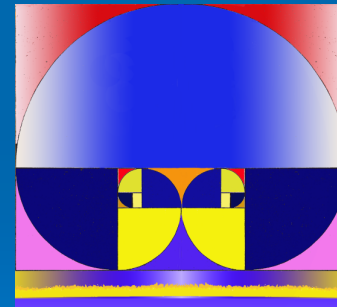
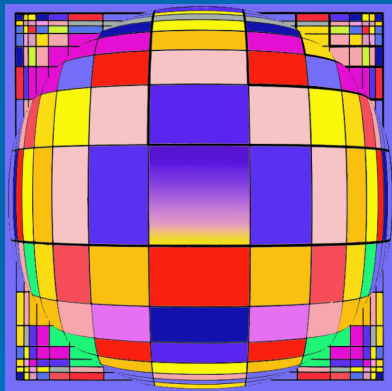
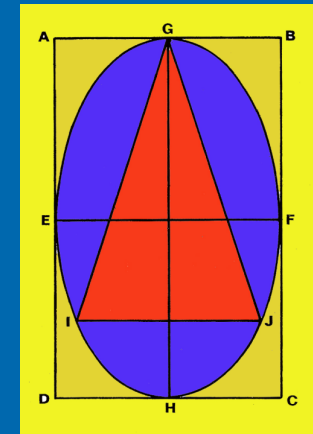
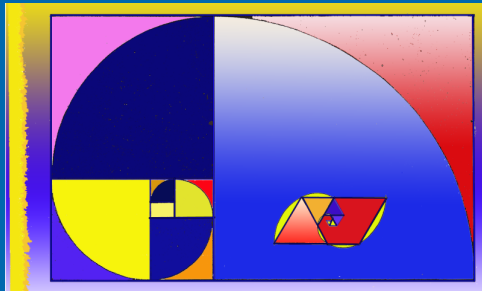


# SG105.Ia The Golden Rectangle & the Golden Spiral

Online Module  
SG 105 / Intro V



Presented by AYA  
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# SG105.Ib PHI: the Golden Rectangle & Golden Spiral - Contents

## Introduction

### 1. The Golden Rectangle

- 1.1 Golden Rectangle (1-2)
- 1.2 Golden Rect - Square (1-3)
- 1.3 Golden Rect - Diagonals (1-2)
- 1.4 Golden Rectangle - Pentagon
- 1.5 Golden Rectangle - Vesica
- 1.6 Golden Rectangle - Circle (1-2)
- 1.7 Rope Construction
- 1.8 Golden Rect Fractals (1-2)

### 2. Golden Grids

- 2.1 Golden Rect Preferences (1-2)
- 2.2 The Modulor (1-4)
- 2.3 Phi Golden Ruler
- 2.4 Phi Grid (1-2)
- 2.5 Orthogons
- 2.6 Phi Matrix Software

### 3. Golden Rectangle Gallery

- 3.1 Phi Formats (1-4)
- 3.2 The Golden Frame
- 3.3 Human faces
- 3.4 Nature (1-2)
- 3.5 Golden Rectangle in Art (1-2)
- 3.6 Golden Rectangle in Design
- 3.7 Architecture (1-3)
- 3.8 Cosmos

### 4. Golden Spiral

- 4.1 Golden Spiral (1-2)
- 4.2 GS Construction (1-4)
- 4.3 GS - Triangles (1-4)
- 4.4 Comparing (1-2)
- 4.5 GS & Pentagon (1-2)
- 4.6 Other Constructions
- 4.7 GS Modulations
- 4.8 J. Bernoulli
- 4.9 GS & Torus Vortex (1-2)
- 4.10 GS & Implosion (1-2)

### 5. Golden Spiral Gallery

- 5.1 Golden Spiral
- 5.2 GS in School (1-2)
- 5.3 GS Fractals
- 5.4 GS in Nature (1-6)
- 5.5 Water Spiral Flows (1-5)
- 5.6 Spirals in the Air (1-2)
- 5.7 Spirals in Plants (1-3)
- 5.8 Harmonics of Heart (1-2)
- 5.9 Heavens (1-2)
- 5.10 GS in Giza
- 5.11 Spiral Jewelry
- 5.12 Spirals in Crop Circles
- 5.13 Spirals of Cooperation

### 5.14. Spirals of Consciousness

### 6. Golden Ellipse

- 6.1 Golden Ellipse Constructions (1-2)
- 6.2 Golden Ellipse & Numbers
- 6.3 Golden Ellipse & Tree of Life
- 6.4 Golden Ellipse & VW Bug

### Conclusion

Cb A New Spiral Cosmology

All contents (texts, concepts,  
images, diagrams...)

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## SG105.1c PHI: the Golden Rectangle & Golden Spiral - Introduction

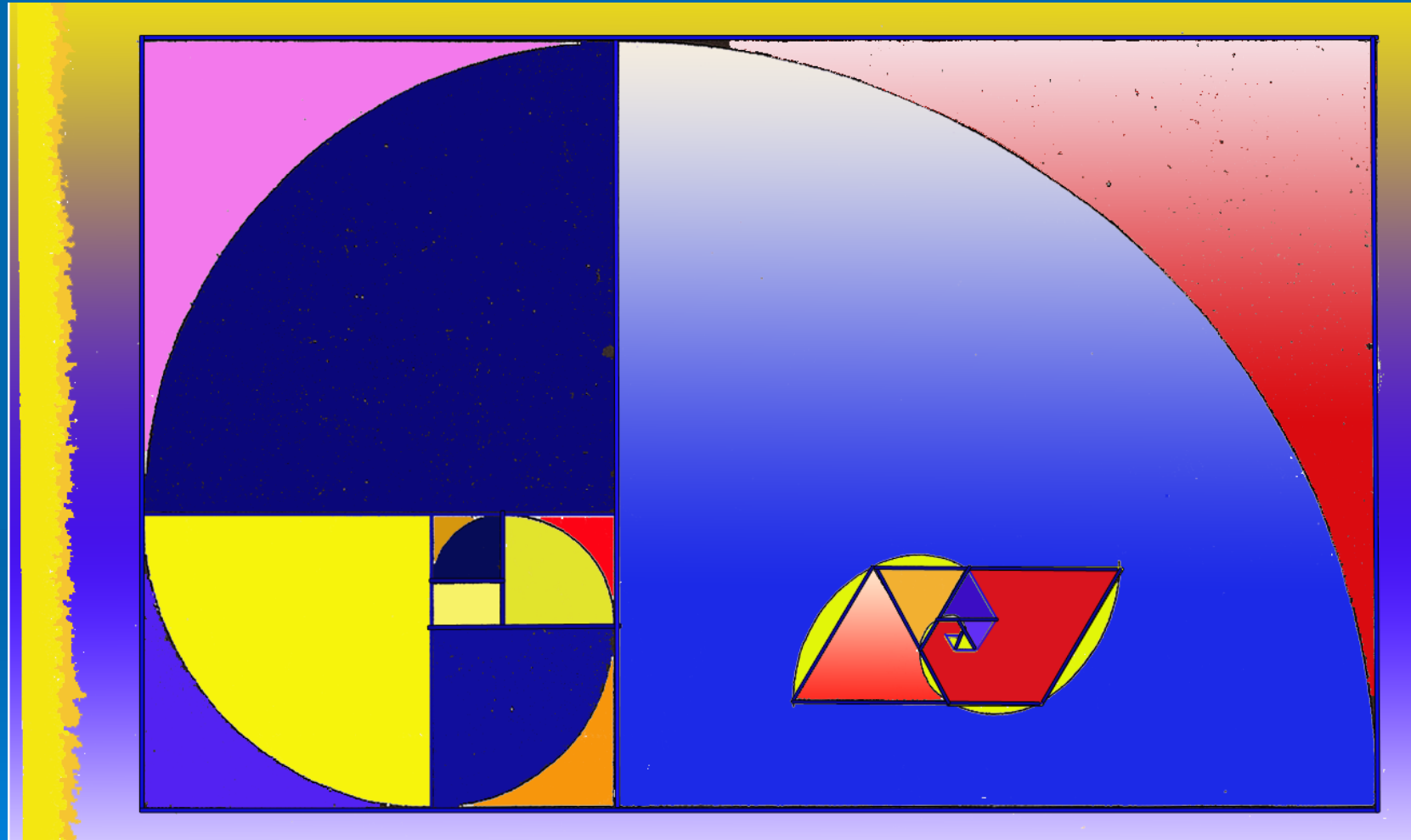
The Golden Rectangle  
is the magical box,  
the treasure chest  
containing  
the secret of life:  
the Spiral of Growth  
or evolutionary  
Golden logarithmic  
Spiral  
based on the  
PHI/Fibonacci  
proportion.

The Golden Rectangle  
is the primordial  
chrysalis  
out of which the  
golden butterfly soars  
into the sky.



# SG105.1 Chapter 1. The Golden Rectangle

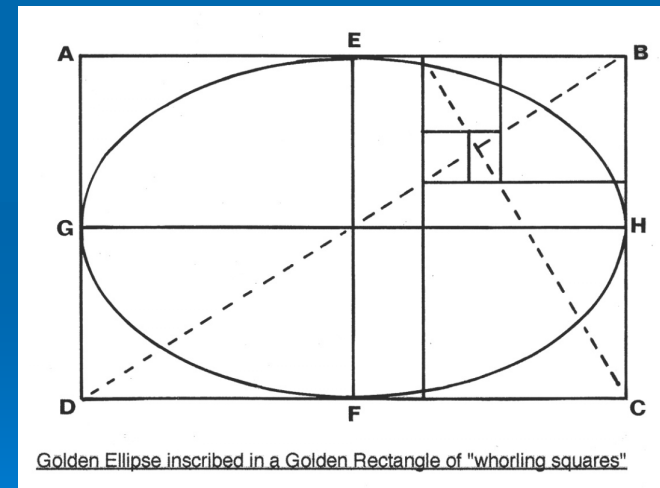
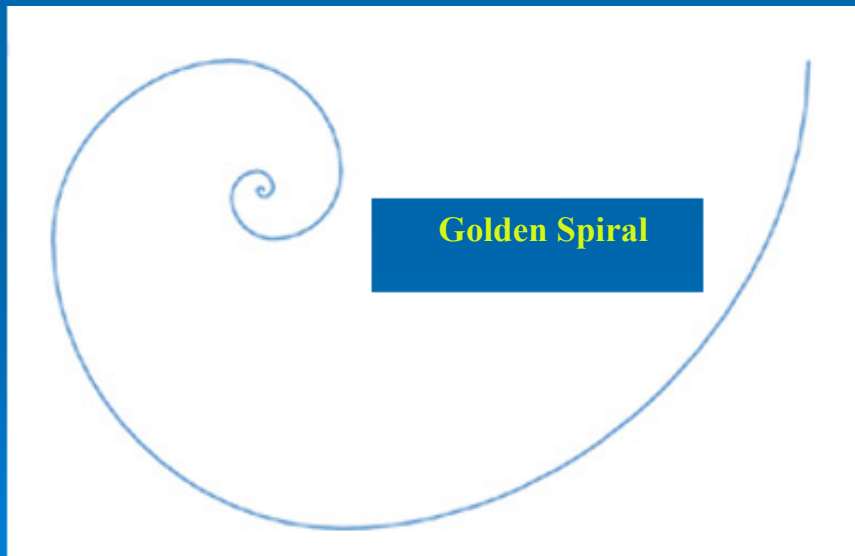
This chapter shows various constructions for the Golden Rectangle.



## SG105.1.1.1 The Golden Rectangle

The Golden Rectangle is a timeless Sacred Geometry shape framing and embodying the Golden Ratio PHI. It is to be found all over nature as a template of perfect proportion. In human cultures, the Golden Rectangle has been known since remote antiquity as having a pleasant shape, and is frequently found in art and architecture as a rectangular shape that seems 'right' to the eye. It was used by all sacred cultures and, in the history of the West, is to be found in Egypt, Classical Greece, Islamic Art & Architecture and the medieval "Age of the Cathedrals". The Golden Rectangle and Golden Ratio are mentioned in Euclid's *Elements* and were known to artists and philosophers such as Leonardo da Vinci and Albrecht Dürer.

Nowadays, the Golden Rectangle (and the associated Golden Spiral and Ellipse) are again of utmost interest to designers, artists, scientists and anyone interested in the the *Feng Shui of Harmony*.



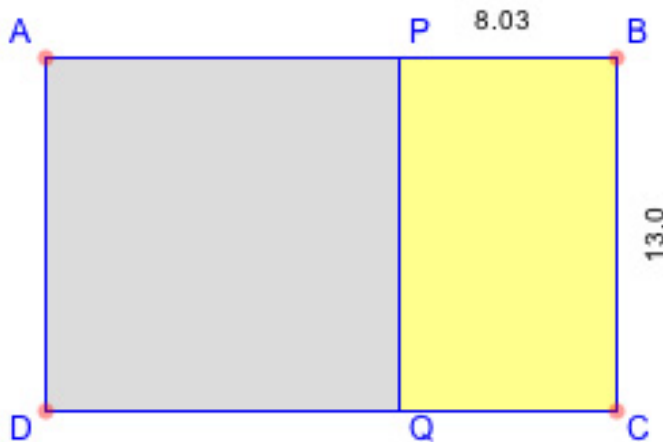
To whirl = to rotate or spin fast  
A whorl = anything that whirls

## SG105.1.1.2 The Golden Rectangle

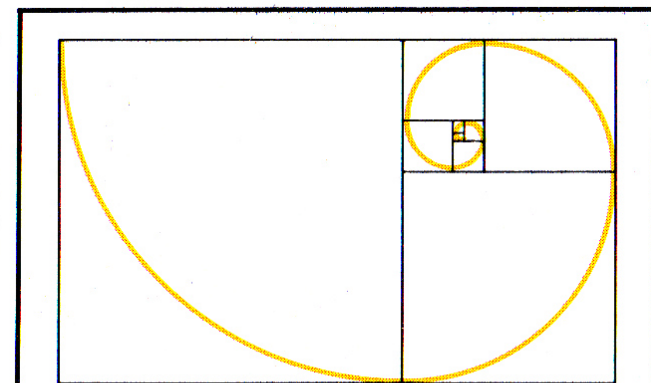
One of the most interesting properties of the Golden Rectangle is that if you cut off a square section whose side is equal to the shortest side, the piece that remains is also a Golden Rectangle with the same proportions as the first. In the figure below left, the yellow rectangle is in the same proportion as the original larger rectangle after the pink square is cut off.

In the smaller yellow rectangle  $\frac{PQ}{PB} = \frac{13.0}{8.03} = 1.618$

Both the rectangles ABCD and PBCQ are golden rectangles.

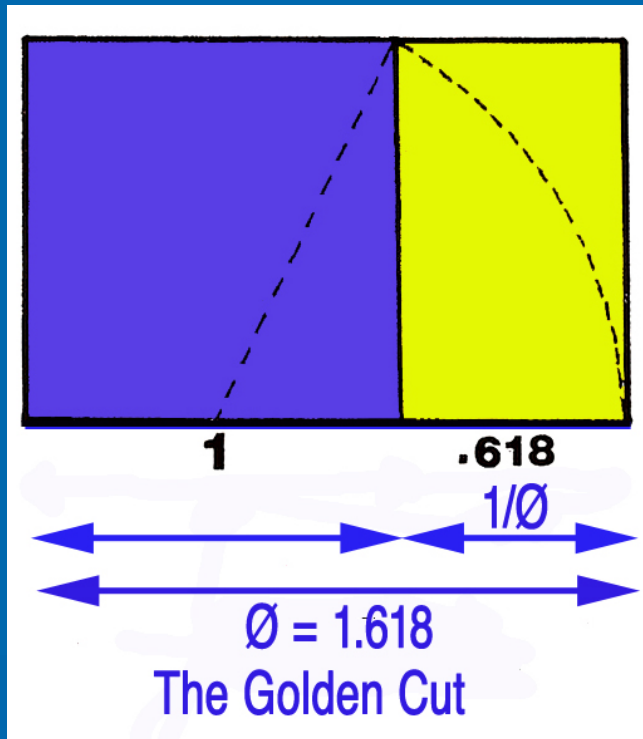


Demonstration of re-sizing the Golden Rectangle:  
[www.mathopenref.com/rectanglegolden.html](http://www.mathopenref.com/rectanglegolden.html)

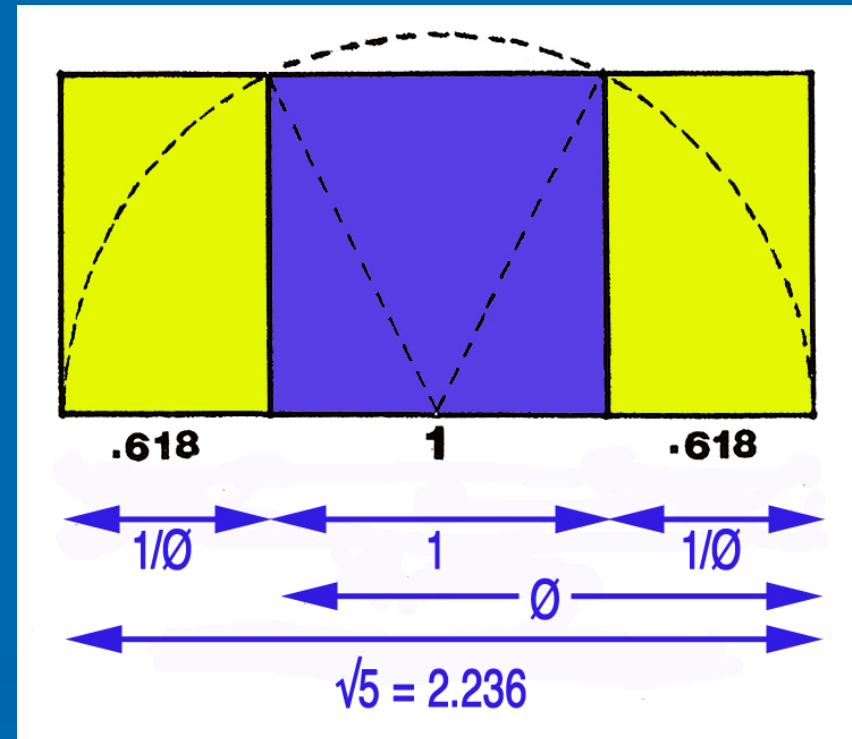


*The golden rectangle can be subdivided into smaller and smaller phi ratios, forever yielding perfect golden rectangles. The phi intersections connected by a logarithmic curve form the golden spiral, one of nature's fundamental patterns.*

## SG105.1.2.1 The Golden Rectangle - Square (1)



$\phi$   
=  
 $\Phi$



Here again is the classic and simplest way to construct the Golden Cut PHI & Rectangle on a given base line:

Step #1: Start with a square of sides 1 x 1 (in blue)

Step #2: From the mid-point on the bottom side of the square extend a diagonal to the top right corner of the square (dotted line at left) or to the two top corners (dotted lines at right).

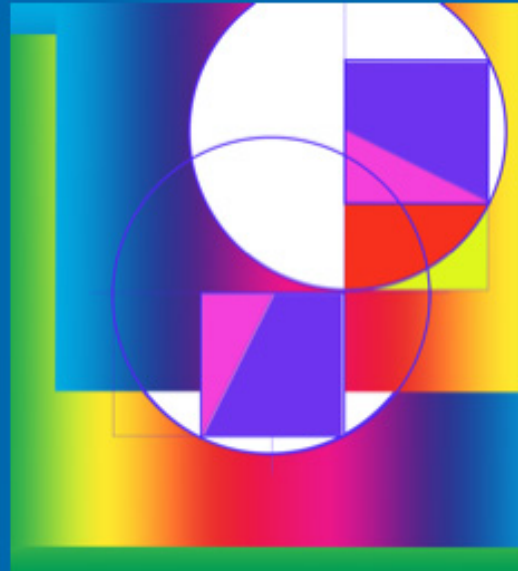
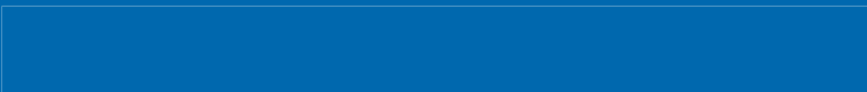
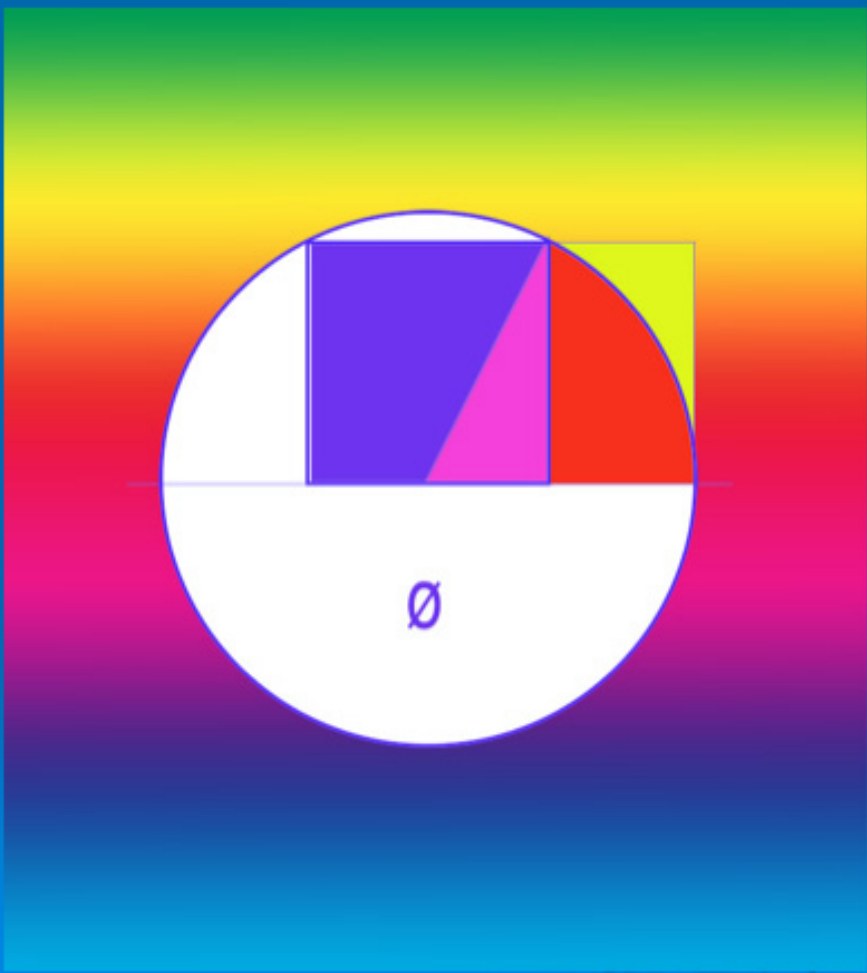
Step #3: With compass, draw an arc down to the base line. This is the Golden Cut. Yellow length =  $1/\phi = .618$

Step #4: Complete the yellow rectangle(s)

Blue square + (one) yellow rectangle = Golden Rectangle (base =  $\phi = 1.618$ )

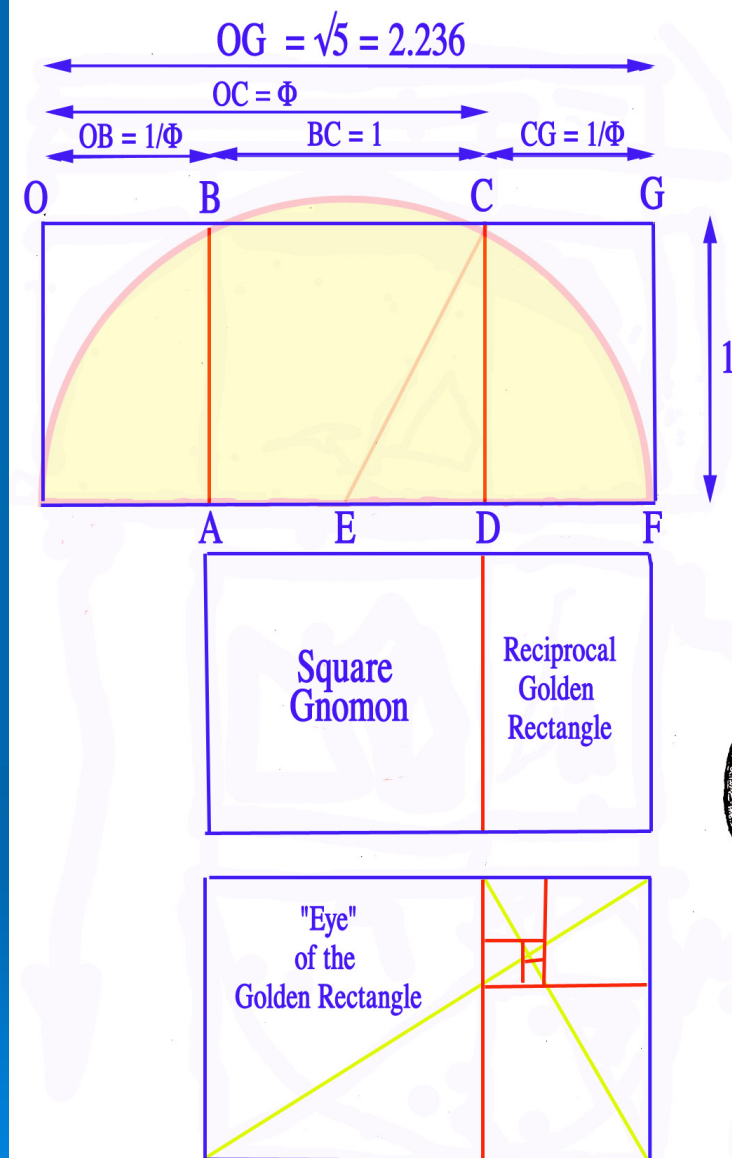


# SG105.1.2.2 The Golden Rectangle - Square (2)



PhiArt

## SG105.1.2.3 The Golden Rectangle - Square (3)

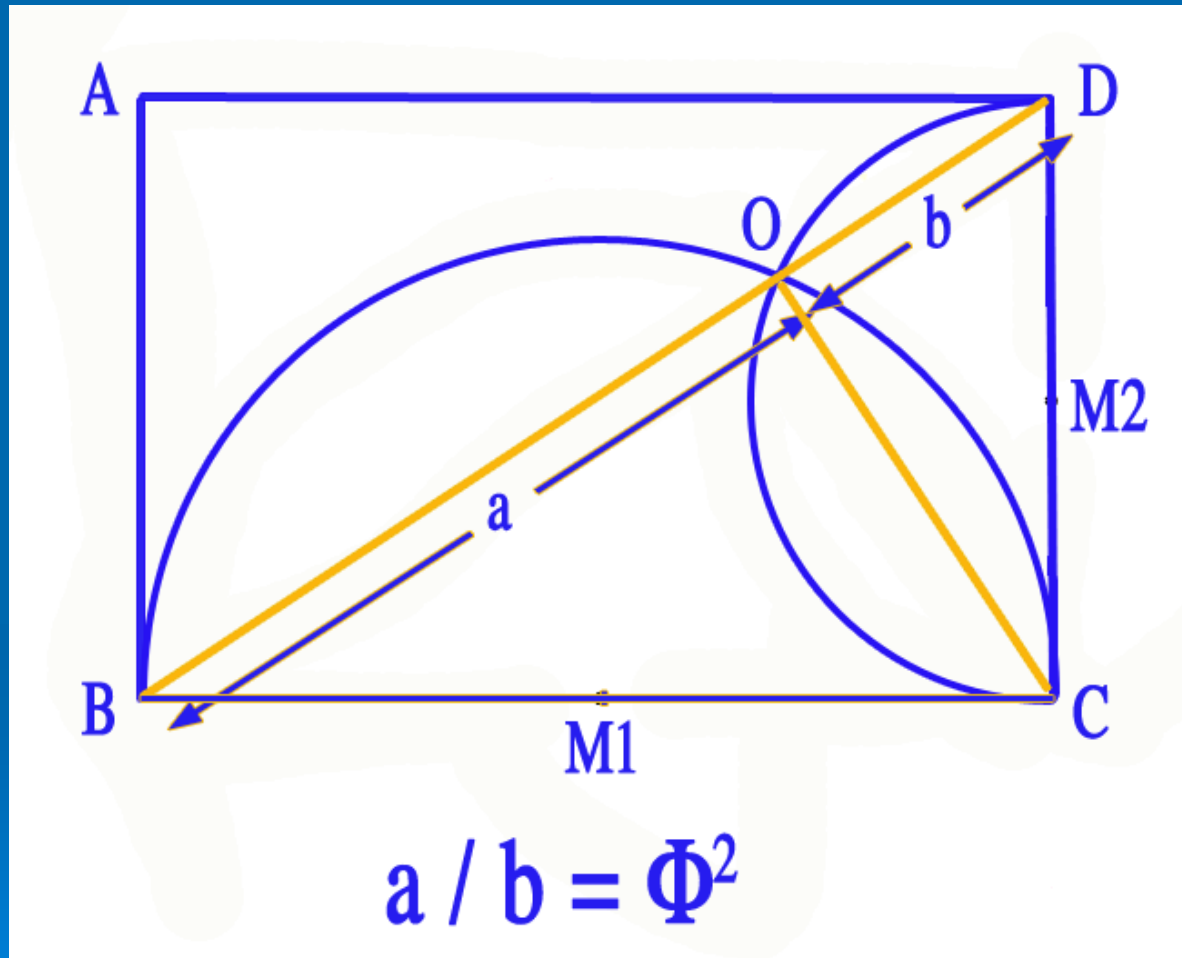


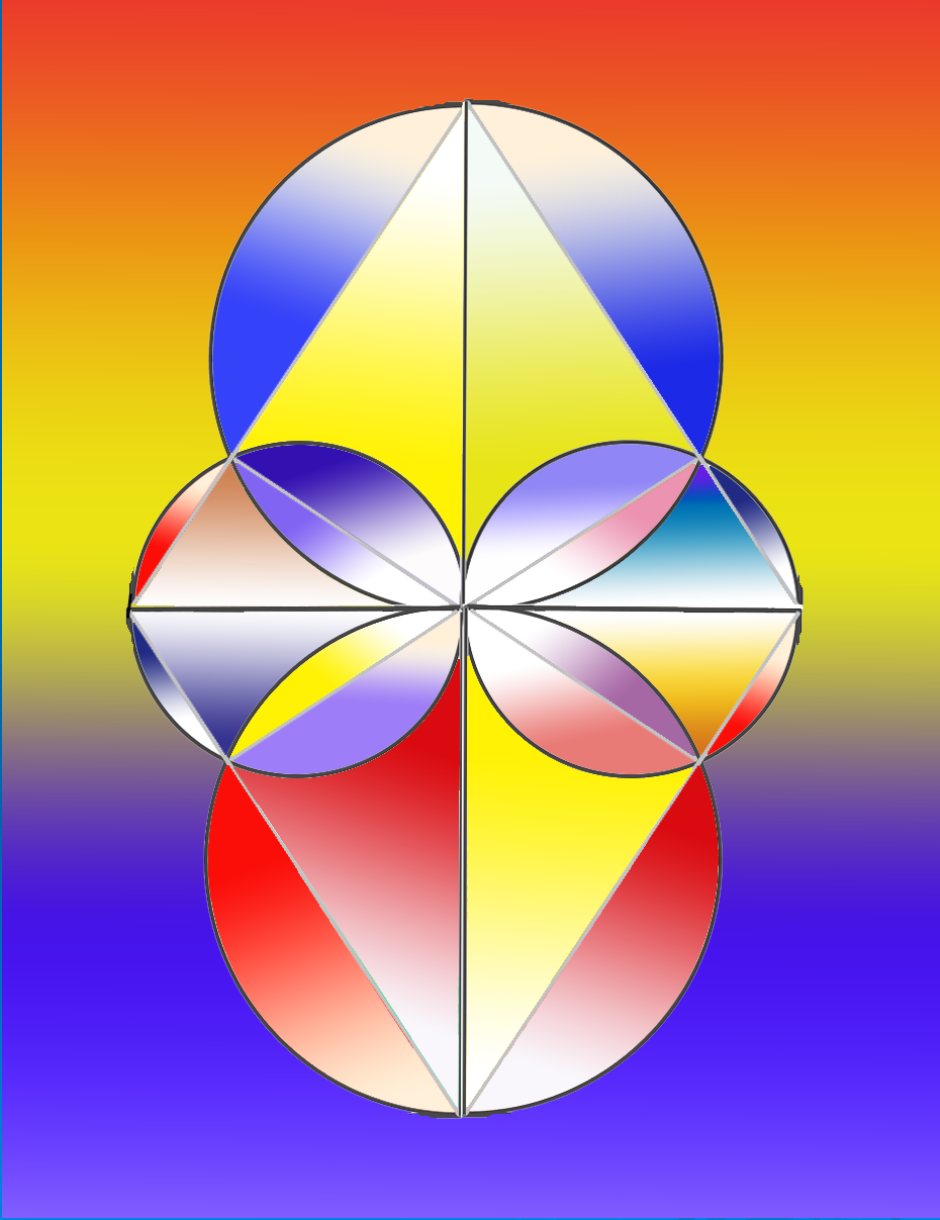
The rectangles  $1 \times \Phi (= 1.618)$   
 And  $1 \times 1/\Phi (= .618)$   
 are  
**RECIPROCAL GOLDEN  
 RECTANGLES**

The PHI Ratio generates  
 these Golden Rectangles *ad infinitum*,  
 both into the smaller & larger scales.

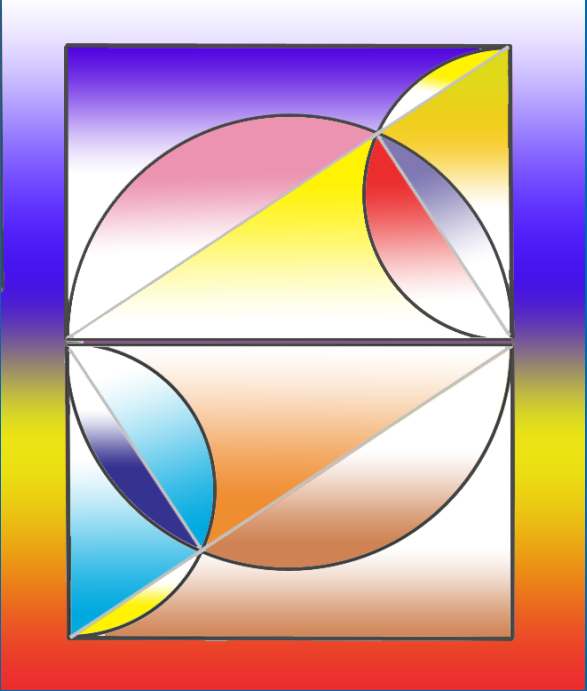
← The diagonals of the proportional  
 Golden Rectangles meet at the "Eye" of  
 the cascade of rectangles - which is also  
 the "Eye" of the Golden Spiral formed  
 from the "Whirling Squares".

### SG105.1.3.1 The Golden Rectangle Construction - Diagonals



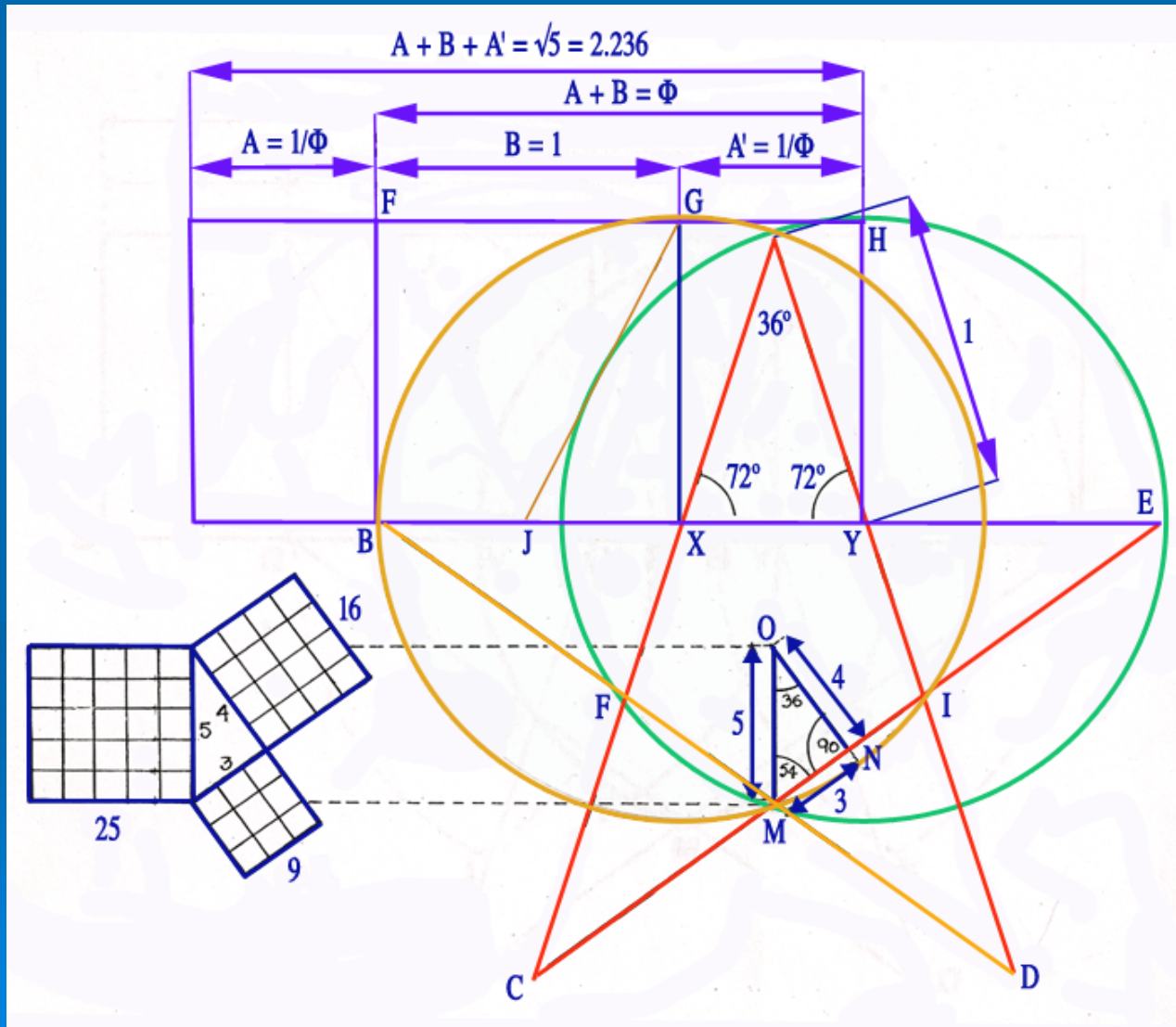


PhiArt A18



PhiArt A17

## SG105.1.4 The Golden Rectangle - Pentagram

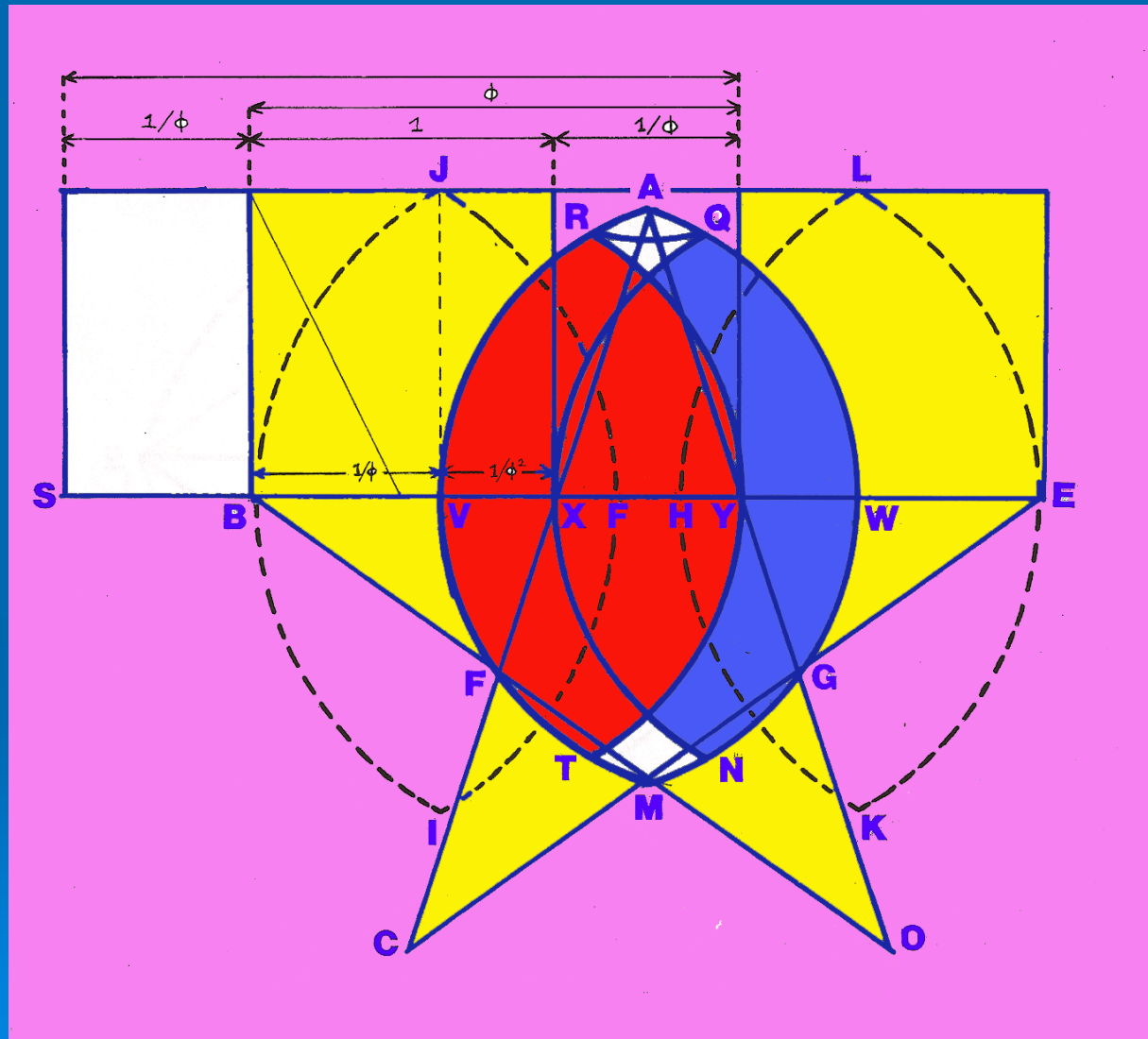


← This diagram shows the connection between the Golden Rectangle and the Pentagram.

(See [SG106.3.6](#) for description & construction.)



## SG105.1.5 The Golden Rectangle - Vesica

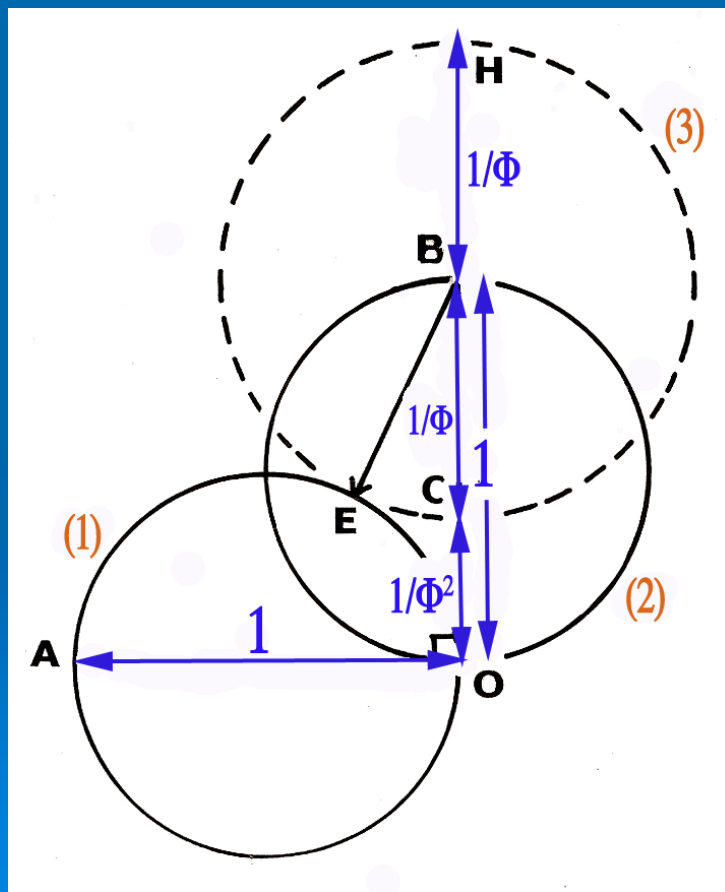


← This diagram shows the connection between the Golden Rectangle and the Vesica, both the Classic Vesica and the Golden Vesica.

(See [SG106.3.7](#) for description & construction.)

## SG105.1.6.1 Golden Rectangle - Circle (1)

R. A Schwaller de Lubicz (1887–1961) is the father of the “symbolist” school of Egyptology. He resided 15 years in Thebes to study in situ the many facets of the Temple of Luxor. In his monumental account “*Le Temple de l’Homme*” (Paris, 1957), de Lubicz describes Egyptian wisdom as rooted in numerology and sacred geometry. He speaks about the mystical function of PHI and gives a simple construction method based on the circle (below). He adds: “*Resulting from the cycle, this function gives countless forms*”.



### Construction

Step #1: Trace circle (1) with diameter  $AO = \text{unit } 1$ .

Step #2: Trace the tangent in point O, with right angle  $AOB = 90^\circ$  to obtain a vertical axis.

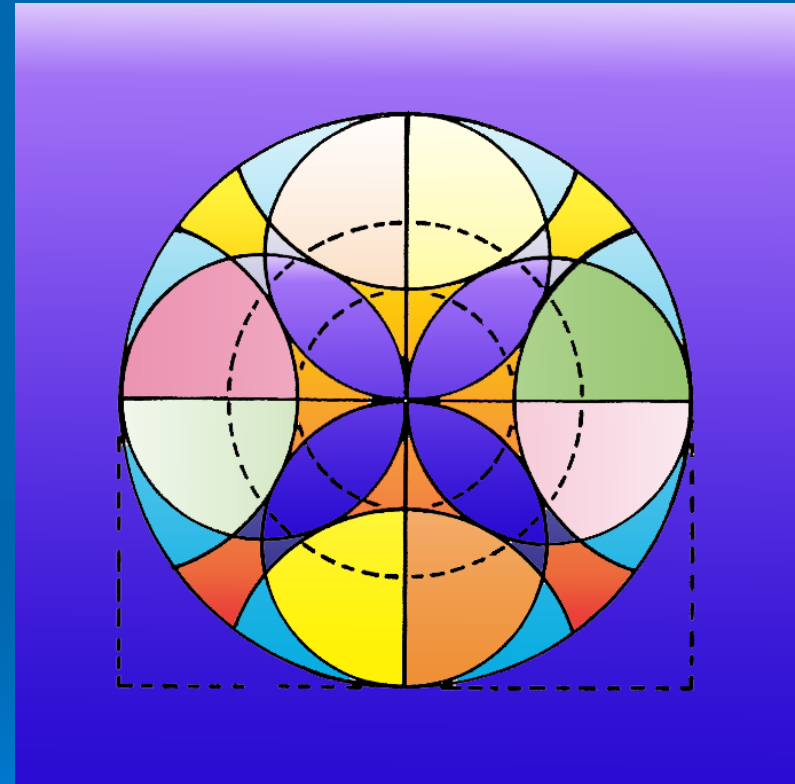
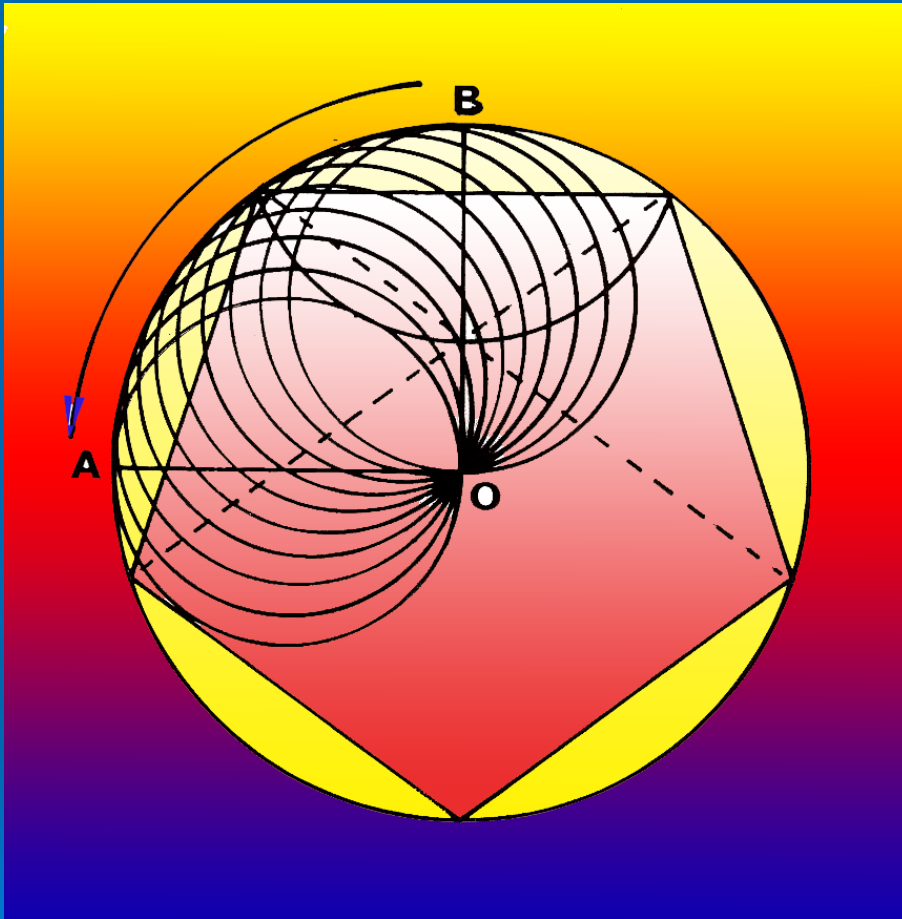
Step #3: Trace a second circle (2) with diameter  $OB = \text{unit } 1$ .

Step #4: From B, trace a larger circle (3) tangent to circle (1) in E.

C and all points on the circumference of circle (3) have a  $1/\Phi = .618$  relationship to B.

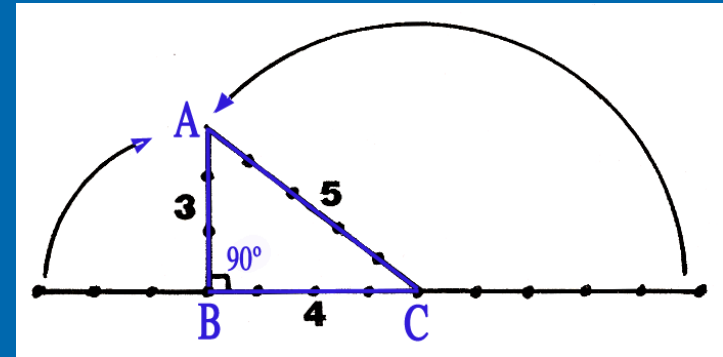
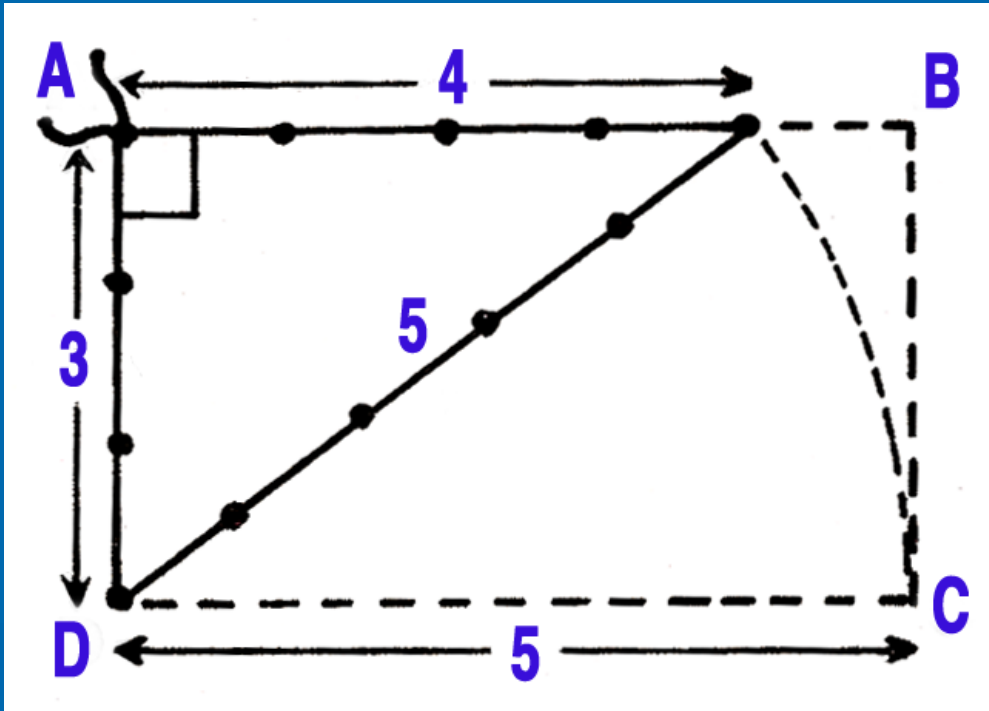
$$\begin{aligned} AO &= OB = 1 \\ BC &= BH = BE = 1/\Phi = .618 \\ CO &= 1/\Phi^2 = .382 \end{aligned}$$

## SG105.1.6.2 Golden Rectangle - Circle (2)



Two of the geometries resulting from the circle-construction of PHI.

## SG105.1.7 The Golden Rectangle - Rope Construction



↑ Constructing a 3-4-5 Pythagorean Triangle with a Builder's Rope (12 intervals / 13 knots)

↑ From the 3-4-5 Pythagorean Triangle constructed with the Builder's Rope, one can easily trace a Golden Rectangle with small side = 3 and large side = 5.

( $5/3$  is a simple approximation of PHI).

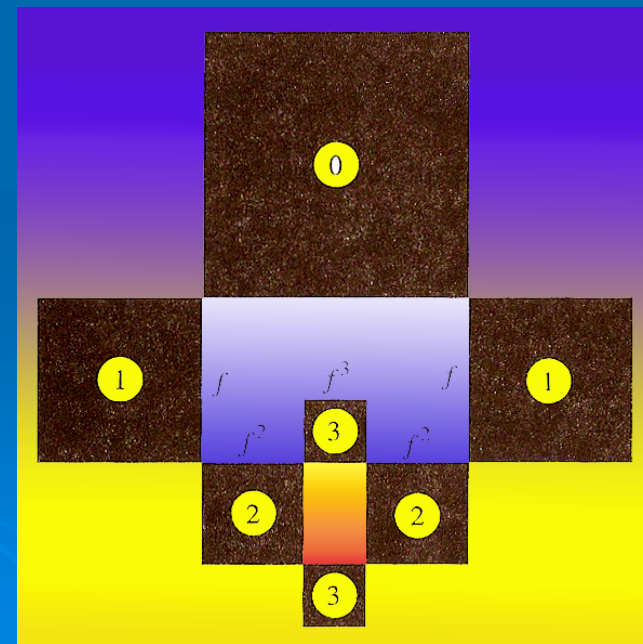
## SG105.1.8.1 The Golden Rectangle Fractal (1)

A typical property of fractals and fractal geometry is *self-similarity*. A self-similar object is exactly or approximately similar to a part of itself (i.e. the whole has the same shape as one or more of the parts). Many objects in the real world, such as coastlines, are statistically self-similar: parts of them show the same statistical properties at many scales.

*Scale invariance* is an exact form of self-similarity where at any magnification there is a smaller piece of the object that is similar to the whole. For instance, the Mandelbrot set or the Koch snowflake are both scale-invariant: they can be continually magnified without changing shape. Does that remind you of the properties of the Golden Ratio and the ‘nesting’ of Pentagons & Pentagrams? The direct connection is that fractals allowing “touching without overlapping” use a *reduction factor*  $f = \text{Mini PHI} = 1/\Phi = \phi = \frac{1}{\Phi} = 0.618$ . We will extensively study the fascinating world of fractal “sacred” geometry in [SG203.1](#).

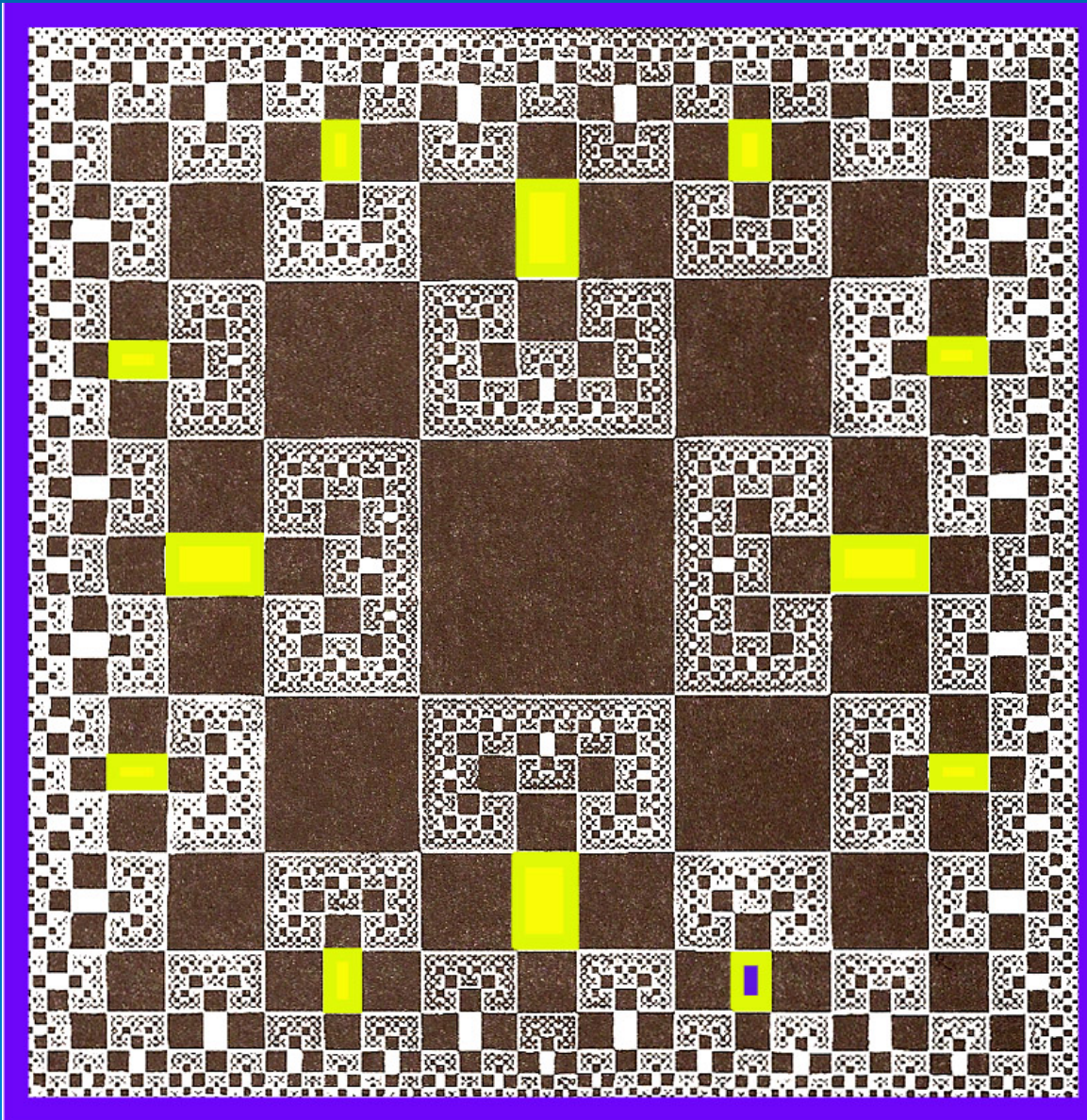
Fractals can not only be constructed from lines but also from geometric figures like triangles and squares. A square fractal using the reduction factor  $f = 0.618$  will be a Golden Square fractal: all the by-passed rectangles are Golden Rectangles with their sides in the Golden Ratio.

→ “Touching” in the third generation of building the Golden Square fractal.





## SG105.1.8.2 The Golden Rectangle Fractal (2)



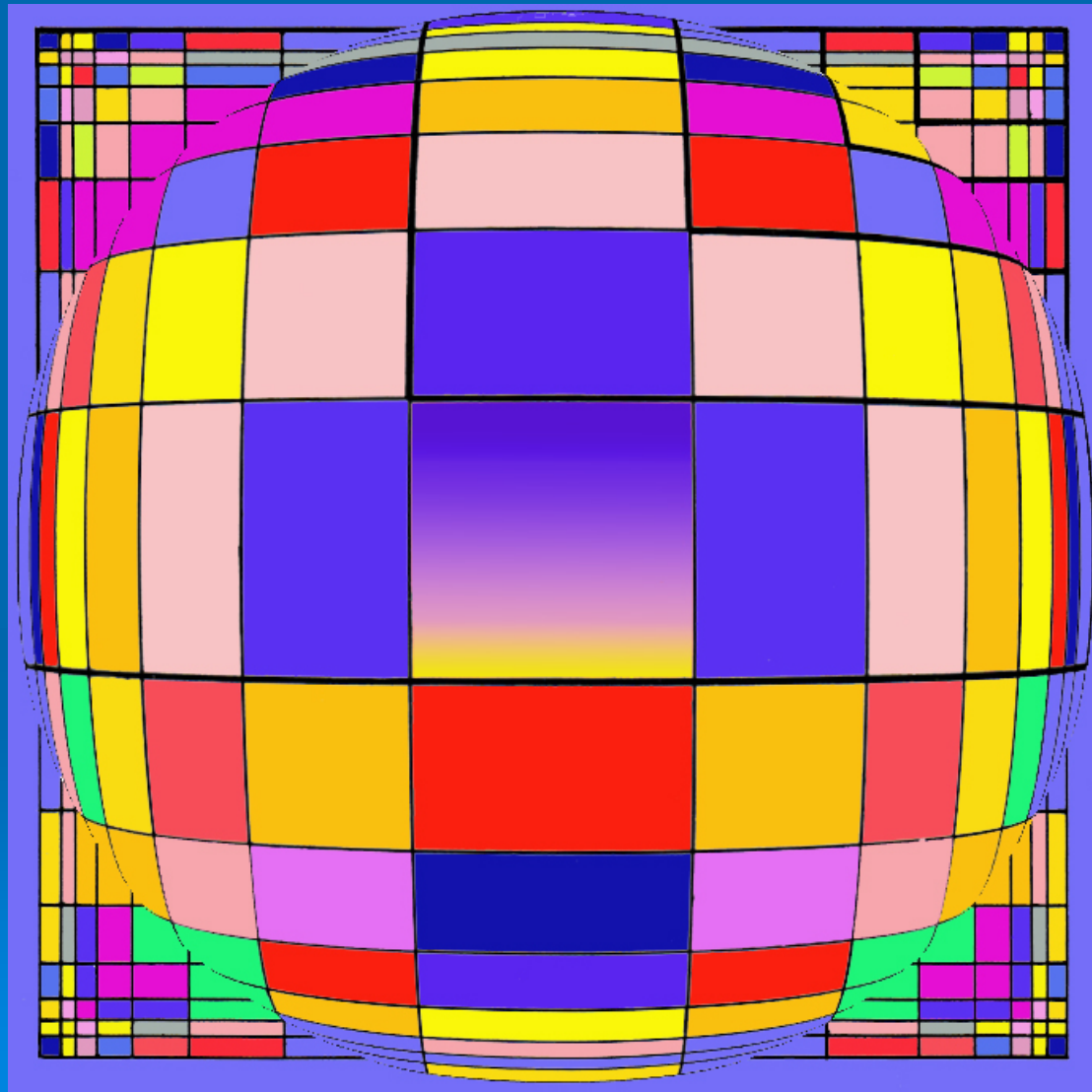
← In the Golden Square Fractal, all the by-passed rectangles are Golden Rectangles (in yellow).

As Mario Livio notes:

*“While, in Euclidian geometry, the Golden Ratio originated from the pentagon, in fractal geometry, it is associated even with simpler figures like squares and equilateral triangles”.*

# SG105.2 Chapter 2. Golden Grids

Tools for artists, architects and designers...





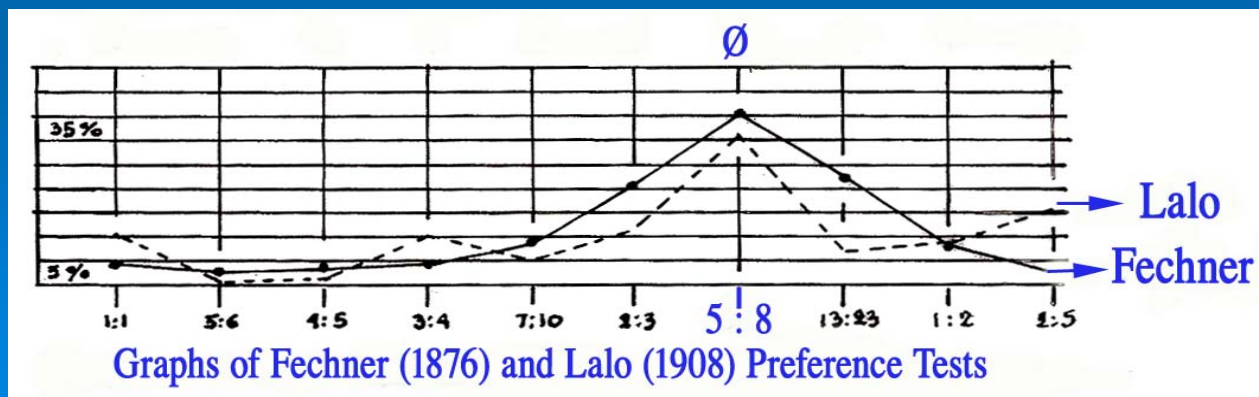
## SG105.2.1.1 Golden Rectangle Preferences (1)

Is there a human aesthetic / perceptive preference for the proportions of the Golden Ratio? This question has been positively answered, in the western tradition, by Plato and a host of other luminaries through the ages. As St. Thomas Aquinas, a 13th century theologian and founder of Thomist scholasticism, put it:

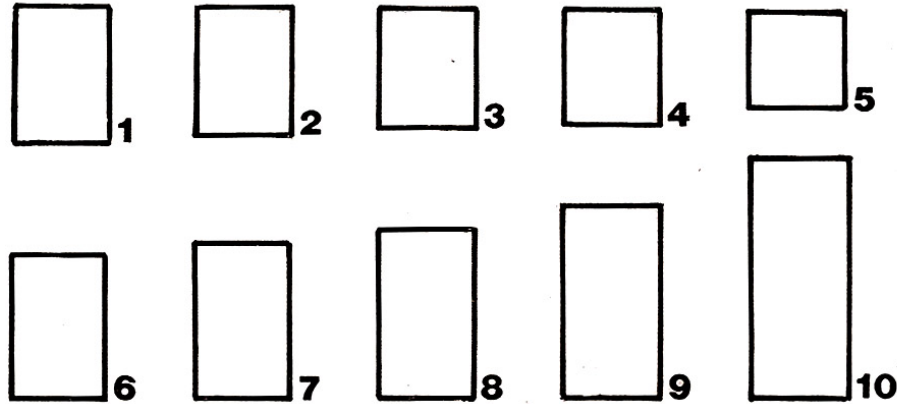
*“The senses delight in things duly proportioned”*

Closer to us, the German natural philosopher Adolf Zeising studied the proportions of the human body and published in 1884 *Der Goldene Schnitt* (The Golden Section) where he extols the virtues of PHI as a universal law. His compatriot psychologist Gustav Theodor Fechner (1801-1887) is considered to be the pioneer of experimental aesthetics.

Fechner investigated the hypothesis of a cross-cultural archetypal preference for Golden Section proportions. He found, by taking thousands of measurements of rectangular objects (such as books, boxes and buildings), that the average rectangle ratio was close to the Golden Section. Moving on to test human aesthetic preferences, he found that most people would choose the Golden Rectangle when asked to pick their preferred rectangle in a series of rectangular shapes. These experiments were later repeated by Lalo and others with similar results.

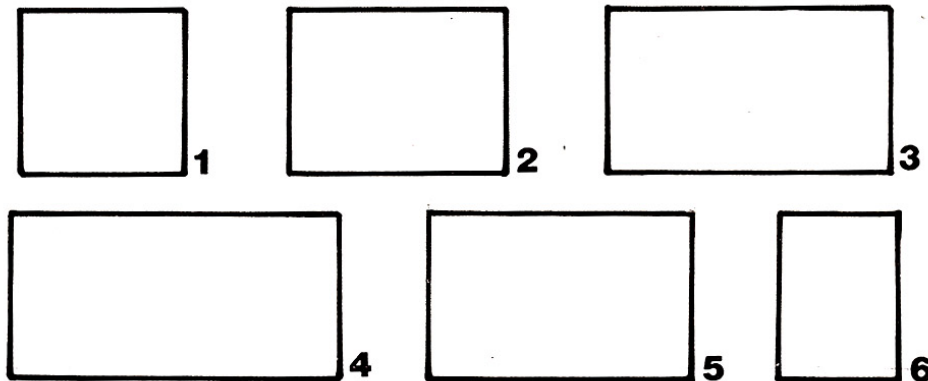


## SG105.2.1.2 Golden Rectangle Preferences (2)



(Above) Set of Rectangles in the Fechner / Lalo tests.

What is your pick?



Another set of rectangles. What is your pick?

Set #1:  $1 = 7:10 = .7$ ,  
 $2 = 3:4 = .75$ ,  
 $3 = 4:5 = .8$ ,  
 $4 = 5:6 = .833$ ,  
 $5 = 1:1 = 1$ ,  
 $6 = 2:3 = .666$ ,  
 $7 = 5:8 = .625$ ,  
 $8 = 13:23 = .565$ ,  
 $9 = 1:2 = .5$ ,  
 $10 = 2:5 = .4$

Set #2:  $1 = 1:1 = 1$ ,  
 $2 = 3:4 = .75$ ,  
 $3 = \sqrt{3}:1 = 1.732$ ,  
 $4 = 2:1 = 2$ ,  
 $5 = \Phi:1 = 1.618$ ,  
 $6 = 1:.726 = 1.376$

## SG105.2.2.1 The Modulor Scale of Le Corbusier (1)

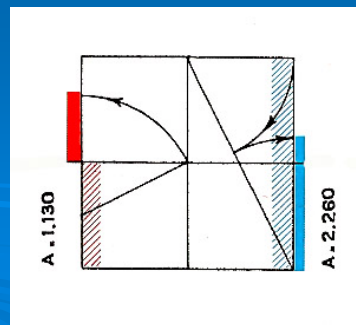
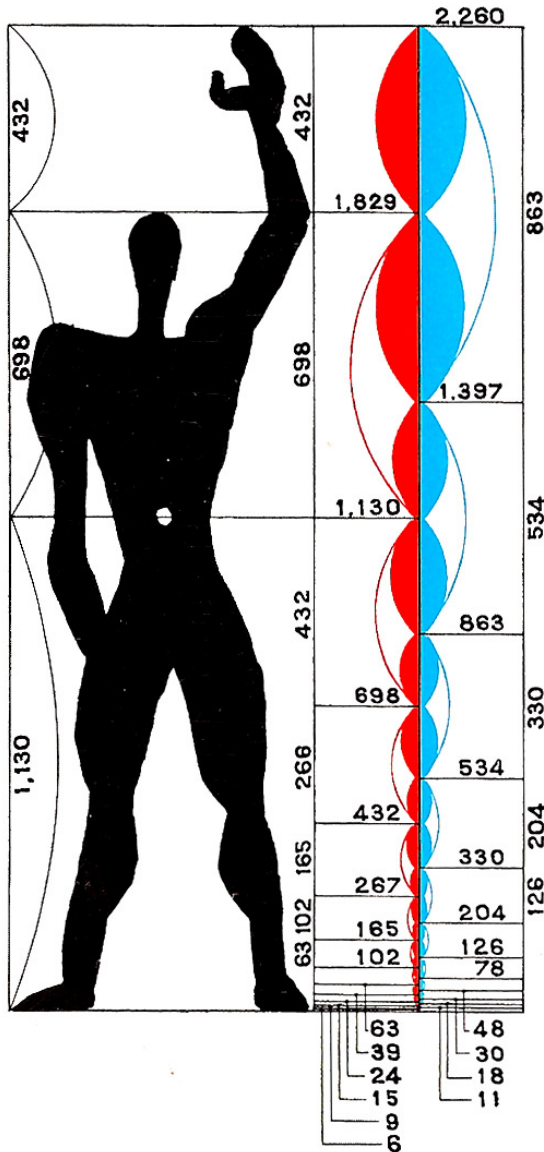
Architect Le Corbusier (1887-1965) created the first modern system of proportions based on the PHI Ratio and the human body. [◆SG207]

As part of this proportioning system, called the “Modulor”, 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:  $a/\Phi^2$ ,  $a/\Phi$ ,  $a$ ,  $a\Phi$ ,  $a\Phi^2$ ,  $a\Phi^3$ ... 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:

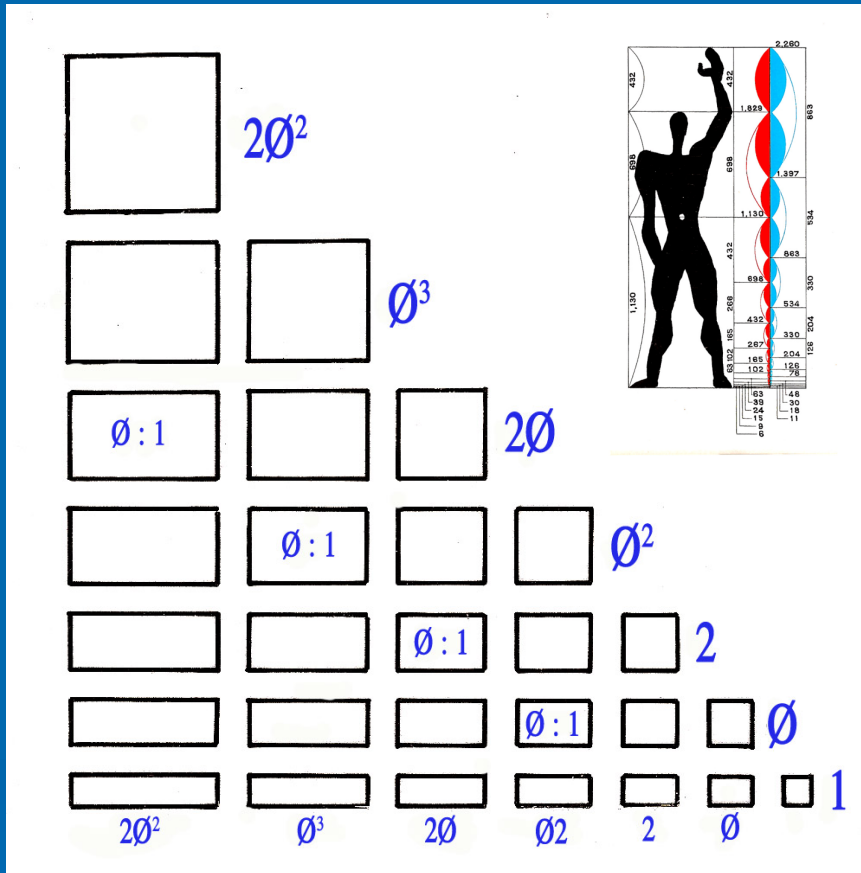
$$2/\Phi^2 - 1 - 2/\Phi - \Phi - 2 - \Phi^2 - 2\Phi - \Phi^3 - 2\Phi^2 - \Phi^4 - 2\Phi^3$$



← The two constructions of PHI used by Le Corbusier: based on the square and based on the triangle.

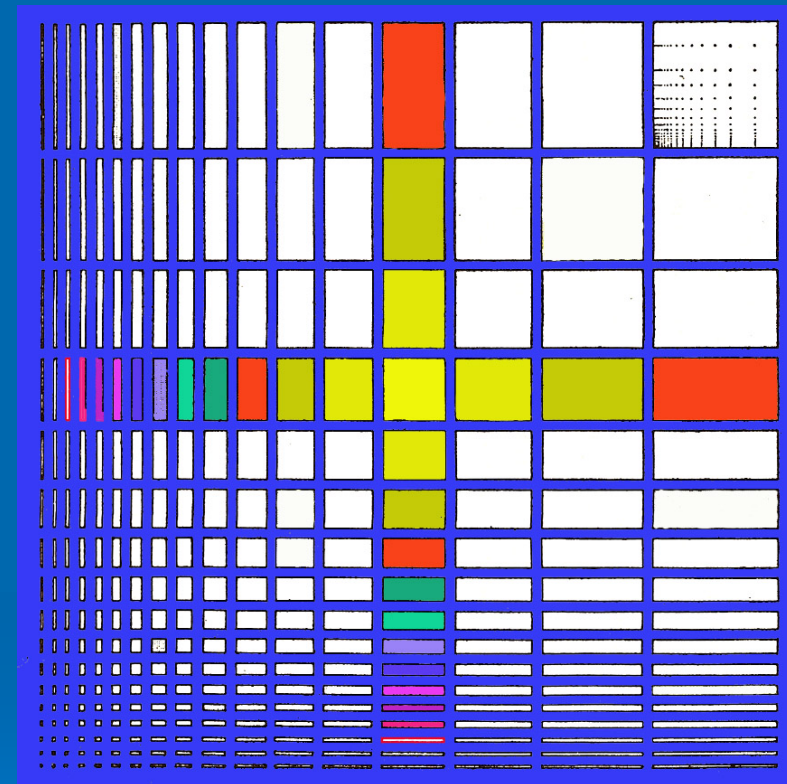


## SG105.2.2.2 The Modulor Scale of Le Corbusier (2)



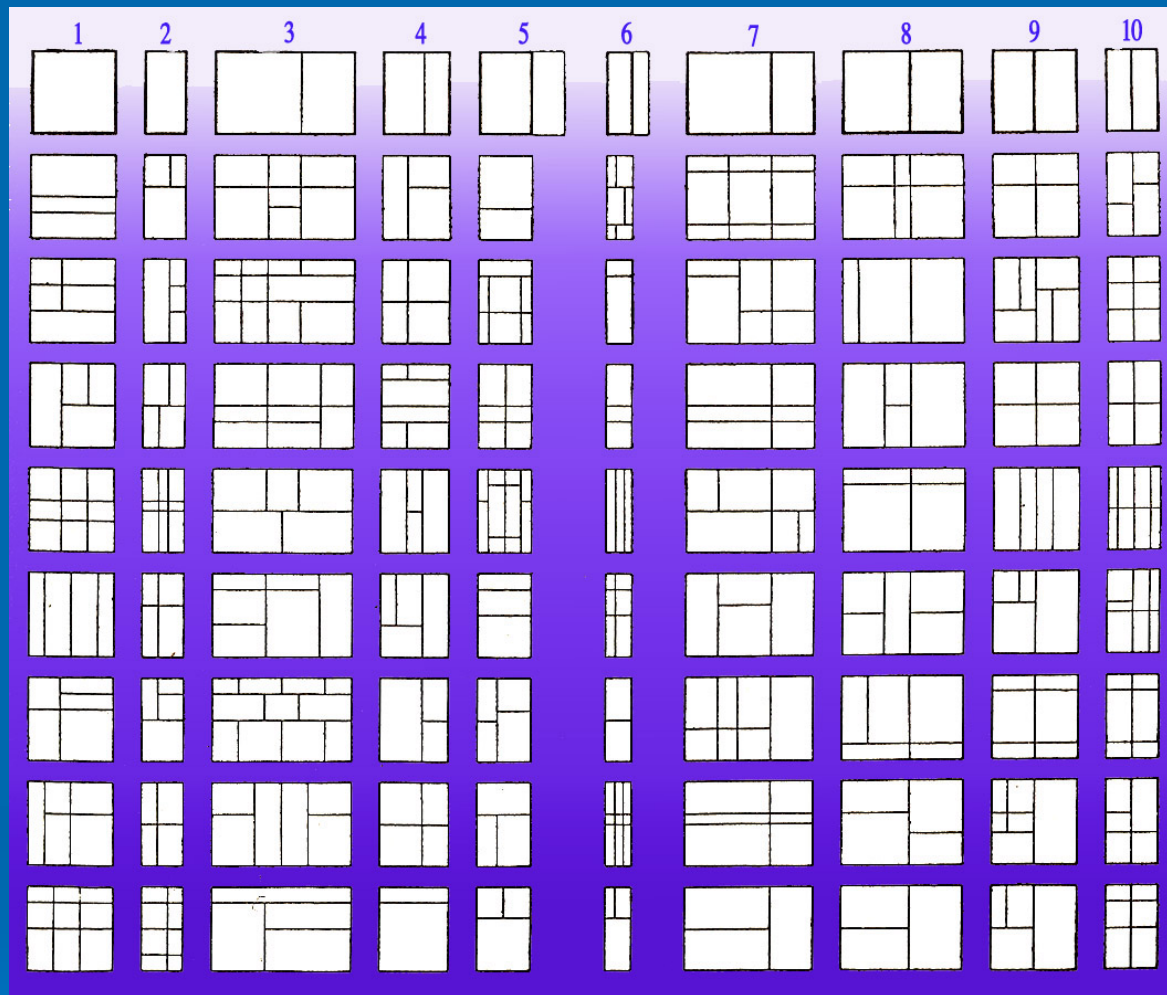
### ↑ The Red + Blue Modulor Series showing the Golden Rectangle

This Table of the Red and Blue Series generates extremely 'modulable' tiles and offers a Golden Ratio system of proportion which, like fractals and growth patterns in nature, is self-similar at every scale.



### ↑ A Modulor Grid

These PHI-harmonized modules can be applied to lengths, surfaces or volumes (in art, architecture etc...) which are engendered by values emanating directly from the human stature.



↑ One of the many “panels” of the Modulor Game.

This panel is based on the primary square of 2.26 m (89 inches) (1), its half 1,13 m (44.5 inches) (2) and its Golden Section 1,397 m (55 inches) (3).

(4) is the basic value of 1,828 m (72 inches). (5) is the Golden Section of (1).

(6) is the Golden Section of (2). (7) is (1) + (2). (8) is (4) + (5). (9) is (2) doubled. (10) is (6) doubled.

## SG105.2.2.3 The Modulor Scale of Le Corbusier (3)



## SG105.2.2.4 A Modulor Practice

← Here is a *Modulor Practice* offered by Le Corbusier.

Take a rectangle or square from the Table on the left and fill it in with submodules.

Two examples are given: #1 and #2.

$2\phi^2$		$\phi^3$	$2\phi$	$\phi^2$	2	$\phi$	$\frac{2}{\phi}$	1	
1	2	3	4	5	6	7	8	$2\phi^2$	
	9	10	11	12	13	14	15	$\phi^3$	
		16	17	18	19	20	21	$2\phi$	
			22	23	24	25	26	$\phi^2$	
				27	28	29	30	2	
					31	32	33	$\phi$	
						34	35	$\frac{2}{\phi}$	
							36	1	

Example 1

5	12	
	19	23
	25	

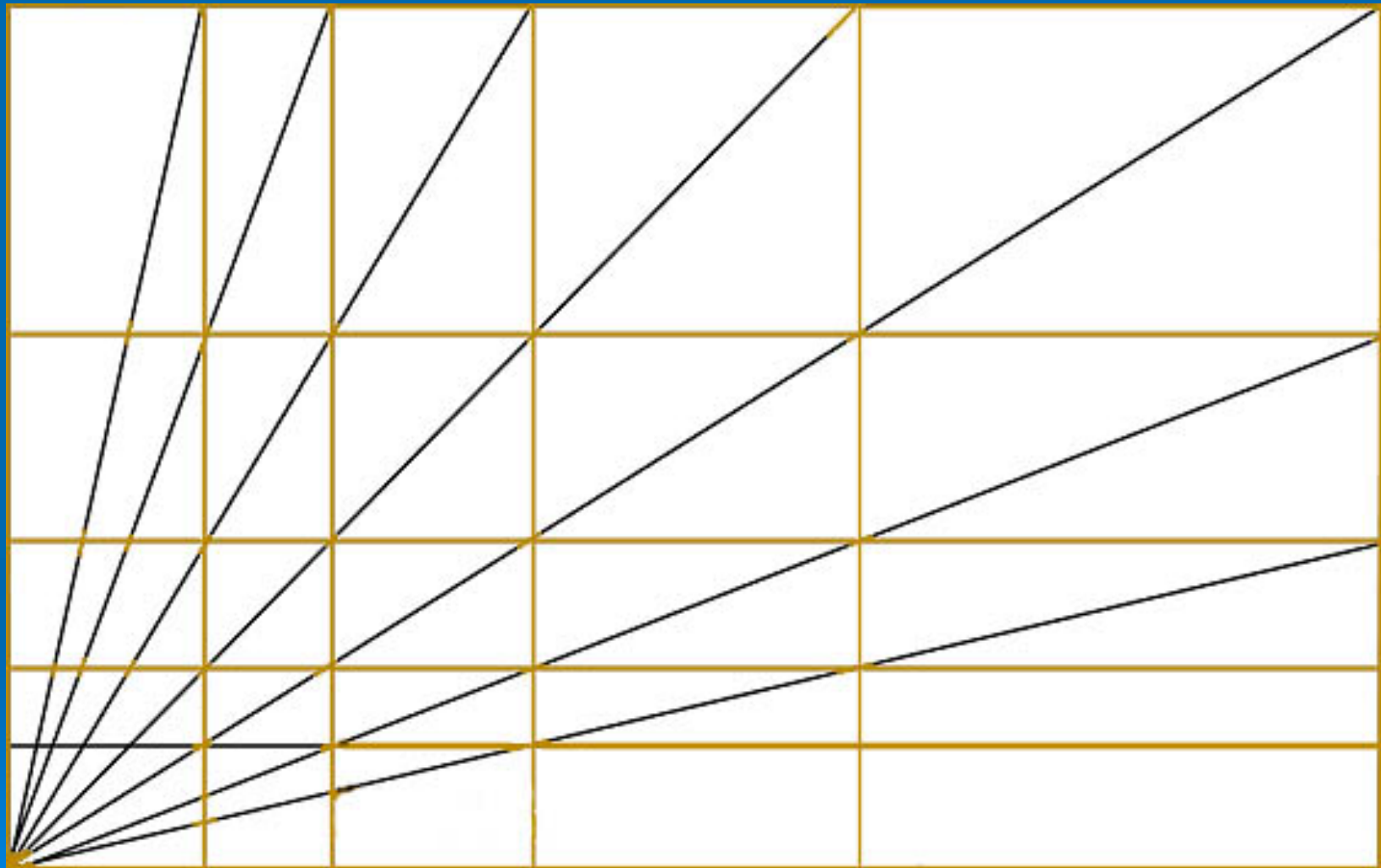
Example 2

8	1		3
	4		11

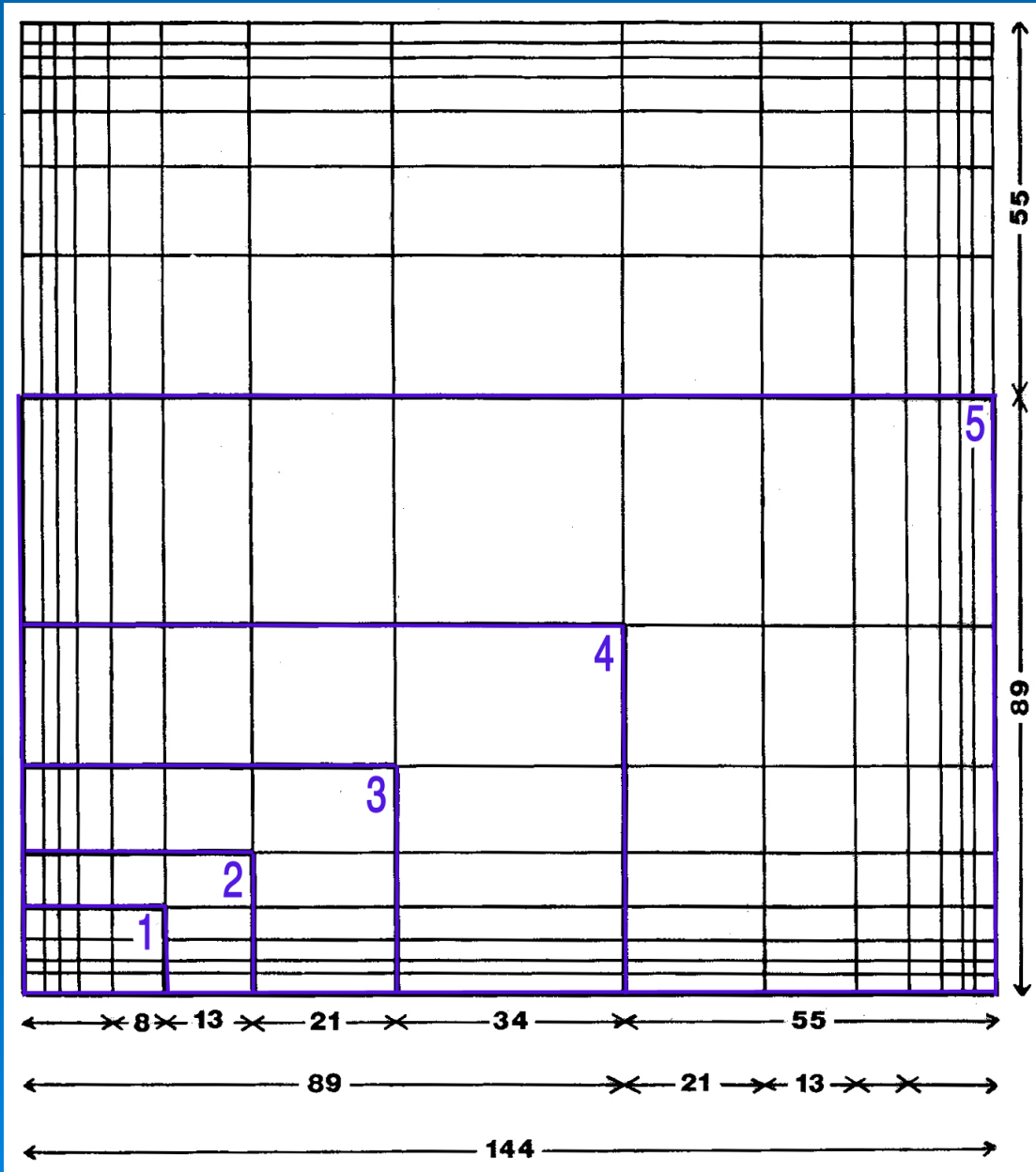


↑ The "Chapelle de Ronchamp" by Le Corbusier. Based on the Modulor.

## SG105.2.3 PHI Golden Ruler

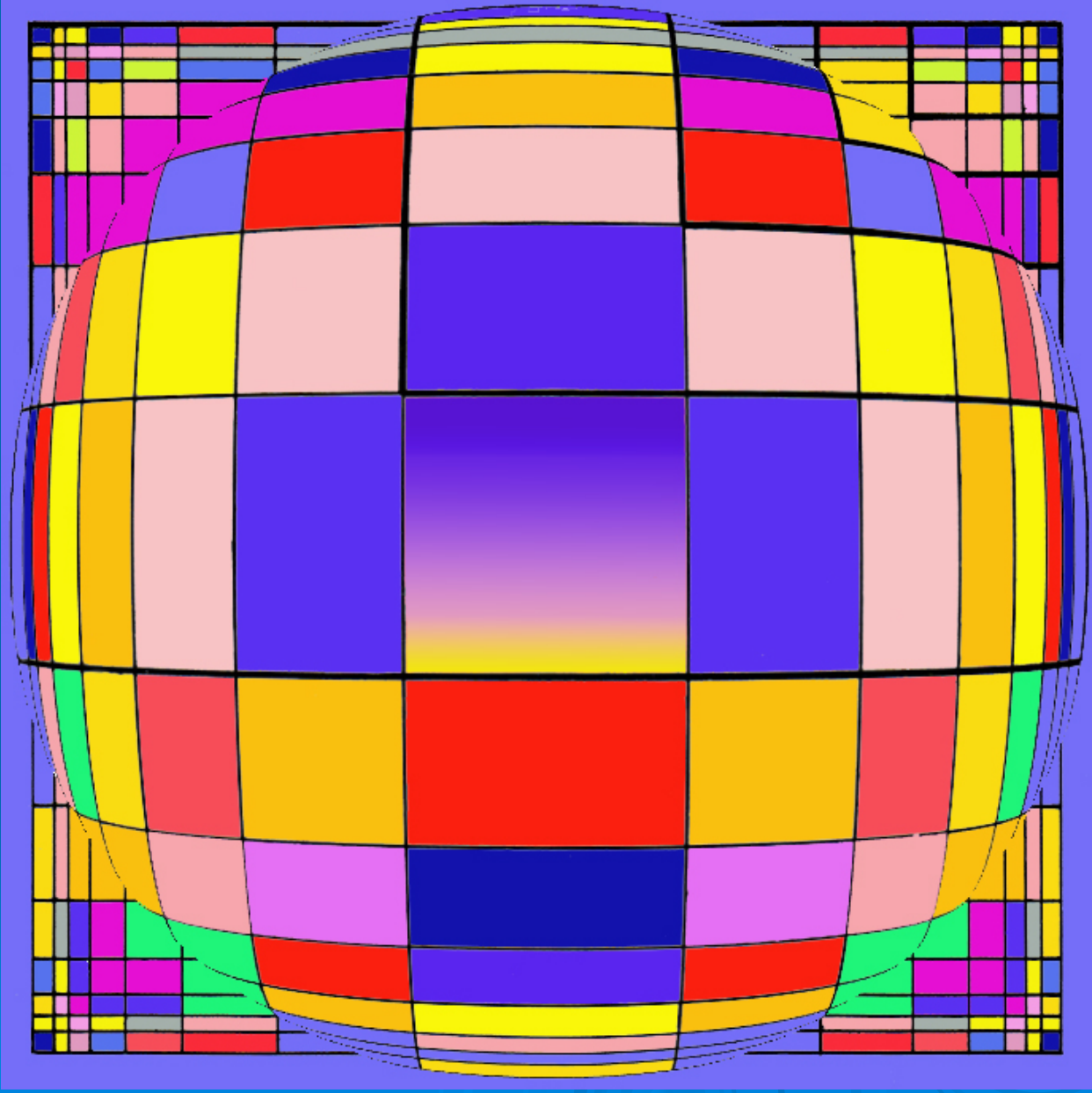


## SG105.2.4.1 Phi Grid



These Phi Rulers & Grids can be copied on acrylic transparencies and then used to assess the Phi proportions of pictures, artwork, architecture, flowers etc...





## SG105.2.4.2 Phi Grid - Spherical



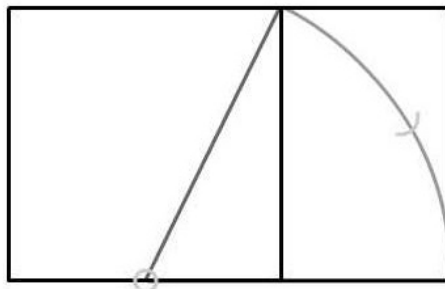
## SG105.2.5 Orthogons

The term “orthogons” was first used by Wolfgang von Wersin in his *Die Orthogon-Scheibe* (1956) and has been popularized by the website: [www.timelessbydesign.org](http://www.timelessbydesign.org) as designating the traditional & simple line templates that can be applied to art or design. It is actually just another name for Sacred Geometry.

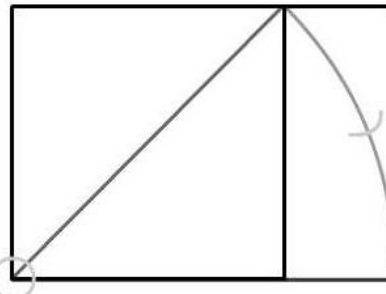
*“Orthogons are a subconscious language in line, dimension and space”,* explains the website. Orthogons resolve design issues by providing: ideas for where to begin, an organizational format that relates specific elements to each other and to the work as a whole, potential layers of meaning - effectively connecting the work philosophically and physically to the world.

### Orthogon Instructions

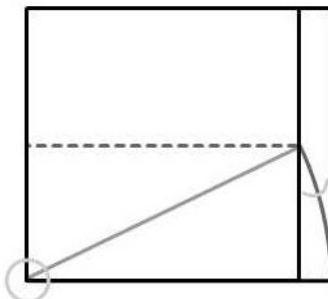
Select an image below for specific instructions



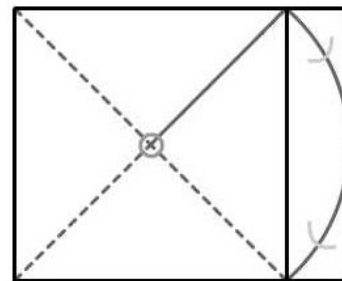
AURON



DIAGON

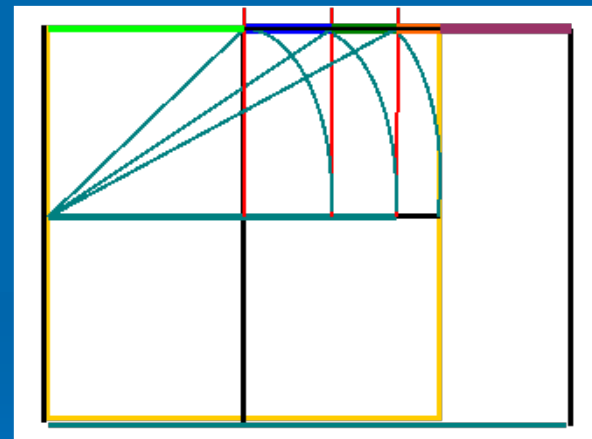


HEMIDIAGON



QUADRIAGON

*“The Orthogons provide order and the artist provide variety”*



↑ Modulations on the Diagon, using compass and ruler.

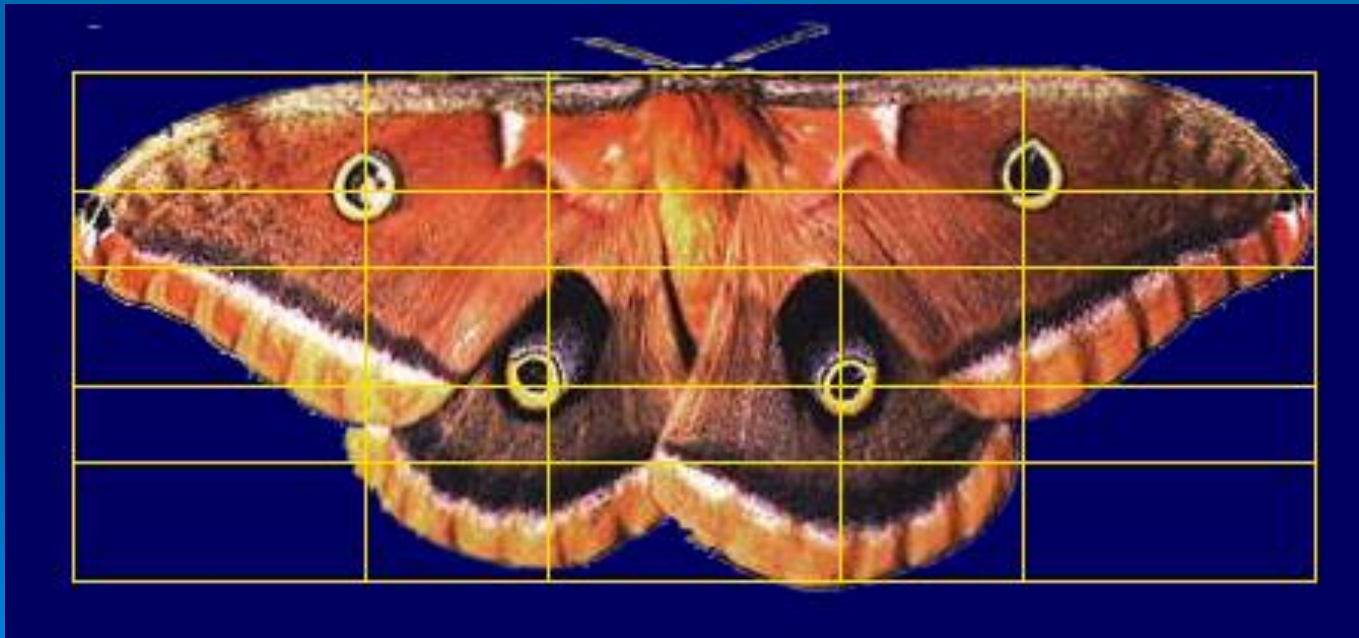
← The “Auron” is the Golden Rectangle constructed on the Golden Section.

## SG105.2.6 The PHI Matrix Software

PhiMatrix is a great software that lays PHI grids (based on the Golden Rectangle) on any image in order to analyse the PHI proportions. Used with a design project, it can suggest and supplement harmonic lines and focal points and new perspectives. Click on the link below to find out the Golden Rectangle grid layout of a variety of images.



<http://www.phimatrix.com/examples.htm>



## SG105.3 Chapter 3. A Golden Rectangle Gallery

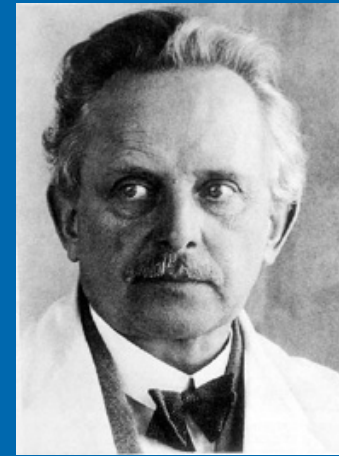


↑ Stamp from Switzerland.

## SG105.3.1.1 Phi Formats (1) 35 mm Film

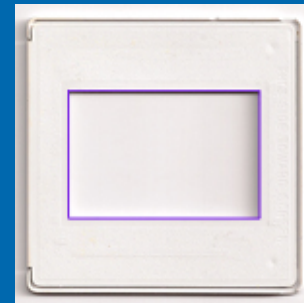
### Oskar Barnack and the 3:2 Aspect Ratio

The origins of the aspect ratio of 35mm film can be traced to Oskar Barnack, an employee of Leitz Camera in Germany. Barnack believed the 3:2 aspect ratio to be the ideal choice for his invention, the first 35mm camera ever, dubbed the "Ur-Leica". After WWI, Barnack convinced his boss, Ernest Leitz II, to begin production of similar cameras. In 1925, Leitz Camera released the first Leica and the rest is history. Why was Oskar Barnack so adamant about the seemingly arbitrary aspect ratio of 3:2? There are many other film formats with different aspect ratios to choose from, but the 3:2 aspect ratio happens to have the closest proportions to the Golden Rectangle of any other major film format out there.



Oskar Barnack  
(1879-1936)

The "slide holder" for 35 mm transparencies →  
measures 35 x 24 mm.  
 $35/24 = 1.52$ , a rough approximation to PHI.



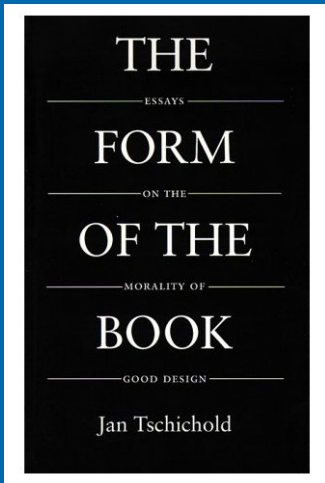
In the first years of the art, photographers were mainly concerned with hauling their heavy plate cameras from one location to the next. Their trials and tribulations stimulated Oskar Barnack into seeking a completely new method of taking photographs. Even as early as 1905, he had the idea of reducing the format of negatives and then enlarging the photographs after they had been exposed. It was ten years later, as development manager at Leica, that he was able to put his theory into practice. He took an instrument for taking exposure samples for cinema film and turned it into the world's first 35 mm camera: the 'Ur-Leica'.

At the time, the miniature film format of 24 x 36 mm was created by simply doubling the cinema film format. The first photos - of outstanding quality for the time - were made in 1914. Progress was interrupted by the First World War, so the first LEICA (Leitz Camera) did not go into serial production until 1924, being presented to the public in 1925.





## SG105.3.1.3 Phi Formats (3) Books



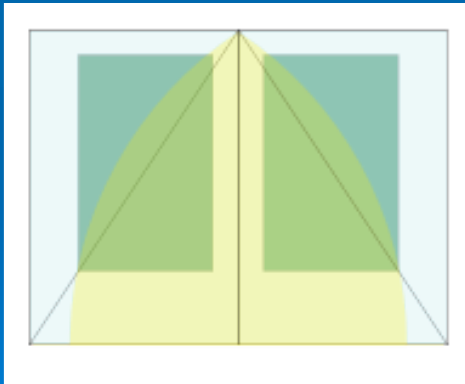
The canons of page construction are a set of principles in the field of book design used to describe the ways that page proportions, margins and type areas (print spaces) of books are constructed.

The notion of canons, or laws of form, of book page construction was popularized by contemporary experts like Jan Tschichold & Richard Hendel based on the historical work of J. A. van de Graaf, Raúl M. Rosarivo and Hans Kayser.

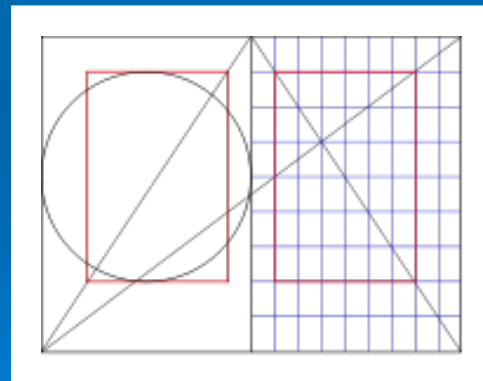
Tschichold wrote: *“Though largely forgotten today, methods and rules upon which it is impossible to improve have been developed for centuries. To produce perfect books these rules have to be brought to life and applied.”*

Besides page proportions close to the Golden Rectangle, the relationship between page format and textblock was designed to produce an *antiphonal* (call and response) dynamic geometry.

Tschichold and Hendel assert that the page proportion of the Golden Ratio (21:34) has been used in book design, in manuscripts, and incunabula, mostly in those produced between 1550 and 1770. Hendel writes that since Gutenberg's time, books have been most often printed in an upright position, that conform loosely, if not precisely, to the Golden Ratio. These page proportions based on the Golden Ratio are usually described through its Fibonacci convergents such as 2:3, 5:8, and 21:34.

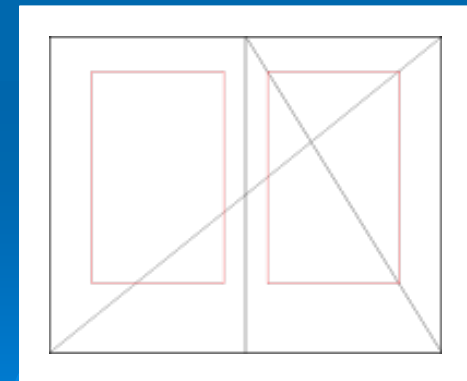


Medieval manuscript framework  
"Page proportion is 2:3,  
text area proportioned  
in the Golden Section."



Tschichold's "Golden Canon  
Circle", combined with  
Rosarivo's construction by  
division of the page into ninths.

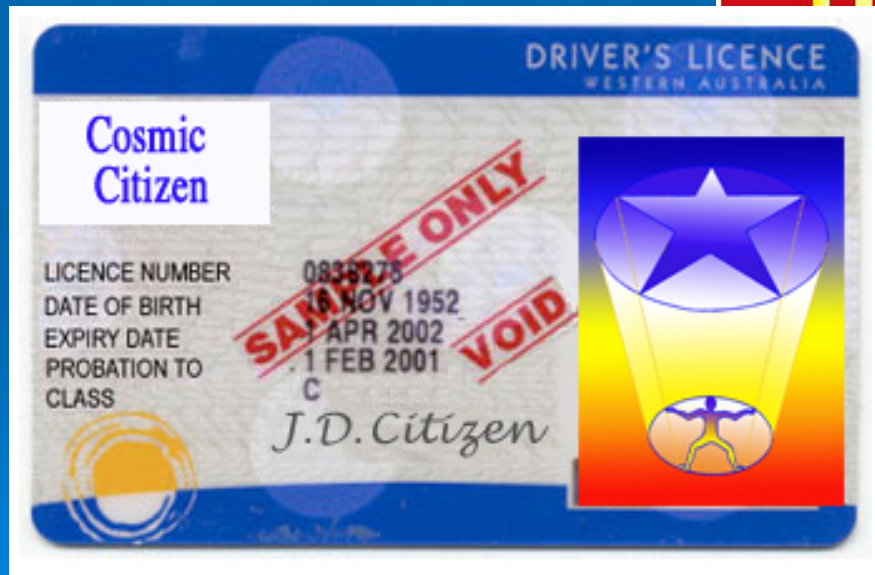
→  
8-format page  
proportioned  
in "34:21".  
The text area  
and margin  
are set by the  
starting page  
proportions.



Jan Tschichold's design.



# SG105.3.1.4 Phi Formats (4) Credits Cards



Check the measurements of your bank & store credit/debit cards, your driver's license and other official ID cards... they all come in 54 mm wide by 85/86 mm high.

$$85 / 54 = 1.57$$

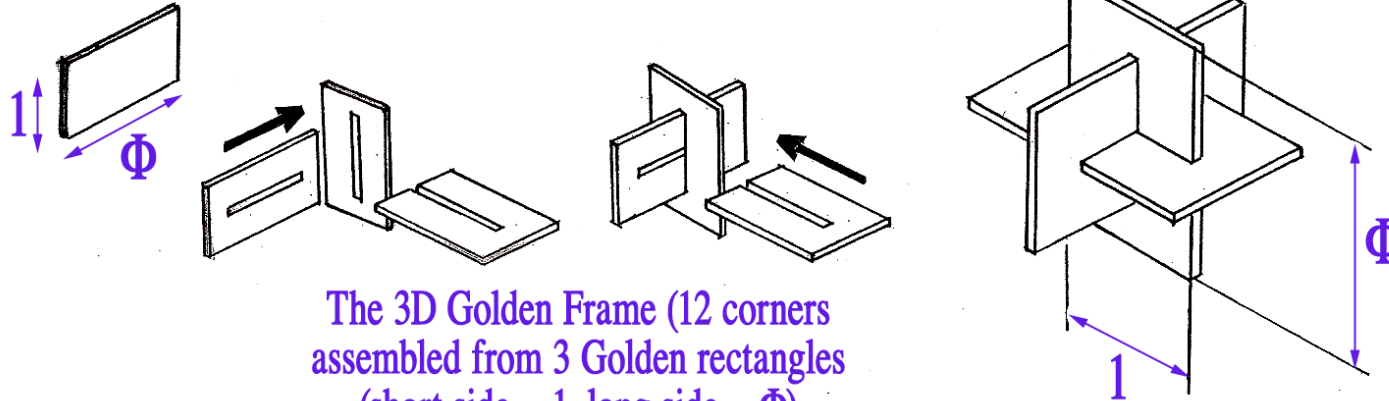
$$86 / 54 = 1.59$$

~  $\Phi$

*“Take 3 credit cards and you have a Golden Frame”.*

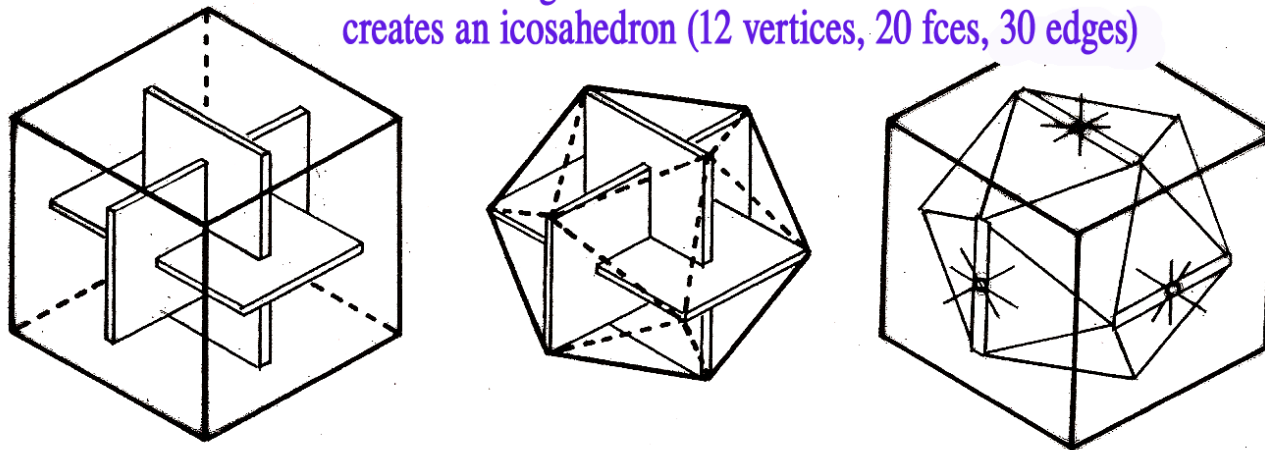
Does that make sense, other than in financial security terms?

Then, consider that a Golden Frame is made out of 3 Golden Rectangles intersecting in the x, y and z directions.

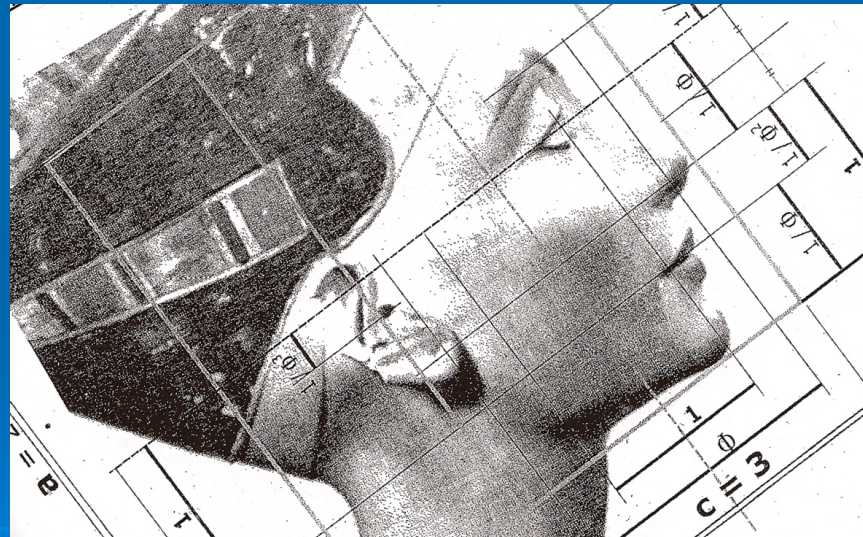
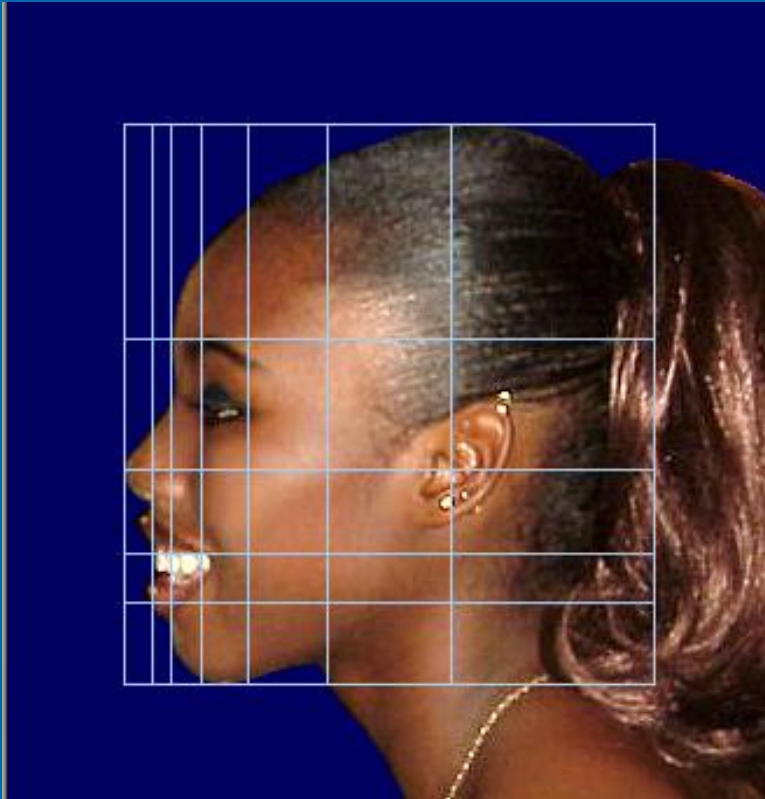


The 3D Golden Frame (12 corners assembled from 3 Golden rectangles (short side = 1, long side =  $\Phi$ ))

Connecting the 12 corners of the Golden Frame creates an icosahedron (12 vertices, 20 fces, 30 edges)



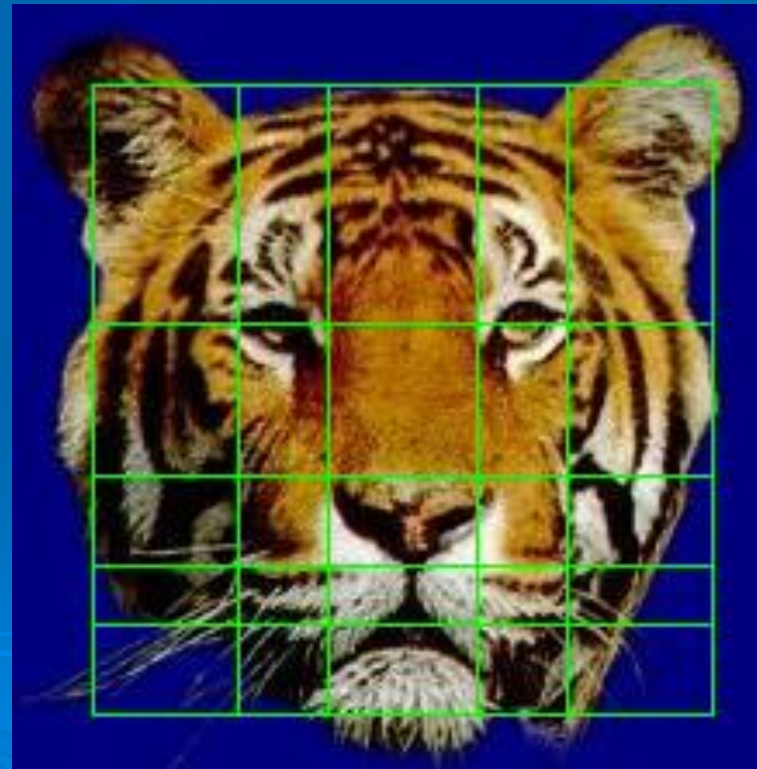
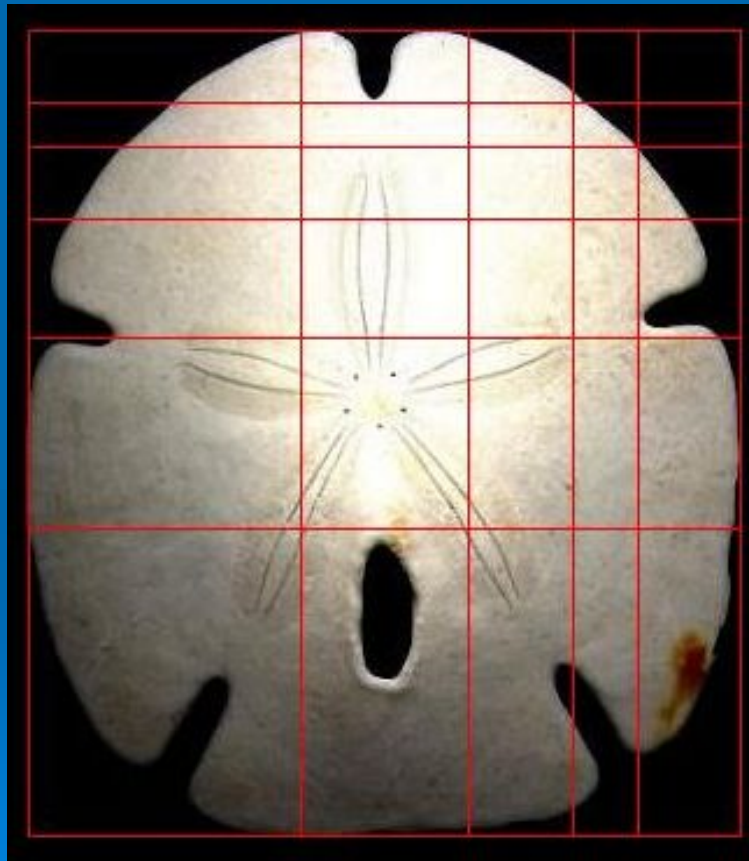
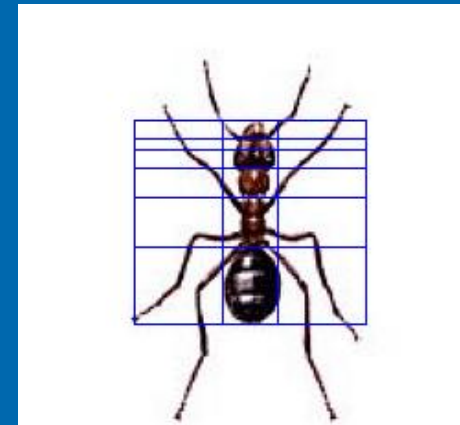
## SG105.3.3 Human Faces



Golden Rectangles  
&  
Phi Ratios



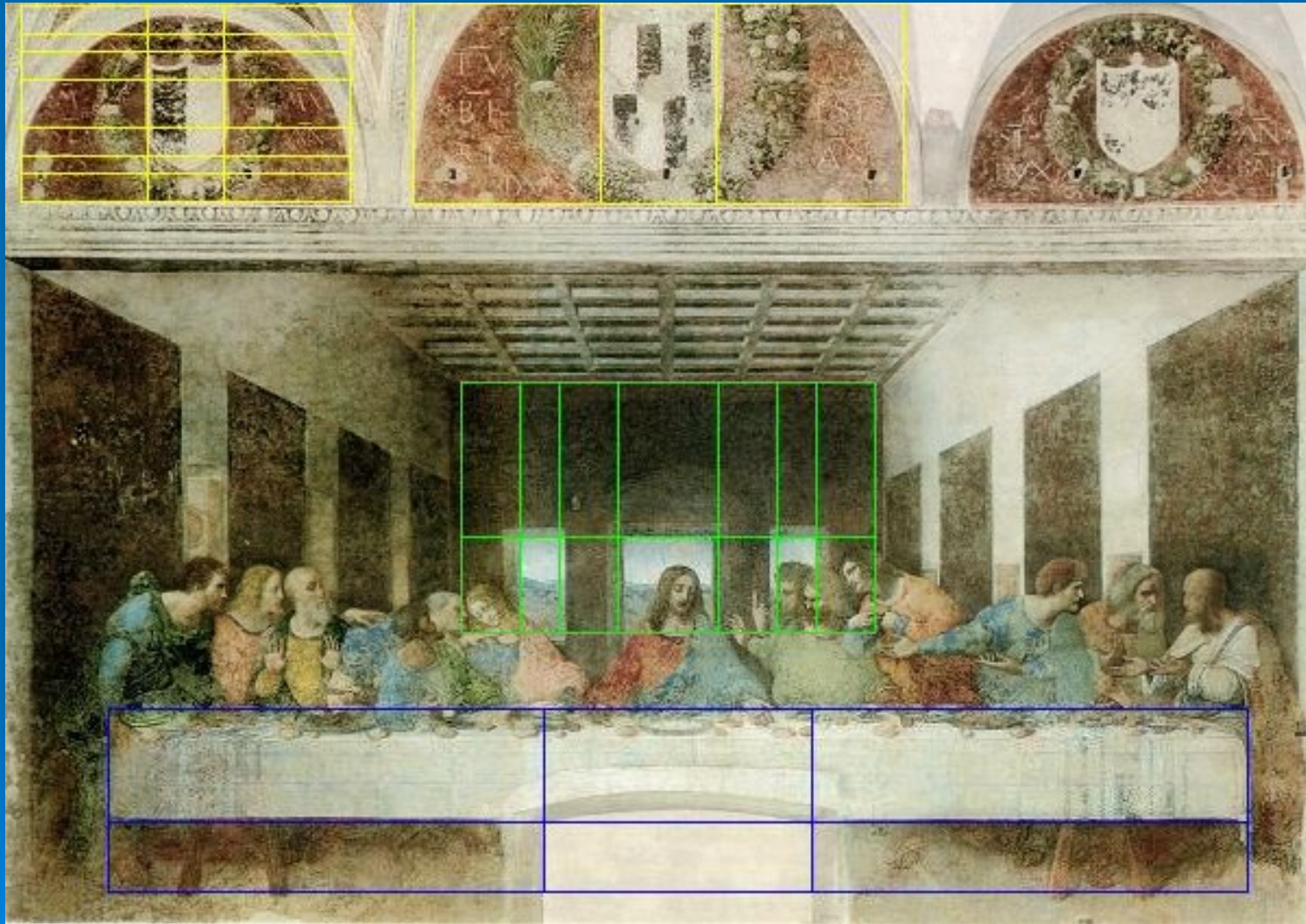
# SG105.3.4.1 Golden Rectangle in Nature (1)





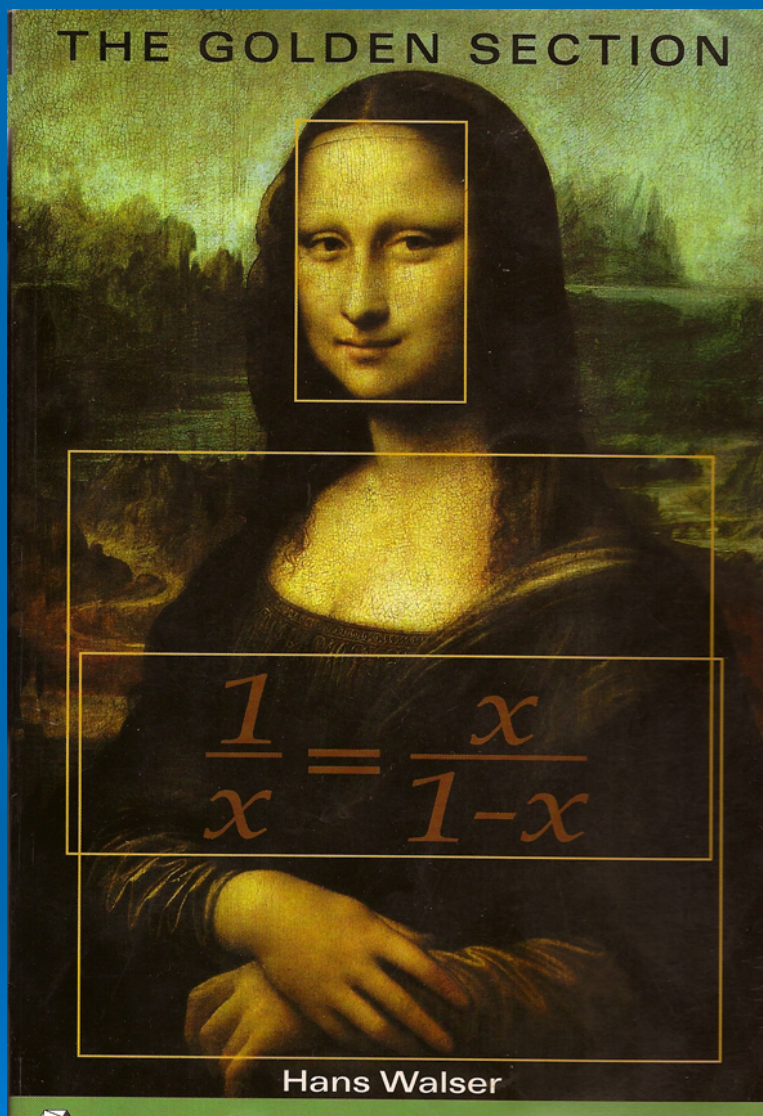


## SG105.3.5.1 Golden Rectangle in Art (1)



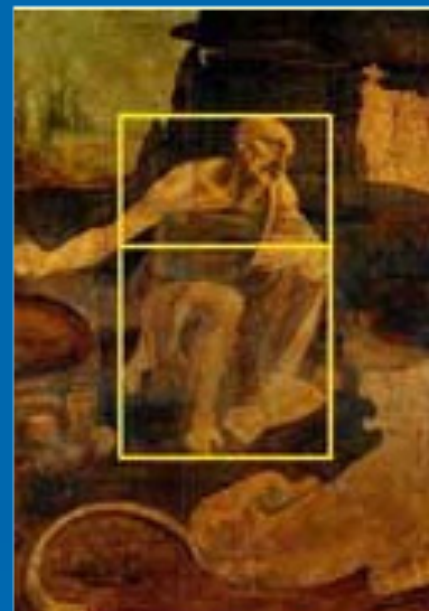
"The Last Supper". Leonardo da Vinci.

## THE GOLDEN SECTION



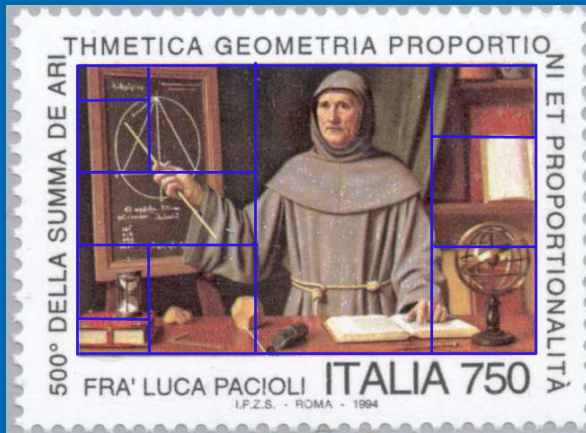
Book by Hans Walser.  
Mathematical Association of America

## SG105.3.5.2 Art (2)



Saint Jerome by Da Vinci

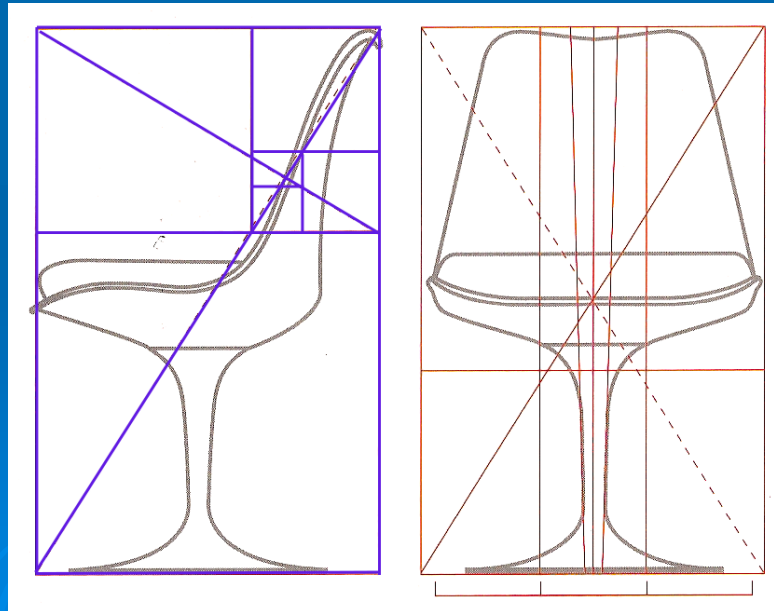
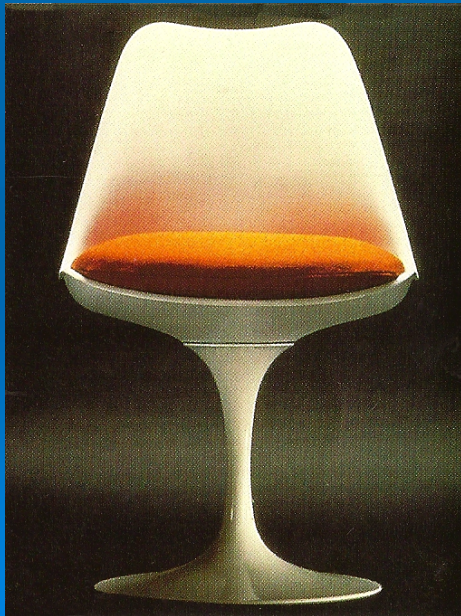




Italian stamp portraying Luca Pacioli with overlaid Golden Rectangle grid.



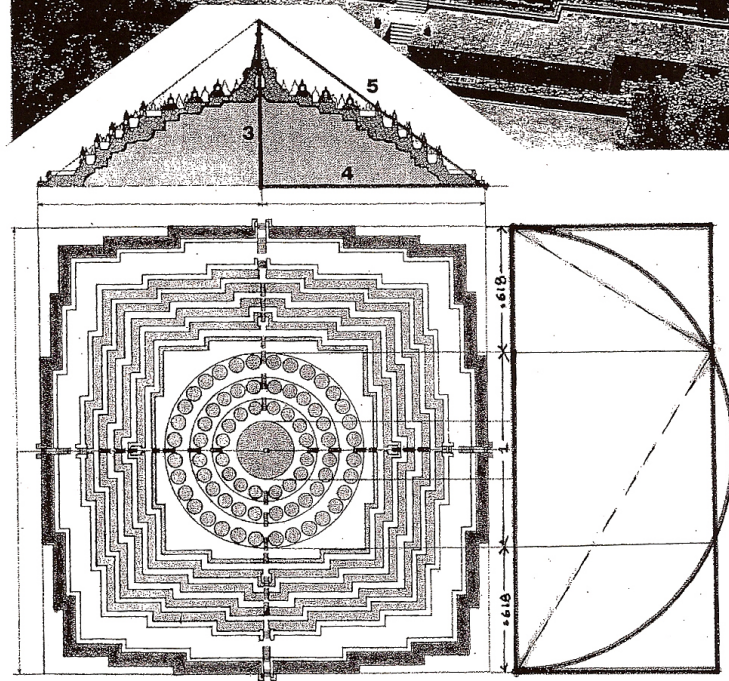
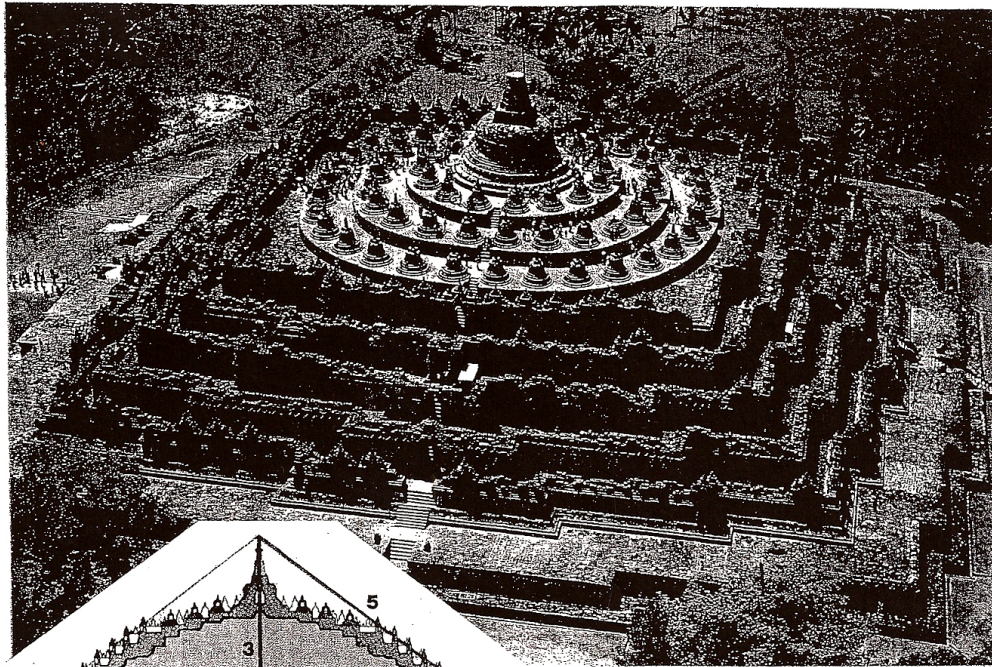
([www.designercuttingboards.com](http://www.designercuttingboards.com))



← Pedestal Chair by Eero Saarinen, 1957.

(Left image: Kimberly Elam *The Geometry of Design.*)

## SG105.3.6 Golden Rectangle in Design

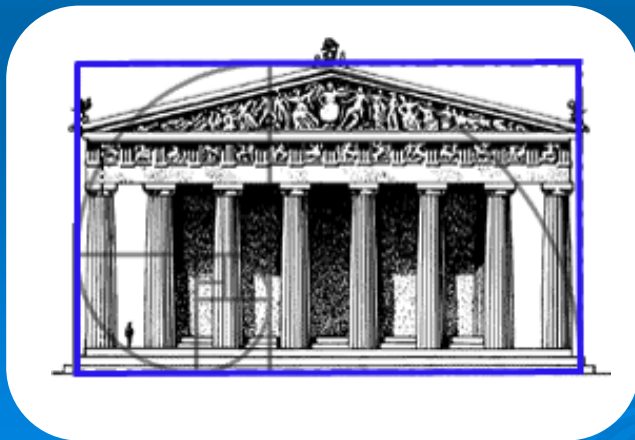
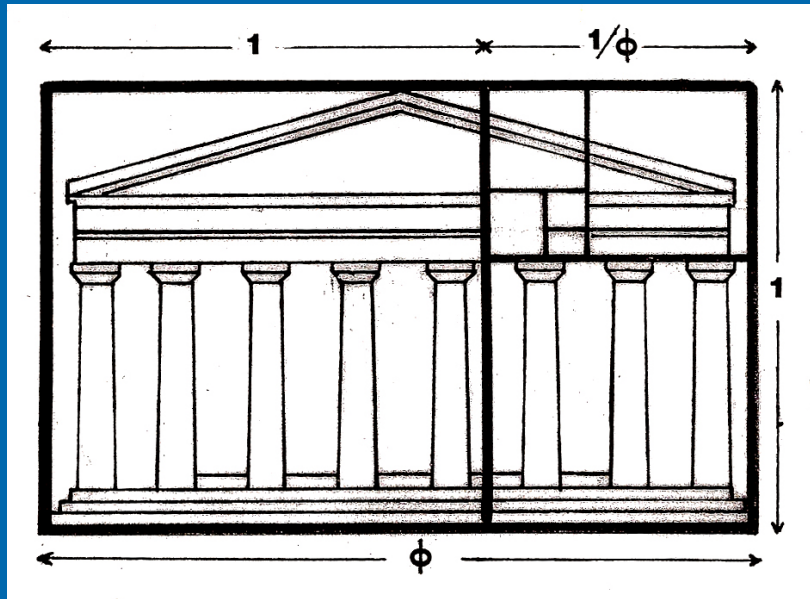


## SG105.3.7.1 Golden Rectangle in Architecture (1)

← The 3-4-5 triangle and  
Golden Rectangle proportions  
in the temple of  
Borobudur, Java.



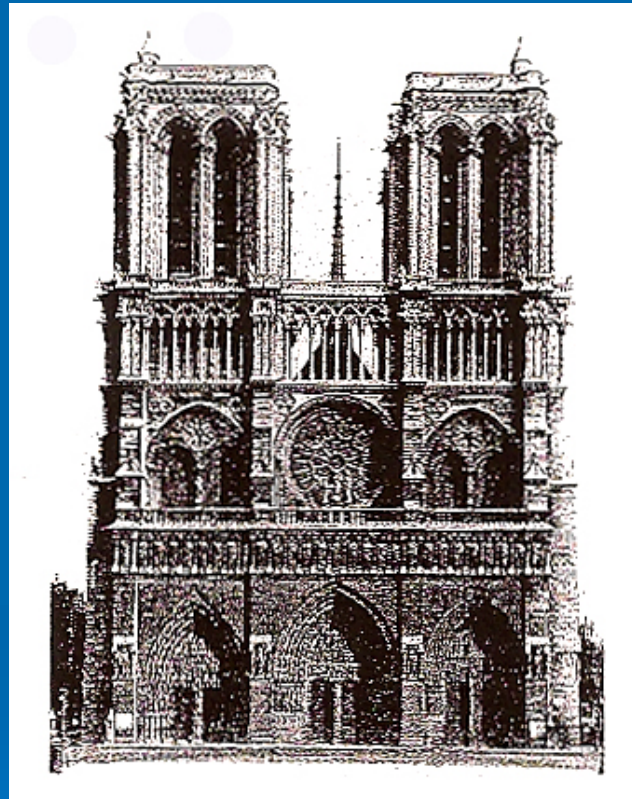
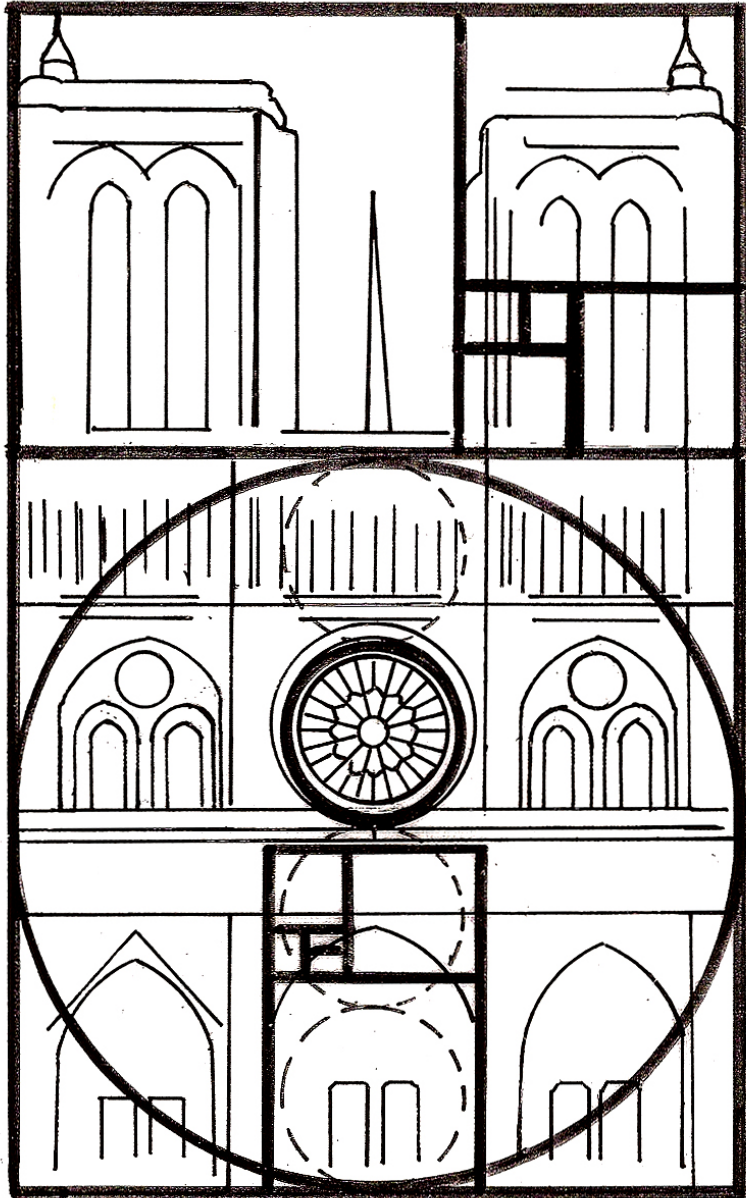
## SG105.3.7.2 Architecture (2)



The Parthenon in Athens, Greece.



### SG105.3.7.3 Architecture (3)



Notre Dame de Paris, France.

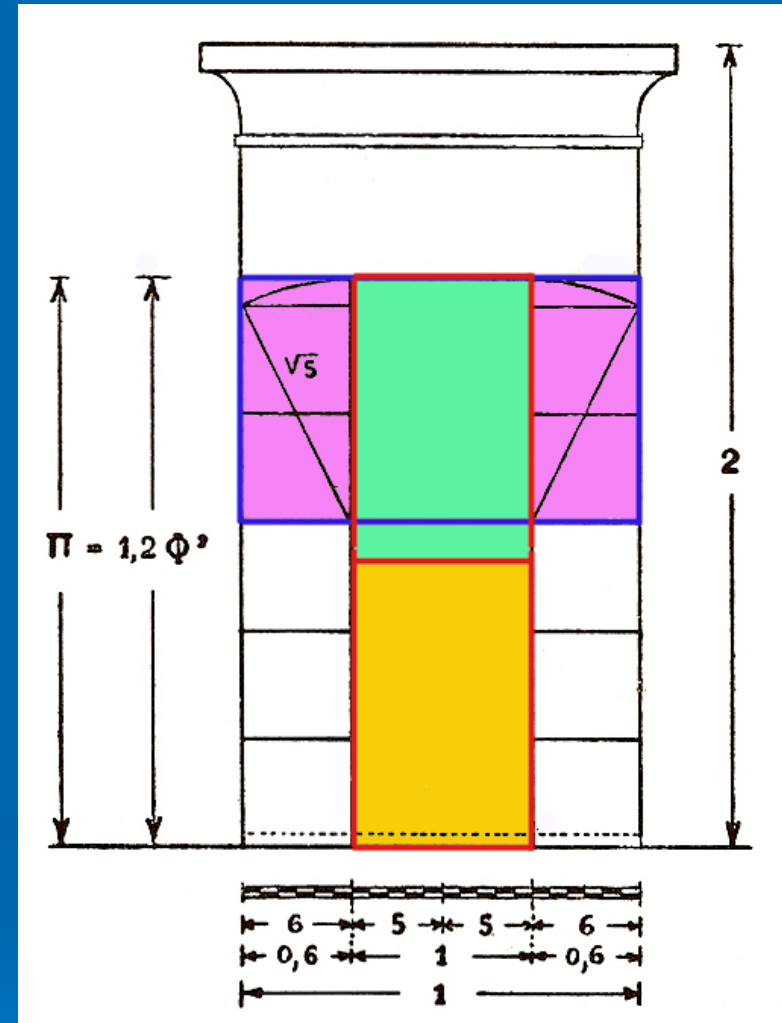
## SG105.3.7.4 Architecture (4)

### Doorways & Gates

Doorways & gates are ideal shapes to frame the Golden Rectangle. Throughout cultures attuned to cosmic harmonics, entering a temple is entering the inner/higher divine self. Going through the threshold of the Doorway is a dimensional transition, a *stargate* process. The very proportion of the Doorway is essential in wave-shaping the energy field of the pilgrims and prepare them for the finer golden harmonic overtones cascading back to Source. In sacred cultures, doorways usually display the Golden Rectangle proportions, or its harmonics (multiples & submultiples).



↑ Main Gateway.  
Kalasasaya, Tiwanaku  
(Mallku Aribalo. *Inka Power Places*)

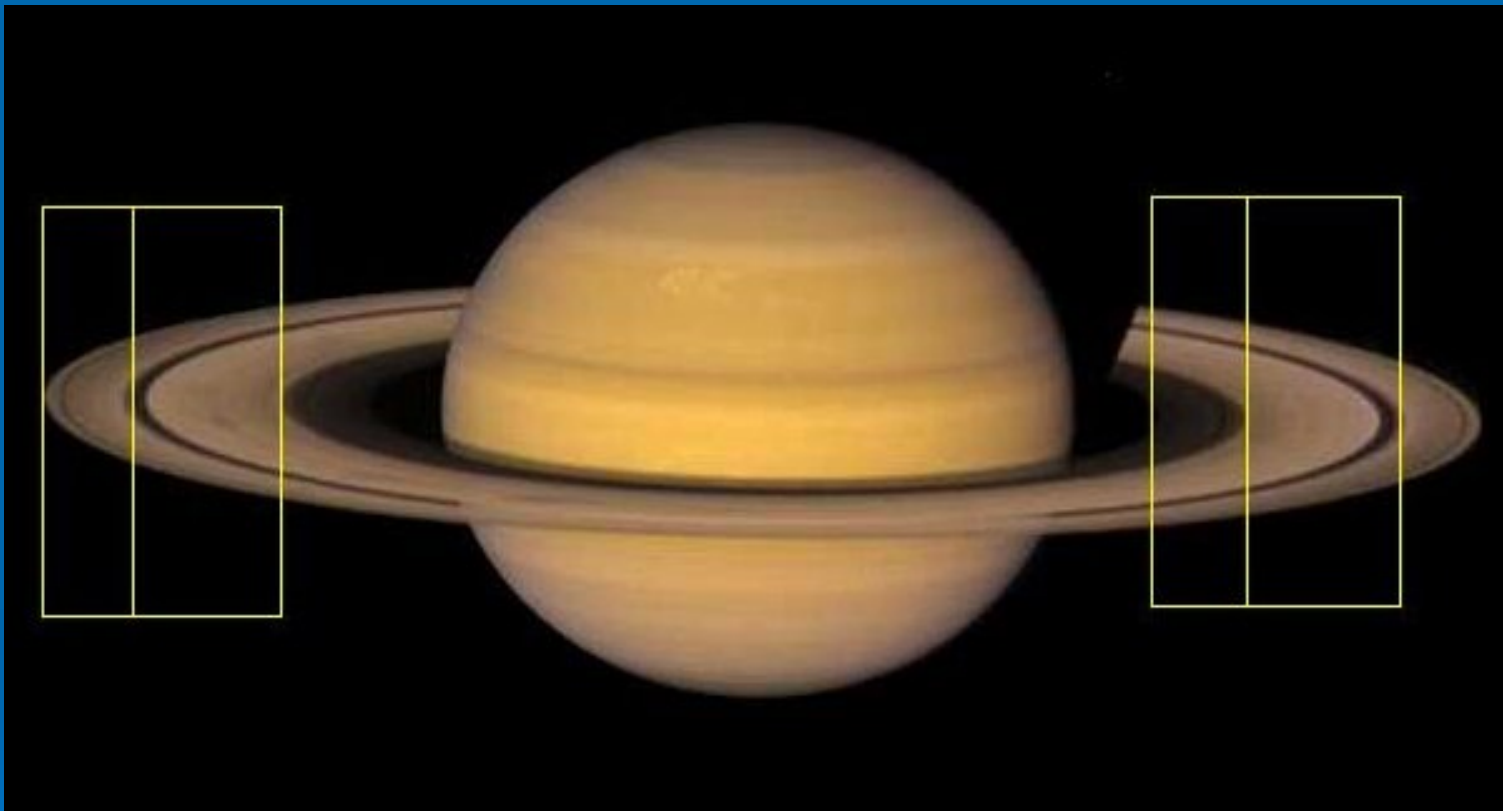


↑ This Egyptian pylon incorporates Pi, Phi and the Golden Rectangle.

In Sacred Geometry, Pi is rooted in Phi:

$$\pi = 1.2 \Phi^2$$

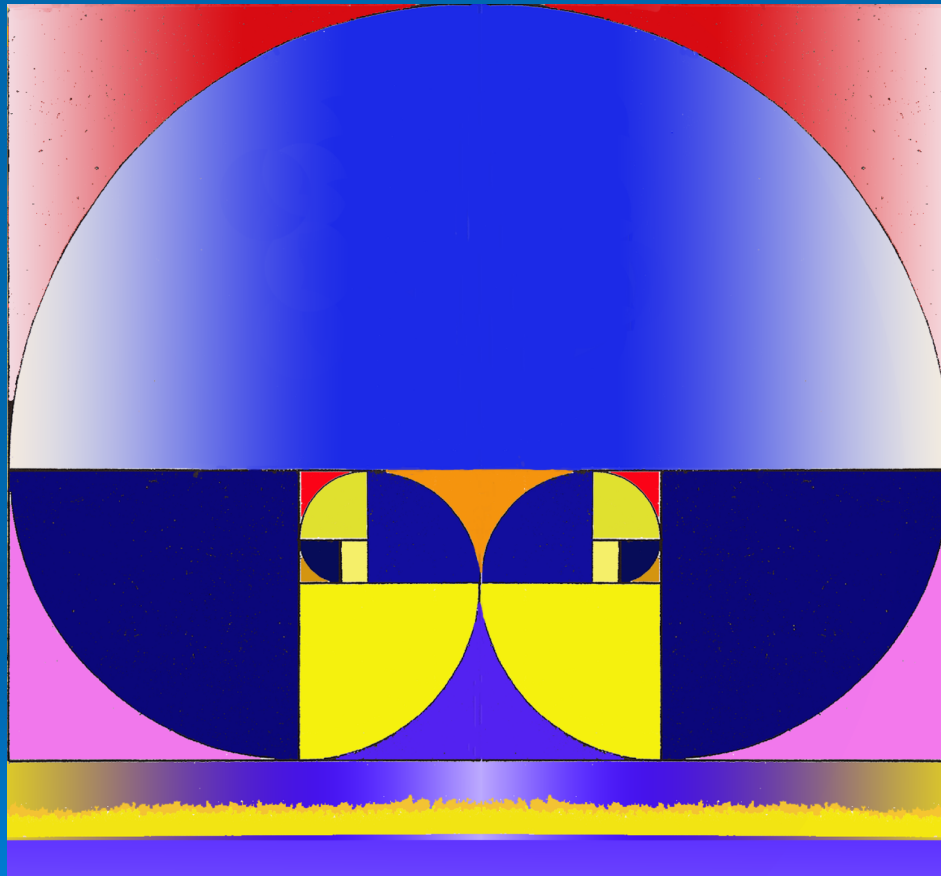
## SG105.3.8 Cosmos



The rings of Saturn show the Golden Proportion.

[//goldennumber.net](http://goldennumber.net)

## SG105.4 Chapter 4. The Golden Spiral





## SG105.4.1.1 Nature's Golden Pattern

The Golden Spiral is nature's favorite "blueprint", her "Golden Pattern". It is known as the "Growth Spiral" or "*Spira Mirabilis*". Everywhere we look, we see whole spirals unfolding, or portions thereof depending on our relative size: water, flowers & plants, winds & clouds, galaxies & embryos... even people dancing...

All spirals share the fact that they unfold or unwrap from a fixed center point while getting progressively farther away as it revolves around the point. There are two types of spirals: *archimedean* (same distance between arms) and *logarithmic* (geometric progression between arms) |◆SG101.6|

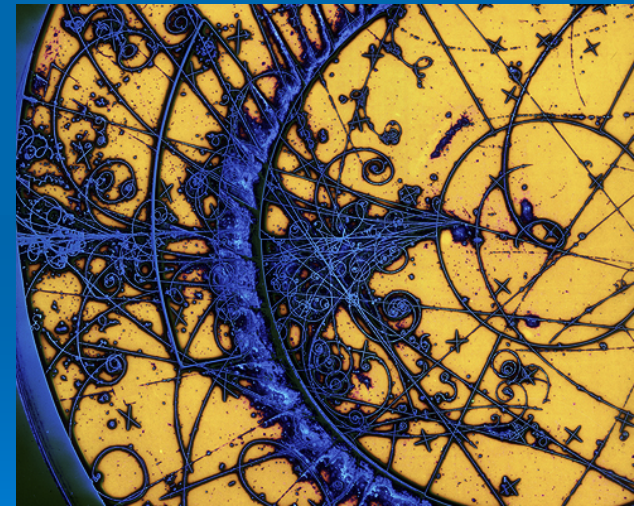
The Golden "Growth" Spiral is the dynamics of creation & change. Mathematically, it is described as a logarithmic spiral, a family of spirals whose curve cuts all radii vectors at a constant angle ("*equiangular*"). Nested in 3D, it becomes the *torus* or *vortex*.

In her wonderful website devoted to Spirals ([//spiralzoom.com](http://spiralzoom.com)), Allison Hopper states:

*"Spirals are exciting because they take us into the very heart of creation... The story of the spiral is the story of creation. It is the story of how form, pattern, order and beauty emerge out of random particles and chaos.*

*The spiral transforms chaos into order".*

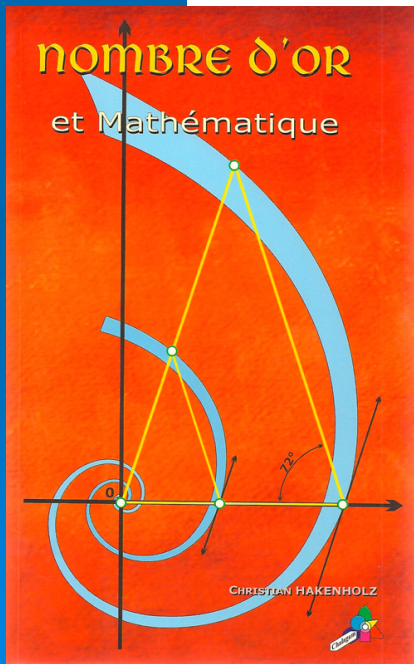
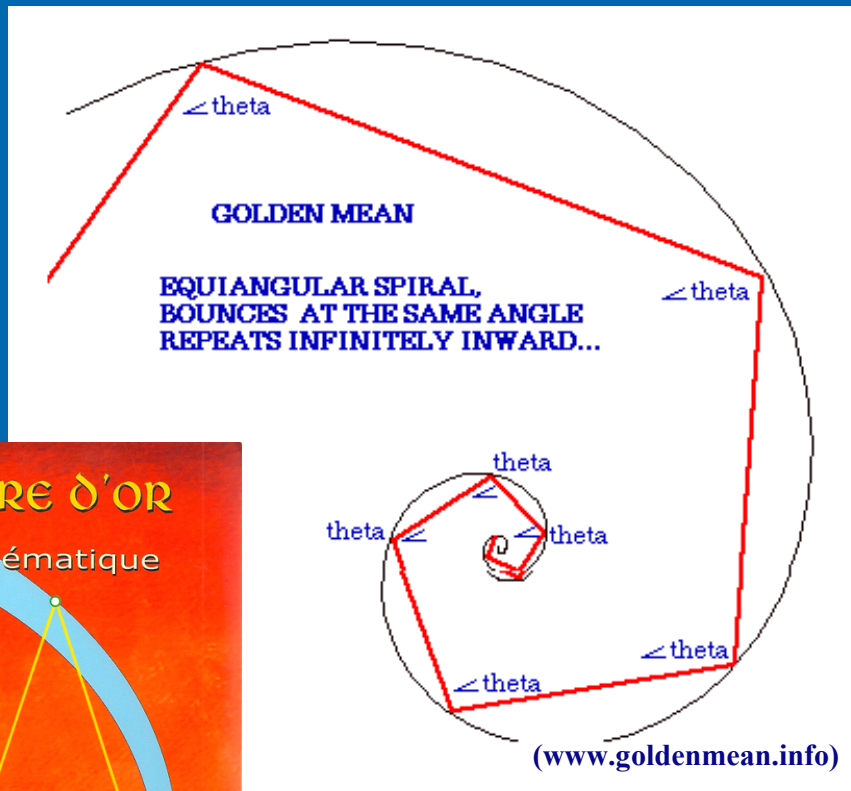
The Golden Spiral is the ultimate agent of evolution. Patterned on the harmonic pulse & power of the universe, the Golden Ratio PHI, the Golden Spiral is the "*yellow brick road*" leading to Source, the "*sacred thread*" weaving the fabric of creation. Both obvious and hidden, it brings about the Tao of Harmony or perfect balance between the curve & the line, the Yin & the Yang polarities of the Cosmos.



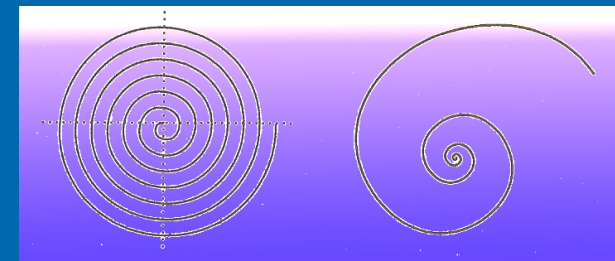
↑ Traces of sub-atomic particles in bubble chamber.



# SG105.4.1.2 The Golden Spiral - Equiangular



← "Golden Number and Mathematics".  
 Christian Hakenholz.  
 Chalagam. 2001. [www.chalagam.com](http://www.chalagam.com)



Left: Archimedean Spiral (same distance between arms)  
 Right: Logarithmic / Equiangular Spiral

The Golden Spiral is an *Equiangular* spiral which means that the distance between its arms increase in geometric progression - in this case, the Golden Ratio.

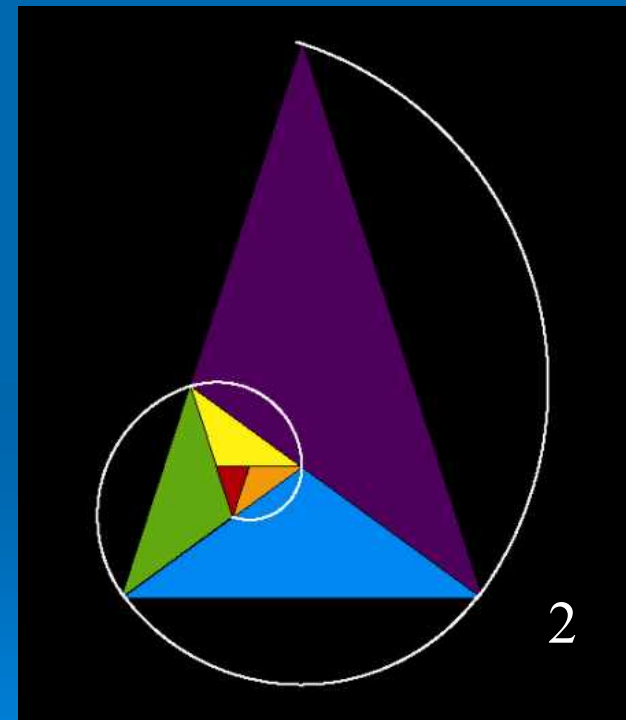
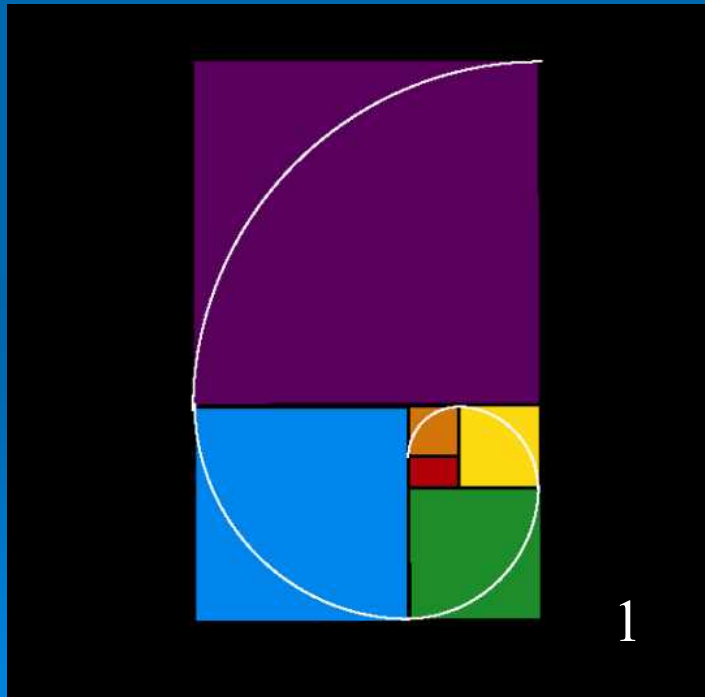
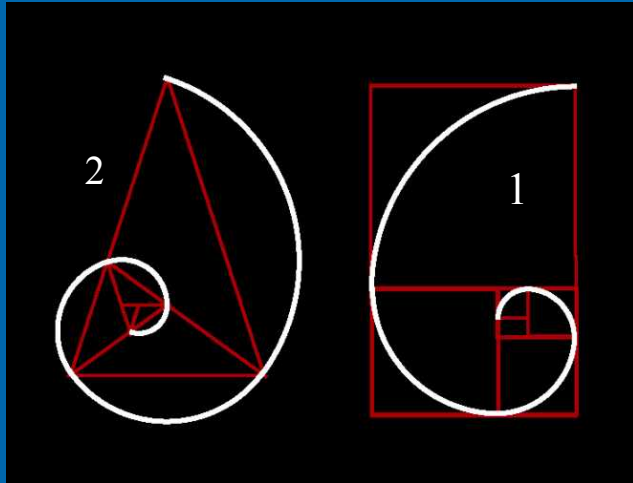
The "equiangular" spiral (so named by Descartes) allows for the angular relationship of the "first bounce" to re-occur infinitely, providing perfect scale-invariance. In other words, the energy repeatedly bounces at the exact same angle and thus transmits fully "verified" information. A hi-quality cosmic router...

The harmonic cascade created by nested Golden Spirals is the communication highway transmitting the codes of creation from galaxies to atoms, DNA to cells and angels to people.

## SG105.4.2.1 The Golden Spiral's Construction (1)

There are two simple ways to construct a Golden Spiral:

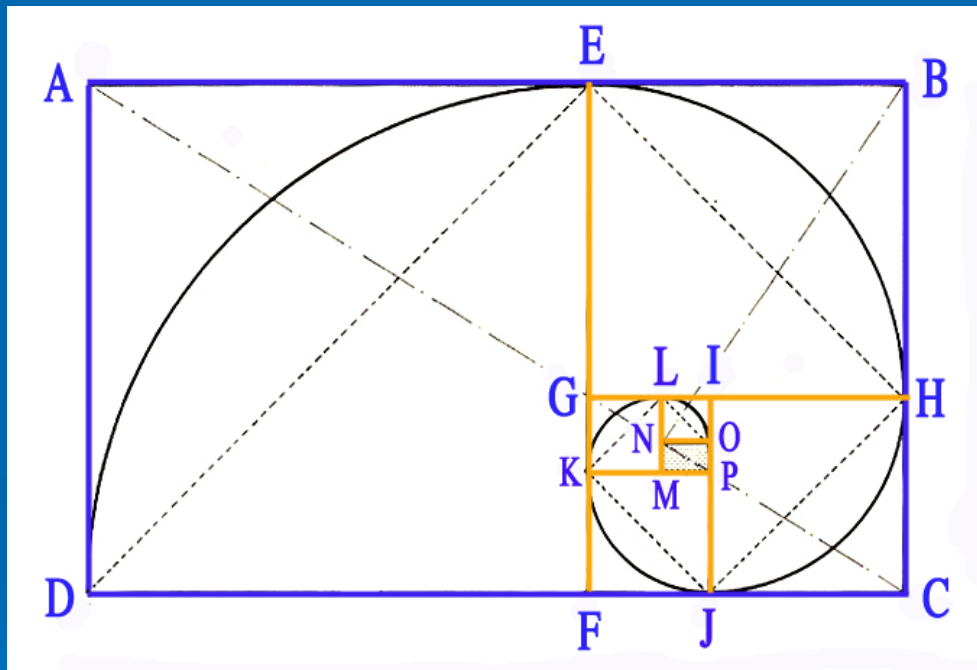
1. From the Golden Rectangle
2. From the Golden Triangle



## SG105.4.2.2 Spiral (2) Golden Rectangle (1)

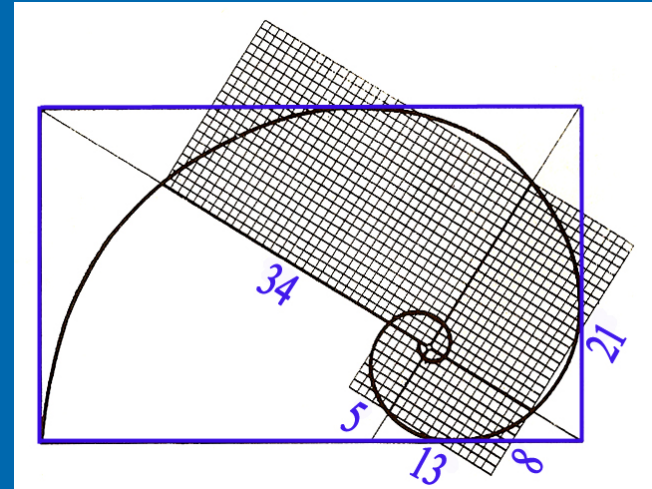
The classical way to trace a Golden Spiral is by using the framework of a Golden Rectangle.

As we have seen, a Golden Rectangle is built upon a progression of squares (the “Whirling Squares”) following the Fibonacci sequence.



The Golden Rectangle can be subdivided into smaller & smaller PHI ratios, forever yielding perfect Golden Rectangles (and Golden Spirals). It is a genesis process *ad infinitum*, all the way down the atomic scale and all the way up the cosmological scale.

This is why the PHI ratio is called *scale-invariant*.



### Construction

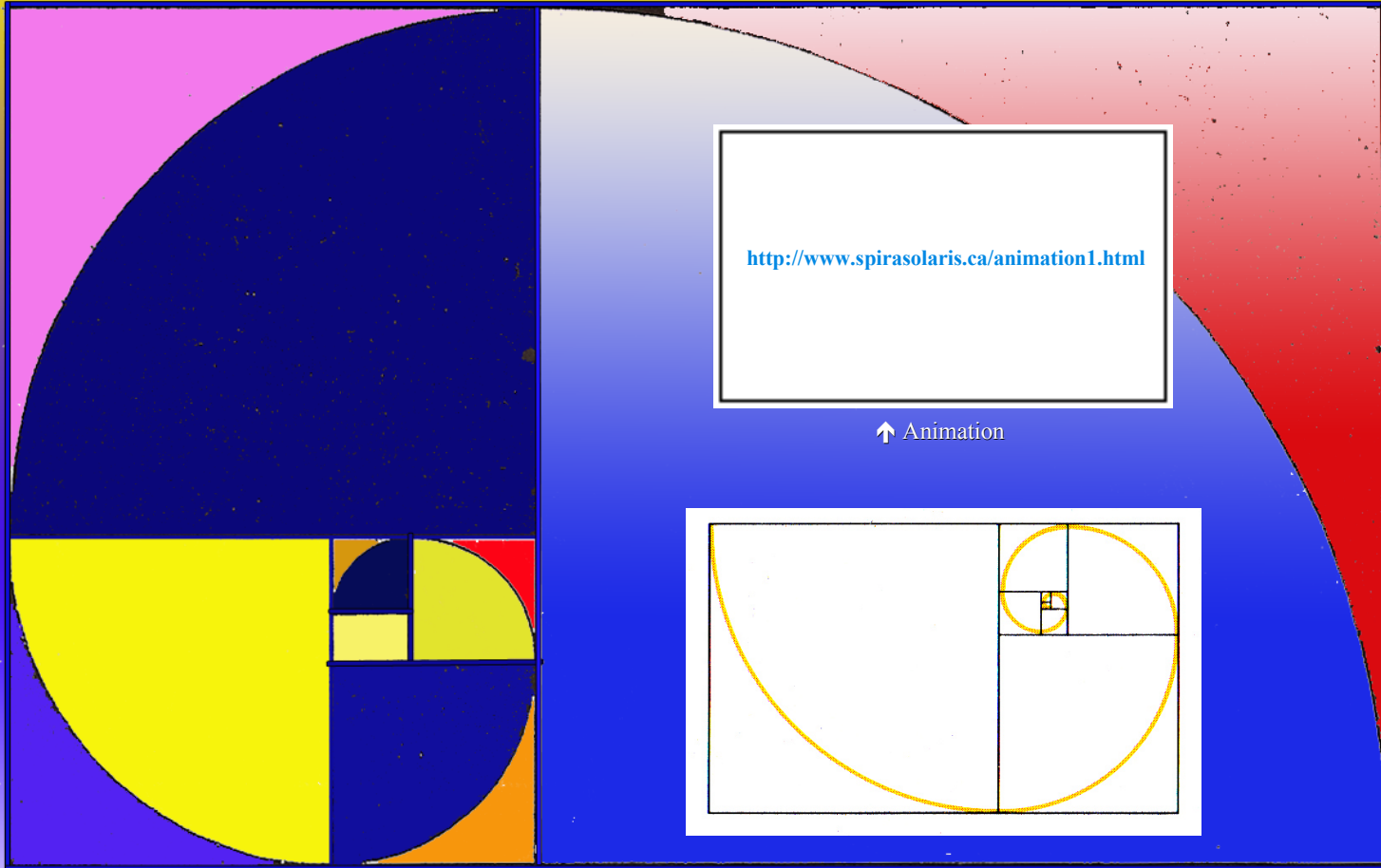
**Step #1:** Construct a Golden Rectangle ABCD based on the following Fibonacci-scaled Whirling Squares: ADEF, EGHB, IJCH, KFJP, GKML, LNOI etc...

**Step #2:** With compass point on F and radius DF, trace a quarter arc to E (connecting the two opposite corners of the larger square).

**Step #3:** Repeat the process on the next smaller square EGHB: compass point on G and quarter arc from E to H.

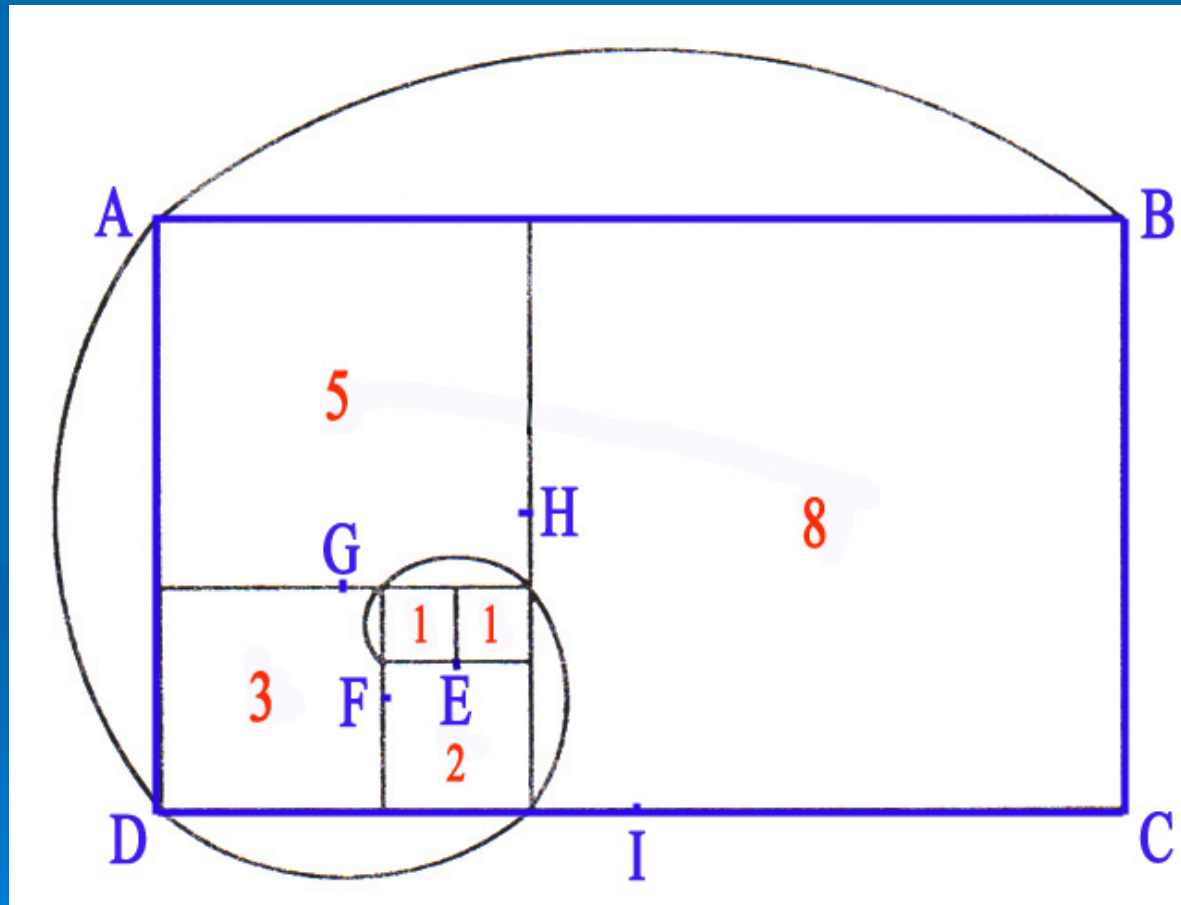
**Step #4:** Continue until you reach atomic scale... and then, jump in or go the other way to galactic scale...

## SG105.4.2.3 Spiral (3) Golden Rectangle (2)



## SG105.4.2.4 Spiral (4) Golden Rectangle (3)

A Golden Spiral can also be obtained by tracing an arc through every alternate square corner, *outside* of the Golden Rectangle.



### Construction:

Step #1: Trace your now familiar Golden Rectangle based on Fibonacci-scaled squares (here: 1 - 1 - 2 - 3 - 5 - 8).

Step #2: Locate the mid-points E, F, G, H and I and trace the respective arcs every alternate square corner.

Example: from mid-point I on DC, with radius IA, trace the arc to B.



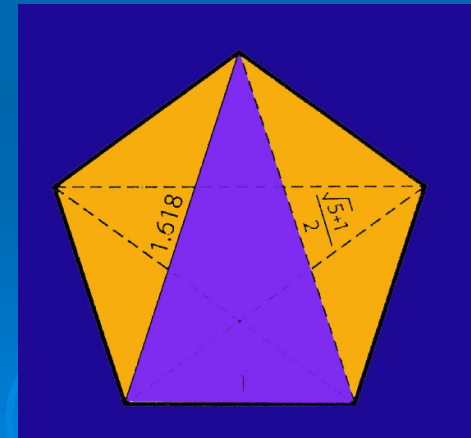
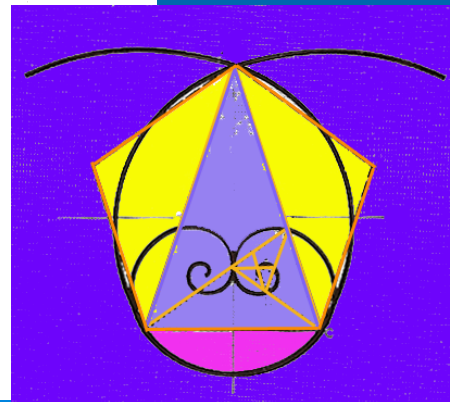
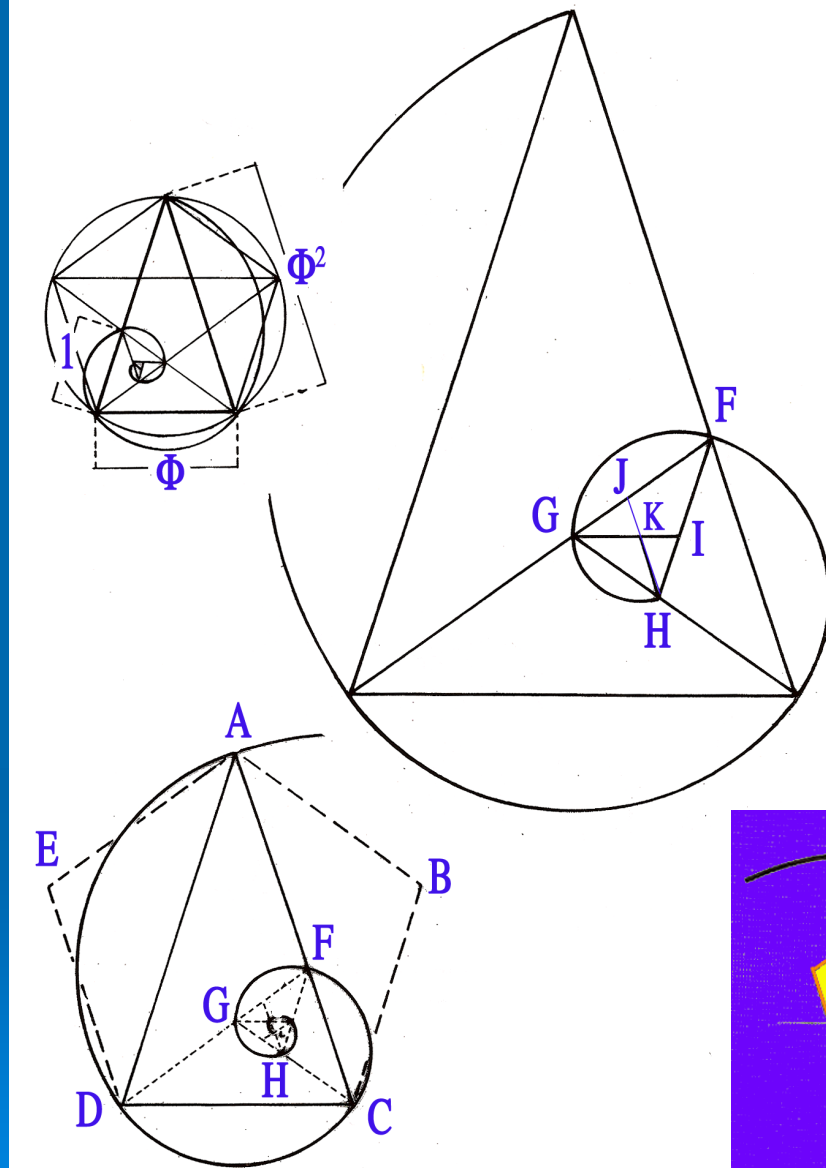
## SG105.4.3.1 Golden Spiral (5) Inner Whirling Triangles (1)

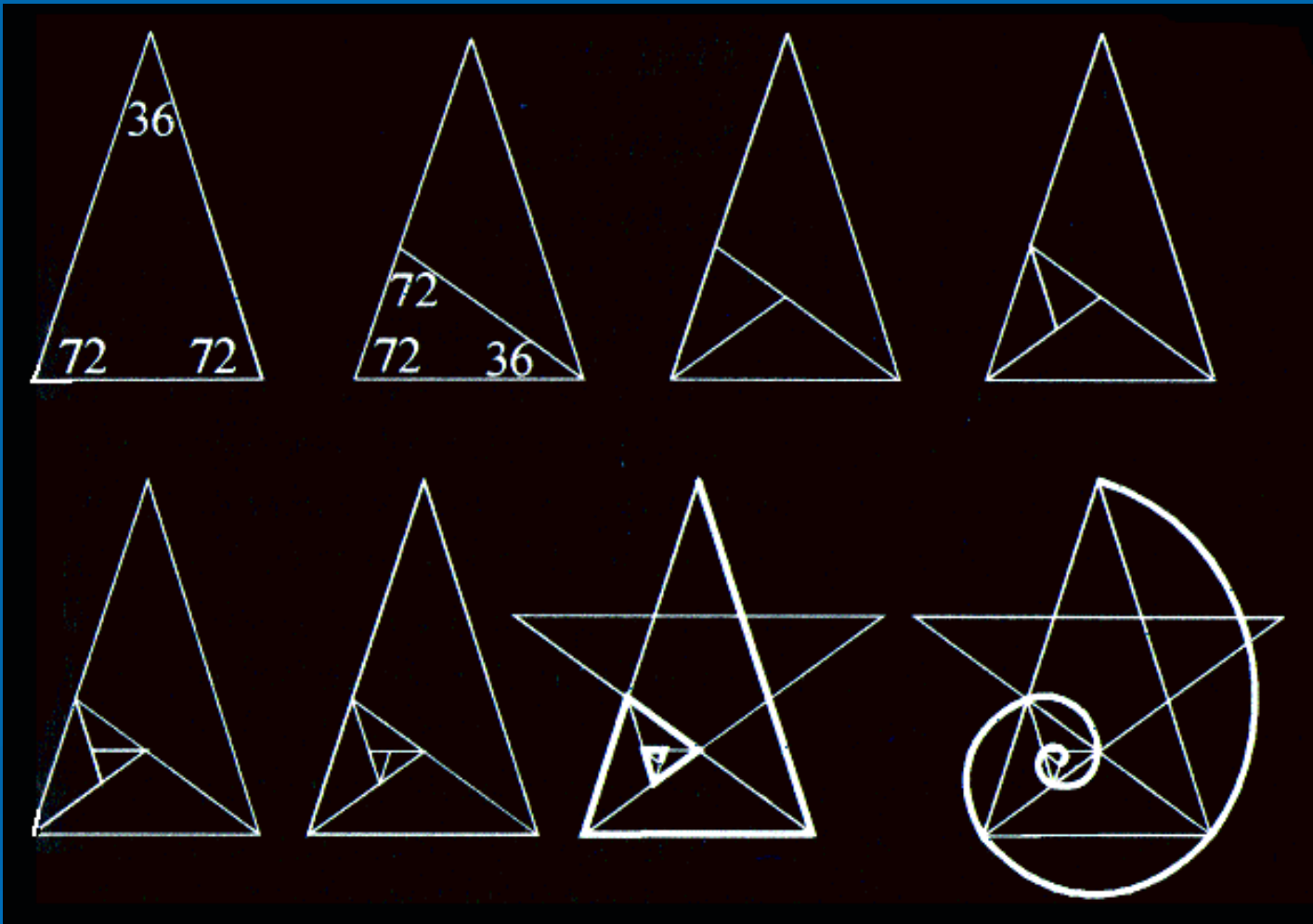
The Golden Spiral can be constructed with Golden Triangles whirling either way: inside or outside. Here is the “Inner Triangles” construction:

Step #1: Trace a pentagon and its Golden isosceles Triangle.

Step #2: Trace the respective bisectrix of angles D, C, F, G, H, I, J.

Step #3: From center points K, I, H, G, F, trace the arcs HG, GF, FC, CD and DA.





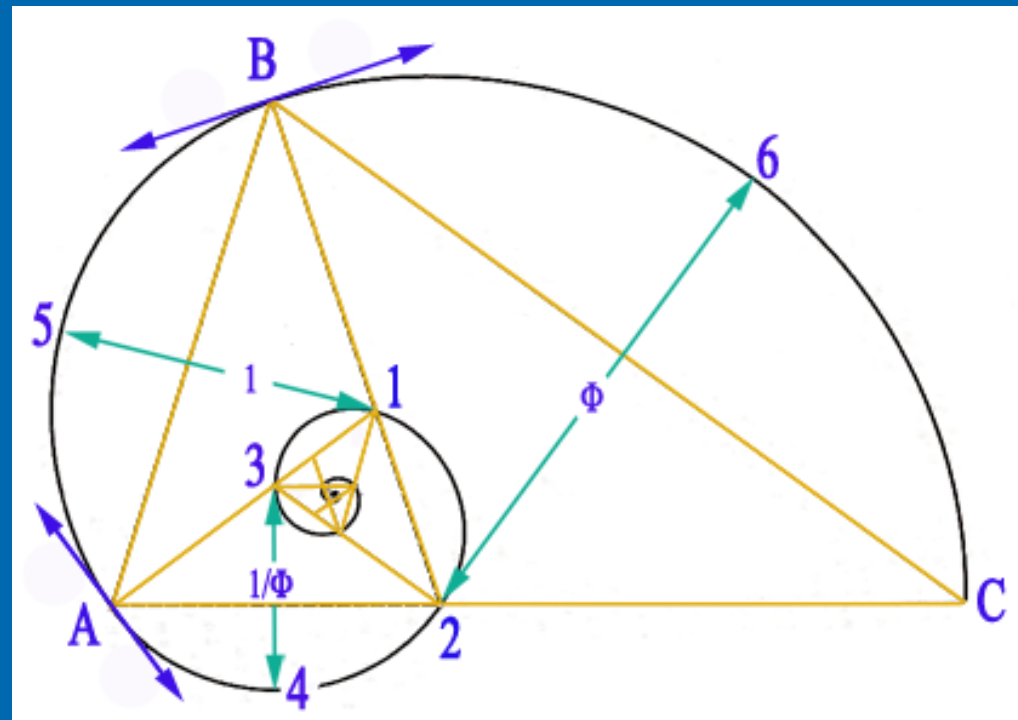
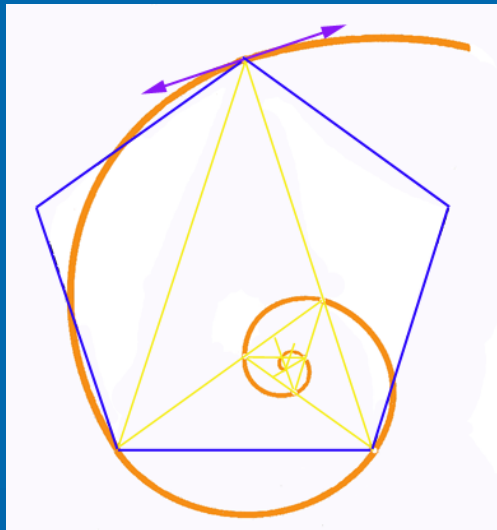
SG105.4.3.2 Golden Spiral (5) Inner  
Whirling Triangles (2)

### Golden Triangle & Golden Spiral

By tracing the bisectrix of each inner angle of a Golden Triangle, we obtain a recursive/self-similar harmonic series of Golden Triangles & Golden Gnomons [◆SG106], at progressively smaller scales. The Golden Spiral is the path of scale-invariant harmony linking the various elements - the melody linking the individual musical notes. (Graphics: [www.goldenmean.info](http://www.goldenmean.info))

### SG105.4.3.3. Golden Spiral (6) Inner Whirling Triangles (2)

Based on Golden Triangles whirling inwardly, the Golden Spiral is therefore based on a pentagonal symmetry.

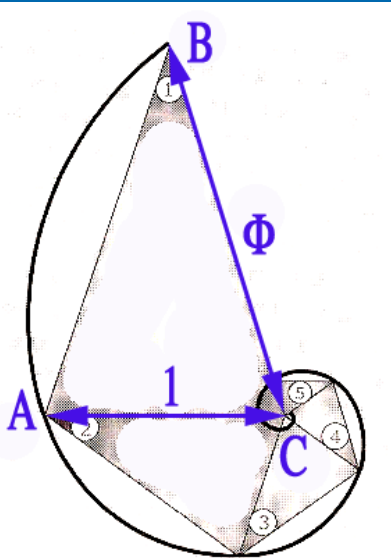


↑ This Golden Spiral is based on the inner whirling triangles ABC, AB2, 1A2 etc...  
These triangles are all Golden Triangles (base = 1, side =  $\Phi$ ) and are in Golden Ratio relationship to each other.

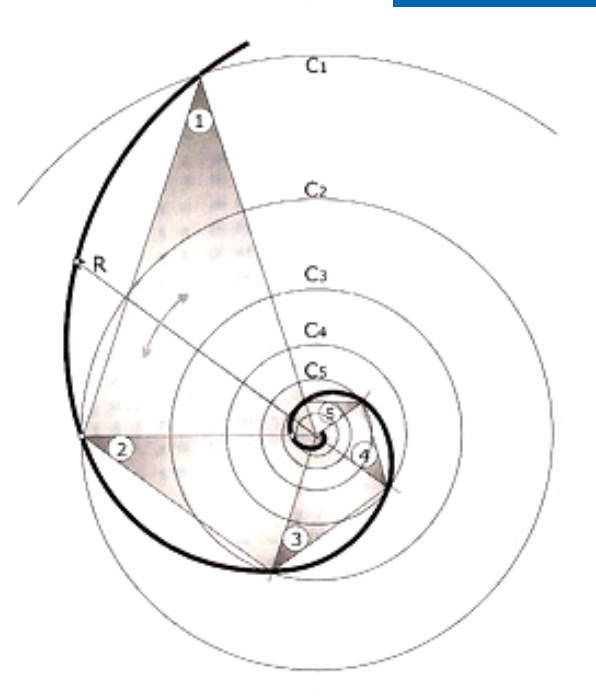
**Golden Note:** Two consecutive arcs always have their centers on the same line perpendicular to the tangent i. e. centers 1 & 2 on 2B. They are in Phi Ratio to each other, and so are the distances from their centers.

**They form a geometric Fibonacci series.**

**Examples:** the arc BC, with center 2, has a radius of  $2B = 2C = \Phi$  (side of Golden Triangle AB2). Arc AB, with center 1, has a radius  $1A = 1B = 1$  (base of Golden Triangle AB2 or side of Golden Triangle 1A2). Arc 2A, with center 3, has a radius  $3A = 3B = 3C = 1/\Phi$ .

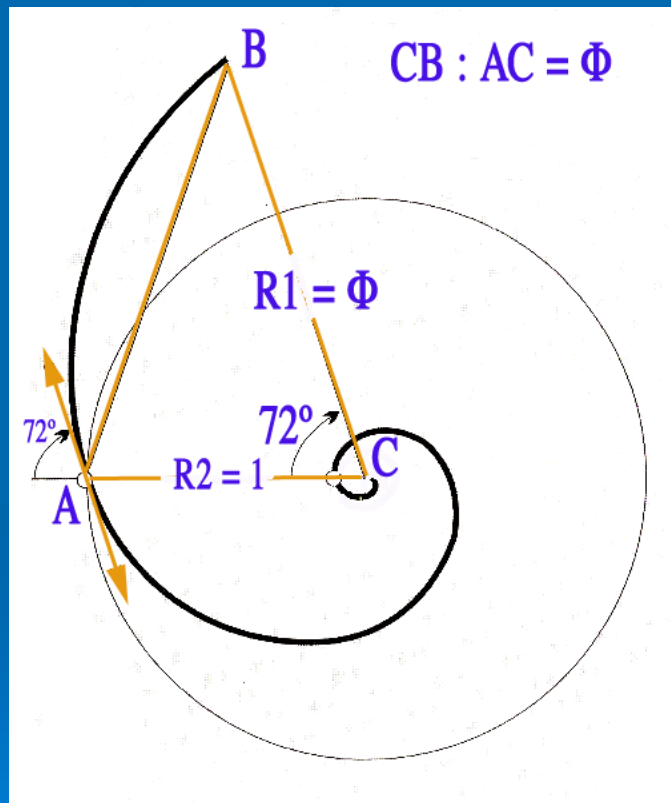


Diagrams & geometric comments:  
Robert Vincent.  
*Nombre d'Or et Créativité*, Paris, 2001



## SG105.4.3.4 Golden Spiral (7) Outer Whirling Triangles (3)

Just like you can construct a Golden Spiral outside the whirling squares of a Golden Rectangle, you can also construct a Golden Spiral on the outer whirling of Golden Triangles.



← The Distance R (from one point of the spiral to its center) varies proportionally to its angle.

Here, from R2 to R1, the growth of the radius is  $R2 \times 1.618 = R1$ .

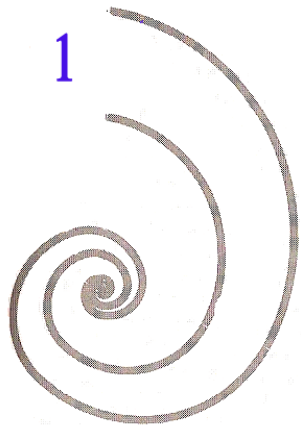
The tangent at the end of a radius is always  $72^\circ$ .

← The circles C5, C4, C3, C2 and C1 have for radius the side of the five respective Golden Triangles.



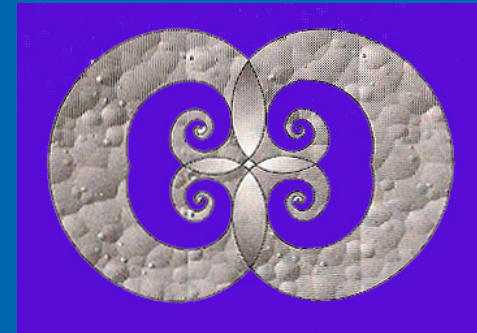
## SG105.4.4.1 Comparing (1) Inner/Outer Spirals

1

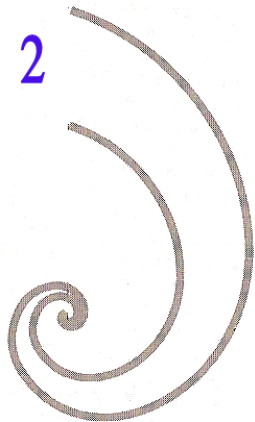


Golden Spiral  
based on inner whirling  
triangles

1. ← The Golden Spiral based on the Golden Triangles whirling inside is the classical construction. It is slightly more rounded up and allows for more circular-type designs.

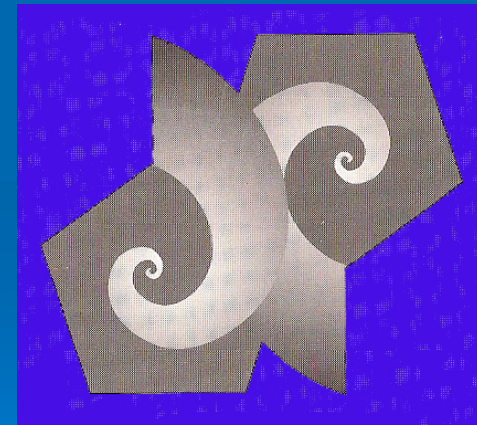


2



Golden Spiral  
based on outer whirling  
triangles

2. ← The Golden Spiral based on the Golden Triangles whirling outside creates a more elongated type of spiral.



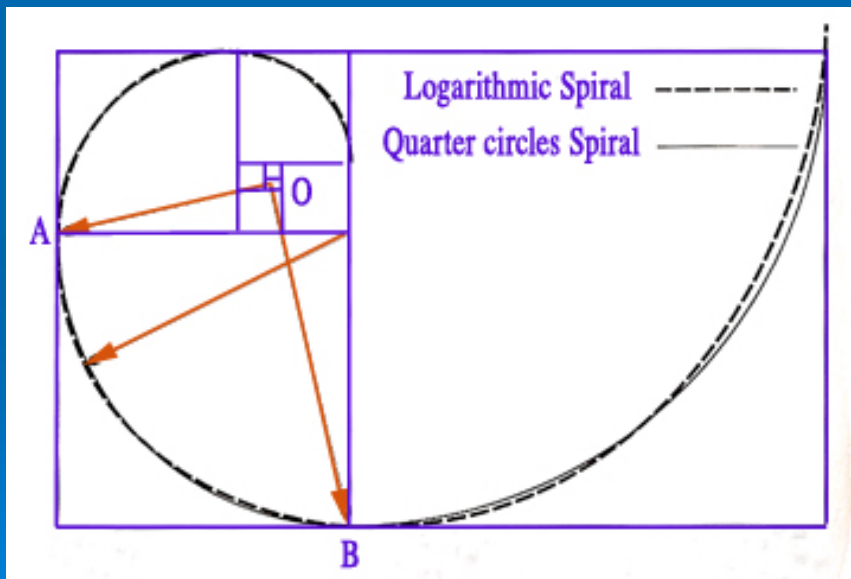
All designs:  
Robert Vincent. *Nombre d'Or et Créativité*.  
Chalagam. 2001. [www.chalagam.com](http://www.chalagam.com)

*These two modulations on the Golden Spiral are found throughout nature and culture, with their Phi Ratio multiples & submultiples.*

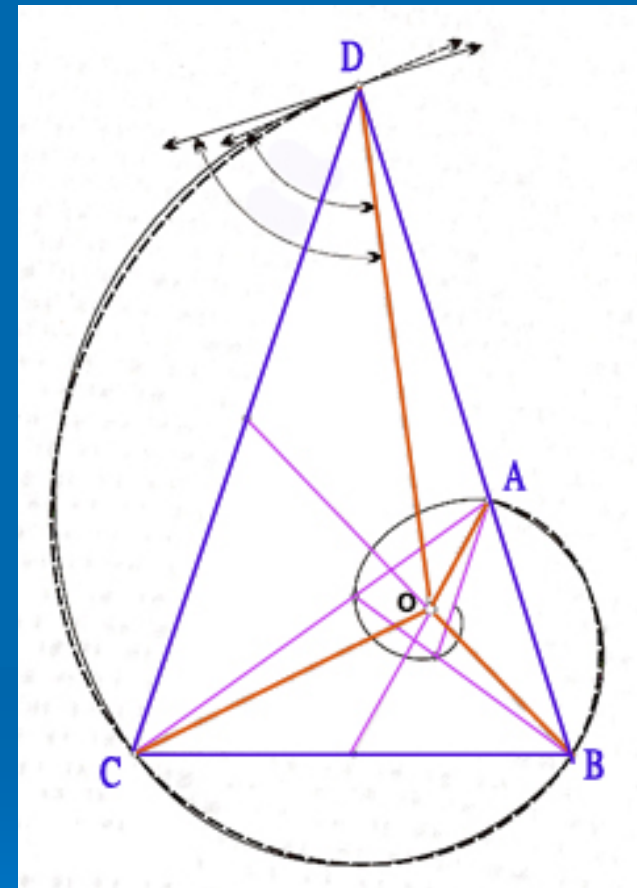
## SG105.4.4.2 Comparing (2) Golden / Logarithmic Spirals

Mathematically speaking, the Golden Spiral constructed with quarters circles based on the Golden Rectangle or Golden Triangle is slightly inaccurate and not an exact logarithmic spiral because the angle made by the vector radius and the tangent is not constant.

However, for all practical and aesthetic purposes, the quarter circle construction is perfectly fine.



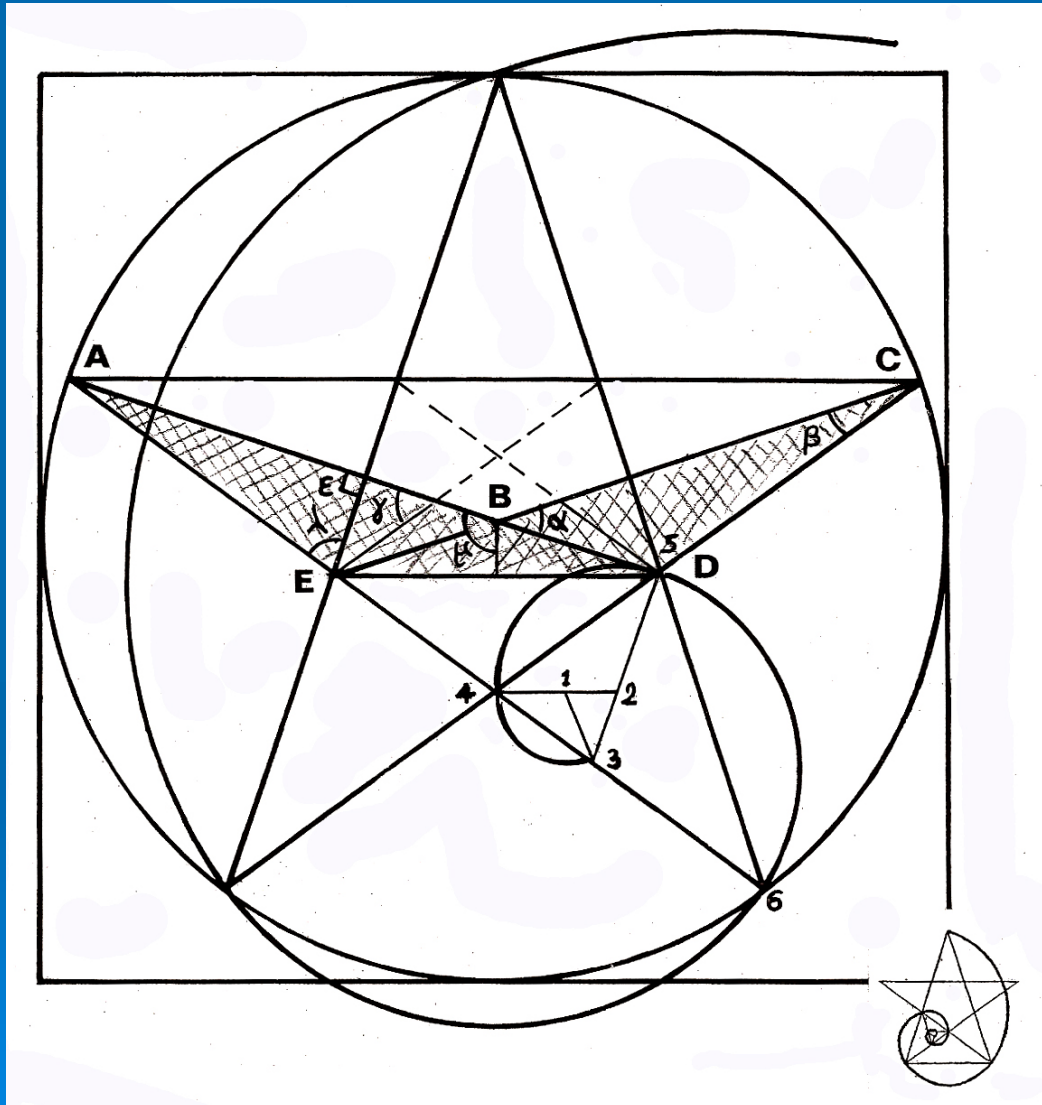
↑ The two spirals based on the Golden Rectangle



↑ The two spirals based on the Golden Triangle

(Diagrams. Christian Hakenholz.  
*Nombre d'Or et Mathématique.*  
Chalagam. 2001. [www.chalagam.com](http://www.chalagam.com))

## SG105.4.5.1 Golden Spiral & Pentagram (1)



The Golden Spiral can also be built upon a Pentagram since a pentagram is a star-pentagon or extension of the five-sided pentagon, by five Golden Triangles.

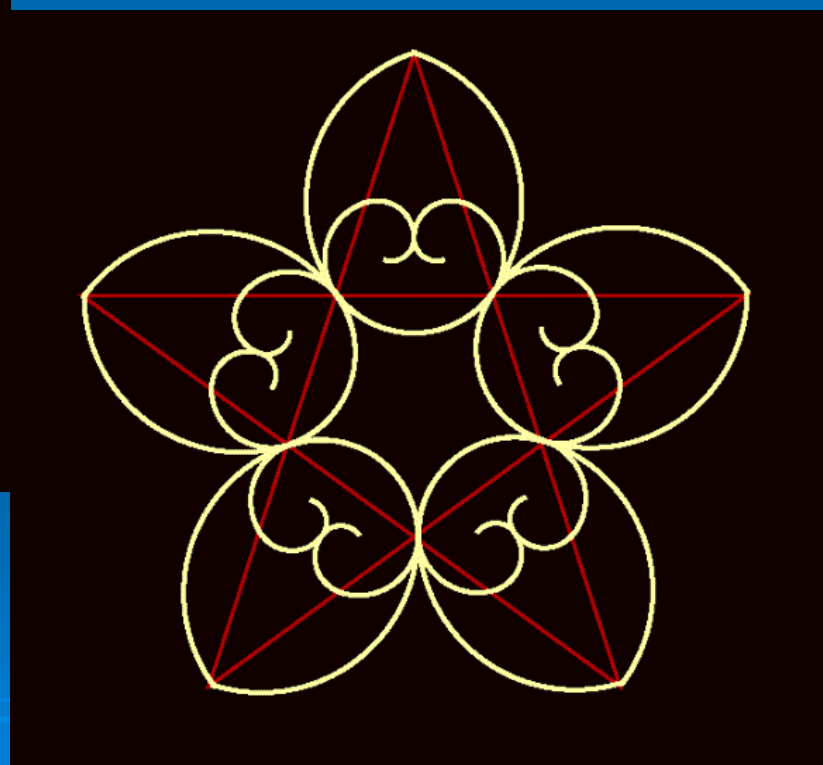
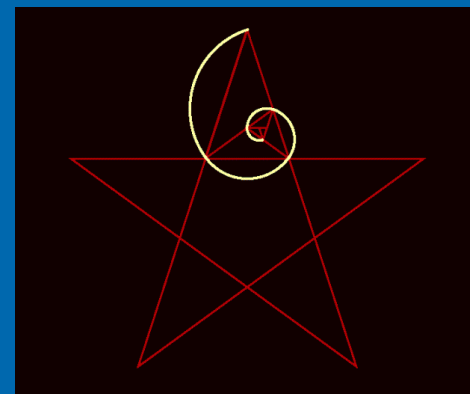
**Construction:** The numbers 1, 2, 3, 4, 5 and 6 mark the successive places to put the compass point and draw respective arcs.

← The shaded area is traditionally called the “Ark of Hippocrates” = ABCDE.

Many remarkable angles appear in this figure:

alpha =  $36^\circ$     beta =  $18^\circ$   
 psi =  $54^\circ$     lambda =  $72^\circ$   
 epsilon =  $90^\circ$     mu =  $108^\circ$

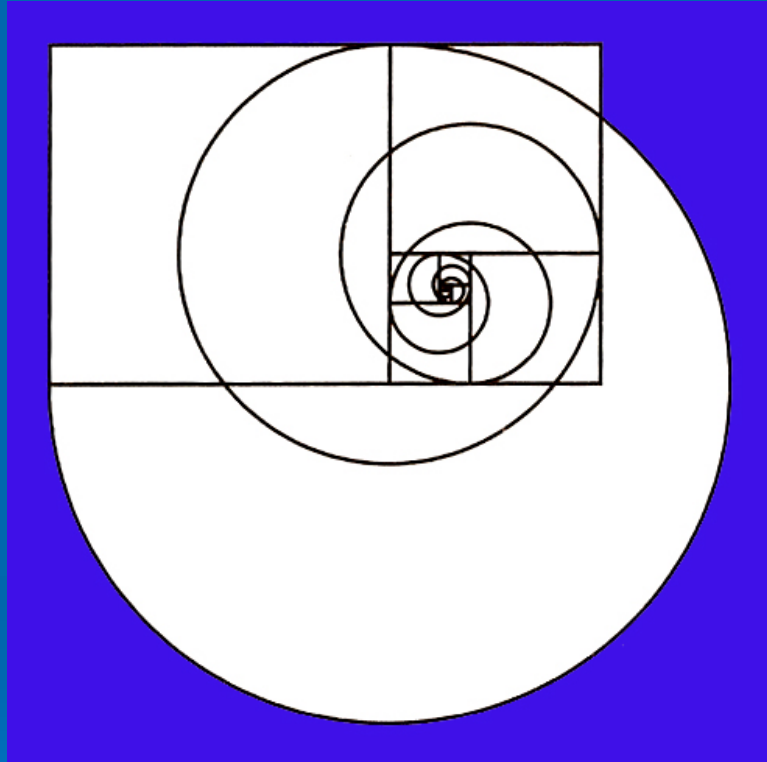
## SG105.4.5.2 Golden Spiral & Pentagram (2)



[www.goldenmean.info](http://www.goldenmean.info)

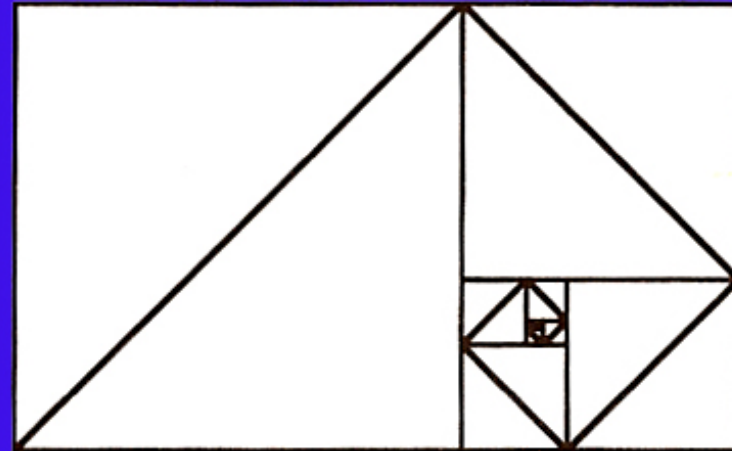


## SG105.4.6 Golden Spiral - Other Constructions

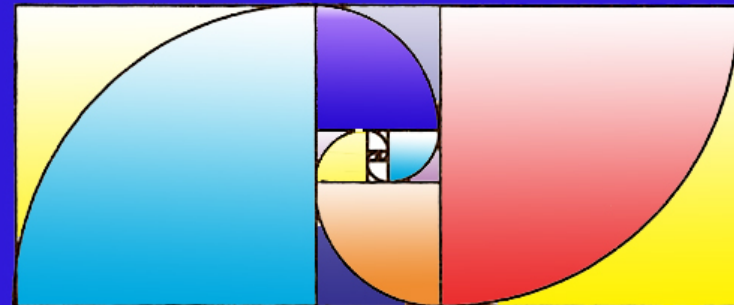


↑ If we replace the quarter-circles by their complementary arcs (3/4 circles), we get the Great Spiral Vortex.

(After H. Walsler. *The Golden Section*.)



↑ Semi-linear Spiral of the Golden Rectangle

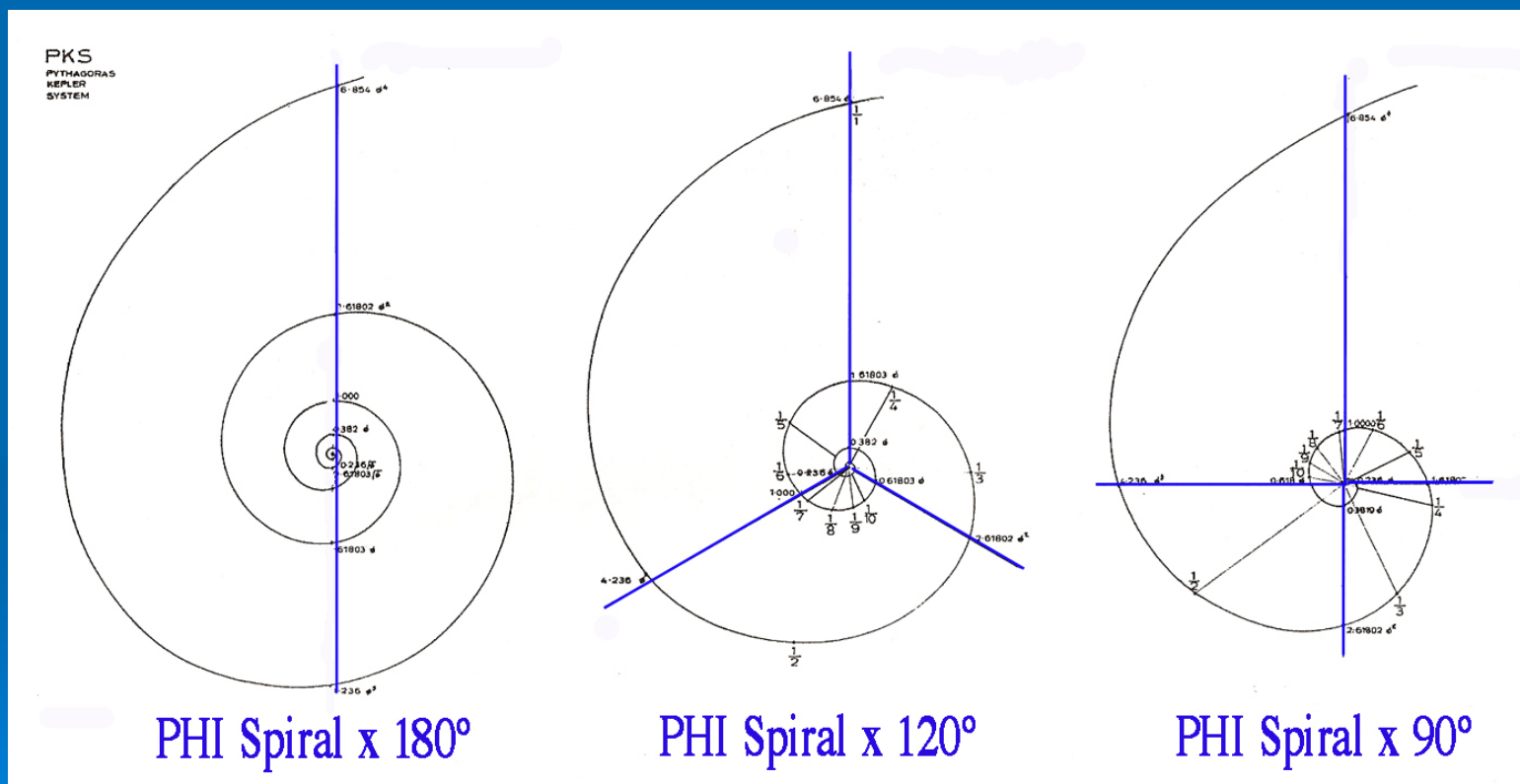


↑ Double Spirals in the  $1 \times (\sqrt{2} - 1)$  rectangle

## SG105.4.7 Golden Spiral Modulations

The question is often asked: *when I look at shells or spirals in plants, they all look like they have many DIFFERENT types of spirals.* The answer is: oftentimes they are mathematically precise modulations on the common theme of the Golden Ratio.

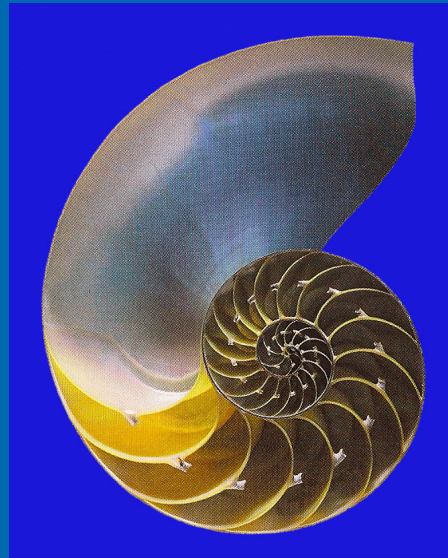
This is accomplished in nature by varying the angle between the adjacent radii (their relative length conformed to the PHI ratio).



↑ PHI Spirals on 3 different angular axes.  
(Callum Coats. *Living Energies*. Gateway. 1996.)

## SG105.4.8 J. Bernoulli & the Spira Mirabilis

Jacob Bernoulli (1654-1705) was the first member of his distinguished family to achieve fame as a mathematician. Following his father's wishes, he first earned degrees in theology and philosophy. But his love was mathematics and he set up traveling throughout Europe to learn his trade. Influenced by Leibniz and his "infinitesimal calculus", Jacob Bernoulli contributed greatly to the foundation of calculus and was the father of the Probability Theory.



Jacob Bernoulli was fascinated by the relationship between mathematics and the cosmos. He studied extensively questions related to spirals and wrote a treatise called *Spira Mirabilis* (Latin for 'Wonderful Spiral') about the logarithmic spiral. He was deeply taken by the self-similarity of the Spira Mirabilis: any section, if properly scaled, is congruent with other portions of the spiral. Jacob wrote:

"(The logarithmic spiral) may be used as a symbol, either of fortitude and constancy in adversity, or of the human body, which after all its changes, even after death, will be restored to its exact and perfect self".

No wonder that Jacob Bernoulli, upon dying, requested the logarithmic spiral to be engraved on his tombstone, along with the motto: EADEM MUTATA RESURGO ('Though changed, I arise the same again').

As fate had it, the spiral engraved by the stone mason was the Archimedean spiral - not the Logarithmic spiral he so loved.



↑ The actual inscription

What is  
should  
have been →

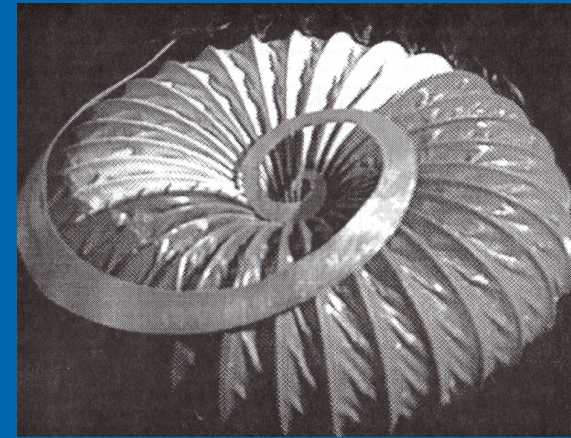




# SG105.4.9.1 Golden Spiral & Torus Vortex (1)

“A vortex (plural: vortices) is a spinning, often turbulent, flow of fluid”. (Wikipedia).

Any spiral motion of energy around a center is a *vortex*. A vortex flow is usually associated with a *torus*, specially the “*spindle torus*” which allows for a double polarity flow. A Golden Vortex incorporates the Golden Spiral. The vortex may well be the primordial dynamics of the universe, from atoms to galaxies. [◆SG203B]



↑ The Golden Spiral turns a torus into a vortex

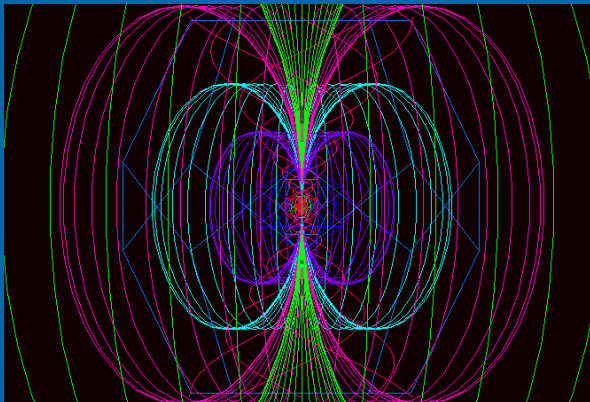


↑ The Golden Mean Spiral maps out a 7-colors “rainbow donut” torus.

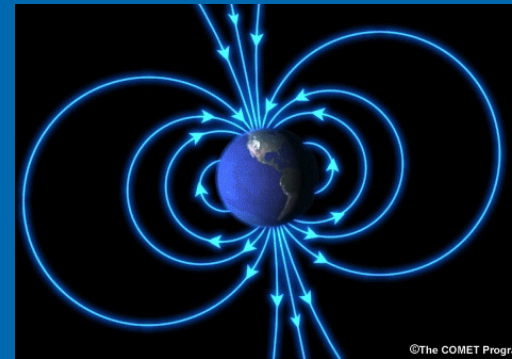
	full view	cutaway	cross-section
ring torus			
horn torus			
spindle torus			

↑ Standard *tori*  
[//mathworld.wolfram.com](http://mathworld.wolfram.com)





## SG105.4.9.2 Golden Spiral & Torus Vortex (2)



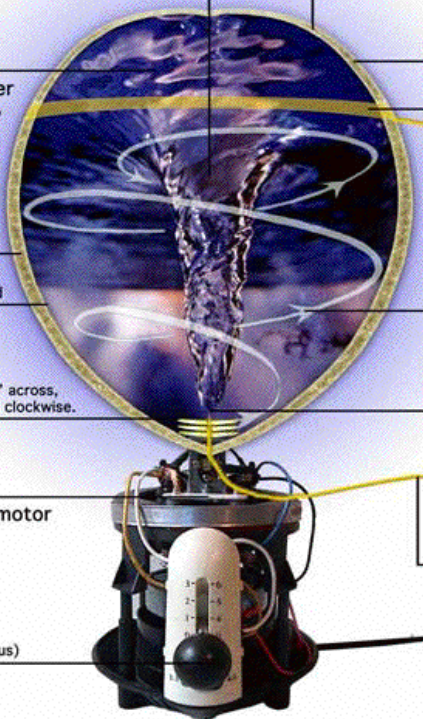
↑ The Earth vortex

In Vortex Implosion Design: Power Out derives from Charge Acceleration thru C (light speed)

- The water is piezoelectrically 'doped'.

Port-U-Grail

<p>Optimising the Whole by measuring the Blue aura with HeartTuner</p>	<p>Fast spinning Vortex for picking up an Energy charge</p>
<p>Most magical water with Colloidal content, a Trace mineral that makes the water piezo-electric.</p>	<p>Egg-shape already creates a charge difference</p>
<p>Ceramic or Glass</p>	<p>Optimising Shape container Side view: 2 golden mean spirals</p>
<p>super smooth polished</p>	<p>Golden band for picking up electrostatic charge</p>
<p>Impeller: several plates 2" or 3" across, Tesla Turbine, Turning clockwise.</p>	<p>Water motion at edge of container</p>
<p>50.000 rpm DC motor</p>	<p>Vortex Implosion contactPoint for picking up electric charge</p>

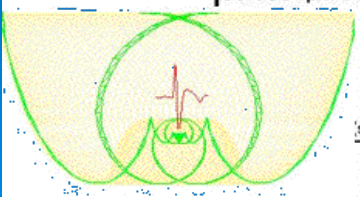


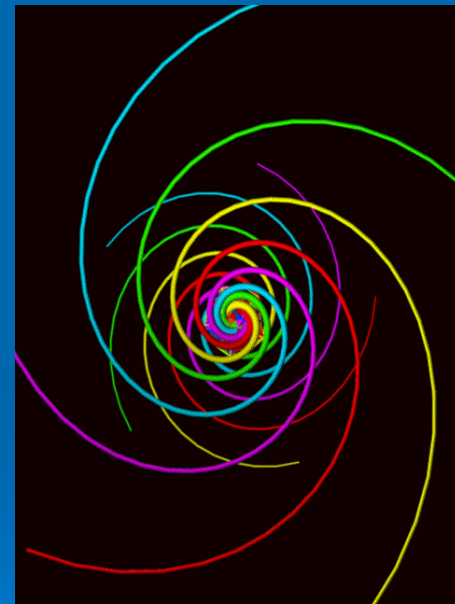
Transformer

? Volts OUT

IN

V IN

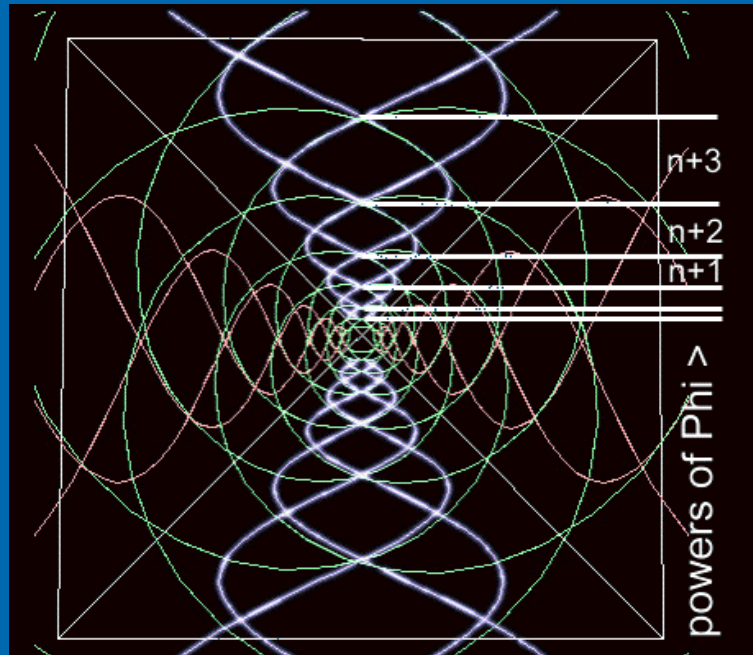




↑ Golden Spiral spin path into implosion

← New generation of Implosion vortex technology.  
([www.goldenmean.info](http://www.goldenmean.info))

## SG105.4.10.1 Golden Spiral & Implosion



↑ Quad-implosion tracks showing exact PHI ratios between nodes.

Dan Winter has shown that the spin path geometry of the Golden Spiral is the key to:

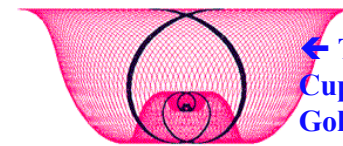
- the perfect compression of fractality
- the “Zero Point” & Implosion energy
- the heart’s compassion/love harmonic pulses

Viktor Schauberger (1885 - 1958) was an Austrian forester/forest warden, naturalist, philosopher, inventor and bio-mimicry pioneer. The inventor of "*implosion technology*" based on nature’s observation, Schauberger developed a new science of energy generation using fluidic vortices and dynamic motion in nature.

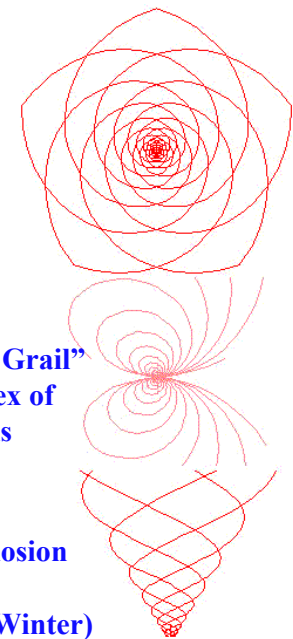
He built implosion propulsion systems for spacecrafts, vortex turbines, self-cleaning pipes and water regeneration vortical systems to re-create live water.

Fifty years later, his insights are finally understood and applied by new paradigm scientists. [◆SG203A]

Here are 3 views of the Spiral Spin Path to the “Zero Point” / Implosion..  
Top / Oblique / Side.. →



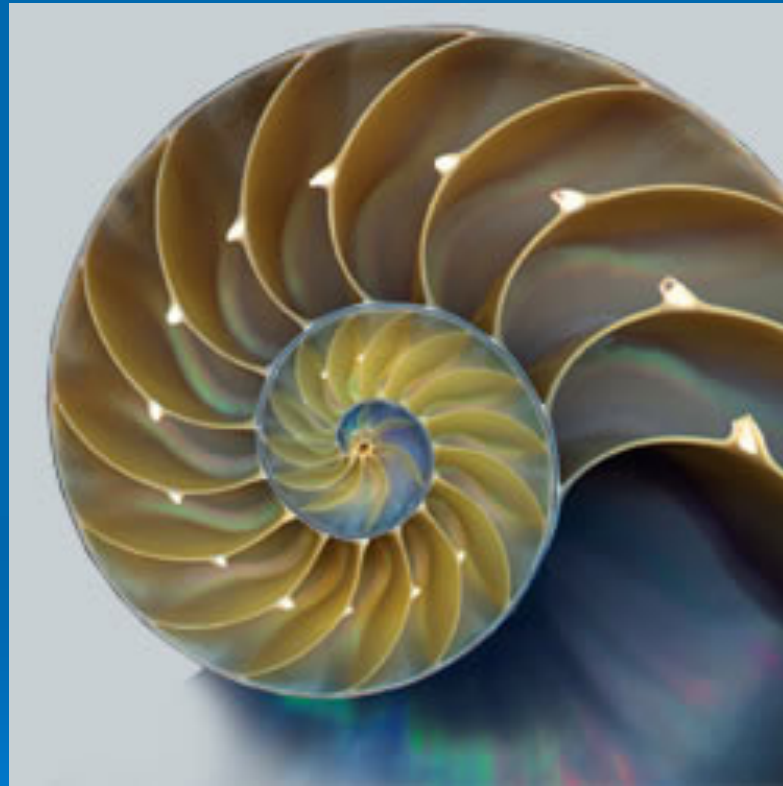
← The “Holy Grail” Cup of a vortex of Golden Spirals



The Golden “Holy Grail” of fusion/implosion also has a consciousness aspect: compassion is spiritual implosion (Dan Winter)

Diagrams: ([www.goldenmean.info](http://www.goldenmean.info))

## SG105.5 Chapter 5. Golden Spiral Gallery

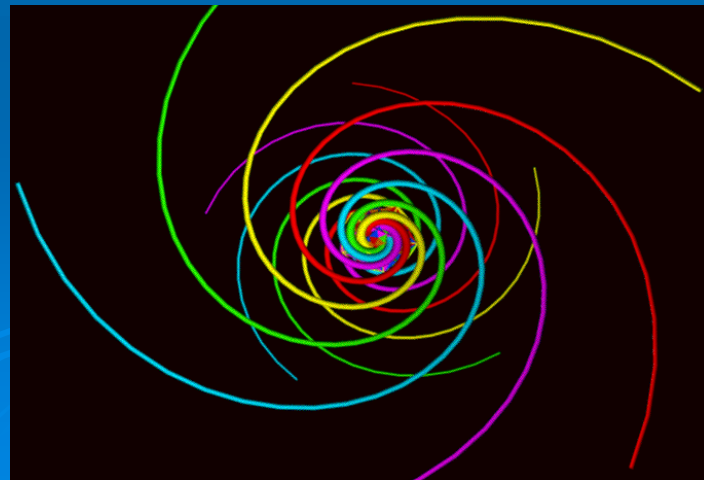
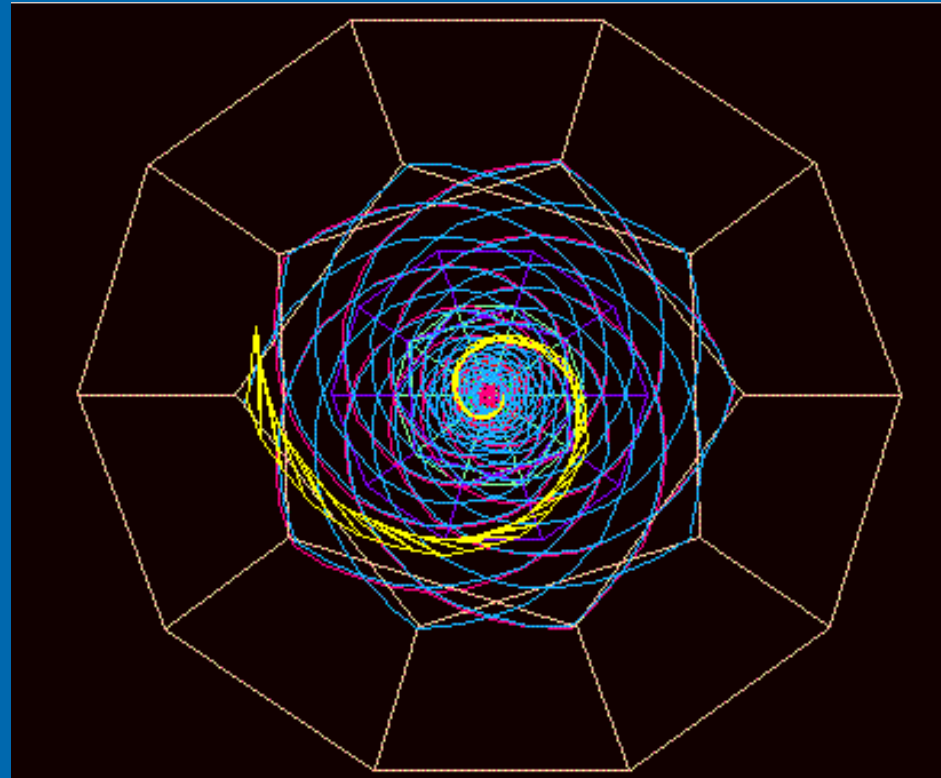




## SG105.5.1 The Golden Spiral



The "Spiral Stone",  
Quincy Park,  
Massachusetts.

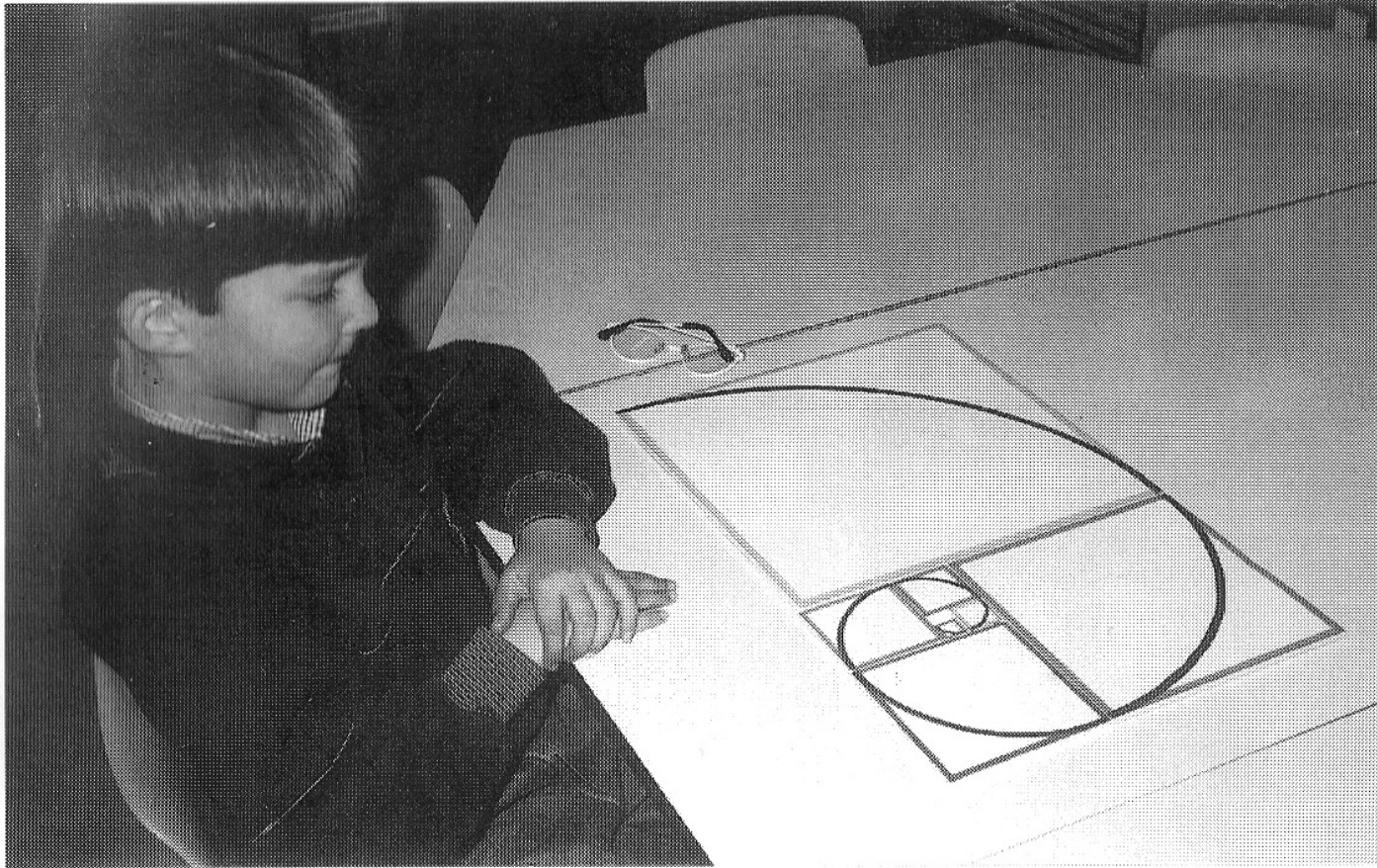


When the Golden Spiral self-embeds perfectly, it provides a harmonic spin path for atomic vortices, DNA, flowers, people and galaxies... to enter the Dance of Life.

[www.goldenmean.info](http://www.goldenmean.info)



## SG105.5.2.1 The Golden Spiral in School (1)



*“I can see myself traveling through this!”*

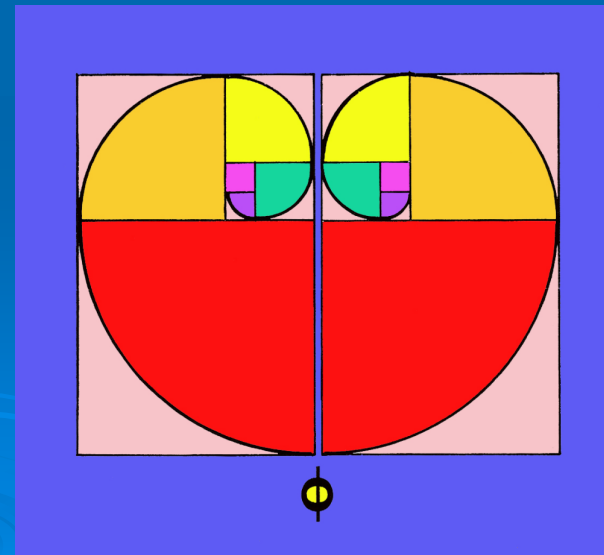
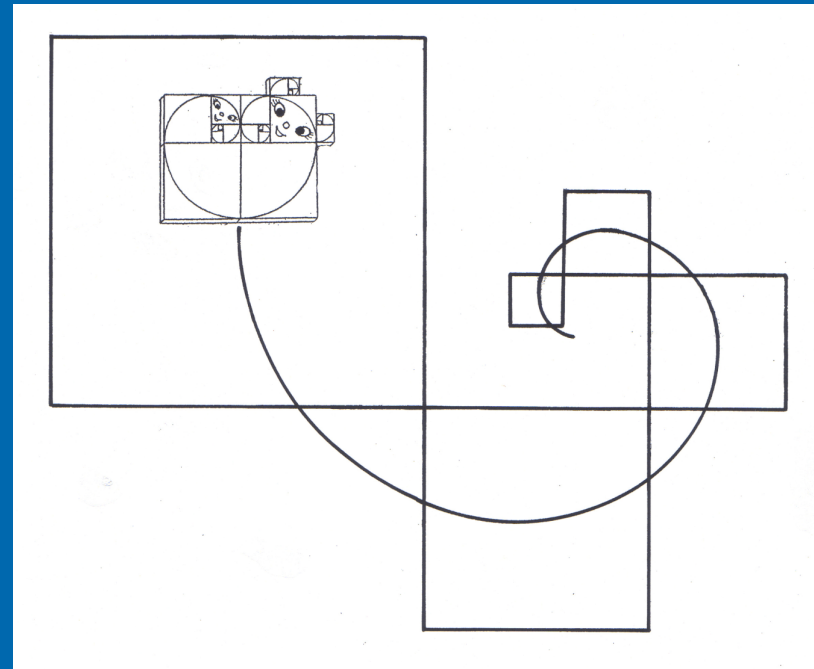
(Mireille Hibon. *L'Enfant et le Nombre d'Or*. Boscodon. 1996)



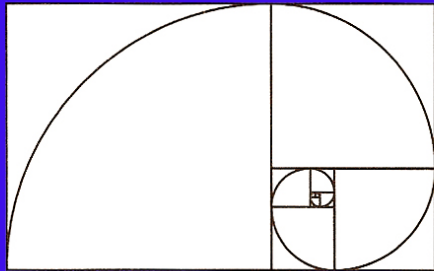
## SG105.5.2.2 School (2)



(Mireille Hibon)



“One  
heart...  
two  
hearts...”



**SG105.5.3 Golden Spiral Fractals**



The "Golden Fractal Tree" ↑ .

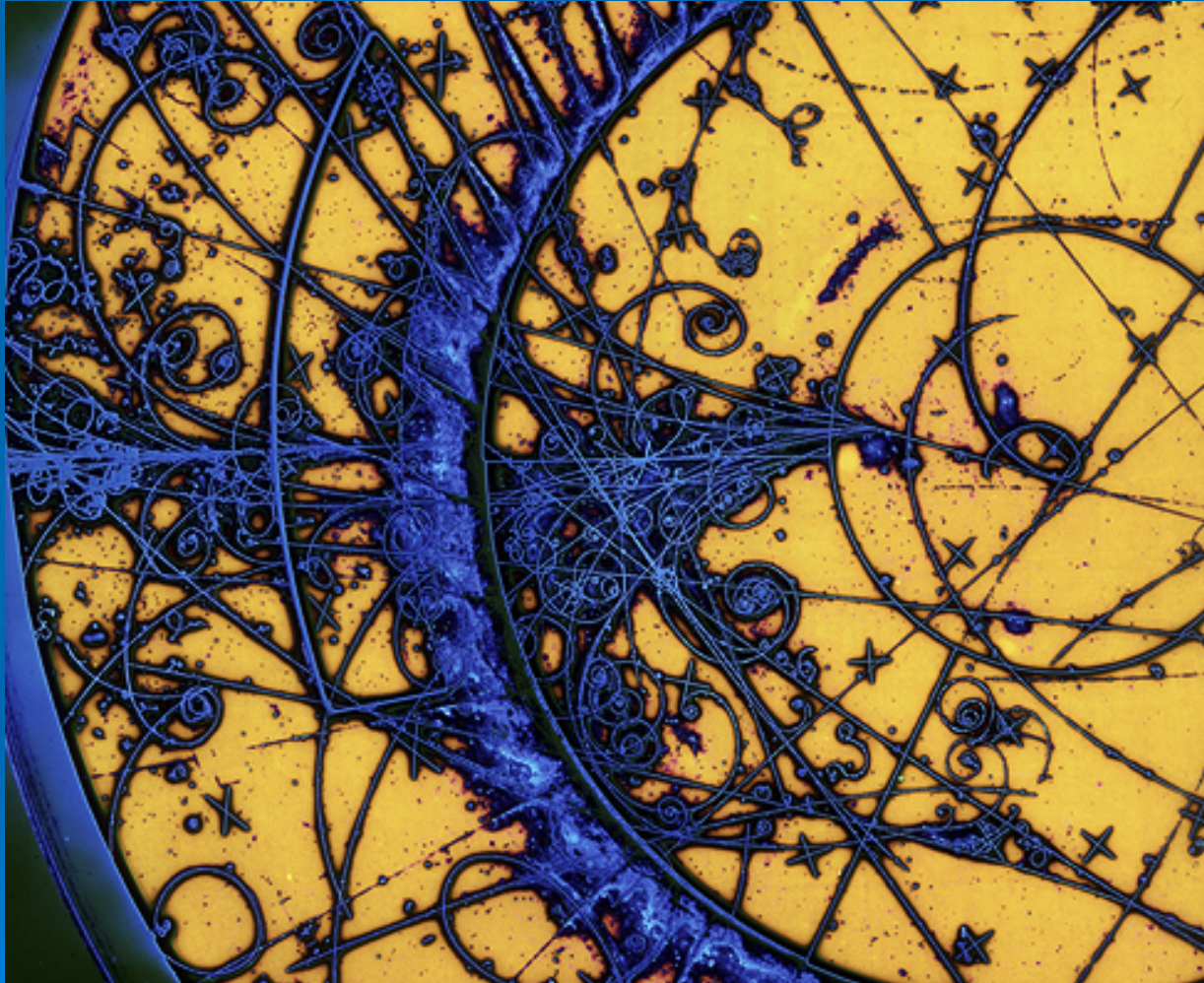


← A nested pentagonal Golden Spirals vortex is a recursive self-similar fractal agent of harmony.

It functions as a super-conductive scale-invariant carrier of the cosmic codes of creation. (Dan Winter)



## SG105.5.4.1 Nature - Atomic Particles



← Image from a bubble chamber showing the elegant pathways of motion that tiny particles make as they move through liquefied gas.

This enticing choreographic display of spiraling tracks is caused by collisions between subatomic particles...

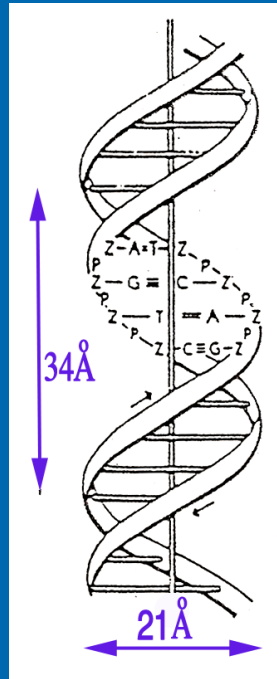
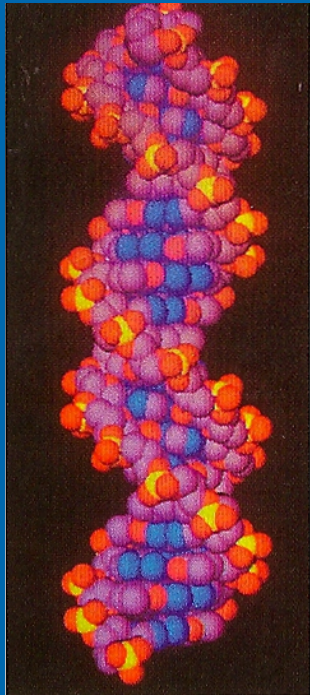
... and by the inner-universal codes of spiral Sacred Geometry.



(A great educational site about Spirals: [www.spiralzoom.com](http://www.spiralzoom.com))

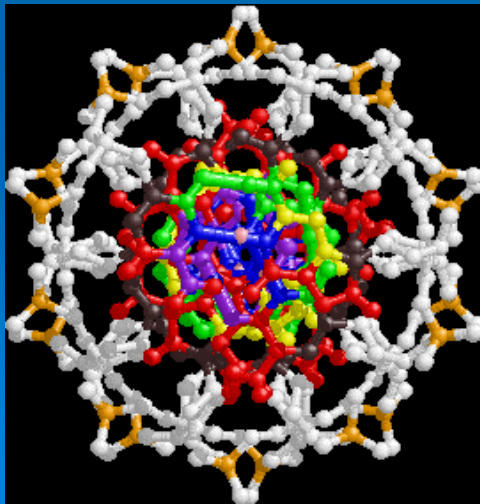


## SG105.5.4.2 Nature - Golden Helix DNA



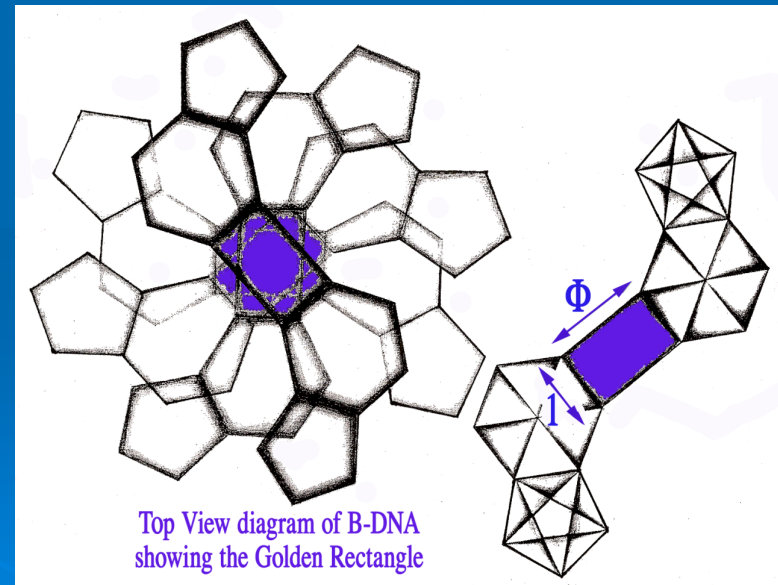
The double-stranded DNA helix (B-DNA) presents two grooves in its spirals with a ratio of 21 angstroms (1 angstrom = 100 millionth of a meter) for the larger groove to 13 angstroms for the smaller groove.  $21 / 13 = \Phi$ .

One full helix turn measures 34 angstroms high by 21 angstroms wide.  $34 / 21 = \Phi$ .



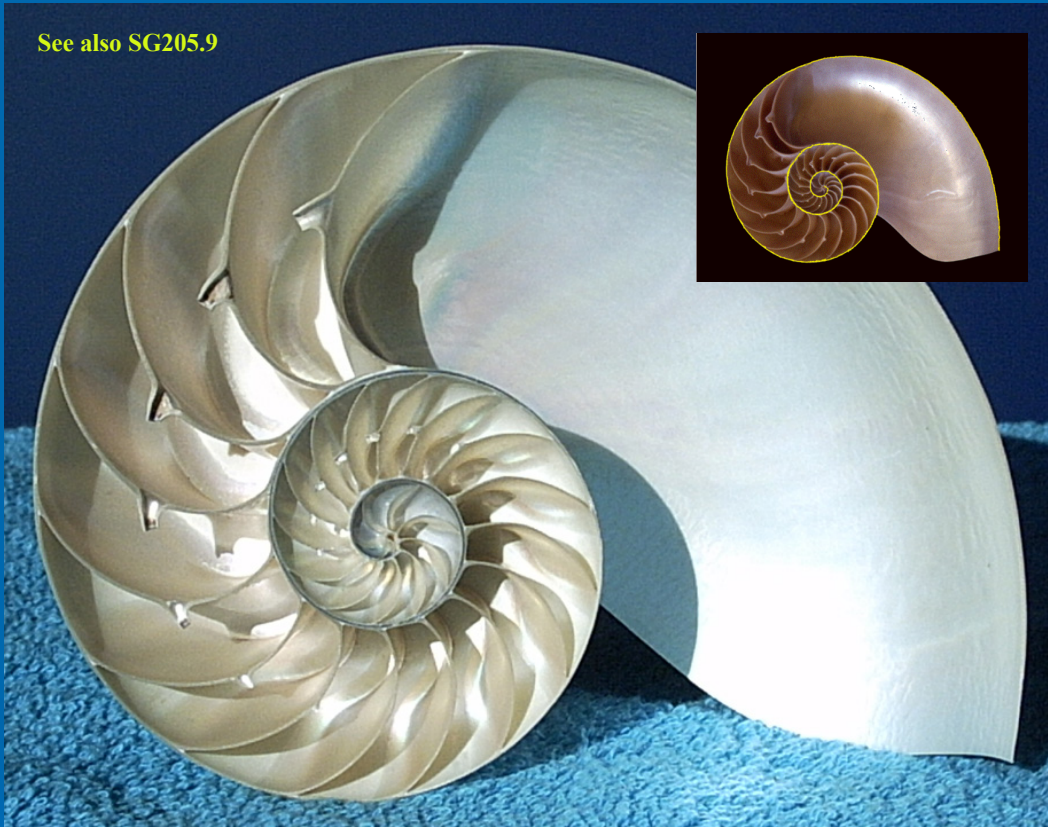
← Top view model of DNA helix showing the decagonal geometry.

→ DNA diagram showing the hexa-penta components and the Golden Mean Rectangle.



## SG105.5.4.3 Nature - Shells (1) - Nautilus (1)

See also SG205.9



- The *pearly* or *chambered Nautilus* is the sole survivor of a stock that flourished 200 million years ago. The PHI-ratioed spiral shell consists of a series of chambers partitioned by *septa*. The animal lives in the largest and newest chamber, with a tubular elongation of its body extending through the septa to the apex of the shell... i.e. a “tail” or energy line that reaches through its successive “past lives” all the way through its “root”...
- The name comes from the Greek *nautilus* = sailor.
- Nautiluses live in deep water, down to several 1,000 feet but come up at night to feed.

Having survived relatively unchanged for millions of years, nautiluses represent the only living members of the subclass *Nautiloidea*, and are often considered to be ‘living fossils’.



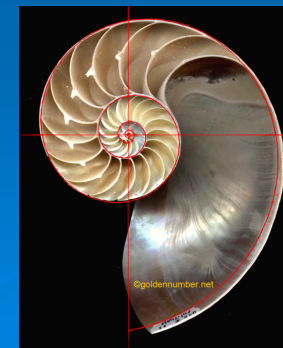
### Is the Nautilus a Golden Spiral?

The classical Golden (Fibonacci) Spiral expands the width of each section by the golden ratio with every quarter of the circle (90°) turn. But there is another golden spiral that expands with every full 180° rotation: it grows more gradually. The Nautilus is definitely not fitting the classical Golden Spiral constructed from the Golden Rectangle with 90° turns. However it does fit the Golden Spiral 180°.

If we refine the study and use a golden gauge to measure the expansion rate and dimensions from successive points of the spirals, we get an ever better fit.

See the full discussion here:

<http://www.goldennumber.net/nautilus-spiral-golden-ratio/>



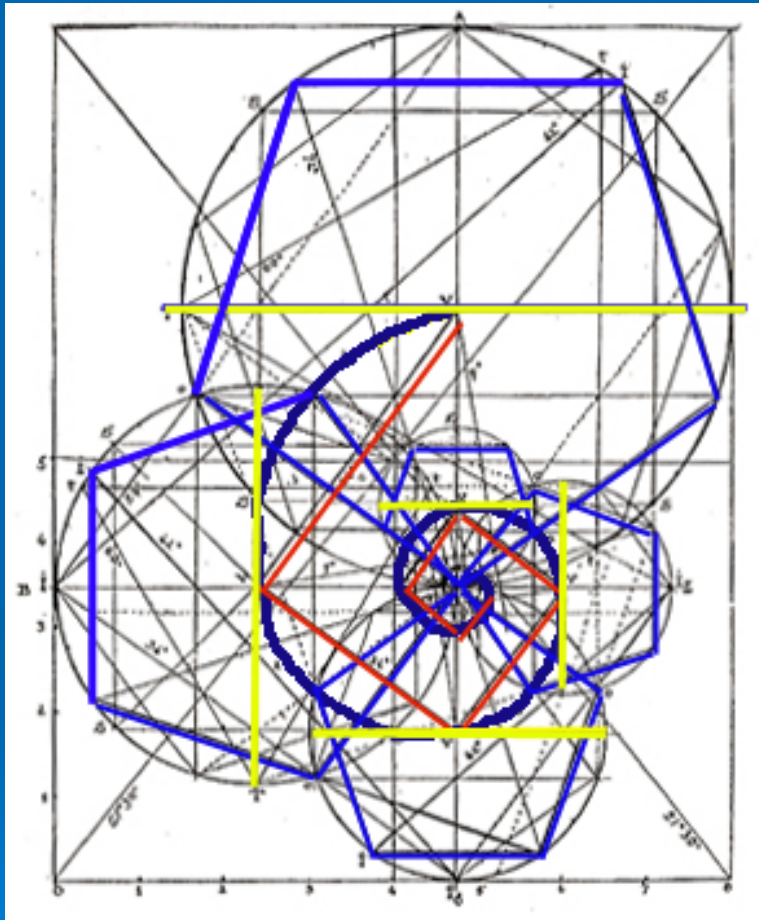
↑ The 180° Golden Spiral



↑ Using a golden gauge.

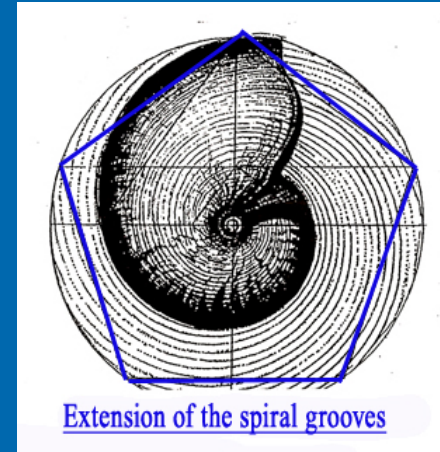


## SG105.5.4.4 Nature - Shells (2) - Nautilus (2)



↑ The harmonic geometries of the Nautilus.

A  
centennial  
view



In his landmark treatise *Nature's Harmonic Unity* (1911), Samuel Colman writes about *conchology* (the study of shells):

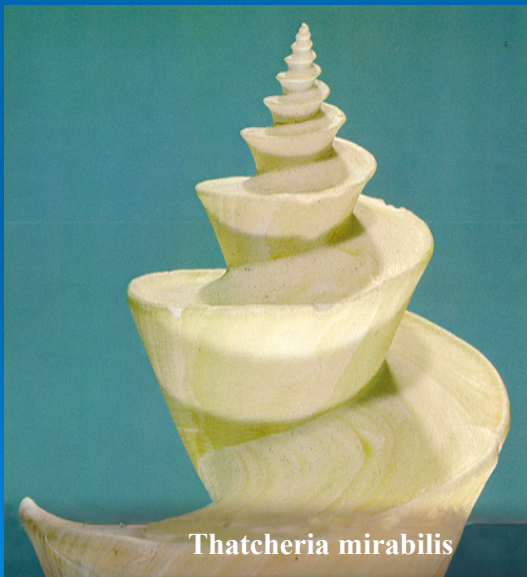
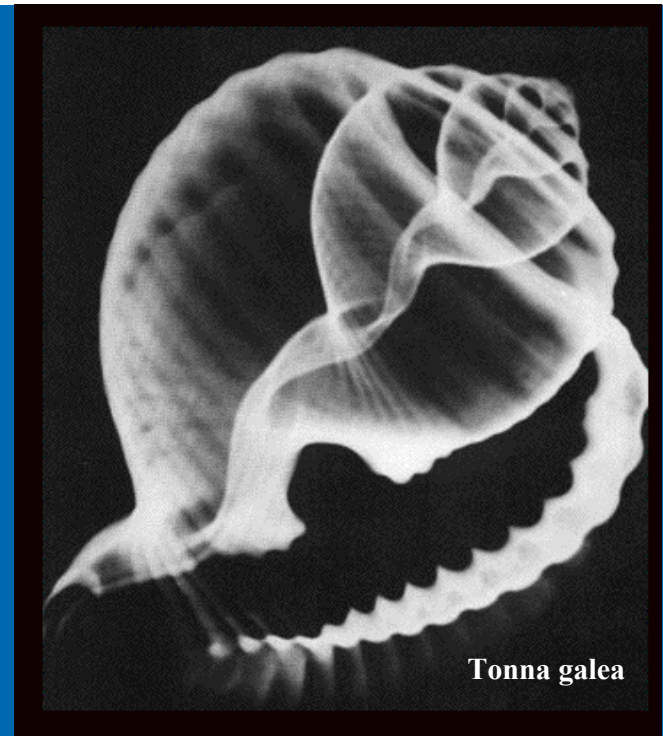
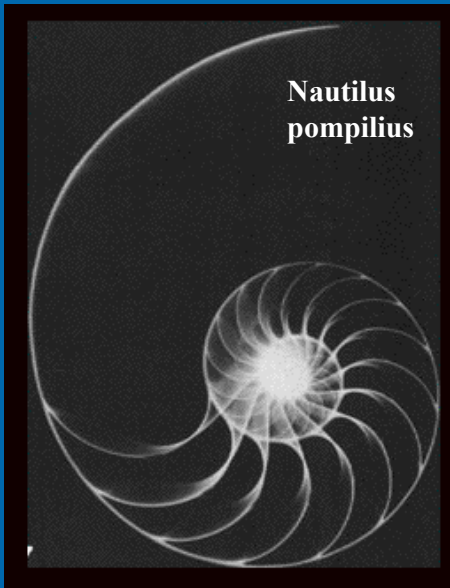
*“Among all the enchanting things in the realm of beauty, the shell is one of the most perfect as a representative form of the spiral construction and the one where the spiral is most obvious to the casual eye, at once announcing itself a geometric product.”*

Colman was most taken by the *Nautilus pompilius* and its “wonderful harmony”. Colman’s precise plans of symmetry, based on the quadrant vectors & chords, show the Nautilus pentagonal & hexagonal symmetries and its tangency to the diameters of harmonic circles.

*“All the lines intersect the others at harmonic points, and this it would not do unless they were in unity”.*

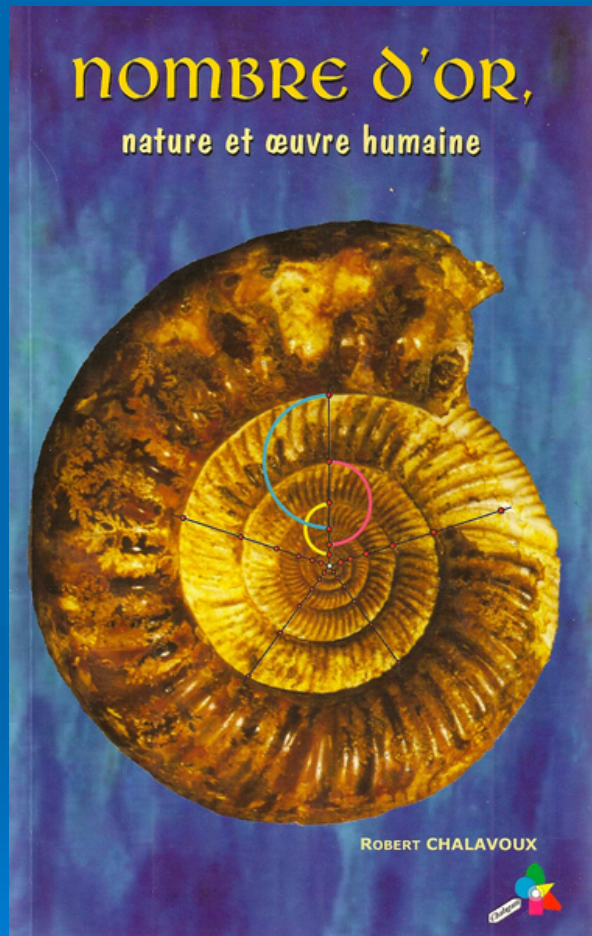
## SG105.5.4.5 Nature - Shells (3)

Shells  
(and their X-rays  
or cross-sections)  
display a magnificent symmetry  
of spiral harmonic  
fractal nesting.

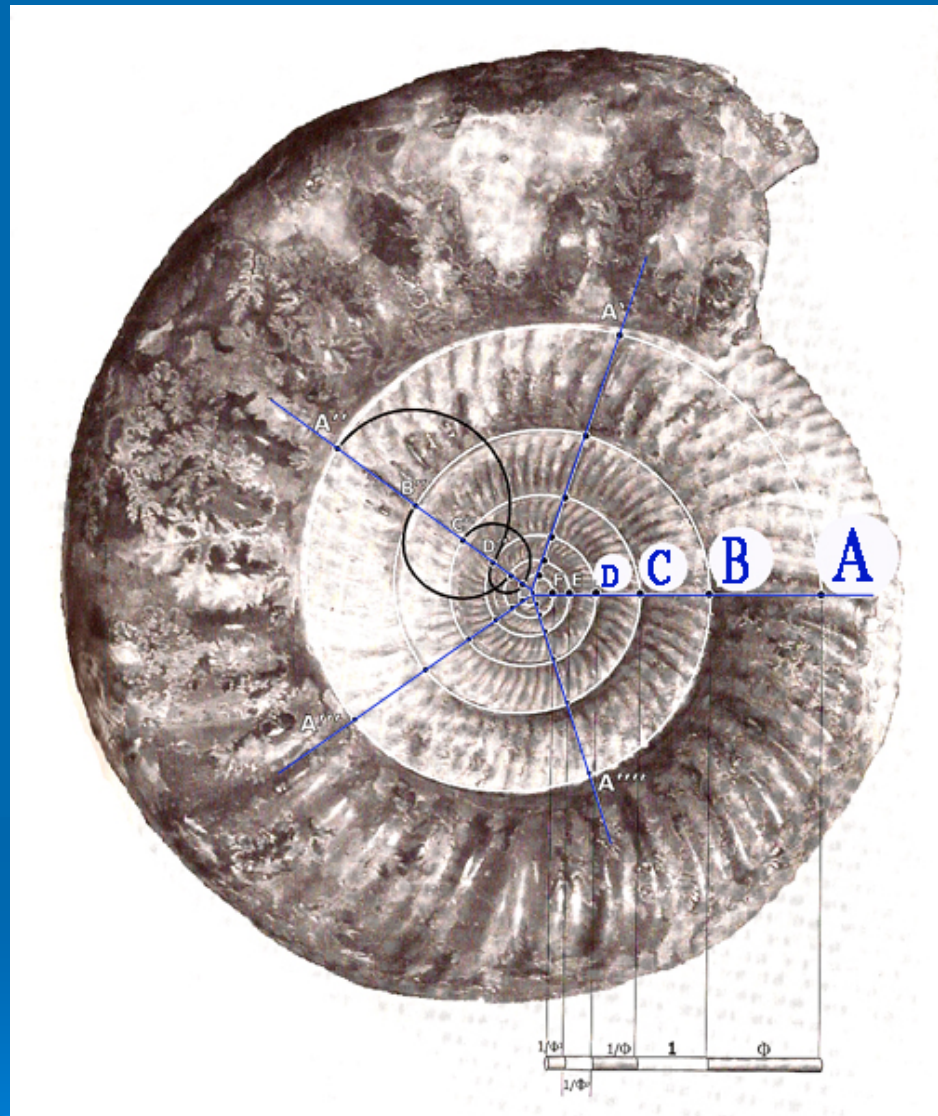




# SG105.5.4.6 Nature - Ammonite



↑ The remarkable booklet  
by Robert Chalavoux.  
Chalagam. 2001 [www.chalagam.com](http://www.chalagam.com)



$$AB = \Phi, BC = 1, CD = 1/\Phi, DE = 1/\Phi^2 \text{ etc...}$$

$$AB : BC = BC : CD = CD : ED \text{ etc...} = \Phi = \text{PHI}$$

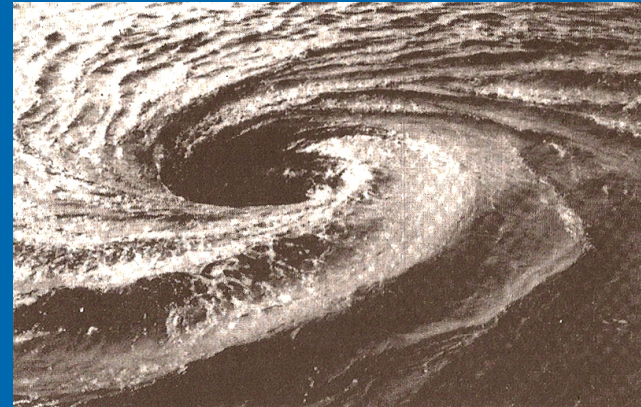
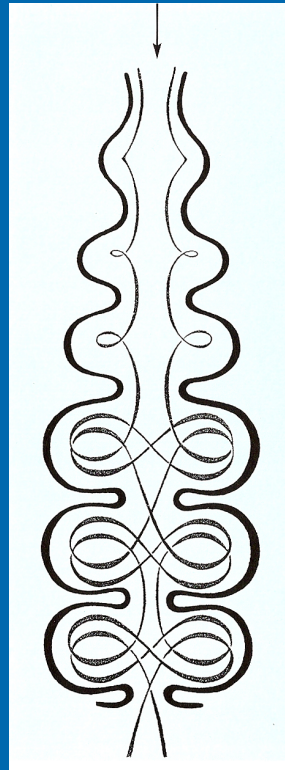


## SG105.5.5.1 Water Spiral Flows



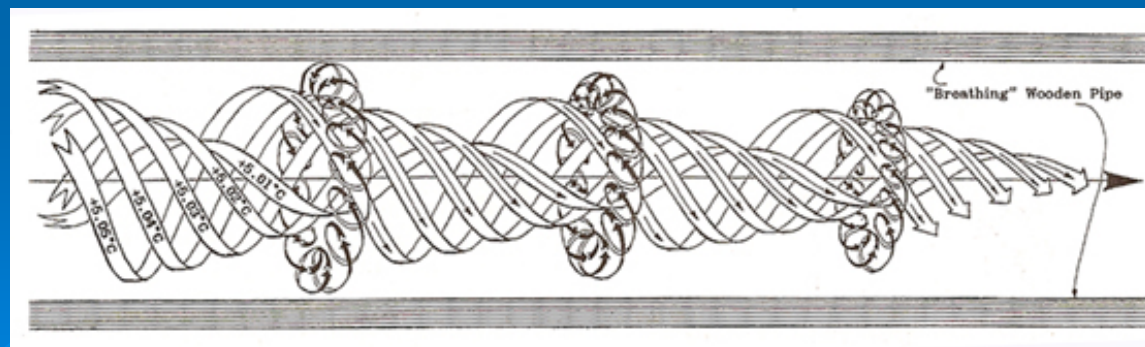
The wake left by a small object pulled through water.

(John Wilkes)



↑ Water spiral vortex flow

← Vortex spiral “lemniscatory” motion achieved by correct proportions. (John Wilkes).



↑ Longitudinal vortex & toroidal counter-vortices developed in the double-spiral pipe invented by Viktor Schauberger. (Callum Coats)



## SG105.5.5.2 Water Hydraulics in Nazca

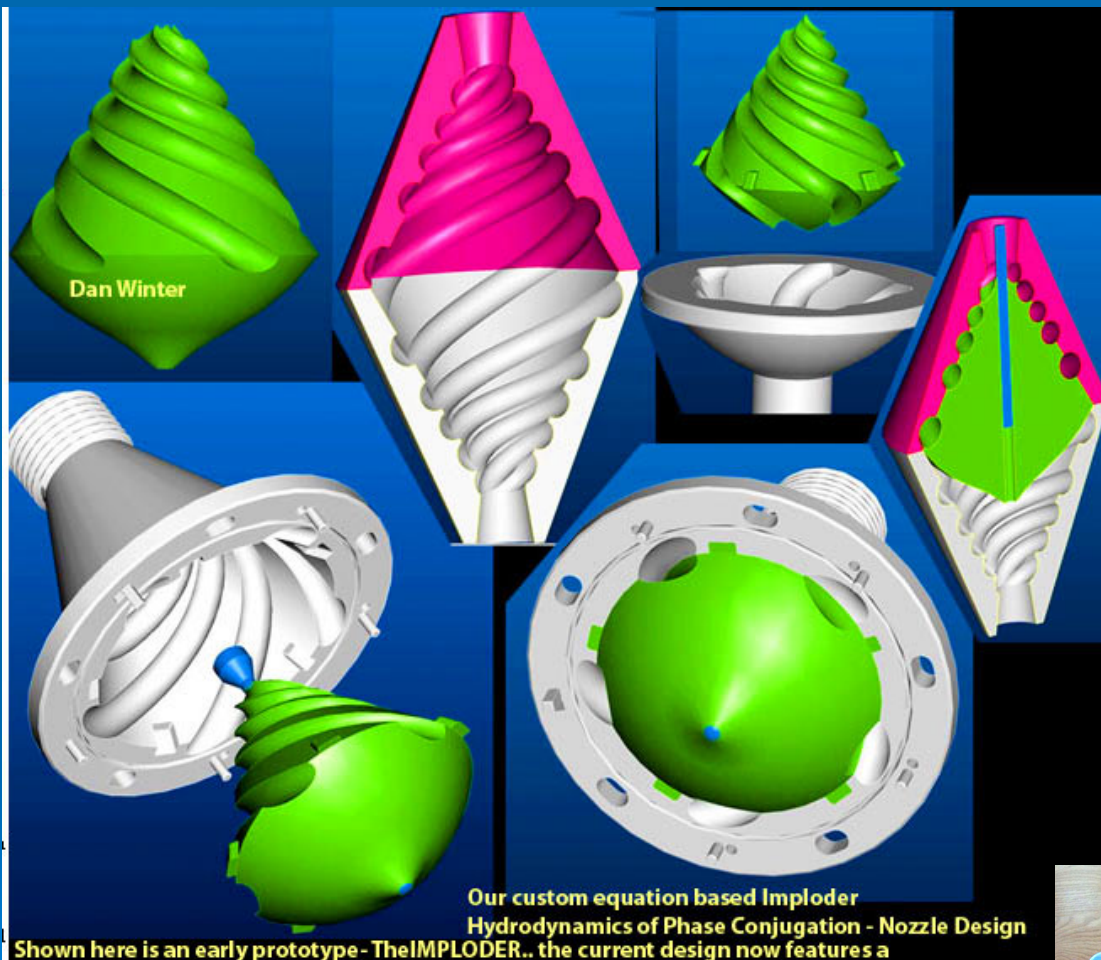


The Aqueducts of Cantalloc, in the Nazca region of Peru, are an extraordinary work of hydraulic eco-engineering. Built around 300 to 600 BCE, the aqueducts were designed to provide a year round water source for the area. The aqueducts conduct water from the mountain springs down to Nazca by means of underground canals. These canals, 36 in total, are S-shaped to allow the water to travel slower during periods of heavy rain. Some of the Cantalloc Aqueducts are still used by farmers in the area.

At various points, water is accessed by spiral-shaped wells, as if to provide a sacred gateway to the Blue Gold of Mother Earth.



# SG105.5.5.3 Water Imploder

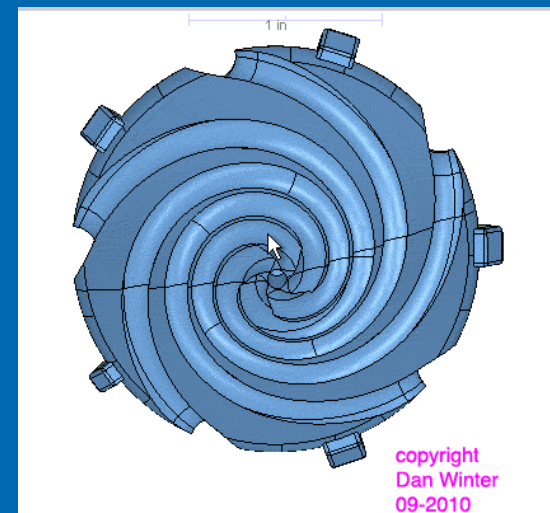


Shown here is an early prototype - TheIMPLODER.. the current design now features a

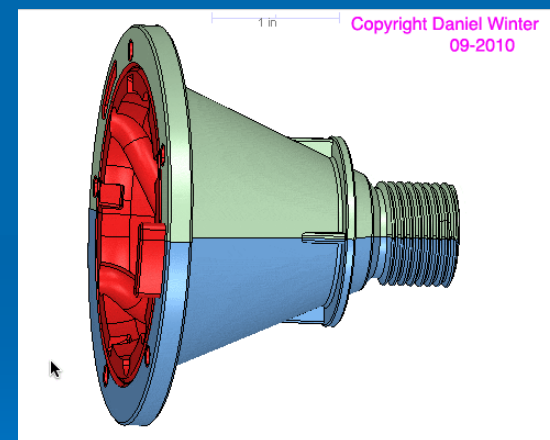
Our custom equation based Imploder  
Hydrodynamics of Phase Conjugation - Nozzle Design

Imploder water treatment device based on the Phi fractal vortex.

[www.fractalfield.com](http://www.fractalfield.com)



↑↓ Animations



## SG105.5.5.4 Flowforms (1)

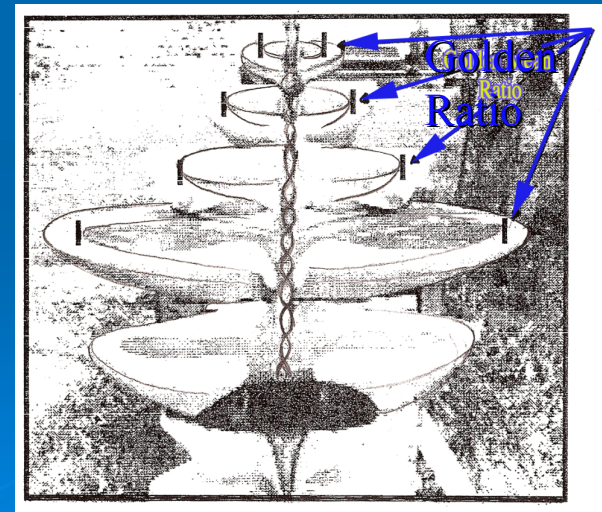
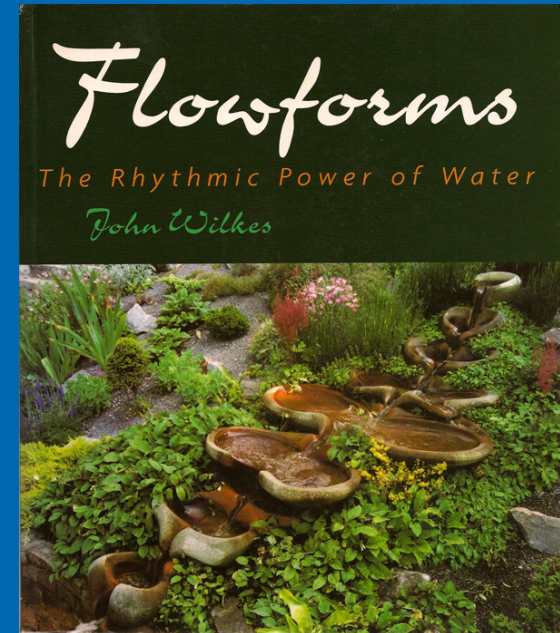
Launched by pioneers like A. John Wilkes, and commercialized by companies like *Virbela* and *Waterforms*, the *Flowforms* are water fountains built into cascading vessels shaped in the Golden Mean Ratio.

Water flowing through Flowform systems pulsates in Golden Spiral vortical meanders. The quality of water thus treated is greatly enhanced.



<http://www.nationalwatercenter.org/flowforms.htm>

← Sketch for Flowform.  
John Wilkes.





## SG105.5.5.5 Flowforms (2)

← One of the original inspirations of John Wilkes in his way to develop the *Flowforms* was... a seaweed.



A “flowform” seaweed -  
*Sacchariza Polyscheides*

*“At both ends there is a complex asymmetry: one expanding into flat fronds, the other radiating linear roots from a spherical-like organ. In between a transitional realm along a flat central stem with edge corrugations developing into a dramatic meandering form either side, bringing a tendency to bilateral symmetry in this rhythmical sector.*

*The plant often wraps its roots round a pebble which leaves it free to move with the sea, yet weighs it down so that it can actually travel in a vertical posture.”*

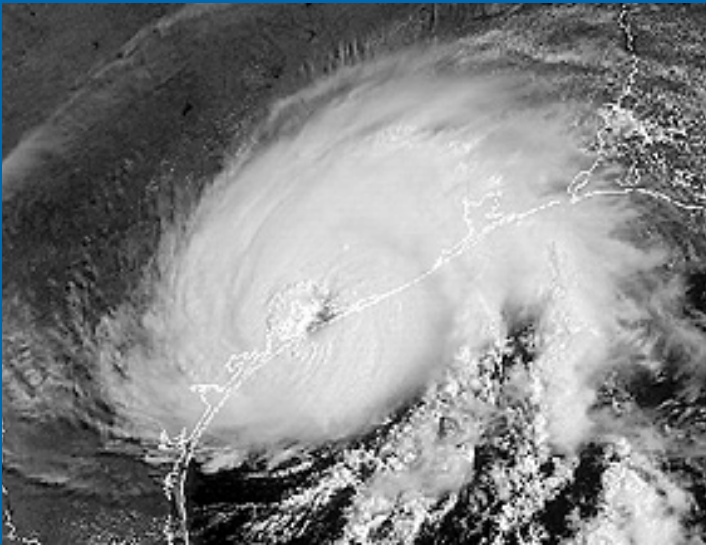
John Wilkes



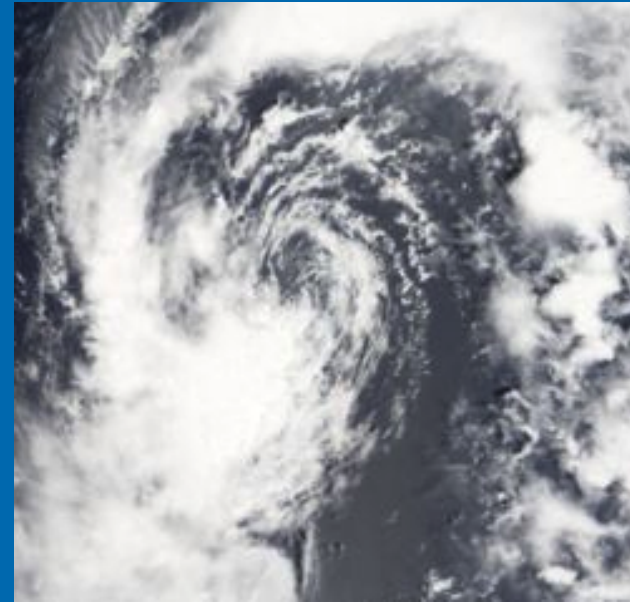
↑ A vortex water energizer.  
[www.ancientcircles.com](http://www.ancientcircles.com)



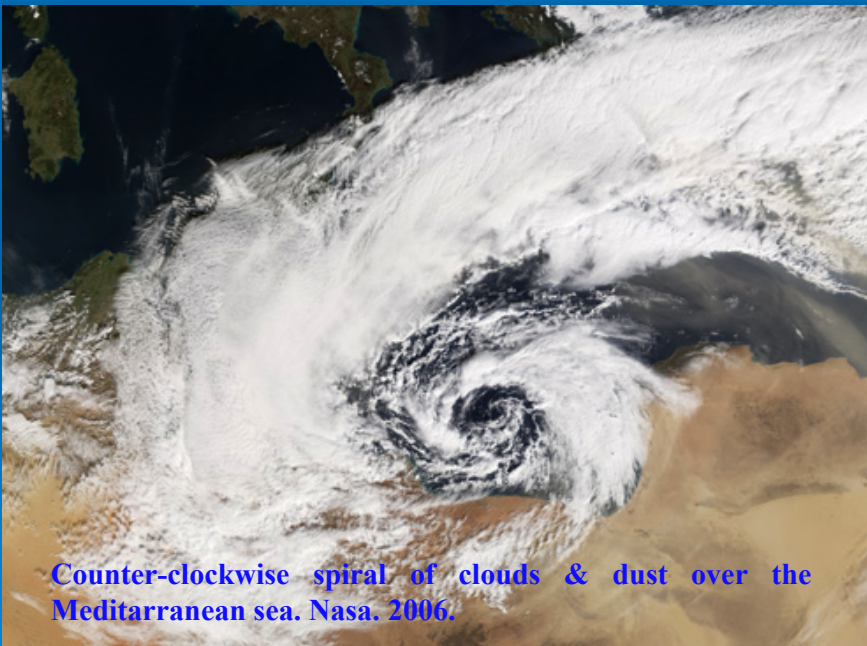
## SG105.5.6.1 Spirals in the Air



← A hurricane is a tropical storm with winds blowing in a large spiral around a relative calm center known as the "eye."



↑ Tropical storm Harvey

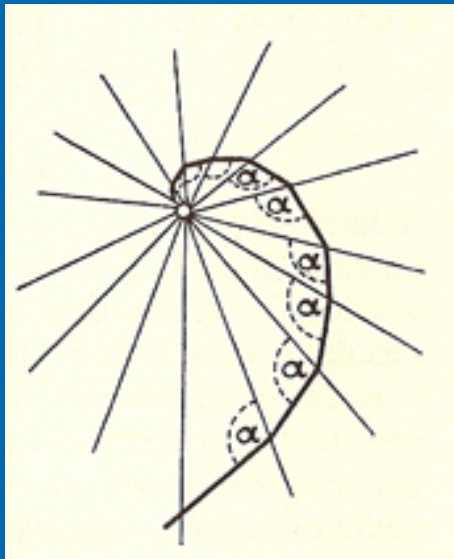


Counter-clockwise spiral of clouds & dust over the Mediterranean sea. Nasa. 2006.



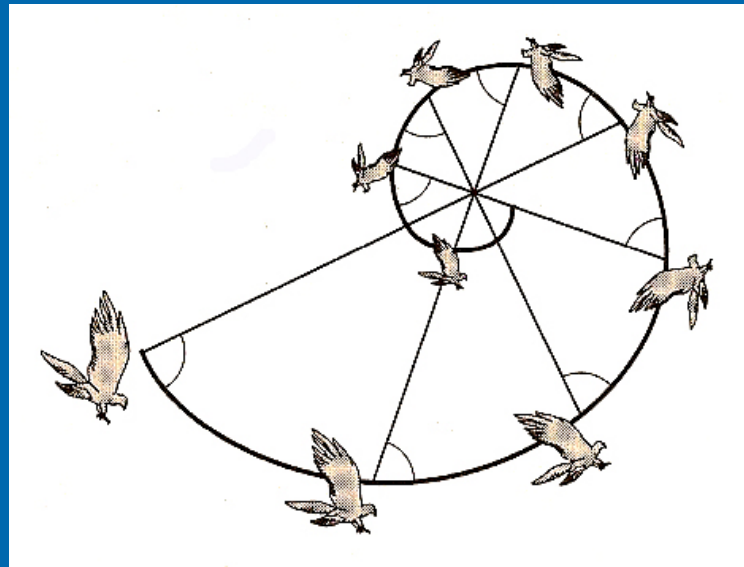
← The "Galactic Gate" on the Human head.

## SG105.5.6.2 Spiral Flight Paths



↑ Spiral flight path of an insect as it draws towards a light.

(D'Arcy W. Thompson. *On Growth and Form*. 1961).



← The spiral flight of falcons.

(Image. Mario Livio. *The Golden Ratio*. Broadway. 2002)

↑ In the *Journal of Experimental Biology* (Vol. 203, 2000), biologist V. A. Tucker (Duke University) et al. show that falcons fly in a logarithmic spiral path when approaching their prey.

The reason why falcons don't fly straight to their prey is because their eyes are located on the side of their heads: they wouldn't be able to see their prey and the aerodynamic drag would slow them down. So, peregrine falcons have developed an optimum flight path to surprise and accurately target their prey. That flight path is based on the logarithmic spiral,

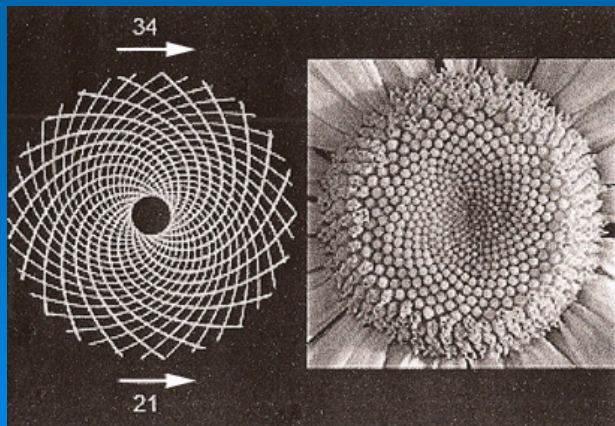
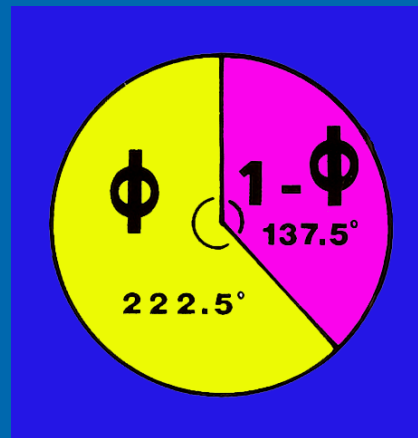
For falcons, the Golden Spiral is the energy efficient flight path of least resistance that allows full view of their prey at all times.



The module **SG205** is devoted to Sacred Geometry in Nature, and specially the fascinating study of Phyllotaxis (**SG205A**) i.e. the spiral arrangement of leaves, seeds & branches in plants according to the Fibonacci series progression and the PHI-based “Growth Angle” of  $137.5^\circ$  ( $137.5 \times \Phi^2 = 360$ ).

Below are some introductory images.

## SG105.5.7.1 Spirals in Plants (1)



← The beautiful  
“fractal”  
*Romanesco*  
cauliflower

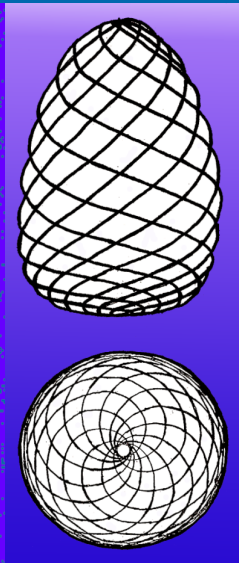


## SG105.5.7.2 Spirals in Plants (2)

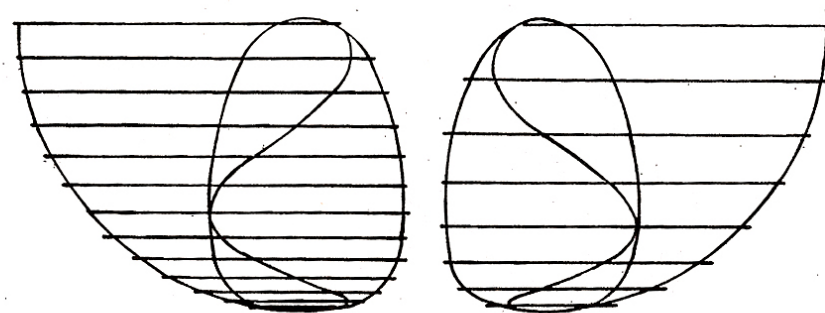
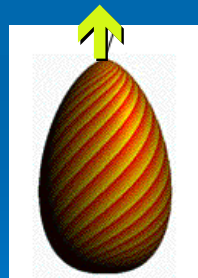


A beautiful image...  
... from an unknown web source.

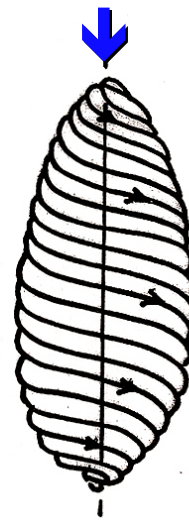
# SG105.5.7.3 Spirals in Plants (3) Pine Cones



↑ The two spirals



The two spiral systems on a pine cone  
(After G. Doczi)



Left: Descending YANG  
energy spirals

Right: Ascending YIN  
energy spirals

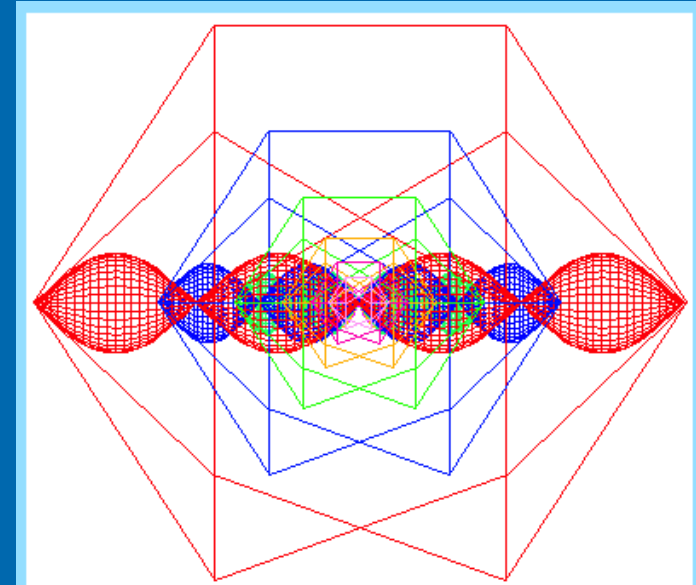
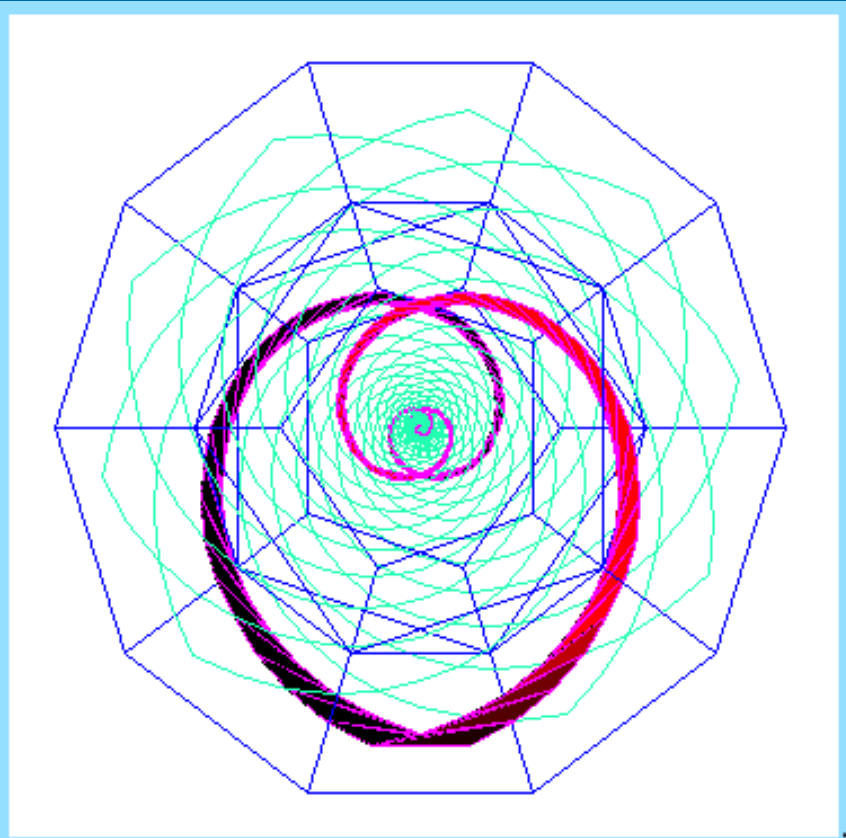
At the node-points  
where the spirals cross,  
energy charges fuse  
together to create new  
seed and bring forth life.  
(After Callum Coats.  
*Living Energies*.)





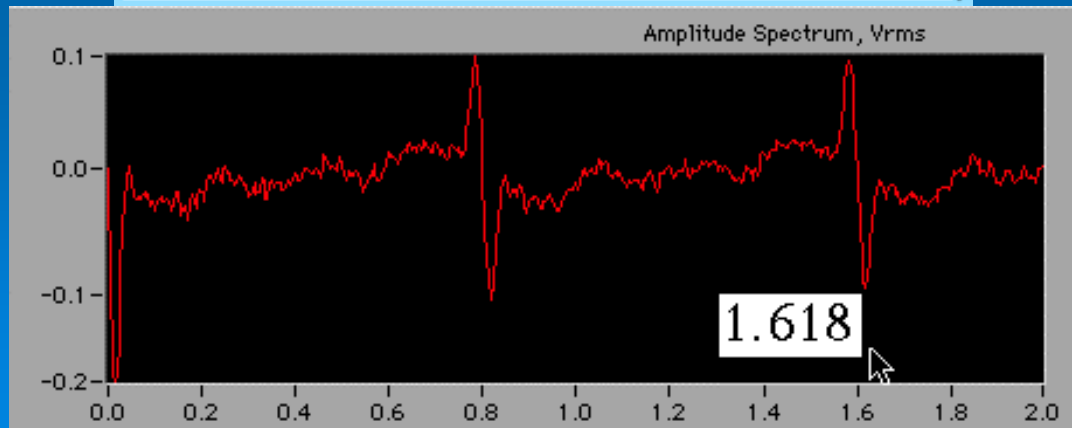






*“The voltage waves around the heart arrange in Phi harmonic ratios at moments of increased self-awareness, triggered by the feeling of reaching out magnetically, i.e. compassion.”*

Dan Winter



[caltek.net/dan/connectivity/phibiz/embedability/index.html](http://caltek.net/dan/connectivity/phibiz/embedability/index.html)

## SG105.5.8.2 Spiral Harmonics of the Heart (2)

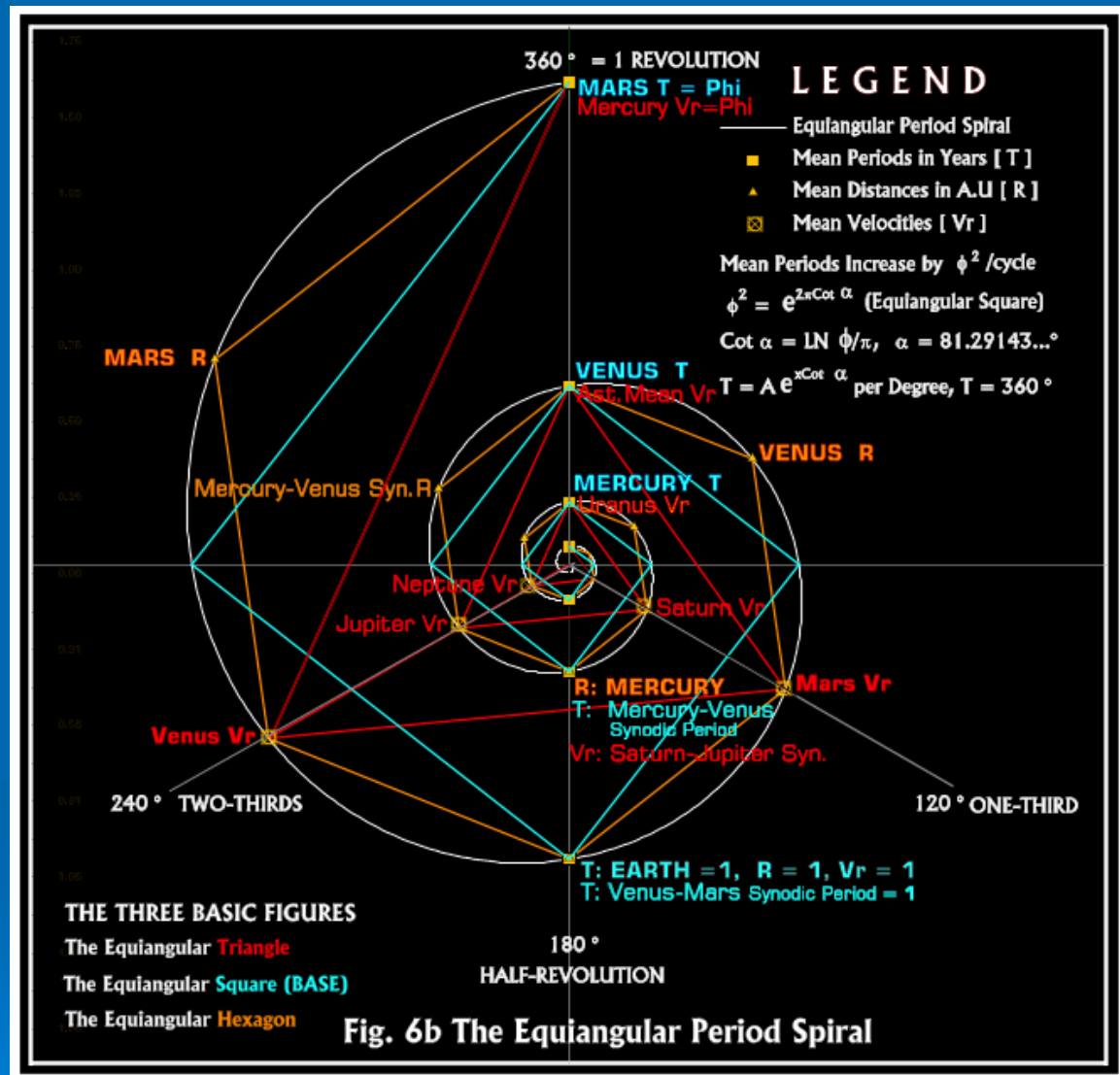
# SG105.5.9.1 Heavens - Spiral Solaris

In his extensive & remarkably well researched website, John N. Harris share a wealth of astronomical data, as well as fascinating historical facts, that support beyond any doubt the ancient and cutting edge understanding of the solar system as a function of the Golden Ratio.

The new current approach uses logarithmic data, orbital velocity, synodic motion, and mean planetary periods, in contrast to the ancient methodology using mean heliocentric distances alone.

John N. Harris:

*“Expressed in its simplest theoretical form, the exponential planetary framework is essentially the PHI-series itself, employing incremental multipliers that are dual additive combinations of the Fibonacci series.”*



↑ This diagram is just a glimpse of the wealth of data available at [www.spirasolaris.ca](http://www.spirasolaris.ca)

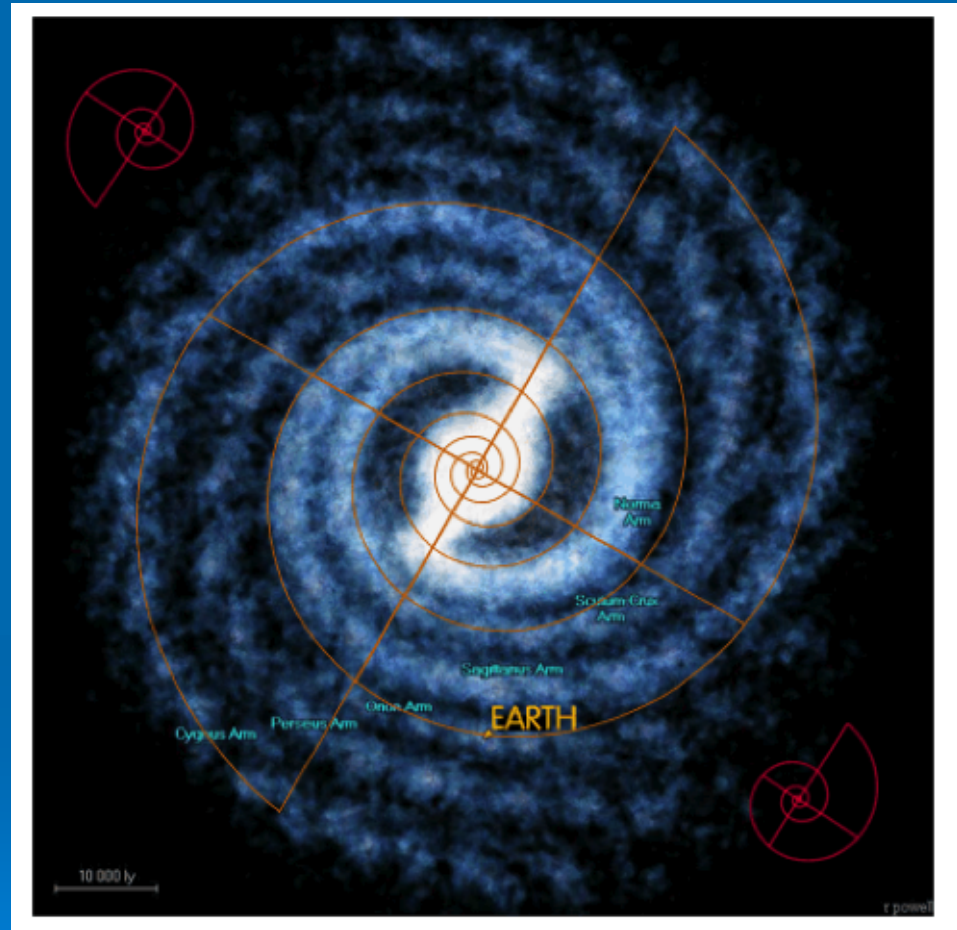
## SG105.5.9.2 Heavens - Spira Galactica



**SG206** will look extensively at  
Celestial Harmonics - Sacred Geometry  
in Planets, Stars & Cosmology.



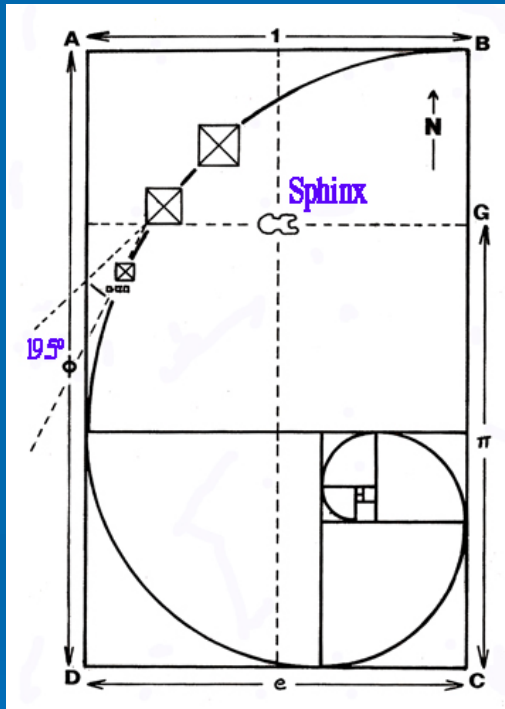
M81



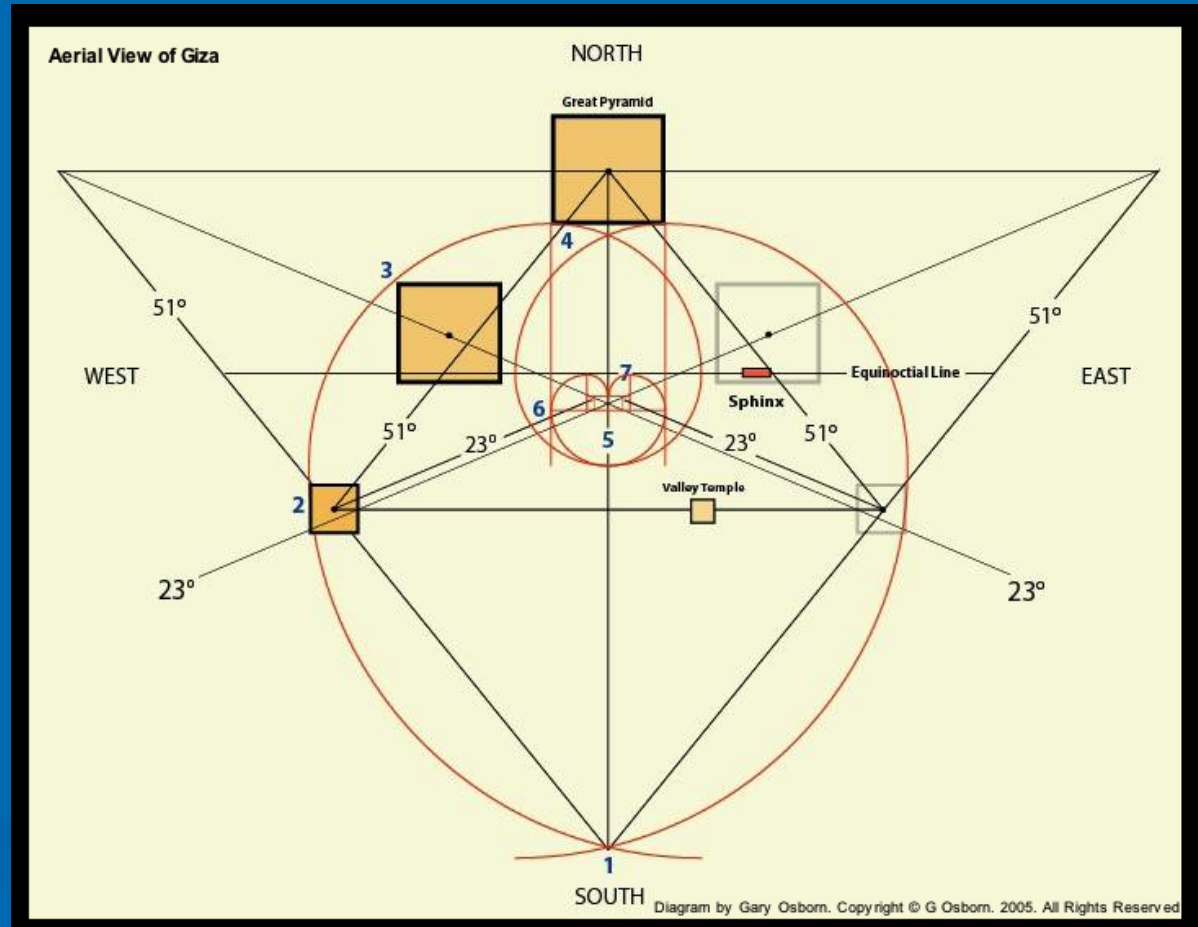
↑ Double Golden Spiral  
overlaid on plan-view of the Milky Way.  
John N. Harris. [www.spirasolaris.ca](http://www.spirasolaris.ca)



# SG105.5.10 The Golden Spiral at Giza



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



↑ 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](http://www.garyosborn.moonfruit.net)

## SG105.5.11 Spiral Jewelry



[www.organicjewelry.com](http://www.organicjewelry.com)

↑ <http://www.ka-gold-jewelry.com> →







↑ "Julia Set"  
Wiltshire. 1996.



<http://www.medwaycropcircle.co.uk>

## SG105.5.12 Spirals in Crop Circles



↑ "Beach crop circle"  
by artist Andres Amador. [//kk.org](http://kk.org)



↑ Milk Hill, Wiltshire. 2001.  
The largest crop pattern of all time,  
(800 feet across, 409 circles).





## SG105.5.13 Spirals of Cooperation



↑ *“Fertility, through cosmic harmony, is achieved by the Deumba or python dance of the Bavenda, South Africa... The old women initiate the virgins and act as the pivot around which the dancers spiral in the rhythmic movements and sinuous coils of the serpent force. Collapsing & reviving they follow the seasonal round of death and rebirth.”*

Jill Purce. *The Mystic Spiral*. Thames. 1974.

Image credit:  
The 13-Moon Natural Time Calendar 09-10  
[www.13moon.com](http://www.13moon.com)

# SG105.5.14 Spirals of Consciousness

## Spiral Dynamics the eight-stage spiral of development

**Second Tier "Being" valueMEMES**

**TURBOVOISE Holistic MEME - starting 30 years ago**  
*Basic theme:* Experience the richness of existence through mind and spirit  
 • The world is a unity, essence, organism, not its ever-changing parts  
 • Life is both sacred and a reflection of it, a single, continuous, unbroken whole  
 • Everything connects to everything else in ontological alignment  
 • Being and information permeate the Earth's total environment  
 • Holistic, intuitive thinking and cooperative actions are to be expected

**YELLOW Integrative MEME - starting 50 years ago**  
*Basic theme:* Give full and responsible to what you are and learn to become  
 • Life is a laboratory of natural hierarchies, systems, and forms  
 • The significance of existence is related to natural processes  
 • Flexibility, spontaneity and functionality have the highest priority  
 • Differences can be integrated into comprehensive, natural forms  
 • Understand that there and change are natural

*"What I am proposing is that the psychology of the mature human being is an unfolding, emergent, oscillating, spiraling process, marked by progressive subordination of older, lower-order behavior systems to newer, higher-order systems"*

**First Tier "Subsistence" valueMEMES**

**GREEN Communitarian/Egalitarian MEME - starting 150 years ago**  
*Basic theme:* Look inward, outside the self and your reality, look others  
 For help and assistance in development  
 • The human spirit must be freed from greed, dogma, and delusion  
 • Feeding, clothing, and caring provide total security  
 • Spread the Earth's resources and opportunities equally among all  
 • Resolve conflicts through negotiation and consensus processes  
 • Relativize spirituality, bring harmony, and provide human development

**ORANGE Achiever/Strategic MEME - starting 300 years ago**  
*Basic theme:* Find your own fulfillment by doing the things that  
 you are best at  
 • Progress by learning nature's secrets and setting out best solutions  
 • Maximize Earth's resources to create and spread the abundant good life  
 • Dynamic, risk-taking, and will-often people thrive success  
 • Societal progress through strategy, technology, and competitiveness

**BLUE Hierarchist/Authoritarian MEME - starting 5,000 years ago**  
*Basic theme:* Life has meaning, direction, and purpose with predetermined outcomes  
 • One hierarchy best for the human race, God, or religious authority  
 • Order and control are a code of conduct based on internal, absolute principles  
 • Progress by learning nature's secrets and setting out best solutions  
 • Maximize Earth's resources to create and spread the abundant good life  
 • Dynamic, risk-taking, and will-often people thrive success  
 • Societal progress through strategy, technology, and competitiveness

**RED Impulsive/Episodic MEME - starting 10,000 years ago**  
*Basic theme:* Be what you are and do what you want, regardless  
 • The world is a jumble of chaos and confusion  
 • Life is a series of random events and experiences that must be met as they come  
 • Spontaneity, risk-taking, and will-often people thrive success  
 • Dynamic, risk-taking, and will-often people thrive success  
 • Societal progress through strategy, technology, and competitiveness

**PURPLE Magist/Archaic MEME - starting 50,000 years ago**  
*Basic theme:* Find the meaning of the world and your place in it  
 • Order and control are a code of conduct based on internal, absolute principles  
 • Progress by learning nature's secrets and setting out best solutions  
 • Maximize Earth's resources to create and spread the abundant good life  
 • Dynamic, risk-taking, and will-often people thrive success  
 • Societal progress through strategy, technology, and competitiveness

**BROWN Instinctive/Universalist MEME - starting 100,000 years ago**  
*Basic theme:* Do what you must and be what  
 you are  
 • Order and control are a code of conduct based on internal, absolute principles  
 • Progress by learning nature's secrets and setting out best solutions  
 • Maximize Earth's resources to create and spread the abundant good life  
 • Dynamic, risk-taking, and will-often people thrive success  
 • Societal progress through strategy, technology, and competitiveness

Spiral Dynamics model originated from "The New Being" (Davidson), "An Introduction to St. Don Beck by Jessica Rosenthal to What is Enlightenment" (negative), from 21/10/2000 "Holistic Press, all rights reserved" www.sdg.org

**Spiral Dynamics**  
 Don Edward Beck & Christopher C. Cowan  
 Illustration by Brandy Agerbeck, Loosetooth.com

Sources:  
 1 Beck, Don Edward & Christopher C. Cowan, *Spiral Dynamics: mastering values, leadership, and change*. Blackwell Publishing, Oxford, 2000  
 2 Wilber, Ken, *A Theory of Everything: an integral vision for business, science, and spirituality*. Shambala Publications, Boston, 2000.

*“What I am proposing is that the psychology of the mature human being is an unfolding, emergent, oscillating, spiraling process marked by the progressive subordination of older, lower-order behavior systems to newer, higher-order systems.”*

Don Beck

Spiral Dynamics is a model of human development introduced in 1996 by Don Beck & Chris Cowan.

More recently, Ken Wilber has popularized the concept.

Spiral Dynamics is a non-hierarchical, in-flux, holographic model as all stages co-exist in both healthy & unhealthy states and pertain to all scales (atoms, molecules, cells, organs, bodies...).

The spiral dynamics of advancement of “higher” levels of development transcends and includes all previous models.



[//en.wikipedia.org/wiki/Spiral\\_dynamics](https://en.wikipedia.org/wiki/Spiral_dynamics)

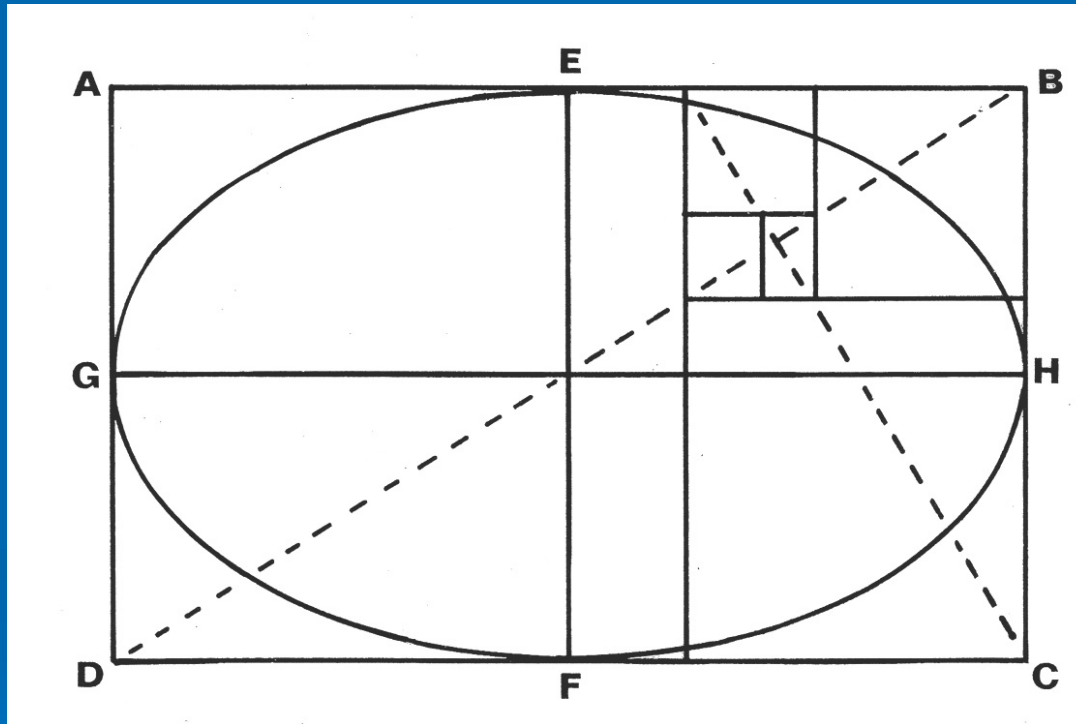
## SG105.6 Chapter 6. The Golden Ellipse



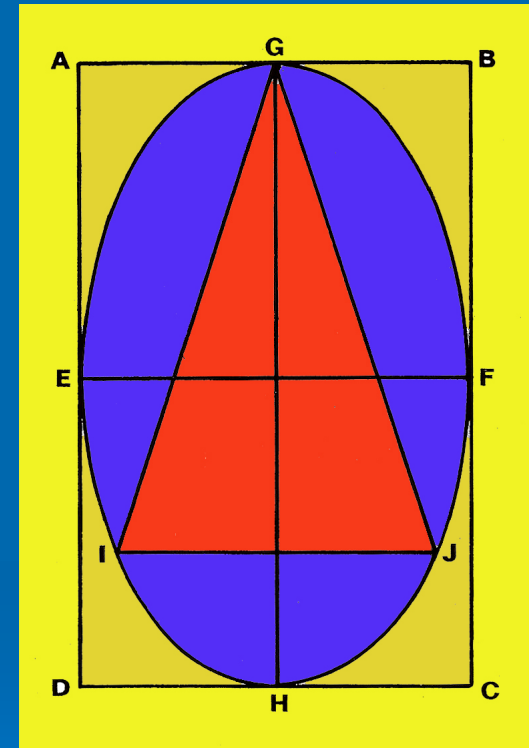
→ Golden Egg  
approximating  
the Golden Ellipse  
within a  
Golden Rectangle



## SG105.6.1.1 The Golden Ellipse Constructions (1) Rectangle & Triangle

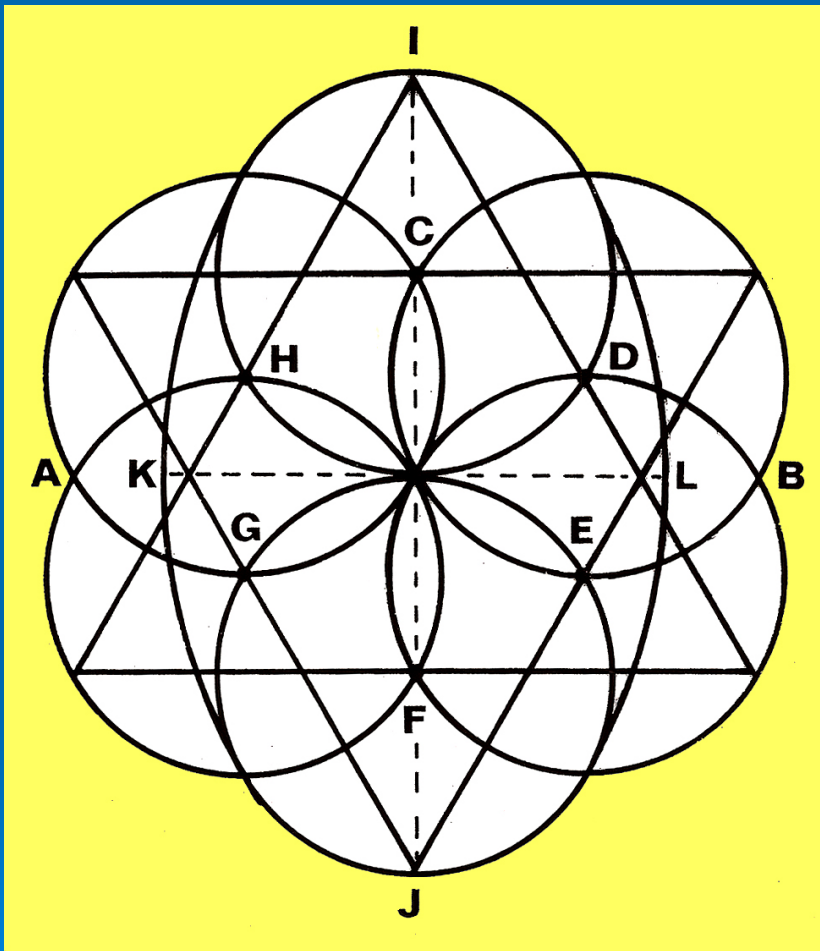


Golden Ellipse inscribed  
in a Golden Rectangle of "Whirling Squares".

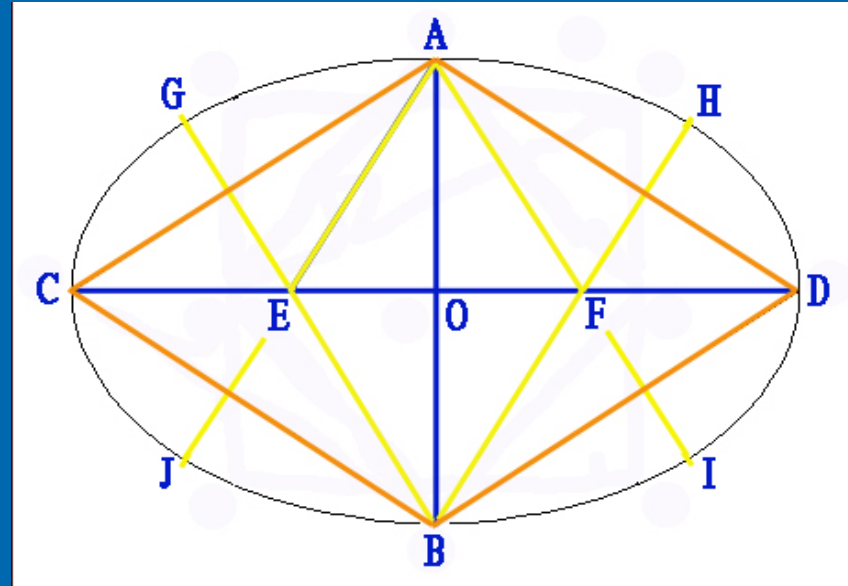


The Golden Triangle inscribed  
in the Golden Ellipse

## SG105.6.1.2 The Golden Ellipse Constructions (2) Vesica & Rhombi



↑ Constructing the Golden Ellipse  
from the Vesica Piscis.



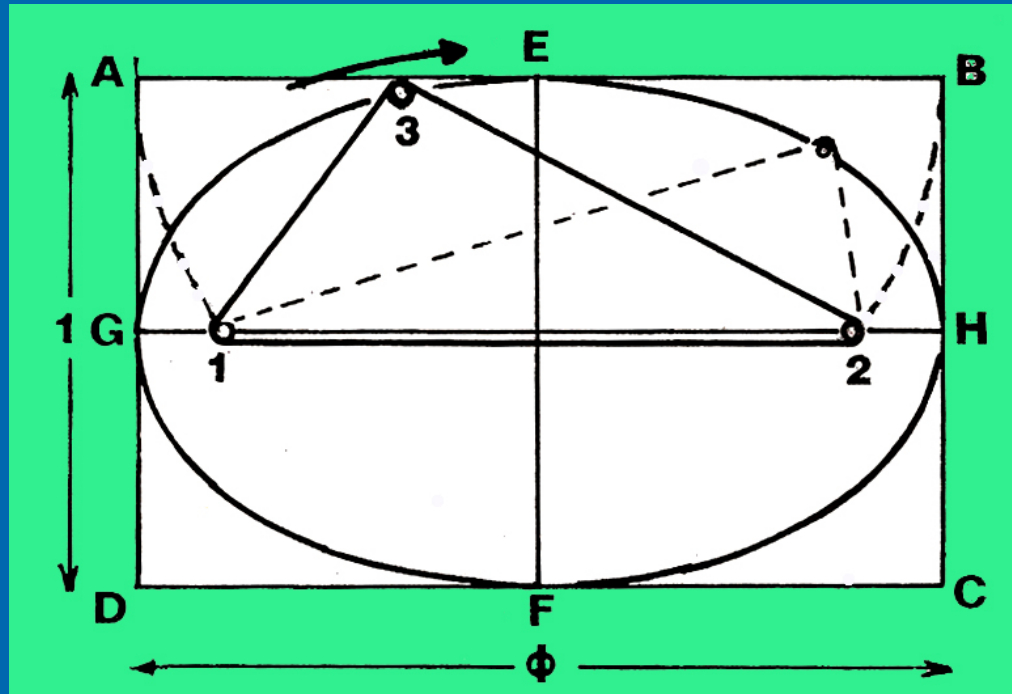
↑ The Golden Ellipse based on two Golden Rhombi  
(for approximation by hand)

ACBD and AEBF are two Golden Rhombi:  
their ratio of width to length is  $\Phi$ ,  
as is the Golden Ellipse itself.

AOF & AOD are Golden Triangles  
(base : height = PHI)

$$\begin{aligned} EB : EG &= BF : FH \\ &= AE : EJ = AF : FI = \text{PHI} \end{aligned}$$

### SG105.6.1.3 The Golden Ellipse Constructions (3) Gardening



#### Golden Gardening: a flower bed in the shape of a Golden Ellipse

Step #1: Trace a Golden rectangle (with 13-knots rope, steps or measure tape).

Step #2: From center E, with radius EA, trace A1 and B2.

A1 and B2 are the two foci of the ellipse.

The rope measures  $\Phi + \sqrt{\Phi}$  ( $\sqrt{\Phi}$  is the distance between the two foci).

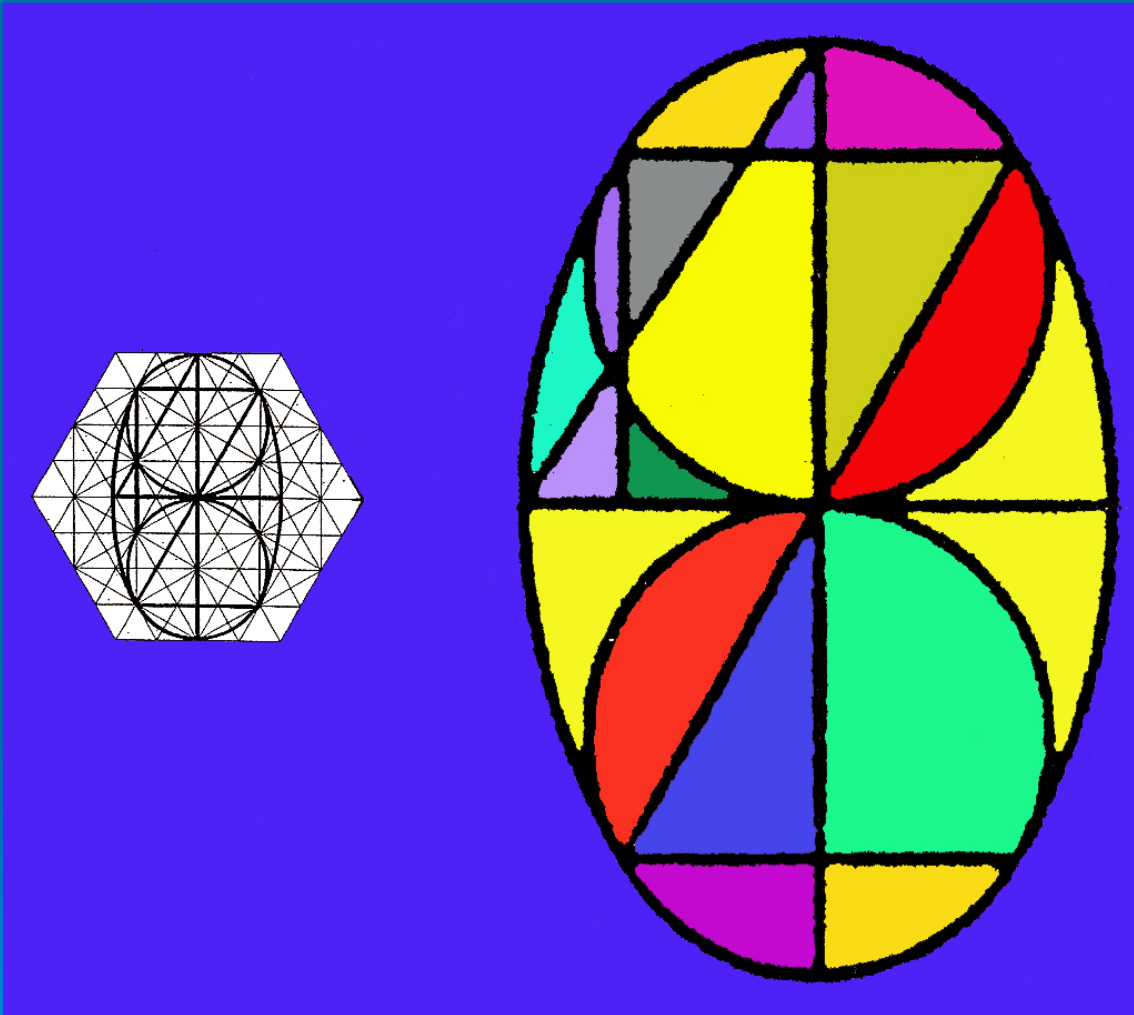
Step #3: Wind the rope around the two foci acting as pivots and trace the ellipse.

HAPPY GARDENING!

(After Robert Vincent. *The Geometry of the Golden Section*. 2003. [www.chalagam.com](http://www.chalagam.com))



## SG105.6.2 The Golden Ellipse - Numbers



The digits  
within the Ellipse.

Trace the numbers

**1-9**

(and of course  
the ellipse as 0)  
within  
this hexagonal grid.

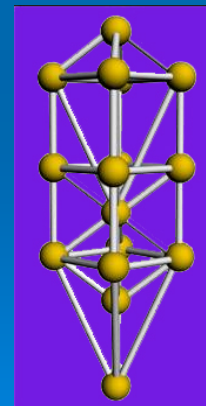
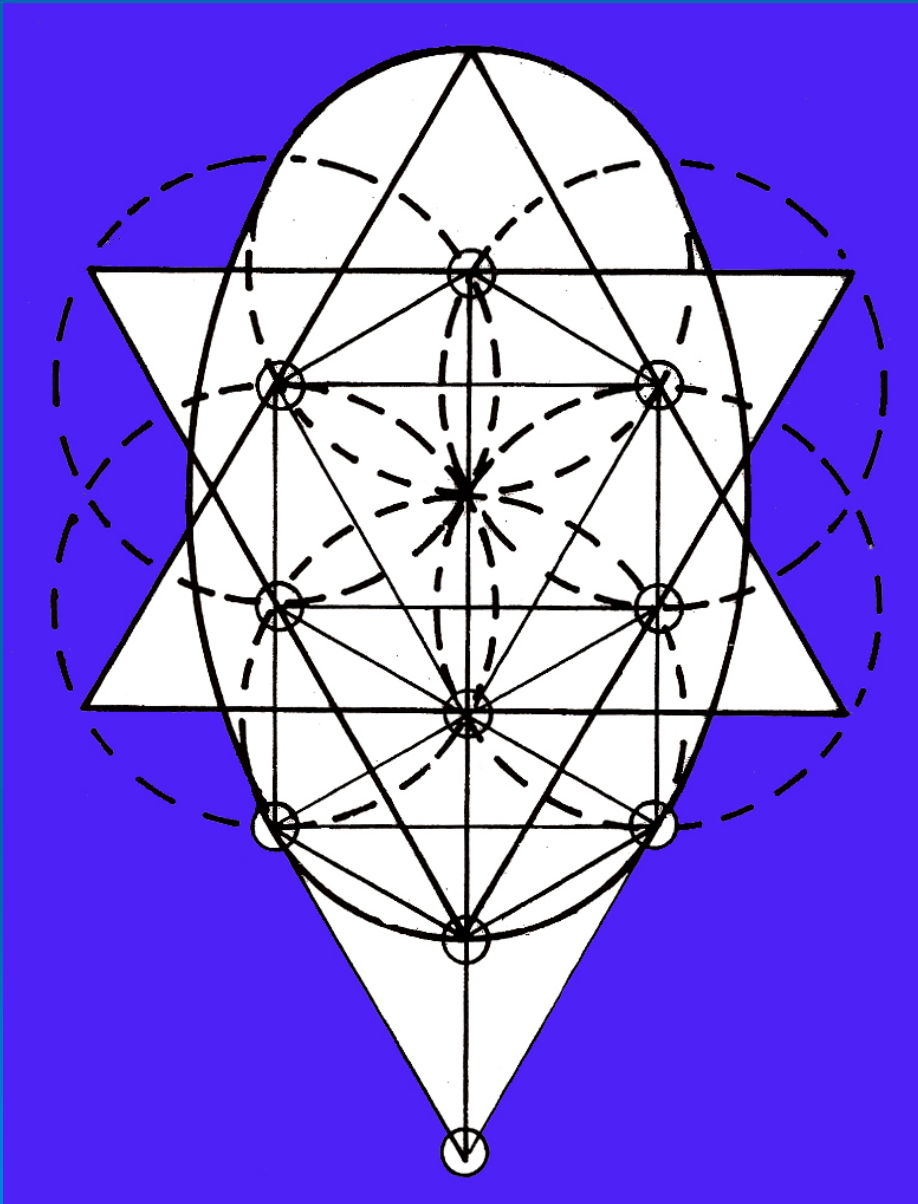
Now visualize  
in your mind's eye  
the numbers 1-9  
progressively inscribed  
within the ellipse.

## SG105.6.3 The Golden Ellipse - Tree of Life

The Tree of Life within the Ellipse.

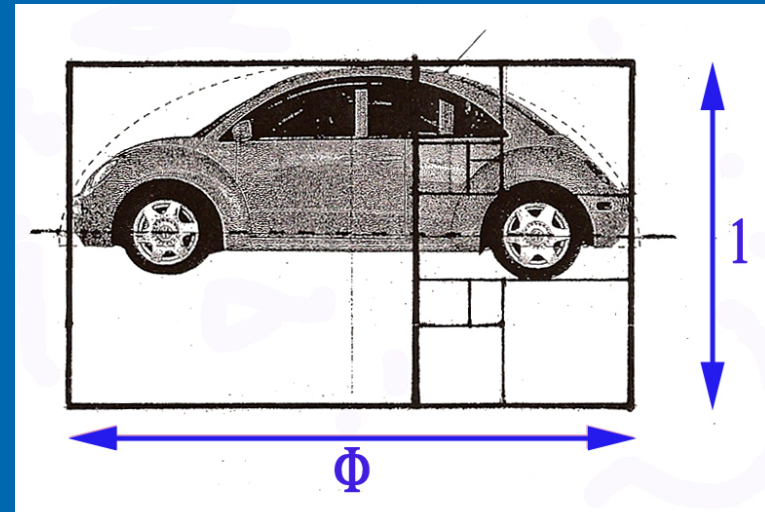
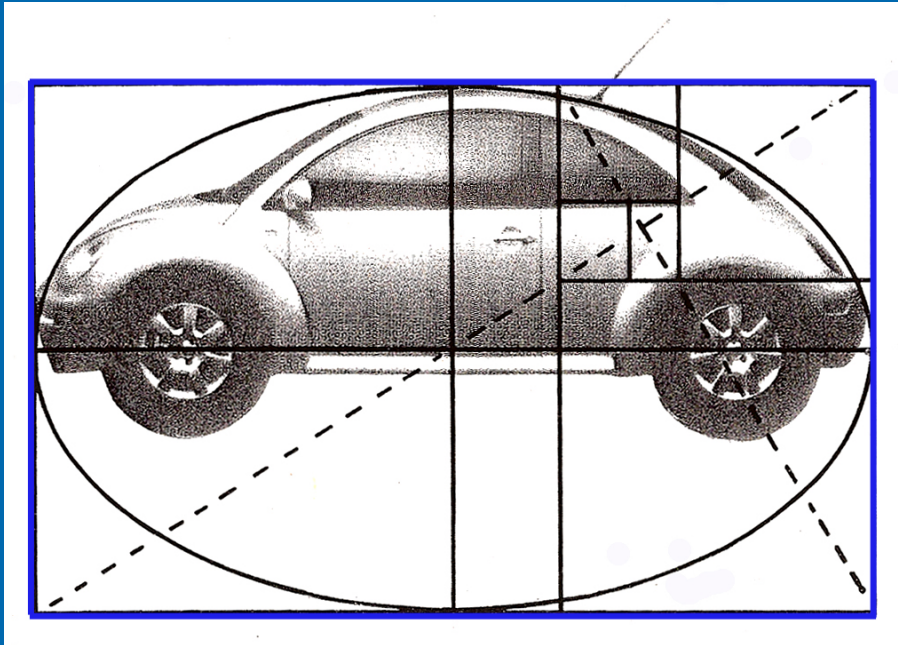
Trace  
the Tree of Life  
the Ellipse,  
the Vesica  
and the Flower of Life  
within this hexa-star grid.

Visualize it in your mind's eye.

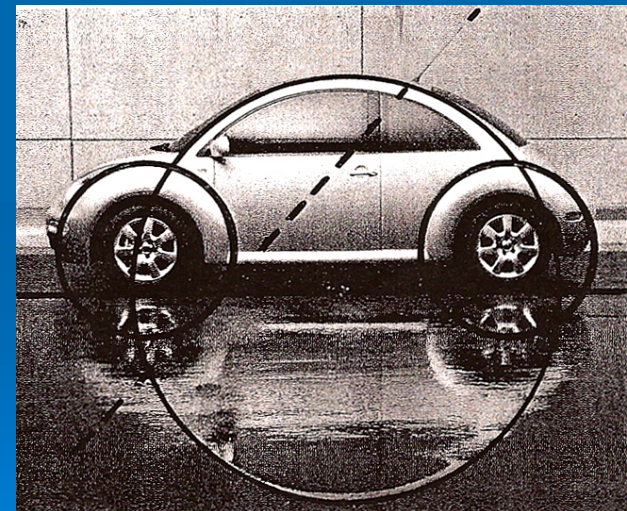
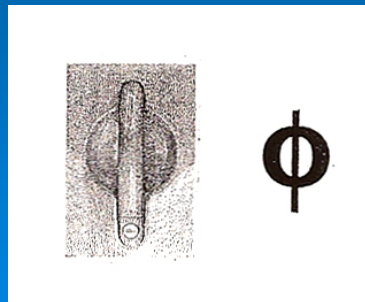


← Now  
visualize the  
Tree of Life in  
3D within  
a Golden Egg

## SG105.6.4 Culture - VW Bug

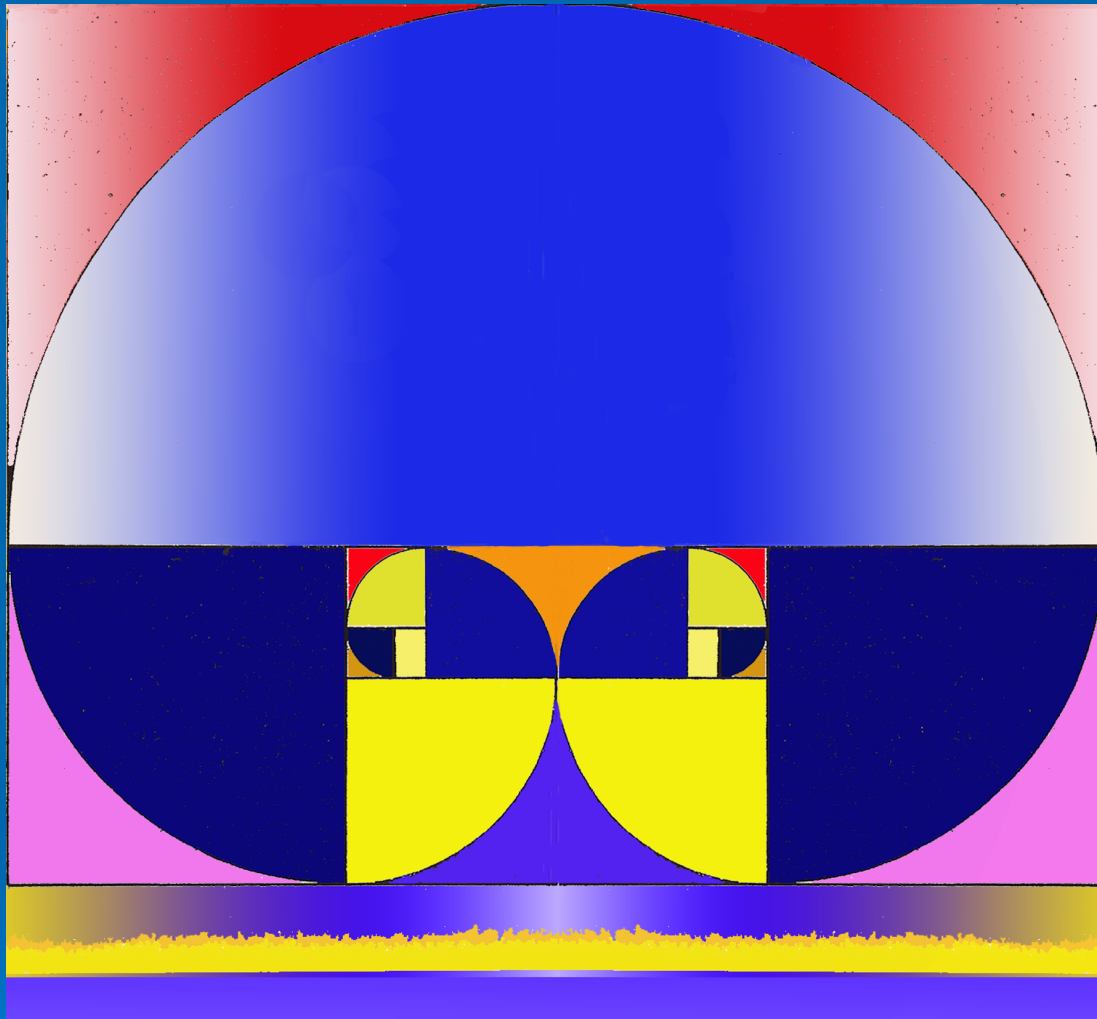


### The Golden Harmonics of the VW Bug



(After Kimberley Elam. *Geometry of Design*.  
Princeton AP. 2001)





SG105.Ca.  
**Conclusion**

*“Look at this cup that can hold the Ocean”*  
(Rumi)

# SG105.Cb. A New Spiral Cosmology



← Spiral-shaped model for  
Auroville, Pondicherry, India.

## **SG105.Cc1 Online SG School Curriculum: Intro & Intermediate**

### **Sacred Geometry Introductory Level: 8 Modules**

<b>SG 101</b>	<b>Intro I</b>	<b>Sacred Geometry: Universal Order &amp; Beauty</b>
<b>SG 102</b>	<b>Intro II</b>	<b>History &amp; Traditions of Sacred Geometry</b>
<b>SG 103</b>	<b>Intro III</b>	<b>Sacred Geometry: A Grand Tour</b>
<b>SG 104</b>	<b>Intro IV</b>	<b>PHI: the Golden Ratio &amp; the Fibonacci Series</b>
<b>SG 105</b>	<b>Intro V</b>	<b>The Golden Rectangle &amp; Golden Spiral</b>
<b>SG 106</b>	<b>Intro VI</b>	<b>Pentagons, Pentagrams &amp; the Penta-Modules</b>
<b>SG 107</b>	<b>Intro VII</b>	<b>The Five Platonic &amp; 13 Archimedean Solids</b>
<b>SG 108</b>	<b>Intro VIII</b>	<b>The Vesica Piscis: Cosmic Womb of Creation</b>

### **Sacred Geometry Intermediate Level: 8 modules**

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



## SG105.Cc2 Online SG School Curriculum: Advanced

### 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 offered in harmonic time.*

Questions: [phi@schoolofsacredgeometry.org](mailto:phi@schoolofsacredgeometry.org)

# SG105.Cd StarWheel Blessing



SW#87. "Merkaba -24" . [www.starwheels.com](http://www.starwheels.com)



## SG106.Ce Contact Info

**Sedona School of Sacred Geometry**  
[www.schoolofsacredgeometry.org](http://www.schoolofsacredgeometry.org)  
[phi@schoolofsacredgeometry.org](mailto:phi@schoolofsacredgeometry.org)  
PO Box 3714, Sedona, AZ 86340

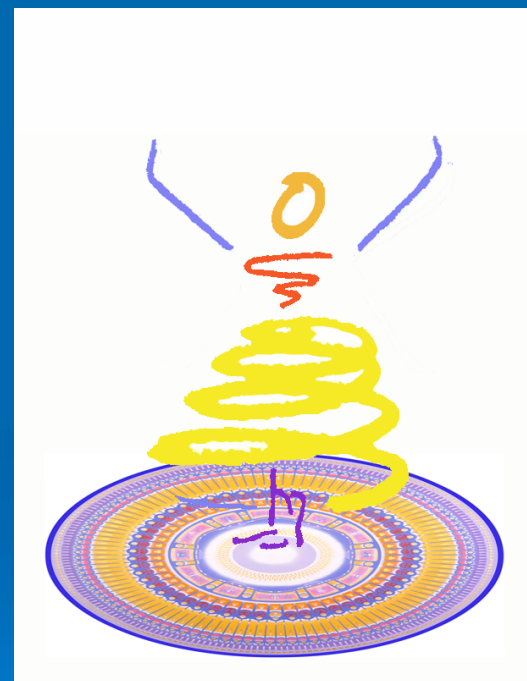
**StarWheel Mandalas by Aya**  
[www.starwheels.com](http://www.starwheels.com)  
[www.starwheels.com/infopage.php?pagename=starwheelgallery](http://www.starwheels.com/infopage.php?pagename=starwheelgallery)  
[aya@starwheels.com](mailto:aya@starwheels.com)

**Our non-profit: [www.starwheelfoundation.org](http://www.starwheelfoundation.org)**  
[www.starwheelfoundation.org/index.php?p=globalecocampus](http://www.starwheelfoundation.org/index.php?p=globalecocampus)  
[www.starwheelfoundation.org/index.php?p=acroyoga](http://www.starwheelfoundation.org/index.php?p=acroyoga)  
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[www.starwheelfoundation.org/index.php?p=treesponsorship](http://www.starwheelfoundation.org/index.php?p=treesponsorship)

**Our online store: [www.starwheelmandalas.com](http://www.starwheelmandalas.com)**  
[www.starwheelmandalas.com/index.php?p=originals](http://www.starwheelmandalas.com/index.php?p=originals)  
[www.starwheelmandalas.com/index.php?p=wisdomcards](http://www.starwheelmandalas.com/index.php?p=wisdomcards)  
[www.starwheelmandalas.com/index.php?p=deck1](http://www.starwheelmandalas.com/index.php?p=deck1)



**On Facebook: Aya Sheevaya**  
**FB Group: Sedona School of Sacred Geometry**



Φ celebration





## SG106.Cf About Aya

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](http://www.starwheels.com) / [www.starwheelmandalas.com](http://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, Magos' 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, fractal-holographic unity of nature, life and spirit... The keyword is HARMONY."* ([www.schoolofsacredgeometry.org](http://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 environment encouraging young people of all nations to develop their creative consciousness and thus contribute to a new, spirited, life-respecting global civilization on Earth. ([www.starwheelfoundation.org](http://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.

Blessings in Anjali!