1 . The circle is divided by the north line s_1s_2 . Another main line goes from s_1 to B. On the south side B has a bay with a bay entrance. South west of A the end of the bigger straight wall bay with the entrance 'e' makes a curve towards the wall marking a parallel to AB with the distance 'd'. In figure 10 you see that the entrance 'e' is just slightly off the north line. The south wing defines the direction of the inner pentagon. The north east wing points towards M_4 .

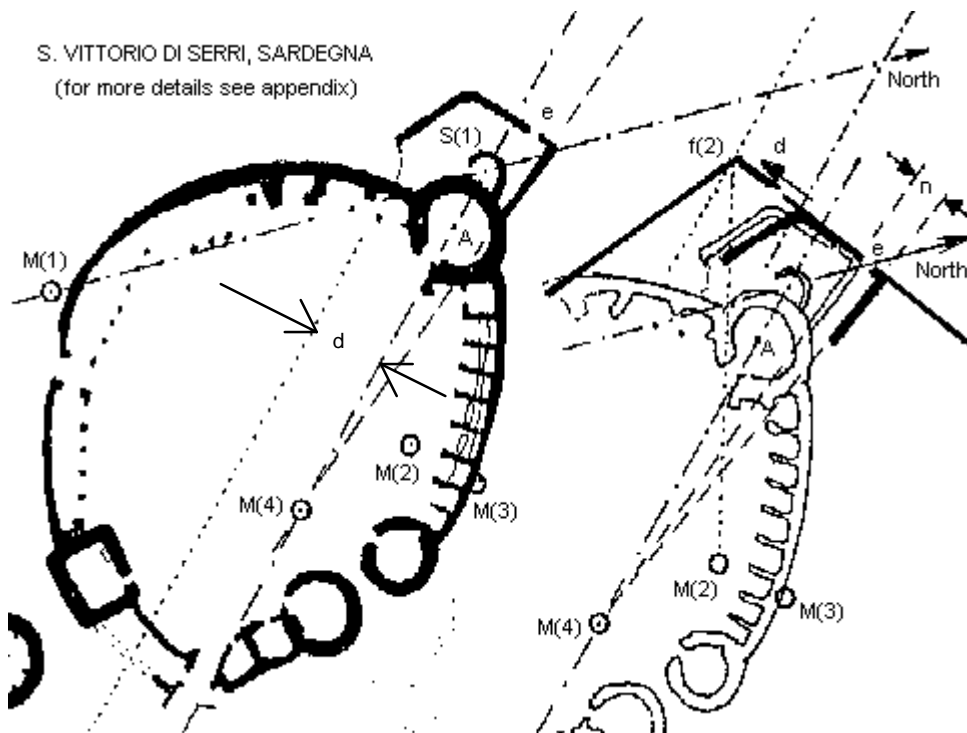


Figure 10: detail of S.Vittorio di Serri

If you could turn now the whole bay with the angle 'n' until the entrance 'e' fits the north line, the north west wing would define the direction of the outer pentagon (figure 10 right). To find the corner you shift the bay from this position with the distance 'd' along the wing direction.

In this case we see that the shifting is done in two steps as with the causeway of the Khufu pyramid, but instead of two turns in S. Vittorio they have chosen one parallel and one circular movement.

²⁷ the exact values: neolithic times: 365.2424 days, bronze age: 365.2423 days, 16th century A.D: 365.2424 days, 1986: 365.24238 days, 3500 A.D: 365.2424 → 365.2425 days;

Of course, that's not a 'proof' for the center, but it would be rational to check it out by digging exactly at that spot, one might find something.

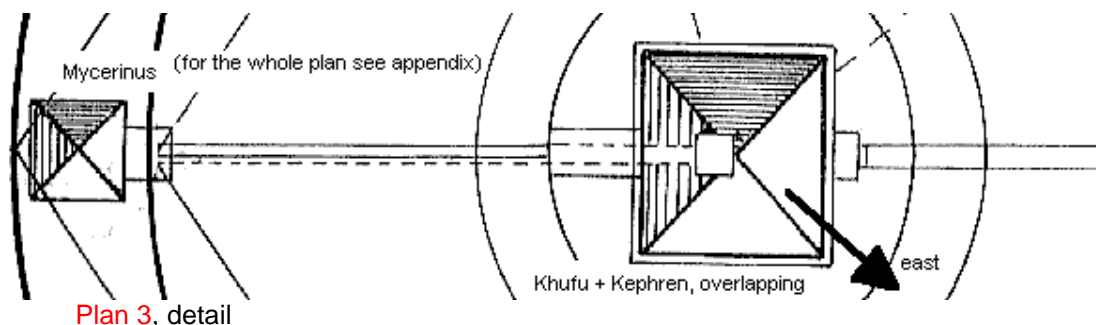
Probable solution

From the initial analysis of the construction plan one can draw the conclusion that the basic idea for the placement of the pyramids started from something like **plan 3**. Two outer circles enclose two pentagons, The symbol for the circles are cycles of life and the symbol of the pentagon is life (and death as a part of the cycle) The Chinese symbol for 'long life' is the same for 'immortal' and for 'coffin'²⁸.

Venus is always connected with it because during a Venus-year the Earth moves around the sun in an angle of 215.3° which is close to $3/5$ of a pentagon. The Ankh symbol contains the circle and the base of the heptagon²⁹. The three pyramids P_1 , P_2 and P_3 could have been symbols for three parts of the human psyche, the so called "higher" consciousness, the mental consciousness and the consciousness of the body.

One of the pentagon corners has to be orientated to the east, since this was considered by most cultures as holy. It was seen as the direction where life comes from. The outer pentagon could have been the symbol for the material manifestation of life and the inner pentagon standing for the unseen life force, or astral body. The reason for choosing a different angle for the causeways on the east-west line, might indicate that there is more to life than simple existence and survival.

In **plan 3** (see appendix for whole plan) the Khufu and Kephren pyramid are overlapping. The Mycerinus pyramid is in the south west. The three pyramids and the three causeways are lined up and overlapping in unity.

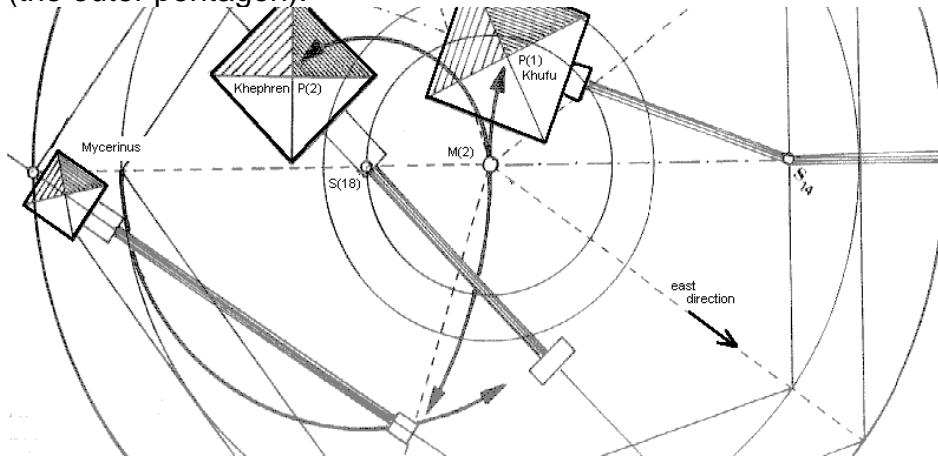


²⁸ The reincarnation idea is demonstrated by the sign 'death' which can also be used for 'long sleep' or 'long sleep'. Inside a believe system of live cycles an empty coffin is a good symbol for 'long life': every new birth is a proof that one has died in another life time.

²⁹ The connection of the ankh and the '5' can be demonstrated by the Papyrus of Nebseni (Brit. Nus. No. 9900, Sheet 14, 11. 16ff). The **fifth** of the 7 Arits says: "*The name of the Doorkeeper is **Ankh-em-fent***". The text continues with the collection of Osiris bones to put them together for a **new life** form. In old Egypt they called '*Osiris Auf Ankh*', the Osiris of the south: "*I, the Osiris Auf-Ankh, whose word is truth in the southern heaven.*" In this way Osiris was named when at the beginning of a new moon cycle they held the 'Haker festival', "*when the dead are separated, and the spirits are judged*". (Papyrus of Nebseni, Brit. Mus. No.9900, Sheet 14, 11.16ff). Those who didn't reached spiritual perfection had to enter a new life on earth.

(see also: http://www.lysator.liu.se/~drokk?BoD/Papyrus_Ani.txt)

Plan 4 below (see appendix for whole plan) shows the first bendings and turnings of the causeways. The one to P_1 is bent at the passage of the inner pentagon S_{14} . The direction defined is the basis of the outer pyramid in the west. The association for west, where the sun sets, is usually death. So with this we have the symbolism that human life enters existence through an immaterial energy form (inner pentagon) and the exit is through a material form (the outer pentagon).



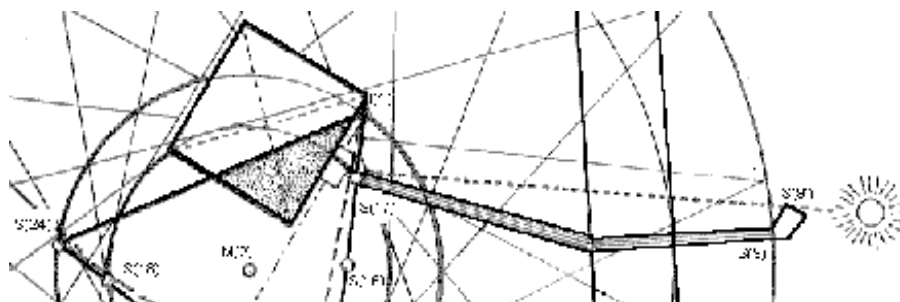
Plan 4, bends and turns

In Chinese language the symbol for 'west' means also '*the place to which all things go*' (1): The right part of the first sign means 'square'. here we have the connection with '4' and the existence in space-time as it is explained above



The first symbol of the second group (2, left) means '*opening*', then follows another sign for 'west' which shows its connection with the number '4', the third symbol (2, right). The inner part of the '4'-symbol shows a striking resemblance with the sign for '*the first*' and for '*the book of changes*'(3). There might be a coincidence with the Greek π sign denoting the '*circle*' as a symbol for cycles.

The Kephren pyramid with its causeway is bent around S_{18} towards the west point of the circle. The circle R_4 as we have seen could be a symbol for the material cycles on the planet Earth, because it refers to the cycles of the Earth's axis. Translated into meaning we may understand that the development of human consciousness depends on living through the life-cycles on earth, since this fits the belief systems of the old Egyptians.



Plan 5, detail

The turning of Mycerinus pyramid with its causeway happens on the outer circle which makes sense in this symbolism. It is the consciousness of the material living body depending on material manifestations of life like food, air, water, weather, plant, animals etc. Every material object must die, so it is logical that P_3 is placed in the west.

The second bend of P_1 is shown in **plan 5**. It happens where the causeway hits the regular triangle at S_{16} . The orientation is parallel to C , which means that the orientation of the development of the higher consciousness goes along with the material expression of the human body, one mirrors the other. This can be safely stated because there are many indicators that the regular tetrahedron with M_2 represents a projection of a tetrahedron. (To avoid confusion in the graphic, the Kephren pyramid is left out but it has the same orientation as P_1 .)

It is all coincidence

Let us count the landmarks for the plan. The Khufu pyramid with the bended causeway offers 5 landmarks, the Kephren pyramid 4 and the Mycerinus pyramid 4. Then we have the sphinx and two triples of small pyramids. All together 17 landmarks. (see also the chapter below: "The 'magic square of 9', the 17-polygon and the torus").

One basic rule of the construction was that no foreign measurement was allowed to take. By "construction" I mean the *mathematical* interpretation of the word. Here you are allowed to work *only* with an unscaled ruler and a pair of compasses. In addition the chosen steps have to make sense in the primary goal of the construction. In the case of the pyramids this goal cannot be known from the builders, but it must be in accordance with the myth and the religion of old Egypt. A contradiction would be a venus symbol connected with the number 4, a mercury with 5, or a major construction point *inside* a wall.

For analysing 'coincidence' you have to divide the *fixed* measurements and distances from the *free* ones. To do that you work in planes. "Fixed" means, that once you have chosen a certain measure, other data can be deducted purely by mathematics. An example: you chose the length 'a' for a side of a square. Then the size of the diagonal, the corner angles of inner rectangles, radius of inner and outer circles are 'fixed' because they can be expressed by a factor of 'a'. In this case a 'free' step would be, if you take half of the diagonal and use it for a circle with the center on a corner of the square. Then new intersections would be obtained which are not part in the first level of creation.

PLANE 1.

In the first phase the diameter of the circle M_1 is given. This diameter determines many measurements. All parts of the construction of the two pentagons with R_2 and R_3 are fixed. In the construction plan that is step 1 to 6.

PLANE 2.

Now we have the first choice. Here the main measure for the pentagon construction is taken to define A which has to line up all the causeways. I

counted about 120 possible distances to chose from, there might be many more. But obviously the *only* important length to construct the pentagon inside the circle is M_1S_5 , which was used to define S_{10} and the new point S_{10} is again on the circle.

PLANE 3.

The construction of B needs the existence of A, so we need a new plane. But here *no* new point got taken, but B develops out of A. On the same level we find the construction of C, also directly referring to A. Those orientations could have been directed in many hundred ways.

With plane 3 we are already at the end, because for all the rest only existing intersections have been taken. With 3 planes the plan covers all of the 10 landmarks³⁰ and not only that, it is accomplished in a way that goes along with the symbolism of old ages.

In the chapters above I showed how the pyramids have been deliberately moved out of the theoretical center only using the intersections constructed until level 3. I think it is very hard to find a shorter and more convincing solution who includes the well known symbolism of the mentioned numbers, angles and proportions. But western scientists preach a pure coincidence for the existence of human life, so there might be many who say that for this construction as well.

Proposed time of construction is impossible

Many religions have priests and the dogmas invented by them. Now scientists have taken over to occupy the place from the priest. "*There is no truth outside church*" the Catholics preached in former centuries. "*There is no truth outside science*" the scientists say now. One basic rule for a theory is that it has to be based on explicit axioms. One does not have to prove the axioms, but the theory. But to accept the axioms they **must** have a base in daily life, that is of experience. It is there that the real problem starts. Nobody is born a scientist. Primary socialization forms children before they can produce arguments for the proposed "truths". Later, the children do not see the world as it is any more, but as they got taught by the society. Secondary socialization (the personal self-reflective one) is not performed by a great number of people. Many prefer not to think their own thoughts and not to believe their own experience. In addition, idiosyncratic experience is often ridiculed because (by definition) it differs from the official world view³¹.

Scientists are not only an integer part of that game, in many cases they are the main promoters for rigid world views. What is worse, is that they

³⁰ the 3 main pyramids, 2 x 3 small pyramids and 1 sphinx.

³¹ Knowledge of history is part of a recursive process. (GIDDENS, ANTHONY; 1988; Die Konstitution der Gesellschaft. Grundzüge einer Theorie der Strukturierung; Frankfurt; - SEWELL, WILLIAM; 1992; A Theory of Structure: Duality, Agency and Transformation; in: American Journal of Sociology, Vol.98/1 p.1-29) To become believable by a society knowledge has to be shaped into an acceptable form. But on the other side you have to believe first the content to do this. "*Believing is activated knowledge*" (FISKE, JOHN; 1993b; *Elvis: Body of Knowledge. Offizielle und populäre Formen des Wissens um Elvis Presley*; in: montage/av, Zeitschrift für Theorie & Geschichte audiovisueller Kommunikation, 2/1/1993, p. 22). Men in power limit public access to knowledge, so the "people" produce it on their own; it's closer connected to their bodies instead to the head, so it's easier to believe it. Schemata and stereotyps based on Idiosyncratic knowledge are always influenced by official forms of knowledge and exists as a mixture

regularly break their own basic rules of (scientific) logic. One of these basic rules for theories is that the conditions for rejection have explicitly stated. A theory who cannot be wrong, cannot be right either.

If we take the supposition that the pyramids have been build about 10500 BC. Then it is acceptable for someone to say that this contradicts his or her theory. However, this is only one part of the argument. The second step involves an explicitly named condition under which the theory will be abandoned (GÖDEL, 1931 carried out important work on this point³². If these two steps are not followed, the so-called scientist involved is nothing but a quack. A mountebank is also someone who uses a theory to argue against axioms. A statement like *"10500 BC the old Egyptians could not have build the sphinx and the pyramids, because its against our theory"* is on the same level as the case GALILEO GALILEI³³.

It may be noted like that the sphinx shows the effect of vertical erosion-channels caused by water and these cannot be explained by reference to the past 5000 years of an undeniably arid climat in the Saharar.

Another calculation often stated is also ridiculous. Aa an example, one man digs a hole of 1 square meter in 1 hour. How long will it take for the same feat if performed by 3600 men? 1 second? When it comes to pyramid construction it is said that they needed 100.000 men would had to have worked for 20 years. But this avoids the fact that during construction the area of the pyramid becomes smaller as the structure becomes more advanced. That means fewer and fewer people can work on it while the problems of transportation and lifting rapidly increase.

Weak and strong points

As a strong line in the proposal advanced herin, I posit the pentagon construction and the relations found concerning the sphinx. Less convincing are the emergent heptagons and nonagons, although these were found often in other sites. The 17-polygon is supported by a weak base of argumentation, but still it is interesting that there is not only a construction mark on the circle with $1/17$ th of 360° but in addition that all connections for the 17-star are tangents to the inner circle, or vice versa, if one starts constructing tangents to the inner circle, a 17-star is produced automatically.

I have no convincing argument to account for the size of the initial circle R_1 . In Egyptian cubits the circumference of R_1 is about $11\ 321 \pm 10$ cubits. I offered an explanation for half of the time for a galaxy cycle knowing that it is easily contestable. Not however, through the argument that the ancients cannot have known it, but with the fact that even our science has not the slightest convincing argument to support it. There is a lot of nonsense published, especially in astronomy³⁴.

³² GÖDEL, KURT; 1931; *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme I*; Monatshefte für Mathematik und Physik 38, page 173-198;

³³ Like arguments are published when it comes to UFO sights. The obvious possibility that fotos can be falsified or that it can be explained away by other arguments is **no** proof that some encounters do not take place. Otherwise the proof that currency can be falsified would be a proof that no valid currency exists.

³⁴ 1.) The official version of western cosmology preaches that "in the beginning" the universe was so small, that according to the laws of quantum physics of the same "science-religion" there was space for only **one** (1) particle.

CONSTRUCTION PLAN

The following section contains a detailed description of the steps taken to establish the geometric analysis of the Giza complex as presented as **plan 1** and **plan 2**. However, each step in itself is quite simple and the sequence is presented here to show: 1) that there is no gap in the logic of the construction; 2) that every single development proceeds from the initial circle, itself based on the overall length of causeway (diameter) running from S_9 to M_2 and connecting Plan 3 to Plan 1. The point M_1 was established by an *axiomatic* first step.

No outside measurement or angle is taken into consideration and the allowable moves are restricted to those described in sections above. The construction itself is established using two compasses (dividers) and one "unscaled" straight edge only. A protractor and a scaled-edge were used in the final analysis to check and measure the resulting forms. The numbering refers to plan 1 and 2

1.) Circle around M_1 with radius R_1 defines circle R_1 . Diameter parallel to north cuts S_N and S_S . Diameter cuts in the east at S_E .

2.) Circle around S_E with radius R_1 cuts first circle in the north (**N**) at S_1 and in the south (**S**) at S_2 .

3.) M_1S_E cuts S_1S_2 at S_3 . A perpendicular to S_E cuts circle around S_E in S_4 . Circle around S_3 with radius S_3S_4 cuts M_1S_E in S_5 . M_1S_5 equals now R_1 multiplied by $(1+\sqrt{5})/2$.

4.) Circles around M_1 and S_N with radius M_1S_5 cut in S_6 . Circles around S_6 and S_N with radius R_1 cut north at S_7 , and the same done with S_6 and M_1 gives southward the point S_8 . M_1, S_N, S_7, S_6 and S_8 represent a regular heptagon **RH**. For simplicity: the western part of **RH** is abbreviated with (1), the northern one (2), north east (3), south east (4) and south is (5).

5.) The half angles of **RH** meet at the center M_2 . Circle around M_2 with radius $M_2M_1=R_2$ gives the outer circle R_2 of **RH**.

- 2.) The whole universe is filled only with discrete energy units. But using discrete mathematics, after a certain number of algorithm steps you'll arrive at a bifurcation point which makes it *impossible* to say something definite about farther development. And this is also valid for backwards calculation!
 - 3.) Science has **no** solution for gravitational fields of more than 2 (two) planets or suns. But there are billions of trillions of stars in the universe. How can they tell us something about the supposed 'beginning'?
 - 4.) Science says redshift comes from the DOPPLER-effect. But the DOPPLER effect needs a medium which is not allowed to exist any more ('Eather is dead'). In vacuum there's no redshift possible. Quantum jumps don't allow redshift either because the necessary time gap is missing. Even the math involved doesn't allow redshift, because either you have an **infinite extended** wave, which cannot have speed by definition, or you have a spinning particle where the spin is independent against linear movement
 - 5.) The christian priests said that you have to believe in their male god. You cannot meet him or see him and if you would face him personally you would be burned by his light and being absorbed by him you would be dead forever. To survive you have to remain in a distance to their god. To know about this god only the priests are experts.
- The scientist priests tell you, that you have to believe into the existence of black holes. You cannot go there to see them and if you would face it personally you would not survive it, being absorbed by it you would be dead forever. To survive you have to remain in a distance to the black hole. To know about black holes only scientists are experts.

6.) The perpendiculars to the sides of **RH** give the inner radius R_3 of **RH**, the circle R_3 and the smaller inner regular heptagon **rh** with the corners M_1' , S_N' , S_7' , S_6' and S_8' .

7.) M_1M_2 cuts R_2 at S_9 . Circle around S_9 with radius M_1S_5 cuts R_2 in the south at S_{10} . S_9S_{10} is now secant **A**. All three causeways are lined up with **A**.

8.) S_NM_2 cuts **A** at S_{11} . S_6M_2 cuts R_2 at S_{12} . $S_{11}S_{12}$ is now secant **B**.

9.) Circle around M_1 with radius M_1M_2 cuts M_2S_8 at S_C . M_1S_C is now secant **C**. **C** cuts R_3 at S_{13} .

10.) M_2S_9 cuts $S_7'S_6'$ at S_{14} . S_9S_{14} is now the first part of the causeway for pyramid P_1 .

11.) $S_{12}M_2$ cuts M_1S_N at S_{15} . $S_{14}M_2$ cuts R_1 at S_{16} . Circle around S_{14} with radius $S_{14}S_{16}$ cuts $S_{14}S_{15}$ at S_{17} . $S_{14}S_{17}$ is the second part of the causeway for pyramid P_1 .

12.) A parallel to **C** trough S_{17} cuts a circle around S_{17} with radius $S_{16}M_2$ at P_1 , which is now the position for the peak of pyramid P_1 . The diameters of the square base equal $R_2/2$.

13.) A circle R_4 around M_2 with radius $R_4 = M_2S_{17}$ cuts **B** in the west at S_{18} . $S_{11}S_{18}$ represent the causeway for the second pyramid.

14.) A circle around S_{11} with radius R_3 cuts **B** at S_{19} . A parallel to **C** through S_{18} cuts a circle around S_{18} with radius $S_{18}S_{19} = S_{18}M_2 = R_6$ at P_2 , which is now the top of the second pyramid. The side for the base of this pyramid equals R_6 .

15.) **A** cuts **C** at S_{20} . A circle around S_{20} with the radius $S_{20}P_2$ cuts **C** at S_{23} . $S_{20}S_{23}$ is the causeway for the third pyramid. A circle around S_{23} with a radius of half the base length of P_1 cuts **C** at P_3 , the peak of the third pyramid.

16.) A circle around P_3 with radius P_3S_{23} cuts R_2 at P_4 , the first of the small pyramids south of P_3 . A perpendicular to M_1S_5 through the point S_{21} , where **C** cuts R_2 , meets **A** in the north at S_9' . A circle around M_2 with radius M_2S_9' cuts a parallel to **C** through P_4 (=D) at P_5 , the second one of the southern triple. A circle around S_{23} with radius $S_{23}S_{20}$ cuts **D** at S_{22} . A circle around S_{22} with radius $S_{22}P_1$ cuts **D** at P_6 , the third small pyramid there.

17.) A perpendicular to S_{22} lines up the three small pyramids east of P_1 . The distance of the peaks of P_7 to P_9 equals the distance of **C-D**. The middle one P_8 has towards S_{22} a distance equal to $S_{22}P_4$ and lies on R_1 . 2750 BC. (and 10 750 BC too) the sun had an ecliptic of 24.0° . This provides an azimuth for the morning summer solstice of 241.99° . The peak of P_8 may be seen from the top of P_2 at exactly this angle (28.01 north of east). This is the middle element of the three pyramids east of P_1 (Fig.11). A "nice" coincidence.

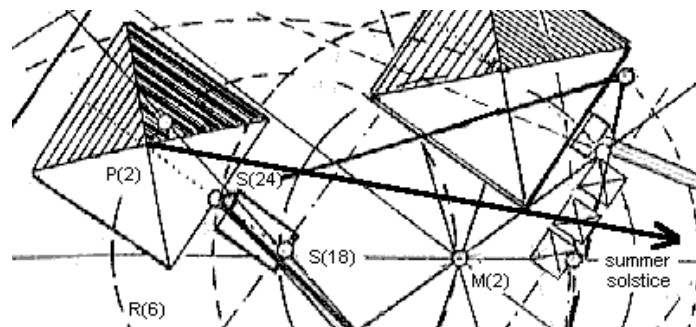


Figure 11: solstice line of Kephren pyramid

At present the ecliptic of the moon to the sun is 5.15° providing the azimuth values of 248.1° and 235.78° for the southern- and northern-most moon-rise for summer solstice for a supposed date of 2750 BC (and 10 750 BC respectively). The remaining peaks, P_7 and P_9 are placed at an angle of 247° and 236.9° respectively. A back-calculating turns up the value of $n=4.22$ for the moon declination for 2750 BC or 10750 BC which could be due to irregular orbital paths followed during the millennia.

18.) S_4M_3 cuts M_2S_6 east at S_E . A circle around M_2 with radius $M_2S_E = R_5$ cuts M_2S_{11} at SX a point near the Sphinx and the east face of P_2 at S_{24} . The head of the Sphinx lies probably where S_7S_8 cuts R_5 , however there is a question of scale which makes determination of the exact point somewhat questionable.

At this stage the regular triangle $S_{24}-SX-t_1$ can be constructed This regular triangle covers a part of the base of P_1 in the form of a rectangular triangle with the side relation of 3:4:5. This corresponds to the only integer-numbered square of Pythagoras, best to demonstrate the knowledge of this law ($5^2=4^2+3^2$). For practical purpose a cord with 12 knots will make a primitive but a perfect tool to measure 90° angles (Figure 11).

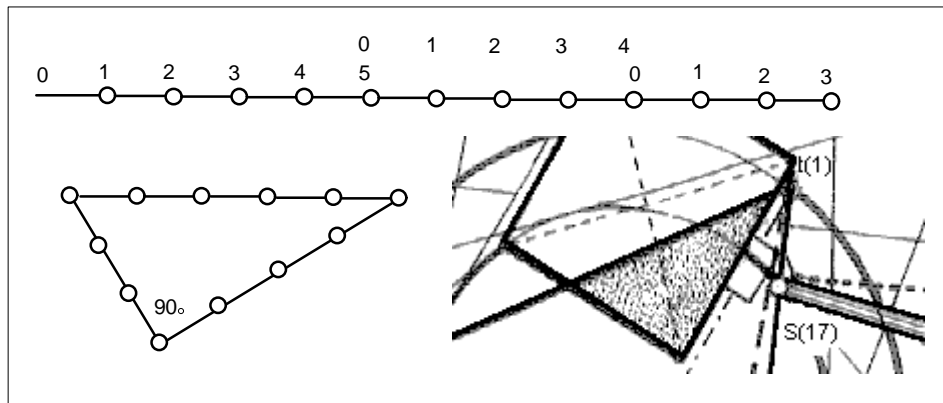


Figure 11: 12 knot rectangle measure cord

19.) Between the beam M_2P_1 and M_2S_{17} is an angle of 40° . Towards east another 40° you will find the direction of the summer solstice as seen from the top of P_2 . Towards west M_2S_{19} has an angle to P_1 of 80° . This defines a regular nonagon indicated in the drawing with the corners $9_P, 9_{S17}, 9_{S.S.}, 9_4, 9_5, 9_6, 9_7, 9_{S19}$ and 9_9 . Another nonagon is defined by a beam from M_2 towards west, S_E and the point q . The point q is constructed by the cut of R_2 with the perpendicular through SX to the line $P_1-SX-S_{11}-S_{13}$. This form displays the corners $9_1, 9_2, 9_q, 9_3, 9_{SE}, 9_8, 9_{10}, 9_W$ and 9_{11} .

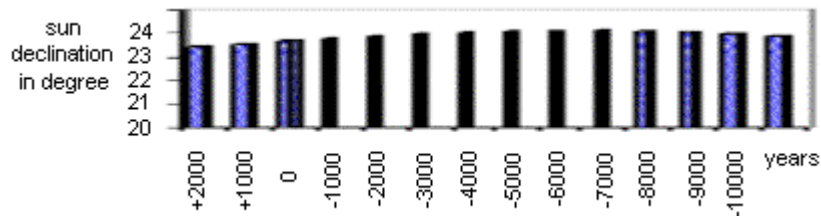
20.) In addition there are 3 heptagons to be found. The first has the corners defined by P_1 and M_1 and together with the remainder inferred it is indicated by the points marked $7_{P1}, 7_1, 7_2, 7_3, 7_4, 7_{M1}$ and 7_6 . The second heptagon has 5 corners fixed by $P_2, S_3, S_E, 9_4$ and e with e as the intersection of the regular triangle with R_1 . The two free corners remaining are 7_5 , and 7_7 . There might be a tenth of a degree difference in the angles of this particular form but the number of very close coincidences is remarkable. The third heptagon has fixed corners defined by the north side of $P_2, 9_7$ and S_{20} .

Together the three heptagons form a 21-polygon. Although not regular because of a 1° divergence, it nevertheless comes close

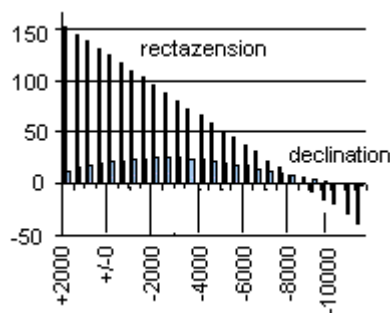
The numbers 9 and the 7 in science are often connected. For instance as in chemistry with the 7 x 9 periodic table of the elements. A connection of 7, 9 and 21 can be found in the FIBONACCI sequence where the 7th step develops the value 21:

12 1+2=3 2+3=5 3+5=8 5+8=13 and the seventh algorithm arrives at 8+13=21.

21.) We may postulate that the Sphinx has something to do with the astronomical sign LEO. In 25 765 years the polar axis of the earth describes a circle of 47°. The exact period of time taken for the equinoctial cycle to be traced-out known exactly is not known. The literature reports values varying from 25500 up to 26000 years. Supposing the analysis presented herein has an objective basis, the present-day position of the monuments could represent certain star and equinox positions in the past. The equinox point itself moves in a spiral since during a complete cycle the declination changes.



The values for the inclination of the ecliptic of the sun over time are shown on the above chart. The vertical axis is scaled by the subtraction of 20°, thus, it starts with a declination of 24°. The horizontal scale starts at the year +2000 and proceeds in reverse until the year -11000. The values for the first 5000 years in 500 years steps are from a chart of WINFRID PETRI who obtained them from the Smithsonian Catalog of G. S. HAWKINS and S. K. ROSENTHAL. The remaining values are extrapolated from the initial curve.



The chart above indicates the rectazension and declination of Regulus (Alpha Leo, 1,34) and is constructed from data contained in the Smithsonian Catalog of G.S. HAWKINS and S.K. ROSENTHAL (1967). The values for the years +2000 until -5000 were listed in 500 years steps and the remaining data were extrapolated from the curve so defined.

Within the great circle of the equinox, if a line is constructed from the star named "Polaris" to the spring equinox, close to the star Jota from Pisces, or Beta from Cassiopeia, a period of about 25 765 years will elapse before

the same relationship can be obtained again. At this moment, movement is towards Aquarius that means the movement is also from Pisces.

Astronomers count angles often in "hours" (h) where "24 h" stands for "360°" with the spring equinox, or "spring point", standing for the "0 h". That means the spring point entered Beta of LEO (the tail star) in h-angles at 11 h and 50' in the past. If the whole cycle (24 h) requires 25 765 years, then 1 h represents 1073.54 years (figure 12).

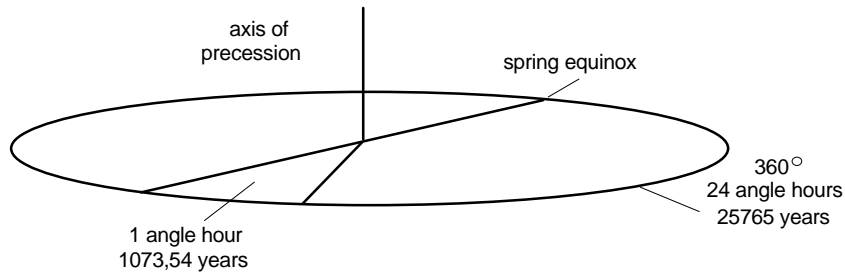


Figure 12: precession cycle

When decimalised, 11 h 50' becomes 11.8333 h and when multiplied by the number of years in 1 h (1073.54 years) the figure of 12703.52 results which represents the number of years from this point in time backwards. Subtracting the present year 1997 will result in an estimation for the year 10706.52 BC. for the time that this event happened.

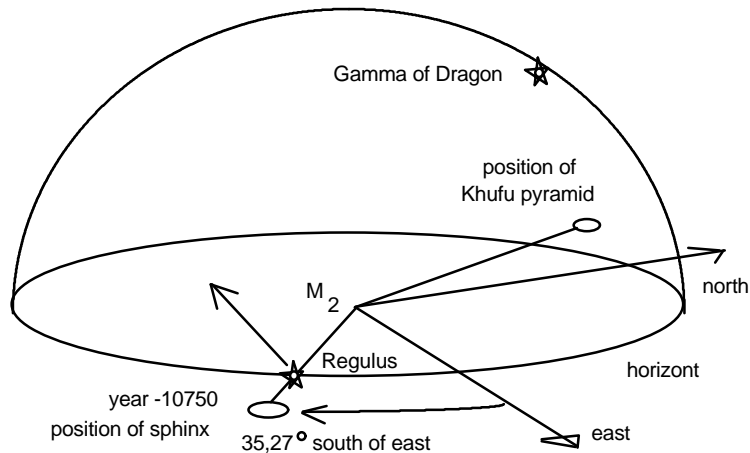


Figure 13: relative sphinx position

If a rough calculation is made to determine the position of Regulus (Alpha) at that time, an estimate for the rectazension would be 330°, or for the point at which it entered the beginning of the constellation of LEO (the actual star-cluster concerned) a value of 355° might be appropriate. The declination can be taken as minus 30°.

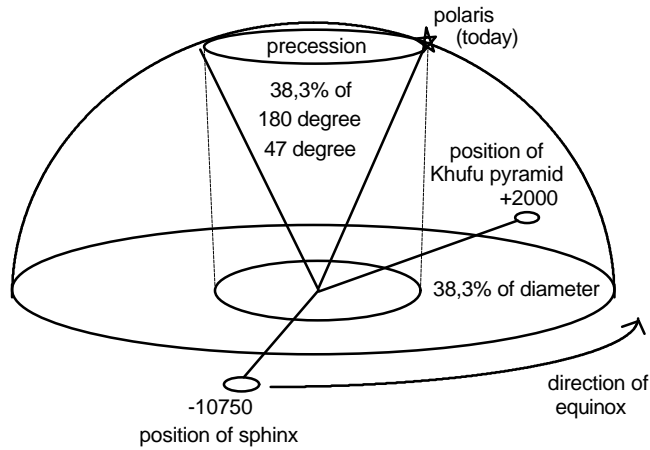


Figure 14: percentage of solstice cycle

For the location of the Sphinx, this suggest a horizon rise 10706 BC for Regulus at an azimuth of $305,27^\circ$ or $35,27^\circ$ south of east. Coincidentally, this is exactly the angle from M_2 towards the head of the sphinx (Figure 13).

However, when the 47° cycle is checked in relation to the construction it can be seen that the visible night sky covers an angle of 180° . 47° are 38.3% of 180° . The inner circle R_4 is exactly 38,3% of the outer circle R_2 .

22.) Now let us assume that M_2 would be the position of Polaris **today**. and the peak of pyramid P_1 would be the position of the equinox point **today**. In this case the angle of P_1 in relation to the head of the Sphinx is 148° , or in angle hours $9.866 = 9\text{ h } 51.6'$.

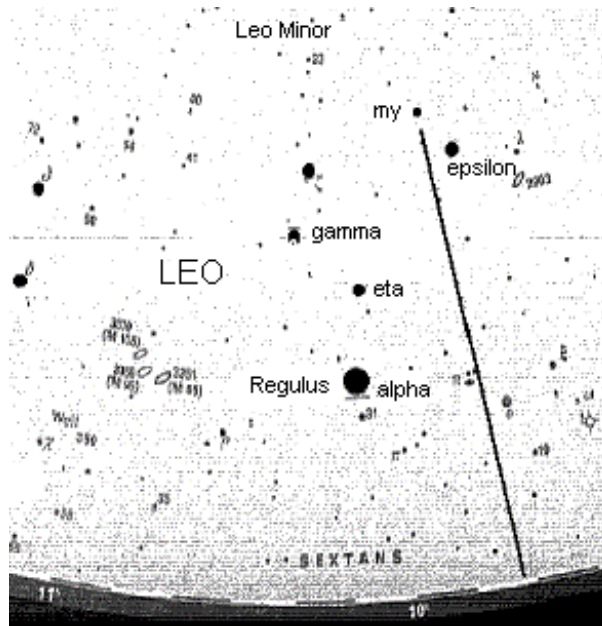


Figure 15: Image taken from: MOORE, PATRICK; 1970. *Das Weltall*, Orbis, München, P.148;

If R_4 represents the 47° cycle, then the next bigger circle R_5 through the sphinx would represent a 65.45° circle, or measured from the equator it would be $90^\circ - 65.45^\circ = 24.55^\circ$ or $24^\circ 33'$. Today at a rectazension of $9\text{ h } 51,6'$ and a declination of $+24^\circ 55'$ one may observe one of the stars representing the "head" of LEO, My, which is adjacent to the other "head-star" known as Epsilon (Figure 15).

23.) To this point the circle R_4 has been identified with precession of the earth axis for a period of **25765** years. The Egyptians measured length in cubits. If the diameter of R_4 is extracted from the plan as carefully as is possible and compared to the diagonal of pyramid P_1 ($230.2 \times \sqrt{2}$) a radius of $R_4 = 218$ meters may be obtained. 218 meters converted into feet will give you: $218 \times 0.30479974 = 715.2237072$ feet.

This converted into Egyptian cubit makes

$715.2237072 \times 0.5714285 = 408.6992102$ cubit.

Thus the circumference is

$408.6992102 \times 2 \times \pi = 2567.932873$. or roughly **2567,9**.

this is in a range of 0.3% a tenth of the value for the precession.

However, since the "real" value is uncertain anyway, the derivation. of 0.3% lies inside the measurement error which is in a range of 0.5 % in using the scale on which the plan reported herein was prepared.

Final calculation should be based on a much better survey of the distances in between the monuments than is possible from a remotely sensed image. Considerable literature exists concerning the measurement of material objects, according to the belief-system followed by modern science, but little attention is given to non-material construction points and to non-material interrelations. It would be very interesting to determine if anything can be found at the theoretical construction point M_2 . If an archeological team were to start digging in that location the results might be of some considerable interest.

DISCUSSION OF THE PLAN

Tetrahedron indicators

The following chapter does not necessarily pretend that the constructors of the pyramids and the sphinx intended the correlations that will be noted. However, the opposite conclusion would also be incorrect. First the facts will be stated, then readers can draw their own conclusions.

A tetrahedron plays a central role in the development of particles, atoms and molecules. The number 4 shows up also in the most common of the elements found in the universe (Helium, with 4 particles, 2 neutrons and 2 protons), the element for life structures (Carbon C_{12} with cube like molecules structures) and the most frequent element on the planet earth, iron (4th row in the periodic table of elements in chemistry). The only stable three dimensional shape for 4 spherical objects is a tetrahedron. It can demonstrated that the development of 3-D-spheres follows a fractal tetrahedron pattern with numbers equal to the electron shells in elements.

In an atom the first electron shell (K) has one 'up' and one 'down' electron. The next stable pattern is given with a tetrahedron shape with 4 spheres. Models in this shape have been found at many different archaeological sites in Scotland (probable date 1500 BC).

Filling the gaps of the group of four leads to another tetrahedron closing the L-shell with 8 electrons. Eighteen more spheres of the M-shell place themselves in a way that 4 groups of three spheres build the first subdivision in the fractal development.

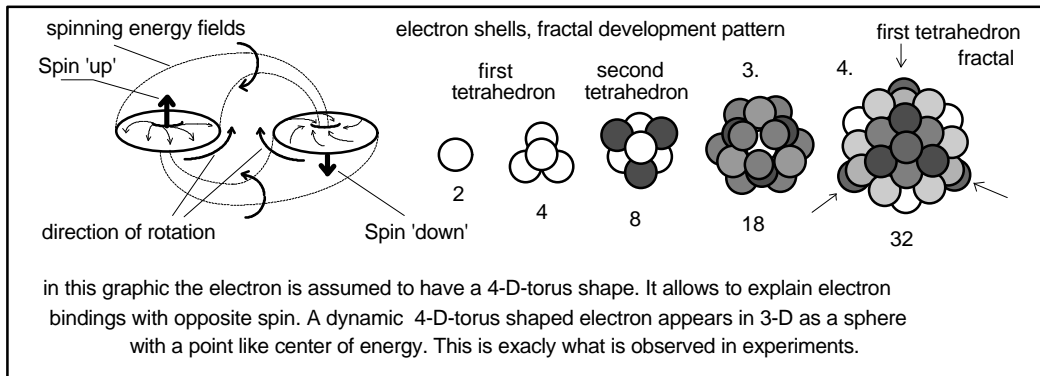


Figure 16: tetrahedron fractals in electron shells

The N-shell has 32 electrons and they are divided in groups of 4, 3x4, 3x4 and 4. The last four of this shell are marked with a pointer. Their position is exactly over the initial tetrahedron. If one thinks of electrons as wave packets, then the spheres represent resonance knots of the wave pattern.

Plan 5 shows on the upper right corner with 5.4. a view over the top of a tetrahedron. The corners are numbered according to plan 1. If this triangle based pyramid is examined from the x-axis along the dashed reference lines, it will be seen as shown in 5.1. From this view the lengths of the sides have changed, only M_2SX remains the same. The triangle $t_1-S_{24}-t_2$ is the side view (as in 5.1.) of the triangle $t_1-S_{24}-SX$. The height of the tetrahedron $t_1-S_{24}-SX-M_2$ is given by $SX-S_{17}$ or $SX-S_{18}$.

However, the pyramids can also be taken as a symbol for projection of a tetrahedron with higher dimensions. As we have seen a 3-D-tetrahedron projected onto a 2-D plane looks like a regular triangle with a center point. If a tetrahedron is turned on an edge as is shown in 5.2, it appears from the top as a square with diameters crossing (5.5) and it then equals the projection of a square based pyramid. From the side it appears as shown in 5.3.

The message behind this could be that what we see as material objects are energy projections from unseen dimensions. Quantum physics provides a solid base for this outlook. By means of FOURIER analysis it can be demonstrated that single, apparently space limited objects, can be described by a sum of unlimited wave packets. As a further symbol for this statement one should consider the constant distance of the second bend of P_1 and P_2 with $P_1-C = R_3$ equaling the radius of the inner circle, thus the inner pentagon.

Papyrus of Nu

The following excerpts from the *Papyrus of Nu* use a mythical language to explain this. Here we have to keep in mind that a multidimensional time concept was used where western terms like 'yesterday' and 'tomorrow' rank like 'left' and 'right' in 3-D-space. "*Khert-Neter*" means the unseen world beyond the material limits (symbol '4'); The "*Egg*" is a symbol for the 'beginning' of the universe, its present source, and it is "*unbroken*" because the beginning is still happening **now!** This statement makes only sense in a time concept with at least 3 dimensions. The "*Seven Uraei*" stand for cyclic time in a 10-dimensional universe (see below) with "7" as parts of a cycle. The primeval energy source charged by emotional desire finds its expression with the word "*Nu*". The "*Benu-Bird*" is a symbol for the initial (born in the east)

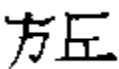


power of creation (= *Khensu* = god of the forces) controlling the four corners of the world (the material one). Even every god stems from seeds of the "*Benu-Bird*"! The name of the god "*Khepera*" means 'the Self-Created' ("*Heru-Kuti*").

From the Papyrus of Nu: "*Imperishable one*' is my name. I am the soul creator of Nu. I make my habitation in *Khert-Neter*. My nest is invisible, my egg is not broken." (...) Making the transformation into the *Benu Bird*. The *Osiris*, the scribe *Ani*, whose word is truth, saith: - I flew up out of primeval matter. I came into being like the god *Khepera*. I germinated like the plants. I am concealed like the tortoise [in his shell]. I am the seed of every god. I am Yesterday of the Four [Quarters of the Earth, and] the Seven *Uraei*, who came into being in the Eastern Land."

Now it can be explained why the causeway of P_1 has the little extra bend towards north at the entrance into R_2 . The sun is one of the main god symbols (*Osiris/Re*) for the Egyptians, so the end of the causeway has to be aligned with the beginning to symbolize the leading part of the god force. There is also a high probability that in this case the pyramid is a moon symbol. The eyes of *RA* are sometimes called "*Sun and Moon*" (Papyrus of *Nebsemi*, Sheet 17) where the left eye is the symbol of the moon (or *Matet-Boat* in the morning) and the right one means the sun (or *Sektet-Boat* in the evening).

Even if human life may deviate from the goal, at the end the force of ALL-THAT-IS will lead to value fulfillment. From the inner laws of the geometrical construction there is 3° gap to the summer solstice line, if seen from the end of the causeway, the bend closes the gap and aligns the ends.

The connection of the solstice line with the square pyramid could also be read as a complementary aspects of nature. From China it is known that the square is associated with the earth and *YIN*³⁵. Some square moon altars have been depressed or quarried into the ground while the altars for the sun have been elevated. The Chinese language used as a symbol for the 'moon-altar' (1.), a combination of the signs 'square' (left) and 'mound' (right). It is a special altar where sacrifices were offered to Earth on the summer solstice. There is a remarkable similarity between the altar sign and the symbol for '5' as it is shown in (2)

(1.)  (2)  (3.) 

The combination of the symbols 'sun' (left) and 'moon' (right) in the second group means 'the times' (3).

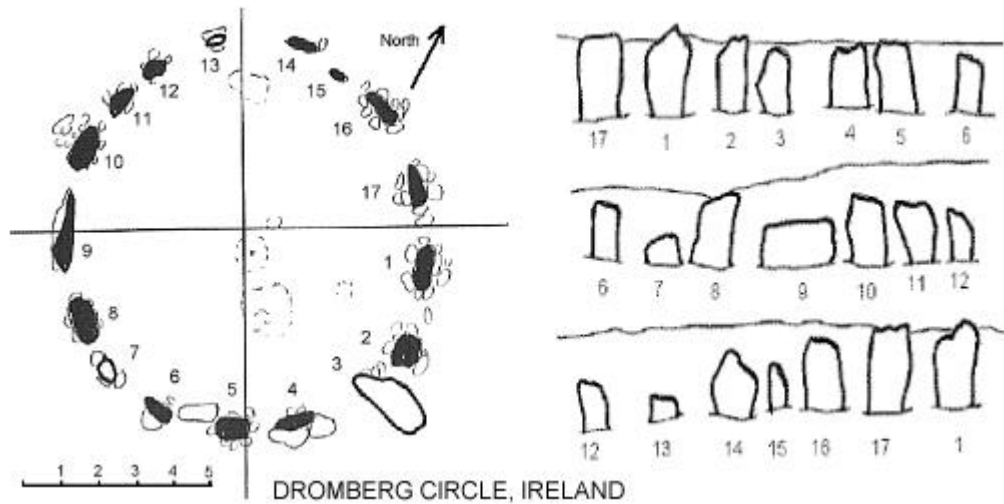
'Magic square of 9', the 17-polygon and the torus

The seventeen-pointed star is an interesting shape. The connection of the star beams are tangents to the inner circle R_4 . One point is oriented towards the east. The secant *B* cuts an arc of $1/17$ th of the circle. If one starts from the east as the beginning, and proceeds towards the end by connecting the endpoints by a sequence of tangents to R_4 then after 5 steps the

³⁵ WILLIAMS, C., A., S.; 1941 *Outline of chinese symbolism and art motives*; Dover Publ. New York, p.278, in: KRUPP, E., C.; 1986; *The cosmic temples of old Beijing*; World Archaeoastronomy, Cambridge, p. 72;

intersection of secant B will be encountered. Counting the entrance as 1, then the whole cycle takes $1+17=18$ steps.

Sometimes the number 17 plays a role in ancient stone circles as it is the case with the form at Dromberg³⁶ where 17 stones are set in a circle (plan 6). Here the 9th stone represents the south-north line from 8 to 9 in plan 5.6. Seventeen is the middle between 2×8 and 2×9 . Additionally, CARL FRIEDRICH GAUSS showed in his first published paper of 1796 that it is possible to construct a regular 17-polygon³⁷.



Plan 6: Dromberg circle

Even more than the figure '17', the next number '18' is connected with the symbol of the moon (see appendix for more information concerning sites in Sardegna and Mesopotamia). The 'tree of life' from the Kabbala has the figure '18' connected symbolically with the moon. The magic square of the size 9 by 9 units was called the "moon square".

The interesting thing about it is that the sequence of the numbers in the magic-9-square follows a simple torus pattern. If one bends, as a first step, the square (a) around the axis x it becomes a tube (b). The top and the bottom are now connected.

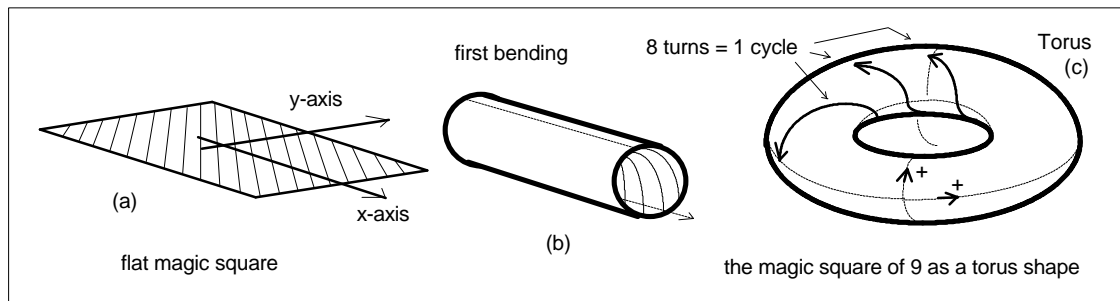


Figure 17: the magic square as a torus

³⁶ See: HICKS, RONALD; 1986; *The year at Dromberg*; in: *World Archaeoastronomy*, Cambridge, p. 470-482.

³⁷ in: 1974; *Mathematik*, VEB Leipzig, p.190;

Then as a second step one bends x to connect the right and left side and the tube becomes a torus (c). The following diagram represents this torus but to simplify the process the torus is wrapped open to the size of the original square.

Now one can start just under the center field (bold) with the first section (unit), and, by following the diagonal down if one arrives at an occupied spot, a sideways step is taken. This happens the first time when one has finished the first loop between step 9 and 10. This side step is necessary in a system with *discrete* units to form an overall closed loop.

Of course, this method can be used for **any** size of squares with odd numbers no matter how high it is. For magic squares with even numbers theoretically the solution follows a similar pattern; but because a discrete system of even numbers does not allow the loops to cover the whole torus, the unevenness has to be introduced artificially by a kind of wave pattern³⁸.

								5(
6(
	7(
		8(
			9(
				↻ 1(
			10(		2(
				11(		3(
							4(

In this way one proceeds until after **8** 360° turns the start point and the end is connected. Then it looks like this:

Moon Square

37	78	29	70	21	62	13	54	5(
6(	38	79	30	71	22	63	14	46
47	7(	39	80	31	72	23	55	15
16	48	8(	40	81	32	64	24	56
57	17	49	9(	41	73	33	65	25
26	58	18	50...'	1(	42	74	34	66
67	27	59	10(	51	2(	43	75	35
36	68	19	60	11(	52	3(	44	76
77	28	69	20	61	12	53	4(	45

Again we have the connection between **8** and **9**. Eight turns on a magic square of **9** in the shape of a torus makes a complete closed cycle. The old Asian Indians counted a week as **8** days with **9** nights. In physics one would say it is an object with spin $1/8$.

³⁸ for the same reason in the modern "String-Theory" the space has to have an uneven number of dimensions. See: DAVIES, PAUL / BROWN, JULIAN, R.; 1989; *Superstrings* dtv, München.

An interesting connection between the number 17 and the moon cycles is to be found in the Osiris myth³⁹. During a party Osiris took place in a coffin prepared by Seth as a trap and then Seth threw the locked coffin with Osiris in it in the river. The myth says, this event happened the 17th Athyr (13th November) in the 28th year of the reign of Osiris. "28" connects with (moon) cycles and "17" with mirroring and change from the visible and touchable world with 8 as a symbol ($2 \times 8 = 16$) to the invisible dimension with 9 as a symbol ($2 \times 9 = 18$). The moment of change is the gap in between, symbolically the "17".

Plato and the torus

It might be an interesting point that PLATO in Timaios 36 b-c, describes an exact replication of the torus model.

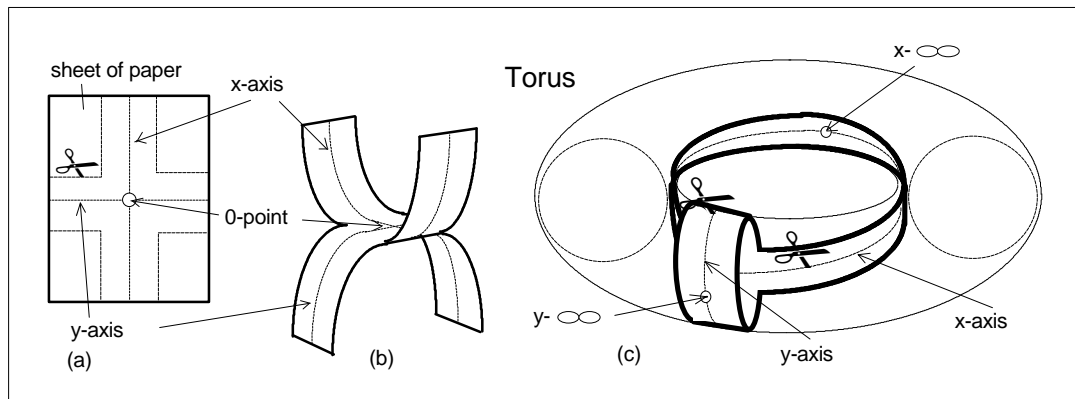


Figure 18: Do-it-yourself torus model, equals PLATO's "world soul"

Instead of the terms "curved space" or "self organizing universe" as used by modern physicists, he talks about the "world soul". If this is checked one can see that he uses an explanation starting from a plane cross ($\chi = X$) bent twice in opposite directions forming two circles where one circle is moved around another circle, thus developing a torus shape. The procedure is shown in **figure 18**.

The proposed paper model has an interesting feature (as with the torus). Usually if you cut a piece of paper along the two center lines (x-axis and y-axis) it becomes 4 pieces. But if one forms the paper into a torus model as the one above, it remains as one single piece if the cut is made along the x- and y-axis!

Odin and the torus

The German myth of Odin says, that in the 9th night the 8th earring of Odin fell off. This is a really nice way to connect standstill, movement, the 8. the 9 and the torus shape into one event that is easy to remember. This connection can also be shown also in geometry in a general way. For a spherical 3-D object only one spin axis is possible. But a torus can have 2 independent axes. If one imagines a bicycle tube, the valve can be turned around the center axis C and around the tube axis T. This allows the following combinations:

³⁹ GRIFFITHS, J., G.; 1970; *Plutarch's De Iside et Osiride*; Univ. of Wales Press, p. 135ff; Brunner-Traut, Emma; 1963; *Altägyptische Märchen*; Rowohlt, Hamburg, p. 127ff.

C\T	→	0	←
↑	↗	↑	↖
0	→	0	←
↓	↘	↓	↙

Table: spin-combinations

The first row: The tube can turn around the T-axis right, left or not at all. The first column: The tube can turn around the C- axis right, left or not at all. All together there are 9 combinations, but 8 of them are only connected with actual movements. This represents the "not-moving-center", the axis of a wheel. This system by which energy patterns were arranged in 8-groups was very successful in particle physics. *'...the quark model automatically leads to the octet and decuplet pattern of the eightfold way. On the basis of this model it is easy to understand the success of the eightfold way, just as the elucidation of the structure of the atom explained why the periodic table has been so successful.'*⁴⁰

Another citation: from HARALD FRITSCH: *"Now, the number eight plays a special role ... with the help of the SU(3) group theory one can predict the existence of eight hadrons and those are just the eight baryons we talked about before."*⁴¹

The number of 18 might well symbolize the mirroring of 9, the material and immaterial part of the process described above. In the pyramid plan there are 2 polygons with 9 corners. A pre-nuraghe site at Goni (ca 20km west of Muravera, Sardegna) presents 18 menhirs lined up in the north-south direction.



Figure 19: Menhirs at Goni, Sardegna

The two middle ones show the most change as the result of human work. The sides facing each other (9 and 10) are made flat as if they had been 1 previously and were now separated into 2 (figure 19) thus providing another example of a connection between 17 and 18.

In Peking until 1899 on the 18th day of the 8th moon of the lunar year the emperor performed a ritual on the moon altar⁴². By considering the above-

⁴⁰ NE'EMAN, YUVAL / KIRSH, YORAM; 1986; *The particle hunters*; Cambridge University Press, Cambridge; p. 208.

⁴¹ FRITSCH, HARALD; 1992; *Quarks, Urstoff unserer Welt*; Piper, München, S.115.

⁴² BREDON, J. / MITROPHANIW, I.; 1927; *The Moon Year*; Kelly & Walsh, Shanghai;

mentioned connections of 8 with 9 and the mirroring to 18, the numbers in the ritual become sensible.

A fractal torus in the theory of chaos

K. R. SREENIVASAN and C. MENEVAU studying fractal dimensions in turbulent liquids found the number 1,37 as a value for torus-like jet streams⁴³. Physicist know this sequence as 'alpha', a constant for the fine structure of atoms. It is a pure number and can be found only in an experiment as the relation of the square of an electric charge and the product of PLANCK's constant h with c . It is related to the probability that a photon will be emitted or absorbed by an electron. It could be a coincidence that the sequence of both numbers are the same. But the other coincidence is that if one considers the electron as a torus shape with no center hole then all of the known behavior of an electron can be explained, including the point-like appearance in 3-D-space. A torus shape can explain also the spin $\frac{1}{2}$ factor found in all particles⁴⁴.

Now, if the quotient of R_5/R_4 is calculated the result is 1,37. But, as we have seen above, R_4 was already involved with the torus shape via the 17-polygon and the magic square of 9. This is speculation, of course, but the number sequence 137 showing up two times with the same object is intriguing.

More torus correlations

Now one may construct around the center M_2 , a theoretical circle representing all of the moon cycles in a year. Every waning and waxing moon shall be represented with one cubit, the length unit of old Egypt. This leads to a circle with a circumference R_c of 13×4 units = 52 cubits. This circle should be considered as the center hole of a torus with the outer radius of R_4 . Such a torus tube with a diameter of $R_4 - R_c$ has a circumference which equals the length of R_3 .

Next the surface of this torus may be calculated with a diameter of $R_4 - R_c$. using the formula $4\pi^2 R_4 (R_4 - R_c)$. The result is $10^3 \times R_4!$ The variations are within the measuring errors.

"TEN"

"10" in mathematics

If you have a modern book of mathematics at hand, check out what it has to say about the construction of a regular 10-polygon. It will say, that *"One side of the regular 10-polygon is the bigger part of the circumference radius divided by the medial section"*. In the event that a graphic is included, you will find a stunning similarity with the presented plan of Giza. The main part of the construction concerns the south eastern triangle M_2 -Q- S_8 with the construction line Q-T representing one section of a regular 10-polygon.

ARLINGTON, L., C. / LEWISOHN, W.; 1935; *In search of old Peking*; Paragon book Reprint Corp., New York;

⁴³ STEWARD, JAN; 1989; Does God play dice ? *The mathematics of Chaos. Chaotic behavior in systems*; Basil Blackwell, Cambridge, MA., page 234;

⁴⁴ WHEELER, JOHN, ARCHIBALD; 1986; *Einsteins Vision; Wie steht es heute mit Einsteins Vision alles als Geometrie aufzufassen?* ; Springer, Berlin, Heidelberg, Seite 97.

Now the first question that arises is "*do Egyptian myths have indicators for the figure 10*"; The next will be, what has modern science to say about the figure '10' ?

"10" in Egyptian myth

The Papyrus of Nebseni (brit. Mus. No.9900, Sheet 14,11. 16ff) contains the text about the "*The Pylons of the house of Osiris*". The following material is an extract formed into a list. As one can see only the first 10 pylons have a 'doorkeeper'. What could be the significance of a doorkeeper? Obviously two conclusions can be drawn. One is that doors usually lead into a kind of space. The second: doorkeepers in most of the cases check one out, you might have to have some kind of knowledge to pass on the other side like a pass word. Doorkeepers in front of heavenly spaces are known in many myths like "Petrus" in christian areas or in an Akkadian cylinder seals one finds the inscription: "*Samas, you lit up the base of heaven. You opened the bolt of pure heaven. You opened the door of heaven*".⁴⁵ In China it was

popular to fix god symbols printed on paper on door posts: 門神

Since EINSTEIN published his theory about quantum behavior of photons modern science equals energy with mass ($E=mc^2$). So the "doors" do not have to be solid ones. Energy wave pattern could be a substitute. But then the dimensions do not have to be limited to three because wave pattern do not occupy 3-D-space (one does not have to move the TV to get another channel). As it will be shown below it is just that what scientists today say about the necessary dimensions for the universe.

P..	Doorkeeper	(comments)
1	Neruit	lady of destruction, sovereign lady
2	Mes-Ptah	mistress of the two lands, devourer by fire, lady of mortals
3	Seqa	lady of the altar, beloved one of every god sailing up the river to Abydos
4	Nekau	mistress of the two lands, decreeth the release of those who suffer
5	Henti-Requiu	flame, Lady of fire
6	Semati	Lady of light, there are serpents over which are unknown
7	Saktiv	garment which envelopeth the helpless one
8	Khutchetef	blazing fire, unquenchable, far reaching tongues of flame
9	Arisutchesef	lady of strenght, clothed with green feldspar of the South
10	Sekhebur	goddess of the loud voice, who herself remaineth unterrified within
11		[Osiris Nu] mistress of every pylon, acclaimed on the day of darkness
12		[Osiris Nu] Invoker of thy Two Lands, destroyer of future ones by fire
13		[Osiris Nu] Hapi (Nile-god) , emit splendour out of Osiris' hidden places
14		[Osiris Nu] lady of might, trampleth on 3 Red Demons, festival of Haaker
15		[Osiris Heru-em-khebit] red of hair and eyes, who appeareth by night
16		[Osiris Heru-em-khebit] lady of the rain storm, soul destroyer
17		[Osiris Heru-em-khebit] Ahibit, lady of hair, Hewer-in-pieces in blood
18		[Osiris Heru-em-khebit] fire-lover, pure one, cutter off of heads
19		[Osiris Heru-em-khebit] light-giver for live, writings of the god Thot
20		[Osiris Heru-em-khebit] Clother, hider of her creations, heart conqueror
21	7 gods	[Osiris Heru-em-khebit] possesseth hidden plans

list of "*The Pylons of the house of Osiris*"

⁴⁵ HEIMPEL, W. 1986; *The Sun at Night and the Doors of Heaven*; JCS 38/2, p. 134

The "pylon" could have been an ancient term for *space dimension*. Modern books of mathematics talk about "families" and "group-theory", in astro-physics one learns about "black holes", "big bang" or "string theory". In case archaeologists from 5991 will find a paper relict from 1991 with the following words: "...The result became known with the maxim: >A Black Hole has no hairs<. The >No-Hair-Theorem< has a high practical value, because it limits considerable th number of possible versions of Black Holes...."⁴⁶. Will they think of an essay about astrophysics?

Other indicators for the ancient use of the term "pylon" as a symbol for space dimensions can be found in Sumer writings and in Celtic songs and poems. The rotating earth produces a fixed point in the night sky. "This colossal celestial pillar, seemingly uniting Earth with various celestial bodies - considered in conjunction with the recumbant crescent - was the aforementioned World Mountain, between the twin peaks of which sat Saturn as the ancient sun-god. Inasmuch as Saturn itself did not appear to move, remaining instead fixed in the polar north"⁴⁷.

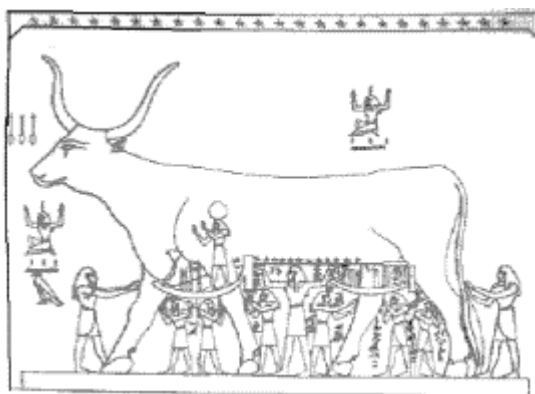


Figure 20: the "cow of the heaven supported by 9+1 gods

The shrine of Tutanchamun shows the "cow of the heaven" supported by 9 gods with 1 god hovering in a bark⁴⁸

Another basic change occurs between 14 and 15 where the text moves from addressing "Osiris Nu" to "Osiris Heru-em-khebit". The term "Osiris" is used in two ways. One means the name of the god and the other is a title for certain states of consciousness, god-like or human-like, dwelling in the realm beyond the four dimensional space-time. "Nu" is a god-like force creating the earth out of the "primeval ocean"⁴⁹. In this case the title "Osiris" points towards the *unseen* part of creation as a distinction to the material part. The

⁴⁶ HAWING, STEPHEN; 1991; *Eine kurze Geschichte der Zeit. Die Suche nach der Urkraft des Universums*; Rowohlt, Hamburg, page121.

⁴⁷ <http://www.ames.net/aeon/feature/fiv57.htm> (The Saturn thesis)

⁴⁸ Image taken from: BRUNNER-TRAUT, EMMA; 1991; *Altägyptische Märchen*; Rowohlt, Hamburg, page 112; The story of the "heavens cow" is to be found in: HORNING, E.; 1982; *Der ägyptische Mythos von der Himmelskuh*; Orbis Bibl. Freiburg; and: MAYSTRE, CH; 1941; in: Bull. Inst. Franç. d.Archéol. Orient, 40, 1941, p.53ff;

⁴⁹ The Papyrus of Nu, I, Bl. XCIII says: "... from the time when earth came into being from Nu, when it sprang from the watery abyss even as it was in the days of old. I am Fate and Osiris, I have made my transformations into the likeness of diverse serpents."

"ocean" association represents an unlimited energy source and the power of emotional desire.

For the 21st pylon there is another text (Turin Papyrus, ed. Lepsius, Bl.64) which goes more into detail. This text says that there is a goddess taking care of the 21st pylon but she cannot be named for to do so will result in great harm to yourself. The chiefs of this pylons are 7 gods: Tchen (Anthch, At) Hetepmes, Messep, Utchara, Beq, Anp (Anubis) and the last one is Amam. The connection of '7' with '21' suggests that there is a 3x7 division of the list as it is known with the "Tree of Life" in the Kabbala. That means that '10' has a section which divides it in 3 and 7.

The Egyptians had a time symbol with no equivalence in western language and thinking. It encloses 'infinite' time as much as 'unlimited source of time units', 'eternity', 'continuance' and 'everlastingness'. The main reason for the difficulty in rendering a satisfactory translation of this concept is the multidimensional nature of time as conceived by the Egyptians.

Modern physics presents it as having made a great stride with the introduction of multi dimensional time like the following citation of STEPHEN HAWKING demonstrates: *"This could lead to the supposition, the so called imaginative time is the real one and what we call real time is only the product of our imagination. In the real time the universe has a beginning and an end at singularities limiting space-time where law of natures have no power any more. Inside imaginative time there are no singularities or limits. Thus, there is a possibility that what we name imaginative time has a deeper meaning and what we call real is only a term invented by us to explain our ideas of the universe."*⁵⁰

The Egyptian symbol for time consisted of the 'uraei', two snakes biting their tail. The Papyrus NU (Sheet 13) equates them with two goddesses winding around the head of the world creator Tem. The snakes belong to the "Lady of the hour" and the 10 toes of a human being are dedicated to her : *"The toes of the Osiris Ani, whose word is truth, are the toes of the Living Uraei"*⁵¹

"10" in space geometry

The discussion of the manner in which space is constructed (see above) is presented as a sequence of considerations up to 5 at which point the term 'speed' was introduced. But to move freely around the world one needs an additional dimension which allows acceleration and deceleration. Continuation of the proposed algorithm results in the introduction of '6', the point representing acceleration. PASCAL's triangle contains the number '6' in the "speed" column. Three parts belong to the 3 components for the 3-D-space dimensions and the other three belong to 'inner' components of curved space.

As demonstrated above, a curved plane becomes a torus which has 2 independent capabilities for spinning, one outer (central axis) and one inner (the tube axis). Continuing this way it can be seen that a curved 3-D-Space

⁵⁰ HAWING, STEPHEN; 1991; *Eine kurze Geschichte der Zeit. Die Suche nach der Urkraft des Universums*; Rowohlt, Hamburg, page 177;

⁵¹ Papyrus of Nu, Brit. Museum N. 10477, Sheet 24;

must have 2 inner axes of spin and a space where acceleration is allowed must have 3 inner spin axes.

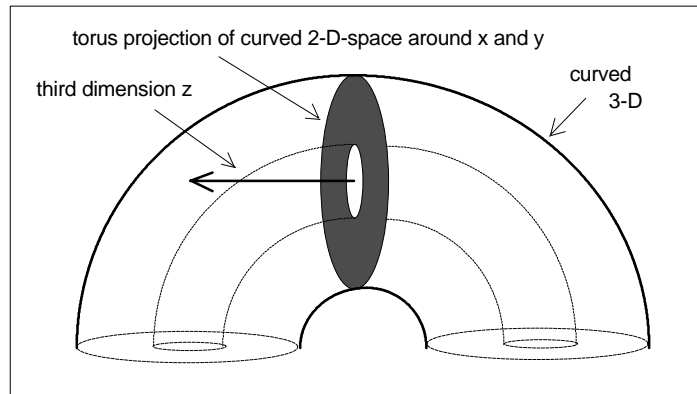


figure 20 : curved 3-D-space for 'speed'

Figure 20 is a model for curved 3-d-space. In order to show it, one dimension has been suppressed in a way that the torus of curved plane space is shown only as a projection and then we can show what happens if we bend the free z-dimension. The former torus would then become a hyper-torus. An additional dimension beyond that will permit a 'hyper-hyper-torus' of the bent 4-D-space with 3 inner spin axes.

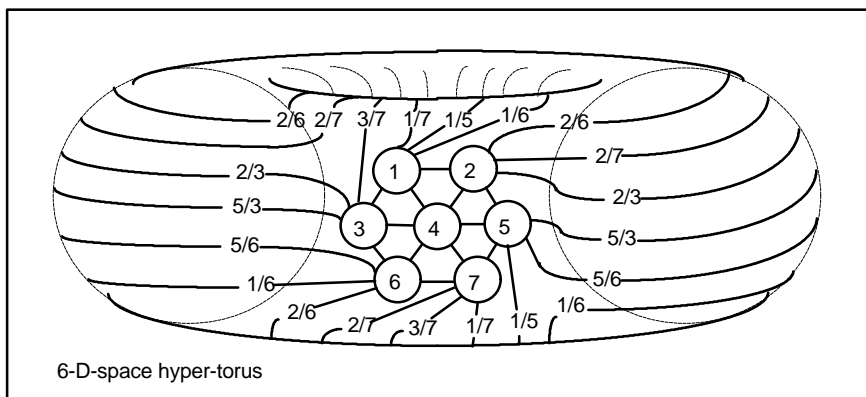


Figure 21: space version of a MÖBIUS-ring

We still need another derivate of space by time to live in this universe and that is *change of acceleration* which allows us to make turns in a car and to control the course. Science has not given a specific term for it but let us stick to "control-dimension". The third derivate is used to explain the propagation of photons in space.

The question is, how long can you continue like this? As you remember the whole construction line follows the rules of projective geometry where 3 points define a projective-regular triangle. But with 7 points even in hyper-space you are finished because then all the hyper-space 'corners' sum up at $6 \times 60^\circ = 360^\circ$! Living in a universe in this shape you cannot say if you might be inside or outside since it is the "space" version of a MÖBIUS-ring as is shown in the figure 21 above.

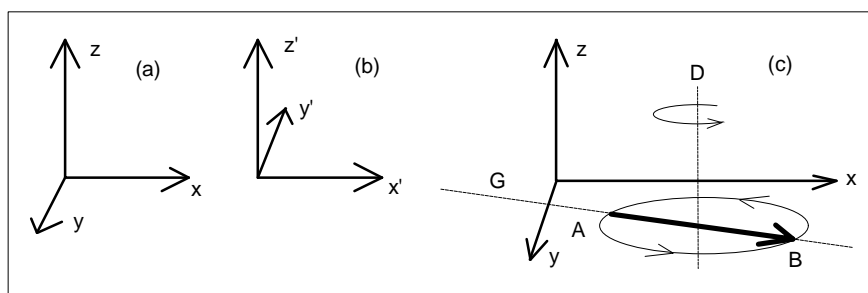


Figure 22: parity transformation of 1-D

However, one important feature of space is still missing and that is called 'parity-transformation'. As an example let us say you have to clean the tables and the sink and you find only two left handed rubber gloves (oriented as in figure 22 a). To do the work, you just turn one glove inside out and use it for the right hand (oriented as in figure 22 b). This is known as a parity-transformation. The scientist G. MÖBIUS in 1825 demonstrated two more dimensions than the dimension of the transformed space are always required for a parity transformation⁵². For an easier understanding figure 22c is limited to the transformation of one dimensional space.

The distance A-B in figure 22 c is orientated towards B. Staying inside the line renders it impossible to change the orientation. But if you turn it, the axis D is 2 dimensions higher. There is an interesting connection between this axis and dying. "The word for die most often used in Vedic literature is aksa, which is part of the term aksaraja. As we have seen, this term is the name of one of the throws [of dice]. But aksa also has another meaning; it designates the axis of a chariot wheel In this case, the word is related to the latin axis."⁵³ says LUIS GONZÁLEZ-REIMANN, and he continues to show the connection of the general law of uncertainty with godlike forces from higher dimensions expressed by an ancient Vedic dice game. The wheel turns but the not-moving center of the axis point towards higher dimensions ruling the lower ones. "That is to say, that the notion that time is a cyclical process is implied here. And it is precisely from the reduplicated form of this root that the Greek kuklos (circle, wheel), English wheel and Sanskrit cakra (same meaning), are derived."⁵⁴ The vedic word for god is deva and devana is the place on which dice were thrown⁵⁵, the place the souls go when they die.

Now let us count all the necessary dimensions together:

- a) We have to consider the point as a unit dimension although this was neglected for historical reasons.
- b) We know of 3 visible space dimension.
- c) 3 (invisible) dimensions are needed for speed (growth), acceleration and 'control'.
- d) 2 separate dimensions are needed for parity transformations.

⁵² MÖBIUS, G.; 1827; *Der Bayrcentrische Calcul*, Leipzig, page 184.

⁵³ GONZÁLEZ-REIMANN, LUIS; 1986; *The ancient Vedic dice game*; in: World archaeoastronomy, Cambridge University Press, N.Y. page197;

⁵⁴ - page 200;

⁵⁵ MACDONELL, A., A. / KEITH, A., B.; 1982 (1912); *Vedic Index of Names and Subjects*, Motilal Banarsidass, Delhi, Vol.1, pp5, 375);

That makes all together 10 dimensions, 9 of which relate to space dimensions and 1 time dimension which produced them. It might be interesting to note, that the Giza area presents 9 square pyramid objects (space-symbols) and 1 sphinx (time-symbol).

"10" in Buddhist teachings and in science

If the concepts of Egypt, India and modern science are compared many parallel thoughts will emerge. In all cases the two numbers 8 and 9 are connected by parity transformation and torus shape rules. Seven is the number of the points to construct space which allows expression of the full control functions. The 4th pylon (stem, axis, pillar, dimension) is dedicated to material manifestation in space. Pylon 5 is connected with change (life, growth)⁵⁶ and fire as a symbol. Pylon 6 talks about movement (snake, animal, acceleration, action). So one could conclude that the universe has to have at least 10 dimensions to show all the features one is used to experience. Interestingly this is exactly that what modern science says and it goes conform with ancient Buddhist teachings as it is demonstrated below:

*"Endowed with the sevenfold gem, trained in the three trainings, These great heroes follow on, fear and dread overcome. Endowed with the factors, great beings concentrated, indeed they are best in the world".*⁵⁷

*"The theory in fashion today is a variance of the ten dimensional theory"*⁵⁸

*"Although, O Sugata, nowhere in the ten directions do you see any suffering, yet you preach compassion for all beings"*⁵⁹

*"The later theories work only if space has 9 and space-time has 10 dimensions It seems somehow mysterious that there remain only four out of ten dimensions whereas six 'roll up'. Why six? Yes indeed, we don't understand this."*⁶⁰

*"A Bodhisattva, a great being, considers the world with its ten directions, in every direction, extending everywhere. He considers the world systems, quite immeasurable, quite beyond reckoning, quite measureless, quite inconceivable, infinite and boundless."*⁶¹

*"Here we have exotic mathematics that curls the eyebrows of some of the best mathematicians in the world. They talk about ten dimensions: nine space and one time dimension."*⁶²

⁵⁶ Many times the error is made to associate "change" intrinsically with "movement". You even find it with famous philosophers like PLATO, ARISTOTELES, KANT, HEGEL, LEIBNITZ etc. Movement is change, but change must not be movement. A simple quartz watch or a TV screen shows that there's no bijective connection between them. They *can* happen together, but this is not necessary!

⁵⁷ Samyutta-nikaya III 83-84. The mentioned "10 powers of a Tathagata" you'll find at Majjhima-nikaya I, 69-71.

⁵⁸ SCHWARZ, JOHN; in: DAVIES, PAUL / BROWN, JULIAN, R.; 1989; *Superstrings* dtv, München.

⁵⁹ Sikshasamuccaya 259-261 (Pitrupturasagama)

⁶⁰ GREEN MICHEL, in: DAVIES, PAUL / BROWN, JULIAN, R.; 1989; *Superstrings* dtv, München, page 137, 155;

⁶¹ Ashtasahasrika VI, 135

⁶² LEDERMAN, LEON; 1993; *The god particle If the Universe is the Answer, What is the Question?;* Houghton Mifflin New York, page 364.

"By the saviors who are masters of the ten stages,When this had been said, the Lord Avalokita, smiling all over, surveyed all the ten regions with eyes that radiated friendliness."⁶³

"you see, in the clearest version the Superstring Theory is expressed in ten dimensions."⁶⁴

"Whatever you see, that is it, in front, behind, in all the ten directions."⁶⁵

" In the early phase of the universe it might have been a time where a scientist - if he would have existed then, that is obviously not the case - would have seen all nine space dimensions plus the time dimension."⁶⁶

" It is the Truly-so, the Transcendent Sphere, where there is neither He nor I. For swift converse with this sphere use the concept "Not Two"; In the "Not Two" are no separate things, yet all things are included. The wise throughout the Ten Quarters have had access to this Primeval Truth; For it is not a thing with extension in Time or Space; A moment and an eon for it are one."⁶⁷.

"10" and the Celts

The Celts had a universe with 9 space and 1 time dimension. The basic difference concerning their theory of mass and energy compared to western science in the 20th century is not as big as one would assume. They thought of mass as a sum of wave pattern and for this they used harp strings as a symbol for overlapping energy pattern producing the illusion of a massiv object. One finds a lot of parallels in the philosophy of the Celts with the ones of Egypt and India. For the Celts the symbol for the primeval energy source was the "ocean" conjured by the Barde TALIESIN as the 9th wave.

In coin engravings the harp body was often depicted in egg shape closing the association to the symbolic form of the universe. Below one finds an example how the correlation of '9' and 'harp' shows up in Celtic songs:

"Wanderings

*I appeared in many aspects
before achieving final form
I have been a golden spear
This I still remember today
I have been the raindrops in the wind*

.....
*I have been the strings of a harp
and this for nine years*

.....⁶⁸

"Le Kat Godeu

*Bum yn lliaws rith
Kyn bum disgyfrith
Bum cledyf culurith
Credaf pan wrlth
Bum deigyr yn awyr*

.....
*Bum tant yn telyn
Lletrithawc naw blwydyn*

....."

⁶³ Aryatarabhattacharitanamashottarasatakastotra, 20, 22

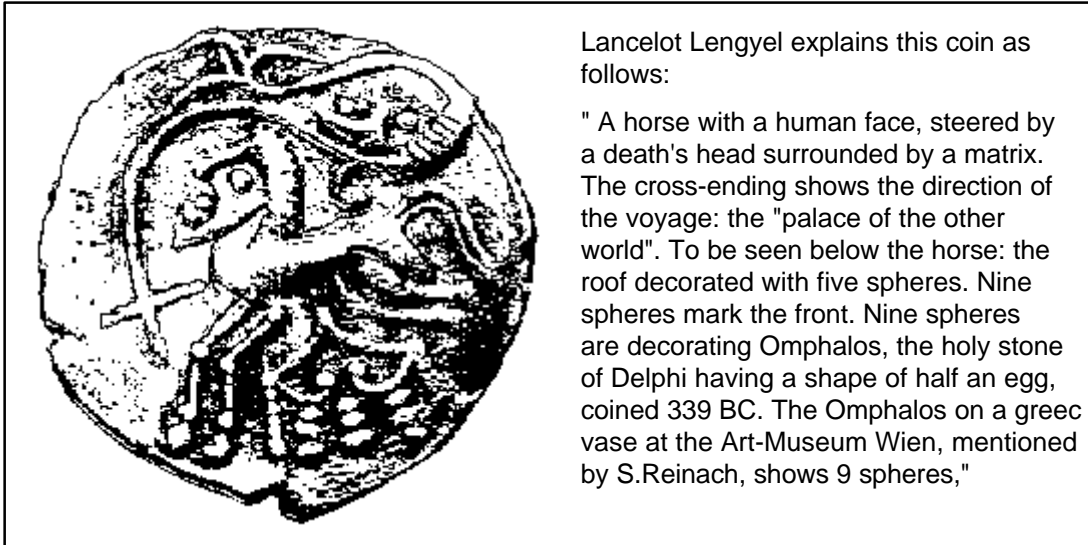
⁶⁴ SALAM, ABDUS; in: DAVIES, PAUL / BROWN, JULIAN, R.; 1989; *Superstrings* dtv, München, page 207

⁶⁵ Saraha's Treasury of Songs, Dohakosha, 28

⁶⁶ WEINBERG, STEVEN; in: DAVIES, PAUL / BROWN, JULIAN, R.; 1989; *Superstrings* dtv, München, page 250.

⁶⁷ Takakusu XLVIII, 376.

⁶⁸ LENGYEL LANCELOT; 1988; *Das geheime Wissen der Kelten*; Bauer, Freiburg, p.200-201;



Lancelot Lengyel explains this coin as follows:

" A horse with a human face, steered by a death's head surrounded by a matrix. The cross-ending shows the direction of the voyage: the "palace of the other world". To be seen below the horse: the roof decorated with five spheres. Nine spheres mark the front. Nine spheres are decorating Omphalos, the holy stone of Delphi having a shape of half an egg, coined 339 BC. The Omphalos on a greek vase at the Art-Museum Wien, mentioned by S.Reinach, shows 9 spheres,"

"10" and chinese cosmology

The Chinese cosmology talks also about the '*10 stems of heaven*' grouped in 5 pairs of: Fire - Bamboo , Burning wood - Lamp flame, Hill - Plane, Weapons - Kettle, and Waves - Brooks. The sign for it is (1):

(1) 十方 (2) 古

The first part of (1) means '10' and the second one we know already as '*square*'. It points towards multi-dimensional space which is invisible from the third dimension, but this is the space where the ancestors, being also future reincarnating persons, are dwelling. The '10'-sign means also 'complete' which goes along with the ideas explained above. In another combination with the root sign '*opening*' it appears as the symbol for '*ancient*' (2). Here it becomes obvious that the writing system was used by the ancient people to communicate with the ancestors. The lower part of (2) means 'talking'. The upper part '10' or '*complete*' means '*the ones living beyond the three dimensional space*', and taken together we get '*talking to the completed ones in the 10 dimensions beyond the visible world*', thus the ancestors who could also be the future family members. In some South American tribes a child dying young is considered as an ancestor just coming to visit for a short period of time from the world beyond. The connection of '*dying*' with '*west*' was mentioned already, and it remains to add that the Chinese sign for '*west wind*' has as an additional meaning as '*gates of heaven*'.

Galaxy correlation

Our galaxy has a radius of about 50000 light years with the sun positioned at a distance of about 30000 light years from the center, that is 60% from the galaxy radius. Astronomical books give different numbers but this is a value in a middle range. If we equal M_2 and the circle R_4 with our sun system cycling around M_3 with M_3 as the center of the galaxy, the position of M_2 (the sun) is likewise 60% from the circumference. Above we equated the circumference of R_4 with one cycle of the equinox through the zodiac involving 25765 years. Taking this as a basis for a scale the circumference of

M_3 equals 114.951. Multiplicating this value with 2 and 10^3 results in a figure which is close to the time for a whole cycle of the galaxy with about 225 Million years.. Because the exact time is not known estimations must be used. The factor 2 is not very satisfying, it could be a hint for spin $\frac{1}{2}$, a very important quantum number.

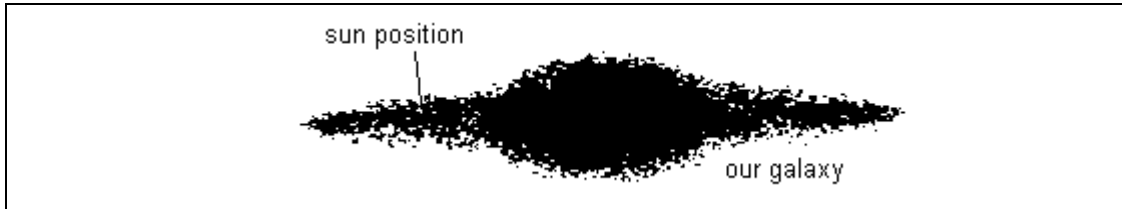


Figure 23: cross section of the galaxy

The other more severe problem is posed by the differential speed of the galaxy. If a galaxy would turn like a stiff disc the red shift should have a linear increase from the center to the edges. In a differential rotation as may be observed with respect to milk in coffee, the rotation remains the same for a great distance. The third type of movement is named 'KEPLER-rotation' as it is known in the case of our solar system and the associated planets. Here the circular speed decreases with the distance from the center This type of movement should be observable but no evidence has been detected to date. That means no single theory can explain the behavior of our galaxy so it is pretty speculative to try to determine a certain number which represents the galaxy cycle. So in case the constructors of the pyramids would have known this problem it could be that this number refers to a relative axis speed of the core disk of the galaxy.

But there is also another correspondence:in that the center of our galaxy is positioned in reference to the spring equinox point with a rectazension of 325° and a declination of 0° . Taking S_{11} as a center and A as a equinox reference line, M_3 expresses an angle of 325° towards $S_{11}S_{20}$ and 325° is also found with the head of the sphinx as a center for an angle between P_1 and M_3 .

A short comment on the estimated time for 1 galaxy cycle of 225 million years. If the sum of the numbers 1 to 5 is squared the value is the same as the cube of the first 5 numbers taken separately and added. In both cases the result is 225. This is probably a coincidence but at least it should be mentioned.

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APPENDIX

The sources for the following plans are

Mesopotamia

TEPE GAWRA:

SETON LLOYD; 1985 (1978); *The Archaeology of Mesopotamia*; Thames and Hudson, London;

Sardegna

S.VITTORIO DI SERRI:

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this book is integral part of:

SANNA, NATALE; 1987; *Il cammino dei Sardi*; Ed. Sardegna.

The plan itself is part of :

LILLIU, GIOVANNI; 1981; *1500 anni della civiltà nuragica. L'era del megalitico*;
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BARACCA SU ENTU, CASA LACCUS:

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S PRIAMO, S. MARIA (MURAVERA) , S.VITO, ASORU

Own research and measurements May 1997

TEPE GAWRA, ROUND HOUSE

Position: 43°15' east , 40° 15' north
North Irak , Level XI, protoliterate period

Azimut sommer solstice 302,29°	northern-most moon 295.09°
northern-most moon 230.32°	southern-most moon 309.68°
southern-most moon 244.92°	
winter solstice 237,71°	equinox: northern-most moon 263.25°
	southern-most moon 276,75°

Construction details:

The curve of the building is not exact circular. So the question is, where was the original center of the construction? With some probability it might be c_1 because from there one can draw a circle with the radius of the notch **n** touching the south eastern point **se** as a main construction direction, and the equinox side. In addition from c_1 you can divide the building in 6 equal layers. In some rooms the division fits the orientation of the walls, in other rooms the walls are slightly moved to fit other orientations. The Sumer connected the number 6 often with the Mars god, presenting him with a 6-pointed star. The value '6' can be explained because they counted the planets from the outside, thus Jupiter is 5th, Mars 6th, Earth 7th and Venus 8th.

All together there are 18 rooms. Studies from other sites suggest that the number 18 (and 17) is connected with the Moon. Here the center wall in the middle room has an orientation 3° south of a theoretical northern-most moon-rise at summer solstice. The deviation might be due to mountains in the north east. Then the openings between room 17 and 18 fit exactly a beam south of the center wall reaching a notch on the inside of room 1 and a northern beam going parallel to the center wall of room 16 and 17. The theoretical point (tp) for the winter southern-most moon-set, resp. summer northern-most rise, is marked by the notch **n** where the prolongation, cut off by the circle C, points exactly in this direction. Another mark on the northside of room together with a slit between room 13 and 14 gives the direction for the southern-most winter moon-rise. Another notch orientated in this direction at the entrance of room 1 outside of 2 gives the winter solstice point.

The orientation of the construction with the main axis 36° west of north suggests a pentagon symbol involved.

A line from notch **a** to the center of the niche at room 13 cuts the center wall in room 17 at C_2 . A circle around C_2 with radius C_2a gives the arc **a-b**. Center beams of a 17-polygon find lots of references in the building. The angle between **a-b** and **f-g** is $2/17^{\text{th}}$, **b-d**, **d-e**, **e-f**, **g-h**, **h-i** and **k-a** are all $1/17^{\text{th}}$.

A line from corner **d** towards the northern-most moon rise cuts **a-c₂** at c_3 .

From here the angle between **a** and **b** is $3/17^{\text{th}}$ and to the **k**-corner of room 6 it is $2/17^{\text{th}}$. The same value one finds between **b** and **e**. From **e** to the **f**-corner of room 11 it is $1/17^{\text{th}}$. Seen from c_1 the east wall of room 18 has an opening angle of $1/18^{\text{th}}$. 120° ($6 \times 1/18^{\text{th}}$) counter-clockwise from C_3a one finds the the north side of the inside notch between room 18 and 11. The south side of this notch is defined by counting clockwise

around C_3 from the northern-most moon $7 \times 1/17^{\text{th}}$.

S. VITTORIO DI SERRI**SARDEGNA****I. Abbreviations:**

- 1.) "circle": \odot
- 2.) "regular triangle": ∇
- 3.) "angle": \sphericalangle
- 4.) "perpendicular": \perp
- 5.) "cut(s)": \bowtie
- 6.) "straight line with the points x and y": (xy)
- 7.) "Circle with center M and radius R" : $\odot M(R)$
- 8.) "straight line with the points x and y cuts the straight line with the points a and b at z" : $(xy)\bowtie(ab)\rightarrow z$.
- 9.) "perpendicular from point c to line d cuts e at f": $\perp c(d)\bowtie e\rightarrow f$.

II. Procedure

- 1.) $\odot M_1(R_1)$
- 2.) North-south axis (NSA) $\bowtie \odot M_1(R_1) \rightarrow s_1$ and s_2 .
- 3.) $\perp M_1(NSA) \bowtie \odot M_1 \rightarrow s_3$.
- 4.) $(M_1 s_1)/2 = s_4$. $\odot s_4(s_4 s_3) \bowtie M_1 s_1 \rightarrow s_5$.
- 5.) $\odot M_1(M_1 s_5) \bowtie \odot s_3(M_1 s_5) \rightarrow f_1$.
- 6.) $\odot f_1(R_1) \bowtie \odot M_1$ east at f_2 and west at f_3 .
- Now you have pentagon #2 = $(M_1, s_3, f_3, f_1, f_2)$
- 7.) \perp from corners give center M_2 of #2.
- 8.) inner \odot of #2 = $R_2 = \perp M_2 \rightarrow \#2$. $R_2 \bowtie$ center beams towards #2 at corners of inner pentagon #3.
- 9.) $M_1 M_2 \bowtie \odot M_1(R_1) \rightarrow M_3$.
- 10.) $\perp M_3(s_1 s_2) \bowtie \odot M_1 \rightarrow f_4$. $\odot f_4(M_3 f_4) \bowtie f_5$.
- Now you have pentagon #1 = $(M_3, f_4, f_5, s_2, s_6)$
- 11.) $\odot M_3(M_3 f_4) \bowtie f_6$.
- 12.) $f_1 f_2 \bowtie s_1 s_6 \rightarrow s_7$. $\odot M_1(R_3 = M_1 s_7)$
- 13.) $M_1 f_3 \bowtie s_1 s_3 \rightarrow M_4$. $\odot M_4(R_2)$.
- 14.) $\odot M_1(M_1 M_4) \bowtie s_2 s_3 \rightarrow s_8$ (landmark = stone).
- 15.) $\perp s_8(M_1 s_2) \bowtie s_1 s_3 \rightarrow s_9$.
- 16.) $\perp M_2(M_1 s_3) \bowtie M_4 s_1 \rightarrow T_1$.
- 17.) $\odot s_9(s_9 T_1) \bowtie s_9 T_1 \rightarrow T_2$.
- 18.) $\odot T_1(T_1 T_2) \bowtie \odot T_2(T_1 T_2) \rightarrow T_3$. now we have the regular triangle $\nabla(T_1 T_2 T_3)$.
- 19.) $\odot T_2(T_2 s_3) \bowtie T_2 T_3 \rightarrow Z$. and we have $\nabla(T_2 T_3 Z)$.
- 20.) $(T_2 Z)/2 = s_{10}$.
- 21.) $\perp f_4(f_4 M_3) \bowtie f_5' s_2' \rightarrow q_1$ (access well temple).
- 22.) $\perp f_4(f_4' M_3') \bowtie \perp q_1 \rightarrow q_2$ (center of well temple).
- 23.) $\odot M_4(R_2) \bowtie M_4 s_1 \rightarrow A$.
- 24.) $\odot A(R_1) \bowtie T_3 T_1 \rightarrow R$. $R f_5 \bowtie R_3 \rightarrow e_4$.
- 25.) $\odot M_1(R_4 = M T_1 = M s_9)$.

- 26.) Center of $\nabla T_1 T_2 T_3 = M_T$; outer $\odot M_T(R_5 = M_T T_2)$; inner $\odot M_T(R_6 = M_T s_9)$.
- 27.) $\odot S_3(R_6) \times S_3 T_2 \rightarrow s_{11}$. $\perp(s_{11}) \times \odot s_4(s_3 s_8) \rightarrow I$ (south) and F (north).
- 28.) $\odot T_3(R_5) \times T_3 T_2 \rightarrow s_{14}$. $s_{14} T_1 =$ radius outer sphere of tetrahedron with side length $T_1 T_2$.
- 29.) $\odot T_2(R_0) \times \odot T_3(R_0) \rightarrow Y$.
- 30.) $T_2 Y \times M_1 s_9 \rightarrow E$; $\odot E(E s_{11}) \times E s_{10} \rightarrow C$.
- 31.) $M_1 q_2 \times R_4 \rightarrow s_{15}$; $\odot s_{15}(R_7) \times R_4 \rightarrow M_5$ (southeast).
- 32.) $f_4 q_1 \times P_1 \rightarrow s_{16}$. $M_1 s_{16} \times s_{15} M_5 \rightarrow M_6$. $\odot M_6(M_6 q_2) \times M_6 s_8 \rightarrow s_{17}$;
 $\odot M_6(M_6 q_2) \times M_6 f_3 \rightarrow s_{18}$.
- 33.) $\odot M_5(M_5 P) \times R_4 \rightarrow s_{19}$ (east). $\odot s_{19}(s_{19} q_1)$ defines second segment of wall, limited by $M_6 s_8$ and $M_6 s_{10}$.
- 34.) $\odot(M_5) M_5 q_2 \times \odot f_5 q_2 \rightarrow W$.
- 35.) $\odot M_6(M_6 q_1) \times s_2' W \rightarrow V$.
- 36.) $\odot f_5(f_5 q_2) \times s_8 q_2 \rightarrow T$. $\odot f_5(M_1 M_4) \times M_1 f_5 \rightarrow U$.
- 37.) $\odot M_5(M_5 f_5') \times \odot q_2 \rightarrow X$ (Part P_3). NSA through X defines orientation of rectangle-temple X and the accesses,
- 38.) $\odot T_3(s_2 f_2 = s_5 f_5) \times T_1 T_3 \rightarrow D$.
- 39.) $T_3 s_{13} \times \odot T_3(R_0) \rightarrow s_{20}$; $\perp s_{20}(T_2 T_3) \times s_{21}$. $s_{20} s_{21} = R_i$. $\odot Y(R_i) \times Y T_2 \rightarrow G$.
- 40.) $M_1 f_5 \times R_1 \rightarrow s_{22}$, $\odot A(R_2) \times A S_{22} \rightarrow N$. $\odot J(R_2) \times J s_{22} \rightarrow L$.

III. Remarks

- 1.) $R_7/R_8 = 1.015 = 365/360$
- 2.) $R_9/R_7 = 0,98 = 360/365$
- 3.) $R_{11}/R_7 = 1,11$; $1.11 \times a =$ inner sphere of dodekahedron
- 4.) $R_{10}/R_7 = 0,95$; $0,95 \times a =$ outer sphere of Ikosahedron

PRE NURAGHE S. PRIAMO,

SARDEGNA

39°21' north 9°37' east

Construction Plan

- 1.) Start with a circle F_1 around C_1 with a diameter representing 13 moons of the year ($13 \times 28 = 364$). One moon cycle shall be represented by one Megalithic Yard (MY) = 0,8235 meter. $13 \text{ MY} \times 0,8235 \text{ m} = 10,7055 \text{ m}$.
 - 2.) The sides of a square inside F_1 are orientated to north and east, they define the corners '1', '2', '3' and '4'.
 - 3.) A circle F_2 around the middle of '2'-'3' = C_2 with the radius of $3 \text{ MY} = 3 \times 0,8235 = 2,47 \text{ m}$. F_2 cuts '2'-'3' at **a** and **b** and the north direction an **d**.
 - 4.) Circle F_3 around **b** with radius **b cuts F_2 at **e** and **db** at **f**. A circle around **f** with the radius of F_2 cuts F_3 at **g** and passing through **b** cuts C_1C_2 at **h**.**
 - 5.) F_4 is the circle around **a** with the radius of F_2 . **ga** cuts eC_2 at **i**. **fb** cuts **ag** at **k**. Circle around **i** with radius **ak** cuts F_4 at **m** and '2'-'3' at **n**. **ag** cuts F_4 at **o**.
 - 6.) F_4 cuts F_2 at **p**. Circle around **b** with radius **bp** cuts C_1C_2 at **q**.
 - 7.) F_1 cuts F_2 at **r**. The equinox line through **r** cuts the north line at **s**. eC_2 cuts **rs** at **t**.
 - 8.) Circle around **o** with radius C_1C_2 cuts in the north the circle around **t** with radius **tq** at **u**, and in the south the line **sr** at **v**.
 - 9.) Circle around **n** with radius **hq** cuts arc **qu** at **w**. The north line through **w** cuts '2'-'3' at **x**. A parallel on the other side in the same distance cuts F_1 at **c**. The summer solstice line through **c** defines the outer south eastern part of the construction The western part of the entrance is defined by **wx**. A circle around **w** with radius **hq** cuts **wx** at **y**.
 - 10.) The south eastern inside is composed by two arcs, the first goes around **z** with radius **zg** and the second goes around **q** with radius **qh**.
- The outer north eastern part is too much deteriorated to find reference points for the construction. Many parts are still burried in the ground.

PRE-NURAGHE BARACCA SU ENTU

Sardegna , Capo Ferrato, south of M. Ferru, east of beach S'acqua Pudexia

Construction plan

1.) It starts with a regular triangle with the corners f_1 - f_2 - c_1 . The mirrored one has the corners f_1 - f_2 - c_2 . f_1 and f_2 are focus points of an ellipse with the center $M_1 = (f_1 - f_2)/2$. The short radius of the ellipse: M_1c_1 and M_1c_2 . The long radius makes a circle around M_1 with the length $f_1 - f_2 = r_1$.

2.) The December solstice line from f_1 cuts r_1 at c_3 . The equinox line from M_1 cuts also c_3 . This defines the orientation of the ellipse.

3.) The long radius through f_2 cuts r_1 at c_4 . Circle around M_1 with radius c_1 - $c_4 = r_2$. r_2 is the bigger radius of the outer ellipse. The orientation: the short diameter points towards December solstice D. D cuts f_2 - c_2 at c_5 . The length of the short radius of the outer ellipse is $c_4 - c_5 = r_3$. A perpendicular at the end of r_3 cuts the circle and from there another perpendicular gives the new focus points f_3 and f_4 .

4.) The north direction cuts r_2 at c_6 . The December solstice line through c_6 and the une solstice line through f_3 cut at M_2 . Circle around M_2 with radius M_2 - $f_4 = r_4$. r_4 is the long radius of the half ellipse, the short one has the length M_2 - f_3 .

5.) r_4 cuts r_2 at c_7 . f_4 - f_3 cuts r_2 at c_8 . A perpendicular to M_2 cuts r_4 at c_9 . A circle around c_7 with radius c_7 - c_8 cuts a circle around M_1 with radius M_1 - c_9 at c_{10} .

6.) The angle c_8 - c_7 - c_{10} has an opening of $26,5^\circ$. This is the angle the earth moves around the sun in one siderical moon cycle (13,37 cycles/year). Constructing an ellipse from a regular triangle one arrives automaticly at a value of $\sqrt{3}/2 = 0,866$. This comes very close to $e/\pi = 0,865$! So this could be a pure coincidence and not intended by the constructors of the Pre-Nuraghe site. But the way the outer ellipse is constructed gives you the same result. Again the relation of the diameters is e/π and the half-ellipse shows the value $0,785 = \text{rad } \pi/4$. M_2 - c_8 is the northern-most moon rise at June solstice 2000 BC. The length of the arc c_8 - c_{10} equals c_4 - c_5 .

7.) As in many other sites for the division of a circle in a 17-polygon one can find some indicators here too. M_1 - M_2 has towards the equinox direction an angle of $1/17^{\text{th}}$. As a coincidence of the azimuth for the site the angle between M_1M_2 and the winter solstice direction is $6/17^{\text{th}}$.

PRE-NURAGHE CASA LACCUS

Sardegna, near Monte Turno

Construction plan

1.) Circle around m_1 with radius r_1 cuts the north direction at c_1 and c_2 . $(c_1 - m_1)/2 = c_3$. A perpendicular to m_1 cuts r_1 at c_4 . A circle around c_3 with radius $c_3 - c_4$ cuts the north direction at c_5 .

2.) Circle around c_1 with radius $m_1 - c_5$ cuts r_1 at p_1 and p_2 . $p_1 - p_2$ is now the base of a regular pentagon; continuing this way one gets the other corners p_3 and p_4 . $p_1 - p_2 - p_4 - c_2 - p_3$ is a regular pentagon.

3.) $p_2 - c_2$ cuts the summer solstice line **A** at c_6 . Circle around m_1 cuts $m_1 - p_2$ at m_2 . Circle around m_2 with radius $m_2 - m_1$ cuts the prolongation at m_3 . Circle around m_3 with radius $m_3 - c_3$ cuts the north direction at c_7 .

4.) Circle around m_1 with radius $c_6 - m_1$ cuts $p_1 - c_2$ at m_4 . Circle around m_4 with radius $m_1 - m_2$ cuts r_1 at c_8 . **A** cuts r_1 at c_9 . Draw the line $c_8 - c_9$. $c_8 - c_9$ has towards the north direction an angle of $49,5^\circ$. $\text{rad } 49,6^\circ = 0,865 = e/\pi$. The same angle counter-clockwise from north cuts a circle around m_1 with radius $m_1 c_7$ at c_{10} .

5.) $m_1 - c_4$ is the equinox direction. **B** points towards winter solstice. The $\text{rad}(x) = e/\pi$ direction finds two landmarks. One is a long stone off-center from m_1 and the other is the end of the outer wall-circle.

PRE-NURAGHE S. MARIA

Muravera, Sardegna

Construction

1.) Circle around m_1 with radius $n-m_1$. $(n-m)/2 = a$. The north-west line from m_1 cuts the circle at **b**. $w-n$ and $w-a$ cut m_1-b at **c** and **d**. A parallel to m_1-n cuts the circle at r . Now r is the second corner corner of a heptagon with the top at west (w).

2.) To make an egg-shape draw an outer circle with radius $(m_1-n) + (c-d) = (m_1-n')$. Then the focus of the half ellipse will be f .

3.) The outer wall circles in a distance of **c-d** to the egg. The western end is limited by e' . Point e is the intersection of the circle with an equinox-parallel in the distance $n-b$. $n-b$ is one side of a regular 10-polygon.

The line m_1-e cuts the outer wall at e' . e and e' are the first corners of a regular nonagon with the top at w . The rest of the wall is orientated towards the **a**-point of the circle.

4.) A parallel to $w-m_1$ in the distance **c-d** cuts the egg at g and h . $h-a$ doubled becomes i . At i an angle towards south with the opening $n-m-r$ cuts the circle around i with radius $i-g$ at k . Adding m_1-n' to i one gets p . A parallel to $p-i$ in the distance $n-b$ cuts a perpendicular to p at q .

NURAGHE S. VITO
SARDEGNA
(1,5km north of S.Vito)

Construction Plan

- 1.) Circle F_1 around C_1 with a radius of 5 Megalithic Yard (MY).
1 MY = 2,7 fuss = 0,8235 Meter. 5 MY = 4,1175 meter = $C_1(18)$. The circumference has now in MY the length of π . The north line cuts F_1 at 18 and 9.
- 2.) Circle around 18 cuts F_1 at 15 and 3. Circle around 9 cuts F_1 at 12 and 6 giving the corners for a hexagon. Dividing the 6 regular triangles in three parts you'll get the regular 18-polygon 1, 2, 3, ..., 18.
- 3.) Circle F_2 around C_1 with radius $C_1(18)/2$ cuts the north line at **b** and C_2 . F_2 is the inner circle of the regular triangle 17-11-5.
- 4.) Circle F_3 around C_2 cuts F_2 at **a**.
- 5.) A rectangular to **b** cuts 18-11 at **d** which defines the radius C_1d for the circle F_4 . F_4 cuts C_1-9 at **G**. 17-5 cuts F_4 at **z**. A line from **z** to the (theoretical) summer solstice point (SS) cuts F_2 at **e**. The *visible* solstice line (VS) (because of mountains on the horizon) is **z-d**.
- 6.) A spiral goes from **z** over C_2 to **g** with **g** as the intersection of 18-11 and the eastern direction.
- 7.) A rectangular at **G** cuts F_3 at C_3 . The circle F_5 around C_3 cuts F_1 at **h** which defines one end of the entrance arc. The other end is defined by the line **g**- C_3 .
- 8.) The flattened south east part is given by a circle around **z** with radius **z-9** ending at **i**. C_1-12 cuts this part at **k**. F_5 cuts 9-**k** at **n**. **e-n** gives the direction of the window.
- 9.) 5-11 cuts C_1-10 at C_4 . Circle around C_4 with radius C_1-k defines the south western arc.
- 10.) Circle around C_4 with radius C_4-11 cuts **e-n** at **m** which is the nose of the lower southern platform. The sides are given by **m-i** and a tangent from **m** to F_1 .
- 11.) **e-n** cuts the west line at C_7 which is the center of a heptagon. Four of the seven corner directions are given by the points 2, West, 7 and **n** (or **m**).

NURAGHE ASORU, S. PRIAMO

Sardegna

Construction

1.) Circle around m_1 with radius r_0 cuts the north-(n) , south-(s), east-(e) and west-(w) direction. The north west beam from m_1 cuts n-w- at c_1 . c_2 -W cuts m-nw at c_3 . c_3 -nw = r_c is the radius of the central circle, a kind of seat inside the Nuraghe. c_3 -w = r_i is the inside radius of the wal.

2.) A parallel throug c_3 to the north cuts r_i at h_4' . h_4' is the 4th corner of the heptagon S'- h_2' - h_3' - h_4' - h_5' - h_6' - h_7' . With it you will get the outer heptagon S- h_2 - h_3 - h_4 - h_5 - h_6 - h_7 .

3.) W- m_1 cuts r_c at c_4 . The east direction from h_3 cuts the perpendicular to c_4 at the observation point **ob**.

4.) $r_0+r_c=r_2$. An inside heptagon angle of $51,4^\circ$ north west cuts r_2 at c_6 . Along the perpendicular to c_6 runs north west wall.

5.) A perpendicular to r_i cuts r_0 at c_7 . Adding that distance to r_2 gives c_8 . A circle around n with radius $n-c_8=r_1$. cuts the north east direction at c_9 . c_9 -N defines the north east wall. It continues with a circle around W with radius W- c_9 . From east to south the direction is given by c_{10} , where the east-line from h_7 cuts r_2 . The south end is limited by r_3 . r_3 is a circle around m_1 with radius m_1-c_8 .

6.) A circle around m_1 with radius r_1 cuts south at m_2 . The wall is defined by a circle around m_2 with radius r_i . The east access is given by the two walls meeting at c_{11} . m_1-h_3 cuts r_1 at c_{11} . The other wall is the tangent from c_{11} to r_i .

7.) The south west line cuts r_3 at m_3 . The circle around m_3 with radius r_c defines this stabilizing wall.

8.) North of r_2 there's an ellipse with the diameters c_3-m_1 and c_3-c_2 .

9.) Stonemarks for the heptagon corners are rows at h_4 , h_5 and h_7 ; the outer stone at h_3 marks the equinox window with a shape of a 5-pointed star at h_6 , which works for summer solstice too. The northern-most and southern-most moon at summer solstice can be seen from **ob** through ne and h_6 .