Mensionization Complementation

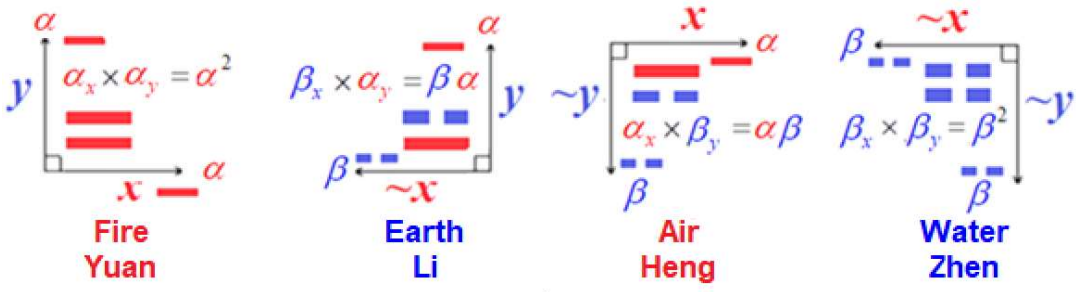
The Mathematics of Hermetic Alchemy

Section 8

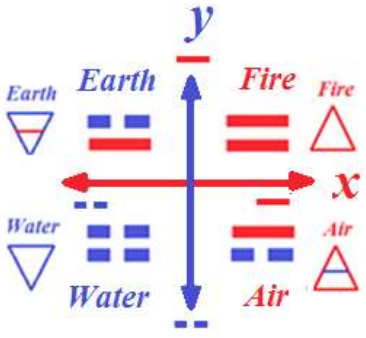
The 2nd and 3rd Dimensional Expansions

20. The Four Elements Bigrams in the 2-dimensional Complementation.

Recall from Section 5 the Alchemist's Four Elements were formed from a 2-dimensional opposition $f(m_2) = (\alpha + \beta)^2$. They were also syncreticly paralleled to the Four Hsiang of the I Ching.



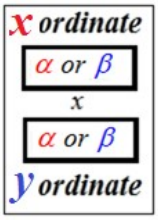
4-Element, 2-dimensional Bigram Binary Expanded Sub Codon Area Elements



The illustration on the right shows a 2-dimensional graphic with its four (4) cross-multiplied complemented bigram elements and its relationship to the cross multiplication graphic above. Each element has two positions, one above the other, in which each position is a structured placeholder for a fundamental 2-dimensional opposite that can hold either a solid Line (▬) (α) or a broken line (▬ ▬) (β). The triangles on the side are copies of the ancient Hermetic Alchemical symbols for each element; they are shown within an x-y coordinate system. Also, rather than introducing new terminology for a standardized system, I have kept the familiar

x, *zed*, & ***y*** notation and have kept the two *binary* lines in an (***x***, ***y***) bigram Cartesian plane

The Alchemical *Four Elements* have a special ordering in their *vertical ordinate* system. The *top* position of each element is the (α)***x***-ordinate *home* position and the *bottom* position, the (β) ***y***-ordinate *home* position.

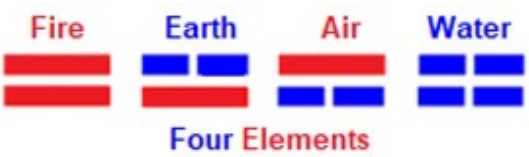


In the excerpt below, *Albert Pike* quotes the philosopher *Proculus'* description of this complementary ***x*** & ***y*** relationship of the Alchemical *Four Elements*.

> *[Pike, "Morals & Dogma," page 657] "Heaven is to earth as the male is to the female. It is by the revolutions of the heavens, that by their movements produce the seminal incitements and forces, whose emanations received by the earth, make it fruitful and cause it to produce plants and animals of all kinds."*

Although *Proculus'* use of the terms *Heaven* and *Earth* is from an *alchemical* standpoint, his description also parallels the view of the realms of *Heaven* and *Earth* presented in the *I Ching* by the sinologist *James Legge* in his translations of the "*Sacred Books of the East*." Notice in the *Four Elements*, as is true in all other elements, you can have a (β) yin in a (α) *yang* position (β_α) and a (α) *yang* in a (β) yin position (α_β) , which *equalize* the complementations because all *males* have some *feminine* qualities as does all *females* have some *masculine* qualities. In *Legge's* quote below, the brackets are my additions.

[*"Legge, I-Ching"*] *The interactions of Heaven* [*Generative Power*] *and Earth* [*Productive Capacity*] *produce a realm of continuous change, diversity, and movement that manifests itself as the four emblematic figures,* [*Bigrams-Four Hsiang*]*; Old Yang* (*Yuan-Fire*), *Young Yang* (*Li-Earth*), *Young Yin* (*Heng-Air*) & *Old Yin* (*Zhên-Water*)."



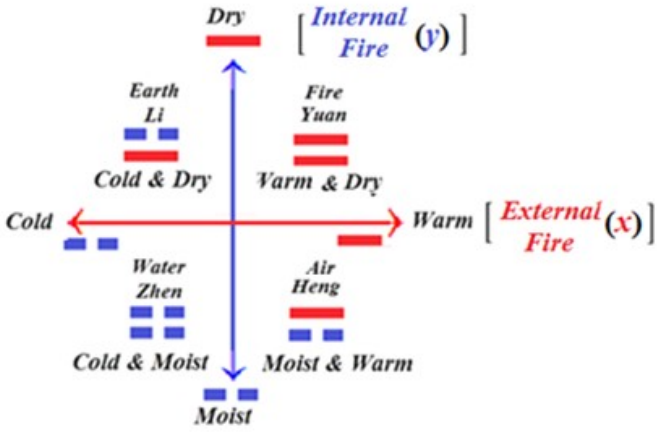
Legge's quote *introduces* the *I Ching's Four Hsiang* which is a *syncretic* relationship to the *Hermetic Alchemist's Four Elements*, as shown in the graphic above.

The following segment from *Albert Pike*, taken from the *Degree* of the true *Mason* [*Le Vrai Macon*], in its ritual the 23rd *Degree* of *Masonry*, or the 12th of the 5th class, introduces the *Four Elements* of the alchemists.

> ***[Pike, "Morals & Dogma," page 783]*** *To work on Universal Matter, use the Internal and External Fire; the Four Elements result, the Principia Principiorum and Inmediata; Fire, Water, Air, Earth,. There are four philosophical qualities of these elements - the warm and the dry, the cold and the moist. Two appertain to each element; the dry and cold to the Earth; the cold and moist to Water; the moist and warm to Air and the warm and dry to Fire. Whereby the Fire connects with the Earth; all the elements, as Hermes said, moving in circles.*

The *Internal* and *External* Fire are *Alchemical notations* for the *volatile* & *fixed* (α) *Generative Power* and (β) *Productive Capacity* duality *nature* of each of the (***x***) and (***y***) axes' binary lines. The (***x***) axis binary line (*external fire*) being the *warm*-*cold* opposite set and the (***y***) axis binary line (*internal fire*) the *dry*-*moist* opposite set.

The *Hermetic Alchemists* believed the *Four Elements* was a fundamental *material* presence in the universe. They believed every existing material *manifestation* from the *natures* of man to *science* was formed from the interactions of the *four* fundamental elements.



Empedocles, a fifth century BCE Greek philosopher, is credited with originating the Alchemical terms Fire, Earth, Air, and Water, although they were already known by others with differing names and associations. He explained the nature of the universe as an interaction of two (2) opposing principles he called love and strife (α, β) manipulating the Four Elements. He believed the Four Elements. were all equivalent and of the same age where each element rules its own province, and its own individual character. Different mixtures of these elements produced the different natures of things.

A Few Examples of Prominent Four Elements

	Fire	Earth	Air	Water
* Four Seasons	Summer	Spring	Autumn	Winter
* Blood Groups	AB	A	B	O
* Nucleic Acids (DNA)	T	C	A	G
* Nucleic Acids (RNA)	U	C	A	G
4-Fundamental Forces	Strong Force	Electromagnetic Force	Weak Nuclear Force	Gravitational Force
The Force Carriers	Gluons	Photons	W & Z Bosons	Gravitons

The Alchemical Four Natures of Man

	Fire	Earth	Air	Water
Four Virtues	Righteousness	Propriety	Knowledge	Benevolence
	Fortitude	Prudence	Justice	Temperance
Four Individualities	Warriors	Merchants	Seers	Servers
Four Emotions	Goal Oriented	Sensory Stimulation	Self Appraisal	Other People
Four Evils of Man	Deceit	Fraud	Trickery	Falsehood
Four Natures of Man	Spiritual	Physical	Mental	Emotional
	Ego	Senses	Intellect	Mind

For a further explanation on the Alchemist's Four Elements "Natures of Man," see INDEX B.

21. Circular Harmonic Motion of the Four Elements

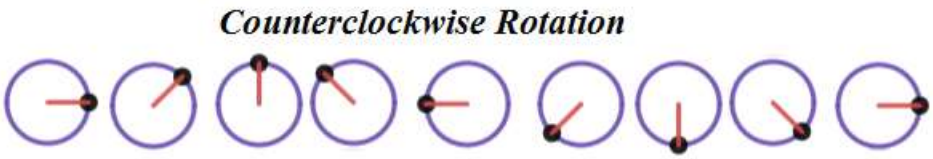
In the Four Elements of the Hermetic Alchemists, the (β) (▬ ▬), and the (α) (▬) can essentially have either a back-forth or up-down type harmonic oscillation. This continuous motion is simple harmonic motion. Circular Motion produces a 2-dimensional complementary harmonic motion; using both back & forth and up & down oscillations, however, the 3-dimensional system is a "complete set" of beginning harmonics. Recall the previous excerpt

from *Albert Pike* in the above topic, when he first introduced the *Four Elements* of the *Hermetic alchemists*. We only need the *last* sentence of the excerpt to define circular motion *harmonics*.

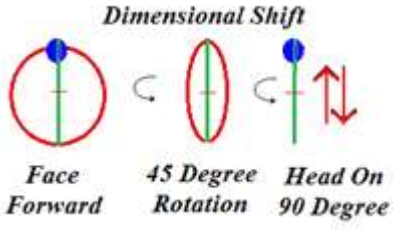
> ***[Pike, "Morals & Dogma," page 783]*** *"Whereby the Fire connects with the Earth; all the elements, as Hermes said, moving in circles."*

The *Four Element's harmonic* motion can be explained by using a 2-dimensional *Cartesian* coordinate system from beginning *algebra*. From the last sentence above; we begin with the *Fire* element, proceed to the *Earth* element and show the *circular* harmonic motion of the elements. The motion is a 2-dimensional *Cartesian* α and β motion. It takes *two* dimensions of space to explain its interactions.

The (2^n) *Four Element complementation* (2^2), embraces oscillations from both the α and β *binary* lines. The actual motion within the 2-dimensional opposition is both *circular* and *complementary*. Its outer motion is *circular*; however, the interior motion or its internal motion is *harmonic* and *complementary*. For example, suppose you attach a string to a ball and begin twirling it. The ball will travel a circular path. Note in the graphic below the position of the ball at *eight* different 45° $\left(\frac{\pi}{4}\right)$ stages; the ball is traveling *counter clockwise*.



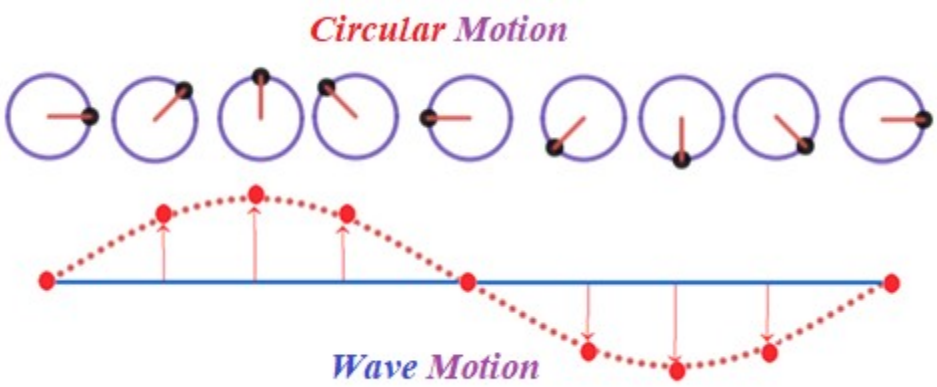
What you are seeing above is the *counter-clockwise* rotation of the ball in a circle shown *face forward*. Now shift the view of the circle *orthogonally* 90° to where you are looking at it "*head on*". This 90° shift is a *complementary* dimensional rotation. If you rotate it 90° horizontally,



the circular motion now becomes a *harmonic* complementary *up-down*-motion by the 90° shift.

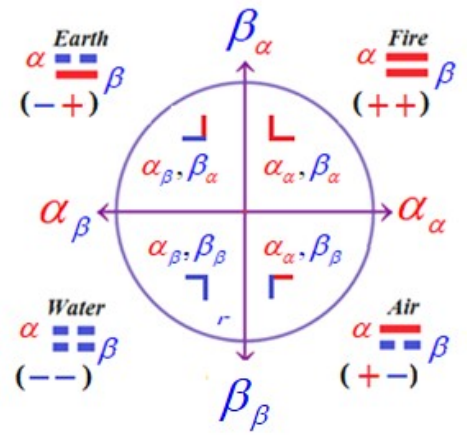
For a simpler example; look at the palm of your hand where you can see all four fingers and thumb in their normal positioning, (that's *Face Forward*). Now turn your hand 90° degrees to where the thumb and four fingers are all in a straight line; (this rotation is a 90° degree *complementary* rotation).

Now you are viewing the circular motion head on or its *vertical* motion." Instead of seeing the ball travel in a circle, you are seeing its' *up* and *down harmonic* complementary motion as the ball travels through the 360° cycle. The *up* and *down* motion is a *harmonic* oscillation and as the motion of the ball moves *up* and *down* from position to position of the eight original positions shown above, you can visualize the outline of a *sine wave***.**

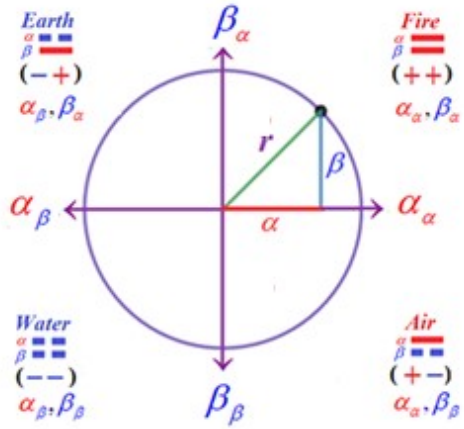


In the next *Cartesian* illustrations, visualize substituting an (α) (▬) bold line *Generative Presence* for a plus (+) sign and a (β) (▬ ▬) broken line *Productive capacity* presence for a minus $(-)$ sign. The quadrant numbers of the Cartesian diagrams will be changed to represent the *Four Elements* (*Fire*, *Earth*, *Air*, and *Water*). If you remember when you first began to draw graphs in first year *algebra*, the quadrant numbers included the *positive* and *negative* areas of the Cartesian graph. Quadrant 1 had two plus signs attached to it (+ +), where both the ***x*** and ***y*** are positive in that quadrant. Quadrant 2 had a minus and plus sign (- +); the ***x*** is negative and the ***y*** remains positive. In Quadrant 3, both the x & ***y*** are negative (- -), it is also a positive-negative *bit-wise* opposite of Quadrant 1 and is *cardinal diagonal* to it. The *cardinal diagonal* opposition will be very obvious and important in future oppositions. In Quadrant 4, the ***x*** is positive and the ***y*** is negative (+ -), it is also the *bit-wise* opposite of Quadrant 2 and *cardinal diagonal* I to it also.

The syncretic symbol for the *Fire* element has two bold solid lines representing the (++,); the *Earth* element has a broken line and a solid line representing the (-+,); the *Water* element, has to two broken lines representing the (- -,) and lastly the *Air* element has a solid and broken line for the (+ -,). Changing these positive and negative areas to (α) and (β) equivalences we end up with the exact graphics for each of the *Four Elements* of the *Hermetic Alchemists*.



The bold and broken lines represent *active* and *inactive* states of the x & y, (α *Generative Power* and β *Productive Capacity*). One thing you should keep in mind; the Cartesian graph is a 2-dimensional model, and within a 2-dimensional (90° *orthogonal*) system, regular opposites which are *linear* number line opposites, become 90° *complementary orthogonal* opposites. If this system looks familiar, you are correct in your assumption that the system is similar to the same as you learned in beginning *algebra* when you started the graphing process. These 90° separations of the α and β are orthogonal *complementations* of the α and β.

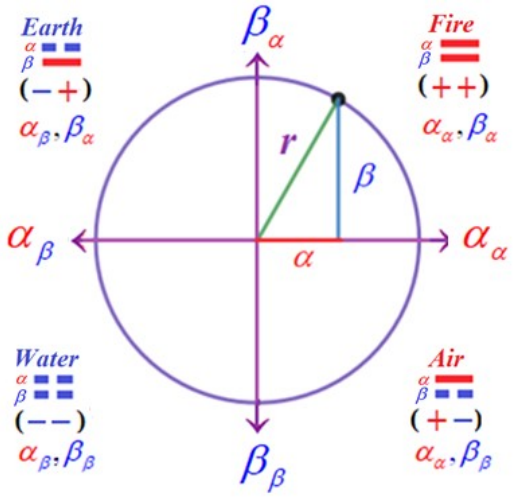


As linear and vertical opposites go *back* & *forth* and *up* & *down* in their harmonic motion, the 2-dimensional *complemented* opposites are both *circular* and *linear* plus their *harmonic* motion occurs within the interior part of the *circular* properties and result in creating *wave functions* as was shown in the original graphics above.

In the *Cartesian diagram* above, I have separated each graph into both α and β binary line components; the *horizontal* component illustrates the *side* to *side harmonic* movement of the α (*red* line), and the *vertical* component is the *up* and *down harmonic* movement of the β (*blue* line), each one *orthogonally complemented* with the other. By separating the *circular* function into its *horizontal* and *vertical* components in the *Cartesian* diagram, we now have *two* components α & β (formerly called the x and the y,) that are in *harmonic* motion at the same instant.

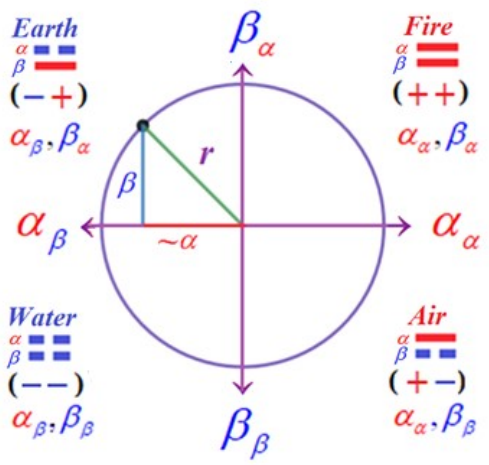
Actually both the α and β are considered one (1) complementary *set* of opposites. Note that both α and β components are the legs of a right triangle; which means we could begin implementing the *Pythagorean Theorem*, introduce *Sine and Cosine* and *Euler's* universal constant "e," at this point, but we'll let that pass for now, this beginning *algebra* math would then begin to enter the *calculus* realm.

In the graphic *above,* from the *point* lying *on* the circle, going down vertically to the α binary line (*vertical blue line*) is the length of the vertical component β. From the center of the circle to the point where the *vertical* component touches the β line (*red* line) is the length of the *horizontal* component α.



In the illustration above, the position of the point on the circle has changed. It has moved *counter-clockwise* to another *location* (both α & β are still in the *first* or active Fire ( ) element quadrant). The α component has decreased in *length* and the β component has increased in *length*. In 2-dimensional harmonic motion, as one component *decreases* in length, the other component *increases* in length. The movement of the *point* on the circle is *forcing* t*he length* of *one* to determine *the length* of the *other;* their values can be calculated by the *Pythagorean Theorem.* The movement of one determining the movement of the other is a fundamental quality of *oppositional harmonic motion* in a 2-dimensional complementary, *orthogonal* opposition. This motion is similar to the action of the *Duality* of *Form* summation equation, where the *derivative* of the (α) is a *reduction* of its *energy* and the *integration* of the (β) is an increase in its energy (, the *intensity* of one property depending on the *intensity* of the other.

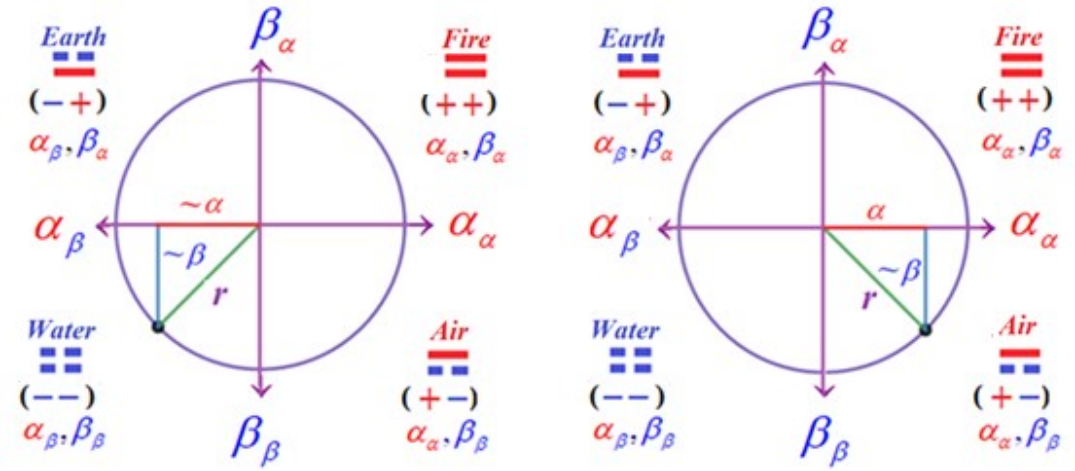
The position of the point is still in the first quadrant. In this quadrant, both the α & β binary lines are in the active (*Fire*) state, each one having a (α) bold line in the symbolic Four Element *Fire* graphic quadrant. This quadrant is the corresponding syncretic *I Ching*, *Yuan,* bigram. In the illustration *below*, the point has moved from the *first* quadrant into the *second* quadrant. The α component is increasing in length in its *inactive* realm. When the point on the circle moved into the *second* quadrant, the α component entered its inactive or α_{β} state; however, the β component still remains in its *active* β_{α} state (- +,). The β component is decreasing in its active realm and both are approaching a transition point, where they will eventually enter a new quadrant. Both are now in the area governed by the principles of the alchemical *Earth* element ( ) or the *I Ching's syncretic Li* bigram. As the point continues to rotate around the circle it will travel through each of the four quadrants 4-*element*s



( ) and then repeat the cycle *again* and *again*.

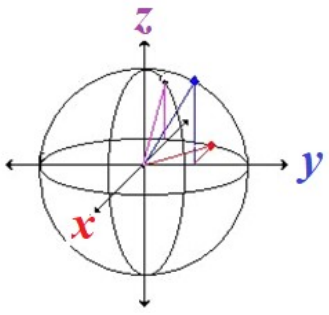
Below are the graphics for the remaining *two* quadrants.

The Remaining Water and Air Quadrants

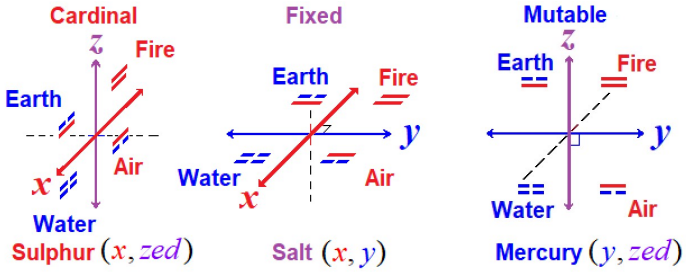


The examples above have demonstrated the *harmonic* behavior within a 2-dimensional circular complementation. The process above is the representative *harmonic* process for the change occurring within the *Four Elements* of the *Hermetic Alchemists* in a 2-dimensional α, β oppositional system.

Now, consider the 3-dimensional complementation. In a single 3-dimensional *Lattice-Datum* System, *three* (3), 2-dimensional complementary oppositional harmonic functions are continuously oscillating, where the oscillations depend upon independent *Tria Prima* positioning.



In the 3-dimensional sphere above, three (3) right triangles are in operation, where each triangle is representative of one member of the *Tria Prima's Sulphur*, *Salt*, and *Mercury*. Each member of the *Tria Prima* being one of the three (3) sets of *Four Elements*.



The three (***x*** *x zed*), (***x*** *x* ***y***), and (***y*** *x zed*) 2-dimensional complementary oppositions each contribute an independent quality of their own; however, each quality is determined by the *Tria Prima* location of the other *two* (2), 2-dimensional positions.

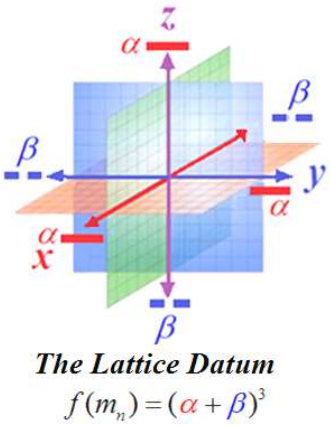
22. The 3-Dimensional System (Lattice-Datum Equivalent)

The *mathematical Lattice Datum complementation* forms a 3-dimensional model with *three* (3) *orthogonal* 1-dimensional oppositional ***x,*** *zed*, & ***y***, (*Sulphur*, *Salt*, & *Mercury*), axis' lines multiplied. Instead of four elements as in the 2-dimensional model, the 3-dimensional opposition has eight (8) or 2^3, 1^{st} order-presences (twice the number of elements of the 2-dimension).

The 2^3 is the eight (8) 1^{st} order-*trigram* elements which are *cross-multiplication* volume-fields (*Octants*) of presence formed from the *coordinate* values of the *three* (3) orthogonal binomial *Lattice Datum* dimension's *binary lines*.

An *octant's* 1^{st} order volume data element is represented by a *trigram* (☰), where each *trigram* represents a particular *octant* in the 3-dimensional *Lattice Datum's* graphic illustration.

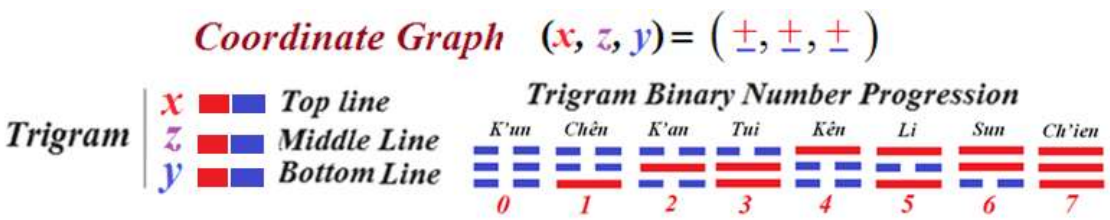
When you observe the *top half* of the *Lattice Datum* graphic, you can identify *four* (4) distinct *sections* or *octants*, the bottom half also has *four* (4) octants, however you can only *visually* identify *three* of them in the 3-D graphic. Each *octant* has a representative *trigram* that identifies it. The *octant* is one *unit* of *trigram* volume within the *Lattice Datum*. It is considered "*volume*" because the three ***x***, *zed*, & ***y*** axes are multiplied at *complementary* 90° angles (*length x height x width*).



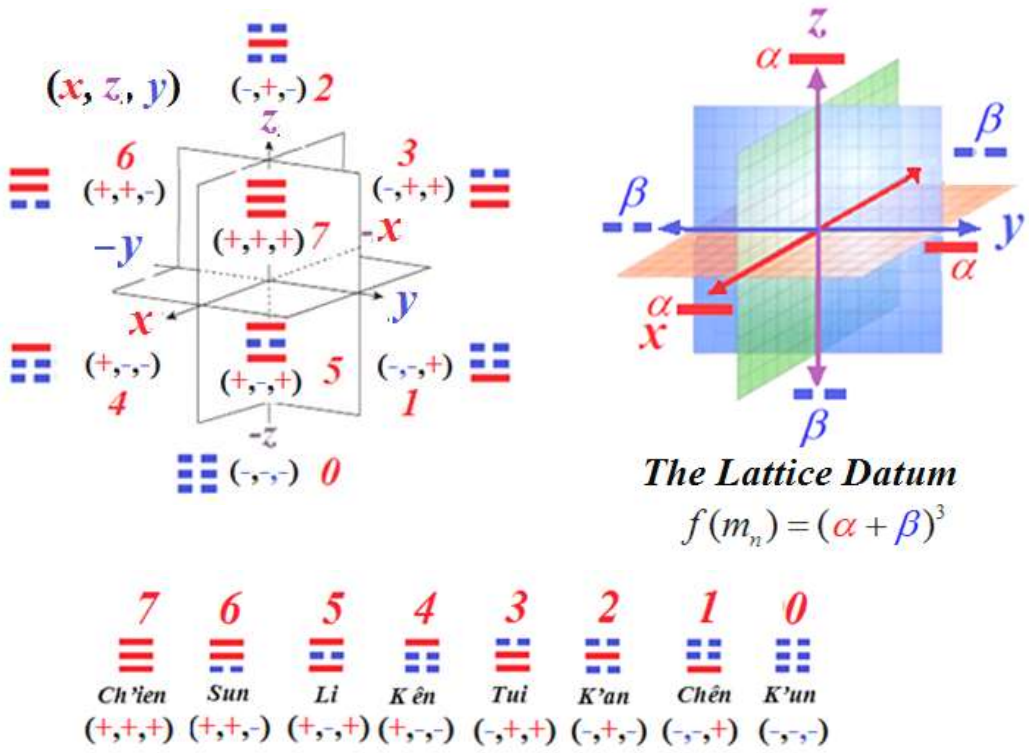
The Lattice Datum

$f(m_n) = (\alpha + \beta)^3$

A *unit trigram* volume of the *Lattice Datum* can be explained by the following convention.



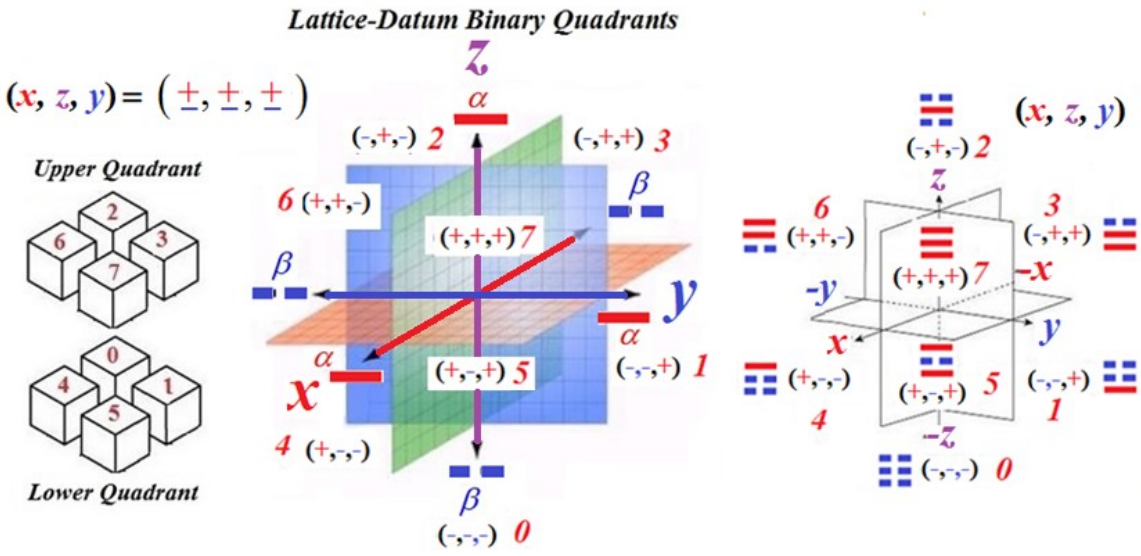
The graphic below shows the *Lattice Datum* and its 3-dimensional coordinate system. Each *trigram* is formed from the (*x*, *zed*, & *y*) *positive*-*negative* coordinates of its specific *octant*. These coordinates are defined by the convention shown below in this manuscript. Note especially the order of the *trigram* coordinate system, it is *x* then *zed* then *y*, not alphabetically (*x*, *y*, & *zed*).



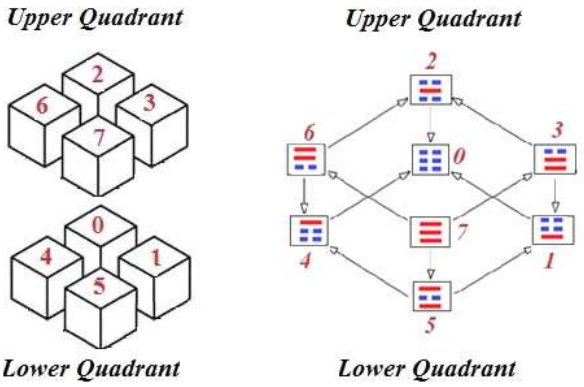
Binary* Numbers and (+,-) (*x*, *zed*, & *y*) *coordinate values

A plus (+) sign is equivalent to a *Generative Power* (α) bold line (▬) and a *minus* sign is equivalent to a *Productive Capacity* (β) broken line (▬ ▬). The (-, +, -) coordinates of the *above* top-back octant would be equivalent to the *binary* 2 trigram (☲) "*K'an*," where *x* is negative (▬ ▬), *zed* is positive (▬), and *y* is negative (▬ ▬). The *z* or (*zed*) axis is *always* shown as the *up*-*down* axis by convention in *Western* mathematical graphs; in philosophy it is the *result* of the interaction between the (α) *Generative Presence* and the

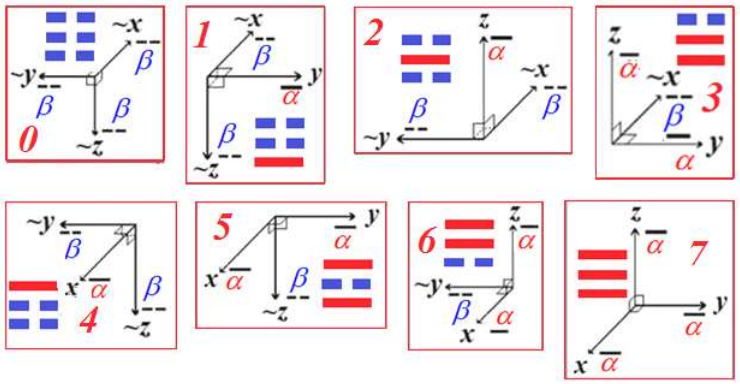
(β) *Productive Capacity* which are the *top* and *bottom* lines of the *trigram*. The x and the y are by convention always drawn as shown in the *Lattice Datum*. *If zed* is *positive*, the trigram will be in the *upper four octants;* if *zed* is *negative,* the trigram will be in the *lower four octants*. The first minus (-) sign in *trigram* (2), is the negative side of the x-*axis*, the (+) sign is the *positive* upper part of the *zed*-*axis,* and the second (-) sign is the *negative* side of the y-*axis*, in that specific order. It also could be written as a *Hermetic Alchemical* (β,α,β), or, since they are the result of a *complementary* multiplication, it could also be shown as $(\alpha^1\beta^2)$. There are eight (8) *sets* of *parentheses*, one *set* for each set of coordinates for the eight (8) *octants* trigrams. The *red* numbers in the different sets of graphics are the trigram's *binary value* equivalents. They are matched with their actual coordinate value. i. e., each trigram has a Base 2 or *binary* value as shown below.



The graphic above includes the eight *octants* as *cubes* in the *Lattice Datum* system and the *red* numbers are their *binary*-value trigrams from the list given above. Each *cube* and its *bit-wise* opposite sum to *seven* (7). Pick a *binary* number from the *upper* quadrant of cubes and its *bit-wise* opposite in the *lower* quadrant of cubes will sum to the *binary value* (7 ≡.) These *bit-wise* opposites are *cardinal diagonal* to each other. The same convention is true in each of the other illustrations. The middle line (*zed*) of each trigram determines the *upper* and *lower octants* in these representations. The following sets of graphics are simply *different* views of what has already been discussed. You should have a beginning understanding of the mathematical definition of *trigrams* from their *octant's positive* and *negative* coordinates.

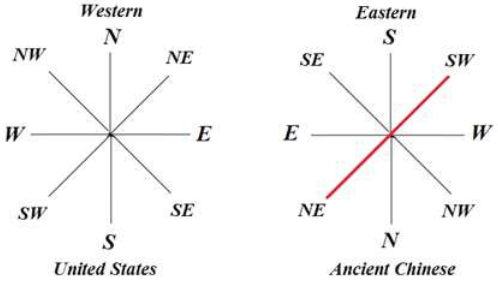


The set of graphics below contains all the above information discussed in one complete set. These graphics include each individual 3- Dimensional *octant* and its corresponding *trigram* and *binary* number.

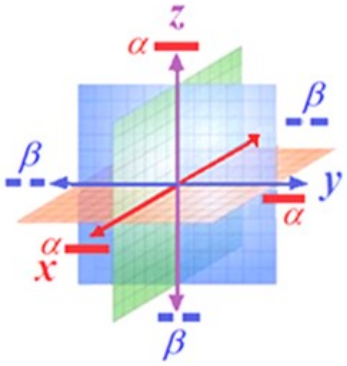


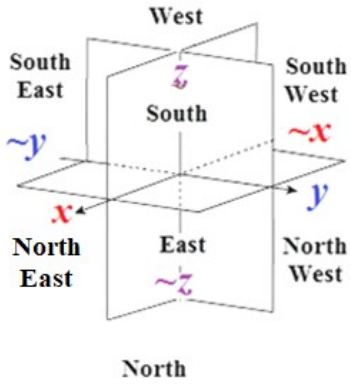
23. *Cardinal*, *Diagonal*, and *Adjacent* Directions

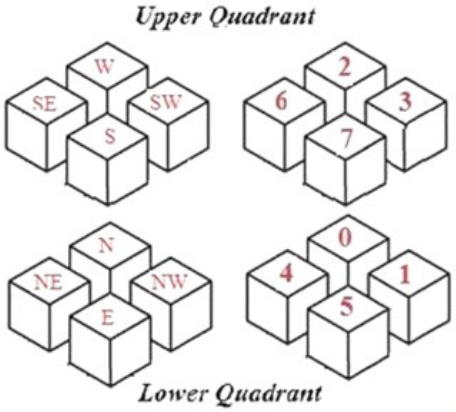
The *I Ching* is used abundantly in oppositional systems for its *structural* configuration. The ancient *I Ching* sages arranged their system by use of the *bigrams*, *trigrams* and *hexagrams*; however, it is an *Eastern* system and 180°reverse to the *Western* system. It gets confusing at times when you are accustomed to viewing compass directions by the *Western* system. *South* is always shown at the *top* of an illustration in the ancient *Eastern I Ching* system.



Note: Since the Eastern *I-Ching* uses *South* at the top of their maps, I assumed *East* and *West* changed accordingly. I used the convention shown above when displaying future "Compass Directions.



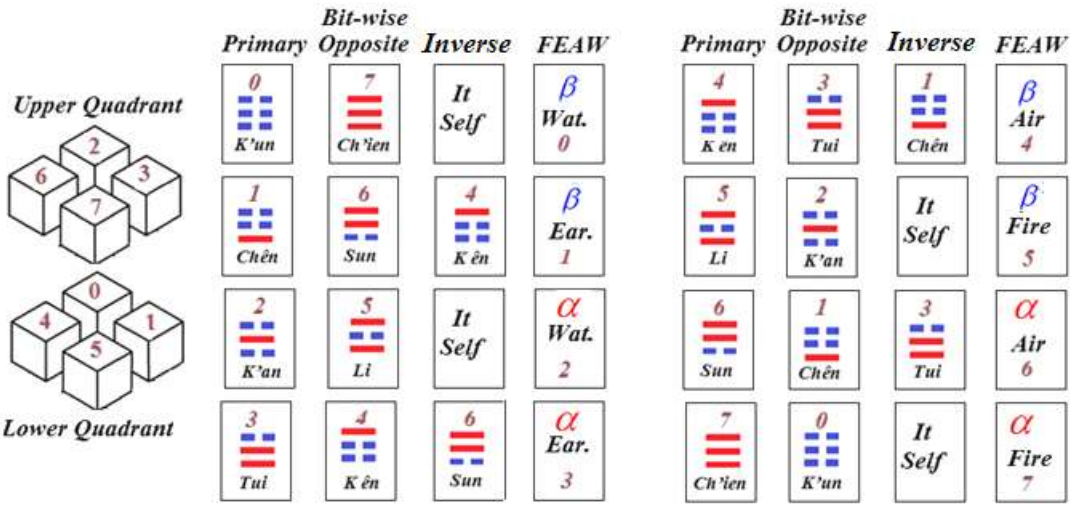




We first need to define the *Adjacent*, *Diagonal* and *Cardinal diagonal*, directions. We will be referencing the set of cubes with the compass directions. The *adjacent* directions are any *two* cubes in either the *upper* quadrant or *lower* quadrant individually which are next to each other (*adjacent positions*).Examples are the pairs, W-SW, SW-S, S-SE, SE-W, It applies to both the top and bottom quadrants holistically, SE and NE are adjacent but in different upper and lower quadrants. In actuality this *adjacency* would be *Cardinal Adjacent*.

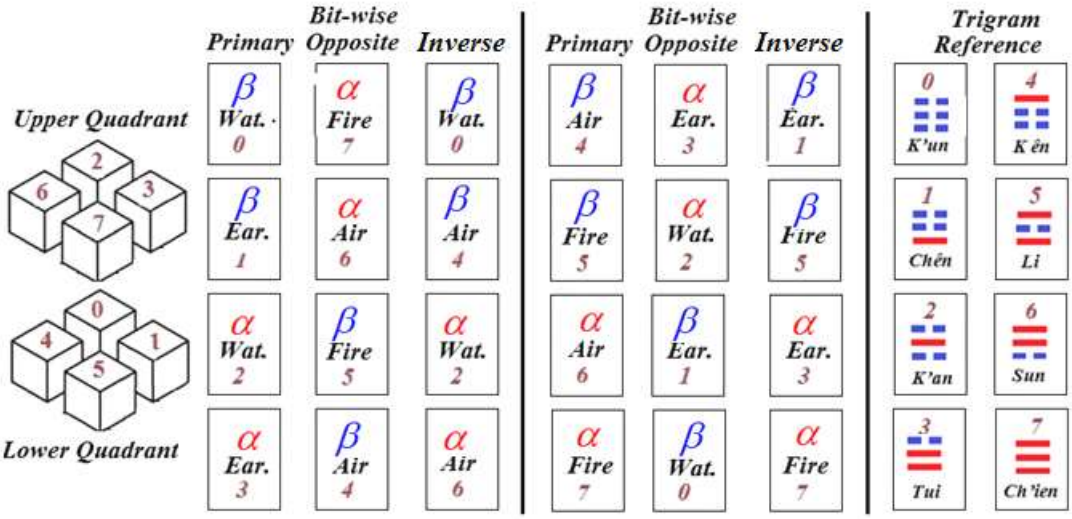
Next define "*sides*", the four cubes SE-S, NE-E constitute a "left side" and the four cubes W-SW, N-NW is the "right side." Sides *include* both quadrants as well; the top quadrant and a bottom quadrant are considered "sides," when working with *regular* diagonals There are *two* (2) types of diagonals, a regular diagonal occurs within a *four octant* "*side*" and a *Cardinal Diagonal* involves one member from the *upper octant* and one member from the *lower* octant. Side diagonals are too numerous and too confusing to name at one try. One type of side *diagonal* is SE-SW, and another is W-S. the really important ones are the *Cardinal diagonals* like NE-SW which determine the *transition* point in *circular* to linear conversions. When I mention "*diagonal*" singularly it is similar to the SE-SW diagonal, and if the diagonal is between the *upper* and *lower* quadrants it is called a *Cardinal diagonal*. The importance of *Cardinal* diagonals is they represent interior *bit-wise* oppositions.

The *Four Elements' Fire*, *Earth*, *Air* and *Water* bigram nature will allow us to present the *trigrams* in a standardized *oppositional* form. The following graphic includes *four* (4) *forms*; a *Primary Trigram*, its *bit-wise opposite*, *its Inverse*, and its *FEAW* α, β nature.



To form an ‘‘*Inverse*,” just *vertically “flip” the trigram* where the top line becomes the bottom line; the bottom line becomes the former top line, and the middle line will *stay* the *same*; in some cases when you “*flip*” a *trigram* you get the same one back so it does not change the structure, thus the. “*It-self*” designation.

The next set of graphics is the previous set in their α, β *FEAW* form

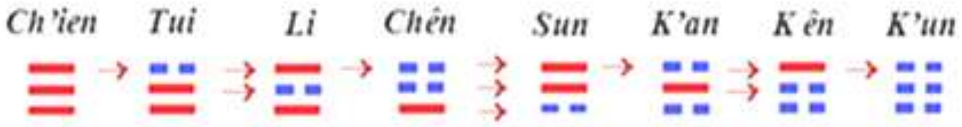


24. *Line Symmetry*

The next set of graphics will show the *Line Symmetry* of the changing lines from a (α) *Generative power* bold line (▬) to a (β) *Productive capacity* broken line (▬ ▬).

This type of symmetry is shown by a *red* arrow (→) between the lines of adjacent trigrams

(⚊ → ⚋). You will notice one (1) set of trigrams within each sequence has all *three* of its lines changing at the same time; this position is the NE-SW transition point used in converting *circular* trigrams into *linear* ones (*Fu Hsi)* Arrangement).



Introduction to Waves, Harmonics, and Spinars Section 9