

## SG207.Ia Sacred Geometry in Architecture, Sacred Sites \& Harmonic Design

Online Module SG 207 / Interm VII


Presented by AYA
\& the School of Sacred Geometry
P. O. Box 3714

Sedona, AZ 86340

Www.SchoolOfSacredGeometry.org phioschoolofsacredgeometry.org
www.starwheels.com

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## SG207.Ic SG in Architecture, Sacred Sites \& Harmonic Design



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## SG207.Id SG in Architecture \& Sacred Sites - Intro

Here again we are tackling a large subject, related to a primordial need of the human being: home-making and the proper, harmonious relationship with the environment. Overtime, the construction of individual and collective buildings became an art and a wisdom, established as the specific expression of certain cultures.

In all ancient cultures, priority was given to define the primordial relationship of mankind with the universe, creating in the process a variety of cosmologies. Sacred buildings and temples were the sites where this relationship was practiced: the natural conditions, the architecture and the attending rituals allowed for a concentration of spirit power and an expansion of consciousness. Moreover, these places seem to have been located in an overall pattern in tune with the energy flows of Mother Earth - the now rediscovered "planetary grid". These places of celestial connection eventually became sacred sites of worship, pilgrimage and vision-questing.

In these ancient cultures, special groups of wise experts, the "geomancers", were in charge of designing sacred and harmonious buildings \& environments. After a turn of the evolutionary wheel, we are coming to the same point again: architecture is primarily an inner wisdom applied externally.

Every human being is the sacred architect of his/her own energy field. This "energy house" is the primary home: we carry it around at all times, like gastropods carrying their shells. As spiritual architects, we are called to fill our auric fields, our physical houses \& environments and the entire planet with Harmony and Love.

Before visiting the Phi-based proportions of a variety of world-famous sacred sites, we first review the traditions of sacred architecture and geomancy, and their achievements around the world. A chapter is specially devoted to the geometric wisdom embodied in the French cathedrals.

Chapters 4 and 5 are introducing the progressive re-emergence of a new awareness in architecture, city \& community planning, green sustainability and harmonic living design. Architecture is becoming a new expanded geomancy: it is changing into an art of wisdom, committed to co-create and manage spaces $\&$ environments that integrate people with the web of life - rather than separating them from it.

The upcoming generation of architects are global healers. Merging the wisdom of ancient traditions with the organic flexibility of sustainable building materials and the computing power of technology, they offer green designs, on a small and large scale, whose goal is to enhance what we now understand as the beneficial flows of life force and the harmonic inter-connectedness with nature and the universe. We introduce some names of pioneers and give some examples of this rehabilitation of trivial architecture into the perennial and noble art of transformational and sacred architecture helping people to dance again with the universe.

## SG207. Chapter 1. Traditions of Sacred Architecture



个 The Kandariya Mahadeva temple.
Khajuraho, India. (www.kamit.jp)

Ancient cultures were seeking to achieve a sense of universal harmony.

Their architecture was "sacred" because it was intended to provide a focused experience of belonging to a universal, cosmological whole.

This was a wholeness of interconnection between earth, humanity and heaven (both physical and meta-physical).

In this chapter, we are reviewing a variety of traditional knowledge applied to temple building and principles of architecture.

We are also touching upon the ancient understanding pertaining to the harmonic landscaping of the environment (loosely called "geomancy").


## SG207.1.1.1 The Sacred Center (1)

## The Fixing of the Center or Planting a Seedling of the World Tree.

Whether building a hut or a temple, the Fixing of the Center is the archetypal Act of Creation: it continues into the human realm the Oneness and Interconnectedness of Being. Marking the center IS becoming the center i.e. finding one's own center with reference to the whole universe.

A flagpole is planted. Not for the purpose of being a proud conqueror, but rather as a prayer flag to join in the harmonic waving of the Cosmic Breath and to unfold a larger "sailing surface".

In most ancient traditions, the act of revealing the foundation spot and placing the foundation "stone" was primordial - the completion step of lengthy and delicate ceremonies to negotiate with the forces of the cosmos an auspicious beginning. The idea being that once the original seed is properly planted, the whole forest will naturally and easily follow, be it a family or an entire nation.

Whatever the "construction" might be (a house, a village, a city, a civilization, a piece of art, a thought or a spirit teaching...), what counts is to initiate it, baptize it, bless it and honor it as a spark of the Universal Spirit Source. It fulfils the function of linking the project to the fractal resonance of the universe.

The original seed has to be embedded into the Web of Life, the life $\&$ consciousness matrix, in order to be animated and "receive a soul". Then it will be lasting, forever enduring and able to sustain many happy future generations. On a personal level, this "rooting" will create an awareness of cascading resonance with the cosmos.


The earth's energies, formerly free, rampant and untamed, were fixed when the Omphalos was defined, i.e. when the geodetic stick was planted into the ground during the foundation ceremony determining the best location for "building".

In dowsing terms, a wandering underground spring was caused to settle permanently in the same spot in order to be tapped for the benefit of the people.
$\leftarrow$ The Omphalos of Delphi, Greece. (Omphalos = navel).
According to the ancient Greeks, Zeus sent out two eagles to fly across the world to meet at its center, the "navel" of the world. Omphalos stones were erected in several areas surrounding the Mediterranean Sea to mark locations in resonance with the "center of the World". The most famous omphalos was at the oracle site in Delphi.


The Churning the Milky Way. ( $\$$ SG202.4)


个 Horus \& Seth, by tying together papyrus \& lotus flowers, are unifying North \& South Egypt.

The Vedic myth of the
"Churning of the Milky Way" and the Egyptian Sma Tui or "Tying up of North \& South" are metaphorical stories about locating and fixing the Sacred Center by a harmonious balance between polarities.

## SG207.1.1.2 The Sacred Center (2)

Obviously some locations, within the physical environment, are more "powerful" than others and, due to a variety of factors from magnetism to astrophysical alignments, act as "vortices" or "transmitting stations" whose clarity can be fine-tuned with the proper geomantic engineering.

But remember: your intention and spirit purpose are always stronger than any physical form because they are the creative forces of the universe. So, even if you don't live in a power spot, the focus of you fixing the "center" of your sacred home-space will create the vortex, the doorway to the World Axis: you will bring into that spot (the "altar" of your home) the power to journey up and down the Tree of Life, to climb the Cosmic Pillar and befriend Heaven, Earth and the Underground, whether in the outer or inner realms.

The concept of the Center of the World, the world's foundation stone, has occurred all over the earth, throughout time and continents. To the individual, the spot where he/she is at any given time is THE place, the hub of their mandala of consciousness, the center of the compass of perception from which the observed world is seen to originate. This point acts as a pivot (pole star) around which everything else revolves.


个 In the Roman tradition, the "augur" (priest in charge of rituals of fertility, growth and best geomantic location) would face Southward and determine the two main directions (Cardo or North-South and Decumanus or East-West) and the 4 areas of the Sacred Ground auspicious for building the Temple or City.


↔A Feng Shui compass (see infra).

Historically, Feng Shui was widely used to orient buildings in an auspicious way - spiritually significant structures such as temples \& tombs, but also secular dwellings and other structures. (See infra).

## SG207.1.1.3 The Sacred Center (3)

The fixation of a central place, individually \& collectively, is a landing of consciousness, an expansion into the sacred marriage or alchemical wedding between solar-galactic energies and the Earth-Gaia matricial womb. In oriental cultures, ceremonies of a Tantric nature, unifying the Yang lingam and the Yin yoni, the Sun and the Moon, were part of the digging of foundation pits and the laying of foundation stones under the temples.

Ancient cultures focusing on embracing the totality of the cosmic play - rather than using one aspect against another for momentary power - knew it: the REAL CENTER IS INSIDE, within the hub of the consciousness-mandala. And to them, the fixing of the center for a house or a temple was the sacred recognition of extending/incarnating the CenterSource into the 3D realm of human existence and bring inner awareness into daily action. There was a direct highway of energy between the heart-perception, the home altar, the holy-of-holies at the temple and the center of the universe.

Traditionally, Sacred Geometry has been pointing to this golden path of harmonic resonance. Nowadays, we call it fractal, scale-invariant, non-local inclusiveness or interconnectedness. It is the feeling of being one with the center of the universe.

So, if you long for cosmic expansion and dare to journey, from your own home, into the four directions and if you befriend the guardians at the "doorways" (your own fears), you will come to understand the scope of the Web of Life and its harmonious weaving in and through your horizon of consciousness. You will learn to trust the Center deeper and deeper and see it everywhere.

This is the whole purpose of mapping out a "sacred" space: to avoid being caught up in the myriad variations of continuously created forms and appearances and, instead, to locate and step on the radial highways cutting across the Mandala, back to Center. The 4 directions are a path of return to the Inner Center. (See infra: Conclusion).


T Seeing and being the Center of the World is a state of consciousness defined by oneness $\&$ harmony.

$\leftarrow$ The Alchemical Wedding is the successful quest for and settling in the Inner Center, thus giving a cosmic reference, "orientation" and harmonic resonance to the individual disconnected from Source.


## SG207.1.2 <br> Orientation <br> in Temple <br> Planning - <br> Cross <br> Vesica

## Orientation

(Latin oriens, oriri
$=$ to rise, the rising sun, the East.)

In traditional cultures, the basic plan of the Temple derives from the ritual of its "orientation", which literally establishes a true "religious" (Latin religare $=$ to connect) link between the people, the Temple and the universe. Below are the basic steps of "orientation", using the geometry of the Vesica Piscis (after an architectural treatise called the Manasava Shilpa-Shastra).

Step \#1. A long stick or pillar is planted in the spot chosen by the priests / dowsers / augurs as appropriate for the sacred location. A circle is traced around it. The pillar represents the world axis and serves as a marker: its shadow will show on the circle the extreme positions of the sun (sunrise \& sunset) on the day of the summer solstice.

Step \#2. The two extreme points are connected by an East-West line.
Step \#3. The two centers (E and W) are used to trace the Vesica Piscis figure which gives the North-South line. This forms the basic Solar Cross, the astrological symbol for the Earth.

Step \#4. The intersections (diagonals) of the four semi-circles forming a double Vesica give the four corners of the basic square. This is the "quadrature" of the solar energy cycle or circle.

The ritual of Orientation is cross-cultural and generates on the sacred ground the $\mathbf{3}$ archetypal symbols:

- the Circle or representation on Earth of the solar cycle.
- the Cross of the 4 cardinal directions.
- the Square of the inter-directions and symbol of grounded spirit. Heaven above, Earth below and the human journey linking both together.


个 Astrological symbol for the Earth.


T In the Hindu tradition, the square obtained from the ritual of orientation is called the Vastu Purusha Mandala and grounds the presence of Cosmic Man (Purusha) into the earth.
"The Universe is present in the temple in the form of proportions."
(Ancient Vedic architectural sutra)

\& The Vastu
Purusha
Mandala
is a system of grid lines that can accommodate approximate Phi circles.

In the Hindu/Vedic tradition, the most potent architectural tool that embodies the Anthropo-cosmic Principle (\$SG204.1) is the Vastu Purusha Mandala (vastu = site; purusha = supreme being). Vastu is the yoga for building: ancient seers understood that every harmonious temple will be a resonant bridge between the smaller and the larger, between Below and Above. Every building is a living, interconnected organism.
"A nuclear diagram of ritual significance, the Vastu Purusha Mandala provides a blueprint for building... a linear (or space-time) computation that governs the rhythm, design, orientation and structural synthesis of a building. Its sacredness and special significance is stressed in all texts. All Hindu architecture is planned and regulated by it. " (B. B. Puri. Vedic Architecture and Art of Living. 1995).

The Vastu Purusha Mandala follows the series of mathematical square powers from 1 to 12. There is a gnomonic progression from the square of 1 (symbol of the meditating yogi's seat) to 4-9-16-25 etc... up to the square of 1024. The geometry of the Vastu Mandala, originally a square/cube, can also be expanded into triangles/pyramids or circles/spheres. The two main templates are $8 \times 8$ and $9 \times 9$ (see next page).

The Vastu Purusha Mandala is a harmonic blueprint that defines and anchors the Inner Sanctum (garbhagriha) of the future temple as the ritualized local space-port of the sacred cosmos. Upon completion of the temple, this blueprint mandala is traced on a raised altar and colored with holy powders. Then offerings are made to all the deities (cosmic energy aspects) one by one, accompanied by the rhythmic chanting of mantras, in order to dispel entropic forces from the building and invite creative energies to come in.


个 Two of the 32 types of Vastu Purusha Mandala templates favored for the symbolic geometry of the Hindu Temple:

- the $8 \times 8=64$ divisions with powers of 2. (Chessboard and Yi Ching).
- the $9 \times 9=81$ divisions with powers of 3 .
(After Stella Kramrish. The Hindu Temple. 1946-1976.)



## SG207.1.3.2 Hindu Temples Vastu Purusha (2)

The way of Vastu is to harmonize the macrocosm with
the microcosm.
$\Rightarrow$ First the Vastu Purusha Mandala is ceremonially turned into the actual architectural plan for the Temple.

Then the 3D building itself grows out of the mandala
as an organic,

\& The Vastu Purusha Mandala is a grid of correspondences between auspicious deities (subtle creative energies), human anatomy and temple/house locations, in order to optimize overall harmony.

## SG207.1.3.3 Hindu Temples - Vedic Altar

The prototype of the Temple orientation plan (Vaastu Purusha) is to be found in the Vedic fire altar. The Vedic texts Sulbasutras and Sathapatha Brahmana contain precise instructions about the geometry \& numerology of the Vedic sacrificial altar. The procedures described for their construction involve methods for approximating the values for the square roots of 2 and 5 . One of the most elaborate public altars was shaped like a giant falcon poised for flight.

In his Symbolism of the Stupa, Adrien Snodgrass explains that the construction of the altar is a mimesis of the cosmos, both in space \& time. Each element is highly significant. The altar is piled up in 5 layers which are the 5 seasons, the 5 directions and the 5 worlds (Heaven, Midspace and Earth + the two intermediate spaces). The water used for mixing the clay (for the bricks) is "primeval" Water, the clay is the Earth, the side walls are Mid-space...

The Vedic altar is also a reconstruction of cosmic time. Quoting the Sathapatha Brahmana: "The altar is the Year... the nights are the stones surrounding it and there are 360 of them because there are 360 nights... The days are the yajusmati bricks which are 360."

The altar is built up with $\mathbf{1 0 , 8 0 0}$ bricks, one for each hour of the year (the day and night each having 15 hours). At the building of the enclosing wall, $15 \times 80$ syllables are recited at the laying of each stone ( $360 \times 15 \times 80=432,000$ syllables). 432,000 is a "canonic" number: total number of syllables in the Rig Veda and number of years in the world cycle or manvantara. [ SSG202]

The square 'body' of the altar may also be described as an $8 \times 8$ grid, a pattern which is most apparent in the arrangement of bricks in layers 1,3 , and 5 . This $8 \times 8$ grid is proportionally equivalent to the plans of Indian temples, and the areas enclosed by the representations of walls in Tantric yantras and mandalas [SG305].

All measurements are based on the angula or distance between the lines forming the middle part of the middle finger.

Adrian Snodgrass explains the spiritual meaning: "The proper sacrificial victim is the appetitive and greedy mind, the sense of separate selfhood... By building the altar, the sacrificer retracts time and space to the center of his being."

$\uparrow$ The falcon-shaped Vedic altar approximates a Golden Rectangle. (Image credit)

$\leftarrow$ Overall plan of the altar.
To maintain structural integrity, layers are overlapped: layers 1, 3 and 5 have brick sizes that are different from layers 2 and 4.

## (Image credit)

## SG207.1.4.1 Pagodas \& Stupas (1) Energy Antennas

As pointed out by Philip Callahan in his ground-breaking books Tuning in to Nature (1975) and Ancient Mysteries \& Modern Visions (1984), stupas, pagodas, steeples and towers are all energy antennas, whether intentionally or not. Callahan remarks about the similarity between man-made antennas, insects' antennas and architectural sacred structures such as stupas, pagodas or church steeples. This is yet another area of research needing expert attention...


Above: pagoda-tapered sensilla on the antenna of a fly.

Right: pagoda in Hangchow, China.
(P. Callahan. Ancient Mysteries, Modern Visions. 1984)


个 Image: Adrian Snodgrass. The Symbolism of the Stupa. 1992

$\uparrow$ Antennae on a moth
\& Man-made
antennas.
(P. Callahan.

Tuning in
to Nature. 1975).
metal antenna dielecric waveguide insect antennae
13


## SG207.1.5.1 The Stupa (1) Symbolism


$\uparrow$ Cross-section of a Tibetan-style Stupa Shown are the symbolic levels of the architecture, proportions, numerology, relation to the 5 elements and the Buddhist steps to enlightenment.
The stupa itself, as construction progresses, is filled with ceremonial offerings: foods, sacred texts, symbolic objects and "tsa-tsa" (mini stupas charged with prayers).
(Kunzang Palyul Chöling flyer, Sedona, 2004)


The Sedona stupa. 2004.
[In Sanskrit, Stupa = to heap or hair knot.]
Originally memorial monument built over the mortal remains of the historical Buddha and other sages, stupas have progressively evolved to become symbolic structures representing Buddha (seated \& crowned) and also mapping out the journey to enlightenment.

The stupa - as the Buddha body. (see next page

$\uparrow$ The Stupa as a way of ascension and enlightenment: 1. Vertical Ascent as the direct mystical way. 2. Spiral Ascent as the progressive way of spiritual practice. 3. The Circum-ambulation (pradakshina) of the stupa is an enactment of the Spiral Way leading clockwise through a series of hierarchical states.

- As spiritual generators, stupas enshrine sacred texts \&
representations and contain auspicious offerings.
- As symbolic sacred mountains, stupas are ritually circum-ambulated. Seen from above, a stupa is a perfect mandala, cosmogram of the universe. (See infra the Borobudur stupa).


P Plan of Borobudur.


Credit: Adrian Snodgrass. The symbolism of the Stupa. 1992).
[See the Tattva symbols -SG306]

## SG207.1.5.2 The Stupa (2) The

 Buddha BodyIn Buddhism, there are direct archetypal correspondences between the stupa, the Buddha, the Dharma (Natural Law), the cosmos and the 5 elements (consciousness being the encompassing matrix).

These 5 archetypes form an
ascending scale of ascension that can be internalized in meditative practice and is also found as sacred architecture in all Oriental cultures.

The Japanese Gorinto


In Japan, traditional tombstones are shaped like miniature stupas of the 5 elements.
They are called Gorinto ("5 ringed pagoda").


个 Front of the Gorinto: seed syllables of the 5 elements. Back: syllable of the 5th element or Consciousness.

## SG207.1.5.3 The Stupa (3) Geometries



- Thuparama Dagoba. Anuradhapura. Sri Lanka. 3rd c. BCE.
Groundplan and elevation.
[All images: Lama Anagarika Govinda.
Psycho-Cosmic Symbolism of the Buddhist Stupa. 1976.]

From comparing a variety of stupa shapes, we offer an hypothesis: the spire and its base are in approximate PHI proportion to the cupola and its base. This an overall visual harmony - what we might call the "onlooker's perception" as one approaches the stupa.
Understanding the Stupa as a living body (Buddha) with an ascending system of energy centers helps in seeing the PHI harmonies of the structure. The top part (umbrella or jewels) may or may not be included in the measurements depending on the authorities.

- Traditional proportions of a Sinhalese Stupa.


A Cross-section of Tibetan Stupa or Chorten.
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## SG207.1.6.1 The Feng Shui Tradition (1)

The art of locating auspicious sites was essential to all ancient sacred cultures. All over the world, sacred places of spiritual power were localized by means of a geomantic practice combining natural science, ecological intuition, astrological geography, numbers \& sacred geometry.

In China, this art is known as Feng Shui ("Wind \& Water"). In the words of John Michell: "The practice of Feng Shui gave the landscape a quality of beauty and order totally beyond the achievement of any modern western planner. This was because it was based not on merely secular considerations, but on a metaphysical system in which scientific and poetic truth harmoniously united." (The New View over Atlantis. 1969)

Weather planting a tree or building a temple, experts of Feng Shui were consulted to determine the auspiciousness of the project. It was understood that any human interaction with nature or the landscape was deeply affecting the quality of the web of life and thus needed to be harmonized with the delicate local environment and the universe at large. (See infra the geomancy of the Forbidden City, Beijing).

Long ago, the Chinese recognized that powerful currents of subtle energy ( $q i$ ) or lines of telluric magnetism were forming a live network crisscrossing the entire surface of the earth. This is now described scientifically as the "Earth grid" [ SG301], the geometric lattice of the flow of qi. The task of the Feng Shui expert (the "Dragon Man") was to detect these lines of energy, interpret their influence on the land and engineer them for the greater harmony of nature and culture.

The telluric currents are of two types: yin and yang. This double polarity is symbolized by the White Tiger (Yin) and the Blue Dragon (Yang). As explained by John Michell: "The lines of this force follow, for the most part, mountainous ridges and ranges of hills. The most favorable position is where the two streams meet. The surrounding country should display both yin and yang features, ideally in the proportion of 3 Yang for 2 Yin."

The art of Feng Shui is a complex system of resonant correspondences between "Heaven" and "Earth" involving Taoist cosmology, the 5 Elements, the 8 Trigrams ( Pa Kua), the 5 planets, the 28 constellations and the basic principles of proportion and numbers. This formed a system of natural magic according to which every stone and plant was intentionally placed in the landscape so that the harmonic laws of mathematics and music were expressed in the re-configuration of the earth's surface.
"The striking beauty and harmony of every part of China, which all travelers have remarked, was not produced by chance: every feature was contrived", explains Michell.

$\uparrow$ River formations \& Feng Shui sites.


The Dragon and the Tiger.

## SG207.1.6.2 The Feng Shui Tradition (2) Luopan

The two main tools used by Feng Shui pratitioners are the Geomantic Compass or Luopan and the simplified system of the Bagua or 8 Trigrams.

$\uparrow$ Sundial computing celestial time. Hall of Supreme Harmony, Beijing. (Robin Rector Krupp)
-A typical luopan.

Like a conventional compass, the luopan is a direction finder, but it is taking into account many different factors because it is designed to find the most auspicious directions.
The luopan is a "harmonic keyboard" with many layers of ancient wisdom built in. In the hands of a good practitioner it is a dynamic, live, interactive "Harmonic Positioning System".

The Feng Shui formulas of the luopan are embedded in up to 40 concentric rings on the circular surface plate of the Luopan: this is known as the heaven dial. This metal or wooden plate typically sits on a wooden base known as the earth plate. The heaven dial rotates freely on the earth plate. A red wire or thread that crosses the earth plate and heaven dial at 90degree angles is the Heaven Center Cross Line, or Red Cross Grid Line. This line is used to find the direction and note the position on the rings.

A luopan typically contains markings for 24 directions. This translates to 15 degrees per direction. Interestingly, the Sun takes approximately $\mathbf{1 5 . 2}$ days to traverse a point. If you mark a series of 24 points on the ecliptic it creates a cycle of 365.25 days, which means that each degree on a luopan approximates a terrestrial day.


个 A modern (simplified) Feng Shui compass. Wikipedia.


个 A traditional Luopan with 36 rings.
Ring 18 shows an approximate Golden Section. (Credit: Evelyn Lip. Feng Shui. 1987)

## SG207.1.6.3 The Feng Shui Tradition (3) Pa Kua

Traditionally, the 8 Trigrams ( $b a=8$; gua $=$ symbol, in Chinese pinyin) are the innermost circle of the luopan. The Feng Shui practitioner uses the 8 Trigrams as a basic tool for determining orientation. A trigram is a 3-tier combination of the Yin (open or "broken" line) and Yang (closed or "unbroken") lines forming the basic polarity of the Taoist cosmology. When combined with one another, the trigrams create the 64 hexagrams of the Chinese I Ching or Book of Changes.

The trigrams are attributed to the $\mathbf{8}$ directions in two arrangements: the "Earlier Heaven" sequence or ideal/archetypal/cosmic version, and the "Later Heaven" sequence for practical application of the trigrams to the earth and the environmental changes of the $q i$. These two arrangements are connected with the two basic Magic Squares of ancient China: the Ho-Tu and the Lo-Shu [<SG302].

In contemporary, popular Feng Shui, the 8 Trigrams are extensively used as the Bagua Map (showing the auspicious location in a house with regards to various aspirations of life) and the Bagua Mirrors used for warding off un-auspicious energies.

| Trigram | Character | In Nature | In Family |
| :---: | :---: | :---: | :---: |
| Qian | Creative | Sky | Father |
| Kun | Receptive | Earth | Mother |
| Zhen | Arousing | Thunder | Eldest Son |
| Xun | Gentle | Wind | Eldest Daughter |
| Kan | Abysmal | Water | Middle Son |
| Li | Clinging | Fire | Middle Daughter |
| Gen | Still | Mountain | Youngest Son |
| Dui | Joyous | Lake | Youngest Daughter |


$\uparrow$ The Lo Shu

- The 8 Trigrams

$\uparrow$ Fuxi "Earlier Heaven" bagua arrangement, used for burial sites.

$\uparrow$ King Wen "Later Heaven" bagua arrangement, used for residences.


## SG207.1.7.1 Egypt (1) The Temple of Man



个 De Lubicz's major work sparked the
birth of the Symbolist School of Egyptology.


Growth of the Temple plotted on a PHI harmonic scale
(R. A. Schwaller de Lubicz)
R. A. Schwaller de Lubicz, an Alsatian mathematician \& philosopher, has offered, after a protracted on-site study of the Temple of Luxor (between 1937 and 1952) a pioneering reinterpretation of ancient Egypt - which is now known as the Symbolist School Interpretation.

The rigorously documented work of Schwaller de Lubicz is rooted in Sacred Geometry \& number principles and presents the metaphysical richness of various mathematical \& biological concepts. De Lubicz's work validates the ancient tradition insisting that there had once been a great doctrine in which science, religion, philosophy and art were fused into a single great synthesis.

According to Schwaller de Lubicz, the great synthesis of Egypt is based upon an exact and complete wisdom: the understanding of the principles \& laws of creation. This unified knowledge was (and still is) expressed in the Egyptian sacred sites, temples and artifacts through sacred geometry, harmony, proportion and symbolism.

$\uparrow$ The Pharaoh is the incarnation of the Anthropocosmic Man, whose cosmic body is expressed in the Temple.

$\uparrow$ Superimposition of the figure of the king over the diagram of the temple of Luxor.

## The entire universe

 is contained in a single gesture."The Temple of Man" is the title of de Lubicz's magnum opus describing his 15 years of research at Luxor. [See infra: Luxor and $\triangle$ SG204.1]

## SG207.1.7.2 Egypt (2) Temple Proportions

Moustafa Gadalla is an Egyptian-American independent Egyptologist who published many books showing the depth and the scope of the spirit-based Egyptian science. Says Gadalla: "The Egyptian temple was the link, the proportional mean, between the macro-cosmos (world) and micro-cosmos (man)... For the ancient Egyptians, geometry was the means by which humanity could understand the mysteries of the divine order... All Egyptian art and architecture, including the representation of the human figure, followed a precise canon of proportion."

In terms of sacred architecture, the Egyptian temples were carefully laid out according to specific proportions of geometrical figures and harmonic relationships of the parts to the whole: they were designed to create harmonious power, both on a spiritual level (setting superhuman forces in action) and on a practical level (maintaining the country's prosperity). Egyptian sacred geometers were using the Progression Series (now called Fibonacci Series) and Harmonic Root Rectangles, and chief among them the Neb (Golden) Rectangle. [See also the pages on the 3-4-5 Triangle ASG102.1] In ancient Egyptian, Neb means gold, divine. How appropriate! (see next page).

The Egyptians manifested in the harmonic proportioning of their buildings a knowledge of the transcendental constants Pi (the "Circle Index") and Phi (the Golden Number or Neb). Two examples are given here. Next chapter introduces the Pyramid, Karnak, Luxor and Abydos.

$\uparrow$ The Khnum Temple (4th century BCE) fits two Golden rectangles.

$\uparrow \mathrm{ABCD}$ and EBCF are Golden Rectangles.

## Images: Moustafa Gadalla.

Egyptian Harmony. Tehuti, 2000.


T On the East side of the Temple of Luxor, there is a relief depicting a cortege of priests exiting from the great temple of Karnak and carrying the king's Solar Boat. Notice the pylon (or gateway) with the door.

$\uparrow$ Analysis of an Egyptian pylon (Temple of Khonsu, Karnak), in terms of the Golden Mean. (M. Gadalla).

SG207.1.7.3 Egypt (3) The Pi/Phi Door


$\uparrow$ If the opening of the door equals 1 , the height with the plinth equals $1.2 \boldsymbol{\Phi}^{2}$ or
Pi. The entire pylon is a $1 \times 2$ rectangle
or Double Square.

$$
\begin{gathered}
0.6(\sqrt{ } 5+3) \\
= \\
0.6 \times 5.236 \\
=3.1416 \\
=\prod(\text { uppercase } \pi) \\
\text { or } \\
\pi=1.2 \Phi^{2}
\end{gathered}
$$

## SG207.1.8.1 Geometric Hieroglyphs (1)

The ancient Egyptian language was described as "hieroglyphic" (Greek hieros = sacred + glyphein = to write) because it was multi-dimensional - and not just a linear and "primitive" form of alphabet as portrayed by academic Egyptology. We are now rediscovering that sacred languages are vibratory technologies of consciousness providing their users with spiritual keys to directly find their right \& meaningful place in the overall scheme of the cosmos: they are an integrative knowledge whereby each fragment contains the harmonics and the heart of the Whole. [ SSG306].

A hieroglyph, traditionally, is a doorway into an essential energy process of the conscious universe. Each sign is a resonant fractal of the whole as number, color or form in space, musical note or chord in time, fragrance or dance in space-time. The sacred language is vibrationally related to music modes, architecture \& social structures, customs, "art", "science", etc...

While most hieroglyphs are pictorial representations of natural objects, there is a category of hieroglyphs that clearly are geometric in their shape and proportions. These have been noted by various observers and they may be significant pointers to the harmonic meta-level of the Egyptian language. Next page, we give two interesting interpretations of the "neb" or segment of circle and the " $d y$ " or pointed isosceles double triangle.


Temple of Khonsu. Karnak. Detail of pylon. (After M. Gadalla).

- The falcon (Horus), the vulture (Mut) and the ibis (Toth) stand on proportioned rectangles.


T The Oudjat (Eye of Horus) is a fractional system.


TSome "geometrical" hieroglyphs.


24
$\uparrow$ The hieroglyph name for Ptah. (M. Gadalla).

Guy Gruais and Guy Mouni, in Guizeh, au-dela des Grands Sccrets (1997), have offered an elaborate interpretation of the " $d y$ " hieroglyph, in terms of the Royal Cubit.
Below are the initial (phase 1) and final (phase 5) steps of their analysis.


个 The $144^{\circ}$ Neb.

## SG207．1．9．1 The Egyptian Royal Cubit（1）A Geodetic Unit

In ancient Egypt，aside from practical land surveying，there was a sacred aspect to geometry：the laying out of temples and sacred buildings．It was all performed by experts known by the Greek name of harpedonaptae（or harpedonapts）．These surveyors strictly adhered to the principles of sacred geometry，using only a compass and a straight line in the form of the 13 －knots cord with 12 intervals of one Egyptian royal cubit each．The rope was used for various configurations and especially for the Pythagorean（or ＇Egyptian＇）Triangle 3－4－5．［ SSG101．5］

The cubit（Latin cubitum＝elbow）as an＂anthropic measure＂＝the distance between the elbow and the middle finger of the extended hand．The ordinary cubit tends to be about 18 inches or roughly 45 centimeters，usually defined to equal 24 digits or 6 palms．However the Egyptian＂royal＂（long or sacred）cubit，is equal to 28 digits or 7 palms （ 1.72 foot or .5236 meter）．The meter is the basic unit of length adopted under the Système International d＇Unités（approximately 1.094 yards），and defined as the length of the path traveled by light in a vacuum during a time interval of $1 / 299792458$ of a second．

In terms of Sacred Geometry：the ancient Royal cubit and the modern meter are directly related to Pi（circle index），Phi and to the dimensions of the earth．


个 The Great Pyramid is a mini－scale model of the earth（1／43，200－ which is half the number of seconds in a day）．
（Peter Tompkins．Secrets of the Great Pyramid．Harper，1971．）

Interestingly enough，Napoleon Bonaparte established the metric standard after his scientific expedition returned from the Egyptian campaign，having extensively studied the metrology of ancient Egyptian monuments．
Apparently，Napoleon used the sacred radius measure of the ancient Egyptian royal cubit circle for his length standard， many thousands of years later．

When turned into a circle，the 13 －knots rope has a radius of 1.91 cubits or one meter（ 0.5236 x $1.91=1$ ）．Since 1 meter $=1 / 100,000$ th part of a quarter of the earth＇s meridian，this means that the Egyptian cubit and the 13－knots rope are based on the measurement of the earth＇s circumference．

The Egyptian Royal Cubit，the ancient Greek foot and the modern meter are all subdivisions of the dimensions of the earth： 5 Greek stadia of 600 ancient Greek feet each＝half a nautical mile（ $1 / 7,200$ th of the earth＇s radius）．
The ancient＂sacred＂measures were based upon the earth measurement by the slow wobble of the earth＇s axis，seen as the apparent movement of the stars along the horizon in a counter－clockwise direction（as the earth wobbles in a clockwise direction）at 72 years per degree．（Credit）

| ＜12 | － | ＊ | ARAER | ＊ |  |  |  |  |  | 2 |  |  |  | － | ㅋFA | $\square$ | tus | at $\dagger$ |  | $\simeq$ | － | － | 1 | － |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | I＇ | III | － | $\sigma$ | － |  |  | ＋ |  | － |  | $\checkmark$ |  |  |  |  |  | － | － |  |  |  | － |  |
| － | － 5 | － 4 | － 5110 | － | － | － | － | $\square$ | － | 5． |  | 㐌5 |  |  |  |  |  | 家宛 | －mim | － $0^{4}$ |  | T－4 | T | － |
|  |  |  |  |  |  |  |  |  |  |  | 퓨N | $\cdots$ | $\stackrel{3}{4}$ | $\cdots$ | \％ | ） | \％ | \％ | \％ |  | ㄴㅔㅔ | 퓬 | ㅍ． | － |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

R Royal cubit in
the Turin Museum． （Wikipedia）



个 The "New Jerusalem" diagram of John Michell: if the Great Pyramid's base $=$ the earth diameter, the distance between the center of the earth and the center of the moon $=\sqrt{ }$ phi or $4 /$ pi.

## SG207.1.9.2 The Egyptian Cubit (2) Cubit, Pi and Phi

The ancients measured the earth by the observed rate of precession, integrated with simple hexagon geometry and subsequent subdivisions to establish the length of the modern kilometer (1/40,000th of the earth's circumference), as well as, the ancient Greek mile ( 10 stadia) and the modern nautical mile, both $1 / 21,600$ th of the earth's circumference, which is twice the factor $(10,800)$ by which the earth's circumference was subdivided to establish the base perimeter length of the Great Pyramid, $\mathbf{1 / 4 3 , 2 0 0 t h}$ of the earth's circumference. It very much looks like that the earth measure ("geo-metry") was the key to the metrics in the ancient world, as they are in the modern world.


↔ The base perimeter = circumference of a circle with radius = height of Great Pyramid.
$2 \pi \times 280=440 \times 4$

$$
=1760
$$

(with $\pi=22 / 7$ )


Great Pyramid in cubits.

## Roval Cubit and Golden Ratio

Golden Number + 1 divided by 5 $=$ the Royal Cubit.

$$
\begin{gathered}
(\Phi+1) / 5 \\
=\Phi^{2} / 5 \\
=0.2 \times \Phi^{2} \\
=0.5236
\end{gathered}
$$

In fractional terms, we have: $1 / 2(1 / \sqrt{ } 5+3 / 5)$

$$
=0.5236
$$

$\leftarrow$ With radius $=1$, the circumference $=$
2 Pi and the cubit $=1 / 12$ th of the circumference. ( $6.2832 / 12=0.5236$ ).

## SG207.1.10 Sacred Geography of Ancient Greece

The co-author of Twelve Tribes Nations (1991), Christine Rhone, published in 1994 her English translation of the work of Jean Richer, a French Hellenist (a scholar of ancient Greek culture) who published in 1967 Géographie Sacrée du Monde Grec.

Starting with a general enquiry into the selection of temple sites and the unusual orientation of certain sanctuaries, Jean Richer came to discover very precise alignments between certain sacred sites. He subsequently devoted his life to map out the networks of correspondences between the sky, the earth and the sacred sites honored by the ancient Greeks.

By studying artifacts such as ancient coins, inscriptions and shield depictions on vases, as well as by reading deeper layers into the legends and myths, Richer was able to uncover the stellar beliefs underlying the ancient Greek religion. He mapped out the various zodiacal wheels (12-fold astrological landscapes) and the association of their tribes (called "amphictyonies") that were centered on the main oracle sites such as Delphi, Delos and Sardis. In each zodiacal division he found references to its ruling astrological sign. A fractal countrywide astrological organization began to emerge, giving yet another example of the $\mathbf{1 2}$ Tribes pattern John Michell \& Christine Rhone have uncovered.

These studies have now been validated with the discovery of similar landscape geometries and alignments in other parts of Europe and all over the world. We now routinely talk about the "planetary grid" based on the great circles and the dodeca-icosa geometry as the nodes of this grid coincide with the location of sacred sites while the lines mark natural phenomena such a bird migrations or magnetic anomalies... [ $\quad$ SG301]

The formal designs of zodiacal landscapes around oracle centers was dated by Richer to about 2,000 BCE and their origins go back to very early times when the pattern of the heavens was reflected upon earth and embedded in all aspects of the culture, thus harmonizing daily life with the grand order of the cosmos.

Interestingly enough, Richer's initial discovery of the Delphi-Athens-Delos alignment was inspired by a dream in which the ancient god Apollo appeared to him and pointed to certain directions.

$\uparrow$ The original discovery: the line Delphi - Athens - Delos.


T The triangle joining the 4 omphaloi: Delphi, Sardis, Delos, Ammoneion.

## SG207.1.11 Vitruvius

We have already met [ SGG102] the Roman architect Marcus Vitruvius Pollio (1st century BCE ) whose book The Ten Books on Architecture is the most influential architectural book in the history of the western culture. In his book Vitruvius summarized the principles \& rules of his Roman \& Greek predecessors. The Ten Books were rediscovered around year 1000 and helped launch the burst of Renaissance architecture. Vitruvius is also known for his description of the human proportions called the "Vitruvian Man", later famously illustrated by Da Vinci and now known as the "Da Vinci Man" [<SG204]

In terms of architectural principles, Vitruvius follows the traditional rule that the proportions of a building, and specially a temple, should reflect the perfect proportions of the human body.
"Since nature has proportioned the human body so that its members are duly proportioned to the frame as a whole, ... in perfect buildings the different members must be in exact symmetrical relations to the whole general scheme".

The concept of SYMMETRY was duly emphasized by Vitruvius. Whereas we understand symmetry as a form of mirror image, the Greeks \& Romans perceived symmetry as a combination of same proportions, using the repetition of a few key ratios to insure harmony and unity. This ancient understanding of symmetry is expressed in the Greek word "sum-metreiv" or "to measure by comparison with / together". This expanded concept of symmetry was called "commodulatio" by the Renaissance artists because it shows additive properties, so the whole could equal the sum of its parts, in different combinations.
"Symmetry is a proper agreement between the measures of members of an entire work, and of the whole, in accordance with a certain part selected as standard."
"The design of a temple depends on symmetry, the principles of which must be most carefully observed by the architect. They are due to proportion, in Greek analogia."


## SG207.1.12 Ancient Metrology

According to John Michell, current research in ancient metrology, sacred sites and prehistoric geomancy points to the existence of a long forgotten code of knowledge, a unified number code behind all units of measure. This canon of number was openly applied to attract the blessings of heaven upon earth and maintain high cultural standards in ancient cultures. All the ancient units of measure relate to each other. Whether they are Roman, Greek, Egyptian, Jewish, Chinese, Vedic or Mexican, all ancient measures that have survived or have been recorded in sacred monuments are related to the same standard dimensions of the earth and in the same code of number found in every other ancient form of art $\&$ science.

We have seen the remarkable geometric and geodetic properties of the Egyptian cubit.
Below are some examples of the global correlations between ancient measures.
Example \#1: Multiples of Greek \& Roman measures, in terms of the Earth's meridian circumference:

$$
\begin{aligned}
& 24,883,2 \text { miles } \\
= & 131,383,296 \\
= & \text { ft or } 12^{6} \times 44 \mathrm{ft} \\
= & \mathbf{9 0}, 000,000 \text { Roman feet } \\
= & \mathbf{2 1 6 , 0 0 0} \text { Roman furlongs } \\
= & 27,000 \text { Roman miles } \\
= & \mathbf{1 2 9 , 6 0 0}, 000 \text { Greek feet } \\
= & \mathbf{8 6}, \mathbf{4 0 0}, 000 \text { Greek cubits } \\
= & \mathbf{2 0 7 , 3 6 0} \text { Greek furlongs } \\
= & \mathbf{2 5 , 9 2 0} \text { Greek miles. }
\end{aligned}
$$



All these measures are canonical numbers, representing powers \& multiples of the number 12. Note that $\mathbf{2 5 , 9 2 0}$ is also the Great Year or Precession of the Equinoxes. 1,290,000 is the Treta Yuga, in Hindu cosmology.
The same units of space measurements \& time cycles show up in all ancient sacred cultures.
Example \#2: The principal dimensions of Stonehenge represent simple fractions of the dimensions of the earth:
Earth polar radius $=\mathbf{2 0 , 8 5 4 , 4 9 1} \mathrm{ft}=400,000 \times$ Stonehenge outer radius $=6,000,000 \times$ Stonehenge lintel width.
Earth mean circumference $=131,383,296 \mathrm{ft}=2,520,000 \times$ Stonehenge outer radius $=2,700,000 \times$ Stonehenge inner radius $=37,800,000 \times$ Stonehenge lintel width.

Example \#3: The Earth's mean radius was defined in proportion to the polar axis, the earth's circumference and the units of ancient metrology as $\mathbf{2 0 , 9 0 1 , 8 8 8} \mathbf{f t}=$ polar radius $\mathbf{x} 441 / 440=3958.6909$ miles $=$ mean circumference $\times 7 / 44=12^{6} \mathbf{x} 7 \mathrm{ft}=\mathbf{2 0 , 7 3 6 , 0 0 0}$ shorter Greek feet $=\mathbf{2 1 , 6 0 0 , 0 0 0}$ shorter Roman feet.

## SG207.1.13 Twelve Tribes Nations

Ina gound-breaking cross-cultural study (Twelve tribes Nations and the Science of Enchanting the Landscape - 1991), John Michell and Christine Rhone describe how, all over the world, there are records and traditions of whole nations and their territories being divided into twelve tribes and twelve regions, each tribe and its sector of land corresponding to one of the twelve signs of the zodiac and to one of the twelve months in the year.

The 12 tribes each had their own customs and assemblies, but were united by a common religion, sacred canon of numbers, code of law and musical scale. Together they formed a zodiacal mandala, at the hub of which was a sacred center (mountain, hill, rock...) symbolizing the pole of the universe. [See infra The Malagasy House]
"The foundation plan of these 12-tribe societies was a symbolic chart of the heavens, divided into 12 sectors which were named after 12 constellations and governed by 12 principal gods... On the principle "As Above So Below", every nation that acknowledged 12 gods, constellations and signs of the zodiac arranged its culture and landscape accordingly..." (J. Michell)

The 12-fold structure of theologies, calendars, societies and landscapes extended to myth and music. It was the manifestation of a sacred canon of numbers whose rhythmic and harmonic pattern was held to be analogous to the pattern of universal creation. This canon was duodecimal or governed by cycles of 12 - nowadays we would say governed by a 3D dodecahedral structure.

Examples of this 12-fold cosmological pattern abound all around the world: Egypt, Phoenicia, Chaldea, Babylonia, Persia, Greece, Rome, Nordic countries, Ireland, Vedic cultures, Shinto cosmogony, China, Peru, Madagascar... This pattern offered a protective cocoon and connective grid placing the inhabitants of virtually all countries in a harmonic relationship with the celestial realms and the rhythms \& pulses of nature. It was Sacred Geometry in full action.


个 Twelve regions of Ireland under the high king. The Hub and geographical center is the Hill of Uisnech.

$\uparrow$ John Michell's reconstruction of the archetypal geometric pattern he calls the "Celestial Jerusalem", based on the diameters of the earth and the moon. It contains the Golden Ratio Phi, the Pythagorean triangle and many other harmonic proportions. [-SG202 \& SG206].


- One easy
way to divide a circle into 12 equal parts.


## SG207.1.14.1 Ancient Western Geomancy (1)

In Great Britain, research into ancient geomancy (the art-science of harmonizing the earth), by such pioneers as John Michell, Guy Underwood or Paul Devereux, has validated the old traditions stating that the ancient sages encoded their knowledge of the world in the dimensions of their temples. A growing evidence points to sophisticated ancient surveying techniques and possibly global mapping of the earth in view of establishing, through temples sites and geomantic landscapes, auspicious harmonic energy grids. These grids and alignments were the most conducive to the nurturing of the currents of Life Force, the blessings of heaven upon earth, and ultimately the material \& spiritual well-being of the people.

- Stone structures \& earth works were placed to mark the subterranean earth currents or flows of terrestrial magnetic energies. These were the 'ley lines', 'dragon paths' and crossroads of old sacred cultures. The entire geographical landscaping of ancient Britain was laid out to coincide with the currents, paths, spirals \& hubs of subterranean intensified magnetic influence.
- The natural earth currents were engineered (tamed) to conform to a system of harmonic universal geometry, a grid able to harness these energies for the benefit of human cultures. This is more than a one-way influence where humans only notice \& seek the benefits of the earth's power spots. The humanmade structures, placed upon the earth on a global scale, in turn affect the course \& potency of the subterranean flows. This is the art of western Geomancy and oriental Feng Shui \& Vastu.
Nowadays, we speak in terms of earth meridians and acupuncture techniques applied to the global icosa-dodeca planetary grid layout, as we understand that the life force that animates the human body is the same as that which flows through the veins of the earth.
- Planting upright stones, earth structures, temple architecture or labyrinths at certain influential locations allows for the introduction of sun and atmospheric energies into the earth current, a global form of alchemy or eco-acupuncture.
- In opposition to the contemporary architecture \& urbanism seeking convenience \& profit and oblivious of the larger context of global harmonic health, ancient geomancy is a wisdom seeking to enhance the interconnectedness of the web of life and the expansion of spirit.




## SG207.1.14.2 Geomancy (2) Ley Line Geometries

Alfred Watkins, walking on the footprints of English prehistory researchers John Aubrey and Dr. Stukeley (the "discoverers" of Avebury), was a merchant with strong antiquarian interests. Here is his story, as told by John Michell.

One hot summer afternoon in the early 1920s, Alfred Watkins was riding along the Bredwardine hills, about 12 miles west of Hereford. On a hilltop he stopped, meditating on the view below him. Suddenly, in a clairvoyant flash of understanding, he saw a web of energy lines linking the holy places $\&$ sites of antiquity: "mounds, old stones, crosses and cross-roads, churches placed on pre-christian sites, old trees, moats and holy wells... all stood in exact alignments running over beacon-hills to cairns and mountain peaks."

Watkins had rediscovered the "ley lines" of western geomancy, corresponding to similar alignment systems all over the world: "Dragon's lines" in China, trackways of the Andes, Australian aborigine paths, "spirit paths" of the American Indians... Validating his discovery on one inch ordnance survey maps and perusing ancient records, Watkins founded the Straight Track Club and published the research in his book The Old Straight Track. Watkins was a remarkably honest visionary who accumulated overwhelming evidence for the existence of what came to be known as the "ancient ley system".

While research into the "ley lines" has brought many new data as well as contradictory hypotheses and controversies, the conclusion reached by John Michell seems to hold a great deal of validity:
"A great scientific instrument lies sprawled over the entive surface of the globe... With the help of some remarkable power, by which they could cut and raise enormous blocks of stone, (ancient) men erected vast astronomical instruments, circles of erect pillars, pyramids, underground tunnels, cyclopean stone platforms, all linked together by a network of tracks and alignments, whose course from horizon to horizon was marked by stones, mounds and earthworks." (John Michell. The View Over Atlantis.)


个 A typical "Dragon's line" (lung mei) in China.

[^0]
## SG207.1.14.3 Geomancy (3) Apollo \& St Michael Line

An intriguing example of long distance "geomantic" alignment is the Apollo - St Michael line running for about 2,500 miles from the West of Ireland (Skellig Michael) to the Holy Land (Mount Carmel).

It was discovered by Jean Richer's elder brother Lucien Richer who first realized that the Greek line Delphi - Athens - Delos could be extended southeastward to Mount Carmel, the sacred mountain below which the crusaders established the citadel of Acre, while, in the opposite direction, it passes over the principal sanctuaries in Europe dedicated to the Archangel Michael.

The angle is virtually $60^{\circ}$ west of north and the line is a so-called "rhumb line" or line of constant bearing with the meridian, which can be represented on a Mercator's earth projection as a straight line drawn between Skellig Michael and Mount Carmel. The 14 main locations identified by Lucien Richer form a narrow band and are the stations of a via sacra or sacred pathway between ritual centers - which is an essential feature of ancient landscapes throughout the world as validated by the records of pilgrimage routes between the sacred sites.

Certain geological, geographical, legendary and mystical features are common to these sites, often reflecting similar attributes of the pagan god Apollo and the Christian Archangel Michael. Both Apollo and St Michael are symbols \& powers of revival, both are dragon killers, and both represent a solar theology overcoming the previously prevalent worship of the earth spirit.

As noted by John Michell in his Twelve-Tribe Nations: "A legend of Apollo is that, soon after his birth, he journeyed far north, to the land of the Hyperboreans, from where he returned to Greece. His path is the Apollo - St Michael line."

Now, what does that have to do with Sacred Geometry? The point is that these lines are portions of a larger planetary grid. We are progressively uncovering the existence of energy grids and networks mapping out the interconnectedness and evolutionary history of human consciousness as anchored to planet earth. It has been discovered that these grids \& routes of 'energy pilgrimage' (which have been wave-guiding humanity all along) do display the archetypal geometries of the Platonic Volumes as templates of global harmony.


## The Apollo - St Michael line of Europe

I Skellig Michael.
2 St Michael's Mount.
3 Mont St Michel.
4 Bourges.
5 Sagra di San Michele.
6 San Michele at Castiglione di Garfagnana.
7 Perugia.

T The arrow points to the Greek section: Delphi, Athens, Delos.

$\leftarrow$ A St Michacl line has been found by John Michell in England itself.

It is running from Land's End to the North Sea, going through Avebury.

The traditional ley-lines, the network of omphalos stones in the Mediterranean ancient world, the St Michael line and much more... these are local geomantic discoveries or re-discoveries. The question arises: could local alignments be only fragments of a ancient global geomantic system or grid of attunement and resonance around the planet?

Researchers are increasingly pointing out alignments and configurations of sacred sites or power spots around the Earth, coinciding with the larger energy pathways and grids of Mother Earth. Some of it may be fantasy, but precise data do accumulate. Together with the uncanny convergence of ancient systems of measurement, the existing body of research, data and hypotheses offered by the nascent field of Global Geomancy points to the existence of an pre-diluvian knowledge applied to a planetary scale by a presumed "Civilization One".

There are complex and multi-dimensional resonant interactions between human cultures \& civilizations and Gaia, the larger organism on which they are born, develop and in turn enter history. The ancient pathways of exchange \& communication, the gathering spots and cities, the sacred \& pilgrimage sites, the architectural artifacts are not located at random but fit into a larger orchestra of consciousness evolution. They actually stay and endure as cultures pass on. Human cultures trace and re-trace, through geographical space and historical time, patterns of expansion that are embedded by the overall grids of energy sustaining the entire planet. Global Geomancy uncovers the symbiosis between planet and the unfoldment of humanity at large, thus contributing a perspective of unification to the timely question: what IS humanity and what exactly are its origins and history?

The awareness, study and practice of the mutual relationship \& choreography between humanity \& Gaia is Global Geomancy. It is a large field of multi-disciplinary research pushing hard on the "history of mankind" as kids still learn it in schools. Many are the experts and few are the conclusive data or solid analysis. Nonetheless, it is opening up new vistas in the human saga. We will point here to one research hypothesis: the question of the global location of ancient pyramids and obelisks around the world and their possible coordinated use in terms of a unified energy grid system (such as Nikola Tesla was envisioning).

It may well be that the ancient world (a broad name, we concede, that includes the historical and pre-diluvian eras) had the knowledge of a global coordinate system. Just like Paris preceded Greenwich as the reference meridian, the ancient world seems to have centered their global coordinate system on the Great Pyramid meridian.


The Great pyramid
coordinates are: $29^{\circ} 58^{\prime} 34^{\prime \prime} \mathrm{N}$ $31^{\circ} 7^{\prime} 58^{\prime \prime} \mathrm{E}$.
This creates an equilateral triangle with the North pole and the geocenter (earth's center). Piazzi Smyth , in 1880, calculated that the Pyramid is located at the center of the earth's land mass.
[See infra: \$SG207.2]

## SG207.1.15.1 Global Geomancy (1) The Pyramid-Obelisk Grid



个 An exciting research project for ambitious GPS googlers: list and precisely locate the main pyramids, ancient obelisks and other man-made significant "antennas". Reference to known levels of the "earth grid" and search for an intentional design geometry of "energy distribution grid".



## SG207.1.15.1 Global Geomancy (2) The 30th Parallel North

The 30th parallel north is a circle of latitude that is 30 degrees north of the Earth's equatorial plane. It stands one-third of the way between the equator and the North Pole and crosses Africa, Asia, the Pacific Ocean, North America and the Atlantic Ocean (a total of 19 countries). The 30th parallel passes through 18 countries (see box) and 6 bodies of water: Persian Gulf, East China Sea, Pacific Ocean, Gulf of California, Gulf of Mexico, Atlantic Ocean

The 30th parallel reads like a history book of civilizations. Many sacred sites, power spots or historical landmarks are located on or close to the 30th parallel.

At the 30 th $^{0}$ latitude, one minute of longitude $=1.61 \mathrm{~km}$ or 1.00 mi . An interesting reference to the Golden Ratio.

## The 18 countries crossed by the 30th parallel

Algeria
Libya
Egypt
Israel
Jordan
Saudi Arabia
Iraq
Iran
Kuwait
Afghanistan
Pakistan
India
Nepal
China
Japan
Mexico
United States
Morocco

## Sites on or close to the 30th parallel

Giza pyramids \& Sphinx
Dome of the Rock \& Wailing Wall Petra (capital of Nabataeans)
Ziggurat of Ur (21st c. BC)
Basra (proposed location of the Garden of Eden) Persepolis (Achaemenid empire - $\mathbf{5 0 0}$ BC)
Shiraz (Elamite city - 2,000 BC)
Kerman (old cultural center)
Kandahar (prehistoric origins)
Multan (one of the oldest cities in the world)
Haridwar (1 of 7 holiest places to Hindus)
Lhasa ("Place of the Gods")
Chongqing (prehistoric origins)
Tianmen Mountain ("Heaven's Gate")
Wuhan (3,500 years history)
Suzhou (3,000 years history)
Midway Island
Casas Grandes (pre-Columbian site)
Austin (Clovis culture - 9,000 BC)
Houston (NASA Space Center)
Bermuda Triangle
Canary Islands (Indigenous Guanches)
Marrakesh (Indigenous Berbers)
Sahara Desert (Ancient civilization)
Ghadames (Roman city)

\& The 30th parallel is $1 / 3$ of the great circle distance from the equator to the North Pole.

It is also located at $1 / 2$ of the height of the northern hemisphere.

The 30th parallel forms a Vesica Piscis geometry.
(Concept Link)

## SG207.1.16 The Celtic Round Towers


$\uparrow$ The Glendalough Round Tower

The most famous round tower in all of Ireland is at Glendalough, an old monastic site founded by St. Kevin (died CE 618) and later the first functioning university in the West.
$\Rightarrow$
Callahan's theory of the cycle of exchange between stored charge and free flow of magnetic monopoles.


In his pioneering book "Ancient Mysteries, Modern Visions", Dr. Philip Callahan describes the Celtic round towers as paramagnetic stone antennae intentionally tuned to growth frequencies.

Professor Callahan further comments: "Sacred mountains and stone structures such as round towers and pagodas are stone antennae and thus, like radio antennae collecting electron charges, they collect far more south magneto-electric monopoles than does the soil. They thereby release more monopoles, consequently stimulating better growth in crops planted around their base. That is why the Irish monks planted their gardens around the round towers... Paramagnetic people are antennae for collecting south monopoles and releasing them for healing: they are human round towers."

世 At 34 meters high, the round tower of Kilmacduagh is the tallest.
In these towers, part of the base below the doorway was often filled with dirt. According to Callahan, this is a tuning mechanism for shortening or lengthening the rock tower antenna.

## SG207.1.17.1 Renaissance Architecture (1) Musical Ratios

The mathematical and harmonic laws of the cosmos described by the Platonic \& Pythagorean schools of antiquity received a new life in the Italian Renaissance times. The architecture that emerged then reflected the revival of classical knowledge made available by new translations of the Pythagorean and Platonic originals. [ SG102.5]. The spirit of Renaissance Humanism was expressed in the arts and created a cultural environment celebrating the ancient principles of proportion, harmony and balance.

Renaissance architecture was conceived and created as the space-time image of an archetypal cosmos displaying a fundamental mathematical harmony. Architecture was considered as an aspect of a universal science: each part of a building, externally or internally, has to be integrated into the same system of proportional relationships and numerical ratios that governs nature and the entire cosmos. Thus Renaissance architects were picking up again the legacy from Vitruvius: a building should mirror the "exactissima harmonia" of the human body, more precisely the "golden" or Phi-based proportions of the "Vitruvius Man" famously rendered by da Vinci. [ SSG102.3] The cosmic order is manifested by the appropriate proportions in architecture.

Renaissance architects directly applied the traditional knowledge of an analogy between audio and visual proportions, based on the cosmological understanding that the whole universe is created as a harmonic mathematical structure.

The educational tradition coming down from antiquity is that the "higher arts" were the mathematical arts (the Quadrivium or "Four Ways"): arithmetic (the study of numbers), geometry (the study of spatial relationships), astronomy (the study of celestial bodies), and music. By contrast, the "manual arts" were the lower arts and formed the Trivium or "Three Ways": painting, sculpture and architecture. In order to raise the lower arts to the level of the higher liberal arts, they had to express and apply a firm mathematical foundation. "This transformation was the great achievement of the 15th century artists", explains Rudolf Wittkower. A thorough familiarity with musical theory was a pre-requisite of any artistic education. Here are some historical facts and quotes pointing to the importance of musical ratios in Renaissance architecture:

- Francesco Giorgi, the author of De harmonia mundi totius (1525), based all the measurements of the church S. Francesco della Vigna (Venice) on harmonic musical ratios.
- As explained by architect Alberti in his De re aedificatoria (1452): "The numbers by means of which the agreement of sounds affect our ears with delight, are the very same which please our eyes and our minds". The universal harmony is revealed in music by the intervals of the consonant chords: octave, fifth, fourth etc... and these are based on specific numbers related by the three "mean proportionals": arithmetic, geometric and harmonic. These three types of proportions are traditionally attributed to Pythagoras and constitute all the intervals of the musical scale, as well as the models for buildings.
- The Renaissance eye was looking for a "polyphony of proportions". In his Commentary to Vitruvius (1556), architect Daniele Barbaro explains that every work of art must express musical proportions: "This beautiful manner in music as well as in architecture is called harmony".

But, with the passing of the Italian Renaissance and the rise of the new rationalist science, the understanding of universal harmony came to be abandoned and even reversed, soon to be forgotten and labeled an "ancient doctrine". Breaking away from universal standards applicable to architecture, the modernists stressed the relativity of perception and beauty, thus opening the way to an architecture of personal creativity "free" from standards such as proportions. [ \&SG204.1]

## SG207.1.17.2 Renaissance (2) Harmonic Proportions

In the Italian Renaissance, artists and architects were trained in all the available learned disciplines. The elder generation of architects such as Fillipo Brunelleschi (1377-1446), Leon Battista Alberti (1404-1472) and Donato Bramante (1444-1514) paved the way towards the model of the "uomo universale" (universal man) that became the ideal accomplishment of the Renaissance and was typified, in architecture, by Daniele Barbaro (1514-1570), Sebastiano Serlio (1475-1554) and Andrea Palladio (1508-1580). [For da Vinci <SG102.5]

It was Palladio's work which remained canonical for the lineage of architects holding on to the concept of harmonic ratios in building. When the young artist Andrea di Pietro da Padova came into the circle of the influential humanist Trissino, he was given the classical name "Palladio", by association with the image of Pallas Athena. Under Trissino's guidance, Palladio was introduced to the Greek classics, to Vitrivius and to the principles of symmetry and proportionate relationship which he studied assiduously and fully developed in his architecture.

Palladio's buildings follow the strict axiom of symmetria postulated by Vitruvius, i.e. the mathematical harmonic relationships of the parts to each other and to the whole. In the Renaissance, this was the essential approach to architecture: make the various proportions compatible, like musical chords responding to each other. Renaissance artists and architects insisted on the integration of all parts by using, in accordance with Vitruvius, a unit of measurement (the modulus) that was applied to all aspects of the construction. For illustration, here are some of the concepts and design techniques used by Palladio and described in his Quatro libri dell' architettura (1570):

- Universal and necessary "Rules of Art" such as a symmetrical plan and a central axis.
- Commensurability of Ratios. "Palladio took the greatest care in employing harmonic ratios not only inside each single room, but also in the relation of the rooms to each other." (R. Wittkower. Architectural Principles in the Age of Humanism. 1971).
- The Mean Proportionals. Palladio varies the volumetric size of his rooms, giving them the creativity and overall balance of a Bach fugue. The proportions of the height of the rooms to their width and length, as given by Palladio, are in fact the classical "three means": the measurements are in geometric, arithmetic and harmonic mean to each other. When using the "means" for the rooms, Palladio was building "spatial harmony".
- The use of the Golden Triangle as a scalar (fractal) template. For instance the ratio 10-to-6 approximates a Golden rectangle $(10 / 6=1.666)$. One feels comfortable in a room that is in a $10-$ to-6 ratio because the room has the same proportions as one's own body.


个 Palladio's Villa Cornaro is a harmonic clustering of Golden Rectangle rooms around a square courtyard.

$\uparrow$ Golden Rectangles in Palladio's Villa Malcontenta. |/2.bp.blogspot.com

$\uparrow$ Toda tribal Hut. Wikipedia.

Vernacular structures $\rightarrow$
in Kazakhstan. wmf.org


个 Toraja houses in Sulawesi, Indonesia. (Credit)..

## SG207.1.18.1 Vernacular Architecture (1)

Vernacular (Latin vernaculus = native, indigenous) architecture uses locally available resources and traditions of building handed down through the generations.

$\uparrow$ The Chinese tolous in the Fujian province.


$\uparrow$ Rondavel. Cameroon. (Wikipedia).
$\leftarrow$ Corbelled architecture.
Africa.
Credit

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The Musgum, an ethnic group in far North Cameroon, create their tall conical dwellings from compressed sun-dried mud. Called Cases Obus (French obus = artillery shell), the geometry is a catenary arch, the ideal mathematical form to bear a maximum weight with minimal material. Decorating the surface allows for further refinement and individualization while the veins contribute to the drainage of rain. The musgum houses require regular maintenance of the coating and the veins allow people to climb atop the building.

$\uparrow$ A typical compound

## SG207.1.18.2 Vernacular Architecture (2) Cases Obus



T The relief pattern on the surface is a built-in scaffolding that can support the body to allow for maintenance of the structure by the re-application of mud to the surface.

## SG207.1.18.3 Vernacular (3) The Malagasy House



Another example of traditional use of Golden fractal harmony is the Malagasy house.

In his monograph Architecture, Time and Eternity (1990), Adrian Snodgrass reproduces drawings by Otto Dahl showing the plan of the traditional Malagasy house. The dimensions are very close to a Golden Rectangle. We give below Dahl's drawings with superposition of the PhiMatrix ${ }^{\mathrm{TM}}$ Golden Rectangle. The Malagasy house is a Golden Fractal, a harmonic part of a larger cosmology.

The location of each part of the Malagasy house is sun-structured: the long side of the (golden) rectangle is oriented North-South. The morning sun strikes the East wall; at midday the sun shines full on the ridge; at mid-afternoon "the sun is "on the rice-pounder"; at five in the afternoon the sun is "at the column"; and at six the sun has reached the place "where the calf is tethered".

The $\mathbf{1 2}$ months of the year and the $\mathbf{2 8}$ days of the lunar month are assigned specific locations around the house. The extra one or two days in the lunar month are assigned to the North-East corner (the place of beginnings and of rituals) which thus carries the destinies of the last 1-2 days and the first 2 days of the month. The position of furniture \& utensils conforms to the astrological scheme by way of correspondences.

The astrological symbolism is reflected in the larger layout of the village, in a fractal way: the head of the family lives in the North-East corner of the house, and the head of the village lives in a house located in the North-East corner of the village.

The traditional organization of the Malagasy nation is a "12-tribe" geometry - as observed by John Michell in many other traditional societies [see supra: Twelve Tribes Nations]. In the ancient sacred community organization, "the nobles of Imerina (Malagasy) are divided into twelve clans, each connected with one of the twelve villages that surrounds Tananarive (Antananarivo), the capital and residence of the Queen..." In this harmonically fractal society, the layout of the state, which is the counterpart of that of the house, had a celestial correspondence: the supreme God was protected by twelve god-kings, among whom those of the four directions had precedence over the others.

## SG207.1.19 African Fractals



个 Ba-ila settlement in Southern Africa. Above: aerial photograph before 1944. Below: fractal generation of Ba-ila settlement.

There are 3 levels of self-similarity:

1. The shape of a single house with the position of the altar.
2. The shape of a family compound with the position of the house for the family's head.
3. The shape of the entire village.

Skipping over the centuries of modern times and going outside of the western cultures, we share here the case of the "African Fractals" that have recently come to global attention.

Ron Eglash is an ethnomathematician who studies the relationships between cultures and mathematics. Early on, he realized that African settlement architecture was showing remarkable examples of fractal structure. After years of field study, he published a book: African Fractals (2005) documenting his research. We will share more about the cultural aspects of African fractal art in SG208. We show here two examples of fractal geometry patterns in African community dwelling.


个 Aerial view of the village of Labbezanga, in Mali. The swirls of circular buildings show a scaling (fractal) symmetry. On the right, fractal graphic.
[Images \& drawings from: Ron Eglash. African Fractals (2005)]

SG207 Interlude 1.1 The Tallest Structures (Old World)



It is interesting to compare the charts of the "Tallest Structures" both from the "Old World" and the "Modern World".

SG207. Chapter 2. Sacred \& Golden Sites


Moving into the 21st century, we are blessed to have inherited a wonderful collection of sacred sites that have somehow manage to escape the ravages of time and history.

Many more are yet to be uncovered, underground and undersea.

These sacred sites are books in stone containing many pages of teachings.

A brief survey around the world reveals a tendency to use proportions close to the Golden ratio,
as well as number scales
that are in harmonic relationships. Hence the name "Golden Sacred Sites".

个 "Mandala" floor-plan of Borobudur, Java, Indonesia.

## SG207.2.1.1 Megalithic Sites (1) Geometric Layouts

In 1967, Professor Alexander Thom, a retired Scottish engineer, published Megalithic Sites in Britain, a survey of more than 300 stone circles. His book was a documented revelation: our forbears had a sophisticated knowledge of geometry, astronomy, surveying and engineering techniques.
Thom showed that, far from being crude structures, these megalithic stone circles were meticulously designed according to a unified canon of geometry.

- Invariably their layout was based on Pythagorean Triangles or right-angled triangles where the base, height and hypotenuse are whole numbers, such as the famous 3-4-5 triangle. Their geometry also incorporates celestial sight lines.
- Their dimensions were set out in terms of a common unit of measure: the Megalithic Yard (2.72 feet).
- They were planned to emphasize integral numbers, evidently of symbolic, magical, geodetic or astronomical significance.

$\uparrow$ The stone circle at Castlerigg (Cumberland, England) shows 7 solar and lunar declinations. The flattened section of the ring is traced as arc CD (from center M), arc DE (from P) and arc EF (from N). The triangle PDE is a Golden Triangle.


T Roxburghshire

$\uparrow$ Carnac, Brittany. France.

## SG207.2.1.2 Megalithic Sites (2) Borrowston Rig

In his 1980 book Megalithic Rings, Alexander Thom gives the plan and measurements of the cromlech of Borrowston Rig, dated c. 2,500 BCE. A.
Thom does not mention the presence of the Golden Ratio in this construction. Yet, as pointed by Robert Chalavoux in Nombre d'Or (2001), the Phi harmony is clearly involved.


$$
\begin{array}{r}
\Rightarrow \mathrm{R} 1 / \mathrm{R} 2= \\
25 / 15.5 \mathrm{MY} \\
=1.613 \\
\mathrm{ED} / \mathrm{DC} \\
=\mathrm{DC} / \mathrm{CB} \\
=\mathrm{CB} / \mathrm{BA}=\boldsymbol{\Phi}
\end{array}
$$

世 Borrowston Rig. The ten surviving upright stones are inconspicious, some barely showing. Many more fallen ones are visible and some buried examples were located by probing. Most of the stones lie on a true circle 41.5 m in diameter. The west segment is formed of an arc of a circle 25.6 m in the diameter, the circumference of which passes through the centre of the main circle. (Credit).
(Original drawings by R. Chalavoux)

$\Rightarrow$ The tangent HF to the 2 circles and the Cheops angle:

If R1 = $\boldsymbol{\Phi}$,
$\mathrm{DF}=\mathbf{R 1}=\boldsymbol{\Phi}$
and R2 = 1
Hence CF $=\sqrt{ } \Phi$
The triangle CDF
= Cheops
[ infra]


个 Outline \& measurements of Borrowston Rig by A. Thom. Megalithic Rings.


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## SG207.2.1.3 Megalithic Sites (3) Wooden Henges


$\uparrow \downarrow$ A newly discovered (1997) wooden "henge" at Stanton Drew (already hosting 3 stone circles) turns out to be the second largest prehistoric circle (after Avebury).


Wooden henges are thought to be astronomical sighting instruments.


个 Geometries at Woodhenge.
\& Sunrise at Durrington Walls, located 2 miles NE of Stonehenge. (A reconstruction). Wikipedia.


SG207.2.2.1 Stonehenge (1)
\& Squaring the Circle.
The mean circumference of
the outer Sarsen circle with lintels is 316.8 ft . (1/100th part of 6 miles).
A square with perimeter of
316.8 ft . would contain a circle enclosing the
bluestone ring, diameter
79.2 ft. (John Michell).

$\uparrow \rightarrow$ Stonchenge geometries

\& Stonehenge reconstructed.
Phi circles (in blue).
(/labalonya.wordpress.com)


个 Harmonic study of Stonehenge III by G. Doczi.
The Sarsen circle and the Bluestone Horseshoe
are in Golden relationship.
(The Power of Limits)

## SG207.2.2.2 Stonehenge (2)


$\uparrow$ The proportion of the archways (Sarsen circle) is the 3-4-5 Triangle. Through the archways, the Heelstone points to the rising sun on the first day of summer. (G. Dozci).

SG207.2.3.1 Great Pyramid (1) Phi \& Pi
Golden Harmonics of the Great Pyramid:
The Great Pyramid at Giza incorporates the
Phi ratio in 3 triangles: cross-section, ridge and apothem.


T The apothem and the length of half the base are in Golden Phi ratio.



Height $=280$ cubits
Side $=440$ cubits Apothem $=356$ cubits

$$
\begin{gathered}
\text { Apothem } \\
\text { divided by } \\
\text { half side } \\
=356 / 220 \\
=1.618 \\
=\text { Phi }
\end{gathered}
$$

Apothem (Greek apo = from + thema $=$ to lay down): distance from apex down one face to center of base side.


\& The Glass Pyramid in Le Louvre, Paris has a slope angle ( $50.71^{\circ}$ ) slightly different from that of the Great Pyramid $\left(51.85^{\circ}\right)$.

## SG207．2．3．2 Great Pyramid（2）Key Global Position

As early as 1864，the then Astronomer Royal for Scotland，Charles Piazzi Smyth， pointed out that Gizeh is at the center of the land mass of the earth：its East－West axis corresponds to the longest land parallel across the Earth，passing through Africa，Asia，and America，and the longest land meridian on Earth，through Asia， Africa，Europe，and Antarctica．

Recent computations（taking into account the rising sea level and other factors） tend to confirm Smyth＇s thesis．

$\uparrow$ When the diagonals of the Great Pyramid are extended they come close to define the delta of the Nile river，i．e．the pyramid is at the geographical apex of the Nile．
（Above plate：Plate II．Charles Piazzi Smyth． Our Inheritance in the Great Pyramid（4th edition，1880．）


个（Credit）


个 The Great Pyramid was built on the 30th parallel North（a very interesting latitude in terms of sacred sites）．From that position，the direct distances， measured in a straight line through Earth，to the geocenter and North pole are the same．
This fact can be visualized by an equilateral triangle with its corners at the geocenter，the North pole and on the 30th parallel North．（Credit）


个 The Pyramid is located at the center of the earth＇s land mass．（Smyth）．

## SG207.2.3.3 Great Pyramid (3) Geodesy



The Great Pyramid is a Geodetic Marker: each face is designed to represent one curved quadrant of the Northern Hemisphere.
(Peter Tompkins. Secrets of the Great Pyramid. Harper, 1971.)

Flat area of half circle = spherical area of quadrant $90^{\circ}$ $=2 \sqrt{\Phi}$


Area of circle $4 \sqrt{ }$ ø



A hemisphere fitted on the Great Pyramid



The Pyramid accomplishes the Squaring of the Circle and the Sphering (spherizing) of the Cube.

The square of the base perimeter = the circumference of the circle with radius of pyramid's height.

Fractional values of $\pi \& \Phi$
$\pi=22 / 7=3.1428$
$\pi=4 / \sqrt{ } \Phi=3.1446$
$\sqrt{ } \Phi=14 / 11=1.2727$
$\pi=6 \Phi^{2} / 5=3.1415$
Also $\Phi=1.4 \pi / \mathrm{e}=1.618$

## SG207.2.3.4 Great Pyramid (4) King's Chamber

Is there any specific geometry in the design and layout of the "King's Chamber"? Below are two 3D sketches showing the actual measurements (in royal cubits) and the proportional lengths.

- The floor of the King's Chamber is a double square of $20 \times 10$ cubits or $\mathbf{2 x} 1$ rectangle (ABCD.)
- The diagonal of the double square (AC) forms two right triangles with base = 1 and height $=\mathbf{2}$. This diagonal CA $=\sqrt{ } \mathbf{5}=2.236$ (or 22.36 cubits in actual length).
- The height of the chamber $=$ half the length of the floor diagonal $\mathrm{CA}=(\sqrt{5}) / 2$ (or 12.18 cubits).
- The diagonal EB in the triangle EBA = $\mathbf{1 5}$ cubits. Consequently, the triangle EBA is a 2-3- $\sqrt{5}$ triangle.


$\uparrow$ The double square engenders the Phi proportions.


↔ The "TalatatCubit" model of Gruais \& Mouny. (Guizeh, au-delà des Grands Secrets. 1997).

The model is also based on a double square and displays Phi, the royal cubit and the Sacred Triangle (3-4-5) [-SG302]
\& Measurements in proportional lengths. ( W. R. Fix. Pyramid Odyssey. 1978.)

\& Oblique sunlight on the Great Pyramid, in this picture from satellite Ikonos, shows the indentation of the apothem (or slant height), a feat of precision.

## SG207.2.3.5 Great Pyramid (5) The Solstice Shadow

In his groundbreaking book The Crystal Sun, Robert Temple (author of The Sirius Mystery), develops the theme of Sacred Optics and the use of technologies of light in the ancient world.

On the winter solstice, Robert Temple was the first observer to notice (and recognize the importance of) the shadow of the Khafre pyramid cast upon the South side of the Great Pyramid.
In his words:
"The shadow has an angle of $26^{\circ}$, which is the same angle as that of the interior ascending passage as well as the descending passage. It thus indicates on the outside what is concealed inside.

Where the solstice shadow meets the apothem (the vertical line dividing the South face into two), a Golden Triangle is formed, just as the ascending passage itself forms a Golden Triangle...
[Note: R. Temple defines a 'Golden Triangle' as a right triangle with sides $1,2, \sqrt{ } 5 . \sqrt{ } 5=2.236$ or $\mathrm{Phi}+1 / \mathrm{Phi}=$ $1.618+.618=2.236$. This is different from the Pentamodule isosceles "Golden Triangle" with sides 1, Phi, Phi. \&SG106.]

If the Pyramid of Khafre/Chefren had been positioned even a fraction differently, the shadow would not have worked. This suggests that the positioning was precise..."

Winter solstice shadow of the Khafre pyramid onto the South face of the Great Pyramid. (Robert Temple. The Crystal Sun. 1999.)


A Approximation of the Solstice triangular shadow.

$\uparrow$ Penta-symmetry in the Red Pyramid, Dahshur.
\& See SG102.1 for the Bent Pyramid and the Red Pyramid in Dahshur. The Red Pyramid and the upper part of the Bent Pyramid display a pentagonal symmetry, due to their slope angle.
[Concept: world-mysteries.com]


T The older view of the Giza Spiral. (McCollum, Torun, Hancock, Hoagland)

- According to researchers R. McCollum and Erol Torun, the 3 pyramids and the Sphinx fit into a Golden spiral design: $\mathbf{A B} / \mathbf{A D}=1 / \Phi$.
- The ratio $\mathrm{DC} / \mathrm{GC}=$ the ratio between the two mathematical constants e $\pi=0.865$.
- The placement of the 3rd pyramid (Mykerinos) points to the "tetrahedral angle" of $19 . \mathbf{5}^{\circ}$.
(After G. Hancock. The Mars Mystery. and R. Hoagland. The Monuments of Mars.)


## SG207.2.3.6 Great Pyramid (6) The Giva Spiral

Is there a Giza Spiral?


个 Gary Osborne's new design of the Giza Spiral, based on recent aerial views.
Reflected as a mirror image, it shows the symbol of the "Heart" inherent in the Golden Spiral's symmetry.
www.garyosborn.moonfruit.net

## SG207.2.4.1 Egyptian Temples (1) Karnak

Karnak is one of the largest religious complex ever constructed in this world. The Hall is considered to be a world's masterpiece.

Begun by Ramesses I (founder of the 19th Dynasty) and continued by under Seti I (13406-1290), the Hall was completed by Seti I's son Ramesses II.

The upper portion of the Hall attests to the use of the Progression (Fibonacci) Series and its related Golden harmonic proportions (Neb).

$\leftarrow$ The main axis (East-West) of the Karnak temple shows 2 Golden rectangles.
(M. Gadalla)


个 Plan of the Amun Temple showing the Hypostyle Hall.

$\uparrow$ Applications of the Progression (Fibonacci) Series. (M. Gadalla).

## SG207.2.4.2 Egypt (2) Luxor (1)

The Temple of Luxor (ancient Thebes), adjacent to the even larger temple complex of Karnak, was the ancient world's first global university. At its prime, up to $\mathbf{8 0 , 0 0 0}$ students were receiving instruction there. All Greek "great names" are known to have studied there: Pythagoras, Plato, Aristotle, Socrates, Hypocrates, Euripides... and later Euclid \& Archimedes...

One of the on-going debates about Luxor is the question of the shifts of the axis throughout time: are they just reflecting the changing angle of the Pole star and showing new alignments to the rising sun? Schwaller de Lubicz believed there was a more sophisticated geometricharmonic knowledge involved. He uncovered, in the Upper Sanctuary of Amon, the three main axis of the temple chiseled in the sub-floor (see picture below). This led him to believe that the Egyptians knew the entire shape of the temple before it was built and that the plan was complete from the very beginning. Indeed, without exception, every wall, colonnade, hall and sanctuary is rigorously aligned upon one of these axis (or its reflection - see below).

As explained by A. T. Mann in Sacred Architecture: "De Lubicz believed the Egyptian temples to be alive, both in the sense of being based upon natural proportions and also that they oscillate, reverberate and harmonize with humanity and are a kind of subtle healing device... These buildings grew from consciously planted seeds: just as plants create stems according to the Golden Mean, so the proportions governed the increase and multiplication of parts into the whole."

$\uparrow$ The reflection of the Axis of Amon is the hypotenuse of a 1:7 triangle. (The Temple of Man).

$\leftarrow$ View of two axis chiseled in the Sanctuary of Amon. (The Temple of Man).

## SG207.2.4.3 Egypt (3) Luxor (2)



个 Luxor analyzed according to the principle of gnomonic growth. Credit: Robert Lawlor. Sacred Geometry. 1992.
"The phases of the temple's construction, which are divected by the various PHI proportions of the initial square of the inner sanctuary, are coincident with the phases of growth of a human body, which the whole of the temple plan symbolizes. " (R. Lawlor).

Figure J. Harmonic analysis of triple sanctuary. (Lucie Lamy)
个 Harmonic analysis of the "holy of holies" (at the top of the Luxor temple). By Lucie Lamy (daughter of Schwaller de Lubicz).


SG207.2.4.4 Egypt (4) Abydos


个 Plan of the Temple of Seti I in Abydos, Egypt.
Note the Golden rectangles.

$\uparrow$ The overall plan of the Abydos temple complex shows the presence of PHI proportions in the form of Golden rectangles:
-The Temple of Seti I seems to be based on Golden rectangles. (See left)

- The temple of Ramses II is a Golden rectangle.
- Even the much older structure known as the Osireion seems to be in a Golden rectangle proportion.
(We welcome exact field measurements to prove/disprove).
(Above plan from:
Leonard Ribordy. Architecture et Géometrie Sacrées dans le Monde. 61
Trajectoire. 2010)


## SG207.2.4.5 Egypt (5) Osireion

The Osireion is located at Abydos at the rear of the temple of Seti I and is built at a considerably lower level than the foundations of the Seti temple. It features an architecture of megalithic blocks, similar to the Khafre's Valley temple at Giza, and suggesting an Old Kingdom era. The geometry of the Osireion is quite "golden".


T Geometric analysis of the Osireion by Lucie Lamy.
(Robert Lawlor. Sacred Geometry. 1992)

$\uparrow$ The Osireion is at a much lower level than the Seti temple.


A A Golden rectangle
fits the Osireion. (Wikipedia)

## SG207.2.5 Khajuraho Kandariya

The Kandariya Mahadeva temple is the largest of the temple group in Khajuraho, India. The main spire (shikhara) rises 31 m . to depict Mount Kailash, the Himalayan mountain abode of Shiva, and is surrounded by 84 miniature spires.

The single-pointed wholeness of the Kandariya, reflected in the many self-similar structures on various scales, displays the striking fractal quality
of recursive geometry. The cascading peaks create a coherent whole: the rising slopes of the cosmic mountain. All the fractal features are integral harmonics of the ultimate Oneness that pervades Hindu wisdom.
$\rightarrow$ Kandariha Front view. (Credit)


In her master thesis about Indian temple architecture (The Hindu Temple, 1976), Stella Kramrisch explains:
"The mountain range of the Kandariya has its peaks arrayed above the longitudinal axis of the building... The mass appears weightless within a silhouette (the side view) which shows ascent \& descent and renewed ascent from a higher level, leading each time to a summit of its own... Rising and falling and rising always higher...

The building is to be viewed from all its angles: the progressively arduous and repeated ascent \& descent towards the pinnacle of the Sikhara limned against the sky; the front view where the several mandapa roofs seem to coincide in one comprehensive outline; and the many other angles of view progressively unfolding during the circumambulation.

This monumental, sculptured architecture is not to be understood functionally, nor in human terms, by empathy or feeling into its form. AN INTRICATE INSTRUMENT OF PRECISION AND ENDURING STABILITY OF CONCATENATED THEMES \& RHYTHMS, IT LEADS TO FINAL UNITY."


SG207.2.6.1 Borobudur (1)


- The figure formed by the height (from the base to the top center stupa), the base line and the apothem roughly approximates the Pythagorean 3-4-5 triangle.


An exact 3-4-5 triangle does not appear in this cross section $\boldsymbol{>}$ AB is 2.9 (less than 3). BC is 4.4 (more than 4). AC is 5.25 (more than 5).

However, there is a Phi proportion between the total height
However, there is a Phi proportion between the total height
and the base of the main center stupa.


## SG207.2.6.2

## Borobudur (2)

Using the plans (assumed accurate) given by Wikipedia, we were able to validate the PHI proportion of Borobudur, but not so the presence of an exact 3-4-5 triangle.
$\leftarrow$ By marking the central square as unit 1 , a perfect Golden Rectangle can be traced.

Furthermore, one can see that Borobudur is designed as a GOLDEN CROSS.



## SG207.2.6.3 Borobudur (3)

In Buddhist practice, the 60 stages of meditation are a continuous ascending way through the 3 worlds as a spiral/spiritual circum-ambulation. This orthodox practice fits exactly over the ground plan of Borobudur.

↔ The Stages of Meditation according to the Pali scriptures.

The Path of the meditator $\geqslant$


The Path $\rightarrow$ of the meditator overlaid upon the

Stages of
Meditation.

<- The Path of the meditator overlaid upon the ground plan.

## SG207.2.7.1 Japanese Pagodas (1) Elegant Power



Horyu-ji 5-storied pagoda. 7-8th century.

Japan has developed a very unique type of pagoda. Besides the vertical symbolism of bridging Heaven and Earth common to all towering structures around the world, pagodas also function as energy antennae (see supra), with various levels of damping/amplifying geo-magnetic energies. The lightning rod function is only a spectacular but small effect of a pagoda - called by some people a "geo-acunpuncture needle".

As a structure, a pagoda is a tiered tower with multiple eaves or levels (traditionally an odd number: 3,5, 9 or 13). Compared to pagodas in other Asiatic cultures which are often built with stones, the Japanese pagoda is a living, organic structure for very specific reasons:

- It is entirely made of wood (with usually no metal involved) like a giant wooden puzzle held together with wooden pegs.
- It is built in a way of resonance with the earth's vibrations such as earthquakes, using some unique \& ingenious devices such as the central pole or shinbashira (also called the "Heart Pillar").

The Japanese pagoda is a harmonic oscillator that is also meant to be perceived as an embodiment of Beauty. A building with no apparent purpose (it has no internal staircase) and a beauty that does not need explanations (golden or other). Allow yourself to gaze at and through some of these magnificent sacred sculptures...

Why do Japanese pagodas withstand earthquakes (After an article in The Economist, July 31st, 2009.)

It is remarkable that only two of Japan's hundreds of wooden pagodas have collapsed over the past 1,400 years as a result of earthquakes' vibrations. Why? Here are some reasons:

- The individual floors of a pagoda are not rigidly attached to those immediately above and below. They are organically juxtaposed on top of each other. Gravity is the only force holding them together. Because of this organic-type of natural stacking, the loosely fitted joints (due to the wooden pegs) allow each level of the pagoda to slide horizontally independently of the others.
- When an earthquake strikes and the structure begins to sway, "the heavy-tiled roof covering the extended eaves of each story acts like the long pole with weights on the ends that a tightrope walker uses to steady himself: the large radius of gyration means the shaking has a lot of inbuilt inertia to overcome."
- "As the loosely stacked stories slide to and fro - with each consecutive floor moving in the opposite direction to the one above and below - they collide internally with the trunk-like shinbashira dangling through the central well of the building. With each collision, they dump more of their kinetic energy into the massive column trying to make it swing like a pendulum... Pagodas that damp the swaying best have their shinbashira resting firmly on the ground." "In essence", concludes the article, "the pagoda is a tuned mass-damping system".



世TM
3 types of shinbashira.

The pagoda is a living tree!

## SG207.2.7.2 Japanese Pagodas (2) Gallery 1



个 3-storied pagoda, Ichijo-ji.
1171 CE. (Wikipedia).

个 East pagoda, Yakushi-ji, Nara.
Dated 730. (Image: Monoru Ooka. The Temples of Nara. 1973.)

## SG207.2.7.3 Japanese Pagodas (3) Gallery 2




个 Horyu-ji. Nara. 9th c. Credit
— 5-storied pagoda, Muro-ji, Nara.
Early 9th century.
(Image: Monoru Ooka. The Temples of Nara. 1973.)



Hiyoshi Zukuri


## SG207.2.8.1 Japan Geometries

## (1) Shinto Temples

Until the introduction of Buddhism in 538 CE, Japan was a nation imbedded in the Shinto religion.
From looking at the plans of some of the many Shinto styles of architecture ("zukuri"), it appears that some of these temples may be close to a Golden Rectangle or the 3:2 musical fifth.

On the left are the examples we were able to find, starting with the most ancient style Shinmei Zukuri typified by the famous Ise Grand Shrine (see below). As usual, "more research is needed".

## The Ise Grand Shrine

The architectural style of the Ise Shrine is known as shinmeizukuri, characterized by extreme simplicity and antiquity. The old shrines are dismantled and new ones built on an adjacent site to exacting specifications every 20 years so that the buildings will be forever new and forever ancient and original. The present buildings, dating from 1993, are the 61st iteration to date and are scheduled for rebuilding in 2013.


Several temples and sites in Nara, together with Kasugayama Primeval Forest, collectively form "Historic Monuments of Ancient Nara", a UNESCO World Heritage Site. Nara was the capital of Japan from 710 to 784, lending its name to the Nara period. During the Asuka and Nara periods (538-784), the Golden Hall (Japanese kon-do = "golden hall") within a Buddhist temple complex was the heart of the temple. As the place where the main Buddhist image was enshrined, the Golden Hall was the first building to be built. According to Wikipedia, "the origin of the name is uncertain, but it may derive from the perceived preciousness of its content, or from the fact that the interior was lined with gold. This is the name used by the oldest temples in the country."

An interesting question is: are there actual golden (PHI) proportions in the Golden Halls? Below are the Golden Hall floor plans of the principal temples, as given by Minoru Ooka in Temples of Nara (1973. p. 71). We applied the PhiMatrix ${ }^{\mathrm{TM}}$ Golden rectangle grid. The result is a good match for the perimeter proportions (base platform). Whereas lecture or refectory halls have various proportions, "Golden Halls" seem to be intentionally "golden" (PHI).


SG207.2.8.2 Japan Geometries (2) Golden Halls


Golden Hall, Todai-ji. Restoration by Minoru Ooka, as reconstructed by Chogen. Completed 1195. Destroyed by Fire 1567.


Middle Golden Hall.
Kofuku-ji, Nara $\rightarrow$
Restoration of original
by Minoru Ooka.
Temples of Nara. 1973.


↔ Golden Hall
(East), Kofuku-ji, Nara.
5th reconstruction 1415. Original 726.


T Pure Land Hall, Jodo-ji, Hyogo. 1192.


T South Main Gate, Todai-ji, Nara.

We offer here a research hypothesis: the roof slope of ancient Japanese temples and pagodas approximates the $36^{\circ}$ base angle of the Golden Gnomon. ( $\langle$ SG106.2) Intentionally or by intuitive, artistic grasp of the harmonic proportions of nature?

www.cepolina.com
(Diagrams: Minuro Ooka)


T Golden Hall, Toshodai-ji, Nara. Cross Section of original structure.


T Main Hall, Matsuno-0-dera.


## SG207.2.9.1 Beijing - <br> Forbidden City (1)

Applying the PhiMatrix ${ }^{\text {TM }}$ Golden Rectangle grid to
the Wikipedia plan of the Forbidden City, in Beijing, China, shows the following:

- A very good match for the Hall of Supreme Harmony located at the Phi Section of its compound (blue lines).
- An approximate match for the Hall of Supreme Harmony in terms of being at about the Phi Section of the entire Forbidden City (white lines).

I would say that, historically, this probably was not intentional. But it shows, once again, that Phi happens when harmonic balance \& beauty are sought by intuitive geomancers, city planners, architects and artists.

- The Hall of Supreme Harmony is approximately at the Phi Section of the overall Forbidden City. (Wikipedia image).

According to the website www.chinadaily.com.cn:
"It also appears that the design and construction of the Forbidden City comply with the Golden Section Rule. The courtyard where the Gate of Supreme Harmony lies in is 200 meters long and 130 meters wide, with a ratio of width to length reaching 0.65 . This number is somewhere near 0.618 , the [reciprocal of the Golden Section Ratio].
Also, with the distance from the Daming Gate to the Jing Mountain reaching 2.5 km , and the distance from the Daming Gate to the center of the Hall of Supreme Harmony hitting 1.5045 km , the ratio of 1.5045 to 2.5 amounts to 0.618 , which is exactly the [reciprocal of the] Golden Section Ratio."

SG207.2.9.2 Beijing - Forbidden City (2)


The Forbidden City was the Chinese imperial palace from the Ming Dynasty to the end of the Qing Dynasty. It is located in the middle of Beijing, China, and now houses the Palace Museum. For almost 500 years, it served as the home of emperors and their households, as well as the ceremonial and political center of Chinese government.

The palace was forbidden to the commoners for $\mathbf{5 0 0}$ years. It is the largest palace complex in the world, with over 800 buildings and almost $\mathbf{1 0 , 0 0 0}$ rooms. It is bounded by 10 meter walls and a 52 -meter wide moat. The building layout is absolutely geometrical (a complete contrast with the Imperial Garden within the palace).

In the 1930s, the city planner Edmund Bacon noted that you could still see that the city, from the walls surrounding it to the emperor's Forbidden City at its heart, was conceived in totality as a work of monumental geometry, symmetrical and precise. (Credit)

The city plan, Geoffrey Jellicoe wrote in The Landscape of Man, was "laid out according to cosmic calculation, heaven being considered a round and the earth counterpart to be a square so that there is a system of boxes one within another..." He noted that the geometry is Confucian and the insertion of natural form is Taoist: the two schools of inspiration together create harmony. But, Jellicoe also notes, "without the emphatic central axis of Western planning... The modest axis passes under and through buildings and does not divide one side from the other". http://www.gardenvisit.com
$\leftarrow$ Golden Rectangles proportions in the Forbidden City.
Note: Please use these data with precaution. Yes, there are other geometries and proportions in the layout plan of the Forbidden City. Yet, there seems to be a great number of Golden Rectangles proportions of all sizes - almost like a natural re-occurring harmonic chord that keeps popping up in a fractal-like manner.

Another research project with exact measurements to
prove/disprove this hypothesis.
(Map credit: http://www.chinahighlights.com)

## SG207.2.9.3 Forbidden City (3) Hall Supreme Harmony

The Golden Rectangle-shaped Outer Court of the Forbidden City is an alignment of halls bearing the name "Harmony". Golden Rectangles seem to be associated here with Harmony. The Gate of Supreme Harmony (B) leads to a 3-tiered terrace, the focus of the palace complex. Three halls stand on top of the terrace:

- The Hall of Supreme Harmony (C)
- The Hall of Central Harmony (D)
- The Hall of Preserving Harmony (E)


The Hall of Supreme Harmony (C) is the largest building: it rises 35 meters above the level of the surrounding square. It was the highest structure in the nation during the Ming and Qing dynasties, no other buildings being allowed to top it. It also is the largest surviving wooden structure in China. The Hall of Supreme Harmony was the symbol and the ceremonial centre of the imperial power.

Proportions. According to Wikipedia, the Hall of Supreme Harmony is 9 bays wide and 5 bays deep, "the numbers 9 and 5 being symbolically connected to the majesty of the Emperor." However there are 11 instead of nine bays in length in today's Hall of Supreme Harmony because the original Hall of Supreme Harmony was destroyed by the end of the Ming Dynasty and repaired in 1669. Exact historical measurements would be welcome. As of today's, the official data are the following:

Height: $\mathbf{3 5 . 0 2}$ meters (and 37.44 if rooftop decoration is counted) Length: $\mathbf{6 3 . 9 6}$ meters
Width: 37.2 meters
The ratio 63.96 / $37.2=1.7$. Slightly longer than a Golden Rectangle. There are a total of 72 pillars (six rows of 12) to support the roof.


个 The Hall of Supreme Harmony as it stands today.


T The Hall of Supreme Harmony (top left) in a 18th century painting. (Wikimedia Commons).


个 Plan of the Mosque of Kairouan. With a slight corner skew, it fits a golden rectangle and its golden subdivision.

## SG207.2.10 Mosque of Kairouan

The Great Mosque of Kairouan (Mosque of Uqba) is one of the oldest places of worship in the Islamic world, as well as a model for all later mosques in North Africa.

It shows, in its overall plan and the proportions of its main doorways, the presence of the golden proportion.


T Mosque of Kairouan. 3D perspective.


T The mihrab, where the imam stands during prayer, is oriented towards Mecca.

(All images: Wikipedia)

## \& Prayer Hall

 facade.

SG207.2.11 Parthenon: Phi or not Phi?


个 The analysis of the Parthenon's façade by Ton Brunes, in The Secrets of Ancient Geometry (1967). Brunes claims to have rediscovered the "Sacred Cut" (=3/2) used in the ancient Greek \& Roman temples. [ SSG302]

The controversy goes on: is the façade of the Parthenon framed by an approximate Golden Rectangle, while reciprocal rectangles delineate the height of the architrave, frieze and pediment?

The issue hinges on whether to include in the measurements the three steps leading to the temple. The Golden Rectangle proponents, by including the 3 steps, do obtain a good golden rectangle. Others say that the "façade" does not include the steps.

When looking at the floor plan of the Parthenon, the fact is that there are no obvious Phi proportions: rather, we find variations on the double square geometry (2-2.1-2.2...).


T The floor plan of the Parthenon yields ratios of 2, 2.1 and 2.2.
An overlaid Golden Rectangle (in blue) does not match the cella proportions. (Image: Stephen Skinner. Sacred Geometry. 2006).

$\leftarrow$ Coincidence, natural intuition or knowledge?

SG207.2.12 The Greek Theater of Epidaurus


T The 12 directions and 2 Fibonacci numbers inscribed in Epidaurus.
In the 1st c. BCE, the Roman architect Vitruvius reported that Greek theaters were designed according to a 12 -fold pattern of symmetry (Ten Books on Architecture. 5, VI:1). The number of rows in each level of the auditorium is 21 and 34 , a Phi ratio. (Design: Rachel Fletcher. James A. Swan. The Power of Place. 1991)

## 3-fold symmetry $\mathbf{7}$

The base of an equilateral triangle inscribing the orchestra circle marks the boundaries of the theatron at its uttermost edge. (R. Fletcher).


Reputed to be the birthplace of Apollo's son Asclepius, the healer, Epidaurus was known for its healing sanctuary as well as its theater.

The theater (c. 340-300 BCE) is famous for its exceptional acoustics, which permit almost perfect intelligibility of non-amplified spoken word from the scene to all $\mathbf{1 5 , 0 0 0}$ spectators, regardless of their seating. Tour guides casually have their groups scattered in the stands and show them how they can easily hear the sound of a match struck at center-stage.

The theater at Epidaurus is the best preserved example of a classical Greek theater. Unlike the modern counterparts with their indoor experience, Greek theaters were open to the universe and were an integral part of the larger cosmic design. Involving the people, the actors, the elements, the landscape, the sky and the spiritual presence of the "gods \& goddesses", Greek theaters were a multi-level, spherical experience. And their design \& geometries reflected the resonance \& symmetry of the cosmos.

The Greek classical understanding of "symmetry" was much more than a balanced equality: it was the deeper insight of a music-like integration between proportional elements, harmoniously related as parts and whole.

In her article Ancient Theaters as Sacred Spaces, Rachel Fletcher made a proportional study of the theater of Epidaurus. She pointed to the 34/21 Phi ratio: if the width of the higher level equals the side of a regular pentagon, then the width of the lower level is the diameter of the pentagon.

## SG207.2.13.1 The Pantheon (1)

The Pantheon (Greek = "to every god") was built by Emperor Hadrian in about 126 CE as a temple to all the gods of Ancient Rome. Almost 2,000 years after it was built, the Pantheon's dome is still the world's largest un-reinforced concrete dome.

The Pantheon is a cosmology in stone, rich in geometric principles and symbolism. The Circle (and 3D sphere), the Square (and the cubic portico) and the Triangle form the basic building blocks of natural design.

The pantheon's vault is a manifestation of the dome of the heavens with its "oculus" (Latin = "eye") allowing the sun light in at the very center. The sun, of course, symbolizes oneness, permanence and consciousness. The light is then reflected across the dome's faceted coffers, producing a moon-like quality of light.

Rachel Fletcher has written an insightful geometric study of the Pantheon (Design Spirit, Fall issue, 1990).


- 7 and 8 . A heptagon (7 sides) can be drawn by "Squaring the Circle" (4-8 symmetry). [-SG302] (Design: R. Fletcher).


Credit


T Number 28. The dome is made of 5 circles of 28 coffers that derive from a 7 -fold symmetric construction. 28 is a "perfect number" [-SG202]: it is the sum of its divisors $(1+2+4+7+14=28)$ as well as the sum of the seven first numbers $(1+2+3+4+5+6+7=28)$.
28 is the traditional number of the phases of the moon, the female cycle and the four 7-days weeks. It marks a lunar calendar. (Image: Rachel Fletcher).

$\uparrow$ The light beam of the sun shining straight through the oculus. (Credit)

## SG207.2.13.2 The Pantheon (2)


(† Original concept: Rachel Fletcher).


$\uparrow$ Circle with center $\mathbf{O}^{\prime}$ is the Pantheon's dome circle.
The sphere is set into the cylinder. Circle $\mathbf{O}^{\prime}$ defines a square with 4 quarters and the 4 directions.
Circle with center O forms a Vesica Piscis [-SG108] with Circle O' . The Vesica's long axis is the top line of the cylinder (AB line). The face of the Pantheon fits in the approximate Golden Rectangle ABEF and the horizontal Golden Cut is the base of the top Circle $\mathbf{O}$.
\& Pentagonal geometry.

## SG207.2.14.1 Teotihuacan (1)

The UNESCO World Heritage page for Teotihuacan describes the main pyramids as "laid out according to geometric and symbolic principles".

Indeed, in 1972, Hugh Harleston, an American engineer, decided to create a mathematical model to superimpose on the filed measurements of the Millon-Marquina mapping project. Harleston reasoned that a comparison of proportions would show significant relationships despite errors made in the reconstruction works. Starting with the recurring measure of 57 meters established by the mapping project, Harleston kept looking for smaller units and arrived at what he called the "Hunab" or STU (Standard Teotihuacan Unit) of 1.0594 or the twelfth root of 2 . This unit seems to be matching a great number of the main measurements of Teotihuacan, such as $\mathbf{1 6 2}$ for the Moon base, $\mathbf{2 1 6}$ for the Sun base and $\mathbf{3 7 8}$ for the Citadel.

Harleston eventually noticed that Teotihuacan was a scale model of the solar system. His assertion is supported by the distances between the stone tumuli punctuating the "Avenue of the Dead" from the Temple of Quetzalcoatl to the Pyramid of the Moon. Indeed, between the Sun on the one hand, and Mercury, Venus, Mars, Jupiter, Uranus, Neptune, and Pluto on the other, the distances measured in hunabs (the standard unit of 1.0594 m .), multiplied by a certain factor, are 36, 72, 144, $520,1,845,2,880$ and 3,780 respectively. This compares well with the distances currently established in astronomical units ( $1 \mathrm{AU}=$ mean distance Earth - Sun): 0.387, 0.723, 1.524, 5.203, 19.247, 30.220 and 39.642.

Note: these numbers are perfect circular numbers (numbers whose digits add up to nine) and belong to the traditional series of Canonic Numbers having a cosmic nature (the "Tribe of 9-18-36-72"). The only exception is the distance from Jupiter (520), whose digits add up to 7. [\SG202.6]

-"9" in the Teotihucan complex.

With the Sun Pyramid as a starting point, Harleston found many series of multiples of 9 . Also many prime dimensional numbers are adding to 9 .


As Peter Tompkins comments
in Mysteries of the Mexican Pyramids (1976):
"Studying the figures obtained from the Citadel, Harleston noticed that $378 \times 1.059 \times 100,000$ gave a very accurate number for the circumference of the earth, whose average spherical measure is 40,049,589.35 m. Harleston then found that the 60-unit base of the Quetzalcoatl Pyramid x 100,000 gave the polar radius of the earth. This led him to wonder whether the Pyramid of Quetzalcoatl, like the Pyramid of Cheops and the stepped ziggurats of Mesopotamia, could have been designed as a scale model of the earth, part of a citadel conceived to incorporate mathematical, geodetic, astronomical, and possibly cosmic data."


世 Harleston said that the modular lengths of Teotihuacan can be compared with musical octaves.

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SG207.2.14.2
Teotihuacan
(2) Sun

Pyramid

\& Harleston's conversion of the Sun Pyramid's measurements
into "hunab"
units.
(P. Tompkins. Mysteries of the Mexican Pyramids.)

## SG207.2.14.3 <br> Teotihuacan (3) Moon <br> Pyramid


§ Mathematical reconstruction of the Moon Pyramid by Harleston. The projection of the sides to an overhead intersection point shows a height of 68 STU.
(Diagrams credit: P. Tompkins.
Mysteries of the Mexican Pyramids.)
$\rightarrow$ Actual measurements of the Moon

Pyramid (in hunabs).


T Image credit

## SG207.2.15 Tikal

The Tikal National Park (northern Guatemala) is a World Heritage Site of the Maya civilization. Deep within the rainforest, the site has more than 3,000 structures.


Temple complex at Tikal. (Credit)


ヘ $->$ Temple I has a slope of $72^{\circ}$ making it a Golden Triangle.
(Credit)

\& Temple IV is the tallest pre-Columbian structure ( 70 meters per Wikipedia) still standing in South America, although Teotihuacan's Pyramid of the Sun may once have been taller.
"The pyramid was built on top of an enormous supporting platform that measures 144 by 108 meters ( 472 by 354 fit); this platform had two levels and rounded corners; it was accessed via a 44-meter (144 ft) wide projecting stairway." (Wikipedia)

It will be interesting to study accurate ground plans and measurements of the main pyramid structures at Tikal.

Tikal temple I
85

In a remarkable piece of Sacred Geometry investigation, Nicholas R. Mann uncovered the original "golden template" of Washington D.C.

His book "The Sacred Geometry of Washington D.C." (2006) explains how the French architect Charles L'Enfant, fully supported by President George Washington and Secretary of State Thomas Jefferson, had the unique opportunity to envision and plan, from the ground up, the design of the capital city of the emerging American nation.

In his $\mathbf{1 7 9 1}$ plan, L'Enfant translated into reality the ideals of the new American Federation. A true heir to the long standing tradition of sacred architecture as the Cosmogonic Act of Recreating the World, L'Enfant designed a foundation pattern based upon the perennial principles of Sacred Geometry: the North-South "orientation", the life \& growth-affirming Golden Section PHI and the cascade of pentagonal harmonic proportions generated by PHI.

In his own words, L'Enfant was aiming for "that harmony and combination of the different parts to the whole". This was an architectural as well as a political statement.


SG207.2.16.1 Washington D.C. A Sacred temple (1)

$\uparrow$ The Cascade of the 5 -pointed stars (pentagrams) overlaid upon the L'Enfant template. The main diagonal avenues and squares are clearly revealed.

## SG207.2.16.2 Washington D.C. A Sacred Temple (2)

L'Enfant succeeded in creating in proportion, measures \& numbers, a dynamic and harmonic equilibrium between the primary buildings and functions of the Federal City: Capitol (Legislature), White House (Executive), and Supreme Court (Judiciary). Washington D.C. is geometric music.

Even though L'Enfant plan of 1791 was later altered (only to be reverted to by the MacMillan Commission of 1901), the geometry of Washington D.C. is a prototype of cosmic order, an earthly model of the traditional Heavenly City. The PHI-based geomancy of the Capital City integrates all parts of the nation into a coherent whole, in tune with nature's harmony, and speaks of the universal scale of the American founding ideals.


## SG207.2.16.3 Washington D.C. A Sacred Temple (3)

The design of L'Enfant for the capital City fits remarkably well with the plans of famous sacred temple sites around the world, such as Luxor (Egypt), Stonehenge (England) or Angkor Wat (Cambodia). Below are some overlays of the PHI-based Washington D.C. template for these 3 sites.
(All designs by Nicholas R. Mann. The Sacred Geometry of Washington D.C. 2006)


Overlay of Stonehenge England. 3100-1800 BCE.

## SG207.2.16.4 Washington D.C. A Sacred Temple (4)

Nick Campbell used surveying knowledge to come up with city geometries based on the actual layout. Below are some of Campbell's geometric overlays as explained in his website www.desymbols.com. Campbell sees the original grid as rhombusbased, thus allowing for skewed pentagonal fractals.


Note the pentagonal fractals that double in height.

The geometric and esoteric symbolism of Washington D.C. has attracted the attention of many researchers. We have presented Nicholas Mann's conclusions because he focuses on the first plan of I'Enfant, thus showing that the original intention for the layout of Washington D.C. was imbued with classic Sacred Geometry.


世 A diagram by Nick Campbell showing the difference between the ideal and actual plan.

Displacing the Capitol Building bends both Pennsylvania and Maryland Aves.

## Credit: desymbols.com

## SG207.2.16.5 Washington D.C. Washington Monument

Designed within 60 years of each other, both the L'Enfant plan of Washington D.C. and the Washington Monument are based on symbolic principles of Sacred Geometry and numbers.

The tallest free-standing masonry building in the world, the Washington Monument has the overall shape and function of an obelisk but, technically, it is not a true obelisk as it is not monolithic but made of 36,000 separate granite blocks. Embedded in the inner walls are ashlars inscribed by the states of the Union, thus embodying in stone the national motto "E Pluribus Unum".

When analyzing the measurements, it seems that the designers had in mind an architectural reconciliation of Five and Six, the principles of Earthly Harmony and Heavenly Order.


## 5-Based Symbology

The height of 555.5 ft cannot just be a coincidence: it had to be intentional on the part of the Freemasons involved in the design.

FIVE is the Pentad principle of Man, the Nuptial Number of even Two and odd Three, and the number of Harmonic Growth in many natural shapes, including the human body.

Five is also the Star of Knowledge as it opens the way to the pentagon/pentagram family of golden ratios on which L'Enfant based his plan of Washington D.C.

For the geometry and symbology of numbers, SG202

## 6-based Symbology

Converted in inches, the measurements of the Washington monument show the ubiquitous presence of the number Six, the Hexad principle.

Traditionally, SIX, its multiples $(66,666,6666)$ and the 6fold geometries represent Cosmic Order and are associated with the Solar Principle. The Magic Square of the Sun sums up to 666. Highly structured forms like crystals, snowflakes and molecular configurations are built upon 6-fold symmetries.

Six, number of the Sun and masculine power, was most appropriate for a monument to the First President.

Historically, towers, pillars, obelisks \& minarets have had symbolic associations with the sun: they channel the sun's benevolent rays and embody the vertical Axis of the World or World Tree. They sometimes were also tuned to have specific functions: antennas for EM radiation, acupuncture needles, geodetic markers. (See supra SG207.1.15)

$\uparrow$ The Washington Monument.
Shaft height $=\mathbf{5 0 0 . 4 3} \mathrm{ft}=\mathbf{6 , 0 0 6}$ in Breadth at base $=55 \mathrm{ft}=660 \mathrm{in}$ Pyramidion height $=55 \mathrm{ft}=660 \mathrm{in}$ Total height $=555.43 \mathrm{ft}=\mathbf{6 , 6 6 6} \mathrm{in}$


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## SG207.2.17 Paris - La Grande Arche

La Grande Arche was inaugurated in July 1989 by French president François Mitterand to mark the bicentennial of the French Revolution. It completed the line of monuments that forms the Axe Historique running through Paris. The Axe Historique is an East-West alignment of power centers \& monuments creating a geometric spinal column for Paris.
At the other end of the Axis, president Mitterand commissioned the Glass Pyramid, a close replica of the Great Pyramid, thus linking past and future in the urban layout of a time-line. La Grande Arche may be seen as a hypercube in 4D (tessaract) and, symbolically, as an open portal into the future.

The Arche is turned at an angle of $6.33^{\circ}$ on this axis. From an architectural point of view, the turn emphasizes the depth of the monument and is similar to the turn of the Louvre at the other end of the Axe historique. Thus placed, the Arche forms a secondary axis with the two highest buildings in Paris, the Tour Eiffel and the Tour Montparnasse.


1 La Grande Arche forms fractal squares along the Axis.



个 La Grande Arche could easily accommodate Notre Dame of Paris.

$\uparrow$ View from La Grande Arche down the Historic Axis.
$\leftarrow$ The Historic
Axis in Paris.
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## SG207. Chapter 3. Geometries of the Medieval Cathedrals



This is a huge subject that is barely starting to be understood.

We can only give here a few glimpses, in the hope of showing the coherence, elegant efficiency and harmonic wisdom that found its magnificent expression in the seemingly impromptu flowering of thousand of sacred buildings within a couple centuries.

During the 11th and 12th centuries, a spirit of passionate sacredness was alive and produced miracles in stone buildings that seem to be dancing to the sky as well as embracing the people within a loving womb \& web of cosmic resonance.

## SG207.3.1 The Age of the Cathedrals

The 11th, 12th and early 13th centuries were the times of a short but global intellectual, cultural and spiritual Renaissance in Western Europe:

- The wisdom of antiquity, newly rediscovered and re-translated in Arabic, was pouring out of the Islamic universities in Baghdad and around the Mediterranean world. [SG102.4]
- The crusades were mixing "enemy" cultures and bringing to Western Europe the knowledge of Islamic art, mathematics, architecture and science.
- The Knight Templars were consolidating a mighty new social order.
- Saint Bernard and his Cistercian order were sprinkling France with dynamic monasteries ( 530 monasteries built during the 12th century).
- The cult of Mary was encouraged and eagerly embraced by the people, as the connection was made with the Great Goddess and the Black Virgin.
- The Cathar faith and other new spiritual paths were rising in popularity as they offered a church-free mystical and practical wisdom.
- Abbot Suger of St. Denis was launching the Gothic style of "lux continua" ("permanent light").

The surge of creative renewal was touching all people: clergy, nobility, merchants, peasants... A fervent Gnostic Renaissance was blossoming and culminated in the "Age of the Cathedrals" (80 cathedrals) with astounding achievements of Sacred Architecture and elegant, harmonic beauty.




个 Left: Music \& Pythagoras Right: Grammar \& Donatus

| Grammar | Donatus |
| :--- | :--- |
| Rhetoric | Cicero |
| Dialectic | Aristotle |
|  |  |
| Arithmetic | Boethius |
| Music | Pythagoras |
| Geometry | Euclid |
| Astronomy | Ptolemy |



## SG207.3.2 The Seven Liberal Arts

Based on the types of studies that were pursued in classical Greece and Rome, the Seven Liberal Arts became codified by late antiquity writers.

At the time of the 12th century Renaissance, this educational program offered a canonical way of depicting the realms of higher learning. The Seven Liberal Arts of the medieval curriculum were divided into two study groups:

- Trivium ("Three roads"): Grammar (Moon), Rhetoric (Venus) and Dialectic (Mercury). - Quadrivium ("Four roads"): Arithmetic (Sun), Music (Mars), Geometry (Jupiter) and Astronomy (Saturn).
Respectively: pure Numbers, numbers in time (Harmony and Tuning Theory), numbers in space (Proportion), and numbers in space/time (Rhythm).

The medieval Quadrivium followed the division of mathematics made by the Pythagoreans, and their understanding of mathematics as the study of patterns in space and time. [Sacred Geometry specializes in the harmonic qualities of these patterns.]
\& The 7 Arts are represented on the
southern tympanum (outer voussoir) of the
Western portal in Chartres, sculpted
around Virgin Mary as Sedes Sapientiae ("Seat of Wisdom").
They are associated, right below them, with the corresponding famous teachers from antiquity.

## SG207.3.3 The School of Chartres

From the 10th to the 13th century, the Chartres Cathedral School rose to preeminence under the early leadership of Fulbert, a brilliant scholar, who was called the "Venerable Socrates of the Chartres Academy". It was the very start of the Latin translation movement from Arabic and before the institution of the medieval universities, which eventually superseded cathedral and monastic schools as the seats of higher learning in Western Europe. The real golden age of Chartres was the second half of the 12th century, under the guidance of remarkable chancellors: Bernard of Chartres, Gilbert de la Porrée, Guillaume de Conches, Thierry de Chartres.

- Bernard de Chartres, renowned philosopher and "the most perfect platonician of his times" (John of Salisbury), is known to us by his famous comparison: "We (the Moderns) are like dwarves seating on the shoulders of giants (the Ancients)".
- Guillaume (William) de Conches wrote De philosophia mundi, an encyclopedia of physics, astronomy, geography, meteorology and medicine.
- Thierry de Chartres assembled, in his Heptateuque, the main classical texts, newly re-translated.


The Quadrivium: Arithmetic, Music, Geometry and Astronomy. Church of Blenod-les-Toul, France.



Chartres: South view.
Insert: the labyrinth.

At the School of Chartres, the curriculum was based on the classical 7 Liberal Arts, with special emphasis on the Quadrivium (mathematical arts) and Natural Philosophy, the study of nature and the physical universe that was dominant before the development of modern science.

Natural Philosophy is considered to be the precursor of natural sciences such as physics. At older universities, longestablished Chairs of Natural Philosophy are nowadays occupied mainly by physics professors.

After the 13th century, the School of Chartres progressively lost its popularity to the new university founded in Paris by Pierre de Sorbon (and later known as "La Sorbonne").

- Gilbert de la Porrée as bishop.


## SG207.3.4.1 The "Compagnon" Builders - Introduction

Australian architect and therapist John James became a world authority on Chartres cathedral and subsequently on medieval church architecture after he spent 5 years in Chartres, with his three children, between 1969 and 1974. During that time he researched, measured and photographed every single stone and structure in the building. In the process, he came to remarkable conclusions regarding the builders and the construction teams.
"The cathedral of Chartres was not designed by three architects, or even five or six: in our sense of the word there were no architects at all - only building contractors who were led by men deeply trained in all the subtle aspects of their craft. The evidence shows that this cathedral was built by large mobile teams of masons who moved around the countryside from job to job working for as long as the money lasted. When the funds ran out they would leave the site in a body, the crews still intact under their master, to find another project. They were like the circuses of today which roam the country, settling on one site for their allotted time and then, complete with their tents and tools, departing for other places."

John James identified nine contracting teams of builders who built the bulk of the cathedral, returning again and again during the 30 years of the (re)building of Chartres cathedral into the sacred site we now admire. Indeed, this is what the historical tradition, in France, has been passing on: groups of craftmen specialized in a particular trade were organized in confraternities with strict regulations and secret knowledge. Builders, for instance, were called the "Compagnon Builders" and were the living repositories of architectural knowledge and applied craft \& construction engineering. A lengthy apprenticeship and progressive initiation was required to enter these guilds. They were the equivalent of our architectural firms, except that they were doing the construction as well. This tradition of "compagnonnage" is the origin of the "free masons".

As rediscovered by John James, the construction depends directly upon the "masters" of these building teams. The Master was much more than a contractor: he was a "sacred architect" and wisdom teacher who, given his experience and the rules of geometry, had the creative freedom to make all building adjustments he would feel necessary in order to guarantee the harmony of the whole. Established masters (and their teams) belonged to lineages of guilds ("lodges") with their own knowledge of geometric tracings, both as a symbolic/mystical wisdom of sacred geometry and as a practical on site application.
"In all ways these men demand our respect - for their organizational skills, their ability to cut and place intractable materials, and for the imagination shown in solving problems that we too would find difficult. They accepted - and indeed made a virtue of the fact - that a building was more a process than a project. Construction was like a natural growth which might take more than a generation to unfold, an accumulation of historic events in stone that, like a living organism, evolved towards a common image of the Heavenly City, while at the same time reflecting something of each man's personal vision." John James.


个 Masons at work. Chartres.
Note the building square and the compass hanging up above.


## SG207.3.4.2 Masons Geometric Signatures (1)



The lineage of the mason "compagnon" guilds and their knowledge of geometric tracing was expressed and transmitted in their signatures on stone or "mason's marks" which seem to have been a "secret language" of mutual recognition between initiates. The ability to give a geometric and symbolic interpretation of a mason's mark was equivalent to a passport and a test in sacred geometry.

Austrian architect Franz Rziha published in 1883 the result of his extensive research about 9,000 mason's marks originating from 4 guilds: Strasbourg, Berne, Vienna and Cologne. These marks were the means by which the master architect transmitted to his students the secrets of his art and to his workmen the principles of his plans.

What Rziha found is that these marks, far from being haphazard, were rooted in specific geometric matrices corresponding to the ground and elevation plans of the cathedrals: circle, square, triangle, trefoil and quadrifoil. On a deeper level, they were all derived from a Master Diagram based on pentagonal, PHI-based symmetries.


Note: The marks shown here are the plates published by Matila Ghyka in his Geometry of Art and Life (1977). These plates are reproduced from the monumental book by Franz Rziha Studien über Steinmetz-Zeichen (1883). Thick lines represent the seal or mark itself; thin lines represent the ground-lattice or matrix which allows for many potential "signature" tracings.

## SG207.3.4.3 Masons Geometric Signatures (2)

## In the words of Matila Ghyka:

"In the operative Masons Guilds, the 'Compagnon' (second degree of initiation) received at the end of his probation period a personal 'mason's mark' or seal which remained for life his sign(ature) and password. He had to draw and 'prove' (demonstrate) it when questioned on his travels to other lodges.

By contrast with the 'Foundation Diagram', only known to the established Master Builders, the masons' marks, which were not secret (except for the way of proving them = placing them in their respective circle geometric matrix), do never show the pentagram, pentagon or decagon."

The foundation diagram used by Gothic Master Builders, their key matrix transmitted from master to master (the third degree of initiation in the craft), is shown on the right. This was based on the pentagon/gram and decagon/gram placed within the circle of orientation for the give church or cathedral.

From this master diagram, all standard plans of Gothic cathedrals can be derived.

$\uparrow$ Two Gothic standard cathedral plans based on the Foundation Diagram. (Credit: Moessel. Die Proportion in der Antike und Mittelalter.)


T The Foundation Diagram.
(After Ghyka \& Rziha).
Note the pentagon/gram, the golden rectangles and the PHI circles.

## SG207.3.5.1 Medieval Geometric Tracings (1)

The medieval builders were using the elegant simplicity of sacred geometry shapes to bring about the harmonic feeling of the golden proportion. By so doing they were also expressing the natural laws of musical harmony inherent in nature and the human body. Using extensions of the traditional "13 knots rope" [ SG101.5], proportional rulers and the "divine" compass, the builders traced on the ground the basic figures related to PHI: the double square ("long square"), PHI rectangle, $\sqrt{ } 5$ triangle, pentagon \& pentagram...


T Some of the PHI-based proportions found within the Double Square, a most simple building plan in many sacred traditions. As shown, the diagonal of the double square is $\sqrt{5}=2.236$ and $\sqrt{5}$ is directly involved in the equation for PHI or $\Phi=(1+\sqrt{5}) / 2=1.618$


Constructing the Golden Proportion with the Double Square Triangle. Step 1: Trace the Triangle BCD within the Double Square with $B C=2$, $C D=1$ and $B D=\sqrt{5}$.
Step 2: From D, trace circle with radius $=\mathrm{CD}$ cutting BD in 0 . Step 3: From B, trace circle with radius $O B$ cutting $B C$ in $E$. $\mathrm{BE}=1$ and $\mathrm{EC}=1 / \Phi$
$\uparrow$ A simple way to find the golden cut point on the side of a double square.

Medieval architecture，like all sacred architectures，was seeking to compose spaces that could，by resonance（symbolically and musically）recreate the Divine Being，the Primordial Unity：the nave is the body，the transepts are the extended arms and the choir is the heart．An intense faith， shared by all，brings about a unity of inspiration．

The square and the circle are the two complementary aspects of Unity，the two cosmic archetypal shapes．The combination of the square（earth）and the circle（heaven）gives rise to the family of simple geometric polygonal forms and their proportional harmonies in the sacred space．The goal is to build a cathedral with a successful balance of grounding and inspiration so that the people feel supported in creating the same balance within themselves．


个 F．di Giorgio Martini． Study in proportions：The church and the human body．


个 Plan of the cathedral
of Lausanne according to the
＂Solomon＇s Pendulum＂，a sketch from the Notebooks of Villard de Honnecourt．
$\leftarrow$ Geometric forms of pillars in medieval cathedrals．
（J．P．Bayard）．

## SG207．3．5．2 Medieval

 Geometric Tracings（2）In 1987，French researcher Florence Chaval collected the few blueprints that have survived the damage of time．These are construction sketches traced on the ground or，in the best preserved case presented here，on the upper roof terraces of the cathedrals．The stone workers could then verify on the spot the exactness of the stone work．


个 Cathedral of Clermont－Ferrand，France．Top view of the blueprint for the North portal，traced on the black stone of the choir terrace．Image：J．P．Bayard．La Tradition Cachée des Cathédrales． 1992.

## SG207.3.6.1 Medieval Vesica (1) Mandorla (1)

In the medieval church \& cathedral architecture, the Vesica piscis [ $\$ SG108] was widely used: 1. As a background figure or mandorla representing the transcendent glory of the Christ or the Virgin Mary. 2. As the design of many archways.

A Mandorla (mystic almond or glory) is a Vesica Piscis shaped aureola which surrounds the figures of Christ and the Virgin Mary in traditional Christian art. It is especially used to frame the figure of Christ in Majesty in early medieval, Romanesque and gothic art \& architecture.

An aureola or aureole (diminutive of Latin aurea = "golden") is the radiance of luminous cloud which, in paintings of sacred personages, surrounds the whole figure. The aureola, when enveloping the whole body, generally appears oval or elliptical in form. When it appears merely as a luminous disk around the head, it is called specifically a halo or nimbus, while the combination of nimbus and aureole is called a glory.

The Mandorla has been traced through the Greeks \& Romans to the ancient Egyptians. Oriental sacred art also uses flaming Halos and Vesicas around holy beings. It is simply the representation of the field of subtle light energy (aura) surrounding any living being, but specially people who have attained a level of awakening to coherent light ("enlightenment"). The Mandorla is also symbolic of the glow of spiritual light coming from a higher dimension, through the doorway of the Vesica. In terms of balance and harmony, the two sides of the Vesica represent the union of opposites: spirit \& matter.

$\uparrow$ Christ in the Vesica (mandorla). The right hand is raised in a teaching gesture (mudra). The left hand rests on the Book of Knowledge (Bible). The Christ is surrounded by the "Tetramorph" (see next page). Tympanum. St. Trophime, Arles, France. 12th c. (This is the last plate of Fulcanelli's "Le Mystère des Cathédrales".)

$\uparrow$ Geometry of the vesica piscis: two circles mutually intersecting at their center.

$\uparrow$ The Mandorla and the Ajna Chakra both point to higher dimensional vision.


The mandorla or halo of glory (effulgent light).

## SG207.3.6.2 Medieval Vesica (2) Mandorla (2)

Around the Christ in his Vesica, is the "Tetramorph", a 4-fold symbolism depicting the four "apocalyptic animals". These in turn represent the 4 evangelists, the 4 zodiacal signs and the celebration of the 4 seasons. When surrounding the Vesica, these 4 figures emphasize the emerging \& transmuting power of the number 5. "Archaeological evidence shows that early man divided the four quarters of the horizon, or space, later a place of sacrifice, such as a temple, and attributed characteristics and spiritual qualities to each quarter. Alternatively the composite elements were carved into mythic creatures such as the Egyptian, Greek and Babylonian Sphinxes of antiquity depicting bull-like bodies with birds-wings, lion's paws and human faces". (Wikipedia).
The Christian version originated from the Biblical book of the Jewish prophet Ezekiel, who, while in exile circa 580 BCE , describes his vision (in which the likeness of four living creatures came out of the midst of the fire) thus: "As for the likeness of their faces, they four had the face of a man, and the face of a lion, on the right side: and they four had the face of an ox on the left side; they four also had the face of an eagle." (Ezekiel 1:10). These four animal figures are also depicted in the St. John's Apocalypse, the last book of the New Testament, where they surround the throne (Vesica) of Christ, the setting most usually seen in Christian art. John alludes to Ezekiel's vision thus: "And the first beast was like a lion, and the second beast like a calf, and the third beast had a face as a man, and the fourth beast was like a flying eagle". (Revelation 4:7).

$\uparrow$ Christ in Glory. Main bay of Royal Portal. Chartres. The Christ figure is emerging out of the inter-dimensional doorway of the Vesica. Under Christ's feet, the 12 apostles (+ Elijah \& Enoch).

## Surrounding the Christ is the "Tetramorph" ("Four Forms". Greek tetra = four + morph $=$ form)

1. (top left) MAN
Matthew
Aquarius
Winter Solstice
2. (bottom left) BULL
Luke
Taurus
Vernal Equinox
3. (top left) MAN

Aquarius
Winter Solstice
3. (bottom left) BULL Taurus
Vernal Equinox

2. (top right) EAGLE
John
Scorpio
Fall Equinox
4. (bottom right) LION
Mark
Leo
Summer Solstice

The Tetramorph also links up with the 4 Chaldean zodiacal signs, the 4 Sons of Horus, the 4 "Living Beasts" of Ezekiel, the 4 Aztec "Tlalocs" or Rain Gods, the 4 Guardians of the Directions, the 4 Hindu Yugas or World ages...


Geometry of the Vesica and tetramorph. Note the symbolism of Squaring the Circle and the "New Jerusalem"


## SG207.3.6.3 Medieval Vesica (3) Mandorla (3)

↔ "Christ in Ascension". Chartres.
West portal. Christ is shown "triumphant", holding the Holy Book in his left hand and bestowing a blessing mudra with his right hand.
In blue lines (approximate proportions):

- the Double Square framing the Vesica.
- the diagonal of the Double Square $=\sqrt{ } 5$
- the diagonal of the Square $=\sqrt{ } 2$


个 Two Vesica shaped Mandorlas show up on the West façade of Chartres (marked in blue): 1. Virgin Mary Annunciation Window.
2. Christ Main portal.

## SG207.3.7.1 The Medieval Gothic Arch (1)

Besides the flying buttress and the ribbed vault, another distinctive feature of cathedral Gothic art is the pointed or ogival arch. Before the rise of the Gothic, almost all arches were round, in the Romanesque style. Pointed arches were used in Islamic architecture and were brought to Western Europe through the inter-cultural contacts created by the crusades and cultivated in inter-faith centers such as Toledo or Cordova, in Spain.

It has been observed that the arches in early (6th - 8th centuries) Islamic architecture were not as pointed as they became during the 9th and 10th centuries. The gap between the two centers from which the arches were drawn moved from $1 / 10$ th to $1 / 7$ th and $1 / 5$ th and then to $1 / 3 \mathrm{rd}$.

Frequently occurring arches, in the Gothic cathedrals, are the $1 / 5$ th, the $1 / 3$ arch (as illustrated below by Villard de Honnecourt) and the Vesica arch or $1 / 2$ arch (which is mirroring the use of the Vesica shape as a Mandorla for the Christ or Virgin Mary figures).


个 Sketch from Villard de Honnecourt showing the construction of the $1 / 3$ arch (full lines). The dotted blue lines show the circles that form a Vesica or $1 / 2 \mathrm{arch}$.

$\leftarrow$ Golden ratio construction of the Cistercian vault or $3 / 15$ th $\operatorname{arch}(3 / 15$ th $=1 / 5$ th $)$, a transition between the Romanesque round arch and the later Gothic Vesica-shaped arch.

The $1 / 5$ th arch was called mukhamma in Arabic, meaning "divided into 5 ".

$\uparrow$ The Vesica $1 / 2$ arch


个Al-Aqsa mosque (Jerusalem), the third holiest site in Sunni Islam, features three central "mukhamma" bays or 1/5th arches. 12th century.


T The three doorways of the West portal, Chartres cathedral.
The arches are built according to the same geometry of $1 / 5$ th.

## SG207.3.7.2 The Medieval <br> Gothic Arch (2)



T Two examples of Vesica doorways with $1 / 2$ arches. France.
Left: Church of the Trinity, Vendome. Risht: Amiens cathedral. Left: Church of the Trinity, Vendome. Right: Amiens cathedral.

## $\stackrel{\rightharpoonup}{-} \Rightarrow$

Two
examples
of Vesica
vaults.
\& Left:
Reims.
Right $>$ :
Paris.


## SG207.3.8.1 Chartres Cathedral (1)

The Cathedral of Our Lady of Chartres, (French = Notre-Dame de Chartres) is located about 80 kilometers ( $\mathbf{5 0} \mathbf{~ m i}$ ) southwest of Paris. It is a UNESCO World Heritage Site since 1979 and is considered the finest example in all Europe of the Gothic style of architecture. Chartres is the most revered and famous cathedral in France, still a holy place \& shrine for pilgrims and a religious centre for much of the world. It was rebuilt in one enormous effort after a disastrous fire in 1194. Less than thirty years later it was completed, with all its magnificent sculptures (4,500+ pieces) and beautiful stained glass windows ( 170 pieces covering 21,000 sq. feet).

Chartres Cathedral is replete with the applied knowledge of Sacred Geometry, from the proportions to the plays of light at certain times of the day (or year), to the rose windows and the famous 11-rings labyrinth. Remarkably, most of the original stained glass windows survived the damages of time \& history. Begun in 1195 under the driving influence of bishop Fulbert, the new cathedral became a Mystery school and a major Marian pilgrimage center.

"The Cathedral of Chartres was spared by an American Army officer who challenged the order to destroy it. Colonel Welborn Barton Griffith, Jr. questioned the strategy of destroying the cathedral and volunteered to go behind enemy lines to find out whether the German Army was occupying the cathedral and using it as an observation post. With a single enlisted soldier to assist, Col. Griffith proceeded to the cathedral and confirmed the Germans were not using it. After he returned from his reconnaissance, he reported that the cathedral was clear of enemy troops. The order to destroy the cathedral was withdrawn." (Wikipedia).


个Aerial view of Chartres showing that the cathedral's overall shape conforms to a golden rectangle, while the nave and transept form a golden cross.
[An entire SG module could be offered on Chartres cathedral. We are presenting here a few glimpses...]

## SG207.3.8.2 Chartres Cathedral (2) Plan Geometries

There is a large literature on the geometric layout of Chartres: the cathedral is so rich in possibilities that it allows for a great variety of opinions - and they may all be part of a larger harmonic coherence combining intentional, intuitive and hands-on planning. Of all researchers, architect John James made the most thorough \& meticulous survey of the cathedral's measurements. We share here his conclusion about the master plan and a few overlay geometries that he highlighted in his monumental work Chartres, Les Constructeurs (1979) [Chartres, the Builders].


个 Master Geometry


T The "heart" and holy-of-holies: the crossing of the transepts, midway between the labyrinth and the altar.


## 1/2 The Double Square



TVarious geometric layouts.


$\uparrow$ PHI geometry in Chartres.
(1 roman foot $=\mathbf{2 9 4 . 4 5} \mathbf{~ m m}$ )


## SG207.3.8.3 Chartres Cathedral (3) Flying Buttresses

The technical innovation that created the Gothic cathedrals was the vault. The art of vaulting, combined with the flying buttresses, allowed the heavy stone walls to be replaced by transparent walls with the magnificent plays of light from the stain glass windows. The flying buttresses flanking the nave are transferring the weight of the roof and stone vaulting downward to the ground. Combined with this engineering purpose, the buttresses well deserve their epithet of being "flying": they have an elegant beauty whose geometry is based on circles (circles C1 and C2).

Note: the gothic arches (V1 - V2 and V3-V4) on the line drawing below are larger than the standard Vesica Piscis shape (ratio long axis to short $=\sqrt{ } 3=$ 1.732) or even the Golden Vesica (ratio= 1.618).

\& Image credit: Titus Burckhardt. Chartres. 1955.


## SG207.3.8.4 Chartres Cathedral (4) Proportions of Spires

It has been found by Keith Critchlow that the height of the West spires (the Sun and Moon spires) meaningfully relates to the length of the cathedral's body.

$\leftarrow$ The top of the Sun spire (below the cross) matches exactly the endpoint of the choir, with a length of 365 feet each foot representing one day of the solar year.
\& The gold sphere (on top of the Moon spire) matches exactly the geometric center of the choir circle.

The distance between the tops of the two spires (below cross) is 28 feet, each foot representing a night of the moon cycle of 28 nights.

## SG207.3.8.5 Chartres Cathedral (5) Rose \& Labyrinth



T Chartres. On August 22nd (corresponding to August 15th, the day of the Assumption, in the Julian calendar used in the Middle Ages), a ray of sunlight goes through the Virgin Yoni Vesica (Annunciation Window) and illuminates the center of the labyrinth.

The rose window displayed on the western façade and the labyrinth inlaid in the nave paving (across the 3rd and 4th bays) are a set of twins. They both are sacred circles conveying the teachings of the geometric \& numerological Journey to the Center. They both, at two different levels of awareness, call for coming from and going back to the spiritual center, Self or Source.

The labyrinth is to be walked with the feet (or the knees) and maps out, down below, the pilgrimage of human life. The rose is to be gazed with the eyes (and the inner eye), up above, and invites to the vortexing surrender of consciousness. Different frequencies, same goal. We could say that the labyrinth is the "washing machine" while the rose is the "stargate". Consider the following similarities.

- Distance doorway to center rose = distance to center labyrinth $=31.75$ meters ( $\sim$ 104feet).
- Diameter both rose and labyrinth ~ 40 feet. • Both centers are matching.
- The rose corresponds (on the Western elevation) to the location of the Third Eye (6th energy center or Ajna chakra). The labyrinth (on the ground plan) corresponds to the 2nd chakra or emotional center.

$\leftarrow$ Overlay of western rose upon the labyrinth.

Credit: Keith
Critchlow's demonstration on Youtube video.

## SG207.3.8.6 Chartres Cathedral (6) Energy Body

Following up on the steps of world-wide older traditions designing sacred temples as a harmonic expression of the Universal Body (the body of Cosmic Man), the Christian tradition talks about Chartres as being the mystical body of Christ. Indeed, one can look at the ground plan of Chartres or the West façade and find the progression of the energy centers or chakras familiar to mystical teachings about the energy body.

$\uparrow$ The 7 chakras overlaid upon the ground plan of Chartres.

Gordon Strachan. Chartres, sacred geometry, Sacred Space. 2003.

SG207.3.9.1 Reims Cathedral (1)


Under the title Cathédrales, Le Verbe Géométrique (2nd edition, 2004), Thierry de Champris published a large (extended quarto-size) and comprehensive geometric study of the Western facades of four French Cathedrals: Amiens, Reims, Rouen and Strasbourg.

This study is based on the precise photogrammetric data from the Institut de Géographie Nationale.

We can only here show some of the plates with overlay of PhiMatrix ${ }^{\text {TM }}$ golden rectangles and triangles. These constructions are so rich in multiple levels of sacred geometry that the suggested best approach is to refrain from mind explanations and just let your gaze browse in and through the complex geometries \& proportions.

Enjoy navigating the beauty of these harmonic landscapes of stone.

$\uparrow$ Reims. Western portals elevation overlaid with Golden Rectangles and main portal rose circles. (Background geometries: T. de Champris.)


T Reims. Western elevation by Deneu (Historical Monuments). PHI rectangles overlays in PhiMatrix ${ }^{\text {TM }}$.

SG207.3.9.2 Reims
Cathedral (2)


个 Reims. Close up of Western main portal.

$\uparrow$ Reims. Geometries by T. de Champris.


Left: Rouen.

Right: Amiens.

## SG207.3.11.1 Notre Dame of Paris (1)

The construction of "Notre Dame", the cathedral of Paris, spans the period 1163-1235, a time of high sociopolitical and spiritual renaissance that was reflected, and inscribed, in the hundred + cathedrals built around that time: 108 cathedrals are registered in the books of the French department of Historic Monuments.

Renovated by Viollet-le-Duc in the 19th century, Notre Dame, like her many gothic sisters, stands as a sacred book in stone. The cathedrals were displaying, in a visual mode, the scenes from the Bible for the benefit of the mass of the population who could not read Latin. For those who could "see and hear", the cathedrals were repositories of secret knowledge of an alchemical, hermetic or gnostic nature - not necessarily friendly to the official teachings of the church.

These hidden levels of reading, were encoded in certain sculptures, themes displayed, stain-glass windows, alchemical color pigments, measurements, proportions \& geometries. The labyrinths [ < SG304], the emphasis on the new Marial (Virgin Mary) cult and the clever plays of light at different times of the year... were additional elements of sacredness.

Many groups of innovators contributed to cathedral building: the Knight Templars with their knowledge acquired from the Holy Land (Jerusalem) and from their contacts with the scholars of the Islamic culture, the Cistercian monastic order under the leadership of Bernard de Clairvaux, the guilds of "compagnons" builders with their sacred geometry trade secrets, the universities of the times or "cathedral schools" (like the School of Chartres), the various groups of Gnostics like the Cathars...


T The 8-pointed cross at the roof of the choir is exactly aligned with the winter solstice sumrise.

earthinpictures.com


1 Cathedral Notre Dame of Paris: some of the sacred geometry that can be read in the West façade:

- Overall shape is a golden rectangle
- The reciprocal golden rectangle encloses the 2 towers
- Main façade is enclosed in a square
- The central portal is a golden rectangle
- Façade can be subdivided into 6 rectangles
- Central portal is a golden rectangle
- The circle of the rose window is half the radius of the large circle in the golden rectangle square.

$\uparrow$ Medieval people saw the cathedral as an "inverted vessel" of light navigating the heavenly waters. Christ was the assigned pilot.
The general orientation of Notre Dame cathedral is parallel to the river Seine.
The orientation of the choir corresponded, in the 12th century, to the rising sun on the day of the Nativity of the Virgin Mary (September 8th).
(Image: Thierry de Champris. Cathédrales, le Verbe Géométrique.)

SG207.3.11.2 Notre Dame of Paris (2)

$\uparrow$ Plan of Notre Dame of Paris. While the overall plan is not in golden proportion, there are some golden harmonics. Note the numbers 108 and 144.
For instance, the distance from the West gate to the middle of the choir (the true holy altar) divides into a close PHI section in the middle of the transept.
(Image: J. P. Bayard. La Tradition Cachée des Cathédrales.)

$\uparrow$ Bayeux. Window detail.

## SG207.3.12 Cathedrals: Geometric Details

The cathedrals abound in exquisite details sculpted in stone. These patterns use the basic geometric divisions of the circle in 2-3-4 and infuse them with harmonic grace \& elegance.
$\leftarrow$ Ogive window. Soissons.


$\uparrow$ Meaux. Window detail.
[All images: Thierry de Champris. Cathedrales, le Verbe Géométrique.]
\& Rouen. Detail of stone geometric patterns sculpted on gable.


个 Abbey of Sénanque. Note the golden rectangles, the golden triangles and the nested harmonics.

## Acoustics in the Cistercian Abbeys

Cistercian builders included in their constructions "vessels of resonance",
i. e. vases of baked clay functioning as acoustic amplifiers. These vessels, in the form of amphoras, were built into the top of the walls and the vaults, most notably near the choir and the pulpit. The volume varied between 2 and 12 liters (half to 3 gallons). The opening was the only visible part and it seems they could be closed at will with a lid.
Experiments have shown that high pitched sounds were absorbed and the periods of resonance were shortened for lower frequencies. This is pointing to a possible enhancement of the spoken word.
(Data from J. P. Bayard. La Tradition Cachée des Cathédrales.)

## SG207.3.13 Cistercian Abbeys

Medieval abbeys were conceived and built by "moines-compagnons" (compagnon monks) applying a geometric knowledge based on the golden proportion. Below are two examples of plans studied by Robert Chalavoux and overlaid (in blue lines) with the PhiMatrix ${ }^{\text {TM }}$ geometric grids.

$\uparrow$ Abbey of Le Thoronet.
Note the golden
rectangles and golden
circles.
\& Le Thoronet. (Credit)

## SG207. Chapter 4.

## Architecture for Global Harmony


$\uparrow$ The "Chapelle de Ronchamp" by Le Corbusier.

Here we point to a complete redefinition of what architecture IS, in terms of a global function of Harmony.

The Modernist, Post-Modernist and International styles of architecture were ignoring the environment, alienating people from their personal and social happiness, and using materials inimical to health and life. They were based on goals of efficiency, functionality or technological prowess. This era of blind unsustainability is over.

Here we present a few pioneer thinkers and actors as we touch upon some of the emerging tendencies in current architectural practice:

- Architecture for the people.
- The increase of bio-energy as a goal of architecture.
- Eco-Green architecture.
- Community architecture.
- Living Systems architecture.
- Master eco city planning.


## SG207.4.1 Prince Charles - Critique of Modern Architecture

The Prince of Wales has frequently shared his views on architecture and urban planning in public forums. He is known to be an advocate of neo-traditional ideas which were illustrated in his 1984 attack on the British architectural community in a speech given to the Royal Institute of British Architects (see quotes below). In this infamous speech, Prince Charles describes a proposed extension to the National Gallery in London as a "monstrous carbuncle on the face of a much-loved and elegant friend".
Charles also published a book and created a documentary entitled A Vision of Britain (1989), which critiqued some aspects of modern architecture. Despite criticism from the professional architectural press, the Prince has continued to put forward his views, stressing traditional urbanism, the need for human scale, the restoration of historic buildings as an integrated element of new development, the essential function of community architecture and sustainable design. Two of the Charles' charities in particular support his theories on design: The Prince's Regeneration Trust (formed by a merger of Regeneration Through Heritage and the Phoenix Trust in 2006) and The Prince's Foundation for the Built Environment (which absorbed The Prince of Wales's Institute of Architecture in 2001). Further, the village of Poundbury was created at the instigation of Prince Charles, with a master plan by Leon Krier.

"... A large number of us have developed a feeling that architects tend to design houses for the approval of fellow architects and critics, not for the tenants... To be concerned about the way people live; about the environment they inhabit and the kind of community that is created by that environment should surely be one of the prime requirements of a really good architect. It has been most encouraging to see the development of Community Architecture as a natural reaction to the policy of decamping people to new towns and overspill estates where the extended family patterns of support were destroyed and the community life was lost.
Why can't we have those curves and arches that express feeling in design? What is wrong with them? Why has everything got to be vertical, straight, unbending, only at right angles - and functional?...
What I believe is important about community architecture is that it has shown 'ordinary' people that their views are worth having; that architects and planners do not necessarily have the monopoly of knowing best about taste, style and planning; that they need not be made to feel guilty or ignorant if their natural preference is for the more 'traditional' designs - for a small garden, for courtyards, arches and porches; and that there is a growing number of architects prepared to listen and to offer imaginative ideas.
May I express the earnest hope that the next 150 years will see a new harmony between imagination and taste and in the relationship between the architects and the people of this country."
(A speech by the Prince of Wales at the 150th anniversary of the Royal Institute of British Architects (RIBA). 30th May 1984)

## SG207.4.2 Redefining Architecture

In his book The Return of Sacred Architecture (2007), American architect Herbert Bangs describes the stunning revelation of his first visit to Chartres cathedral:
"Until then, I had believed that the rational, scientific architecture of the 20th century represented the peak of architectural achievement. Yet no Modern or Post-Modern building I had ever seen or studied could be compared to this wonderful creation... When I entered the cathedral the following day and walked through an interior bathed in light from the stain-glass windows, I understood with certainty that in school and practice I had learned nothing of the deeper, esoteric meaning of space and form that is the essence of architecture".
H. Bangs proceeds to denounce the modernist, scientist approach that has given us an "architecture of alienation" spreading an environmental wasteland, with ill emotional \& psychological effects for the populations and an arrogant disregard for the dignity and true happiness of human life. The 20th century's false conception of the scientist as a detached, objective observer of the natural world was carried over into the architectural design: the dweller is isolated and alienated from the earth and sealed away from the natural environment, the sunlight and the air - as if there was an intentional politics to break the link between humans and the cosmic web of life. H. Bangs notes: "It is now ofien difficult to distinguish, at first glance, a contemporary public school building from a factory. A factory for people?"

The designers who founded "Modern" architecture (the "scientific" architecture that emerged after WWI), the "Post-Modern" architecture (later modifications that occurred after the 1960s) and finally the "International Style" sought a clean break with the entire Western tradition that had preceded them and had applied the ancient canon of proportion and harmony. Originality, novelty and technological prowess became the goal rather than the search for beauty, meaning and a harmonious life environment for the people. The scientific architecture of the 20th century, sums up Bangs, "was created by men and women who were themselves alienated from the intuitive levels of their own being".

The root cause of this still prevailing architecture is that the current schools of architecture are founded on the assumptions of the contemporary scientific-materialist paradigm stating that the material reality perceived through the senses is the only reality there is and that it may only be apprehended through logical thought. These assumptions are never expressed nor discussed but they underlie both the curriculum and the mindsets of the instructors, i.e. the "successful and fashionable" among the architects. H. Bangs explains that, in his experience as an architecture student, there was a growing conflict between architecture-as-engineering and architecture-as-art, resulting in what he calls the "plight of the practicing architect". "Why are the laws of proportion, harmony, and form so neglected, even ignored, in the schools?" A new education for architects is sorely needed.

By contrast, the traditional function of the architect was to express, in material form, insights into the higher spiritual realities, thus making these insights available to others. "The duty of an architect had once been to build the temple of man... Every structure that rose upon the face of the earth was designed to reflect the order, the mystery, and the magical powers inherent in the cosmos." Reviewing some of the principles and examples we present in this SG207 module, Herbert Bangs concludes:
"We may confidently expect that the new architecture will be ecologically aware; it will relate man to his instinctual roots; and it will express the order and harmony of the cosmos in the form of building and space."

Another pioneer architect, Eugene Tsui, writes in his Evolutionary Architecture (1999):
"As we become more aware of our purposeful place in the world, of a life lived responsibly and fully in the present, of a life that befits a more comprehensive understanding of humanity and the universal forces of nature, we need an architecture that is truly responsive to our times:
an architecture that is the physical and spiritual embodiment of human dignity...

## SG207.4.3.1 Meet Le Corbusier (1)

Artist, architect and designer Le Corbusier (born Charles-Edouard Jeanneret - 1887-1965) has possibly been the most influential figure in modern architecture and design. His work displayed a wide variety of forms and concepts and his career spanned almost sixty years, during which he was constantly questioning, searching, reformulating theories, and modifying his language of forms. As a consequence, he now draws high praise and admiration (the unique beauty of his sculptural buildings: private villas, Ronchamp, Marseille, Chandighar...) as well as high criticism (his standardized high-rise schemes which were co-opted by the "inhuman" townplanning policies of post WWII).

We will focus here on Le Corbusier's interest, use and applications of Sacred Geometry to designing space, and his contribution to a new architecture of Harmony. Born in Switzerland, Le Corbusier attended a Fröbelian school. Friedrich Fröbel (1782-1852) coined the term 'kindergarden' and developed an education based on the recognition that children have unique needs and capabilities and are best taught with games, songs, dances, gardening \& plays. Maybe because of this creative start, from the onset, Le Corbusier was deeply interested in systems of proportions which he called "Regulating Lines". This is what he writes in his 1931 book translated as "Towards a New Architecture":
"(The builder) has imposed order by means of measurement. To get his measurement, he has taken his pace, his foot, his elbow or his finger. By imposing the order of his foot or his arm, he has created a unit which regulates the whole work; and this work is on his own scale, to his own proportion, comfortable to him, to his measure. It is on the human scale. It is in harmony with him: that is the main point.
By deciding the relative distances of the various objects, he has discovered rhythms... And these rhythms are at the very root of human activities. They resound in man by an organic inevitability, the same fine inevitability which causes the tracing of the Golden Section by children, old men, savages (sic) and the learned".

We have looked in SG104 at Le Corbusier's innovative system of proportions, called "The Modulor" - the first modern system of proportions based on the PHI Ratio and the human body. [ $\triangle$ SG207] As part of this proportioning system, Le Corbusier devised a double scale of lengths: the "Red" and the "Blue" series.

- The Blue Series is simply a PHI sequence built on the Golden Section: a/ $\Phi^{2}$, a/ $\Phi$, a, a $\Phi, a \Phi^{2}, a \Phi^{3} \ldots$ for some practical value of $a$.
- The Red Series is created so that each length is the arithmetic mean of successive lengths of the Blue Series. And each length of the Blue Series is the harmonic mean of the two adjacent lengths of the Red Series. So the two series are like yin-yang complementaries: they work together with units of one interspersed with units of the other. This prevents the rapid gaps building up if one series is used alone.
The combined Blue \& Red Series give the following sequence:


$\uparrow$ Le Corbusier with glasses off.


The "Modulor" is Le Corbusier's "keyboard" to design buildings \& furniture harmonious to people.


T Villa Stein (Garches, France). This home represents the conscious use of the Golden Rectangle: in the overall proportion and also vertically. Le Corbusier felt that human life was "comforted" by the Golden Mean.

< Model
of the
Villa Stein.

## SG207.4.3.2 Le Corbusier (2) Villas


$\epsilon$
Villa Schwob, La-Chaux-de-
Fonds,
Switzerland.
1916.

These villas by Le Corbusier have a "purist", angular geometry. Yet one can't help but wishing for more organic curves (that would also be PHI-based).


SG207.4.3.3 Le Corbusier (3) - Ronchamp


The Chapelle Notre-Dame-du-Haut in Ronchamp (eastern France) is arguably the master piece of Le Corbusier. It was completed in 1955.

By Le Corbusier's own admission, it was the site that provoked his irresistible response, with the horizon visible on all four sides of the hill and its historical legacy for centuries as a place of sacred worship. The nature of the site is such that the pilgrim starts from the ascent at the bottom of the hill to various landscapes along the way, before finally terminating at the top: the chapel itself. The chapel is invisible until one reaches the crest of the hill. From the top, magnificent vistas spread out in all directions.

In his speech of inauguration, Le Corbusier said: "In building this chapel, I wanted to create a place of silence, of prayer, of peace and of inner joy. The feeling of sacredness was the soul of my effort."


T The Key. Le Corbusier materialized the golden proportions of his Chapel at Ronchamp into a "Foundation Stone". Drawn in 3D (left) \& in 2D (right) as a Golden Rectangle, this "Regulating Stone", when developed in the plane, shows the Golden Spiral.

The roof, supported by columns and not walls, seems to float and creates a feeling of lightness.

< The forms are sculptural symbols.

## SG207.4.3.4 Le Corbusier (4) - Chandigahr

"Chandigarh is an experimental city designed in 1952, and is the single biggest and most significant example of urban planning executed by Le Corbusier. It demonstrates Le Corbusier's modern idiom of architecture, his radical and visionary plan of low density terrace housing, monumental government buildings, tree lined streets and green belts penetrating the orthogonal plan. The most significant buildings designed by Le Corbusier are in Sector $\mathbf{1}$, known as the Capitol Complex which encompasses three major buildings: the Secretariat, the Legislative Assembly (Vidhan Sabha) and the High Court - bold sculptural forms, pure, geometrically subdivided with an emphasis on proportion, scale and detail."
[Note: the blue Golden Rectangle indicates the possibility of its application. To be verified on the building plans.]


↔ The
Legislative Assembly. (Vidhan Sabha)

$\uparrow$ Museum

## 个 Garden

 feature.

世 Gandhi
auditorium.

Buckminster Fuller is remembered for his global vision (he coined the expression "Spaceship Earth") and for being the father of the "geodesic domes". [^SG106]

At the 1967 Montreal World Fair Expo, the United States pavilion was enclosed by a futuristic-looking structure: Buckminster Fuller's 250 foot diameter geodesic dome. The dome appeared above the fairgrounds like a giant silver bubble. The US dome (a class 1 , frequency 16, hexa-penta icosahedron), was roughly three-quarters of a sphere, and designed to look like a lacy filigree floating against the sky. Reaching a height of 200 feet, the structure was a frame of steel pipes enclosing 1,900 molded acrylic panels. A complex system of shades was used to control the internal temperature.

In 1990, the dome was purchased to turn it into an interactive museum. Now called the Biosphere, it offers interactive activities and presents exhibitions about the major environmental issues related to water, climate change, air, eco-technologies, and sustainable development. The Biosphere is missing the structure's original external clear acrylic skin which was destroyed by a fire in May 1976.


## SG207.4.4.1. Buckminster Fuller (1) Geodesic Domes



个 $\downarrow$ In 1950, architect Terence Kelly asked Buckminster Fuller to complement the crescent-shaped ASM corporate building (in Russell, East of Cleveland, Ohio) with a geodesic dome.
The result is a stunning marriage: completed in 1959, it turned 50 years old in 2009 and became eligible for a listing in the National Registry of Historic Places.

Image credit: //inhabitat.com



## SG207．4．4．2．Buckminster Fuller（2）The Fly＇s Eye Dome

All though his life，Buckminster Fuller（＂Bucky＂）was deeply involved with creating high－ performance shelters that could be available to all humanity．The circular－shaped Dymaxion house of 1929 was conceived for ease of shipment and assembly．

In 1977，Bucky started prototyping his Fly＇s Eye domes as a 5／8th sphere of the hexa－penta geodesic configuration．The smaller size of 26 feet in diameter was conceived as a fully equipped， air－deliverable two－story shelter＂that weighs and costs about as much as a good automobile＂．The larger 50 feet Fly＇s eye was enclosing 3 or more stories（each of $2,000 \mathrm{sq}$ ．feet floor area），a garden， trees and providing what Fuller calls＂Garden of Eden living＂．
＂Bucky＂standing up against the 50－foot diameter Fly＇s Eye Dome．


个 Buckminster Fuller surveying the Fly＇s Eye dome


个 The Fly＇s Eye dome shelter complete with trussed flooring was conceived to be air－lifted all over the world．Critical Path， 1981.


世The Fly＇s
Eye dome
is a wonderful
structure for
children to
play．


个 The Old Man River's City was a relocation project in East St. Louis, Illinois, conceived to house $\mathbf{1 2 5 , 0 0 0}$ people. The inner bowl was dedicated to business, while the outer bowl was residential.
$\downarrow$ The transparent geodesic sky-umbrella is a watershed.

$\leftarrow$ Futuristic "Cloud Nine" floating tensegrity spheres - navigated through sunlight heat differentials. 1958.

## SG207.4.4.3. Buckminster Fuller (3) Visionary Architectures


$\uparrow$ The famous concept of covering New York city with an environmentally-controlled dome. 1968.

$\uparrow$ The Tokyo Tower (8,000 ft). 1966.
$\leftarrow$ Cross-section of an automated cottonmill in Raleigh, North Carolina. 1951.

The same design was later applied to a Growth Dome for multi-tiered tray agriculture, with rotating arms. 1952.


T The curvature of a monolithic dome can be customized.

## SG207.4.5 Monolithic Domes

A monolithic dome is a highly insulated, steel-reinforced thin-shell structure. The building technique uses an inflatable airform and a continuous spray-inplace process. There are alternatives to steel rebar. www.monolithic.com


## SG207.4.6.1 Michael Rice (1) Bio-Architecture

Michael Rice is an Irish architect who, after graduation, continued on a vision quest for the "pure principles" of architecture and life. This led him to the martial arts, Feng Shui, Sacred Geometry and sustainable living which he now combines into "Bio-Architecture".

Bio-architecture is "the art and science of designing and building spaces which create, support and enhance life and living systems." In other words, just like the purpose of life is to increase life force by PHI-based fractal nesting, the purpose of architecture is to create spaces that can create in their users a natural resonance with proportional, harmonic, larger systems of life and consciousness.

Says Michael: "As nature uses shape to hold charge or life force, it makes complete sense to use nature's shapes and proportions for the shape of our spaces and buildings... In terms of architecture and design of space, I believe that by creating spaces that are based on the pure principles of natural design we provide a sacred environment that can nurture our bodies, minds and spirits. We can literally design to raise the vibration of the inhabitants..."

Advising younger colleagues, Michael Rice adds: " Build with respect, fearlessness and playfulness! Trust the process: allow the building to become a fractal attractor... and let the magic loose! This is Bio Architecture... Remember, a truly sustainable environment begins with our hearts: everything else flows from that!"

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www.holisticarchitecture.com




SG207.4.6.2 Michael Rice (2)
Community Spaces


## SG207.4.7.1 Architecture for the People (1) Hassan Fathy (1)

The village of New Gourna is located in Luxor on the West Bank of the Nile River, within the World Heritage property of Ancient Thebes in Egypt. The village was designed and built between 1946 and 1952 by Egyptian architect Hassan Fathy (1900-1989), the "earth architect", heralded by Wikipedia as "Egypt's best known architect since Imhotep".


The main characteristics of the New Gourna village consist of: - being a reinterpretation of a traditional urban setting,

- making appropriate use of local materials and techniques,
- displaying an extraordinary sensitivity to climatic problems. New Gourna demonstrated, within the era of modern architecture, that sustainability and social cohesion could also be met with vernacular architectures, local materials and techniques. Fathy's tenets derived from humanistic values about the connections between people and places and the use of traditional knowledge and materials especially the exceptional advantages of earth as full-fledged construction material. New Gourna was a critical experiment in the implementation of that philosophy.

Exposed in Fathy's book Architecture for the Poor: An Experiment in Rural Egypt (1973), these ideas inspired a new generation of architects and planners worldwide through an integration of vernacular technology with modern architectural principles. Called the Middle East father of Sustainable Architecture, Egyptian architect Hassan Fathy died in 1989 but left behind a legacy of 160 building projects ranging from small buildings to large-scale communities complete with mosques and schools. His impact can still be felt from Egypt to Greece and even New Mexico, where in 1981 he designed the Dar Ar-Salam community.

There is a 2011 proposed UNESCO initiative to safeguard Hassan Fathy's New Gourna Village. The project aims at valorizing the pioneering ideas and philosophy of Hassan Fathy's work and reinforcing its relevance to contemporary sustainability concerns.


## SG207.4.7.2 Architecture for the People (2) Hassan Fathy (2)



All images: credit "Hassan Fathy" movie. Various locations \& projects: New Gourna, Dar-ar Salam (New Mexico)... All buildings are "mud and brick" architecture, sustainable yet harmonious \& beautiful.

## SG207.4.7.3 Architecture for the People (3) Sandbags



Architect and humanitarian Nader Khalili (1938-2008) asked: "How can we build shelters for people in the world who have no money?". As an answer, Khalili developed the simple breakthrough building technologies known as Superadobe (sandbag tubes and barbed wire) and Ceramic Houses, with the freely available material of earth.

Inspired by the poetry of the 12th century mystic Rumi, Khalili has created a global movement and left a rich body of philosophy, design and innovative construction technology. His work is continued at Cal-Earth Institute, as the basis for his research and educational mission.
"For 25 years, Nader Khalili's specialty as an architect was skyscrapers. Then at thirty-eight, his turning point in life, he bought a motorcycle and went to the desert for five years in Iran to see what the solution was for sheltering the poor in the world and to learn from what already existed. There [he] got to know five personalities: earth, water, air, fire and Rumi, the $\mathbf{8 0 0}$ year old Persian mystic poet... Rumi taught him the unity of these universal elements, forming his archemy or alchemy of architecture. Water is fire, earth is water, and there is a unity in all elements."
"Through understanding and utilizing the principles of 'Yekta-iArkan' (unity of elements), integration of tradition and technology in harmony with the laws of nature is possible at many levels of microcosm and macrocosm."
(N. Khalili).

$\downarrow$ The "Eco-Dome"



## SG207.4.7.4 Architecture for the people (4) Earthships

in the 1970s, Earthships were developed in New Mexico by Michael Reynolds as the most radically sustainable, versatile and economical buildings in the world.
Now sprouting all over the planet, Earthship construction \& green living is promoted by a growing body of enthusiastic and happy users and taught as "EarthShip Biotecture" in Taos, New Mexico.

An Earthship is defined by the following 6 principles:

- Thermal/Solar Heating \& Cooling
- Solar \& Wind Electricity ("off-the-grid")
- Contained Sewage Treatment
- Built with Natural and/or Recycled Materials
- Water Harvesting
- Food Production

Visit www.earthship.com to participate in this flowering of green living and a true architecture for the people.
\& "Water from the Sky" outlines how to solve the problem of water shortage through catching, storing, using, reusing and treating rainwater.

\& The original Earthship
Manual.
Volume 1.



Paolo Soleri (1919-) is an Italian-American visionary architect. He is widely known for the concept of "arch-ology" he created, i.e. large-scale urban architecture in line with ecology: sustainable, compact, self-sufficient, multi-functional and pedestrian-oriented.

As early as 1955, the idea of environmental architecture appears in Soleri's notes. Soleri made a life-long commitment to experiment with "arcologies" and founded the nonprofit Cosanti Foundation to support his work. The Foundation's major project is Arcosanti, a prototype experimental town, under construction in the high desert of Arizona ( 70 miles north of metropolitan Phoenix), accommodating 5,000 people, which was conceived to show how cities might be re-invented, according to the principles of arcology.

Arcosanti is an educational process. Volunteers and students come from around the world to attend the Arcosanti workshop. Many are design students, and some receive university credits. At the present stage of construction, Arcosanti consists of various mixed-use buildings and public spaces constructed by 5000 past workshop participants.

$\uparrow$ Soleri's signature architectural element: South-facing apses (half domes) that enable year-round activity outdoors by allowing sunlight in winter while shielding people from the sun in summer.
$\Rightarrow$ A view
from inside.


SG207.4.8.1 Paolo
Soleri (1) Arcosanti

$\uparrow$ The large-scale Arcosanti 5,000 of the future.


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## SG207.4.8.2 Paolo Soleri (2) Arcologies

In the course of offering the world his vision of future cities, Paolo Soleri has produced, out of his stream of consciousness, miles of arcology plans and sketches. These visionary drawings were first recorded in Mesa City (1955) and then Arcology - City in the Image of Man (1969), a title reminding us of the humanist approach of Soleri: traditionally, the temple was built in the proportions of the human body (see supra).

A visually stunning synthesis of bold architectural design, elegant primary geometries, large-scale urban planning, self-efficient sustainability and a passion for supporting creative social interaction, these drawings are a golden mine of ideas, loosely organized in arcology "generations".
$\uparrow$ An example of Arcology Generation \#1: the "Hexahedron".
$\Rightarrow$ "Two Suns", an example of arcology Generation \#2.
The core of previous models is split open to the sun.


## Example of Modular Arcology. Generation \#3. 7

The important design element here is the "Apsedra" which combines two architectural forms, the "Apse" and the "Exedra". The "Apsedra" is a twin "solar garment" architecture: the first garment is loose and provides shade; the other garment is tight and transparent allowing the suns rays to enter and trap the warm air.

In his notes, Soleri points to "the influence curved space has on our relationship with things and people. The Apsedra encourages conviviality by offering a focusing convergence (its center of centers) where awareness and dialoging are enhanced... The semi- spherical curvature of the apse is the concave form in upright position found in cathedrals and mosques. A truncated apse of large size becomes an exedral geometry."


个 "Nudging Space".

## SG207.4.8.3 Paolo Soleri (3) Arterial Arcologies

The latest development of Soleri's vision is the macro-arcology level of "arterial" or "lean-linear" cities. As the keynote speaker at 2009 Beijing's exhibit "The 3D City: Future China", Soleri actually proposed this LLC model as a sustainable alternative to the current Chinese urban sprawl.

Lean Linear City (LLC) proposes a continuous urban ribbon of twenty or more stories high, extending for many kilometers. Two main, parallel structures are built in modules measuring 200 meters ( 600 feet) in length. Each module accommodates about 3,000 residents and spaces for commercial, industrial, educational, cultural, recreational, and health maintenance activities. LLC suggests a possibility of sustainable urban development within its structure and the environment beyond. While carbon neutrality is within its reach through innovations in building technology and energy conservation, the most important contribution of LLC is perhaps, its logistical approach to define and control the growth pattern of the existing and future cities.

(Image credit: computer renditions of the LLC at www.arcosanti.org)



The model LLC stretches for hundreds of kilometers along the spine of a high speed rail corridor to form a continuous structure in which people live, work, and play. Photovoltaic cells and windmills help power the city, which features a considerable amount of parkland.

个 V Views of LLC's stretches.


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Dan Winter - Pioneer scientist \& philosopher on Sacred Geometry, Bio-Harmonics and the Physics of Life Force.


## SG207.4.9.1 Architecture \& Bio-Energy (1) Dan Winter

One perspective on Green Design has been offered by cosmic scientist Dan Winter. Dan has redefined in scientific terms the traditional arts of Geomancy and Feng Shui, as well as their current reincarnation: Green Design. The question is: how can we make a sustainable \& harmonious integration between conscious intention, human living, architecture and landscaping? Dan Winter's answer is: by creating architectural and landscape structures that act as biological or life force capacitors, optimally based on PHI. What does that mean?

An architecture is SACRED and GREEN when it is consciously built to act as a biological capacitor $=\mathbf{a}$ system that can attract, store and redistribute a life-friendly and life-propagating charge. A beehive, a Celtic straw hut, a stone circle, a labyrinth, a dolmen or a cathedral all have one thing in common: they can attract, hold and radiate a capacitive charge, a compressed field of LIFE-FORCE (Chi, Orgone, Shakti...).

Says Dan Winter: "Life occurs when biological / Green Design structures can attract enough different wavelengths and cause them to constructively share one vortex point with love = without canceling each other. This happens through Golden Ratio Implosion or Phi Fractality Cascading. Any being standing in that vortex will then be in a position of reaching up \& down the infinite cascade of light dimensions constituting the universe."

Implosive-recursive, self-embedded, Golden Ratio-based fractal charge compression, by defining life and growth, is REDEFINING all human activities as HARMONIC EXPERIENCES: architecture, agriculture, food preparation, politics, arts etc... as well as consciousness expansion.

Here are some insights gathered from Dan Winter and pointing to a new, global, vibrational, geomantic understanding of architecture, landscaping \& eco-planning. The way to make a house, landscape, city or oneself attractive to life starts with a intentional process of weaving the human design into the magnetic lines and eco-web energies of a site through appropriate harmonic symmetries. This is the re-introduction of new forms of science-based geomancy, dowsing and sacred geometry or wisdom of harmonic forms and alignments.

- The thoughts in our minds and the emotions in our hearts set the vibrational interaction with our surroundings because the heart, the brain, the trees, the plants, the stones and planet Earth all share the same information bandwidth ( $0-30 \mathrm{hz}$ spectrum).
- In order to be healthy (= to radiate life force) trees, people, buildings, landscapes... need to couple with the natural magnetic ringing of the Earth and to be embedded in the musical harmonic proportions of the Web of Life. Creating circular \& spiral symmetry on a land provides a capacitive nest for magnetic lines to enter into harmonic coherence and allow for an increase in life force, fertility of the soil, growth of the plants, self-empowerment \& bliss in people, tuning to the basic Earth frequency and access to the larger scale memories of the biosphere. Magnetism is attracted to PARAMAGNETIC STONES (limestone, granite...) and SYMMETRY.
- The highest states of inclusive Oneness (LOVE, COMPASSION...) are transmitted by cascades of harmonic series waveforms based on the Phi Ratio.
- The best DIET is the raw vibrational diet of ingesting coherence \& fractal harmony with: the water we drink, the air we breathe, the magnetic alignment and organic materials of our homes, the emotional and mental fields we choose...
- "Green Design is the art of embedding life in the continuous web of universal harmony."


## SG207.4.9.2 Architecture \& Bio-Energy (2) Stephane Cardinaux

Known in Europe as "geo-biology", a Western type of Feng Shui is rapidly coming of age. Geobiologists are routinely called upon to assess the auspicious location or orientation of a site, a house, a bed ... Geo-biology is the combined synthesis of several levels of study and data collection:

- Mapping of geometric symmetries \& proportions in existing structures and artifacts, whether natural, architectural or other.
- Survey of relevant planetary grid networks, such as Hartmann or Curry nets and their potential crossings and interferences. [ $<$ SG206]
- Use of a geo-magnetometer to measure the variations of the earth's magnetic field and locate the geomagnetic fault lines as well as the local network of underground water streams, pools and fountains.
- Survey, with dowsing (bio-resonance) and ultra-sensitive electronic meters, of geo-telluric currents and phenomena. Telluric currents are extremely low frequency electric currents moving underground or through the sea and traveling over large areas at or near the surface of Earth. Geo-telluric phenomena include cosmo-telluric chimneys, vortices and energy flows.
- Study of health and energy effects of the existing or planned architecture or alignment... This is becoming an integral part of the "Medicine of wellbeing".

Stephane Cardinaux, a Swiss architect, founder of the school of geo-biology "Genie du Lieu" ("Spirit of the Place"), has devoted his life to a synthesis of physical "hard" science and ancient "etheric field" science in the understanding of sacred sites and architecture. In his books and website, S. Cardinaux has laid out the foundation for a new bio-energetics of architecture, eco-landscaping and well-being.



个 A cosmo-telluric "chimney".


个 A cosmo-telluric "vortex".
(S. Cardinaux)

$\uparrow$ Cross-section of cosmo-telluric vortex showing PHI Golden Spiral.
(S. Cardinaux - Golden Rectangle added)


1 A Magnetic Flux Density Emission map reveals the location of population centers, minerals, water, and converging lines of earth magnetic energy.
The regular survey land map overlaid upon the magnetic map shows roads, communities and fields. (Image: Dan Winter).

## Landscaping \& the Magnetic Field

New Biology scientists (such as Phil Callahan or Dan Winter) have shown the direct connection between the soil fertility and the magnetic conductivity of a land.

Where the magnetic conductivity has been canceled through EM pollution, metallic structures and hard-angle landscape or building geometries, conflicts are arising within and between people and wars are breaking out. Where magnetic coherence is maintained or restored, peace prevails and the land is greening.

Eco-Green Design is rapidly becoming interactive geomantic landscaping. In a new form of bio-mimicry, harmonic architectural forms \& sustainable systems are braided into living eco-systems to achieve "living systems geo-architecture". Moreover, the overall "landscaping" intention has to be sourced into the coherent waves of harmonic emotion (i.e. love) and a higher consciousness of the interconnectedness of all.
> "Restorative architecture is the next stage of Green architecture, where more is given to the environment over a building's lifetime than is taken during its construction and operation". (Alec Couchman. A Deeper Shade of Green. 2008 )

## SG207.4.10 Green \& Living Systems Architecture

Just like organic farming is growing into farming integrated with surrounding ecological systems, Green architecture is growing into living systems architecture aiming at full sustainability and balance with the natural environment.

Green architecture, by introducing compliance to green accreditation systems (such as LEED or BREEAM), is a progress from the still current modernist architecture using materials \& designs that are totally blind to environmental \& human impacts. However, leading edge visionary architects (such as Ken Yeang and other Green Design groups) are now going beyond the "fashion green" flag to look at the more complete picture of global sustainable design. In the words of Jason McLennan, a leading Living Architecture proponent: "The world of green building is a world that is a little less bad... But it's no longer adequate: we have to be a lot more restorative."

The current call for architects is to hold a global, "whole system" vision of their job and to learn, like their ancient predecessors, how to co-create with nature, and produce "ecosystem-like structures and systems whose content and output not only integrate benignly with the natural environment, but whose built form and systems function with sensitivity to the locality's ecology as well in relation to global bio-spheric processes." (Ken Yeang).

In the traditional words of Sacred Geometry, the job is to harmonize the Small with the Large and the Large with the Whole.

Forward-thinking architects are going beyond "sustainability" and exploring rehabilitation, restoration and regeneration of environmentally devastated landscapes.

To illustrate the current "awakening" in the new generations of architects, we will take the example of Ken Yeang, a Malaysia-born world leader in bio-climatic skyscrapers, living systems architecture and eco-masterplanning.

## SG207.4.11.1 Ken Yeang (1) Bio-Climatic Skyscraper

Ken Yeang (1948-), a Malaysian eco-architect has been designing ecological, bioclimatic and energy efficient architecture for 40 years. He is world famous for his invention of the Bio-climatic Skyscraper, the forerunner of his novel ideas on vertical urban eco-design.

What differentiates Yeang's work from other eco-designers is his authentic ecological approach. Whereas most green design is based on rating systems or on eco-engineering (cleantech, carbon neutral...), Yeang's designs are ecology based, focusing on evolving an eco-aesthetic for green buildings and masterplans.

Ken Yeang makes it clear at the outset that the skyscraper building type is probably the most ecologically unfriendly of all building types, but states that until an economically viable alternative is identified, it is necessary to make them as humane and as sustainable as possible.


\&个 The EDITT Tower. Singapore. (Competition design)


In her 2011 book：Ecoarchitecture，The Work of Ken Yeang，Sara Hart explains the kind of bio－integrative and restorative architecture that Ken Yeang is pursuing and pioneering．This is much more comprehensive and fully ecological than the other eco－designers who oftentimes only comply with some official rating systems and just showcase attractive green spaces．

Focusing on weaving human buildings \＆functions into living eco－ systems，Yeang has developed a platform for eco－masterplanning in order to create a total living system that is both interactive and coherent as a bio－integration of four eco－infrastructures：
1．The green infrastructure which includes nature＇s corridors and networks that link open spaces and the various habitats for fauna and flora，urban food production，natural resource management，all of which he describes as＇nature＇s utilities＇．
2．The grey infrastructure which includes sustainable eco－engineering cleantech systems such as transportation systems，sewage，materials recycling and designing for disassembly and other green engineering utilities．
3．The blue infrastructure which encompasses hydrological management， water conservation，grey water reuse，rainwater harvesting，sustainable drainage，bioswales（landscape elements designed to remove silt and pollution from surface runoff water．），filtration strips，detention ponds as storm water management．．．
4．The red infrastructure is human societies which includes creating sustainable ways of life，providing new food systems，changing existing socio－economic，industrial and political systems into sustainable systems．

Yeang＇s recent work investigates＂eco－mimicry＂or＂eco－mimesis＂i．e． designing human built environments as living ecologies that mimic the properties and attributes of ecosystems in all their aspects．All of Yeang＇s architectural eco－designs create an ecological nexus or＂web of life＂within each building and with the landscape，and seek an inter－ connectedness between human activities，the built environment and the surrounding ecosystems．

And so the loop is completed：here we are again，reinventing the traditional geomancies（such as Feng Shui）by seeking the harmonic integration between landscape，human aspirations and built structures． This is the beginning of a new era of＂sacred global architecture＂．

SG207．4．11．2 Ken Yeang（2） Bio－Mimicry \＆Eco Master－ planning


个个个 The Soma eco－city in Bangalore，India，is currently under construction． It was masterplanned by Ken Yeang with green eco－infrasructure as the driving configuration，offering continuous corridors of vegetation，retention ponds and roof forests．Within Soma，Yeang also deployed the principles of Vaastu Shastra， the Indian system of geomancy．［Blue lines denote golden rectangles．］
（Images from：Sara Hart．EcoArchitecture， the Work of Ken Yeang．2011．）

## SG207. Chapter 5. Pioneer Architecture Projects



In this chapter, we are reviewing examples of outstanding architecture projects.

Some are intentionally "sacred".

Some involve the re-creation of living environments in harmony with nature.

Some are just stunning flight of human creativity.

AlDar HQ, Dubai. 2010.

## SG207.5.1.1 The Matrimandir (1) Introduction



The Matrimandir Temple Auroville, India

## SG207.5.1.2 The Matrimandir (2) Structure

The Matrimandir Temple is the soul of the city-community of Auroville. Founded in 1968 by the Mother (Mirra Alfassa - the spiritual collaborator of Sri Aurobindo, the founder of Integral Yoga), Auroville is an international city whose goal is to showcase human unity. ...The inauguration act of Auroville consisted of placing in a lotus-shaped urn the soil from 124 nations as a symbol that Auroville belongs to humanity as a whole.

Inside the Matrimandir, a spiraling ramp leads upwards to an airconditioned chamber: the spacious Inner Chamber in the upper hemisphere of the structure. Completely white, with white marble walls and white carpeting, it is designed as a sacred place to amplify consciousness. In the centre of the Inner Chamber there is a pure crystal-glass globe suffusing a ray of electronically guided sunlight which falls on it through an opening at the apex of the sphere. The Mother said about it: "The most important thing is this: the play of the sun on the centre. Because that becomes the symbol, the symbol of future realizations".

In the Matrimandir, there are no images, no organized meditations, no flowers, no incense, no religion or religious forms. But the geometries have been designed to be sacred harmonics of the human body, nature and the cosmic structure. It is a Temple of resonance.

In the overall vision, the Matrimandir, whose ovoid shape is the symbol of the Cosmic Egg, is set within a larger Oval Island, itself the heart shape of the entire city-community. Fractals within fractals.



个 Matrimandir. Cross section with the Inner Chamber (white) and the outer petals (brown).


个 Matrimandir. Cross section close-up showing the spiral access ramps and crystal (blue).

## SG207.5.1.3 Matrimandir (3) Solar Radiance

At the center of the Inner Chamber there is a 70 cm crystal ball in a gold mount. This ball glows with a single ray of sunlight that is directed on it from the top of structure by a heliostat system.

The heliostat is controlled by a computer program, which moves a mirror across the sun's path every day. This mirror projects sunlight into a lens which sends the single sun ray down onto the crystal. To make sure that the ray strikes the crystal exactly in the centre, a photo sensor is installed in the path of the ray itself and relays the data on the ray's position to the computer, which in turn will adjust the ray to the correct position if necessary.


## SG207.5.1.4 Matrimandir \& Sacred Geometry (1)


$\uparrow$ The yogic Lotus posture overlaid on the geometry of the Matrimandir.
(Drawings \& overlays by Robert Gulick)


个 The geometry of the Squared Circle [ SG302] overlaid on the cross section of the Matrimandir.

SG207.5.1.5 Matrimandir \& Sacred Geometry (2)


T Phi concentric circles match the 12 pillars (3), the 12 -sided enclosure (2) and the outer enclosure (1).


T The Matrimandir geometry fits into two Golden Rectangles, each with short side $=1$ and long side $=1+1 / \Phi=P h i=1.618 \ldots$

The Inner Chamber has the same proportions as the Great Pyramid, here in scale with the Golden Rectangles: base $=1 / \Phi$, slope $=1$ and apothem $=\sqrt{ } 1 / \Phi=.786$

SG207.5.1.6 Matrimandir \& The Oval Island


Layout of the Oval


Photo taken from a satellite in 2005
(All images: www.auroville.org)

The Matrimandir Oval Island is a fractal of the Matrimandir Sphere in the shape of the "Shalagram" symbol [ $\quad$ SG303]. It has the following features:

- Within the $\mathbf{1 2}$ petals of the Matrimandir, there are $\mathbf{1 2}$ Meditation Rooms.
- As an extension of the petals, there are the 12 Gardens.
- The Banyan tree is now a little more than 100 years old and was selected by the mother as the geographical center of Auroville.
- An amphitheater converging towards the lotus-shaped urn holding soil from all over India and the world.

$\uparrow$ The amphitheater

\& Celebration
at Auroville.


## SG207.5.1.7 Matrimandir - A Global Icon of Harmony



This is a potent archetypal image showing the spiral of evolution/consciousness ascending the Mountain of the World topped by the Lingam/Urn-of-all-nations, on the background of the Golden Cosmic Egg/Temple of the Mother. (Wikipedia Commons).

## SG207.5.2 The Nautilus House

In $\triangle$ SG205B, we saw one image of the "Nautilus House" in Mexico City. Here are more images. www.newhouseofart.com.


## SG207．5．3 Bali：the Green School

With the agenda of＂empowering global citizens and green innovators who are inspired to take responsibility for the sustainability of the world＂，the Green School in Bali，Indonesia，is creating a new paradigm for learning by educating young leaders in global citizenship．＂Our purpose is to champion a new model of education that connects the timeless lessons from nature to a relevant and effective preparation for a fast－changing future＂．

The architecture of the school＇s organic buildings and even the bridges are an extraordinary achievement of elegant beauty，local sustainability $\&$ traditions，and efficient inspiration to be creatively learning．Everyone wants to go back learning and start again in such a school．



个 A bathroom


个 The＂Wave＂house


个 The Kulkul bridge
［See SG203B for the Water Vortex electric plant at the Green School．］


## SG207.5.4 Energy Positive Architecture

\& This Apple project would have a solar roof canopy creating 5
Megawatts of electric power. (/inhabitat.com)


个 $\rightarrow$ CyberEgg, Mumbai,

India.
Features solar and wind energy generation.


个 $\downarrow$ Utopia 1. Dubai project. Skin using photovoltaic nano-cell tech.



↔ The Elithis
Tower creates more power than it uses.
Dijon, France. (Credit).

## SG207.5.5.1 Contemporary

 PHII (1)

T Nauticus, an interactive naval center in Norfolk, Virginia, has a "Fibonacci Foreyard" (top right corner of image). (www.nauticus.com)


个 In the United Nations building, the ratio of width of the building compared with the height of the upper block of 10 floors is approximately golden.

$\uparrow$ The CN Tower in Toronto contains the golden section in its design.
Total height / height of the observation deck
$=553.33 \mathrm{~m} . / 342 \mathrm{~m} .=1.618$
(Image credit)

↔California Polytechnic State University built a new Engineering
Plaza based on the Fibonacci numbers. The designer of the Plaza J.
G. Smith, says: "As a guiding element, we selected the Ftbonacci series
spiral, or golden mean, as the representation of engineering
knowledge." (Credit)


## SG207.5.6.1 Eco Complexes (1)


$\Rightarrow$ New
Orleans Arcology Habitat (NOAH) project. (Credit).



个个 Akros International Hall, Fukuoka, Japan. By Argentinian architect Emilio Ambasz. 1994. (Credit).


## SG207.5.6.2 Eco Complexes <br> (2) The Sky Forest Tower

Ken Yeang's entry (2010) for the Gyeong-Gi complex, located outside of Seoul, may be his masterpiece of vertical eco-structure and ecocomplex planning. It is also a stunningly beautiful living sculpture.

Introducing gardens \& forestry not only in the landscape but within the buildings themselves with large "skycourts", the plan calls for automated shutters that close during the colder months, partially open in the mid-season and become fully exposed in the summer months. The design for the complex also creates a variety of new natural habitats related to the flora and fauna species endemic to the area.



## SG207.5.6.3 Eco Complexes (3) Crystal Flower City

Conceived as a city in microcosm, Crystal Island is an unprecedented, compact and diverse urban project. It is planned to be located at only 7.5 km from the Kremlin. Rising from a large public park, the entire development is enclosed within a vast tent-like superstructure.

The 1,500 feet ( $\mathbf{4 5 0}$ meters) tall multi-use structure at the heart of the project features a double spiral geometry in the $\mathbf{1 2 / 2 4}$ symmetry, forming the 3D shape of a giant inverted flower of crystal. The spiraling geometry extends itself throughout the landscaping of the park.

The tent-like superstructure forms a breathable second skin and thermal buffer for the main building, shielding the interior spaces from Moscow's extreme summer and winter climates. Providing accommodation that is flooded with daylight, this second skin will seal itself in winter to minimize heat losses, and open in summer so that the interior can be cooled naturally.

Efficient energy management is built into the design.



Crystal Island will also incorporate a number of sustainable design features. The exterior facade is to be solar responsive and will include solar panels which, along with wind turbines, will generate electricity for the huge tower. Natural ventilation will be provided thanks to numerous strategically placed large atriums.

The internal environment will also have dynamic enclosure panels slotted into the structural framing that will allow daylight to penetrate deep into the heart of the structure. The panels are designed to be controlled to modify temperature inside the building - closed in winter for extra warmth and opened in summer to allow natural ventilation. Energy management is at the heart of this structure: several on-site renewable and low-carbon energy generation projects are planned.

According to Wikipedia, "as of 2009, the construction has been postponed."


SG207.5.7.1 Futuristic Projects (1) Performing Centers

\& The Beijing's Opera, dubbed the "Bird's Egg", is an ellipsoid dome of titanium and glass surrounded by an artificial lake. 2007. (Wikipedia).


世个 Front \& top views of Dubai's Opera House. The form of the building is based on sand dunes.




T个 Dubai's Vertical Seawater Farm.
To deal with the lack of fresh water in Dubai and other Arabian nations, Italian architectural firm Studiomobile created the Seawater Vertical Farm to cool and humidify greenhouses. This innovative concept produces adequate humidity to convert seawater into fresh water, necessary for irrigation. (Credit).

SG207.5.7.3
Futuristic
Projects (3)
Vertical Farms


个 Ecological self-sustaining vertical farm to be located on the southern tip of Roosevelt Island adjacent to New York City. Vincent Callebaut Architects. (Credit).


Plantagon Geodesic Farm project. (Credit)

## SG207.5.7.4 Futuristic Projects (4) Business Centers



T Taichung Convention Center, Taiwan. Designed like a volcano for natural ventilation and light, the structure features photovoltaic glass pleats. (Credit).


个 The proposed EP15 Towers in Dubai. Credit.


The Taiwan Center for Disease Control Biolab is inspired by the elegant shape of the Nautilus Shell. Its facade is of geometric patterns, the 4 symbols of the DNA sequence of the bacteria on which they base their studies.

$\leftarrow$ The world's first Circular skyscraper: AlDar HQ, Dubai.

The shape of this building is achieved through the use of structural diagrid, a diagonal grid of steel.


个 The Soumaya Museum, Mexico City. 2011. (Wikipedia).

## SG207.5.7.5 Futuristic Projects <br> (5) Museums



## SG207.5.7.6 Futuristic Projects (6) Mandala Cities



ヘン The Venus Project. www.thevenusproject.com


In his Venus Project, Jacque Fresco envisions a global civilization in which science and technology are applied with human and environmental concern to secure, protect, and encourage a more humane world for all people. There is, says Fresco, an attainable, humane social design of the near future where human rights are no longer paper proclamations but a way of life. The Venus Project calls for a "resource-based economy" where all of the world's resources become the common heritage of all of the earth's people.

The mandala-shaped cityscape project on the left is but one of the contemporary resurgences of the ancient understanding of the sacred cosmic city or celestial-archetypal site where the mandalic layout of the architecture \& landscape environment express the fractal resonance between macro-, meso- and microcosmos, overlaying them to form a sacred spatial living system.

The mandalic sacred city, as activated antenna of a celestial archetype, is literally wave-guiding the people residing in it and partaking of its cosmo-magical powers.

Many examples of mandalic cities will be given in 4 SG304B. We show here two examples:

Right: the traditional map of Varanasi (Banares or Kashi), the holy city of Hinduism, on the Ganges river.

Below: the layout of the fabled city of Atlantis (as described by Plato in his Critias).

$\uparrow$ Mandala map of

< The city of
Atlantis with its rings of water (in blue) and land. In Critias, Plato describes the design and gives exact measurements of its elements. The numbers turn out to be canonic numbers.



## SG207.5.8.2 Biodomes (2) Chester

Designed by Proctor \& Matthews, 'Heart of Africa' is a gigantic biodome for the Chester Zoo in Northern England. It will be 34 meters ( $\mathbf{1 1 2}$ feet) high and larger than the Tropical House at Eden. The project covers 16,000 square meters ( 172,000 square feet) and will simulate the natural African rain forest habitats of the Congo region. It includes an undulating dome which will be one of the largest ETFE clad free form roof structures in the world and contain a jungle canopy with an authentic climate.

T The biodome backside.
(Image credit: //archinect.com)


The 'Heart of Africa' Biodome will be home to a band of gorillas, a large troop of chimpanzees, okapi (rare giraffe-like creatures), birds, amphibians, reptiles, fish, and invertebrates.


T Water Island. Wolf Hibertz has found a way to use sunlight to turn the seawater minerals into limestone. The limestone would be used to construct floating island homes. The process begins with as a series of wire-mesh armatures, anchored on top a sea mountain. These will then be connected to a low-voltage direct current supplied by solar panels. Electrochemical reactions will draw minerals from the sea to the armatures over time to create walls of calcium carbonate - or limestone. (Credit).

## SG207.5.9 Floating Cities



DUBAI
4

- The Palm Islands are artificial archipelagos in Dubai, UAE. The islands are the Palm Jumeirah, the Palm Jebel Ali and the Palm Deira.

Each settlement will be in the shape of a palm tree, topped with a crescent, and will have a large number of residential, leisure and entertainment centers. The Palm Islands will add 520 kilometers of beaches to the city of Dubai.


## SG207.5.10 Floating Homes


$\leftarrow$ Neptus 60 is a cliff house.

It allows the occupant to fully enjoy the cliff location, to admire the views on the sea and the spectacular underwater sea life.

The project reflects on Neptus, the amphibious shellfish that once thrived in the oceans over 500 million years ago.


All 3 habitats designed by Giancarlo Zema

世个 The Jelly-Fish 45 is a floating house (33 feet high and 45 feet wide) allowing its residents to live either above or below sea level: like the Trilobis (right), the Jelly-Fish has a submerged lower deck for dining, drinking and viewing ocean life. Its shape comes from the observation of jellyfishes that animate our seas with their transparent and weightless structure. A spiral staircase joins the five stories of the floating habitat and ample windows accommodate views in all directions from all levels. (Credit).

6
Trilobis.
Onboard DC from sun and fuel cell.

## SG207.5.11 Underwater Habitats



个 Inspired by the Jules Verne's 20,000 Leagues Under the Sea, Hydropolis is a submarine luxury hotel in Dubai, UAE. The project has been stalled in 2008.

Mimicking natural forms, it is shaped like a collection of bubbles and curves designed to give the appearance of a circular atoll. It has already been compared to both a jellyfish and a sea turtle. The hotel would feature a pair of observation domes which allow an expansive view of the water and the creatures that live in it. They are large enough to emerge above the waves, and one has a retractable roof allowing people to be surrounded by the ocean while looking directly into the sky.



$\uparrow \leftarrow \downarrow$ The Apeiron Hotel (Sybarite Architects of London) is a design project in Dubai for a new "7 star" hotel in Dubai only accessible by boat or helicopter. The Apeiron will be a jungle-themed hotel built on an island about $300-500 \mathrm{~m}$. off the coast of Dubai. The underwater levels of the Apeiron Hotel include an underwater seascape (the "Crescent Lagoon"), and an undersea health spa \& restaurant.

The internal facade has louvers to prevent direct solar gain and the louvers are made up of solar cells as is the ribbon (looking like an "infinity loop") that frames the building and gives the Apeiron its name.

Note: "Apeiron" (meaning "boundless" or "infinite") is a cosmological concept introduced by Greek philosopher Anaximander (610-546 BC).

## SG207.5.12 Growing Living Buildings

Why not GROW your own living bridge or dwelling? (and use sacred geometry to wave-guide the growth)

"In the depths of northeastern India, in one of the wettest places on earth, bridges aren't built - they're grown.

The living bridges of Cherrapunji, India are made from the roots of the Ficus elastica tree. This tree produces a series of secondary roots from higher up its trunk and can comfortably perch atop huge boulders along the riverbanks, or even in the middle of the rivers themselves.

Because they are alive and still growing, the bridges actually gain strength over time - and some of the ancient root bridges used daily by the people of the villages around Cherrapunji may be well over five hundred years old.

In order to make a rubber tree's roots grow in the right direction - say, over a river - the Khasis use betel nut trunks, sliced down the middle and hollowed out, to create root-guidance systems. The thin, tender roots of the rubber tree, prevented from fanning out by the betel nut trunks, grow straight out. When they reach the other side of the river, they're allowed to take root in the soil. Given enough time, a sturdy, living bridge is produced." (Credit: http://rootbridges.blogspot.com)


个 "Fab Tree Hab" is a current project of the M.I.T. Human Ecology Design group: a tree-grafted symbiotic structure composed of $100 \%$ living nutrients.
"Here traditional anthropocentric doctrines are overturned and human life is subsumed within the terrestrial environs. Home, in this sense, becomes indistinct and fits itself symbiotically into the surrounding ecosystem. This home concept is intended to replace the outdated design solutions at Habitat for Humanity. We propose a method to grow homes from native trees. A living structure is grafted into shape with prefabricated Computer Numeric Controlled (CNC) reusable scaffolds. Therefore, we enable dwellings to be fully integrated into an ecological community." (Credit: http://www.archinode.com/bienal.html)

\& Research Group Baubotanik at the University of Stuttgart have been focusing on the idea of living plant constructions that consists of structures made from living trees. The first prototype tower has been completed in South Germany. (www.baubotanik.de).

Note: As early as 1926, German landscaper Arthur Wiechula published his seminal book: Wachsende Hauser... (Developing Houses from Living Trees).



All the knowledge about sacred sites and harmonic architectures is nothing until we apply it to ourselves.

This SG207 module and the whole of Sacred Geometry is a preparation, a circumambulation, before entering the inner spirit temple, our Holy of Holies, the Luminous Self.

We first rehearse in the outside world by visiting and learning from these sacred sites \& architectures. And when the universe sees that you are ready, you will be redirected within and ushered to the ongoing Sacred Temple that is You and was awaiting you all along your human journey.

The Source Self that you embrace is the Beloved you were seeking outside, the power vortex you were trying to step into at the places of spiritual power.

Stopping at the sacred sites outside is stopping mid-way. The body and the physical reality, both natural \& cultural, are here to create an echoing effect that is sending you back deeper into the Glory of Self-A wareness.

In essential fact, there is only one sacred site: your own Self, the Heart of your being. And the only sacred geometry you need is the cascading Golden Bliss of your Cosmic Laugh.

## SG207.Cb Conclusion The Inner Sacred Site



## SG207.Ce School of Sacred Geometry - Curriculum (1)

Sacred Geometry Introductory Level: 8 Modules
SG 101 Intro I Sacred Geometry: Universal Order \& Beauty

SG 102 Intro II
SG 103 Intro III
SG 104 Intro IV
SG 105 Intro V
SG 106 Intro VI
SG 107 Intro VII
SG 108 Intro VIII

History \& Traditions of Sacred Geometry Sacred Geometry: A Grand Tour PHI: the Golden Ratio \& the Fibonacci Series The Golden Rectangle \& Golden Spiral Pentagons, Pentagrams \& the Penta-Modules The Five Platonic \& 13 Archimedean Solids The Vesica Piscis: Cosmic Womb of Creation

Sacred Geometry Intermediate Level: 8 modules
SG 201 Interm I The Monochord, Music \& Cymatics
SG 202 Interm II The Power of Archetypal Numbers
SG 203A Interm IIIA Sacred Geometry Resurgence in Science - Part 1
SG 203B Interm IIIB Sacred Geometry Resurgence in Science - Part 2
SG 204 Interm IV PHI in the Human Body, Biology \& DNA
SG 205A Interm VA The SG of Nature - Part 1: Plants \& Phyllotaxis
SG 205B Interm VB The SG of Nature - Part 2: Animals \& Minerals
SG 207 Interm VII SG in Architecture, Sacred Sites \& Green Design

## SG207.Cd School of Sacred Geometry - Curriculum (2)

Sacred Geometry Advanced Level: 8 modules
SG 301 Adv I Golden Cosmos: Planets, Stars \& Cosmology
SG 302 Adv II SG in Art, Culture \& Creativity
SG 303 Adv III Universal Symbols: Primordial Knowledge
SG 304 Adv IV Labyrinths: a Mini-Pilgrimage to Self
SG 305 Adv V Mandalas \& Yantras: Sacred Vortices
SG 306 Adv VI Languages \& Gematrias: Sacred Communication
SG 307 Adv VII Sacred Geometry in the Healing Arts
SG 308 Adv VIII Harmony on Earth: Science \& Consciousness of Harmony

Upon completion of each level (Introductory, Intermediate \& Advanced), a Certificate of Graduation from the Sedona School of Sacred Geometry will be presented to Certification Students.

Postgraduate seminars on current Sacred Geometry research, discoveries \& updates will be organized in harmonic time.

Questions: phi@schoolofsacredgeometry.org



Sedona School of Sacred Geometry www.schoolofsacredgeometry.org phi@schoolofsacredgeometry.org PO Box 3714, Sedona, AZ 86340

StarWheel Mandalas by Aya www.starwheels.com
www.starwheels.com/infopage.php?pagename=starwheelgallery aya@starwheels.com

Our non-profit: www.starwheelfoundation.org
www.starwheelfoundation.org/index.php? $p=$ globalecocampus www.starwheelfoundation.org/index.php? $\mathrm{p}=$ acroyoga www.starwheelfoundation.org/index.php?p=poona1hbooks www.starwheelfoundation.org/index.php?p=treesponsorship

Our online store: www.starwheelmandalas.com
www.starwheelmandalas.com/index.php? $\mathrm{p}=$ originals www.starwheelmandalas.com/index.php? $p=$ wisdomcards www.starwheelmandalas.com/index.php?p=deck1


## On Facebook: Aya Sheevaya

FB Group: Sedona School of Sacred Geometry


A native of France, Aya is a visionary artist and celebration yogi who has dedicated his life to serve humanity and to develop sacred arts education. In his late 20's, Aya realized that his professional life in the French diplomatic service was not fulfilling his heart's desires; he quit everything to go on an extended vision quest. His path took him around the world to visit a variety of sacred sites \& cultures and to receive inspiration from many teachers.

In 1985, in Santa Monica, CA, Aya was gifted with a spiritual vision prompting him to create a series of 108 airbrushed neo-mandala paintings: the "StarWheels". The StarWheels, a happy family of vibratory flowers for the Earth, are looking for sacred spaces to be graced with their presence... (www.starwheels.com / www.starwheelmandalas.com)

Moving to Sedona, Arizona, in 1997, Aya has been involved with sacred arts classes \& events, mandala creation, Sedona guided tours, labyrinth making and Sacred Geometry teaching. Aya has presented several StarWheel art exhibits, has sponsored community awareness events at the Sedona Library, has developed, in collaboration with Gardens for Humanity, the Peace Garden arboretum at the Sedona Creative Life Center, was a speaker at the Sacred Geometry Conference (Sedona, 2004), co-designed several labyrinth sites (The Lodge at Sedona, Mago's Ranch...), and was on the management team of the Raw Spirit Festival in 2006-2008.

Realizing that Sedona was progressively becoming a global spiritual university for many seekers from around the world, Aya founded in 2005 the Sedona School of Sacred Geometry. The school is offering online access to Sacred Geometry PDF modules, with 17 modules completed so far. In the school's website, Aya states: "We are living at the extraordinary and exciting times of a global transformation to a higher order of human consciousness... Sacred Geometry is the expression and resurrection of our deep innate wisdom, now awakening from a long sleep: seeing again the all-encompassing, fractalholographic unity of nature, life and spirit... The keyword is HARMONY." (www.schoolofsacredgeometry.org)

Aya's visionary dream, supported by his non-profit educational organization, the StarWheel Foundation, is the co-creation of an international eco-village "The School of Celebratory Arts" - a green, tropical environment encouraging young people of all nations to develop their creative consciousness and thus contribute to a renewed, spirited, life-respecting global civilization on Earth. (www.starwheelfoundation.org).

Since 2012, Aya is dancing the body divine, after his re-discovery of Yoga, Partner Yoga and AcroYoga. Aya is currently the AcroYoga.org Jam coordinator for Sedona and a teacher of yoga swing asanas.


[^0]:    "The architects of (ancient) times drew their inspiration from the philosophers of antiquity, from sources concerning the former universal application of some natural principle through which terrestrial and celestial forces can be induced to respond to certain sounds, rhythms, numbers and patterns laid out on the land."

    John Michell. The View Over Atlantis. (1969).

