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The Geometry of Inert vs. Pulsing Forms;
or the Square Root of Three and Phi in the Formation of Matter

I. Introduction:

Perhaps sacred geometry's strongest aspect as a system of understanding all levels of the world that surrounds us is the fact that it ties together comparably objective "hard sciences" with our subjective human experience of life. By "hard sciences" here we mean the various sciences that deal with the physical growth and forms of nature, such as crystallography, botany, zoology, etc, i.e., those sciences that observe the patterns of growth and formation in mineral, vegetative, and animal life forms. By the term "human experiences of life," we mean the experience of one's own interaction with both the worlds that surrounds us (the environment) and the world within us (the conscious and subconscious realms).

Sacred geometry pulls the seemingly disparate threads of empirical science and philosophy together into a single system. It overcomes the apparent dichotomy of logical, rational reasoning versus creative, intuitive spirituality by pointing out the direct relations between great archetypal experiences common to all humans and the ontological reality of the universe surrounding us. For the well-balanced student, sacred geometry is not more of a spiritual quest than a scientific exploration - it is both, perfectly in equilibrium, complimenting one another flawlessly.

Herein, we choose to focus on the "scientific" and ontological aspect of the two proportions known as the square root of three, and phi (or the Golden Proportion) - namely how these two proportions can be intrinsically linked to the nature of space itself. The philosophical implications of these proportions have been discussed at length elsewhere, and we will not waste the reader's time by reiterating them extensively here. Needless to say, both proportions are heavily laden with layers upon layers of meaning, and a quick summary of those layers will never suffice to impart a true understanding upon even the most willing student.

However, to serve as a simple reminder, we say this: the square root of three can be generalized to the creative force that results from bringing two opposing forces into balance, and phi is that force which carries the processes of life toward attaining their full and complete potential. Specifically in regards to human experience, phi has been traditionally associated with the ideas of regeneration, transcendence, and beauty. It is not too far a stretch for most to see that these three ideas are all part of what has been traditionally perceived to be the final product of human evolution, and thus it is no surprise that they have been considered characteristics of the proportion phi.

II. Defining the Terms "Space," "Nature," and the difference between "Inert" vs. "Pulsing" Forms:

To quote a prior work:

> "…nature is the self-producing and self-consuming aspect of the space that surrounds us, i.e., it is the "nature" of space that it grows, moves, lives and dies in cycles. Nature cannot be separated from space – it is space, from the actions of the most miniscule atomic particle to the movements of the cosmos at large."[1]

Thus, nature and space are not separable. The only real difference between the concepts of space and nature is that space seems to be empty, because our eyes do not readily perceive the countless number of atomic particles that fill every inch of it. Those particles are continuously moving, fluxing, exchanging sub-particles, dying, and being born - just like the "natural" phenomena that we see every day like weather patterns, the tide, and the movement of the moon.

It is safe to say that space is constantly in a process of change. We can easily see that it is the nature of space to be in continuous flux. In an age when contemporary science is beginning to show that it can only describe the "tendencies" of nature's activity, and never fully define it with laws, it seems that the only thing that we can definitely state is that you can count on the fact that

[1] A. O'Connor, "Sacred Geometry as a Vehicle of Transformation," 1998

things will change. Particles degrade, stars collapse, and a baby is born - nothing remains constant, besides the fact that every part of the universe is going through some process or another.

Within that process of change, we can see that there are two distinctly different modes: inorganic and organic. Inorganic forms are certainly in a process of change, as can be see in the gradual degradation of a mountain by the wind and rain, or the Earth's precessional movement (the 5000 year process of the "north star" having to be reassigned from one star to another, due to a slight wobble in the Earth's rotation). Organic forms, on the other hand, change extremely quickly - so quickly that any individual organic life form would seem completely irrelevant in the vast ocean of the history of the universe. Even the life span of the oldest living organism on Earth today (most likely a tree) is comparably less than a microsecond when compared with the life span of the universe as a whole. If we could somehow experience the perspective of a mountain, the organic life that we observed would seem to be nothing more than brief pulses of dynamic natural energy - trees would grow spiraling upwards, die and degrade in a second's time. Individual animals' lives would be nothing more than brief flurries of motion and energy.

Thus, we have two forms of space, or two basic modes of nature: inert and pulsing. Although both experience change over time, the inert, inorganic form of nature is comparably rigid and slow changing, whereas the organic, pulsing form is a sudden irruption of accelerated change, that disappears almost as soon as it comes into being. Both are generated from the same homogenous substance - space - a space whose nature it is to change. The rate of change is simply highly accelerated in one form (the organic, or pulsing form), and extremely gradual in the other (the inorganic, inert one).

III. The Geometry of Inert vs. Pulsing Form

As we shall see, the geometry of inert space vs. pulsing space is quite dissimilar. We can observe this fact by examining the natural forms that inert and pulsing forms most commonly take. It is clear that the inert forms of nature heavily favor the square root of three in their physical shapes, whereas organic life seems to employ the phi proportion most often. If we further define the fundamental differences between these two forms and how they grow, we might start to understand why the geometrics of these two types of space vary so greatly.

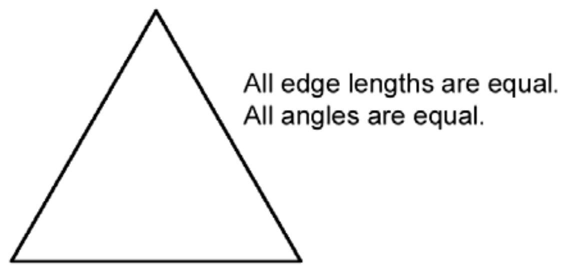
Because crystals display the most obvious geometry of the inert forms of nature, we will use their growth and form as an example for our study. For our pulsing or organic form, we will take the common sunflower into consideration.

The principal of least action:

During the process of formation, inorganic life tends to follow the Principal of Least Action (also known as the "Principal of Hamilton"). This Principal states that a given substance will structure its molecules in such a manner than the lowest possible potential energy is achieved when its formation is completed. To effect this state of lowest potential, the molecules of the substance must arrange themselves in such a manner that a state of total equilibrium achieved. For this equilibrium to be achieved, the arrangement as a whole must be able to balance and share stress placed on the substance across its various parts as readily as possible - thus preventing external forces from altering the substance. Having the greatest resistance to external forces equates to having the lowest potential energy. In order for a material to share stress across its entire structure, the molecular arrangement of that material must have elements that are equally spaced from one another, and a support lattice for those elements that is symmetrical in as many ways as possible.

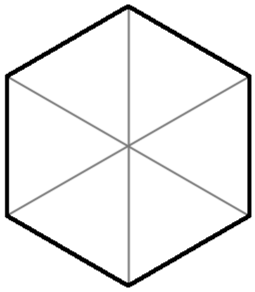
Molecular grids that result from the Principal of Least Action:

The reason behind this is quite simple: by placing molecules at equal distances from one another, a substance can equally distribute external stress across all of its form the moment that stress is applied. Each molecule, and the lattice that supports it, shares the stress load equally, whether that stress is applied to one part of the formation or another. By employing the entire structure to resist stress on any individual part of that structure, the maximum resistance to change, and thus the lowest amount of potential energy, is achieved. Let's look at an equilateral triangle as an apt example of this idea:



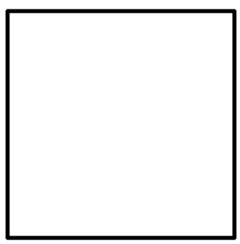
It is easy to see that there is no weak point in the structure - if pressure were applied to any point, the entire form would instantly share the burden equally. The pressure is instantly distributed across every point, and thus the maximal strength to amount-of-materials ratio is achieved. If we were to lengthen or shorten a single side of the triangle, the structural integrity of the entire polygon would drop, leaving a greater potential for external stress to affect those parts that were out of symmetry. Modern day structural engineers are well aware of this fact, and many equilateral triangle-based lattices can be found in structures requiring great strength-to-weight ratios.

It is easily observed that a perfect hexagon is nothing other than six equilateral triangles placed adjacent to one another. As with the equilateral triangle, every two points (or molecules) in the pattern are equally spaced from one another. Note that this is only true so long as each of the outer points are connected to the center point of the polygon, thus creating six equilateral triangles, as mentioned. As would be guessed, when composed of six equilateral triangles, the perfect hexagon is also extremely strong and bears external stress very effectively. Consider the strength-to-weight ratio of a bee's honeycomb for an excellent example of a lightweight, yet resilient structure that is based on a hexagonal matrix.



A hexagon consists of six adjacent equalateral triangles.

The perfect square also is a fairly strong and resistant form, although not nearly as strong as the equilateral triangle. The more points that we add to a structure, even if they are equally spaced, the weaker the overall form becomes and the higher the potential energy. Thus, those substances that have molecules equally spaced and grouped in small numbers have the greatest stability.



All edges are equal in a square.

The regular division of the plane:

If we "regularly divide a plane," we can appreciate all the more why triangle/hexagon lattices and square lattices are particularly strong and distribute external forces well:

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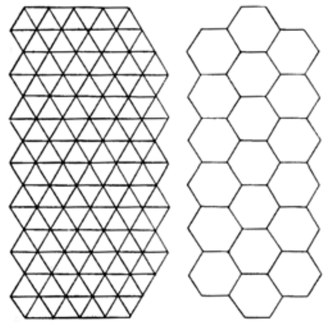

We can see from the illustration that squares and triangles can be arranged on a plane in a way that the entire plane is covered by equal polygons. In other words, every point on the lattice is connected by a line of equal length. Thus we have "regularly divided the plane," by creating a pattern of adjacent polygons in which no point is external to one of the polygons. Even angle is similar, and every line length equal. If we base a molecular structure on such a regular division of the plane, we find that the structure formed is particularly resistant to external stress.

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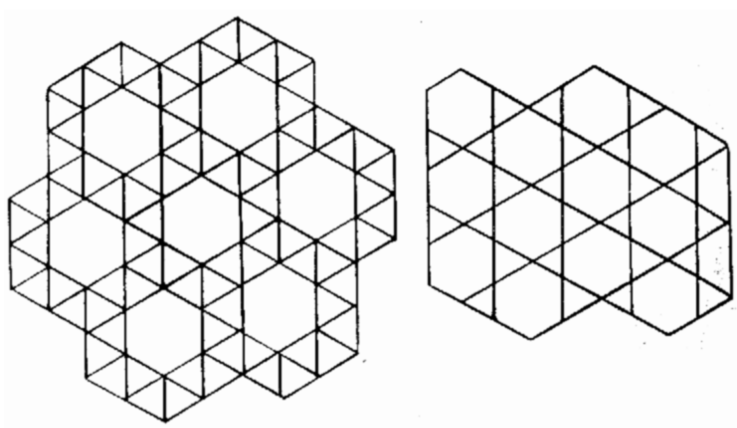
In addition to the basic two grids that we see above, several combinations of the triangle and square can be arranged in such a way that the patterns regularly divide the plane. The patterns thus formed are also particularly strong, molecularly speaking:



The two patterns above are not the only possible arrangements of squares and triangles that can regularly divide the plane - there are several others. But these two suffice to serve as examples to show that it is possible to use both polygons to create lattices wherein every point is separated from its directly connected neighboring points by a line of equal length.

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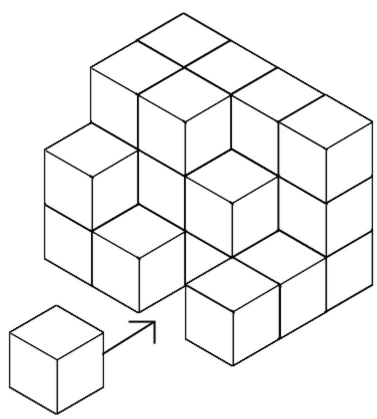
The regular division of space, or "close packing":

Molecular structures based on regular division of the plane prove to be particularly resilient, but there is one more grid that also resists external forces very well. Up until this point, we have been regularly dividing the plane, but space is of course three-dimensional. When we apply the ideas of regularly dividing the plane to three-dimensional space, we enter the geometric area of study known as "close packing." As with the regular division of the plane, the guiding rule of close packing is to arrange identical polyhedrons in such a way that there are no gaps anywhere between the faces of the polyhedra. In other words, every face of every polyhedron must be touching a similar face of another polyhedron.

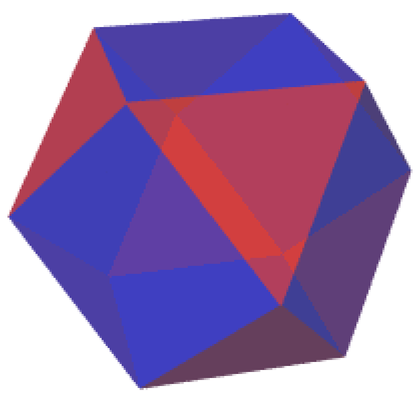
Probably the easiest close-packing arrangement that we can visualize is the use of the perfect cube:



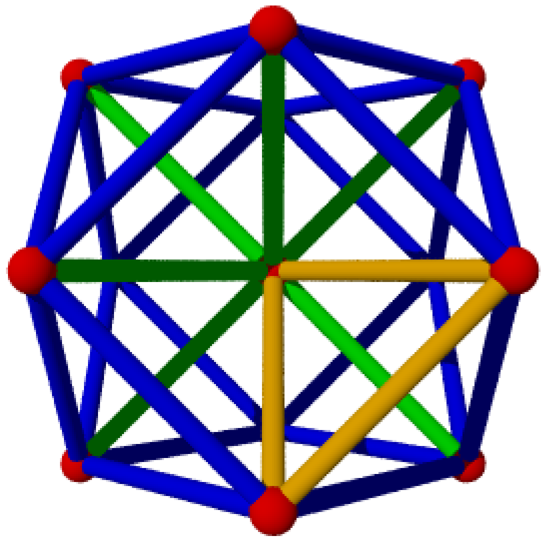
We can easily see that identical cubes can be packed in to fill a space in such a way that there is no face that does not wholly meet with the face of an adjacent cube. The corner points, or vertices, of every cube are also the vertices of an adjacent cube, and thus are "shared" between polygons. The entirety of space could be filled with such a matrix of cubes, and every vertex of every cube would be separated by an equal distance from its neighboring points - but only those neighboring points connected directly by the lattice. If we consider that the distance across the transversal of the cube is not equal to the edge length of the cube (the transversal measures the square root of three if the edge length measures one), then it becomes clear that the cube lattice is not "isotropic." In an isotropic structure, every point on the grid must be equally spaced from all of the points that surround it, regardless of whether those points are connected directly by the lines of the grid or not.

This is a particularly important point, because to attain the maximal ability to bear stress, a three-dimensional lattice must be truly isotropic. A cubic matrix is a very resilient structure (iron is found to arrange its molecules on a cubic lattice), but it is not as strong as a matrix wherein every point is an equal distance from every one of its neighboring points. The logic behind this is the same logic that shows us why a triangular/hexagonal grid is stronger than a square grid when dividing a flat plane.

To create a three-dimensional matrix wherein every point is of equal distance to all of its neighboring points, we must study the Archimedian polyhedron known as the "cubeoctahedron," or the unified vector field (as it will be referred to here).



In the close packing structure of the unified vector field, all edges are equal. This is not a particular exception, as there are many polyhedra that can be formed with equal sides (the Platonic and Archimedian solids are excellent examples). What makes the unified vector field distinct from all other polyhedra is the fact that the circumsphere that surrounds the shape has an equal radius to the edge length of the polyhedron (the circumsphere is that sphere which completely encloses the polyhedron by touching each vertex). In other words, if we were to draw a line from the center point of the unified vector field to any of its vertices, we would find that line to be of equal measure to the length of any edge.



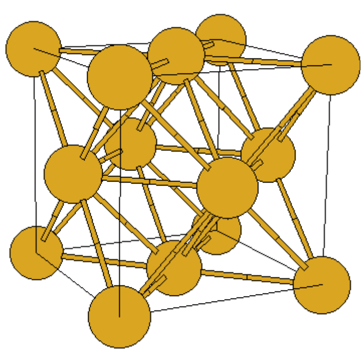
As can be seen in the illustration, any two neighboring vertices can be connected to the center point of the polyhedron to create equilateral triangles. In addition, the individual faces of the polyhedron are alternating equilateral triangles and perfect squares (8 triangles and six squares) - both particularly strong structures, as we have seen above.

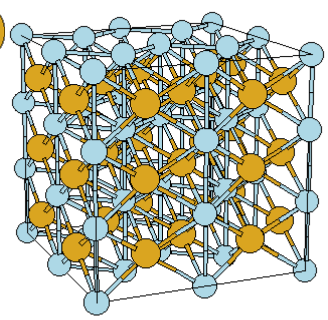
If we look at the structure of the polyhedron above, it may become clear why the name "unified vector field" has been applied to this particular polyhedron. If we consider that every edge and every line that connects a given vertex to the center of the form to be a vector, and it is noted that they are all equal in measurement, then the name makes good sense. This is particularly true when we consider that because the edges and vertex-to-center-point lines all are of equal measure, we can proportionally assume their lengths to measure one. The number one is always considered to represent unity in sacred geometry, and thus *unified* vector field seems a particularly fitting name.

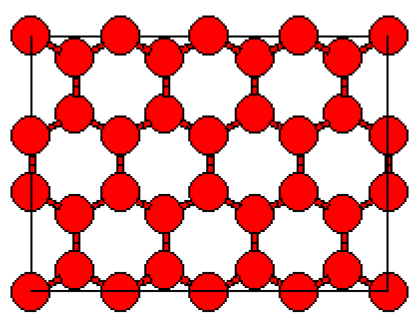
Because of the total symmetry aspect of the unified vector field, it is safe to say that it is the best representation of a hexagon extended into three dimensions. The unified vector field's form does not appear to be hexagonal, but it shares the "equal in all ways" characteristic, which no other polygon or polyhedra can claim in such a literal sense. Once again, because of the total equality between points in both, no other polygons or polyhedrons can profess to be as resistant to external stress, or to have as low a potential energy rating.

To tie all of these apparent digressions together, one must note that molecular structures of crystalline forms choose to mold themselves along lattices that consist of the following geometric "ingredients": the triangle, the hexagon, the cube, and the unified vector field, or cubeoctahedron. This would only make sense, considering that in order for a substance to attain the lowest probability of being molecularly altered due to external forces, it must arrange its atoms according to one of the above mentioned matrixes.

The Principal of Least Action states that inert forms of space will organize their molecules in such a manner as to have the maximum stress resistance. We have shown those geometric grids that resist stress most effectively, and, through no coincidence, we find that many inorganic forms of nature employ those grids as their structural guiding principals. Let's take a quick visual tour of a few examples of inorganic life that display obviously triangular, hexagonal, cubic, and cubeoctahedral symmetry:





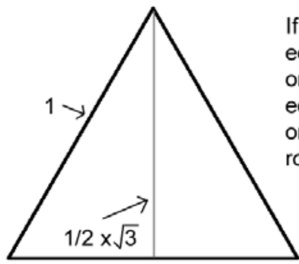


left to right: molecular structures for silver, b19, and bonded carbon

The square root of three in triangular, hexagonal, cubic, and cubeoctahedral matrixes:

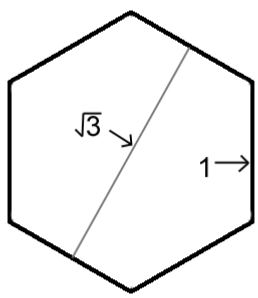
Now, it must be noted that all of the structural matrixes that we have mentioned as being tied to those forms of nature that have the greatest resistance to external forces all intrinsically contain the square root of three in their proportions. As a rule, every one of the grids mentioned (both two-dimensional and three-dimensional) contain the square root of three in their proportions.

To begin with the equilateral triangle, it can be observed that the proportion between the edge length and the height of the equilateral triangle is one to one half of the square root of three.



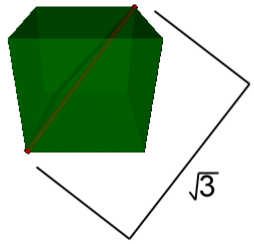
If the edge length of an equilateral triangle equals one, then the height of the equilateral triangle equals one half times the square root of three.

In a regular hexagon, the proportion between the edge length (or the radius) and the distance from the center point of one edge to the center point of the edge opposite to it is one to the square root of three.



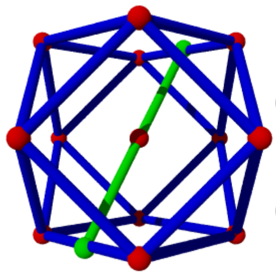
If the edge length of a perfect hexagon equals 1, then the distance between the center points of opposite sides equals the square root of three.

In the perfect cube, the proportion between any edge length and the transversal that cuts from one corner through the center of the cube's volume to the corner opposite to it is one to the square root of three. In other words, if the edge length measures one, then the transversal measures the square root of three.



If the edge length of a cube equals one, then the cube's transversal equals the square of three.

And finally, we come to the unified vector field, or cubeoctahedron. The proportion of the edge length to the distance from the center point of the polyhedron to the center point of any edge is one half of the square root of three. This could also be stated this way: if the edge length of the cubeoctahedron is taken to measure one, then the distance between the center points of opposing edges (across the center of the polyhedron's volume) must be the square root of three.



If the edge length of a unified vector field equals one, the distance between the center points of opposite sides equals the square root of three.

Also note that the three common spheres used to delineate polyhedra - the insphere, intersphere, and circumsphere - all relate to one another by one to one half of the square root of three. For the unfamiliar, the insphere is the sphere that touches the center point of each face of the polyhedron, the intersphere is the sphere that touches the center point of each edge of the polyhedron, and the circumsphere is the sphere that touches each of the vertices of the polyhedron. In the unified vector field, if the radius of the insphere is taken to measure one, then the radius of the intersphere must be one half of the square root of three. If the intersphere is taken to measure one, then the circumsphere must also measure one half of the square root of three.

Our point should be quite clear by this time: in order for inorganic matter to attain its goal of lowest potential energy, and thus be as stable a form as is possible, it must arrange its molecules along a lattice that is based on the square root of three - either triangularly, hexagonally, cubically, or cubeotrahedrally. *It is therefore safe to say that the very energy grid of inorganic space itself is intrinsically tied to the square root of three proportion*. If this statement were not true, then inert forms of nature would not naturally form along matrixes that contain the proportion. To restate, it is the natural and commonly recurring tendency of inorganic molecules to fall into geometric patterns that contain the square root of three because the square root of three is intrinsically tied to inert space. By doing so, the composition of inert space fulfills its necessity to resist external stresses, and therefore attains the lowest possible potential energy -

and thus change to inert space is highly unlikely. This is not to say that inert space does not change, but more that change is resisted as much as possible.

Formation and growth in inert vs. organic forms of life:

When a crystal takes shape, it adds new units of crystal to itself by "agglutination," i.e. tiny crystals form completely exterior to the mass of crystal material, and then fit themselves into the grid of the pre-existing crystalline structure. It is almost as if sticks and balls were floating in liquid, and when the correct number of sticks and balls were in that liquid, they would spontaneously form equilateral triangles. Those equilateral triangles would form completely independently of one another. If there happened to be a greater lattice of pre-exiting crystal material nearby, the individual triangles would then attach themselves to it where they fit best, thus forming an eventual regular division of the plane. In such a situation, each individual "cell" (each triangle) of crystal is particularly strong and resistant to change. When a group of such "cells" join together to form a single lattice, that lattice is also strong and resistant to change. It could be said that the focus of a crystal's formation and growth more heavily accents keeping the individual crystalline cell strong, and the fact that these individual cells bond together to form strong structures is almost secondary.

Compare this with the forming of organic life: Organic life does not follow the Principal of Least Action. In fact, it often swings quite to the opposite extreme. Organic life forms new growth by intussusception - by using the already existing material of its own body to intentionally create a situation where new molecular structures (cells) will spawn. The organic life form takes energy in the form of food into its body and breaks that energy down into its base parts, which can then be reassembled into the cell material that the life form requires to grow. It takes energy in, breaks it down, builds cells from the energy, and then It adds these cells to its structure. Thus the organic life form grows from the inside out.

Because every individual unit or "cell" in a crystalline structure forms to fit within a pre-designed grid, each "cell" need only take form relative to itself. As long as the individual crystal "cell" forms according to the correct molecular grid, it will end up fitting into the greater grid formed by previously assembled crystal units. To put it bluntly, a forming molecule of crystal cares little whether a prior crystalline structure exists at all, or where in that structure's lattice it may attach itself.

With organic life, the whole life form must be taken into consideration when new growth is occurring. If a group of cells were to grow too far in one direction or the other, the entire life form would become unbalanced. Every new growth in an organic life form must be proportionate to that which has already formed. Thus we find in plants, such as the sunflower, that leaves or branches grow out of a central stem at the correct angle, rate of rotation, and length so as cause the entire structure of the plant to remain balanced and upright. If the growth of the plant were not governed correctly in proportion to the pre-existing structure, that structure would not be able to function correctly - it would topple, or cease to receive enough sunlight, water, or minerals from the earth to continue to function. The plant then would loose the ability to sustain itself, and the life form would die.

In animal life, it is easy to understand that new growth must form in accords with the pre-existing organism if that organism is going to continue to function properly. If a cat's legs grew too long in relation to the rest of its body, it would become sorely out of balance and unable to kill its prey or flee from predators. If a bird's wings were too short in relation to the rest of its body, it could not fly and also would easily fall victim to predators. There are countless examples, but the point is that new growth in organic life must take into account the life form as a whole, or that life form will cease to exist.

Phi in the formation and growth of organic life forms:

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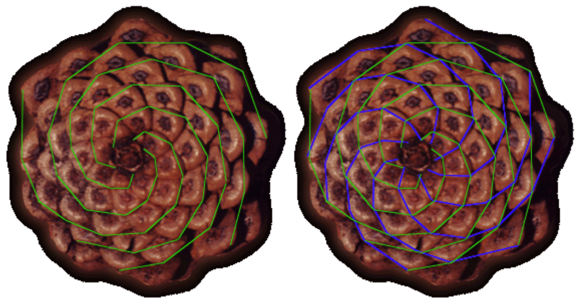
If we analyze the growth and form of organic life, it is clear that the proportion that governs the "perfect angle, rate of rotation, and length" of growth is linked intrinsically with the proportion phi. Phi is linked with three major geometric phenomena: first, the direct proportion of lengths between two objects (wherein if one object is taken to measure 1, then the other would measure 1.618…), second, by the use of numbers taken from the Fibonacci series, and third, by the use of the pentagon or pentagonal symmetry.

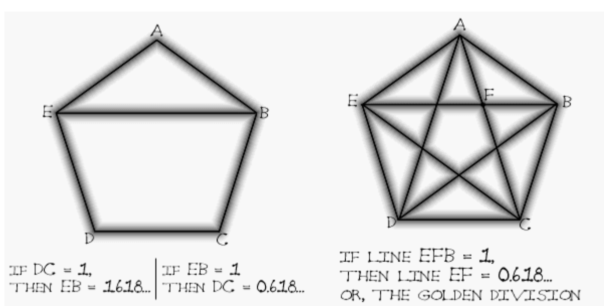
In dozens upon dozens of organic life forms we find the direct proportion of phi (1:1.618…) ruling the sizes of various parts of a life form in relation to each other. A common example of this would be that the lengths of the bones of the fingers in an average human display phi proportions in relation to one another. Another fine example is the fact that in an average human the navel divides their overall height at phi, i.e. if the distance from the ground to the navel is taken to measure 1, then the height of the individual from head to toe would be 1.618…

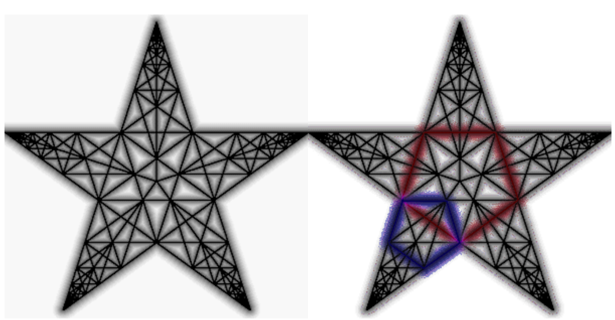
Besides finding the direct proportion of phi in a life form, we also find numbers taken from the Fibonacci series, wherein any two adjacent numbers divided into one another will give the value of phi. To review, the Fibonacci series is a simple additive series wherein a third integer is determined by adding together the two previous integers. The series begin with 1, and proceeds in the following manner: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, etc. The series continues out to infinity, and if any two adjacent numbers are divided into one another, it is found that the answer approximates the value of phi (1.618…). The further into the series one progresses, the more accurately the product of the division of adjacent numbers approximates the actual value of phi.

In organic life, many examples of the use of Fibonacci numbers can be found, but one specific example would be the pattern that determines the seed distribution in the head of a common sunflower. In the seed head of the sunflower, two sets of counter-rotating spirals form the pattern of seed distribution; if counted, it is found that 55 spirals rotate in one direction, and 89 spirals rotate in the opposite direction. If we look above we can see that 55 and 89 are adjacent numbers from the Fibonacci series. If we divide 55 into 89, we arrive at 1.618…, or the approximate value of phi. A similar pattern of counter-rotating spirals determines the shape of the pinecone, with 8 spirals turning in one direction and 13 spiraling in the opposite direction. Once again, 8 and 13 are consecutive numbers in the Fibonacci series.

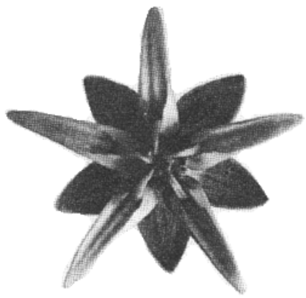


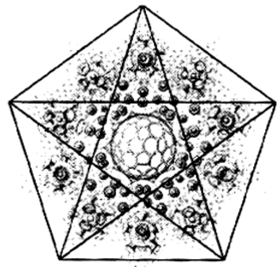
Also, we can look for pentagonal symmetry in organic life as a sign that phi rules organic geometry - and indeed we find that pentagonal symmetry is practically *commonplace* in organic life. As has been shown in past studies, the pentagon and the proportion phi are completely inseparable from one another. The edge length of a pentagon in relation to the edge length of the pentagram that can be drawn within it is 1 to 1.618… Also, the pentagram can easily be used to create a pattern of ever-diminishing pentagrams, all of which have phi relations to the greater pentagram that encloses them.



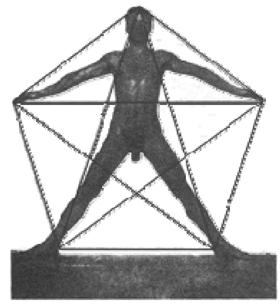


Thus any form that takes pentagonal shape (many flowers, sea creatures such as the radiolarian, and even the human body) must intrinsically contain the phi proportion.





A RADIOLARIAN



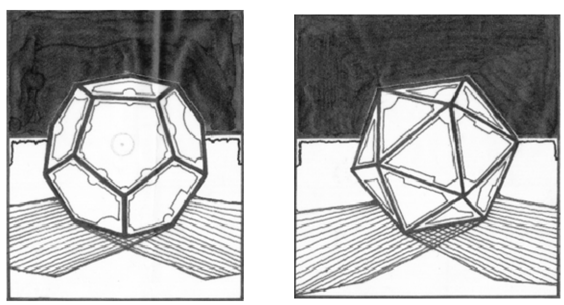
If we look at the illustration above labeled "The Fibonacci Kite" we can clearly see the particular aspect of the phi proportion that keeps all parts of a form in direct proportion to all the other parts. Every pentagon relates to the next larger pentagon by the same proportion that larger pentagon relates to the one larger than it. Every new pentagon added to the overall form relates to the whole structure in the same way that all the other parts relate to it. Phi shows this type of "part relating to the whole" aspect in all of its forms, several of which we have not mentioned here. It is for this reason that phi can be understood to be the penultimate proportion to govern additive, or "intussusceptive" growth - because every new growth is balanced according to the proportions of the pre-existing form. Even if this logic does not seem clear, it can be easily shown that phi appears so many times in the various organic life forms on this planet that it cannot be denied that the proportion has some special relation to organic life.

Pentagonal forms and the regular division of the plane and space:

Earlier we determined that both the regular division of the plane and the regular division of space are intrinsically linked to the molecular structures of inert, or inorganic, life forms. We also saw that the matrixes that best serve the purpose of creating structures that will resist externally enforced change are those that contain the square root of three proportion.

It is interesting, then, to note that the pentagon, due to its 72-degree angles, cannot be employed in the regular division of the plane. There is no way possible to place pentagons adjacent to one another in such a way that they will entirely cover a plane without leaving a gap. if we place two pentagons adjacent to one another, they leave a gap that cannot be filled by a third pentagon without overlapping one of the other pentagons.

In three-dimensional space, the pentagon is best represented by the icosahedron and the dodecahedron, which display obvious pentagonal symmetry and contain the phi proportion in many ways throughout their forms. Just as the pentagon cannot be employed in the regular division of the plane, neither can the icosahedron or the dodecahedron be close-packed.



The dodecahedron (left) and icosahedron (right)

It is no coincidence, then, that we do not find pentagonal, icosahedral, or dodecahedral lattices in inert, inorganic life forms. Occasionally one comes across a molecular lattice that approximates a dodecahedron - but never replicates it completely in the way that inorganic molecular structures will form on matrices containing the square root of three. The proportion of phi would seem to only be useful in regards to the "intussusceptive" growth associated with organic life forms.

IV. Conclusion

The general purpose of this document is to attempt to point out that there are two types of "nature" or "space" in the universe that we perceive, and that the geometrics of those two types of space are governed directly by two separate geometric proportions: the square root of three and phi, or the "Golden Proportion." To keep the reading concise, many possible examples of the two respective proportion's usage in inert and pulsing life forms were left out - they have been dealt with at length in many other publications and written works.

The implications of this observance would seem both astonishing and useless at the same time. If it is indeed true that these two basic geometric proportions govern the formation and growth of nature, then it only seem to be a logical extension that they are somehow implicitly part of space itself, whether that space be inert and inorganic or pulsing and organic. The ramifications of such a statement are vast and currently unknown - and at the same time, one is left wondering what can be done with such information, if anything at all.

If nothing else, the simple observance that there are two distinctly separate forms of space in this universe is of particular interest. The proportion of one form of space makes it resistant to change by its very nature. The proportion of the other prepares it for continuous growth and change. The substances built according to the proportions of the first can last for hundreds of millions of years, and perhaps longer, yet allow no room for change, advancement, or adaptation. Those substances built in accords with the proportion of the second type pulse into existence and die off again in but a blink of an eye - yet they grow, breathe, adapt, *evolve*.

The basic duality of Yin and Yang comes to mind regarding these two apparently separate aspects of space. One force represents that which contracts and waits passively for change to occur due to external forces. The other represents that which radiates and takes an active role in changing its surroundings. The connection between the organic and inorganic forms of natural life and this ancient idea of passive and active forces seems clear.

As a final word, we must remind the reader that behind any duality, there lies a single force, uniting all that exists throughout the universe. Although this paper has emphasized the divergent geometries that are associates with two separate aspects of space, this dualistic mindset cannot overshadow the understanding that both are, at some incomprehensible level, united in one. Although further explorations of the ideas herein are felt to be valid and worthwhile, we pray that they never lead future scientists and philosophers to a segmented and disjointed vision of the chaotic unity that we partake in daily.