THE

GOLDEN

PROPORTION

I'm going to talk to you about 3 fascinating things – which really are one:

1. A "magical" series of numbers – called the Fibonacci sequence
2. A "golden ratio" between these numbers
3. A spiral that takes shape as you place this golden ratio of numbers together

1. THE "MAGIC" SERIES OF NUMBERS

In *Liber Abaci*, the Italian mathematician named Fibonacci posed this problem:

QUESTION:
How many pairs of rabbits
can one pair of rabbits
(in an enclosed area)
produce in a single year
- if each pair gives birth to
a new pair each month
(starting with the second
month)?

When a rabbit is born it needs one month to grow up. Then it can start breeding. Then it takes one more month for the baby to develop and be born. So, at the age of two months the first pair of rabbits gives birth to its babies. Then they can have more babies a month later, and so on, each month.

At the beginning of months 1 and 2, the number of pairs is the same (that is, the sequence is 1,1).

During month 2, the first pair doubles its number. So at the start of month 3, there are two pairs (1 + 1 = 2).

During month 3, the older pair begets another pair, while the younger pair does not (because it is still maturing). (Thus at the start of month 4, the sequence is 1, 1, 2, 3.)

During month 4, the two older pairs reproduce, but not the youngest pair, so the number of rabbit pairs expands to five. (The sequence is now 1, 1, 2, 3, 5.)
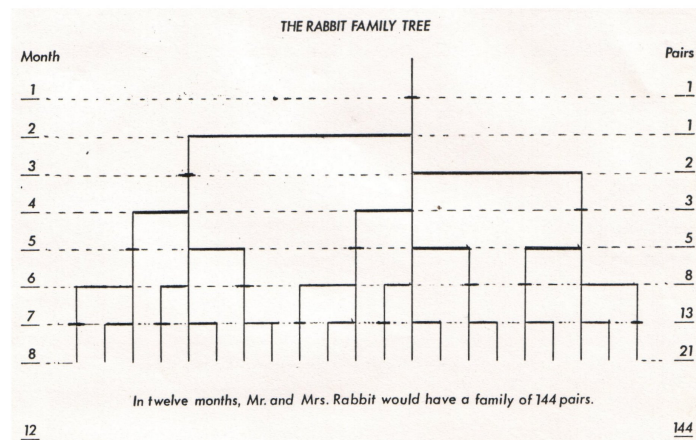
During month 5, three pairs produce. (So at the start of month 6, the sequence has gone to 1, 1, 2, 3, 5, 8.)

Thus it continues, each of the twelve months. The rabbit family grows:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, to 144.

ANSWER:
In 12 months, Mr and Mrs Rabbit would have a family of 144 pairs.

THE RABBIT FAMILY TREE

In twelve months, Mr. and Mrs. Rabbit would have a family of 144 pairs.

Fibonacci (otherwise known as Leonardo of Pisa) was a 13th century Italian mathematician. He discovered this sequence mathematically.

It goes like this:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, and so on.

You will notice that each number is equal to the sum of the two preceding numbers:

1+1=2; 1+2=3; 2+3=5; 3+5=8; 5+8=13; 8+13=21; 13+21=34; 21+34=55; 34+55=89; 55+89=144; 89+144=233; 144+233=377, and so on.

THE FIBONACCI SEQUENCE IN NATURE

Numbers of the sequence are present in the human body, botany, production, animals, music and waves of human activities, including the stock market.

INCREASE IN A COW'S FAMILY

A cow has to be two years old before she has her first calf. Then she can have one a year. That's 1 cow the first year, 1 in the second year, 2 in the third year, 3 in the fourth year. And the year after that, both of her first two calves will give birth, as will the mother cow, so there'll be 8 of them. Then there'll be 13, then 21, then 43… and so on. The number of cows always equals the Fibonacci numbers.

INCREASE IN PLANT STEMS

We could take as another example the yarrow. In particular, I've noticed that the sneezewort kind (which has a beautiful white flower) has a thick main stem coming up the center, with smaller stems branching off it, and still smaller stems branching from them.

Well, each stem needs to grow for about two months before it is old enough to send out another stem. After that, it sends out a new one about once a month.

Interestingly, each new stem has to grow for two months, but then it likewise starts producing a new stem every month.

Each new month, the number of stems is this: 1 - 1 - 2 - 3 - 5 - 8 - 13 - 21 - 34 - 55 - 89 - 144.   This is the same as the rabbits!

THE INCREASE IN THE NUMBER OF BRANCHES IN A TREE
expands each year in the same ratio as the ratio of successive terms in the Fibonacci series – 1, 1, 3, 5, 8, and so on.

THE SUNFLOWER

Seeds are distributed over the sunflower disk in sockets. These sockets form a pattern of intersecting curves.

 Thus the seeds of a sunflower are located in curved rows that intersect each other. THE HIGHEST NUMBER OF INTERSECTIONS IS 144. We'll look closer at the sunflower in a moment.

IN THE PATTERN OF MASS HUMAN BEHAVIOR

Incidentally, this number (144) is also the number of Minor waves in a complete cycle of the stock market (for both bull and bear markets).
Says market analyst Robert Prechter, Jr.: "From experience I have learned that 144 is the highest number of practical value. In a complete cycle of the stock market, the number of Minor waves is 144, as shown in the following table and in Figure 7, Chapter 4:

Number Of Waves cycle)	Bull Market	Bear Market	Total (complete
Major	5	3	8
Intermediate	21	13	34
Minor	89	55	144

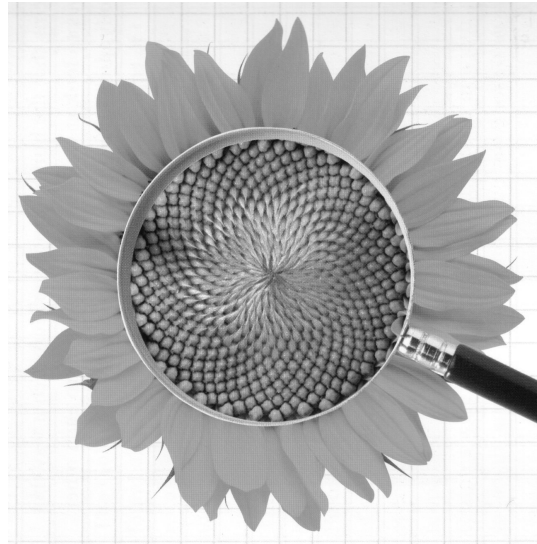All are Fibonacci numbers and the entire series is employed."
(Robert R. Prechter, Jr., editor, *The Major Works of R.N. Elliot.* Gainesville, Georgia: New Classics Library, Inc., 1987, p.162)

But back to the **SUNFLOWER**. The same numbers are found in the **ARRANGEMENT OF SEED CURVES on the sunflower**.

On the head of the sunflower, the florets form clockwise and counterclockwise spiral patterns, intertwined and crisscrossing each other. As they twist in upon each other, ever closer toward the center of the flower, they do so in a specific ratio – the golden ratio phi.

1. Each curve is a definite shape - like the curve of shell growth.

2. On a normal sunflower disk of five or six inches (12 – 15 cm) diameter, are 89 curves. Winding in one direction are 55, and in the other direction are 34. Thus, the normal head carries 55 curves crossing 34. These two numbers are written 34 + 55, as in the Fibonacci series. (**34 + 55 = 89**)

3. Below the apex flower of the stalk, you will usually find smaller, secondary flowers. The curve-crossing numbers for these are generally 21 + 34. **(21 + 34 = 55)**

4. Lower on the stalk may be tertiary flowers of late development. The curve-crossing numbers of these are 13 + 21. **(13 + 21 = 34)**

5. At Oxford, in England, sunflowers have been nourished to produce disks larger than normal. Their curve-crossing numbers were not 34 +55(see point 2), but 55+ 89. **(55 + 89 = 144)**

6. Professor Arthur G. Church, a modern authority on the subject, reports that one gigantic sunflower disk grown at Oxford bore curve-crossing numbers of 89 + 144 **(89 + 144 = 233)**

7. Around the seed complex of the flower disk there is an arrangement of florets. Like the seeds, these exhibit curve-crossing numbers. They are usually **5 + 8.**

8. "If we begin at the bottom of the plant stalk and count the actual number of leaves up to the flower disk, we are likely to find, as we wind our progress around the stalk, that we pass a certain number of leaves before we find one imposed directly over the one first counted and that this number and the number of revolutions about the stalk, are constant between each leaf imposition. These will represent curve-crossing

numbers belonging to the same series of numbers exhibited by the seeds and florets." (Jay Hambidge, *Practical Applications of Dynamic Symmetry*. Yale University Press, pp. 27,28)

Pic: John Foxx

FLOWER PETALS

Let's see what happens if we count the number of petals on a flower.

Here's a buttercup. It has 5 petals. And here's a delphinium, with 8. A wood lily… 3 petals. Here's a daisy and it has 55… while another daisy has 34. And here is a marigold… 13. They are all Fibonacci numbers. (I should say that not every flower is like this, but a large number are. So much in nature fits into Fibonacci numbers.

LEAVES OF PLANTS

So with plants and their leaves. Leaves which sprout from the stalk of a plant grow at a specific angle determined by phi. As Dr Mario Livio, an expert on the golden number, notes: "By arranging themselves according to an angle determined by phi, the leaves can fill the spaces in the most efficient way possible, with the least amount of overlap." (M. Livio, "The Golden Number", *Natural History*, 112, no.2, p.66)

The golden ratio, or phi, and the Fibonacci sequence, are all linked in this same amazing phenomenon.

As Livio observes:

"Thus Fibonacci numbers are a kind of golden ratio in disguise, and they, too, pop up in the most unexpected places. One is in the microtubules of an animal cell, which are hollow cylindrical tubes of a protein polymer. Together they make up the cytoskeleton, a structure that gives shape to the cell and also appears to act as a kind of cell 'nervous system.' Each mammalian microtubule is typically made up of thirteen columns, arranged in five right-handed and eight left-handed structures (5, 8, and 13 are all Fibonacci numbers). Furthermore, occasionally one finds double microtubules with an outer envelope made up—you guessed it—of 21 columns, the next Fibonacci number." (*Ibid.,* p. 68)

THE BODIES OF HUMANS follow the numbers 3 and 5.

From the torso there are 5 projections – head, two arms and two legs. Each leg and arm is subdivided into 3 sections. Legs ad arms terminate in 5 toes and fingers. The toes and fingers (except the big toe) are subdivided into 3 sections. We also have 5 senses.

THE INNER EAR

Fibonacci numbers are unquestionably part of a natural harmony that FEELS GOOD, LOOKS GOOD and even SOUNDS GOOD.

Music, for example, is based on the 8- note octave. On the piano this is represented by 8 white keys and 5 black ones – 13 in all.

It is no accident that the musical harmony that seems to give the ear its greatest satisfaction is the major (third). The note E vibrates at a ratio of .62500 to the note C. Thus, at a mere one 7,000[th] away from the exact golden mean, the proportions of the major (third) set off good vibrations in the cochlea of the inner ear – an organ that just happens to be **shaped in a logarithmic spiral.** Which is extremely significant. And of this spiral we shall speak soon.

2. "GOLDEN RATIO" BETWEEN   THESE NUMBERS

1 - 1 - 2 - 3 - 5 - 8 - 13 - 21 - 34 - 55 - 89 - 144 - 233 - 377 - 610 - 987 - 1597 - 2584 - 4181 etc., etc.

The Fibonacci numbers are connected by a "Golden Ratio".

As the sequence of numbers progresses, it is discovered that any given number approximates 1.618 times the number preceding it. The higher the number, the closer it approaches this ratio. Likewise, any given number approximates .618 of the number following. The higher the number, the closer it approaches this ratio.

For example, in above sequence you add .618 of 1597 to get the next number, 2584. The difference (that is, the ratio of .618 more than the first number) is called phi.

In the sequence, each number can be increased by adding to it .618 of itself.

This ratio of .618 is seen in nature, for the shape of everything from tiny snails to the gigantic spiral galaxies of outer space.

THIS .618 PROPORTION IN THE HUMAN BODY

As I mentioned in my book *The Ark Conspiracy*, one experimenter measured sixty-five women and found their navel height, on the average, was .618 times their total height – divinely proportioned indeed, and a fine symbol of the creation of "like from like".

Well, for thousands of years we have been copying nature. And that brings me to the classics of art and architecture …

IN ART AND ARCHITECTURE

The continual occurrence of Fibonacci numbers and the golden spiral in nature explains precisely why the proportion of .618 to 1 is so pleasing in art. Man can see the image of life in art that is based on the golden proportion.

The Greeks based much of their art and architecture upon this proportion. They called it "the golden mean". The proportion of .618 is the mathematical basis for the shape of the Parthenon and even Greek vases.

Works of art have been greatly enhanced by the use of the Golden Rectangle. Leonardo da Vinci found the ratio pleasing and he used it to enhance many of his works.

In da Vinci's painting "St Jerome", he depicts his subject in a crouched position in such a way that a Golden Rectangle can be placed over the figure, containing it perfectly.

Other works of art, such as Salvador Dali's "The Sacrament of the Last Supper", utilize many Golden Rectangles.

This phi proportion does have an effect upon the viewer of art. Experimenters have determined that people find the .618 proportion AESTHETICALLY PLEASING.

For example, subjects were asked to choose one rectangle from a group of different types of rectangles, and the average choice was found to be close to the Golden Rectangle shape. In another experiment, subjects were asked to cross one bar with another in a way they liked best. They generally divided the first one into the phi proportion.

Windows, picture frames, buildings, book and cemetery crosses often conform quite closely to the Divine Proportion.
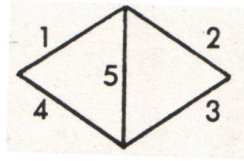

THE GREAT PYRAMID

The original measurements of the Great Pyramid of Giza are estimated to have been: base 783.3 feet, elevation 484.4 feet – a ratio of 61.8 per cent.

The elevation, 484 feet, equals 5,813 inches – 5 – 8 – 13 – figures in the Fibonacco series.

Looking at a pyramid from any one of the four sides, 3 lines are visible – another Fibonacci number.
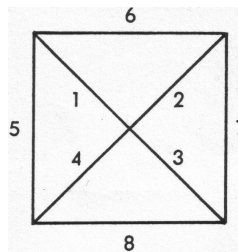
Viewing the pyramid from any one of the four corners, 5 lines are visible –
another Fibonacci number.

A pyramid has 5 surfaces – four above ground and the bottom.

From the apex, a pyramid shows 8 lines – another Fibonacci number.
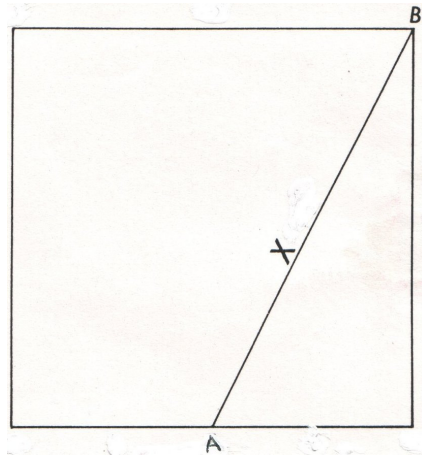

A "MAGICAL" CHARACTER OF THE GOLDEN RATIO

Livio comments further: "This seemingly magical appearance of phi
stems from another unique mathematical property of the golden ratio:
its square can be obtained simply by adding 1 to phi (you can check
that statement with a pocket calculator)" (*Ibid.*, p.68).

HOW DO YOU GET .6180?

Here's how to add .6180 in order to make a Golden Rectangle:

1. Mark the halfway point along the bottom of a square (A).

2. Draw a line from "A" to the top right hand corner of the
   square (B). Call this line "X".

3. Now pivot the line "X" until it is horizontal, so that it extends from "A" through "C" and continues out beyond the square to "D".
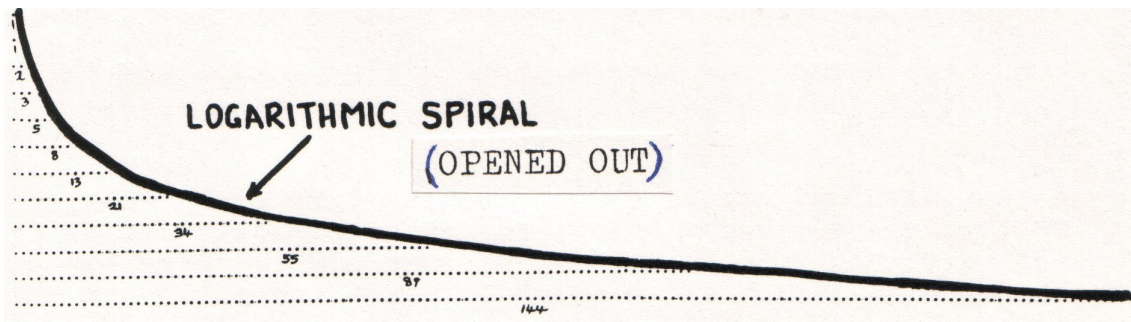

4. The portion of the line which is outside the square (that is, the portion marked "C-D") is equal to .6180 of the square.

5. Now draw a rectangle from this ("B-E-D-C"). Added to the square, this forms a Golden Rectangle.

HOW TO FIND .618 OF A SQUARE
WITHOUT MEASURING

It's easy. Take a sheet of paper and simply fold a square in half.

From the bottom of the crease line, draw a new line to a top corner of the square. Now drop this new line to extend outside the square as a continuation of the bottom line. That's it!
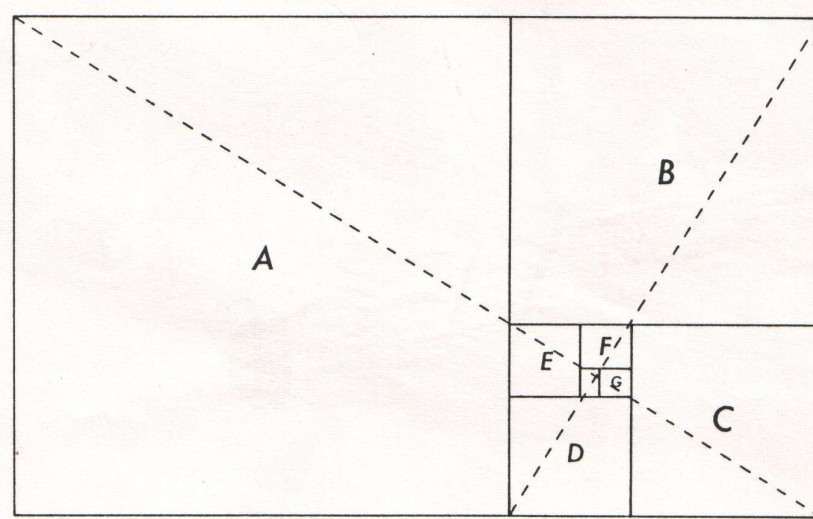
3. HOW FIBONACCI NUMBERS FORM
THE LOGARITHMIC SPIRAL
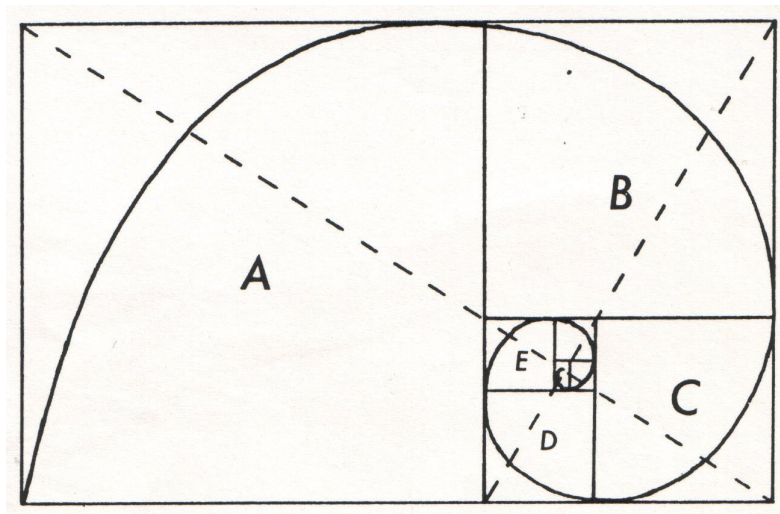

HOW TO DRAW A GOLDEN (LOGARITHMIC) SPIRAL

If we start with a Golden rectangle, we can take the next step, the construction of the logarithmic spiral.

We can draw a large Golden Rectangle (as above, in the previous section) and then divide it into a square and a smaller Golden Rectangle, as shown in the first figure below.

This process then theoretically can be continued to infinity. The resulting squares (shown), which appear to be whirling inward, are marked A, B, C, D, E, F, and G.
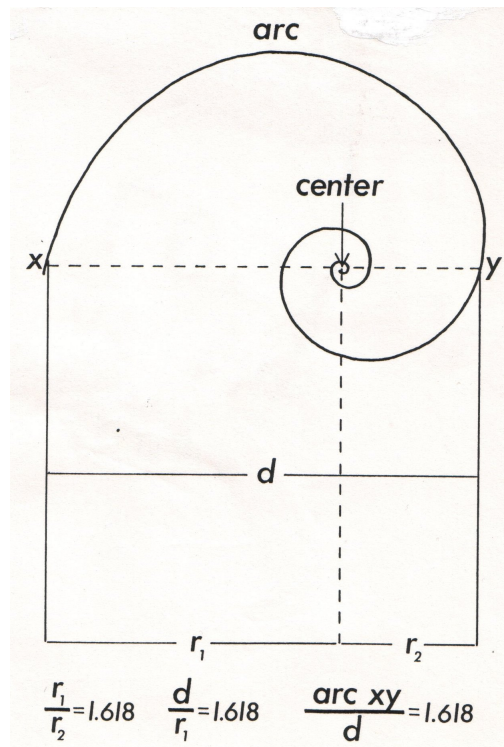
The dotted lines, which are themselves in the golden proportion to each other, diagonally bisect the rectangles and pinpoint the theoretical enter of the whirling squares. From this central point, we can draw the spiral as shown below, by connecting the points of intersection for each whirling square, in order of increasing size.

As the squares whirl inward and outward, their connecting points trace out a logarithmic spiral.

The logarithmic spiral has no boundaries and is a constant shape. The center is never met and the outward reach is unlimited. **The core of a logarithmic spiral seen through a microscope has the same look as a spiralling galaxy viewed through a telescope.** It is the only spiral that never changes its shape.

At any point in the development of a logarithmic spiral, the ratio of the length of the arc to its diameter is <mark>1.618</mark> and the diameter is related to the larger radius just as the larger radius is to the smaller radius, by <mark>1.618</mark>, as illustrated below.

$$\frac{r_1}{r_2} = 1.618 \qquad \frac{d}{r_1} = 1.618 \qquad \frac{arc\ xy}{d} = 1.618$$

OR HERE'S ANOTHER WAY TO DO IT

Let's draw some squares. Each square will be the size of a Fibonacci number.

First, make **two** small squares, joining one on top of the other, each with sides of **1** centimeter. (Remember that the first two Fibonacci numbers are both 1.)
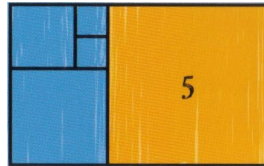
Draw a **2** centimeter square right alongside these two.

Now draw a **3** centimeter square right below the others (joined onto them).

The next square will be **5** centimeters. You'll tack it onto the right hand side of the others.
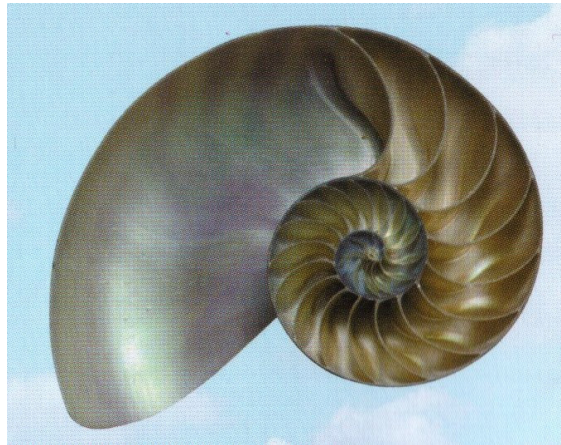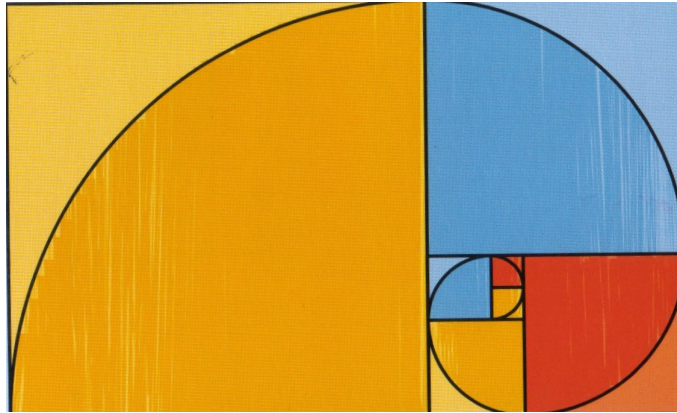

Then add on an **8** centimeter square.

Then a **13** centimeter square. Then a **21** centimeter square. And so on.

Now take a compass and draw an arc in each square. Be careful to place the point of the compass exactly on the inside corner of each square.

What do you now have? A spiral!

THE LOGARITHMIC SPIRAL
IN ANCIENT TECHNOLOGY

As mentioned on our website http://www.beforeus.com - 40 feet underground in Russia's Ural region, gold prospectors are finding ancient, spiral-shaped artefacts.

 These microscopically tiny artefacts are the product of some inexplicable and highly advanced ancient technology.

They resemble control elements used in micro-miniature devices in our latest technology "nano-machines".

An incredible aspect of this discovery is that exact measurements (using electronic microscopes) show that even these tiny artefacts are constructed according to the phi proportion.

How amazingly advanced must have these ancient civilizations been!

THE LOGARITHMIC SPIRAL
IN NATURE
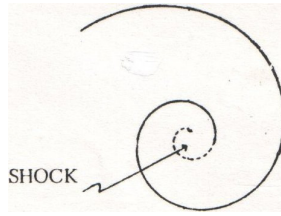
Nature just loves logarithmic spirals!

BIRDS

According to studies by Duke University biologist Vance Tucker, when falcons bank, instead of diving straight down toward their prey, they follow a slightly curved trajectory. This curved dive matches the logarithmic spiral!
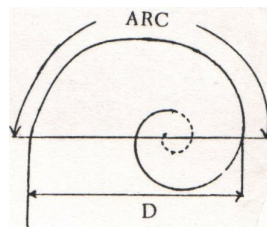
PLANTS

Growth in plants is initiated by a shock. A succession of electric charges causes a flower to open up.

This growth can be made only by the logarithmic spiral.

The ratio of the length of the arc to the diameter, at any point in the development of the spiral, is approximately equal to the ratio of consecutive numbers in the Fibonacci series:

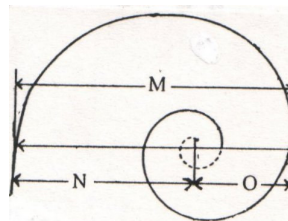2 - 3 - 5 - 8 - 13 - 21 - 34 - 55 - 89

In the diagram below:

Line "N" = .618 of Line "M"
Line "O" = .618 of Line "N"

Likewise:

Line "M" = 1.618 of Line "N"
Line "N" = 1.618 of Line "O"

BACK TO THE SUNFLOWER

The seeds on a sunflower appear to spiral out both to the left and right. They are arranged into a remarkable spiral pattern.

The most efficient pattern is the pattern that fits the largest number of seeds into the smallest amount of space. And the best way to place seeds so that the greatest number fit into a circle is to place each one of them at the Golden Angle – 222.5 degrees.

Now, how is this done? Remember, the seeds themselves have no idea of this. But a circle has 360 degrees. Now, if you divide the number of degrees in a circle (that's 360) by the Golden Number (1.6180) you get approximately 222.5 degrees.

So the seeds, as they spiral outward from the center to the outer edges, fit themselves in at 222.5 degrees – the Golden Angle. No matter how many seeds there are around the circle, it always works.

The seeds just push and shove against each other as they grow, spacing themselves naturally so that they get as much room as possible. And they do this so perfectly that they end up in these wonderful double-spiral patterns.
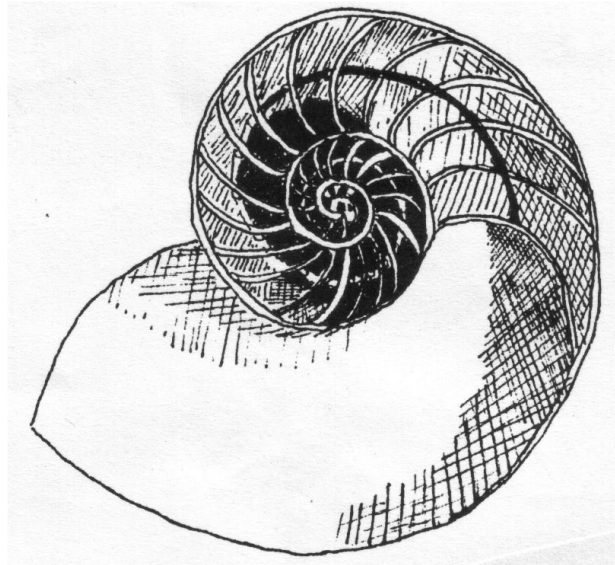
Logarithmic spirals occur in

- *FLOWERS*
- elephants' *TUSKS*
- pine *CONES*
- *LEAVES* of trees
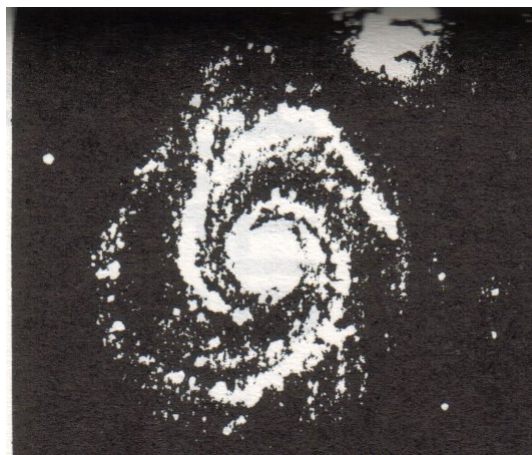- *BUMPS* in pineapples
- And even *HURRICANES.*
- And more:

The *TAIL OF A COMET* curves away from the sun in a logarithmic spiral. The epeira spider spins its web into a logarithmic spiral.

METEORITES, when they rupture the surface of the earth, cause **depressions** that correspond to the logarithmic spiral.

Snails, oysters, the chambered nautilus and other soft-bodied members of the **MOLLUSK FAMILY**, have hard shells which grow in the form of a logarithmic spiral.

Logarithmic spirals also occur in the **GALAXIES OF OUTER SPACE**.

Light years of space separate these two formations, but THE DESIGN IS THE SAME: a 1.618 ratio, or in simpler terms, a 5 to 3 relationship.

A SPIRAL UNIVERSE?

Debate continues to rage regarding the origin of the universe –was it by mindless chance or by clever design?

We know that galaxies demonstrate the golden proportion. So did the "original muddy soup" on our planet Earth also mindlessly, accidentally arrange itself to produce living shapes with this same golden proportion as the galaxies?

Or did a Master Programmer design it this way?

If so, then did God create the immense matter and energy of the universe and scatter it out away from Him in a spiralling, spherical fabric into the infinite void of space? Stretching out the heavens like a curtain?

(I'm suggesting here that the gigantic filaments of galaxies are majestically spaced by voids.)

An ancient writer observed, "They stand up together" (Isaiah 48:13). Astronomers have discovered intense burst of ultraviolet in the earliest created, most distant galaxies, indicating rapid simultaneous creations of stars. (I say "earliest", because the farther away they are, the further back in time we see them.)

The same ancient sage noted that the universe was created first, then stretched out (Isaiah 42:5,6).

So here is my question concerning outer space. Is the universe shaped like one gigantic spiral, which is opening up progressively like a delicate flower?

If so, then light from the most distant galaxies may not have taken so long to reach us, at all! In fact, it may have taken a mere fraction of the time we've assumed. And that could mean that the universe is younger than we've been calculating!

Here's a fascinating topic for some further research.

In any case, the occurrence of the golden ratio throughout nature is powerful evidence for an intelligent programmer.

<p style="text-align:center">***********</p>

For some truly astonishing facts on how people 4,500 years ago used the Fibonacci numbers, see Jonathan Gray's book *The Ark Conspiracy*, chapters 8 and 15.

- **Was the geography of the ancient world, including the Great Pyramid positioned relative to the believed location of Noah's Ark?**

- **Did the Babylonian scholar Berosus use Fibonacci numbers in pinpointing the longitude and latitude of the alleged Ark?**

- **Were the legendary Ark's measurements and curves deliberately designed to conform to the phi factor?**

Credit for some of the above information, including diagrams, must go to the stock market book of Frost and Prechter, *Elliott Wave Principle*. New York: New Classics Library, Inc., 1981, and to Ray Galvin's book *Fibonacci's Cows.* Auckland: Shortland Publications, 2001.

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